SFCTA Contract Number 99/00-7

SOUTH ACCESS TO THE GOLDEN GATE BRIDGE

DOYLE DRIVE

ARCHAEOLOGICAL TREATMENT PLAN

San Francisco County, US101 KP 12.8-15.7 (PM 8.0-9.8) / SR1 KP10.9-11.4 (PM 6.8-7.1), EA 04-163700

February 2009

Prepared For:

Parsons Brinckerhoff

San Francisco County Transportation Authority

Federal Highway Administration

Caltrans District 4

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Archaeological Treatment Plan

South Access to the Golden Gate Bridge
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ACRONYMS AND ABBREVIATIONS

ACHP	Council on Historic Preservation
af	artificial fill
AMS	Accelerator Mass Spectrometry
ANZUS Treaty	Australia, New Zealand, United States Security Treaty
APEs	areas of potential effect
ASR	archaeological survey report
ATP	Archaeological Treatment Plan
BART	Bay Area Rapid Transit
Bay	San Francisco Bay
Bay Area	San Francisco Bay Area
BETP	Built Environment Treatment Plan
BIA	Bureau of Indian Affairs
Caltrans	California Department of Transportation
CCC	Civilian Conservation Corps
CCTS	Central California Taxonomic System
CEQA	California Environmental Quality Act
CFR	Code of Federal Regulations
CHRIS	California Historic Resources Information System
Delta	Sacramento Valley/Sacramento–San Joaquin River Delta
EIS/R	Draft Environmental Impact Study/Report
FHWA	Federal Highway Administration
FOE	Finding of Effect
FPO	Federal Preservation Officer
GGBHTD	Golden Gate Bridge Highway and Transportation District
GGNRA	Golden Gate National Recreation Area
HSP	health and safety plan
HSR	historic structure report
km	kilometers
MIP	Mitigation Implementation Plan
MM	millimeters
MOA	Memorandum of Agreement

Muni	San Francisco Municipal Railway
NAGPRA	Native American Graves Protection and Repatriation Act
NAHC	Native American Heritage Commission
NARA	National Archives and Records Administration
NEPA	National Environmental Protection Act
NHLs	National Historic Landmarks
NHPA	National Historic Preservation Act of 1966
NPS	National Park Service's
NRHP	National Register of Historic Places
NWIC	Northwest Information Center
OHP	Office of Historic Preservation
PA	Programmatic Agreement
PB	Parsons Brinckerhoff
PNHLD	Presidio National Historic Landmark District
QMC	Quartermaster Corps
RPA	Registered Professional Archaeologist
SFCTA	San Francisco County Transportation Authority
SHPO	California State Historic Preservation Officer
TOP	treatment oversight panel
Trust	Presidio Trust
Undertaking	replace Doyle Drive, located in the Presidio of San Francisco, within the Golden Gate National Recreation Area and the City and County of San Francisco
US-101	U.S. Route 101
VA	Veterans Administration

SECTION 1: INTRODUCTION

The Federal Highway Administration (FHWA), the California Department of Transportation (Caltrans), and the San Francisco County Transportation Authority (SFCTA) propose to replace Doyle Drive, located in the Presidio of San Francisco, within the National Park Service's (NPS') Golden Gate National Recreation Area (GGNRA) and the city and county of San Francisco (Project). The Project consists of replacing the existing facility with a new 1.5-mile-long six-lane facility and an eastbound auxiliary lane, between the toll plaza for the Golden Gate Bridge on the west and the eastern end of Doyle Drive where it splits and feeds into Richardson Avenue and Marina Boulevard.

The Project will adversely affect historic properties listed in or eligible for the National Register of Historic Places (NRHP), including the Presidio National Historic Landmark District (PNHLD) and its contributing historic resources; however no known archaeological sites will be affected by the Project as well as CA-SFR-6/26 will be fenced and avoided during project implementation. Analysis of these effects can be found in the *Finding of Effect for the South Access to the Golden Gate Bridge Doyle Drive Project, San Francisco, California* (San Francisco County Transportation Authority 2005a) and the *Addendum Finding of Effect for the South Access to the Golden Gate Bridge Doyle Drive Project, San Francisco, California* (SFCTA February 2007).

Consequently, the FHWA has consulted with the California State Historic Preservation Officer (SHPO) and the Advisory Council on Historic Preservation (ACHP) pursuant to *36 Code of Federal Regulations* (*CFR*) *800,* regulations implementing Section 106 of the National Historic Preservation Act (NHPA) (*16 U.S. Code* [*USC*] *470f*) and with the Secretary of the Interior pursuant to *36 CFR 800.10* with regards to special requirements for protecting National Historic Landmarks (NHLs). As the federally appointed land manager for the areas of the Presidio within the Project's designated areas of potential effect (APEs), the Presidio Trust (Trust) has also been consulted.

A Programmatic Agreement (PA) among the consulting parties has been developed, pursuant to *36 CFR 800.14*, following guidance for the resolution of adverse effects resulting from this Project, pursuant to *36 CFR 800.6.* The PA outlines the treatment for historic properties that will/or may be affected by the Project, which include stipulations that two historic property treatment plans will be completed: one for potential effects on archaeological resources and one to identify treatments for effects on the built environment and cultural landscape. These treatment plans describe the work that needs to be conducted prior to construction, during construction, and after construction.

Per Stipulations 1.A, B of the PA, for actions involving resources under the Trust's management, Caltrans, SFCTA, and the Trust will coordinate efforts regarding the review and approval of the qualifications of individuals and firms considered to carry out terms of the PA and participate in all source-selection boards for selecting contactors; participate in the development of all contract scopes, contract modifications, and technical reviews of project deliverables; and have a primary role in all NRHP-eligibility determinations.

1.1 PURPOSE AND APPLICATION OF THE ARCHAEOLOGICAL TREATMENT PLAN

This Archaeological Treatment Plan (ATP) was prepared as part of the studies conducted for compliance with Section 106 of the NHPA as outlined in the PA for the South Access to the Golden Gate Bridge Doyle Drive Project (referred to in this document as the Project). Specifically, this plan serves to guide additional archaeological subsurface exploration prior to construction to identify historic properties within the project APE and to provide a plan for managing any discovery of previously unrecorded archaeological materials during the implementation of this Project. This document also serves to assist FHWA in complying with *36 CFR 800.10,* "Special Requirements for Protecting National Historic Landmarks."

FHWA has requested this plan be prepared because the project APE contains known and predicted resources and may contain additional unidentified prehistoric and historic archaeological materials, including Native American/prehistoric sites with human burials. This document and specific procedures are defined to evaluate and treat known sites and new discoveries. . Efforts to completely identify resources prior to project approval were not practical for a variety of reasons discussed in earlier reports and summarized here (Jones & Stokes and Albion Environmental 2002a, 2002b).

This plan includes a strategy for the detailed and systematic preconstruction exploration of areas where archaeological deposits could be present in the APE, provisions for monitoring other sensitive locations, and a procedure for dealing with discoveries of previously unknown archaeological resources during construction in areas that are not defined as sensitive in this plan. Detailed environmental, prehistoric, ethnographic, and historical contexts first used to inform sensitivity analysis and a research design provide the basis for evaluating the NRHP eligibility of newly discovered archaeological properties and determining appropriate treatment. The sensitivity analysis defines known and anticipated property types and where they are likely to occur in the APE. This analysis is based on a review of historical data; geomorphological analyses; land use patterns; and a digital elevation change model, among other data. The final chapter characterizes where each general treatment approach will be applied within the APE based on the sensitivity predictions and offers specific details regarding archaeological field and laboratory methods, Native American involvement, health and safety measures, treatment of human remains and grave goods, reporting interpretation, and curation.

The PA also calls for the preparation of a Mitigation Implementation Plan (MIP) to be prepared when construction plans are completed. The MIP will be used to coordinate the scheduling and application of this ATP to the staged construction specifications so that the treatments outlined here are updated to accurately reflect the project as designed and implemented. Over the course of the execution of the ATP, Caltrans and SFCTA will convene regular meetings of a treatment oversight panel (TOP), which will coordinate mitigation activities among responsible parties and communicate progress on the mitigation program. The scheduling of these meetings will be included in the MIP. The TOP, which coordinated the content of this document and met several times to develop and refine treatment plans, is comprised of professionally qualified representatives from Caltrans, SFCTA, and the Trust Federal Preservation Officer (FPO) and includes FHWA, NPS, and others as appropriate.

The core TOP comprises Caltrans historic preservation staff, representatives for SFCTA, and the Trust FPO. This group will closely coordinate efforts regarding the contracting of tasks identified in this document in order to ensure adequately qualified personnel will implement the treatments. Together they, or their designees will review and approve the qualifications of individuals and firms considered to carry out the treatments and participate in all source

selection for contractors for actions within the PNHLD. Caltrans and SFCTA will consult in the selection with regards to mitigation activities concerning properties outside of the PNHLD, namely the Golden Gate Bridge and the Palace of Fine Arts.

The core TOP will participate in the development of all contract scopes and in contract modifications, perform a technical review of all deliverables resulting from this treatment plan, and review efficacy of treatment in the field, as appropriate. Upon receipt of each draft deliverable, the reviewing members of the core TOP will complete their review and provide comments within 30 days. Upon acceptance by the core TOP, each report will then be forwarded to the SHPO for concurrence of adequacy. If the TOP does not receive notification within a 30-day review period, the TOP will assume concurrence.

The ATP TOP is as follows.

Doyle Drive Archaeological Treatment Plan Treatment Oversight Panel	
SFCTA	Consultant for SFCTA ICF Jones & Stokes[1]
Caltrans	Office of Cultural Resource Studies, District 4 Meg Scantlebury
Trust	Trust Historical Archaeologist, Eric Blind, and FPO (position currently vacant)
National Park Service	Division of Cultural Resources & Museum Management Paul Scolari

1.2 PREPARERS' QUALIFICATIONS

ICF Jones & Stokes is the environmental consulting firm under contract to Parsons Brinckerhoff (PB), the project engineer who is under contract to SFCTA, to carry out the cultural resources investigations in compliance with federal and state regulations. This ATP was prepared by Ms. Dana McGowan, MA, Registered Professional Archaeologist (RPA); Ms. Michelle C. Jerman, MA, RPA; and Ms. Karen Crawford, MA, RPA, all of ICF Jones & Stokes, in consultation with cultural resources staff from the lead and responsible agencies. Ms. McGowan received a master's degree in Anthropology in 1990 from California State University, Sacramento, and has over 28 years experience in cultural resources management in California. Ms. Jerman received a master's degree in Anthropology with a Specialization in Historical Archaeology in 2005 from the College of William and Mary, Williamsburg, Virginia. She has 9 years experience in cultural resources management in northern California. Ms. Crawford received a master's degree in

[1] Dana McGowan will serve as Principal Investigator for prehistoric and historical archaeological investigations. She meets the standards for the Secretary of the Interior's Professional Qualifications for Principal investigator.

Anthropology in 2000 from the University of California, Davis. She has over 10 years experience in cultural resources management throughout California.

It should also be noted here that portions of prehistoric research design were extracted from technical reports prepared by Mark Giambastiani, Ph.D., then of Albion of Environmental. Dr. Giambastiani received a doctorate of Anthropology in 2004 from the University of California, Davis, and has over 10 years of experience conducting prehistoric archaeological studies in California.

1.3 REVIEWERS QUALIFICATIONS

All reviewers of this plan and documents called for in this plan, such as the MIP, will meet or exceed the Secretary of the Interior's qualifications and standards for archaeology.

SECTION 2: PROJECT DESCRIPTION AND AREA OF POTENTIAL EFFECTS

2.1 PROJECT LOCATION

Doyle Drive is located in the Presidio of San Francisco, in the northern part of the city of San Francisco at the southern approach to the Golden Gate Bridge (see Figure 1, *Project Location and Vicinity Map*). In 1994, when the U.S. Army transferred jurisdiction of the Presidio to the NPS, it became part of the NPS and the GGNRA. In 1996 management of the Presidio was divided between two federal agencies: the Trust, the agency responsible for oversight of 80% of the Presidio delineated as Area B, and NPS, which is responsible for management of the coastal portions of the park (the remaining 20%), delineated as Area A. Doyle Drive lies within the Area B lands managed by the Trust with a small portion at the western end on land operated by the Golden Gate Bridge Highway and Transportation District (GGBHTD). The Presidio was designated an NHL in 1962; in the 1993 NHL update Doyle Drive was determined to be a contributing element to the PNHLD.

Doyle Drive, the southern approach of U.S. Route 101 (US-101) to the Golden Gate Bridge, is 1.5-miles long with six traffic lanes. There are three San Francisco approach ramps that connect to Doyle Drive: one beginning at the intersection of Marina Boulevard and Lyon Street; one at the intersection of Richardson Avenue and Lyon Street; and one where Veterans Boulevard (State Route 1) merges into Doyle Drive approximately 1 mile west of the Marina Boulevard approach (Figure 1). Doyle Drive passes through the Presidio on an elevated concrete viaduct (low viaduct) and transitions to a high steel-truss viaduct (high viaduct) as it approaches the Golden Gate Bridge Toll Plaza.

2.2 PROJECT DESCRIPTION

The preferred alternative for the Project is known as the Presidio Parkway Alternative, which proposes to replace the existing Doyle Drive facility with a new six-lane facility and an eastbound auxiliary lane, between the Park Presidio interchange and the new Presidio access at Girard Road (see Figure 2, *Area of Potential Effects for Archaeology*). The new facility will consist of two 11-foot (3 m) lanes and one 12-foot (4 m) outside lane in each direction, with 10-foot (3 m) outside shoulders and 4-foot (1 m) inside shoulders. In addition, the southbound direction will include an 11-foot (3 m) auxiliary lane from the Park Presidio Interchange to the Girard Road exit ramp. The width of the proposed landscaped median will vary from 16 to 41 ft. (5 to 12 m). The total roadway width will be 105.3 ft. (32 m), and the overall facility width, including the median, will vary from 121.7 to 146.3 ft. (37 to 45 m). To minimize impacts on the park, the footprint of the new facility will overlap with a large portion of the existing facility's footprint east of the Park Presidio interchange.

A 1,475-foot-long (450 m) high viaduct will be constructed between the Park Presidio interchange and the San Francisco National Cemetery. The height of the high viaduct will vary from 66 to 115 ft. (20 to 35 m) above the ground surface. Two cut-and-cover tunnels will extend 787 ft. (240 m) past the cemetery to east of Battery Blaney. The facility will then continue towards the Main Post in an open at-grade roadway with a wide, heavily landscaped median. A retaining wall between 13 and 26 ft. (4 and 8 m) high will be constructed along the south side of the facility between the battery and the second set of cut-and-cover tunnels. A landscaped berm will be constructed along the north side of the facility to shield park visitors from the proposed facility.

From Building 106 (Band Barracks), the second set of tunnels, one of which is up to 984 ft. (300 m) long, will extend east to Halleck Street. The amount of fill over the tunnels is being coordinated with the Trust based on requirements of their Vegetation Management Plan. The expected minimum depth to support native vegetation is 6 ft. (2 m). The facility will then rise slightly on a low-level causeway 525 ft. (160 m) long over the site of the proposed Tennessee Hollow creek restoration and then pass over a depressed Girard Road. The low causeway will rise to approximately 10 ft. (3 m) above the surrounding ground surface at its highest point. East of Girard Road, the facility will return to existing grade north of the Gorgas warehouses and connect to Richardson Avenue.

The proposed facility includes a transition zone starting from the Main Post–area tunnels to reduce vehicle speeds prior to merging with city streets. A motor-control and switch-gear room to operate the tunnel life-safety equipment will be integrated with the Main Post tunnels. The Park Presidio interchange will be reconfigured due to the more southerly realignment of Doyle Drive. The exit ramp from eastbound Doyle Drive to southbound Veterans Boulevard will be replaced with standard exit-ramp geometry and widened to two lanes. The loop of the westbound Doyle Drive exit ramp to southbound Veterans Boulevard will be improved to provide standard exit-ramp geometry. The northbound Veterans Boulevard connection to westbound Doyle Drive will be realigned to provide standard entrance-ramp geometry. The northbound Veterans Boulevard connection to eastbound Doyle Drive will be reconstructed in a similar configuration as the existing directional ramp with improved sight lines and exit and entrance geometry.

The Presidio Parkway alternative will provide direct access to the Presidio and indirect access to Marina Boulevard in both directions via access ramps from Doyle Drive connecting to an extension of Girard Road. East of the Letterman garage, Gorgas Avenue is a one-way street with a signalized intersection at Richardson Avenue. North of Richardson Avenue, Lyon Street will remain in its existing configuration, providing access to the two-way Palace Drive.

The surface parking spaces will be reconfigured to maintain the existing parking supply in the area and improve pedestrian access between the Presidio and the Palace of Fine Arts. The Preferred Alternative will include extended bus bays on both sides of Richardson Avenue that will accommodate up to four buses each, and improved crosswalks to provide safer and enhanced pedestrian circulation in the area. The extended bus bays will keep buses out of the main flow of traffic during stops; provide safer merging capability for the buses; and facilitate transfers between Golden Gate Transit, San Francisco Municipal Railway (Muni), and PresidioGo vehicles. Fences will be required along the edge of the at-grade portions of the roadway to restrict pedestrian access onto the roadway.

2.3 DEFINTION OF AREA OF POTENTIAL EFFECTS FOR ARCHAEOLOGY

Two APEs, one for architectural resources and one for archaeological resources, were established early in the Project. The SHPO concurred with FHWA regarding the Focused APEs on October 31, 2001. SHPO reconfirmed on December 17, 2007, that both focused APEs for this project appeared adequate and met the definition of an APE set forth in *36 CFR 800.16(d).* The archaeological APE is illustrated in Figure 2. In early 2004, FHWA and Caltrans reviewed the focused APEs and compared them with the revised Alternative 2 and new Alternative 5 developed after the approval of the previous focused APEs. FHWA and Caltrans determined that while the focused APEs had expanded slightly at that time, no additional identification work was needed to comply with *36 CFR 800.4.* To obtain agreement for the cooperating agencies, Caltrans sent a letter to NPS and the Trust requesting that they concur in the

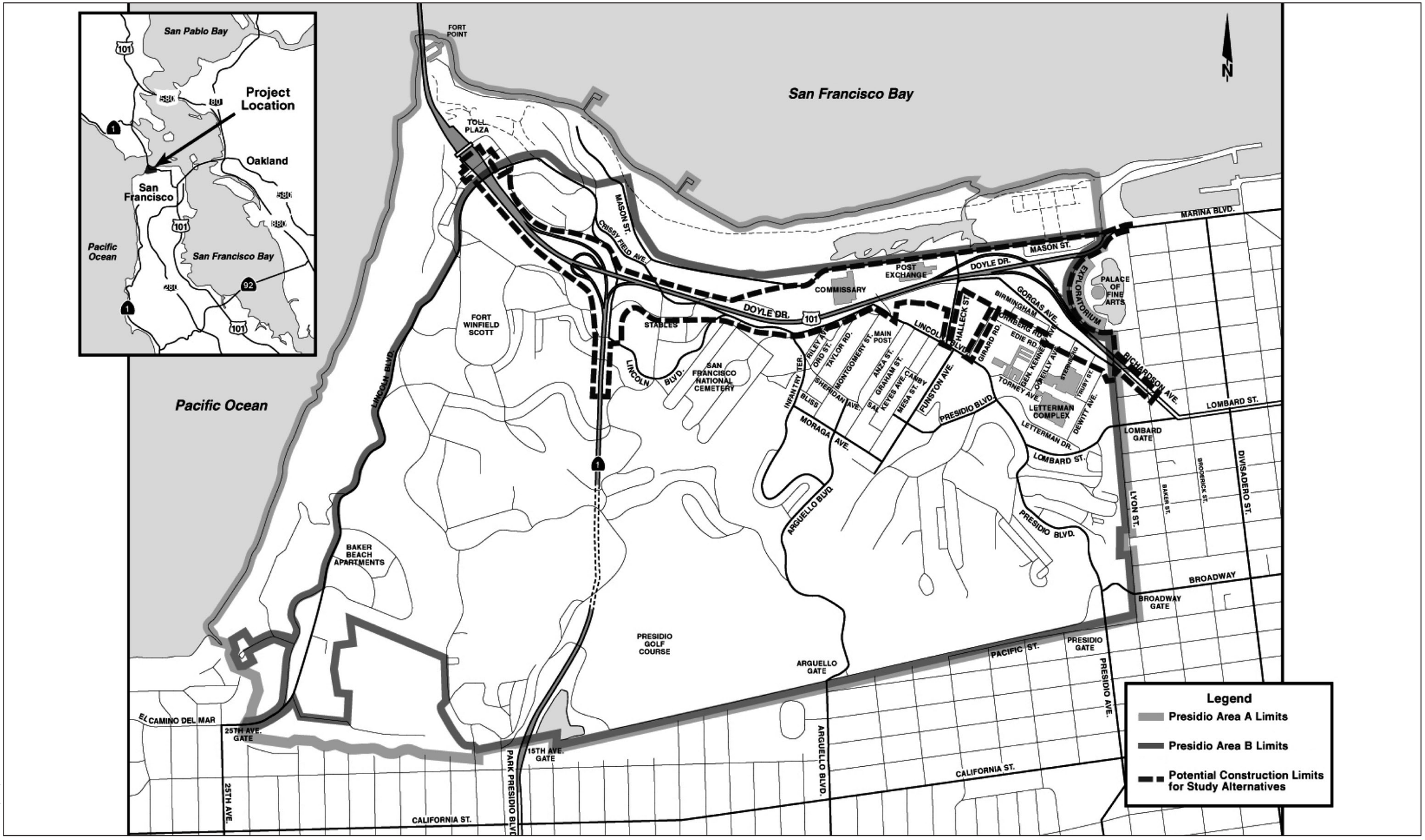

Figure 1
Project Location and Vicinity

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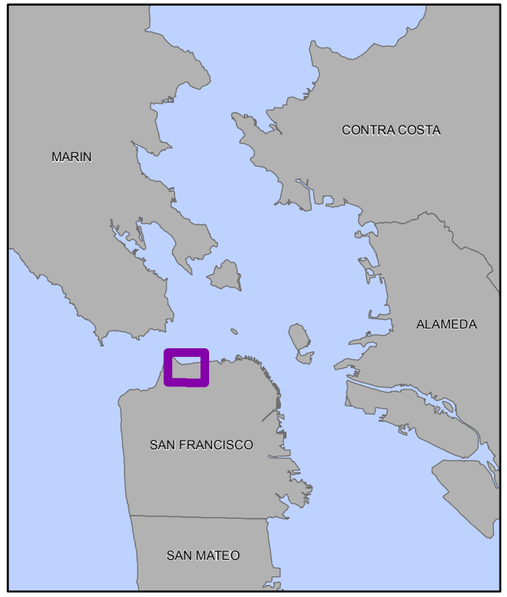
Figure 2
Area of Potential Effects for Archaeology

Legend

Archaeological Area of Potential Effects



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Feet

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Meters

Source: PRESIDO TRUST

modification of the focused APEs and the adequacy of the identification efforts for Alternative 5; the cooperating agencies concurred in September 2004.

SECTION 3: REGULATORY CONTEXT

3.1 FEDERAL REGULATIONS

The studies described in this report and future studies associated with the Project will be conducted in compliance with Section 106 of the NHPA of 1966 and its implementing regulations, 36 CFR Part 800, as amended in 1999. Section 106 requires that federal agencies, and entities that they fund or license, consider the effects of their actions on properties that are listed in the NRHP or that may be eligible for such listing. To determine if an undertaking could affect NRHP-eligible properties, cultural resources (including archaeological, historical, and architectural properties) must be inventoried and evaluated. Although compliance with Section 106 is the responsibility of the lead federal agency, others can conduct the work necessary to comply.

Additionally, because the Presidio is an NHL, it is a statutory requirement under Section 110(f) of the NHPA that the agency official undertake such planning and actions as may be necessary to minimize harm resulting from an undertaking, to the maximum extent possible.

3.1.1 Application of Section 106 to the Project to Date

The FHWA established that the replacement of Doyle Drive is an undertaking for the purposes of Section 106 of the NHPA and that it will cause effects on historic properties. Compliance with Section 106 of the NHPA for this Project was initiated in 2000. Two APEs, one for architectural resources and one for archaeological resources, were established early in the Project. The SHPO concurred with FHWA regarding the focused APEs on October 31, 2001. The architectural APE is illustrated in Appendix D of the Built Environment Treatment Plan (BETP).

In early 2004, FHWA and Caltrans reviewed the focused APEs and compared them with the revised Alternative 2 and new Alternative 5 developed after the approval of the original focused APEs. FHWA and Caltrans determined that although the focused APEs had expanded slightly at that time, no additional identification work was needed to comply with *36 CFR 800.4.* To obtain agreement from the cooperating agencies, Caltrans sent a letter to NPS and the Trust requesting that they concur in the modification of the focused APEs and the adequacy of the identification efforts for Alternative 5; the cooperating agencies concurred in September 2004. SHPO reconfirmed on December 17, 2007, that both focused APEs for this Project appeared adequate and met the definition of an APE set forth in *36 CFR 800.16(d)* of Section 106.

An archaeological survey report and an historic architectural survey report were produced to identify historic resources within the Project Area, and a finding of effect (the final Finding of Effect [FOE] plus an addendum FOE) was produced to determine the effects of the Project on the identified historic resources. Following completion and approval of the final FOE, SFCTA continued the Section 106 process with Caltrans, cooperating and responsible agencies and other interested parties working toward the PA to resolve adverse effects that the Project will have on historic properties in the APE. The FOE Addendum supplemented the Section 106 activities by identifying and clarifying the nature of the potential adverse effects of subsequent project refinements on historic properties. The final and addendum FOE outlined in detail the effects of the Project on historic properties. Four properties were identified as having adverse effects. These include the following:

- PNHLD – overall district, contributors, and cultural landscape
- Doyle Drive – Presidio Viaduct (bridge 34 0019)
- Doyle Drive – Marina Viaduct (bridge 34 0014)
- Golden Gate Bridge – Doyle Drive as contributor

One significant resource within the APE, the Palace of Fine Arts, was found to have no adverse effect.

3.1.2 Continued Application of Section 106

As the Section 106 process proceeds, Caltrans and SFCTA will continue to afford FHWA, ACHP, the Trust, the NPS (on behalf of the Department of the Interior), SHPO, other agencies, interested parties, and the public reasonable opportunity to comment on the Project and its effects on historic properties.

If modifications to the Project subsequent to the execution of the PA and the completion of the ATP should necessitate a revision to the APE, Caltrans and SFCTA will consult with the Trust and the SHPO to facilitate mutual agreement on the revisions. If changes to the APE include properties not previously evaluated for eligibility or effects, or changes to the project design are found to adversely affect a property within the APE previously not affected, the regulations set forth in Section 106 will be followed and the treatment plans will be amended in consultation with the parties to the PA to incorporate any additional identification and treatment.

3.1.3 National Historic Landmark Significance

The Presidio was recognized as an NHL in 1962 for its important role in the colonial and military history of the West. The Presidio was found to be significant under criteria A, C, and D of the NRHP. Properties that contribute to the Presidio NHL include buildings, structures, landscape features, objects, and historic archaeological sites. The period of significance for the Presidio NHL is 1775–1945. Additionally, Criterion Consideration G (less than 50 years) has since been found applicable to the Presidio, and it is considered significant as the location for the signing of the Australia, New Zealand, United States Security Treaty (ANZUS Treaty) and the Joint Security Pact between the United States and Japan in 1951 (Alley et al. 1993). The Trust has contracted to have a NHL update prepared to determine the significance of resources that were not evaluated in the NPS 1993 NHL update. This NHL update is anticipated to be completed by fall 2008.

Archaeologically, the Presidio NHL documentation defined the entire property as a single historic site composed of numerous contributing archaeological features, both known and predicted from cumulative historic research conducted by NPS staff. Contributing features represent the variety of functions known to have existed at the Presidio, from the evidence of dwellings (structural remains, privies, and sheet refuse) to the remains of industrial complexes and their associated refuse. A list of predicted archaeological resources at the Presidio was included in the NHL documentation (Alley et al. 1993). Additional information regarding the archaeology of the Presidio that has been generated since 1993 will also be included in the 2008 NHL update.

The NHL documentation limited the period of significance for historic archaeological sites, indicating that resources dating between 1776 and 1890 have the greatest potential to be

significant. During this time period, the historic record is insufficient to document activities at the post and to understand the lifeways of its occupants. As a result, archaeological data may be the most important, if not the only, form of historical information for this period. For those resources that date from between 1890 and 1917, there is significantly more documentation available, reducing the critical nature of archaeological resources as a source of historical data. Exceptions will be sites that contribute under A, B, or, C, not just D. After 1917, there is extensive historical documentation, further diminishing the potential significance of properties that date to this later period.

Four broad research domains that were identified in the NHL nomination should be considered when determining whether historic archaeological sites and features contribute to the landmark. These four research domains are integrated with the specific research objectives developed in this document for archaeological property types anticipated in the Project APE. These include:

- Physical layout and design/functional intent
- Construction techniques and individual building design/function
- Social and economic history
- Technological history

Prehistoric sites do not contribute to the military significance of the NHL and are not included in the landmark. They do, however, have the potential to be eligible for listing in the NRHP as separate historic properties.

3.1.4 Native American Graves Protection and Repatriation Act

Because the Project is located on federal land, compliance with the Native American Graves Protection and Repatriation Act (NAGPRA) (1990) (104 Statute 3048–3058) will also be required if human remains and cultural remains of Native American origin are discovered within the APE during implementation of the Project. NAGPRA provides a process for museums and Federal agencies to return certain Native American cultural items -- human remains, funerary objects, sacred objects, or objects of cultural patrimony -- to lineal descendants, and culturally affiliated Indian tribes and Native Hawaiian organizations. NAGPRA includes provisions for unclaimed and culturally unidentifiable Native American cultural items, intentional and inadvertent discovery of Native American cultural items on Federal and tribal lands, and penalties for noncompliance and illegal trafficking. In addition, NAGPRA authorizes Federal grants to Indian tribes, Native Hawaiian organizations, and museums to assist with the documentation and repatriation of Native American cultural items, and establishes the Native American Graves Protection and Repatriation Review Committee to monitor the NAGPRA process and facilitate the resolution of disputes that may arise concerning repatriation under NAGPRA.

Regulations from the NPS United States Department of the Interior in 43 CFR 10 state that if Native American human remains are discovered, the following provisions are required to comply with the regulations:

- notify, in writing, the responsible federal agency; and
- cease activity in the area of discovery and protect the human remains.

Upon notification that human remains have been discovered on federal land, the responsible federal agency (the Trust) should:

- certify receipt of notification;
- take steps to secure and protect the remains;
- notify the Native American tribes or tribes likely to be culturally affiliated with the discovered human remains within 1 working day; and
- initiate consultation with the Native American tribe or tribes in accordance with regulations described in *43 CFR, Part 10, Subpart B, Section 10.5.*

Under NAGPRA, only Federally recognized Native American tribes, Native Alaskan villages and corporations, and Native Hawaiian organizations may claim cultural items. NAGPRA does not require museums and Federal agencies to consult with nonfederally recognized tribes. However, the Native American Graves Protection and Repatriation Review Committee has recognized that there are some cases in which nonfederally recognized tribes may be appropriate claimants for cultural items. Museums, if they wish, may consult with nonfederally recognized tribes. (Because NAGPRA requires Federal agencies to consult government-to-government with Federally recognized tribes, it may be difficult for Federal agencies to include non-recognized tribes in NAGPRA consultations.) Museums and Federal agencies that wish to return Native American human remains and cultural items to nonfederally recognized tribes must make a request for review of a proposed disposition to the Review Committee.

No federally recognized tribes currently claim an ancestral relationship with the northern part of the San Francisco peninsula (including the Presidio of San Francisco). None of the Ohlone groups has received formal federal recognition, and thus none is afforded repatriation rights under NAGPRA. The federal lead agency (Trust) in this case does not have the authority to repatriate the remains of Ohlones for reinterment. Human remains found in the Ohlone area, under NAGPRA provisions, are termed “culturally unidentifiable.” The terminology recognizes the remains may be affiliated with Ohlone descendants. Federal agencies that wish to return Native American human remains and cultural items to nonfederally recognized tribes must make a request for review[2] of a proposed disposition to the NAGPRA Review Committee. Therefore, in the event that human remains are found, the Trust may request that the Review Committee[3] review the case to determine if nonfederally recognized tribes may be appropriate claimants for human remains and cultural items. Alternatively, in the absence of formal federal recognition of the descendant group, it may be possible for a nearby group that is federally recognized to appeal for repatriation of the remains on behalf of the Ohlones.

[2] The request for review document is available online at: <http://www.nps.gov/history/nagpra/REVIEW/Review_and_Findings_Procedures.htm>

[3] The review committee’s home page is available online at: <http://www.nps.gov/history/nagpra/REVIEW/INDEX.HTM>.

3.2 STATE REGULATIONS

The California Environmental Quality Act (CEQA) (Section 15064.5) requires the lead CEQA agency (SFCTA in this case) to assess the effects of the Project on cultural resources. Cultural resources are defined as buildings, sites, structures, or objects, each of which may have historical, architectural, archaeological, cultural, or scientific importance. Before the level of significance of impacts can be determined and appropriate mitigation measures developed, the significance of cultural resources must be determined. The application of Section 106 is considered to adequately address the requirements of CEQA for the purposes of this Project.

3.3 AGENCY RESPONSIBILITIES

SFCTA is the project sponsor and lead agency responsible for complying with CEQA. FHWA is the lead federal agency responsible for complying with the National Environmental Protection Act (NEPA) and Section 106 of the NHPA. Caltrans is representing the responsibilities and interests of the FHWA. The Trust and the NPS are both federal entities responsible for managing the PNHLD, which is federal land. Both the Trust and the NPS are cooperating agencies for NEPA compliance. The SHPO is responsible for historic preservation in the state and has participated in agency meetings to advise on historic preservation issues. The ACHP has also been invited to participate in the consultation. In addition, Caltrans conducted extensive consultation with the Veterans Administration (VA) and the GGBHTD; GGBHTD has declined to be a PA signatory.

3.4 AGENCY AND INTERESTED PARTY CONSULTATION

Public-outreach and agency-coordination activities undertaken since the issuance of the *Finding of Effect for the South Access to the Golden Gate Bridge – Doyle Drive* in December 2005 have been ongoing. Meetings to inform and involve interested parties in the Section 106 process are listed in Table 1 below.

TABLE 1. PUBLIC OUTREACH FOR CULTURAL RESOURCES

Date	Meeting
02/22/06	Alternative Workshop – Cultural & Natural Resources
02/23/06	Meeting with California Heritage Council; Fort Point and Presidio Historical Society (now PHA); San Francisco Architectural Heritage
03/15/06	Design Workshop
04/05/06	Memorandum of Agreement (MOA) Workshop
05/03/06	MOA Workshop
07/27/06	MOA Workshop
09/11/06	MOA Workshop with State Historic Preservation Office and Advisory Council on Historic Preservation
9/21/06	Meeting with representatives of the Ohlone community regarding the MOA and ATP
09/27/06	Meeting with members of the California Heritage Council; Fort Point and Presidio Historical Society (now PHA); and San Francisco Architectural Heritage regarding MOA and BETP

Date	Meeting
01/29/07	Meeting with representatives of the Ohlone community regarding the MOA and ATP
02/29/2007	MOA Workshop with members of the California Heritage Council; Fort Point and Presidio Historical Society now PHA); and San Francisco Architectural Heritage

The project team conducted multiple design workshops to seek input on different elements of the Project and to develop appropriate design refinements. Two workshops focused primarily on avoiding and minimizing impacts to cultural resources. These workshops assisted in identifying design refinements to address concerns of interested agencies, organizations, and residents and included participation by several interested parties to Section 106 of the NHPA. In addition, the Doyle Drive Executive Committee, whose members represent all lead, cooperative, and responsible agencies, conducted five meetings during the release of the Draft Environmental Impact Study/Report (EIS/R), identification of the preferred alternative, and preparation of the Final EIS/R.

In compliance with Section 106 of the NHPA, meetings have been ongoing with several historic preservation groups with an interest in the resources at the Presidio. Specifically, numerous meetings have been held with members of the Fort Point and Presidio Historical Association (now known as Presidio Historical Association), the California Heritage Council, and San Francisco Architectural Heritage to review their concerns about the Project and to facilitate their participation in the Section 106 process. A number of other organizations, agencies, and individuals have been consulted for the Project.

The Project has also included, and continues to include, a comprehensive outreach program that actively involves the public and other interested parties throughout the process. To reach the public, the outreach program has used the NEPA scoping process and public open houses, key-stakeholder interviews and briefings, ongoing technical and community meetings, periodic general-public meetings, open houses and community workshops, information materials, and a public-hearing process.

A citizens' advisory committee was established for the Project. The Doyle Drive Subcommittee of the SFCTA's Citizens Advisory Committee meets regularly to discuss project issues and bring information back to the groups that they represent. The Doyle Drive Subcommittee members represent at-large interests, as well as the following associations/interests:

- Cow Hollow Association
- Cow Hollow Neighbors in Action
- GGNRA Advisory Commission
- Marina Civic Improvement & Property Owners Association
- Marin Commuters
- Marin Neighborhood Association
- Neighborhood Association for Presidio Planning
- Planning Association for the Richmond Presidio Residents and Tenants
- San Francisco Bicycle Coalition
- SFCTA's Citizens Advisory Committee

- San Francisco Planning and Urban Research Association
- San Francisco Tomorrow

3.5 PROGRAMMATIC AGREEMENT, TREATMENT PLANS, AND MITIGATION IMPLEMENTATION PLAN

In compliance with Section 106 of the NHPA, a PA was developed and executed to resolve adverse effects that will result from this Project. The PA identifies that the FHWA, as lead federal agency, has the primary responsibility to ensure that the provisions of the PA are carried out; Caltrans and the SFCTA are operating as an integrated team to jointly design and implement construction and mitigation measures for the Project. Caltrans is ultimately responsible to FHWA for the appropriate and timely implementation of mitigation commitments.

Two treatment plans are called for in the PA—a BETP and an ATP. Both plans describe the work that needs to be conducted prior to, during, and after construction of the Project to avoid, minimize, or mitigate effects on historic properties. Combined, these plans present in detail how the treatment measures that are stipulated in the PA will be carried out.

The PA also calls for the preparation of a MIP to be developed prior to the commencement of demolition. The MIP is a communication tool for coordinating construction phasing with the treatment measures. It will combine the requirements of the treatment plan with design/construction information to provide detailed guidance for the temporal and geographical phasing of treatment measures in the field. Because it is dependent on construction information, it will be prepared when project plans and specifications have reached 35% completion; however, it will be subject to change as plans are further developed. The MIP will be organized by construction phase, detailing the work to be conducted before construction, during construction, and after construction. The plan will discuss how treatments will be executed during each stage of the Project and will include a schedule for completion of mitigation measures based on the design and construction milestones established by the SFCTA and Caltrans integrated team. The MIP will address the ongoing communication between the PA signatories. Furthermore, the MIP will incorporate any subsequent substantive changes to the Project, the effects of which will be determined and analyzed following Section 106 guidelines.

SECTION 4: SOURCES CONSULTED

Several sources were consulted in order to obtain information regarding existing and potential cultural resources in the Project APE. Efforts to locate archaeological resources consisted of conducting archival and map research; a records search at the Northwest Information Center (NWIC) of the California Historic Resources Information System (CHRIS); research at the Trust and NPS holdings and Park Archives; and consulting the Native American Heritage Commission (NAHC), Native American representatives, historical societies, and other interested parties.

4.1 RECORDS AND ARCHIVAL RESEARCH

A records search for information on prehistoric and historical resources within the archaeological APE and a 0.5-mile radius was conducted at the NWIC of the CHRIS in May 2001 for the Doyle Drive archaeological survey report (ASR) and historic structure report (HSR) (Jones & Stokes and Albion 2002) (File No. 01-048). Specific data obtained from this records search included the locations of previously recorded prehistoric and historical archaeological sites, copies of pertinent site forms, and a list of associated reports. In addition, a copy of the *Report of Archaeological Investigations at the Crissy Field Prehistoric Site, CA-SFR-129, Crissy Field* (Clark 2001) was obtained from the NPS. In August 2001, additional site records and reports documenting San Francisco Bay Area (Bay Area) prehistory in general were obtained from the NWIC by Albion Environmental.

Maps consulted during prehistoric research for the ASR and HSR (Jones & Stokes and Albion 2002) included those listed separately below, as well as maps attached to archaeological sites forms and the registration forms for both the Presidio NHL (Alley et al. 1993) and Point Lobos Archaeological District (Kelly 1976). Various visitor and archaeological study maps provided by the Presidio of San Francisco (Trust & NPS) also were consulted and are listed in Table 2 of the ASR and HSR (Jones & Stokes and Albion 2002a).

Additional archival research for pertinent information on historical sites in and adjacent to the APE was conducted with the assistance of the Trust and NPS and archaeological staff. Leo Barker, Historical Archaeologist with the NPS at GGNRA, provided copies of pertinent materials, including the Presidio NHL study and various historical reports published by the NPS, and the research design (second draft) and preliminary findings report for the Crissy Field Restoration Project (Holman & Associates 1999). A draft management plan for archaeological resources on the Presidio NHL (Adams et al. 1994) also was obtained from the NPS, as well as the Woodward Clyde (now URS Corporation) monitoring logs. Additional information on archaeological research on the Funston Avenue officers' quarters excavations was obtained from the University of California, Berkeley.

Other sources consulted include the *Historic Properties Directory* for San Francisco County (California Office of Historic Preservation 2001a), with the most recent updates of the NRHP, California Historical Landmarks, and California Points of Historical Interest, as well as other evaluations of historic properties reviewed by the California Office of Historic Preservation (OHP), listed below:

- California Inventory of Historic Resources (California Office of Historic Preservation 1976);
- *Five Views: An Ethnic Sites Survey for California* (California Office of Historic Preservation 1986); and
- Archaeological Determinations of Eligibility for the City and County of San Francisco (California Office of Historic Preservation 2001b).

Archival research was also conducted at numerous repositories housing information pertinent to the military history of the Presidio, the construction of Doyle Drive, and the historical archaeological sites within the Presidio boundaries. These archival repositories included the National Archives and Records Administration (NARA) in Washington, D.C.; College Park, Maryland; and San Bruno, California. Research at NARA was conducted within the Cartographic, Still Pictures, and Text branches of the archives. Research was also performed at the Presidio's Park Archives and Record Center, the Bancroft Library at the University of California, Berkeley, the California Department of Transportation Library, the California State Library, the California State Archives, the Library of Congress, and the GGBHTD. Hundreds of historic maps, blueprints, plans, pictures, aerial photographs, and articles of military correspondence were examined. Although all of the aforementioned repositories contained information that was relevant to this Project, the National Archives, the Presidio Archives, and the GGBHTD provided the most valuable documents. A summary of this research is provided in the ASR and HSR for Doyle Drive (Jones & Stokes and Albion Environmental 2002a: Table 3; pages 16-20).

In 2007, additional research was conducted at the Trust and NHP Presidio Archaeology Laboratory and library for the current ATP and Project. The Trust and NPS provided copies of studies and reports conducted within the Presidio since 2001. These studies are summarized in tabular format (Table 5) in Chapter 6.

4.2 NATIVE AMERICAN CONSULTATION

Throughout the consultation process, local Native Americans, including the currently federally unrecognized Ohlone, have been involved in all aspects of the investigation and planning for this Project. Participants have contributed their knowledge to the process and, as a result, have assisted in the overall assessment of significance and potential impacts. Significant consultation with the local Native American community was undertaken for the ASR and HSR for Doyle Drive (Jones & Stokes and Albion Environmental 2002a), which included a search of the Sacred Lands File maintained by the NAHC, letters to interested Native American parties and individuals named by the NAHC, and several face-to-face meetings. In addition, nine personal interviews were conducted with interested Native Americans regarding these projects. Researchers took extensive written notes at the interviews; no other recording devices were used. Formal field notes were prepared for each interview and compiled in a confidential report (Brickley and Blount 2001). Those notes are the basis for the summary findings presented in the ASR and HSR and generally encompass recommendations regarding the archaeological testing plan, burials, human remains and related materials, and Native American involvement and/or monitoring for the Project. On September 21, 2006, Ohlones attended a workshop to participate in the development of the MOA, and on October 25, 2006, tribal representatives participated in the development of an ATP being prepared for the Project.

The composition of the list of interested parties was a matter of concern to many of the respondents. The concerns generally focus on if the individuals or groups actually represent the Presidio of San Francisco or should even be consulted about the Presidio area, even though they may not claim ancestry from the area. One respondent indicated that the terms Costanoan and Ohlone had, in modern times come to refer to a large group of people, all representing, individually or a group, a large ancestral homeland ranging from San Francisco to Monterey on the coast and inland to Hollister and Gilroy. This respondent felt this is an artifact of history of the Costanoan/Ohlone people and that there is sufficient evidence to tie individuals or lineages to specific villages and locales within the general Costanoan/Ohlone territory. This same respondent reasoned that groups with demonstrable ties to San Francisco should take the lead in consultation and later involvement in the Project and that others with ties to other areas within the general territory should not be involved in the decision processes. Other respondents expressed almost opposite opinion, stating the Costanoan/Ohlone people have a right and responsibility to represent all parts of the greater traditional territory. Of all respondents contacted, only one declined to meet based on the matter of territorial representation: "That is out of my territory."

One group, the Muwekma Ohlone Tribe, agreed to meet with the researchers but quickly indicated that the tribe would not be participating in further consultation for the Project. The researchers recorded the tribe's concerns and agreed to incorporate a summary of concerns in this report. These are the researchers' summary and interpretation of those concerns. Alan Leventhal, representing the tribe, and Rosemary Cambra, tribal chairwoman, felt that the distribution list for the Project is inappropriate, first because it is not based on geographic ties to ancestral villages, and second, because individuals on the list have not proven, by virtue of genealogical research, their Ohlone ancestry or their ties to particular villages/missions within the greater Ohlone territory. They felt that by virtue of their exhaustive research in preparation for their petition for federal recognition, the Muwekma Ohlone Tribe has demonstrated a tie to the San Francisco area, to the exclusion of other groups or individuals on the distribution list. They also felt that the number of individual members in the Muwekma Ohlone Tribe, in combination with demonstrable ties to the area, should give the tribe higher standing in the consultation process. This is relative to others on the distribution who they felt represented only themselves or small groups, some of which have non-Native American members. They presented the Muwekma Ohlone Tribe as a well-organized group with a long record of "prior unambiguous recognition" from government authorities.

4.3 OTHER INTERESTED PARTIES

Numerous meetings were also held with the Presidio and Fort Point Historical Association (now PHA), California Heritage, and San Francisco Architectural Heritage regarding the MOA and the BETP. At these meetings, the purpose and proposed contents of the ATP were discussed in general terms. These groups' interests were largely concerned with the built environment resources impacts and mitigation measures outlined in the BETP. They expressed their concerns that archaeological resources that might be impacted would be addressed by developing the ATP.

SECTION 5: ENVIRONMENTAL CONTEXT

The Bay Area has a Mediterranean climate, with mild winters and warm, dry summers. Warmer summer and colder winter temperatures are found inland, while more moderate temperatures prevail near the coast, due to winds and fog from the west. Annual rainfall, most of which falls between November and March, averages between 15 to 18 inches (381 to 457 millimeters [mm]). In this landscape, many of the smaller streams are seasonal, and the availability of fresh water, particularly fresh water sources, has been significant both prehistorically and historically in the selection of places for settlement.

The San Francisco Bay (Bay) is almost completely surrounded by land, with its long southern arm separated from the Pacific Ocean by the San Francisco peninsula. The modern city of San Francisco covers the northern end of the peninsula. The modern Bay covers some 1,600 square miles. Almost 40% of the water carried in California streams flows to the sea through this shallow estuary. The Sacramento River, which drains the northern part of the state, and the San Joaquin River, which carries water from the south, join together in an extensive delta, then enter the eastern side of the Bay through Suisun Bay, Carquinez Strait, and San Pablo Bay, northeast of the Golden Gate. Historically, before extensive landfill and development in the late 19th and early 20th centuries, the estuary was as much as a third larger than its present size (see Figure 3, *Timing and Extent of Holocene Sea-Level Rise in the San Francisco Bay*). Probably the most significant change to the Bay during the historic period resulted from siltation associated with gold mining in the latter half of the 19th century. During this time, massive quantities of silt and debris from placer and hydraulic mining, were carried into the Bay by the Sacramento and San Joaquin Rivers, diminishing the average depth of the estuary to as little as 10 ft. (3 m) over extensive areas. This siltation led to substantial changes in the shoreline, including the creation of over 27 square miles (75 square kilometers [km]) of new marshland (Wells 1995).

The marshlands around the San Francisco estuary, and the estuary itself, provide a rich and complex range of habitats. The Bay is a key element in the Pacific flyway, a major migration route for waterfowl. The Bay also hosts substantial numbers of migrating sea mammals, including gray whales. The shores of the Bay historically offered thousands of acres of salt marsh, mudflats, and other tidal lands, with their ecological gradients ranging from fresh to brackish to salt water. All of these components supported a vast number and variety of animal and plant species. Twentieth century development severely affected these areas, both directly (through fill and development) and indirectly (through environmental pollution, redirection of freshwater, and general degradation). However, some successful restoration efforts have occurred in recent years (Grossinger and Baye 2004).

5.1 REGIONAL PALEOENVIRONMENT

The following section is summarized from the *Research Design and Treatment Plan for Archaeological Site CA-SFR-04/H, Yerba Buena Island, San Francisco, CA* (Morgan and Dexter 2002).

The San Francisco region has undergone marked environmental change over the past 10,000 years. During the Wisconsin Glaciation, between about 80,000 and 10,000 years ago, the depression now occupied by the Bay was a broad valley, watered by rivers that entered from the south and east. During that time, the Pacific Ocean shoreline lay in the vicinity of the

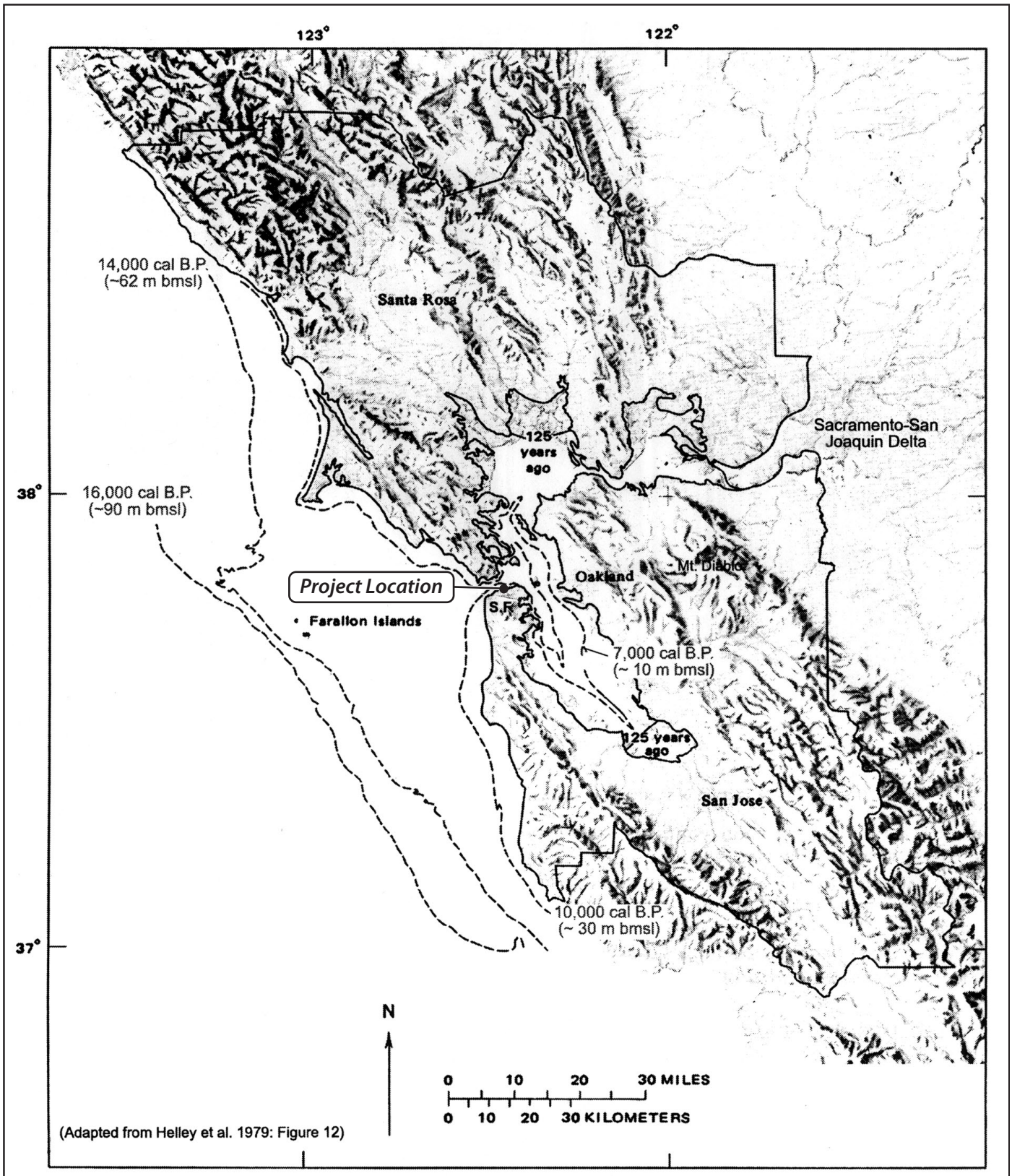
Farallon Islands, about 26 miles (43 km) west of the modern Golden Gate. About 10,000 years ago, worldwide climatic warming trends resulted in relatively rapid melting of the glaciers. As a result, sea levels worldwide rose around 75 to 100 ft. (25 to 30 m) over a period of 2,500 years, sometimes encroaching as much as 100 ft. (30 m) inland in a year (Atwater, Heckel, and Helley 1977). Researchers variously estimate the timing of this rapid rise as between 10,000 to 8,000 years ago (Atwater, Heckel, and Helley 1977) and 11,000 and 9,300 years ago (Wells 1995). During this time, the sea rose and flooded through the Golden Gate, inundating the inland river valleys to form San Francisco Bay.

After this initial period of rapid rise, the rate of sea-level rise slowed markedly. As the rate of sea-level rise continued to diminish, the slow inundation of the Bay was outstripped by sedimentation from bayside streams, and mudflats and tidal marshes began to form around the Bay. There is conflicting evidence as to the time at which this transpired: sedimentary data suggest that the marshes began to form between 6,800 and 6,300 years ago (Wells 1995), while chemical isotope investigations of shellfish suggest that the process began between 6,000 and 5,000 years ago (Ingram 1998; Lightfoot 1997). Irrespective of this "conflict," scientists agree that the marshes gradually expanded for at least 1,000 years. Around 4,000 years ago, sea-level rise slowed to modern rates of less 0.1-inch (about 1.4 mm per year) (Atwater, Heckel, and Helley 1977). After this time, marshes and mudflats began to grow more rapidly, reaching a maximum extent around 2,000 years ago. Since then, sea levels have continued to rise very slowly.

In combination with rising sea levels, major (and ongoing) tectonic shifts have occurred over the past 6,000 years, which have also contributed to the shaping of the Bay region geomorphology. The Bay basin has undergone marked local and regional subsidence during this period. For example, Holocene salt-marsh deposits in the South Bay have subsided by about 15 ft. (5 m) as the result of tectonic and possibly isostatic activity, relative to elevations that might be expected from sea-level changes alone (Atwater, Heckel, and Helley 1977:1). Thus, significant changes in bayshore elevations have occurred over time, which—in interplay with sea-level fluctuations—undoubtedly have influenced the rate and extent of marsh development.

These changes are important in understanding the human prehistory of the region. Based on extant archaeological evidence, the development of the marshes appears to have been coeval with what may have been the first substantial human settlement of the Bay's shores. However, it is possible both the subsidence and sea-level rise may account for the absence of archaeological evidence of substantial occupation of the shoreline prior to 4000 BP (2150 BC). Any earlier settlements along the shoreline likely would have been inundated as a result of subsidence and the continuing slow rise in sea level.

Although the rising sea levels that filled and shaped the Bay are the basic framework of the natural setting, shorter-term climatic and ecological fluctuations also may be significant not only to the history of Bay hydrology but also to human use of the bayshore. It is almost certain that worldwide and regional climatic fluctuations have affected the Bay environment throughout prehistory. Natural environmental variability within the estuary cycles at a number of different frequencies: long period sea-level fluctuations, millennial and centennial scale shifts in mean freshwater flux, decadal and interannual drought and flood cycles, and catastrophic vertical and horizontal land displacements (Wells 1995:247). Moratto (1984) discusses the cycling of warmer, drier climatic intervals and cooler, wetter periods and the effects of these shifts on Sierran populations. Climatic shifts of even a few seasons duration could have resulted in marked shifts in Bay salinity and possibly in sedimentation rates, as a result of fluctuations in



Source: Praetzellis et al. 2004.

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Figure 3
Timing and Extent of Holocene Sea-Level Rise in the San Francisco Bay Area

water discharge from inland valleys. Temperature changes also may have affected the availability and abundance of plant and animal foods around the Bay. For instance, deer may have become scarce along the bayshore during periods of drought as they sought water at higher elevations. Duck and goose populations summering and breeding in the arctic may have been depressed during the colder, harsher periods of drought as they sought water at higher elevations, such that abundance was decreased during fall and spring migrations through the Bay Area. The near-shore availability of fish and sea mammals also likely changed with climatically induced fluctuations in salinity and water temperature. As Atwater et al. note:

> At about 6000 years BP [4050 BC] an abnormally warm, dry Altithermal period began and lasted until approximately, 3,000 years ago, causing further glacial melting. Following the Altithermal Period, cool and moist conditions persisted until 1500 BP [AD 450]. An intense warm and dry period extended from 1500 to 600 years BP [AD 450–1350]…Conditions returned to cool and moist from approximately 600 years BP [AD 1350] until roughly 100 years ago, at which time California's climate again reverted to the warm and dry conditions that persist today (Atwater, Heckel, and Helley 1977).

The Sierran Recess Peak Glacial Advance, marked by cooler temperatures and increased precipitation in central California, began sometime around 3,000 years ago and reached a peak with record amounts of annual rainfall between 1,900 and 1,500 years ago. After about 1500 BP (AD 450), rainfall declined rapidly and the cooling period gave way to a warmer climate, which predominated between 1,500 and 900 years ago

Subsequently, pulses in glaciation have continued to result in alternating epochs of warm, dry climates and cooler, moister climates into modern times. A worldwide phenomenon known as the Medieval Climatic Anomaly may have been expressed in the Bay Area by two prolonged periods of drought between 1300 and 1100 BP (AD 650–850), and again between 800 and 650 BP (AD 1150–1300) (Ingram 1998). Finally, perhaps most marked of recent climatic fluctuations is the so-called "Little Ice Age," a possibly worldwide period of prolonged cooler winters between 650 and 150 BP (AD 1300–1800). Whether and how the effects of these worldwide climatic trends were felt in the Bay Area is uncertain. However, even small-scale climatic fluctuations may have had significant effects on Bay Area ecology and human populations. For instance, increased rainfall during wet epochs might have induced rapid erosion along rivers and creeks, with increased siltation at creek mouths on the Bay and resultant changes in availability of shellfish and other food sources. Drought years also might have changed siltation patterns by decreasing circulation in the Bay and certainly would have affected the supply of perennial freshwater streams. These fluctuations in depositional and erosional patterns, and the larger scale changes in sea levels, undoubtedly have implications for the preservation of archaeological sites present on the bayside plains and shore at this time: older sites that survived erosion may have been deeply buried beneath alluvial deposits or may have been inundated beneath the Bay.

5.2 GEOENVIRONMENTAL SETTING

The following section is summarized from the *SF-80 Bayshore Viaduct Seismic Retrofit Projects, Report on Construction Monitoring, Geoarchaeology, and Technical and Interpretive Studies for Historical Archaeology* (Praetzellis 2004) and the *Final Report of Archaeological Investigations at the Crissy Field Prehistoric Site, CA-SFR-129, Presidio of San Francisco, Golden Gate National Recreation Area* (Clark 2001).

As mentioned above, between 700 and 6000 BP, there was a dramatic decrease in the rate of sea-level rise worldwide (Stanley and Warne 1994). During this time, the sea inundated the Franciscan Valley at a more gradual rate of about 4.3 ft. (1.3 m) every 1,000 years, for a total of 26.2 ft. (8.0 m) over the past 6,000 years. This allowed sedimentation to keep pace with inundation, which permitted the formation of extensive tidal-marsh deposits during the middle Holocene (Atwater et al. 1979). As base levels rose, the lower reaches of the stream and river channels became choked with sediments that spilled onto the surface of existing fans and floodplains, forming large alluvial floodplains (Helley et al. 1979). As a result, bay and marsh deposits now cover many formerly stable Holocene-age land surfaces. During the late Holocene, the Bay grew in size as marshlands expanded in response to higher sea levels and the decomposition, compaction, and subsidence of intertidal deposits. These processes resulted in the formation of large tidal mudflats and peat marshes, which further promoted the deposition of sediment around the margins of the Bay. Radiocarbon dates from the southwestern Bay (Palo Alto Marsh) indicate that these deposits were generally formed during the past 2,000 years (Atwater et al. 1979:349).

Several studies confirm that many of the late Pleistocene and early Holocene land surfaces located near the Bay were overlain by deposits of younger alluvium that are generally less than 6,000 year old (Borchardt 1992; Gmoser et al. 1999; Helley et al. 1979; Meyer 2000, 2001; Stewart, Meyer, and Newland 2002). Stratigraphic and radiocarbon evidence indicate that the Holocene-age alluvial deposits average 7 to 10 ft. (2 to 3 m) in thickness, with deposits exceeding 33 ft. (10 m) in a few areas. These older land surfaces usually exhibit well-developed soils (paleosols) that represent a significant stratigraphic boundary in the region. As a result, older archaeological sites located in around the Bay were either submerged by sea-level rise and/or buried by sediment deposition.

Isotopic analysis of shell suggests that salinity and discharge levels of the Bay have undergone substantial fluctuations over the past 6,000 years (Ingram, Ingle, and Conrad 1996a and 1996b; Wells and Goman 1994). The mass extinction of large prehistoric oyster beds that flourished in the southern Bay between 1700 and 1850 BP indicates that significant changes did occur in the south Bay (Story, Wessels, and Wolfe 1966). Given the potential influence of large-scale environmental changes on the distribution and abundance of certain animal communities, it is likely that prehistoric human populations were forced to respond to periodic, perhaps critical, shortfalls in the availability of species used for subsistence.

5.2.1 Geology and Soils in the Project Area

The following is summarized from the *Geoarchaeological Sensitivity Study of the Doyle Drive Corridor, City and County of San Francisco, California* (Meyer 2002).

The Project Area is located in the northern part of the Presidio, which lies at the northern end of the San Francisco peninsula. Modern Bay Area local landforms result from tectonic movements of the San Andreas Fault and related structures, global sea-level fluctuations, and alluvial filling. The geology surrounding the Project Area contains rocks of the Franciscan Assemblage, formed 100–200 million years ago and overlain by the late Pleistocene Colma Formation and other quaternary deposits. Franciscan rocks form the headlands and are dominated by sheared sandstones and shales with inclusions of greenstone, cherts, greywacke, and serpentinite that may be seen in cliffs and artificial cuts in the Project Area. These rocks were utilized by both prehistoric and modern peoples.

Geologic mapping indicates that the project corridor crosses at least five major types of geological deposits, including Pre-Quaternary bedrock (br), Early to Middle Pleistocene-age alluvium (Qoa), Late Pleistocene to Holocene-age alluvium (Qa), Holocene-age dune and beach sand (Qhs), and deposits of Historic to recent artificial fill (af) (see Figure 4, *Depositional Soils*). The upland hillslope portions of the corridor are underlain by bedrock and Pleistocene-age alluvium, which are mantled in some areas by Holocene-age sand dunes and artificial fill deposits. A small area of Pleistocene to Holocene-age alluvium is located in or near part of the corridor, in the area identified as the "Quartermaster Complex." Late Holocene to Historic-age alluvium, dune and beach sand, tidal marsh, and artificial fill deposits underlie the northern and eastern parts of the corridor (Meyer 2002) (see Figure 4).

Stratigraphic reconstruction of the APE indicates that the lowland portion of the APE lying between McDowell Avenue, Mason Street, Baker Street, and Doyle Drive is overlain by 2 to 10 ft. (1 to 3 m) of af deposits, which consist of fill sand, historic period debris, or both. The excavations at CA-SFR-6/26 bear this out, where approximately 2 ft. (1 m) of fill covered the archaeological deposit. The fill is underlain by 1 to 3 ft. (0 to 1 m) of beach, dune and marsh deposits that vary widely across the across this area (Qhs). Lenses of peat and mud appear in this stratum and indicate slough or marsh development. This stratum may also contain weakly developed soils, the development of which was arrested by dune formation or migration. Soils occurring in this stratum would have been formed during the Late Holocene to the historic period.

Below the Late Holocene deposits are thick deposits of dune sand between 15 to 25 ft. (5 to 8 m) below mean sea level (Qhs). Moderately developed soil at the tops of this stratum indicate the dunes underwent a prolonged period of stability. The dunes may slope from the bluffs down to the bay. Based on stratigraphic position and the nature of the overlaying strata, age estimates for this stratum is Middle Holocene (7,000 to 4,000 BP). Mid-Holocene dune sands may be underlain by either bedrock (br) or a potentially Pleistocene-aged soil over 11,000 years in age. There appears to be a well developed soil at -62 to -68 ft. (-19 to -21 m), beneath Holocene dune sand, on the uplands under McDowell Avenue (Qa). The age of this soil indicates it would have developed during the Late Pleistocene to Early Holocene (14,000 to 7,000 BP). The underlying bedrock (br) consists of rocks composing the Franciscan Assemblage.

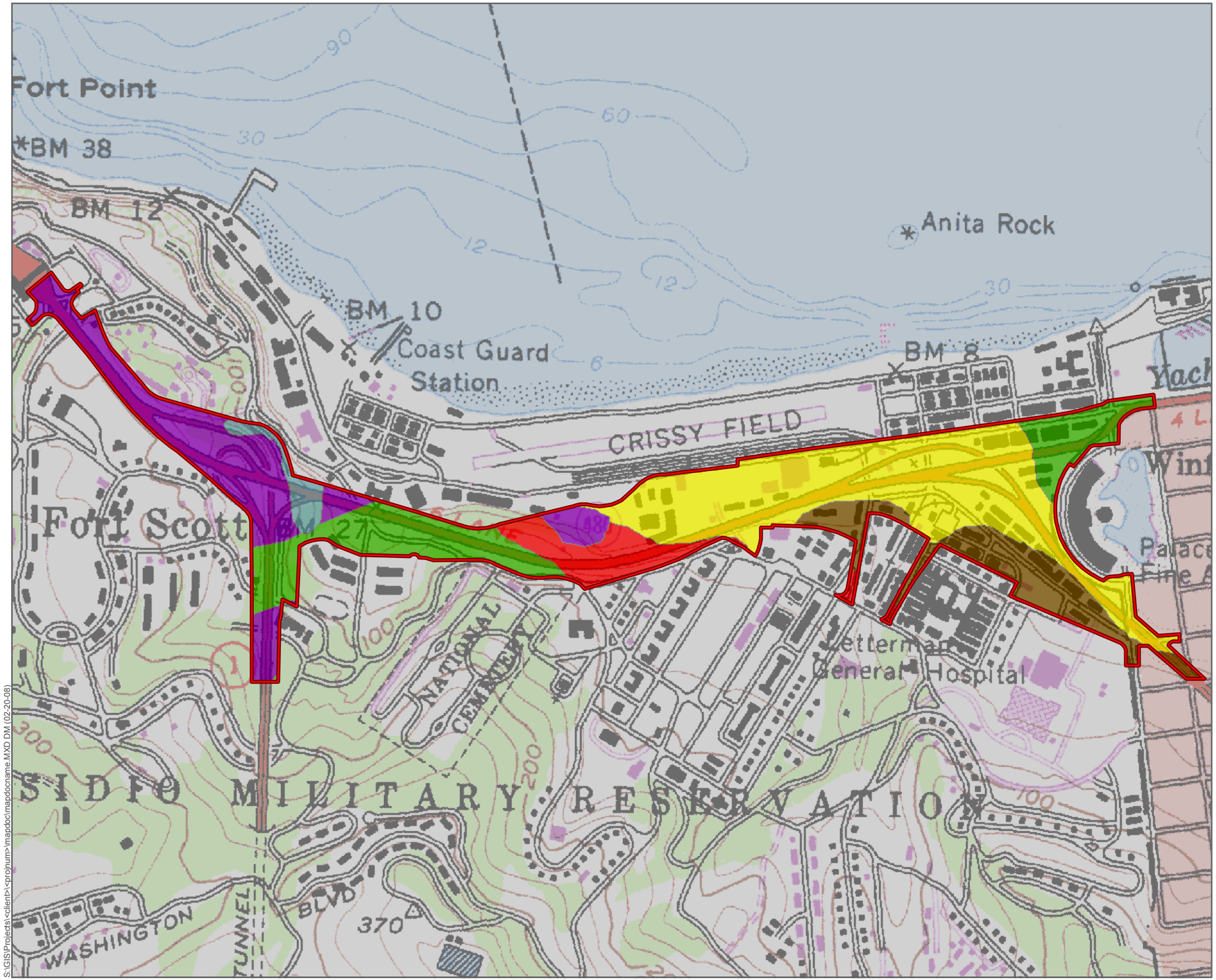

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Figure 4
Depositional Soils

Legend

Archaeological Area of Potential Effects

Stratigraphy Type

- Qa - Latest Pleistocene to Holocene Alluvium, Undifferentiated
- Qds - Latest Pleistocene to Holocene Dune Sand
- Qoa - Early to Late Pleistocene Undifferentiated Alluvial Deposits
- af - Artificial Fill
- afbm - Artificial Fill over Bay Mud
- br - Bedrock

N

0 1,000 2,000
Feet

0 255 510
Meters

Source: Knudsen et al. 2000. Description of Mapping of Quarternary Deposits and Liquifaction Susceptibility. USGS.

USGS Quadrangle 1:24,000
"SAN FRANCISCO, NORTH"
N3745 - W12222.5/7.5
1973

SECTION 6: CULTURAL CONTEXT

6.1 PREHISTORIC CONTEXT

Because of its unique position, the prehistory of San Francisco must be examined within the broader context of central California prehistory. This is because the San Francisco peninsula occupies various landforms and biotic communities, each of which requires varying subsistence strategies. For example, early occupants of the San Francisco peninsula had the option of using open coastal habitats for marine resources, bay margins for estuary resources and the Coast Ranges for terrestrial resources. It is likely that prehistoric human occupation in the area required scheduling in order to acquire resources in various areas as they became seasonally available. Thus, reconstructing the past lifeways of the Bay Area requires a regional perspective that incorporates the timing and nature of occupation and use of various habitats and landforms. The overall rarity of prehistoric sites in San Francisco also requires a more regional context by which to evaluate and interpret archaeological material. To this end, the following discussion of Bay Area prehistory begins with a summary of the chronology and taxonomy of the greater Bay Area. This section then discusses the known prehistory of San Francisco.

6.1.1 Chronology

Identifying the age of and duration of prehistoric occupation of various areas of the Bay has been central to archaeological investigations since the early part of the 20th century (e.g., Uhle 1907; Nelson 1909, 1910a). These early studies were able to recognize changes in material culture in the archaeological record. However, the predominant position of the day, which viewed culture change as occurring in progressive stages, limited the ability to provide meaning to these changes in material culture. This belief was born out of the dominant paradigm (Progressive Social Evolutionary Theory) in anthropology at the time that held that humankind evolves by gradual improvement in a series of successive stages. One of the best known of these is Morgan's classic three-stage scheme of savagery>barbarism> civilization. This perspective guided efforts to understand the archaeological record in most of North America. In fact, although Uhle's (1907) work at the Emeryville Shellmound (CA-ALA-309) identified what amounted to be minor changes in artifact styles, the contemporary perception of cultural change led him to infer a cultural succession similar to the large-scale stage level theory of cultural change mentioned above. At Uhle's time, the Emeryville Shellmound stood up to 27 ft. (8.2 m) above the surrounding ground surface and had a 270-foot (82 m) diameter (Uhle 1907:3). Uhle identified certain artifacts or traits that were widespread in all levels and others that were primarily associated with the deep strata (Uhle 1907:36-41). Uhle's inferences were strongly criticized by Kroeber (1909) and others who still held the view that the time span of North American prehistory was relatively short and that culture change was unilineal and progressive (i.e., innovation drives culture change along a single trajectory). The focus of large-scale change implied that cultural progress in the New World was not visible in the archaeological record and thus prehistory in the Bay Area was relatively unchanging.

Nels Nelson's Emeryville excavations of 1906 and limited testing by Gifford (1916) supplemented Uhle's work. Between 1906 and 1909, Nelson undertook several investigations in the Bay Area, the findings of which still have an important role in understanding Bay Area

archaeology. To test Uhle's findings, Nelson also excavated at CA-CCO-295, the Ellis Landing Shellmound, between 1906 and 1908 (Nelson 1910a). Nelson identified two main cultural strata in the deposit, a lower deposit of crushed shell and an upper layer dominated by larger pieces (see also Greengo 1951), apparently corroborating Uhle's findings.

Around the same time, Nelson inventoried and mapped over 400 shellmounds by horseback, including sites along the bay margins and the open Pacific coast (Nelson 1909), as well as excavating at Ellis Land (CA-CCO-295), the Fernandez site (CA-CCO-259), and the Crocker Mound (CA-SFR-7) (Nelson 1909). Several other shellmound studies quickly followed including Loud's excavations at CA-SFR-6 (Loud 1912) and the Stege Mounds (CA-CCO-298 and CA-CCO-300) (Loud 1924).

Despite unique characteristics and changes in material culture and shellfish remains identified by Uhle and Nelson, Kroeber found that the prehistory of the Bay Area and most of California to have experienced "little transformation and but slight succession" (Kroeber 1925:931). This belief was echoed by Schenck who found the Emeryville Shellmound site to be evidence for an "extraordinary stability of culture" (Schenck 1926:279) despite the fact that Uhle had initially recognized two varying cultural components with multiple strata in his earlier excavations at the site. The perception of Kroeber and other scholars that native cultures of the Bay Area were so primitive as to rule out any possibility of culture change throughout prehistory eventually gave way in response to the successful development of local sequences both inside and outside of California (Hildebrandt 1983).

It was not until initial chronological innovations in the form of stratigraphic excavation and seriation that it became evident that culture changed in gradual and predictable ways and at a scale much smaller than previously believed. Stratigraphic excavation and seriation allowed culture change to be viewed in details of style rather than at the grand structure of society. This was evident several years later in a new culture sequence (see Table 2, *Concordance of Bay Area Chronologies*) developed by Lillard et al. (1939) for the lower Sacramento Valley/Sacramento–San Joaquin River Delta (Delta) area, which ultimately came to be known as the Central California Taxonomic System (CCTS) (Beardsley 1948; 1954). Patterned after the Midwestern Taxonomic System (McKern 1939), this tripartite division of Early, Middle, and Late Periods was based on artifact types, burial patterns, and the condition of human bones (Moratto 1984). These pioneering efforts in the Delta area (see Lillard and Purves 1936; Lillard et al. 1939) resulted in the first concepts of central California prehistory.

According to Lillard et al., the early culture (Windmiller) of the Delta area was the "parent" culture to the Transitional Cultures (Middle Period) of central California. It is from this early Delta culture that influences spread to the Bay Area, affirming the margin status imposed by Heizer. This position differed from that in the earlier work of Nelson and Uhle who viewed the Bay Area as a distinct archaeological region, evident through internally uniform changes in artifact assemblages, mortuary practices, and dietary remains found in shellmounds throughout the region. The basic sequence developed by Lillard et al. was later recast by Heizer and Fenenga (1939) as the Early, Middle, and Late Horizons. The CCTS assumed a basically uniform cultural succession for all of central California. Heizer and Fenenga emphasized the similar changes in both the Bay Area and the Delta regions from the Transitional period through the Late Period. This view became known as the parallel cultural succession model (Bickel 1981).

In Beardsley's (1954) refinement of the Delta sequence, he extended the taxonomic system of cultural horizons to include most of the Bay Area, although he found little evidence for the Early Horizon in the Bay region. Beardsley (1948, 1954) identified three facies for the Bay, with

TABLE 2. CONCORDANCE OF BAY AREA CHRONOLOGIES

Lillard et. al. 1939 *	Date AD / BC	Heizer (1949)	Bennyhoff and Heizer (in Heizer 1958)	After Frederickson (1974, 1992)		Scheme B1 (Bennyhoff and Hughes 1987)	Scheme D based on AMS dates on Beads (after Groza 2002)
Historic Period	1800	Late Horizon Phase III	Phase 2	Emergent Period	Augustine Pattern	Late Period 2B	Late Period 2B
	1720	Late Horizon Phase II					
	1700						
	1542	Late Horizon Phase I				Late Period 2A	Late Period 2A
Late Period Phase 2	1500						
	1400					Late Period 1C	Late Period 1C
	1300						Late Period 1B
	1265					Late Period 1B	
Late Period Phase 1	1210		Late Phase 1				Late Period 1A
	1100						Middle/Late Period Transition
Transitional Period	1010		Middle Phase 1			Late Period 1A	
	900						Late Middle Period
	735					Middle/Late Period Transition	
	700		Early Phase 1				Terminal Middle Period
	575					Terminal Middle Period	
	500						Intermediate Middle Period
	420	Middle Horizon	Middle Horizon	Upper Archaic	Berkeley Pattern	Late Middle Period	
	300						Early Middle Period
	210					Intermediate Middle Period	
	100						Early/Middle Period Transition
	0					Early Middle Period	
	200					Early /Middle Period Transition	
	500						
	1000					Early Period	Early Period
	1500			Middle Archaic			
Early Period		Early Horizon					
	2500		Early Horizon				
	3000						
	5500			Lower Archaic	Borax Lake Pattern		
	6000						
	8000			Paleo-Indian Period			

Note:
* Lillard, Heizer and Fenenga represent a cultural sequence and not a chronology with temporal indicators

materials from Ellis Landing typifying the Ellis Landing facies of the Middle Horizon, the Emeryville facies representing Phase 1 of the Late Horizon, and a Contra Costa County site, CA-CCO-259, the Fernandez facies, representing Phase 2 of the Late Horizon. Beardsley's interpretations of central California prehistory soon became the dominant theoretical model of California prehistory. For all its usefulness in bringing some semblance of order to central California prehistory, the concept of "Horizons" as implied by the CCTS tended to obscure cultural variability, causing distinctive local manifestations to be overlooked (Moratto 1984).

In retrospect, perhaps the most glaring problem with the CCTS is that its Early Horizon became the rootstock for all other archaeological manifestations in central California. Indeed, the absences in the Bay Area of the Early Horizon as represented by the distinctive Windmiller culture of the Delta region reinforced the notion that the Bay Area was no more than a recipient of cultural influences emanating from the Delta. According to Heizer, the Bay Area was a "local, marginal, culturally backward area into which outside influences either failed to spread or spread slowly" (Heizer 1949:39). This view is evidence in Heizer's relatively short chronology for the Bay Area, with the Early Horizon starting ca. 2500 BC (see Table 2). This perception of Bay Area archaeology began to give way, however, with the excavation of CA-SMA-77, the University Village site, in 1951 and 1952 (Gerow and Force 1968). Data from Gerow's excavations caused a major reevaluation of Bay Area and central California prehistory.

CA-SMA-77 was found to be buried under alluvium deposited by San Francisquito Creek with the deepest graves and "other signs of human occupation" covered by as much as 6 to 7 ft. (2 m) of stratified clay and silt (Gerow and Force 1968:7). The majority of archaeological materials occurred more than 2 ft. (1 m) below the level of an abandoned stream course with many of the features lying directly on stream gravels (Gerow and Force 1968:7). Gerow excavated 43 burials, a cremation, and other features from this site (Moratto 1984:264). Some 3,000 artifacts were recovered from 35 graves. Contrary to the model proposed by the CCTS, Gerow's analysis of CA-SMA-77 indicated the presence of an Early Bay culture, representing a different population than the Early Horizon (Windmiller) people of the Lower Sacramento Valley (Gerow and Force 1968; Moratto 1984:264). Gerow's evidence included 12 radiocarbon assays that clustered around 3200 BP, burials (flexed versus extended), and their associated grave items (i.e., shell beads, ornaments, and red ochre). Gerow also identified different physical characteristics of burials from the lower levels of the West Berkeley Shellmounds (CA-ALA-307) to those at the University Village site as further evidence of a distinct early Bay Area culture during the early part of the record. Gerow concluded that the University Village site bore closer affinities to the early cultures of the Hokan speakers of the south coast, than the Sacramento Valley. Gerow's findings at the University Village site demonstrated a greater time depth for the Bay Area, which was reflected in a subsequent chronology developed by Bennyhoff and Heizer (Heizer 1958). He postulated that similarities in Middle and Late Period assemblages between regions, represented convergence of the two distinct cultures or traditions in central California of the Bay and Valley (Gerow and Force 1968:126; Gerow 1974). This view became known as the convergent model of Bay Area prehistory (Bickel 1981).

Moratto (1984:278) had argued that a number of other Bay Area sites, including Ellis Landing, De Silva Island, Pacheco Valley, Newark, and Castro, are as old or older than the University Village site. Moratto (1984:279) has suggested that the University Village site may be atypical of any widespread archaeological culture in the San Francisco Bay region and it may represent a relict Hokan settlement showing influence of the later Berkeley Pattern. Since the time of Moratto's publication, CA-SMA-150 and CA-SMA-40 (Wiberg 1998) have been identified as sites that predate the University Village site.

Bickel (1981) compared parallel change (Lillard et al. 1939; Beardsley 1948) and convergent change (Gerow 1974) with dates from three sites near the Coyote Hills located in the southeast corner of San Francisco Bay. Bickel concluded from her analysis that although she agreed with Gerow about the difference between the two regions (the Delta and the Bay Area), during the Early Period, she also was left with "strong impressions of change in both areas and separate traditions in each interwoven with evidence of interplay between them" (Bickel 1981:338). Bickel found that neither model was complex enough to explain the elaborate archaeological record of central California. These observations notwithstanding, Gerow's contribution to Bay Area prehistory is immeasurable for he established that Bay Area archaeology had followed its own trajectory and was not subordinate to that of the Delta region, as previously believed.

Fredrickson (1973, 1974) has also presented a model of the culture taxonomy for central California. Based primarily on North Coast Ranges data, but including his work in the East Bay interior valleys (Fredrickson 1966), Fredrickson proposed a system of Patterns, Periods, and Aspects designed to account designed to account for regional and interregional spatial variability in the archaeological record. As originally formulated, Fredrickson's "Patterns" were defined by similar technological skills and devices, similar economic modes, and similar mortuary and ceremonial practices that are not restricted to any particular time frame (e.g., The Borax Lake Pattern). Periods on the other hand are time specific and independent of specific cultural assemblages (Bennyhoff and Fredrickson 1994). Following the example of stages as presented by Willey and Phillips (1958), Fredrickson (1973) divided prehistoric California into three periods (Paleo-Indian, Archaic, and Emergent), with Fredrickson (1974) later splitting the Archaic Period into a Lower, Middle, and Upper (see Table 2). The Aspect component of the system was defined as a district-level variant of a pattern, made up of historically related sequences of phases (Bennyhoff and Fredrickson 1994).

Fredrickson found support for Gerow's contention of a distinctive Bay Area culture that was contemporaneous with the Windmiller pattern at the western base of Mount Diablo at CA-CCO-308, as well as a suite of radiocarbon dates at the bottom of the West Berkeley Mound. However, unlike Gerow he placed it "under the rubric of the Berkeley Pattern" (Fredrickson 1974:44), presumably for the evidence he found at the West Berkeley Mound. Since its introduction, the Berkeley Pattern has been recognized as a wide spread archaeological manifestation with several Aspects identified (e.g. the Ellis Landing Aspect, the Houx Aspect, etc.). Although the subsistence practices of the Berkeley Pattern vary from one geographical area to another, it is thought that high ratios of mortars and pestles represent a heavy dependence on acorns as a food staple. In the Bay Area, an acorn intensive diet was supplemented by large amounts of oyster, clam, mussel, smaller quantities of other marine shellfish, along with fishing and the trapping of waterfowl.

In one manner or another, all the foregoing cultural-historical schemes have relied upon discrete types of shell beads and ornaments that were exchanged throughout much of California and the Great Basin. Building upon the pioneering efforts of Gifford (1947) and Bennyhoff and Heizer (1958), Bennyhoff and Fredrickson (1967) offered an operational typology for diagnostic bead types. This work was later refined by Bennyhoff and Hughes (1987) who offered two alternative dating schemes (B1 and B2) to Heizer's (1958) scheme (called A2 by Bennyhoff and Hughes). This effort was the first true chronology for central California based on radiocarbon dates. The more complete B1 scheme (see Table 2) was divided into three basic periods (Early, Middle, and Late) with multiple phases, including phases of transition from one period to the next. Each period and phase was developed through seriation of grave lot assemblages, and absolute dating was provided by 180 radiocarbon dates (Bennyhoff and Hughes 1987:149). Milliken and Bennyhoff (1993) later

slightly altered the B1 scheme to accommodate a perceived overlap between mortuary items of the Late Phase 1-A and the Middle/Late Transition. These slight adjustments aside, the chronology as presented by the B1 scheme has become the preferred ordering of central California prehistory since its introduction in 1987.

Bennyhoff and Hughes, however, were aware that their data were limited and acknowledged that "more dates with firmly established contexts are sorely needed" (1987:147). Caution was indeed warranted because the 180 radiocarbon dates used in construction of scheme B1 included charcoal, bone collagen, and shell from a variety of contexts, which left room from considerable error when assigning assemblages to temporal periods. Also note one of the dates was calibrated for isotopic fractionation, marine/atmospheric 14C discrepancies, marine reservoir effect, the variables of human bone collagen, old wood, etc. These problems have been either rectified or addressed since Bennyhoff and Hughes published their monograph.

A recently completed study (Groza 2002) has attempted to address the problems associated with scheme B1 by directly dating grave associated shell beads through Accelerator Mass Spectrometry (AMS) dating. AMS is a more advanced form of radiocarbon dating that is highly accurate yet requires samples that weigh milligrams. Previously standard Carbon-14 dating of shell required as much as much as 40 grams for an accurate date, typically requiring large numbers of shell beads to be destroyed for a single radiocarbon assay. In Groza's study, 104 temporally sensitive *Olivella* shell beads were dated with AMS (Groza 2002). This effort has resulted in scheme D that is a refinement of Bennyhoff and Hughes' B1 scheme (see Table 2). The most notable difference between the two schemes is timing of the Middle/Late Transition, which according to Groza occurred 300 years later than expected (ca. AD 1000). Groza also identifies a greater time breadth for the Middle Period (ca. 500 BC to AD 1000). Further research on earlier periods of time in the sequence indicated a hiatus of shell bead production in central California occurred between circa 800 to 400 BC.

Most recently Hylkema (2002), utilizing the Bennyhoff and Hughes B1 sequence, proposed a cultural historical scenario that integrates extant data and a new data from many recently excavated sites from the southern Bay Area and the coastal regions of San Mateo and Santa Cruz Counties. Hylkema argues "that a cultural florescence transpired among the people of the southern San Francisco Bay, (while) neighboring people of the Peninsula Coast maintained an older adaptive pattern that did not change until after AD 1200" (2003:232). Hylkema believes a derivative of Windmiller culture was present at CA-SCL-354 in the south Bay Area during the Early Period (2000 to 500 BC) marked by Windmiller traits such as extended burials, polished stone wedges, and chisels. Furthermore, Hylkema states that because CA-SCL-354 and CA-SMA-77 are coeval and separated by only 16 km, "that these two sites may indicate a succession of cultural traits during the Early Period that were either replaced by, or incorporated into the Berkeley pattern" (2003:243). If Hylkema has correctly identified the presence of both Early Bay and Windmiller cultures in the Bay Area, the influences of the Delta likely occurred several times in the Bay Area. The other times in which Delta influences appear have been identified as the "Meganos Intrusion" by Bennyhoff (Bennyhoff 1994; Cook and Elsasser 1956; Wieberg 1984). Bennyhoff (1993) identified the Meganos culture as having traits different from the Berkeley Pattern such as ventrally or dorsally extended burials that first emerged in the Stockton District between 500–200 BC. If correct, Hylkema's findings would lend support to Bickel's (1981) contention that neither model of parallel change (Lillard et al. 1939) nor of convergent change (Gerow 1974) is complex enough to explain the elaborate archaeological record of the Bay Area.

6.1.2 Archaeological Investigations in San Francisco

There have been approximately 20 substantive prehistoric archaeological investigations within the city limits of San Francisco (see Figure 5, *Previously Identified Prehistoric Sites in the San Francisco Vicinity*), including the work done by early pioneers such as Jones (1900), Nelson (1909), and Loud (1912). Roughly ten of these projects involved actual excavation, and only five of these occurred in the last 18 years. In fact there were no formal excavations within San Francisco city limits between 1912 and 1976 (Rudo 1982). The majority of the archaeological data generated from San Francisco has come in the form of isolated finds or as salvage finds after a site has been impacted by modern development (Rudo 1982). This situation has improved somewhat in the last two decades with the application of modern archaeological methods at a handful of sites, the majority of which were previously unrecorded (i.e., deeply buried under modern or historic fill). The following is a brief account of archaeological investigations in the San Francisco and the immediate vicinity.

Much of what is known of San Francisco archaeology can be attributed to Nels Nelson, who recorded 17 shellmound sites in San Francisco in addition to over 400 shellmounds around the margins of the Bay Area (Nelson 1909). The information from Nelson is somewhat limited given that many sites had already been destroyed by the early 20th century and Nelson did not record inland sites. Following his survey, Nelson excavated at CA-SFR-7, also known as the Bayshore Mound. Nelson never published the data from the Bayshore Mound, although his notes and the collections are housed at the Hearst Museum (Nelson 1910a). In 1912 Loud conducted salvage excavation at CA-SFR-6, the Presidio Mound. Here again only a few notes were taken, but a good map of the site and the excavations was produced. A few years later Gifford (1916) used the midden sample from the Presidio Mound as part of his comparative analysis of 15 California shellmounds (Rudo 1982).

There were no more formal excavations in San Francisco until the advent of Cultural Resources Management in the mid-1970s. Several sites were visited and collections made such as Loud's visit to CA-SFR-17 in 1929 and to CA-SFR-4 on Yerba Buena Island in 1934, but by in large very little research was conducted and even less published. Riddell led an excavation on the Farallon Islands, but these were historic deposits attributed to Russian use of the islands during the height of early 19th-century otter hunting along the California coast (Riddell 1955). In 1970, Dietz and Jackson (CA-SFR-25) recorded the first nonlittoral site ever found in San Francisco near California State University, San Francisco (Rudo 1982). This was the same year of the discovery of the famous "BART skeleton" (CA-SFR-28) during the construction of the Bay Area Rapid Transit (BART) mass transit system at the Civic Center Station on Market Street between Seventh and Eighth Streets. The partial remains of a young woman were found at a depth of 75 ft. (22.9 m) and were hailed initially as an "Early Man" find due to the depth of the discovery. However, radiocarbon dating of an organic mud sample collected from the pelvis area returned a date of 4900 +/- 250 years BP (Henn and Schenck 1970). This find clearly demonstrated the potential for deeply buried cultural resources in San Francisco and the Bay Area in general. To this day the remains from CA-SFR-28 are the earliest evidence of the prehistoric occupation of San Francisco. In 1972 workmen at the Presidio uncovered another partial skeleton (CA-SFR-26) at a depth of 8 ft. (2.5 m) (Hegler and Moratto 1973). A radiocarbon date from the remains yielded a date of 1210+/1 BP. The finds at CA-SFR-28 and CA-SFR-26 demonstrate the potential for sites dating throughout the Holocene to be deeply buried beneath the urban landscape of San Francisco.

Holman & Associates' (1977) excavations on two sites at the old Sutro Baths location (Point Lobos Avenue), which were first noted by Jones (1900) and recorded by Nelson (1907), mark

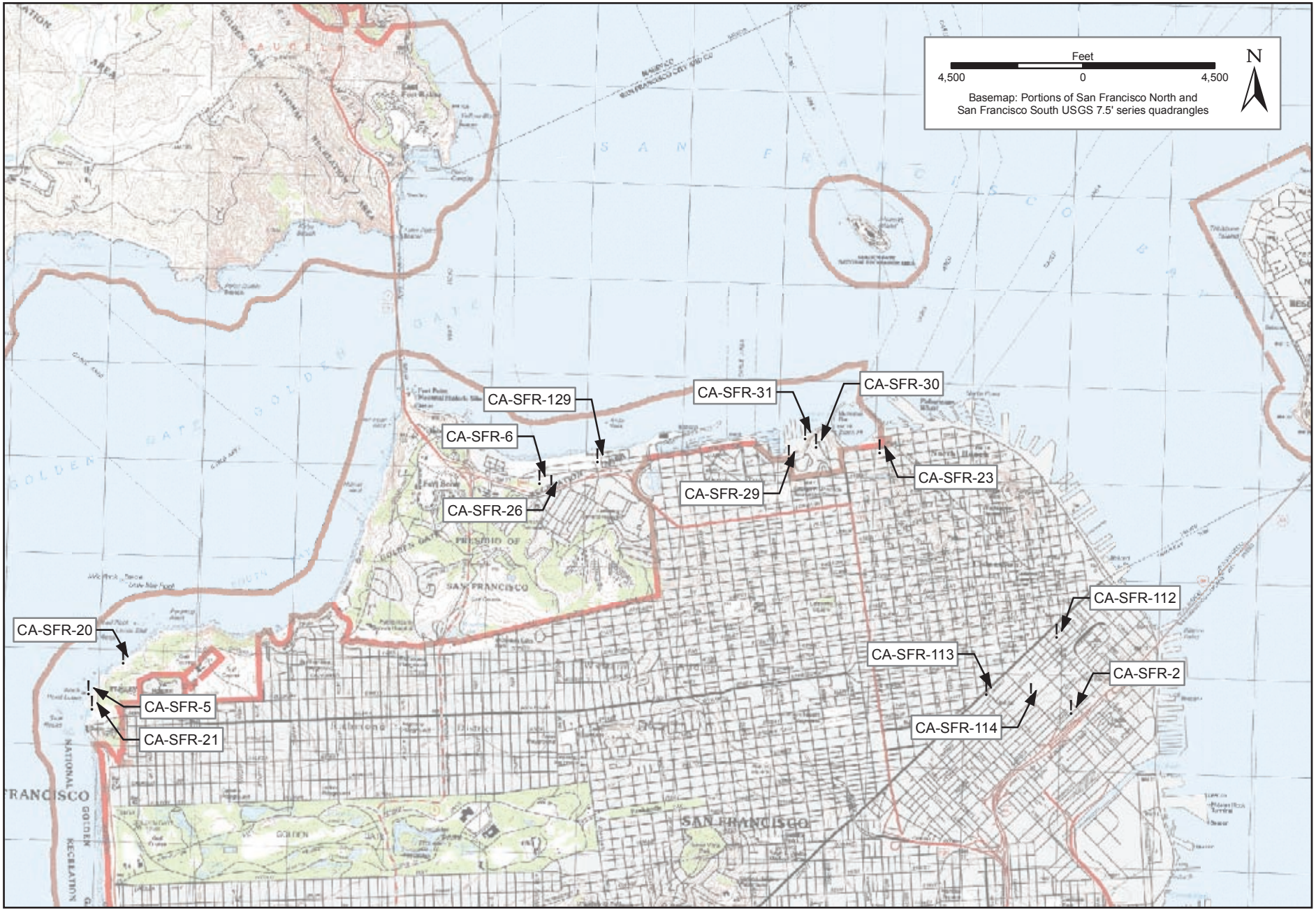

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Figure 5
Previously Identified Prehistoric Archaeological Sites in the San Francisco Vicinity

the resumption of formal excavations within San Francisco. The excavations at CA-SFR-5, CA-SFR-21 (these were later combined as a single site), and CA-SFR-24 yielded little useful data other than they represented small deposits exclusively used for resource extraction and processing (i.e., shellfish gathering stations) (Clark 2001). Baker (1978) retrieved somewhat better data from three sites (CA-SFR-29, CA-SFR-30, and CA-SFR-31) at Fort Mason in 1978. The shell-rich, disturbed deposits yielded typically low numbers of diagnostic artifacts, and chronometric data, but they did display a strong focus on exploitation of Bay resources such as otter, seals, fish, and shellfish (Clark 2001). Artifacts recovered included shell, bone, and Napa obsidian flakes. A charcoal sample from CA-SFR-29 yielded a radio-carbon date of 1475 +/- 100 BP, and shell specimens from CA-SFR-30 were dated to 1705 +/- 100 BP (Breschini et al. 1996). Analysis of faunal materials conducted by the California Academy of Sciences concluded that the Fort Mason sites were permanent habitation sites (Rudo 1982).

Pastron and Walsh (1988al 1988b) and Pastron (1990) excavated three sites in San Francisco in the late 1980s. The first was the Stevenson Mound (CA-SFR-112), located between First and Second Streets west of Rincon Hill. The deposit was discovered during construction and was more than 16 ft. (5 m) below street level. The midden was 70- to 90-cm thick and buried under sterile dune sand. It contained a high frequency (80% of the shell total) of *Macoma nasuta* (bent-nosed clam) and lower numbers of mussel than is normally found in Bay Area shellmounds. A total of 26 sq. ft. (8 sq. m) of deposit were excavated from three 2x2-meter units. Deer and otter, with lesser amounts of elk, rabbit, seal, and resident and migratory birds dominated the faunal assemblage recovered. The site also contained Olivella beads (saddles and saucers), soapstone and bone beads, bone whistles, awls, punches, and a worked bat-ray spine tool. Chipped stone tools included ten bifaces, ten flake tools, a drill, a core tool, and debitage. Ground stone and battered tools included five pestle and three mortar fragments, 16 grooved net sinkers, eight piled charmstones, a schist ring, an anvil and three hammer stones (Pastron and Walsh 1988a, Clark 2001). Five radiocarbon assays derived from a nonfeature context yielded an average age of circa 1375 calibrated years BP (AD 575). Forty-four specimens of obsidian yielded 29 readable hydration rims of which 22 were from the Napa obsidian source, five were from Annadel, and two were from Casa Diablo. The Napa obsidian rim values ranged from 3.6 to 1.6 with a mean 2.5 microns. These chronometric data indicate that the site was occupied during the Terminal Middle Period using Scheme B1 of Bennyhoff and Hughes (1987).

CA-SFR-113, the Market Street Shellmound, was the next buried site discovered (Pastron and Walsh 1988b), roughly four blocks northwest of CA-SFR-112. The site was found during the course of preconstruction archaeological testing at the corner of Fifth and Market Streets. The deposit was located at an average depth of 13 ft. (4 m) below street level under a layer of burned historic rubble thought to be associated with the 1906 earthquake and a layer of sterile sand, part of an aeolian dune complex that varied in thickness over the cultural layer. A total of 14.05 m^3 of deposit yielded an artifact assemblage dominated by flake and ground stone tools, including six bifaces, five scrapers, five choppers, six flake tools, three pestle fragments, two mortar fragments, one hammerstone, and 178 pieces of debitage. In contrast to CA-SFR-112, only a few bone tools were recovered. Mammalian remains were predominately terrestrial with the majority being rabbit and deer, with lesser amounts of canine and otter. The shellfish assemblage was the exact opposite of CA-SFR-112, with the California bay mussel composing more than 80% of the assemblage and bent-nosed calm comprising only 11.6% of the total shellfish collected (Pastron and Walsh 1988b; Clark 2001). Several features were also found, including hearths, pits, and possible post molds. Seven radiocarbon assays from charcoal collected from the midden yielded dates ranging from 2085 to 1760 calibrated years BP

averaging about 2000 BP (AD 50). Thirty-five specimens of obsidian were also recovered of which 32 were sourced to Napa and on from Annadel, and on from Casa Diablo. The Napa sample returned hydration rim values that ranged from 2.4 to 4.5 with a mean of 3.5 microns. These dates indicate that CA-SFR-113 was occupied approximately 500 years before CA-SFR-112, placing it within the Early Period after Bennyhoff and Hughes (1987).

A third buried site, CA-SFR-114, was discovered around the same time (1986) on Howard Street between Third and Fourth Streets and was excavated in 1989 (Pastron 1990). The site was found during construction of the Yerba Buena/Moscone Convention Center with mechanical auger boring at depth of 10 to 21 ft. (3 to 6.3 m) below the present street level. Although not yet fully reported, this site is described as “an extensive remarkably well preserved Native American village and cemetery site” (Pastron 1990:26). Called the “Surprise Shellmound” the site was established on what once was a stable bay dune environment that was later covered with dune sand. The site is thought to date to between 500 and 1000 years BP (Late Period) and contained structural features including a sweathouse floor, numerous ground and chipped stone tools, bone and shell artifacts, and “literally tons of mussel, clam, and oyster shells” (Pastron 1990:26). Eleven burials were also excavated. All were accompanied with grave goods, with one individual that had 5000–10,000 Olivella disc beads, hundreds of perforated mica ornaments, several quartz crystals, and more than a dozen finely made bird and mammal bone whistles and tubes (Pastron 1990).

All three of the sites (CA-SFR-112, -113, and -114) excavated by Pastron are apparently associated with a marsh/slough fed by Mission Creek that once existed near the eastern edge of the Project Area that included tidal flatlands and wetlands that were later filled (Jones & Stokes and Albion Environmental 2002a). In the last 6 years, two more buried sites have been located and excavated within San Francisco. The first is a previously unrecorded site, CA-SFR-129, and the second site, CA-SFR-6, was discovered in 1912 but it precise location had been unknown since it was first discovered.

CA-SFR-129, also known as the Crissy Field Site, was discovered during a cultural resources inventory conducted as part of the Crissy Field Restoration Project (Clark 2001; Jones & Stokes and Albion Environmental 2002b). Also recently, the boundaries of archaeological sites CA-SFR-6 and CA-SFR-26 were combined and are now considered one site (Jones & Stokes and Albion Environmental 2002b). A detailed discussion of these two sites follows in Section 6.4-1, “Review of Previous Studies in the APE”.

Lastly, in the fall of 2002 significant excavations were completed at CA-SFR-4, which is located in a small cove on the eastern side of Yerba Buena Island. These excavations were undertaken as part of the construction for the new San Francisco–Oakland Bay Bridge, and the results are still forthcoming. According the newspaper accounts, the first notice of the site occurred in 1899, when burials were uncovered by workmen during grading for the Naval Training Station parade ground (Morgan and Dexter 2002). No further work was done at the site until 1934 when Loud helped with the recovery of human remains exposed in a utility relocation trench excavated during construction of the original San Francisco Bay Bridge (Rudo 1982; Morgan and Dexter 2002). Loud deposited the remains along with a number of other items he had collected from the site. An inventory of these materials conducted recently found a wide array of materials including bone tools, a bone knife, an ungulate “gouge smoother or flaking tool,” an obsidian blade, and projectile point, a chert projectile point, and a variety of faunal materials (Morgan and Dexter 2002). The excavations recently completed were quite substantial with several burials and features exposed and many radiocarbon dates generated,

all of which will certainly increase understanding of this site as well as its context in the greater Bay Area.

6.2 ETHNOGRAPHIC CONTEXT

At the time of Euro-American contact, the area now occupied by the Presidio was part of a larger cultural region long inhabited by the Costanoans, or Ohlone, an aggregation of tribal bands united through intermarriage and shared culture, and who spoke dialects of a common mother tongue, stretching from what is now Marin County south to Monterey. In general, the population density of Ohlones ranged from about 6 people per square mile along the inland northern and southern bay shores to as low as 2 people per square mile in the dry interior areas and along the wet Pacific coast and entrance to the Bay (Milliken 1995: 20).

Spanish explorers first traversed the San Francisco peninsula in the late 1760s to late 1770s, making what were often initial contacts with its inhabitants and frequently recording some details of the events that took place. As Milliken (1995:225) notes, Spanish colonists were not interested in merely acquiring new lands but were intent on converting native peoples to Christianity. This meant that the Spanish incursions were wholly devastating to aboriginal populations in the Bay Area because the social and economic lives of native inhabitants were to be restructured according to the tenets of the new religion. Furthermore, unlike other parts of California, native lands on the San Francisco peninsula were rapidly populated by Spanish and other European settlers. This drastic influx of foreigners, combined with the pressures of forced missionization, resulted in the swift collapse of native populations and the near end of traditional cultures in the Bay Area. Today, the modern Ohlone community continues many of its traditional practices and endeavors to restore and preserve other aspects of its traditional culture.

6.2.1 The Costanoans/Ohlone

Modifying the Spanish term “costeños” or “costaños,” which means “coast-dwellers,” most anthropologists have used the term “Costanoan” in reference to native peoples that once lived on the San Francisco peninsula, throughout the East Bay (comprising what is now Alameda and Contra Costa Counties), and along the coast from San Francisco to Monterey. In 1902, however, Merriam (in Heizer 1967) referred to Bay Area languages as “Ohlonean,” a term derived from the name of a tribelet located between San Francisco and Santa Cruz that was spelled variously as “Alchone,” “Olchone,” “Oljon,” or “Olhon” (Heizer 1974; Levy 1978). More recently, modern descendants of Costanoan people have identified themselves as “Ohlone” (a derivation of Olhone), a name that continues to be used today (see Bean 1994).

Estimates of total Costanoan populations during the contact period vary. Kroeber (1925) suggested about 7,000 people for all Costanoans; Cook (1943b) posited a total of about 11,000 by the end of the Mission Period; Heizer (1974) estimated about 10,000. Milliken (1995:19) claimed that the earliest explorers usually encountered native villages in the Bay Area “every three to five miles [4.8 to 8 km],” and notes that their descriptions suggest village populations numbering from 60 to 90 persons. Evidently, such villages were relatively small because there were reports of Costanoan villages in other parts of the Bay Area containing up to 200–250 inhabitants and two villages in particular that were reported to contain 400 residents each (Milliken 1995:19).

The territory of each tribe[1] included several seasonal villages and camps; according to Kroeber (1925:464), at least 100 Costanoan village settlements supplied converts to San Francisco (Mission Dolores) alone. The "tribes" can best be described as associations of families that worked together to harvest wild plant and animal resources within fixed territories and to maintain yearly ceremonial cycles (Milliken 1995:13). Each tribe might be thought of as an independent, landholding religious congregation (Milliken 1995:13). The villages the tribes lived in were probably occupied for several months each year, with groups of families moving between different locations as food resources became seasonally available. Groups of families coalesced during winter, in part to make use of shared food stores but also to engage in annual ceremonial activities. Many Spanish diaries note also that warfare was common between Costanoan groups, normally for the purpose of territory defense (Broadbent 1972; Milliken 1993, 1995). Nonetheless, conflicting groups often were linked together by intermarriage ties and trading relationships, and it is likely that episodes of fighting were relatively rare as compared to occasions of ceremonial dances or trade feasts.

Although Costanoans certainly maintained well-rounded diets, most references to ethnographic subsistence practices indicate that Ohlone populations relied on the acorn as a staple food (Beechy 1968; Bickel 1981; Broadbent 1972; King 1974; Levy 1978; Milliken 1995; Parkman 1994). Acorns were collected in fall; leached in freshwater streams to remove tannic acid and processed into flour, using stone pestles in either portable stone or bedrock mortars. Acorns were stored whole and consumed during winter as mush or cakes (Broadbent 1972:61).

Hard grass seeds also were an important plant resource, particularly during summer months (Milliken 1995; Parkman 1980, 1994). These seeds also were stored and consumed later in winter as a supplement to shellfish diets. Grass seeds were prepared without leaching, ground into flour between stone slabs and handstones, and cooked as a meal or baked into small cakes. Various other nuts (buckeye, laurel), roots (wild onion, cattail), shoots (clover, thistle), and berries (wild blackberry, elderberry, and strawberry) also were eaten when ripe as complements for seasonal diets. Kelp is one sea plant that was a common food, being sun-dried and roasted (Broadbent 1972).

As for animal foods, shellfish, particularly mussels, were undoubtedly an important Costanoan foodstuff (Beechey 1968; Broadbent 1972; Kroeber 1925; Switzer 1974; Levy 1978). Kroeber (1925:466) suggested that the upper layers of many or all of the shellmounds found along the Bay should be ascribed to Costanoan habitations. Indeed, there are many references to shellfish collection and consumption in the diaries of Spanish explorers. These records indicate that this resource was of significance to contact-period diets. Mussels, clams, and other species probably were collected year-round but primarily during winter, being taken by hand or with spears or sticks. Clams were dug from beds within tidal flats, and a variety of fish (salmon, steelhead, and sturgeon) were captured with spears or dip nets from riverine and coast shoreline habitats (Broadbent 1972; Levy 1978; Switzer 1974). Some Costanoan groups

[1] Many anthropologists consider the term *tribe* imprecise (Colson 1986; Fried 1975). Most California anthropologists refer to the contact-period political groups of west Central California as *tribelets,* following Kroeber (1932). Yet tribelet has not taken hold as a term to describe similar multifamily landholding groups in other hunter-gatherer and agricultural societies. Milliken (1995) finds the term *tribe* to be useful and meaningful to lay audiences and used herein. Note this does not mean they are tribes in terms of federal recognition.

also used small "balsas," or rafts made from rushes, not only to exploit marine fish habitats but also to obtain lakeside waterfowl (ducks and geese).

Various land animals also were important to Costanoan subsistence. In particular, deer and rabbits, both available in foothill ecozones, were significant sources of nutrition. Ethnographic data from central California are replete with details of deer-hunting practices (cf. Beals and Hester 1960; Heizer and Elsasser 1980) and indicate that this was a highly visible but also important part of Costanoan culture. Deer were hunted individually, while rabbits probably were taken with traps or nets (Broadbent 1972; Kroeber 1925; Levy 1978; Simons 1992; Switzer 1974).

All Costanoan groups have rich social and religious lives that were intimately connected through communal rituals. Most gatherings and festivals, including those for marriage, served some religious purpose. Prayers, offerings, and dances were an integral part of any ceremony. The sun was one of several principal deities; prayers were directed to the sun through offerings of smoke, seeds, tobacco, and shell beads (Broadbent 1972; Levy 1978). Harrington (1921) noted that the Chochenyo offered shell beads to a spirit that supposedly inhabited a whirlpool in San Francisco Bay. Many offerings also were made to promote good luck in hunting and fishing ventures (Amoros 1950; Kroeber 1908; Font 1930).

6.2.2 The Yelamu of the Northern San Francisco Peninsula

Moving beyond long-accepted Costanoan language/ethnic boundaries, Milliken's (1983, 1995, 1996, 2007) recent work with mission registers has produced a more comprehensive layout of hypothetical tribal divisions and provides a more complete picture of native cultures in the Bay Area during the early years of Spanish contact. He proposes the term Yelamu as a tentative name for the tribe living on the northern tip of the San Francisco peninsula. This tribe may have comprised as many as 160 individuals who were divided for most of the year into three semi-sedentary groups, one of which included a cluster of families that made seasonal use of "the beach area facing the sea and the Golden Gate" (Milliken 1995:61; 1996:1, 6). This location, referred to as Petlenuc (Milliken 1995:261; 1996), was "perhaps near the site of the Spanish Presidio compound" and was supposedly one of five villages (Chutchui, Sitlintac, Tubsinte, Amutac, and Petlenuc) in what is now the city of San Francisco.

One group (band) of Yelamu families in the San Francisco area may have used the sites of Sitlintac and Chuchui at different times of the year because these sites were "only a mile or two [1.6 to 3.2 km] apart in the valley of Mission Creek" (Milliken 1995:261), and another band may have alternated between Amuctac and the village of Tubsinte in the Visitation Valley area. As for Petlenuc, Milliken (1983, 1995) indicated that this site may have been used seasonally by a smaller, third band. Milliken's claim that the northern end of the San Francisco peninsula held few subsistence resources implies that Petlenuc may have been a less significant habitation. As he notes, "much of the area was covered with windswept sand dunes and the scrubbiest of grasslands. Its creeks were small and it lacked extensive oak groves" (Milliken 1995:61). The extensive slough present near the shore at that time, however, may have provided some marsh and sea resources.

Both the Presidio of San Francisco and the Mission San Francisco de Asís (Mission Dolores) were founded in late 1776. In June of that year, the priests Francisco Palóu and Pedro Cambón traveled with a caravan of 75 people from Monterey to establish the mission at the Presidio. Palóu's account of the journey mentions several contacts with Yelamu peoples, including a meeting at the Padres' camp in the Mission Valley lagoon, somewhere outside the village of

Chutchui. In this encounter, Palóu indicates that native peoples received beads and food from the Spaniards, and in return brought "presents of small value, principally shellfish and grass seeds" (Milliken 1995:62).

After the establishment of Mission San Francisco, the years between 1777 and 1810 saw a complete transformation of Yelamu culture. In all, 131 Yelamu people were baptized at Mission San Francisco (Milliken 1996:24). The last Yelamu couples joined the mission in 1786, and two older Yelamu women were converted in 1787. Their conversions effectively marked the end of tribal life on the northern San Francisco peninsula. Indeed, by about 1805, the native population at Mission San Francisco was completely mixed and included individuals from many different Costanoan tribes, from Bay Miwok tribes in the East Bay, and from Coast Miwok tribes on the Marin peninsula.

Of all the changes that occurred during the Mission Period, however, the most detrimental to Yelamu populations was a shift away from native subsistence practices (Milliken 1995; Stodder 1986). Many Yelamu and other Costanoan neophytes labored in mission gardens to grow a variety of fruits and vegetables, but what they received from the Padres consisted mainly of barley, wheat, and corn. Meat was rarely served, and many families had to supplement mission rations with animals captured on their own. Despite earlier descriptions suggesting that the neophytes were quite well fed (Langsdorff 1968), Stodder (1986) suggested that nutrition deficiencies in meals eventually led to outbreaks of disease, drops in birth rates and increased death rates—all of which culminated in a drastic reduction of Yelamu and Costanoan populations during the Mission era. Indeed, Milliken (1996:22) reported that the population of Yelamu and Yelamu descendants at Mission San Francisco dropped by more than half between 1790 and 1800 and again between 1800 and 1810. He indicated that populations dropped "due to the effects of diseases" and that many births at the mission could not overcome the high mortality rates for both infants and adults (Milliken 1996:21).

6.2.3 The Costanoans/Ohlone after Missionization

Costanoans and other indigenous groups who had joined the Spanish missions continued to suffer population declines after secularization of the missions under Mexican rule and throughout the 19th century after California became a U.S. state. This decline resulted from a number of factors, culminating in the inability of many Indians to create a stable life for oneself and one's family. These factors included the practice of bestowing land grants largely to Mexicans, with very few lands granted to Native Americans. Additional impediments included racial discrimination and limited employment opportunities such as low-paying servant/labor work in urban areas, followed by glut the labor market from gold rush immigrants who pushed Native Americans out of workforce. Many Native Americans on the peninsula lived and supported themselves on ranchos under Mexican patronage, but Americans began winning legal disputes over land —in American courts, against Mexicans—heralding a new era of racism (Milliken 2007:183). Indians in rural areas with few Euro-Americans tended to do much better and were able to maintain some of their cultural traditions. In addition to facing economic hardship, it has been estimated that 60% of the decline in Indian population between 1848 and 1870 could be attributed to deaths from disease and alcoholism (Rawls 1984:175). Another reason for apparent population decline was that many Native Americans, if they could, recharacterized themselves as Hispanic or "white", which allowed greater access to employment, education, simulation, and stability. Census records demonstrate that many individuals who identified as "Indian" in one census were later able to identify as "white" in a later census (Milliken 2007). The 1847 census listed 36 Indians in San Francisco and in 1852

listed 140 Indians in the combined San Francisco/San Mateo County area (Milliken 2007:181). In the 1860 census, there are only 37 individuals listed as Indians, and none are from the former Mission Dolores. None of the individuals were over the age of thirty (only eight are over 17) and all were unmarried. Most lived with white families and some gave the surname of the family with which they lived; some were listed as not having a name at all. Those listing an occupation were listed as servant or laborer. These data suggest the Indians listed in the 1860 census were victims of village slave raids, known to have occurred since the 1830s (Milliken 2007:187).

6.2.4 Ohlones in the Twentieth Century

In the early 20th century the Bureau of Indian Affairs (BIA) sent an agent to California to assess the needs of landless Indians and make recommendations for land purchases for them. A lawyer named C. Kelsey traveled around central California and reported that there were 15 groups of landless Indians in four counties: Monterey County (six groups totaling 138 people); San Benito County (the San Juan Bautista band); Santa Cruz County (two groups totaling 70 people); and San Francisco County (six groups totaling 132 people). Congress authorized $100,000 for the purchase of small plots of land for landless Native Americans in California, but none of this real estate was purchased for those in west central California (Milliken 2007: 204). In 1927, Colonel Lafayette Dorrington, a BIA superintendant reporting to Washington, DC, mentioned the Verona band near Alameda and the San Juan Band and recommended that neither group needed land because they were well taken care of by the nearby Catholic missions (Milliken 2007: 205), thereby denying these groups opportunities to own land.

Today, modern descendants of Ohlone groups now identify themselves collectively using the name "Ohlone." Since the 1980s the modern Ohlone community has undergone a period of revitalization based on familial ties and former rancheria affiliations (Albion Environmental 2001). Although they have yet to receive formal recognition from the federal government, Ohlones are becoming increasingly organized as a political unit and have developed an active interest in preserving their ancestral heritage. Descendants of Ohlones still live in the area, and many are active in maintaining their traditions and advocating for Native American issues.

6.3 HISTORIC-ERA

Periods of significance in Presidio history have been established for the Presidio NHL, and the following historic setting for the Project Area is organized in conjunction with these periods: Spanish-Mexican Settlement (1776–1846); Early United States Occupation (1846–1860); Civil War (1861–1865); Indian and Military Affairs (1866–1890); Nationalistic Expansion (1891–1914); World War I (1915–1918); Military Affairs between the Wars (1919–1940); World War II (1941–1945); and 1945 to the present. The information outlined in each period has been adapted directly from the detailed and comprehensive historical context prepared by NPS historians, archaeologists, and historical architects for the NHL registration (Alley et al. 1993).

6.3.1 Spanish-Mexican Settlement (1776–1846)

For nearly 50 years *El Presidio* played a key role in the extension of Spanish settlement into northern California. From this outpost, the Spanish Crown established four missions, two pueblos, a rancho, and an *asistencia*. Upon gaining its independence, Mexico succeeded Spain at *El Presidio* in 1822 and kept the post as its main base in northern California until 1835,

when it transferred headquarters to Sonoma. Between 1835 and 1846, *El Presidio* remained in caretaker status and was only intermittently garrisoned.

The increased efforts of the Spanish government to explore and settle Alta California led to the discovery of San Francisco Bay in 1769. Recognizing the strategic importance of the harbor, colonial officials ordered the establishment of a military post. It would be Spain's northernmost military garrison on the Pacific coast. In 1776, Lieutenant Colonel Juan Bautista de Anza planted a cross atop the cliff where Fort Point is now located thereby claiming the Golden Gate for Spain. His second in command, Jose Moraga, followed with a group of soldier-settlers shortly thereafter to carry out the colonization of the region. Moraga established the garrison called *El Presidio de San Francisco* in a sheltered location east of the point. As Spain became increasingly threatened by English and Russian incursions along the Pacific coast, *El Presidio* was followed by the construction in 1793 of an armed adobe fort, the *Castillo de San Joaquin,* on the point itself.

While occupying *El Presidio,* Spanish troops were successful in mounting several punitive expeditions against Native Americans, occasionally penetrating into the vast Central Valley of *Alta California. El Presidio* provided protection not only for the nearby Mission Dolores but also for Mission Santa Clara and Mission San Jose, located more than 40 miles southeast. The soldiers housed at *El Presidio* were primarily the leather-armored guards, or lancers, called *soldados de cuera.* Additionally, the garrison was host to the famed *Voluntarios de Catalunu,* or Catalonian Volunteers, as well as Spanish infantry and artillery men who manned the *castillo.*

The location of *El Presidio* was chosen not only for its strategic position on the Golden Gate and relative protection from the wind but also for its proximity to freshwater springs, wood, and safe anchorage. Convenient access to offshore anchorage at *El Presidio* was provided by a long sand spit that extended along most of the shore east of the point. This spit, later called Strawberry Island for its abundant growth of wild strawberries, enclosed a large estuary of saltwater marshes and sloughs, as well as a freshwater lagoon. Behind this estuary rose a steep bluff that was more than 100 ft. (30 m) high in some areas. The walled *El Presidio* was situated approximately 1,312 ft. (400 m) back from the bluff's edge, on a gently sloping plain of grass-covered sand dunes, backed by wooded hills and flanked by ravines and hollows.

The walled compound, or quadrangle, that surrounded the buildings of *El Presidio* was constructed of traditional adobe brick and was open or enclosed by a brush fence on one side. Buildings often had redwood or thatched roofs that were later replaced with ceramic tile. The first permanent facilities included a church, a house for the commander, quarters for troops, a slaughterhouse, and storehouses. The adobe construction of *El Presidio* was consistently weakened by the coastal dampness and torrential winter rains prevalent at San Francisco, requiring three near-total reconstructions between 1776 and 1846 (Alley et al. 1993; Adams et al. 1994).

In 1820, the Republic of Mexico was founded and *El Presidio* was transferred from Spain to Mexico 2 years later. By this time, the garrison's mixed community of soldiers and their families, civilians, and Native Americans had grown significantly. This was true both in and around the walled compound. The surrounding land had long been grazed bare by cattle, an important source of food for the *El Presidio* inhabitants. Following the secularization of California missions in the 1830s, however, *El Presidio* was abandoned gradually by military personnel, and both it and the adobe *castillo* on Fort Point began to deteriorate from neglect.

The Project is located on *El Presidio* lands and is situated approximately halfway between the current shoreline and the site of the 18th-century walled compound. Trails and wagon roads

between *El Presidio* and its landing, presumably located on the sand spit later known as Strawberry Island, most likely would have bypassed the estuary system at the eastern side of *El Presidio* and therefore bypassed the Project Area. There is some historical evidence suggesting that this sand spit along the north shore of *El Presidio* lands also may have been the scene of occasional bull and bear fights, a popular form of entertainment enjoyed by the soldiers and settlers. Additionally, a second landing from this period may have been located in the first cove east of Fort Point (Leo Barker pers. comm. 2001).

It is also likely that the edge of the estuary bluff stretching along the shoreline featured a well-traveled road connecting *El Presidio* with the *castillo* (now the location of Fort Point). Because the walled compound of *El Presidio* was located well south of the bluff's edge, however, colonial activity in the Project Area may have been limited mostly to travel and cattle grazing.

6.3.2 Early United States Occupation (1846–1860)

In 1846, the United States invaded California as part of its overall war with Mexico. By March 1847, volunteer troops serving the United States arrived at the abandoned Mexican fort and found it virtually uninhabitable and certainly not defensible. Almost immediately, the troops established a sawmill opposite the Bay (in what is now Marin County) to provide lumber for construction. The very next year, however, the war with Mexico ended with the signing of the Treaty of Guadalupe Hidalgo and the sale of approximately half of Mexico to the United States for $15,000,000. American military forces in California were dissolved, and operations at *El Presidio* were postponed for lack of money and personnel.

In 1850, the Presidio of San Francisco was designated a U.S. military reservation by executive order but nearly a decade would pass before conditions at the new Army post were substantially improved. Soldiers often abandoned the post to join the rush to the California gold fields, and the Army's limited budget for post improvements could not compete with the hyper-inflated economy of San Francisco during the gold rush. Wood for construction was especially difficult and expensive to obtain during this period, so the old adobe buildings at the post were repaired and maintained to the extent possible. During the 1850s, new wooden barracks, a hospital, a guardhouse, a supply storehouse, and new stables gradually were added to the small cluster of buildings in and around the original quadrangle.

While improvements to post amenities languished, the Army hastened to begin construction of a new defense facility on the prominent point west of the main post. In 1853, the 100-foot (30 m) cliff on which the Spanish *castillo* sat was leveled to just above the high-water line and a three-story brick fort equipped with tiers of cannon was constructed in its place. The new Fort Point, completed by 1861, included a 10-cannon battery built into the cliff behind the brick fortification, an adjacent cantonment housing fort engineers and personnel, and a wharf and associated facilities located a short distance to the east.

The gold rush population explosion in San Francisco quickly necessitated improvements to the regional water supply. By the early 1850s, several water companies were competing for water rights along Lobos Creek, one of the Presidio's natural water sources. Between 1857 and 1860, the San Francisco Water Works Company constructed a water conveyance system from Lobos Creek north across the Presidio's ocean side, then across Fort Point and along the north shore of the post into the city (Thompson 1997:38). To gain an easement across government land, the water company promised a free water supply to Fort Point and the Main Post. A wooden flume, attached precariously to the sheer face of the estuary bluff, carried the water as far as the modern location of the Crissy Field headquarters buildings, whereupon it was conveyed

underground in an iron pipe to a point east of the present-day Post Exchange. By 1862, a small pump and windmill located on the edge of the bluff north of the Main Post pumped its water supply to two reservoirs at the south end (Thompson 1997:38).

6.3.3 Civil War Period (1861–1865)

The outbreak of the American Civil War had immediate repercussions in California, which came to be seen as one of the Union's essential assets. Moreover, because the war cut the Union off from many of its resources, San Francisco harbor became increasingly important for its proximity to the gold mines of the Mother Lode country, the rich silver deposits of Nevada's Comstock mines, and even lesser discoveries such as the large mercury deposits at New Almaden near San Jose. The Presidio began to develop from a frontier outpost into a military establishment that resembled its counterparts elsewhere in the nation.

Although there was a substantial degree of pro-Union sentiment in California, there was also a very vocal pro-Confederacy faction. During the war, Army troops from the Presidio participated in the organization of a provost marshal's guard to serve under the chief of police in patrolling and maintaining order in the city through the course of the war. Fear of Confederate elements in California compelled the Union to attribute increasing importance to the Presidio as protection against alleged Confederate schemes and conspiracies. During this time, Congress appropriated funds for substantial improvements at the Presidio and for rapid completion of the new installation at Fort Point. Although the Presidio was located far from the heart of the conflict, the Civil War was directly responsible for a significant period of growth and redevelopment at the post.

As a measure of the post's importance, the Army assigned the 9th United States Infantry to service on the Pacific coast for the duration of the war, with its headquarters at the Presidio. By 1865, the post's troop strength had increased fourfold as it reached a peak population of 1,000 men. In addition to the regular troops, hundreds of civilians from California and Nevada camped at the Presidio as they convened in response to President Lincoln's call for volunteers to the Union forces.

One of the first Civil War-era improvements to the post was significantly enlarging the garrison beyond the boundaries of the colonial quadrangle. In keeping with Victorian-era Army posts throughout the American West, the layout of the Presidio was redesigned to accommodate a rectangular parade ground flanked by rows of new quarters and other needed facilities. New buildings with wooden frames and muted decoration also were in keeping with the architectural style of military buildings during this time.

The new grass-covered parade ground at the post measured 150 yards wide by 500 yards long and was oriented southwest-northeast toward the Bay. Along its southern boundary were remaining adobe buildings, a new chapel, and a three-story bachelor officers' quarters. Along its eastern boundary was a row of wood-frame officers' quarters facing the parade ground, each with kitchen facilities and a small garden plot in the rear. Later, when the parade ground was widened and in-filled with other new facilities, these quarters were reoriented 180 degrees to face Funston Avenue. At the northern end of this row, a new post hospital was constructed in 1863, replacing the temporary facility constructed only a few years earlier in the old Spanish quadrangle.

The long western side of the parade ground featured a row of one- and two-story enlisted men's barracks, a quartermaster's facility, a guardhouse, an adjutant's office, a wagon shop,

and non- commissioned officers' quarters. Behind these buildings, along the edge of a small drainage, a second row of shops included a bakehouse, a carpenter's shop, a blacksmith, two mess kitchens, two sutler's (trading posts), and a powderhouse. Directly west of these buildings, across the drainage ravine, a row of post laundry facilities doubled as quarters for the laundresses themselves, who were mostly the wives of the enlisted men. Post Quartermaster's reports of 1871, along with a map from that year (Figure 6*, 1871 Plan of the Presidio of San Francisco, California*), indicate a row of eight frame buildings for laundresses (27 x 60 ft. [8 x 18 m]), and a last, larger laundresses' building at the northern end of this row (28 x 90 ft. [9 x 27 m). Also, near the northern end of the row of laundry facilities was a small, early-American Period cemetery (first used in 1854) that was no longer in use but was still visibly marked in the 1860s. A cluster of buildings off the northwest corner of the parade ground, closest to the bluff's edge, included the post stables, storehouses, and a blacksmith.

When completed, the buildings surrounding the new parade ground were connected by a series of streets, alleys, and boardwalks. The new layout of the grounds reflected the regimented and rigidly stratified military society of the Victorian era. The main entrance to the post was located through the eastern Presidio lands in the vicinity of modern Lombard Street. The road to Fort Point, now the approximate location of Lincoln Boulevard, was an improved thoroughfare that traveled along the top of the estuary bluff and then dropped to the shore on its approach to Fort Point.

In a sheltered cove along the road to Fort Point, a second laundresses' row was established shortly before 1865. This second laundresses' row consisted of five small dwellings with outbuildings, in an area near the present location of the Crissy Field headquarters buildings. The laundresses who occupied this site were associated with Companies A and B of the 3rd Artillery (assigned to Fort Point in 1861) and with six companies of California volunteers that arrived at Fort Point sometime before 1865 (Thompson 1997:74). The soldiers and volunteers were quartered in barracks at the base of the bluff further west and near the Fort Point engineers' wharf. Officers' residences were directly above the wharf on the top of the bluff.

6.3.4 Indian and Military Affairs (1866–1890)

With the immediate crisis of the Civil War over, the U.S. government continued to uphold the strategic importance of the Presidio as a bastion of the western frontier. Troop strength expansion and improvement of the post continued during this period. Assignment to the Presidio during the late 19th century was considered "gilt-edged,'' due to the proximity of the bustling city of San Francisco and the quality and quantity of post amenities, which included a hospital, individual and communal dwellings, a chapel and other support facilities, and even vegetable gardens to enhance the relatively unimaginative post rations. Gradually, other improvements brought even better amenities, such as the installation of water pipes and a force pump to provide fire protection and to improve sanitation.

In the aftermath of the Civil War, most westerners feared that Indian tribes had been emboldened by the diversion of the military's attention to the eastern United States during the great conflict between the states. Following the war, troops at the Presidio consequently returned their attention to the "Indian problem" and engaged in the Indian Wars on the West Coast. Troops from all over the nation arrived in San Francisco and billeted at the Presidio before entering the field. Additionally, the Presidio's own troops were not entirely excused from field duty, even though they were located far from the scene of the campaigns against the Indians. In 1872, Presidio troops participated in the savage confrontations on the Lava Beds of

northeastern California, where the Modoc Indians staunchly held off a force many times their size. Troops from the Presidio also formed part of the force assembled for the Nez Perce and Sheepeater campaigns in Idaho and for the Apache and other uprisings in Arizona.

While the Presidio's critical function in operations against the Indians was widely recognized and appreciated by the local citizenry, the fact that the military' held a large tract of land in a prime locale for urban development was not. As San Francisco grew, land values in the vicinity of the Presidio increased enormously, and military leaders began facing formidable pressures to relinquish major portions of the reservation. Thus began a conflict between the Presidio and the citizens and business leaders of San Francisco that has continued for nearly a century and a half. During the 19th century, Army engineers countered various schemes to reduce or eliminate Presidio lands with the claim that the post was indispensable for housing the troops that manned the Golden Gate's defenses. As if to emphasize this point, the Army began programs to upgrade and replace its "Third System" fortifications at Fort Point. This walled-fort type of defense system had proved inefficient elsewhere during the war and was now considered obsolete. Battery West, located at the Presidio's ocean side, was completed in the 1870s. Construction on Battery East, located east of Fort Point, began in 1873 but was never completed due to a suspension of Congressional funding. By the time financing was again available in 1890, both batteries were technologically obsolete.

A few concessions of Presidio land were made during this period. In 1873, an 85-acre tract on the southern part of the post near Mountain Lake was leased for the construction of a Marine Hospital, a civilian facility that provided free, short-term and long-term medical care to merchant marines. In 1881, a railroad was built between downtown San Francisco and the Presidio, connecting military and urban communities and permitting civilian access to the Presidio. The post's cemetery, located west of the Main Post, was designated as a National Cemetery in 1884. In 1886, the cemetery, which occupied a rectangular area of 9.5 acres, was expanded south and west to encompass 15.5 acres and substantially improved by the addition of landscaping and enclosing walls with iron fences. Additionally, a small portion of Presidio lands along the northern shore east of Fort Point was transferred in 1889 to the U.S. Life Saving Service (later the Coast Guard) for use as a station. Although the station was relocated approximately 656 ft. (200 m) west of its original location during the 1915 Panama Pacific International Exposition, these facilities are still present along the outer edge of Crissy Field.

Although progress in upgrading defenses in the area of Fort Point was sporadic, improvements elsewhere on the reservation, particularly in the area of the Main Post, were spurred on by the growing presence of San Francisco. As the city's residential development encroached on the boundaries of the post, criticism regarding its unattractive appearance became more strident, and the public asked that something be done to improve the views of the reservation from the city. One unusual response to this request was for the Army to reverse the orientation of the officers' quarters along Funston Avenue to face the city, whereupon their backyards, kitchens, and privies faced the parade ground–a maneuver that must have been an affront to military traditions of the time.

The largest and most far-reaching improvement scheme of the period was conceived by Major William Albert Jones, an engineer at department headquarters. In 1883, Major Jones, under the direction of the Commander of the Department of the Pacific, developed a relatively grand and comprehensive plan to stabilize the Presidio environment, as well as to beautify its appearance. Although the plan kept the Presidio's Main Post as the focal point of the landscaping design, its goals were to create an imposing forest across the southern hills of the reservation that would contrast sharply with the adjacent city and to blend the forest northward

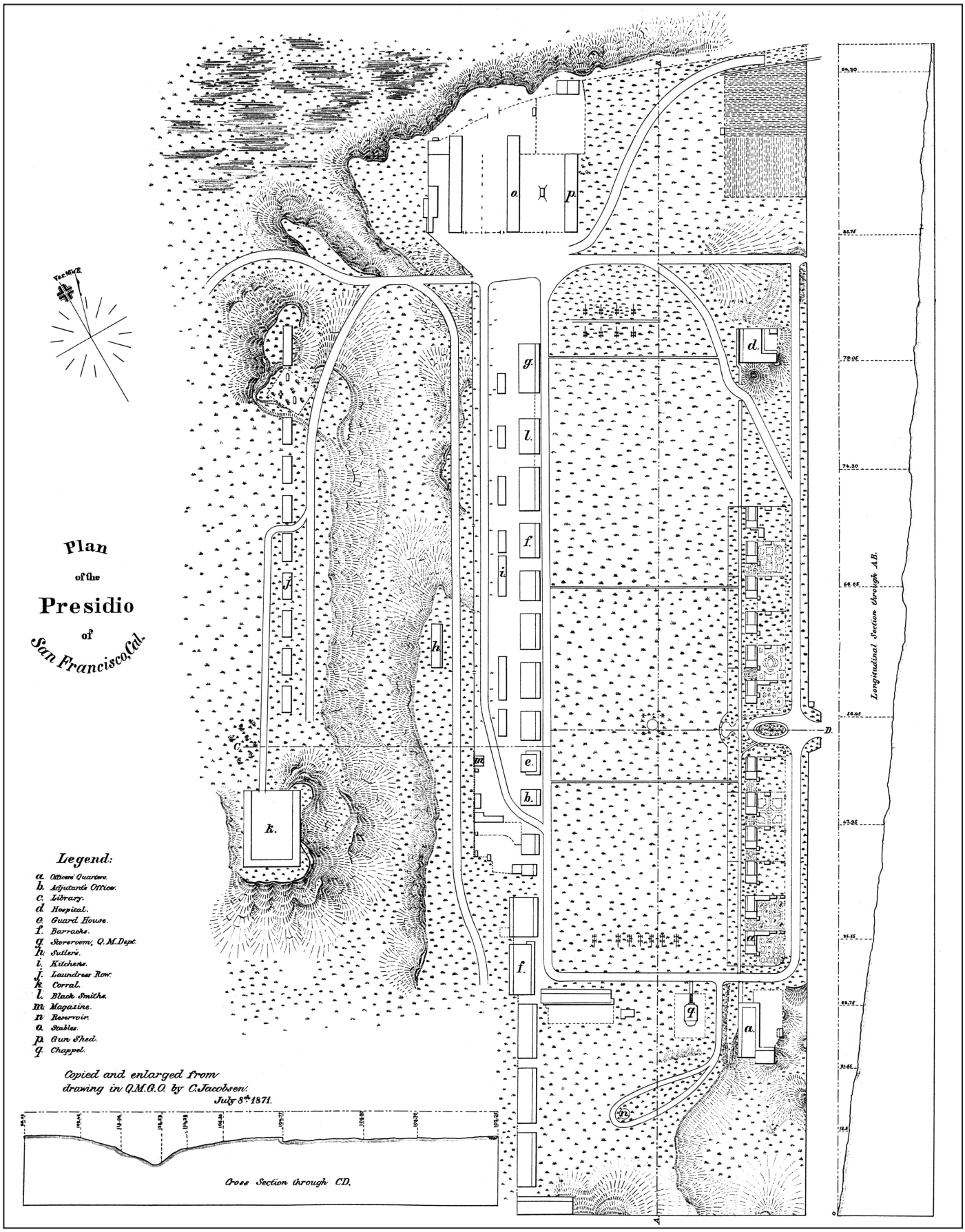

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Figure 6
1871 Plan of the Presidio of San Francisco, California

into rolling green vistas where the Presidio sloped to the estuary bluff. Leaving nothing to chance, Jones had the soil analyzed for planting, provided for the maintenance of new growth and stressed that all planting should be done with effective intent rather than in a random manner. During the 1880s, Jones's plan was carried out with funds secured for post road improvements and setting improvements to the National Cemetery. To the present day, the wooded park-like landscape of the Presidio remains a tribute to Jones and to the efforts of the Presidio military leaders in executing his plan.

6.3.5 Nationalistic Expansion (1891–1914)

In the West, as the country was settled and the Indian Wars came to an end around 1890, the function of the U.S. Army changed from a frontier constabulary to an integrating arm of government power, institution, and prowess. As early as the 1880s, the Army, in an effort to reduce maintenance and the costs of transporting supplies, had developed plans to close remotely located frontier posts that were no longer necessary for the protection of trails, railroads, and Indian reservations. Existing posts that already were located in or near cites, like the Presidio, were improved by the addition of permanent brick buildings, which replaced former quarters, barracks, storehouses, and stables of wood-frame construction.

As a result of developments nationwide, and specifically in the West, the physical environment of the Presidio was profoundly transformed through the period of the 1890s and into the new century. As its garrison strength increased more than fourfold, infrastructure improvements made at the Presidio during this time served to upgrade its water and power systems, its defense systems, and its medical facilities. Post engineers began the first large-scale reclamation efforts to fill the slough and marsh areas along the north shore of the reservation, allowing the Main Post to expand significantly to the north and resulting in the creation of the lower post, where Crissy Field eventually would be established. Additionally, an entirely new parade ground and an extensive complex of buildings, later known as Fort Winfield Scott, was established on the high plateau between the east and west armaments of Fort Point. One of the most visible landscaping efforts of the mid-1890s was the beginning of a program to enclose the post with handsome stonewalls, with imposing entrances designed by architect J. B. Whittemore.

Prior to the 1890s the most common material for building at the Presidio had been wood; the majority of the new buildings erected after 1895 exhibit exteriors of brick or stucco. This permanent construction began with an impressive row of five brick barracks where the "laundry row" of the Main Post had formerly been located. To prepare for this construction and subsequently create a new drill field adjacent to the parade ground, the substantial drainage along the west side of the Main Post was filled and brought up to grade. Except for the stone powder magazine, the old adobe and frame buildings forming the western boundary of the Civil War-era parade ground eventually were demolished.

Beginning in 1899–1900, an extensive complex of medical buildings, later known as Letterman General Hospital, was constructed directly east of the parade ground. The timing of this facility was fortunate because along with serving the multitude of troops that came to and from the Pacific, the Army opened the hospital to treat hundreds of civilian victims following the catastrophic San Francisco earthquake and fire of 1906. Not only were medical services and supplies provided in the aftermath of the earthquake, but the Army opened the Presidio grounds for the establishment of temporary "tent cities" for the homeless and subsequently erected shanty camps for the refugees in various locations on the post.

In addition to continued permanent expansion of the Main Post, new areas of more rapid construction and occupation spread throughout the southern portion of the reservation. The East and West Cantonments were established in the late 1890s to accommodate recruits entering the growing ranks of the Army, as many new companies and regiments had been added to the regular Army after the war with Spain, the Philippine Insurrection, and the Boxer Rebellion. The Presidio also housed cavalry detachments who spent their summer months between 1890 and 1914 patrolling Yosemite and Sequoia before a National Park Service was established.

One of the significant improvement programs of the period reflected the Army's most recent achievements in defense technology. The findings of a board chaired by Secretary of War William Endicott from 1885–1886 gave rise to a strong recommendation regarding the nation's critical need for new defense armaments, particularly at strategic coastal defense points. Technological advances, including new steel breech-loaders, improved propellants and projectiles, electric mines, and the experimental pneumatic dynamite gun, dictated that a new series of fortifications should replace the Presidio's "Third System" defenses and the interim East and West Batteries. The emplacements constructed over the next 16 years formed one of the most up-to-date defense systems in the nation and included one of the rare installations of the new dynamite guns. Today, even after all the ordnance has been removed, these massive structures of reinforced concrete represent some of the best-preserved examples of "Endicott-era" defenses in the country.

Located along the bluffs and peaks of the Presidio's western and northern exposures, 12 emplacements were constructed between 1891 and 1902. Batteries Baldwin, Sherwood, Slaughter, and Blaney are located along the estuary bluff in the north central portion of the Presidio. Batteries Baldwin and Slaughter, both constructed in 1901 were partially buried by the initial construction of Doyle Drive in the 1930s.

Towards the end of the 19th century, the development of the Presidio gained momentum as the United States declared war on Spain in April 1898. The war not only boosted the post's ongoing program for the construction of defenses but also focused additional attention and resources at the Presidio as the principal marshaling area for troops bound for the Philippines. As the United States began to develop a strong military presence in the Pacific, the use of the Presidio as a staging area and reentry point for troops rapidly increased.

6.3.6 World War I (1915–1918)

For the Presidio, the most notable event of this period had nothing to do with war, but instead with a world's fair—the 1915 Panama-Pacific International Exposition (Figure 7, *Map of the Panama Pacific Exposition with Approximate Area of Potential Effects*). The fair, which was planned to be held over a 5-year period, lasted only 1 year due to the mounting crisis in Europe. With its vast "Jeweled City," the exposition celebrated the momentous occasion of the linking of the Atlantic and Pacific oceans by the Panama Canal. In political terms, the exposition advanced the close relationship that had developed between the Presidio and the city of San Francisco and, for a brief time, brought the attention of the world to both. In terms of environmental change and development on the post, the exposition helped to complete the reclamation of the lower post and paved the way for the later construction of the North Cantonment and for Crissy Field.

The groundbreaking ceremony for the exposition took place in 1911 and was attended by President Taft, who had authorized the property to be set aside for the event. The majority of

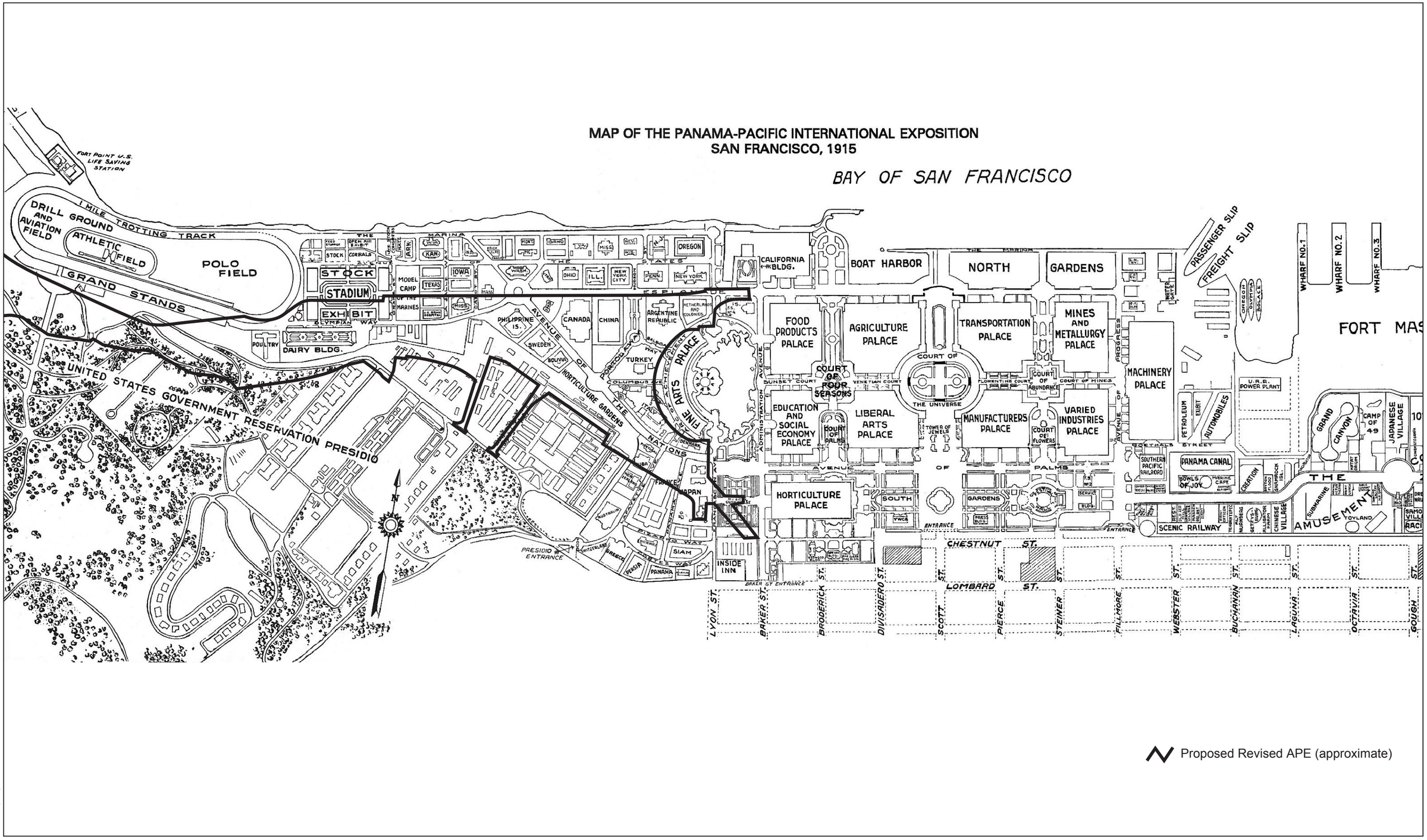

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Figure 7
Map of the Panama Pacific Exposition with Approximate Area of Potential Effects

this land was located just east of the Presidio but also included approximately 290 acres of the post's northeastern lands along the Bay (Figure 7). These lands would accommodate a significant portion of the exposition and included the State Pavilions and the Foreign Pavilions, the impressive U.S. Government Building, the U.S. Army Hospital Exhibit, the livestock exhibit area and associated buildings and corrals (many of which were located in the current Doyle Drive APE), a vast athletic field, an automobile race track, a drill ground, and service yards.

To prepare the lower post for the exposition, the remaining wetlands in the northeastern comer of the reservation were filled and raised to sufficient grade for the installation of underground utilities, streets and sidewalks, and building foundations. Between 1912 and 1913, the Quartermaster's facilities and Cavalry stables located at the base of the bluff near the Main Post were demolished and replaced by permanent stables of brick that were located west of the National Cemetery.

When the Governor of California opened the exposition on February 20, 1915, he was escorted by an honor guard of the 1st U.S. Cavalry. Throughout the exposition, many units from the U.S. Army, Navy, Marine Corps, and National Guard contributed to martial displays and events. In recognition of their cooperation, any uniformed military man was permitted to enter the exposition grounds free of charge.

The lower post of the Presidio served a nonmilitary function during the exposition. Exposition facilities in this area included the Model Camp of the Marines; the Hospital; the Texas, Mississippi, and Massachusetts buildings; International Buildings representing the Philippine Islands, Sweden, Bolivia, Canada, China, Argentine Republic, Netherlands, Turkey, Italy, and Denmark; and the Horticulture Gardens and Palace of Fine Arts (Figure 7).

Most of the exposition facilities were dismantled after its closing on December 4, 1915. Today, a reconstruction of the exposition's Palace of Fine Arts dominates the northeastern comer of the post, serving as a reminder of this historic event. During the next few years, in response to the growing threat of U.S. involvement in World War I, the Presidio grounds vacated by the exposition was transformed into the North Cantonment of temporary barracks, mess halls, and warehouses. In 1917, a railroad line was constructed from Fort Mason into the northeastern comer of the Presidio along Mason Street (Thompson and Woodbridge 1992:196). Through both World Wars, this area served as the post's major supply depot.

6.3.7 Military Affairs between the Wars (1919–1940)

In essence, the period between World War I and World War II at the Presidio featured a decade of "peacetime" with reduced forces and development, followed by the gradual upgrading of defense systems and military facilities in response to the growing crisis overseas. Army and Navy planners on the East Coast were developing contingency plans for possible future hostilities, known as "color" plans—as each potential enemy was assigned a color, such as black for Germany and orange for Japan. By the 1930s, Japan's invasion of Manchuria (1931), the sinking of the *U.S.S. Panay* in China (1933), the Marco Polo Bridge incident (1936), and Japan's general brutality in the attack on Nanking all played against the self-perceived role of the United States as historic protector of China. Relations with the Japanese grew increasingly tense, and the U.S. military and naval establishments focused increasingly on "War Plan Orange," which ultimately evolved into the "Rainbow Plan" for an alliance. The plan envisioned invasions on the Pacific islands held as bases by the Japanese.

The focus on the Japanese translated into stepped-up activities at the Presidio, including intensive training and practice for troops in amphibious landings, testing to prove the utility of the Higgens Boat and the Landing Craft Vehicle Personnel and development of new techniques in communications and the use of codes. Presidio troops involved in these activities consisted principally of the 30th U.S. Infantry Regiment, headquartered at the Presidio and occupying the Montgomery Street barracks (Buildings 100–106), as well as other facilities. This regiment had a particularly strong association with the Presidio dating back to 1901, when it was authorized by an Act of Congress and its first battalion was recruited, trained, and organized at the Presidio.

During the period between the World Wars, the command status of the Presidio increased. The post became headquarters of the Ninth Corps Area in 1920 and also headquarters of the Fourth Army in 1933. Corresponding to this increase in command status, the expansion and improvement of post facilities continued throughout this period. Building activities flourished in most of the defined areas of the post, including the Main Post; the National Cemetery; Letterman complex; Fort Winfield Scott; the North, East, and West Cantonments; the South Post; and the Marine Hospital. Virtually the only Presidio facilities that were not improved during this time were the Endicott-era emplacements located around Fort Point and at Baker Beach. By 1920, the warfare technologies advanced by World War I once again resulted in the obsolescence of the Presidio's defenses, and most of the batteries constructed during this era were dismantled.

To replace their obsolete defense systems with the technology of modern warfare, the Presidio turned to air power and in doing so ushered in one of the most significant developments to occur at the post—the installation of Crissy Field in 1919–1920. Col. Henry H. "Hap" Arnold, one of the top-rated pilots in the Army, was instrumental in establishing this airfield. When Arnold arrived at the Presidio in 1919, he noted that pilots had already adopted the sandy flatland of the lower post for an airstrip. During the 1915 Panama-Pacific Exposition, this area served as the athletic field and racetrack, creating a near-perfect area for aircraft landing.

By July 1920, the Presidio's airstrip had been named Crissy Field in honor of Maj. Dana Crissy, an Army aviator who was killed in the 1919 transcontinental air race that originated at San Francisco. Construction of the permanent post at Crissy Field was completed in June 1921; it was turned over to the U.S. Army Air Service, who was joined a year later by the 91st Observation Squadron and the 15th Photo Section. The air missions carried out by these groups contributed important aerial photography to the Army and helped to increase the effectiveness of the Coast Artillery Corps and other ground forces. Unfortunately, the dangerous coastal cliffs and largely foggy conditions at the airfield soon outweighed its advantages, and Crissy Field was closed as a first-line air base in 1936.

A second significant event to occur at the Presidio between 1933 and 1937 was the construction of the Golden Gate Bridge and the elevated highway through the Presidio that formed its southern approach. The enormous growth of the entire Bay Area during the 1920s and 1930s led to this massive public works project, a collaborative effort of six area governments collectively known as the Golden Gate Bridge and Highway District. This nonmilitary use of Presidio lands was one more in a long series of services the Army provided the city of San Francisco and the Bay Area, and the bridge literally and figuratively linked all three. In order to anchor the immense piers supporting the elevated structure, the approach to the bridge was constructed on the remains of the old bluff along the Presidio's northern reach.

Another important service that the Army provided the community during the 1930s was the supervision of Civilian Conservation Corps (CCC) units assigned to the Presidio, beginning in

1933. Employing men for both skilled and unskilled labor associated with public works projects, the CCC was formed to alleviate the hard times and unemployment experienced during the Great Depression. In 1935–1936, the CCC built several storehouses and sheds on the lower Presidio. Funds received from the Works Progress Administration also were used to employ civilian workers for landscape and roads improvements at the Presidio, including curbs, retaining walls, and drainage features handsomely constructed of stone or scored concrete.

6.3.8 World War II (1941–1945)

The general lull in defense building at the Presidio that followed the development of Crissy Field ended on December 7, 1941, as the country entered World War II and the Presidio became the nerve center for Army operations in defense of the western United States. General John L. Dewitt led the IX Corps and Fourth Army from his headquarters at the Main Post. The Harbor Defense Command, under the general's authority and located at the old Battery Dynamite. The impressive programs of permanent construction that had come to reflect peacetime years on the post once were again set aside in favor of temporary, rapid mobilization facilities. New cantonments sprung up on the Main Post, at Fort Winfield Scott, and on Crissy Field. During the war, the Army even regained use of the Palace of Fine Arts from the City and County of San Francisco for a temporary warehouse.

As in the first World War, one of the Presidio's most important activities during World War II centered around the Letterman Hospital complex. The facility, which had been expanded substantially through the 1920s and 1930s, was fully utilized during this period. It became the largest debarkation medical center in the United States; at the height of the war, it registered a peak load of 72,000 patients in 1 year.

6.3.9 1945 to the Present

Although the Presidio continued to serve as a major military installation from the end of World War II to 1994, the period of historical significance for the Presidio NHL District ends in 1945 (at the close of the World War II era). Important post-war developments associated with the Presidio involve the signing of treaties, such as the 1951 ANZUS Treaty and Joint Security Pacts between the United States and Japan, the Cold War-era installation of Nike missile defenses, the role of Letterman Hospital during the Vietnam conflicts, and the Presidio's continued service to the community.

Although the Presidio's transformation from military post to national park began in 1972 when Congress created the GGNRA, the U.S. Army did not lower its flag for the last time until October 1994, when the Presidio was transferred to the NPS as part of the GGNRA. Because of the Presidio's city-like infrastructure, its nearly 800 buildings, and its expansive cultivated forest and natural area, funding the Presidio's operation and long-term care is much more costly than traditional parks. In 1996, the Congress devised a management and funding model unique among national parks and created the Presidio Trust to preserve the Presidio's natural, scenic, cultural, and recreational resources and to become financially self-sufficient. The Trust receives federal appropriations that diminish each year and cease at the end of fiscal year 2012.

6.4 PREVIOUS CULTURAL RESOURCES STUDIES

Prior to 1989, the Presidio was an active military installation with few important archaeological projects taking place there. However, a few notable excavations were conducted during the U.S. Army's use and are noted in the NHL study. Barbara Voss's recent book, *The Archaeology of Ethnogenisis: Race and Sexuality in Colonial San Francisco* (Voss 2008) contains an excellent summary of the previous work conducted within the Presidio to date.

In general, archaeological research at the Presidio has been limited to minimal excavation and observations made during monitoring for construction projects and environmental cleanup efforts. Not all of these efforts have been formally documented in study, survey, or monitoring reports. Table 3 summarizes all known and documented studies, surveys, and monitoring efforts within the Presidio and should serve to direct the reader to more comprehensive studies of Doyle Drive and the greater vicinity.

6.4.1 Review of Previous Studies in the APE

The first known archaeological work within the Project APE was conducted by Woodward-Clyde Consultants (1996b) for the D.E.R.P. Related Archaeological Monitoring Services. Archaeological monitoring during soils sampling undertaken at Building 637 and archaeological monitoring and soils bore inspections for well installations at Building 231 were negative for archaeological resources. In 2001, Basin Research Associates conducted a coring program within the APE primarily to determine local stratigraphy in order to assist in future test excavations associated with the Doyle Drive Corridor Project (Jones & Stokes and Albion Environmental 2002a) and secondarily to determine the presence or absence of material cultural at the sample locations. One hundred potential locations were intuitively and systematically selected for coring in the APE; however, only 88 were cored because of the presence of underground utilities, dangerous traffic patterns, and hazardous materials at some locations (see Figure 8, *2001 Geotechnical Coring Locations in the Area of Potential Effects*). Then, in September 2001, a second review of 20 selected core samples was conducted by geoarchaeologist Jack Meyer, then of the Anthropological Studies Center, which provided information regarding buried archaeological site potential and testing in the Doyle Drive APE for the project.

An ASR/HSR was prepared for the Focused Archaeological APE of the Doyle Drive Corridor by Jones & Stokes and Albion Environmental (2002a), followed by an archaeological testing program throughout the APE in November and December 2001 (see Figure 9, *Previously Excavated Archaeological Trenches in the Area of Potential Effects*). The objectives of the testing program were to identify archaeological resources in the APE, delineate their boundaries, and assess their eligibility for inclusion in the NRHP and the CRHR. The Phase I Extended Survey/Phase II Evaluation Report (Jones & Stokes and Albion Environmental 2002b) documents the findings and results of the program. The report provides a comprehensive research design for historic and prehistoric sites, which provides some of the same information for the current project.

Prehistoric sites in the current Project APE include the remains of prehistoric shellmound CA-SFR-6, the Presidio Mound, first identified and recorded in 1912 by L.L. Loud, when it was unearthed during marshland reclamation for the Panama-Pacific International Exposition. It was covered over shortly thereafter and not relocated until archaeological testing of the Doyle Drive APE. The site is set near the base of steep cliffs (see Figure 10, *Previously Recorded Prehistoric Sites in and Adjacent to the Area of Potential Effects*). A human burial, designated

TABLE 3. SUMMARY OF ARCHAEOLOGICAL STUDIES CONDUCTED AT THE SAN FRANCISCO PRESIDIO

Title	Reference	Type of Study	Location(s) of Project	Findings	In Project APE?
National Register of Historic Places Registration Form, Presidio of San Francisco National Historic Landmark District	Alley et al. 1993	NHL District Nomination	Entire Presidio	NRHP eligible as NHL District	Yes
Report on Architectural and Historic Evaluation of Access-Holes	Woodward-Clyde 1994	Architectural evaluation	Main Post	7 access holes have a high level of structural integrity and may be eligible for the NRHP District as contributing elements	No
Summary of San Francisco Marine Hospital Cemetery, Presidio of San Francisco, California	Mainery 1994	Historic and documentary research	Marine Hospital Cemetery	Marine Hospital Cemetery	No
Report on the Archaeological Inspection of an Historic Feature Adjacent to Building 104, Presidio of San Francisco, California	Voss 1994	Archaeological testing	Building 104	Concluded to have no research value	No
Wayside Exhibit Field Investigations, Presidio of San Francisco, California	Voss and Benté	Archaeological testing	Wayside Exhibit Field	No cultural resources located	No
Archaeological Discovery and Investigation of the Historic Presidio de San Francisco, California	Voss et al. 1996	Archaeological testing	Main Post	Presidio quadrangle wall	No
Archaeological Investigation Reports, Volume 1	Woodward-Clyde Consultants 1996a	Archaeological monitoring and architectural and historic evaluations of access holes for sanitary sliplining project	Sanitary Sewer Sliplining Project; Underground Storage Tank Removal; Replacement of Lateral Sanitary Lines in Vicinity of Buildings 101–104; Construction of Backflow Protectors and Additional Storm Drain Repairs	No cultural resources located; 3 access holes have a moderate level of structural integrity and may be eligible to the NRHP District as contributing elements	No

TABLE 3. Continued

Title	Reference	Type of Study	Location(s) of Project	Findings	In Project APE?
Archaeological Investigation Reports, Volume 2	Woodward-Clyde Consultants 1996b	Archaeological monitoring	D.E.R.P. Related Archaeological Monitoring Services (Buildings 38, 39, 231, 637, 650, 920, and 1827, Fort Baker, Selected Underground Storage Tanks, Sanitary Sewers, Landfill 2 and 8); NPS Related Archaeological Monitoring Services (Wayside Exhibit, Buildings 4, 35, and 104); Water Treatment Plant Foundation Exposures (Buildings 1773 and 1776); Landfill Soil Testing (various landfill areas); Motorpool Area Environmental Remediation (Crissy Field); Fiber Optic Cable Feature Recordation	No cultural resources located	Yes (Buildings 231 and 637)
Archaeological Investigation Reports, Volume 3	Woodward-Clyde Consultants 19966c	Archaeological monitoring	Water Distribution System Upgrade	No cultural resources located	No
Archaeological Research in the Presidio Quartermaster's Dump: Preliminary Summary Report and Proposal Mitigative Data Recovery	Holman & Associates 1999	Archaeological excavation	Crissy Field	Quartermaster Dump area for the Presidio	No
Final Report, Funston Avenue Archaeological Research Project, Presidio of San Francisco	Ramsay and Voss 1999	Documentary research, stratigraphic trenching, geophysical survey and presence/ absence testing	Funston Avenue	Dense concentration of Spanish-colonial (1776–1821) and Mexican period archaeological deposits and American period (1861–1878) archaeological deposits	No

TABLE 3. Continued

Title	Reference	Type of Study	Location(s) of Project	Findings	In Project APE?
Final Report, Funstone Avenue Archaeological Research Project, Presidio of San Francisco	Ramsay and Voss 2000	Archaeological excavation	Funston Avenue (Building 13 West Yard, Building 14 East Yard, Building 15 East Yard)	Intact historic-era (early colonial occupation of Presidio through the early 1900s) archaeological deposits	No
San Francisco Spanish Colonial Presidio Field and Laboratory Report for 1996, 1997, 1998, and 1999 with Stratigraphic Discussion	Simpson-Smith and Edwards 2000	Archaeological excavation	Presidio Chapel, Sacristy, Defense Wall Segment, and the eastern Extent of the Officers' Club Adobe	Construction-related materials and late Mexican/Early American period trash pit	No
Crissy Field Restoration Project Final Report of Archaeological Investigations at the Crissy Field Prehistoric site, CA-SFR-129, Presidio of San Francisco, Golden Gate National Recreation Area	Clark 2001	Archaeological testing, excavation, and evaluation	Crissy Field	CA-SFR-129	No
Coring Program Report: Doyle Drive Corridor Project, Presidio of San Francisco National Historic Landmark District, City and County of San Francisco, California	Basin Research Associates, Inc. 2001	Geoarchaeological testing	Doyle Drive	No cultural resources located	Yes
Rediscovery of Presidio Mound (CA-SFR-6)	Gambastiani and Fitzgerald 2001	Archaeological testing and excavation	Doyle Drive	CA-SFR-6/26	Yes
Phase I Extended Survey Report/Phase II Evaluation Report, Doyle Drive Corridor Project, Presidio of San Francisco National Historic Landmark District, City and County of San Francisco, California	Jones & Stokes and Albion Environmental 2002b	Archaeological testing and excavation	Doyle Drive	CA-SFR-6/26	Yes

TABLE 3. Continued

Title	Reference	Type of Study	Location(s) of Project	Findings	In Project APE?
Archaeological Survey Report/Historical Study Report, Doyle Drive Corridor Project, Presidio of San Francisco National Historic Landmark District, City and County of San Francisco, California (Volume 2 of 4)	Jones & Stokes and Albion Environmental 2002a	Treatment plan	Doyle Drive	NA	Yes
Tennessee Hollow Archival Research	URS 2002	Historic and documentary research	Tennessee Hollow Watershed	El Polín and other associated water supply systems; Sanchez Adobe and Briones, Miranda, Miramontes Adobes at El Polín Springs; wood frame house and Higuera Family at El Polín Springs, astronomical station and Native American sites and road to Mission Dolores	No
Crissy Field Restoration Project: Research Directions –Treatment of Historic Archaeological Data and Proposed Research Plan for Data Recovery from the Crissy Field Archaeological Project	Ambro and Clark 2003	Treatment plan	Crissy Field	Quartermaster Dump deposit	No
Preliminary Condition Assessment, Building 50, Presidio of San Francisco, CA	Crosby et al. 2003	Architectural condition assessment and fabric (material) investigation	Building 50 (Officer's Club)	Adobe structure present	No
Cultural Resources Baseline and Impact Assessment for the Baker Beach Disturbed Areas (BBDAs) 1, 1A, 2, and 2A Remedial Action	URS 2004	Archaeological survey	Baker Beach Disturbed Areas 1, 1A, 2 and 2A	Nineteenth century fortifications (various)	No

TABLE 3. Continued

Title	Reference	Type of Study	Location(s) of Project	Findings	In Project APE?
Tennessee Hollow Watershed Archaeology Project 2003–2004 Annual Progress Report of Test Excavation at El Polín Springs	Voss et al. 2004a	Archaeological testing and focused excavation	El Polín Springs	Stone foundation of Spanish-colonial/Mexican adobe house	No
Tennessee Hollow Watershed Archaeological Project, Summer 2004, Excavations at El Polín Springs	Voss et al. 2004b	Archaeological excavation	El Polín Springs	Stone foundation of Spanish-colonial/Mexican adobe house and related household refuse deposit or midden	No
Tennessee Hollow Watershed Archaeology Project, 2004-2005 Annual Progress Report, Excavation at El Polín Springs	Voss et al. 2005	Archaeological excavation	El Polín Springs	See above	No
Archaeological Investigations of the Mesa Room, Building 50 of the Officers' Club, El Presidio de San Francisco, San Francisco, California	Blind and Bartoy 2006	Archaeological testing	Building 50 (Officer's Club)	Adobe structure dating to 1776	No
Subsurface Geoarchaeological Survey of the Building 207/231 Area, Presidio of San Francisco, City and County of San Francisco, California	2006	Geoarchaeological survey	Building 207/231 Area	No prehistoric artifacts, but two palesols (or "old soil" representing stable land surfaces in the past) and isolated historic-era artifacts within fill deposit concluded to have no research value	Yes
The Analysis of Glass and Shell Beads from Building 39 at the San Francisco Presidio, California	Van Bueren 2006	Specialized analysis	Building 39	Possible Native American labor encampment outside walls of Presidio	No
Archaeological Testing Report for Disney Presidio Project (letter report)	Bartoy 2006	Archaeological testing	Buildings 104, 108, and 122 along Taylor Road	Isolated historic-era deposits and coal/clinker deposit	No
The Marine Hospital Cemetery, Presidio of San Francisco, California	2006	Historic and documentary research	Marine Hospital Cemetery	Marine Hospital Cemetery	No

TABLE 3. Continued

Title	Reference	Type of Study	Location(s) of Project	Findings	In Project APE?
Presidio de San Francisco 2006 Excavation Report	Simpson-Smith and Edwards 2007	Archaeological excavation	Presidio Chapel	Construction-related materials	No
Up to Our Elbows in Nightsoil	Clevenger and Blind 2007	Archaeological excavation	Taylor Road	5 privy features related to the historic-era 'Laundresses Row'	No
Macrobotanical Analysis of Flotation Samples from the Taylor Street Privies, San Francisco County, California	Popper 2007	Specialized analysis	Taylor Road	Same as above	No
Doyle Drive Project – Incinerator Site historic period dump	Caputo 2008	Archaeological testing	Adjacent to former incinerator building (No. 669)	Artifacts associated with 20th century dump and possible architectural incinerator remains	Yes

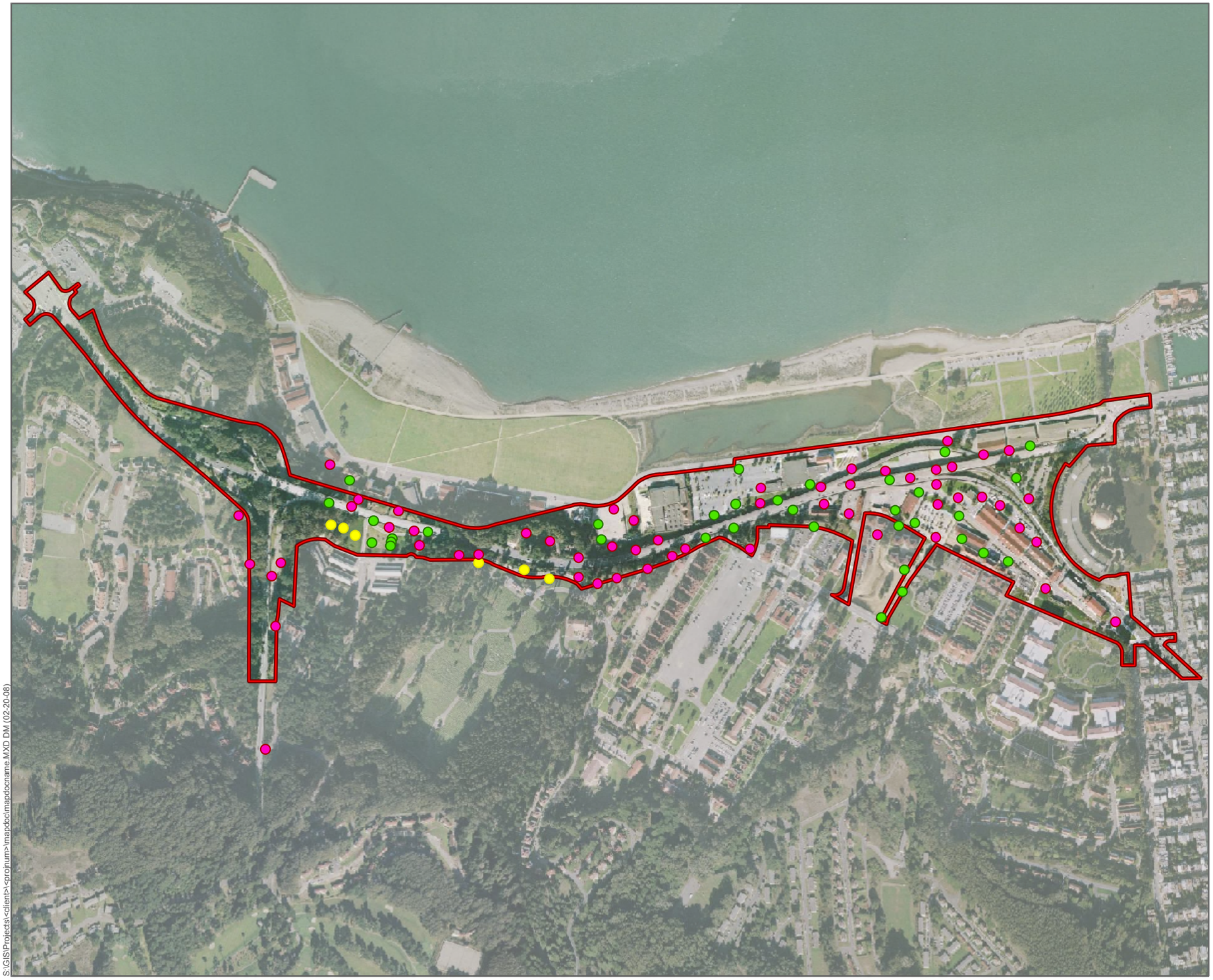

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Figure 8
2001 Geotechnical Coring Locations in the Area of Potential Effects

Legend

Archaeological Area of Potential Effects

Core Locations

- NEGATIVE
- NOT DUG
- POSITIVE

N

0 1,000 2,000
Feet

0 250 500
Meters

Source: Basin 2001

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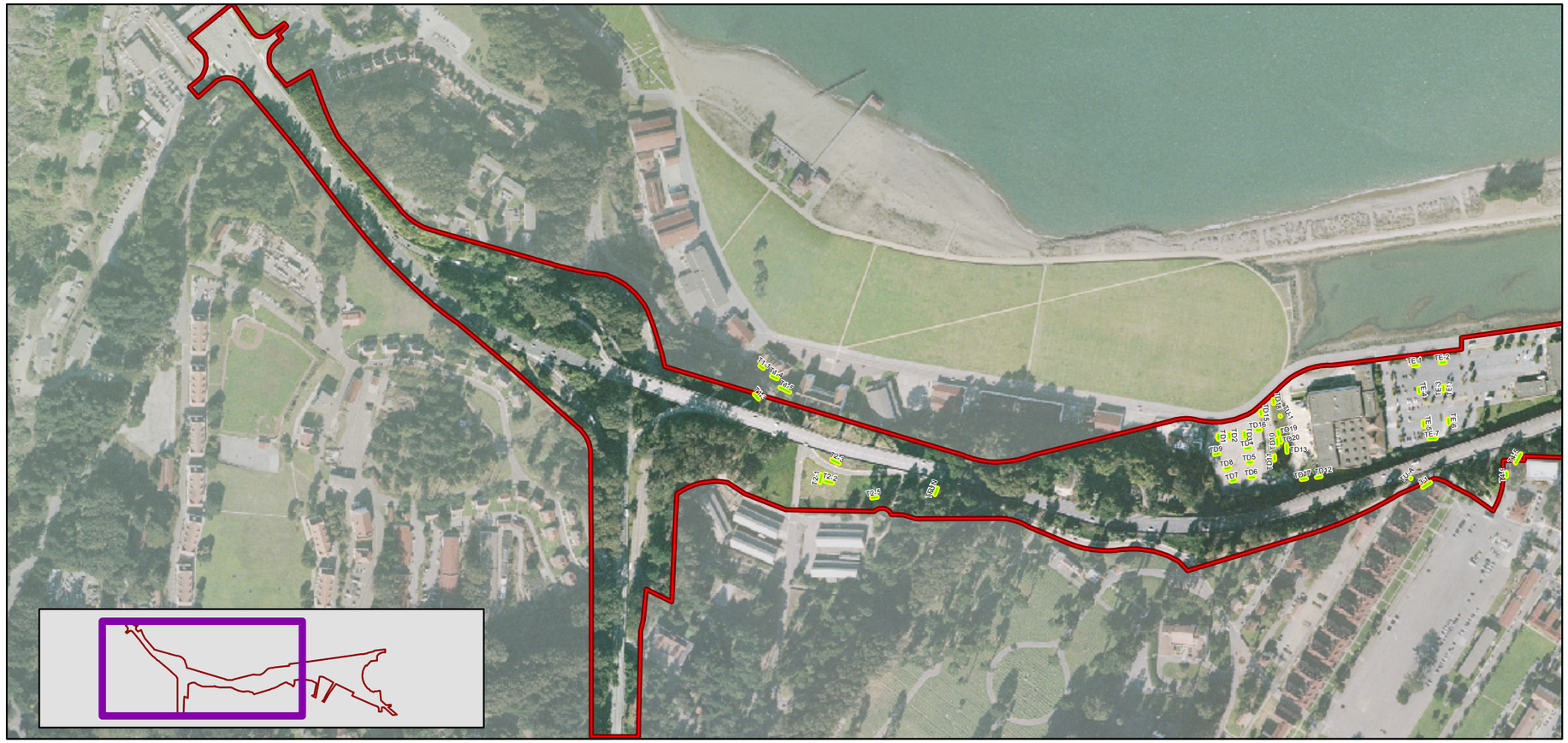
an ICF International Company



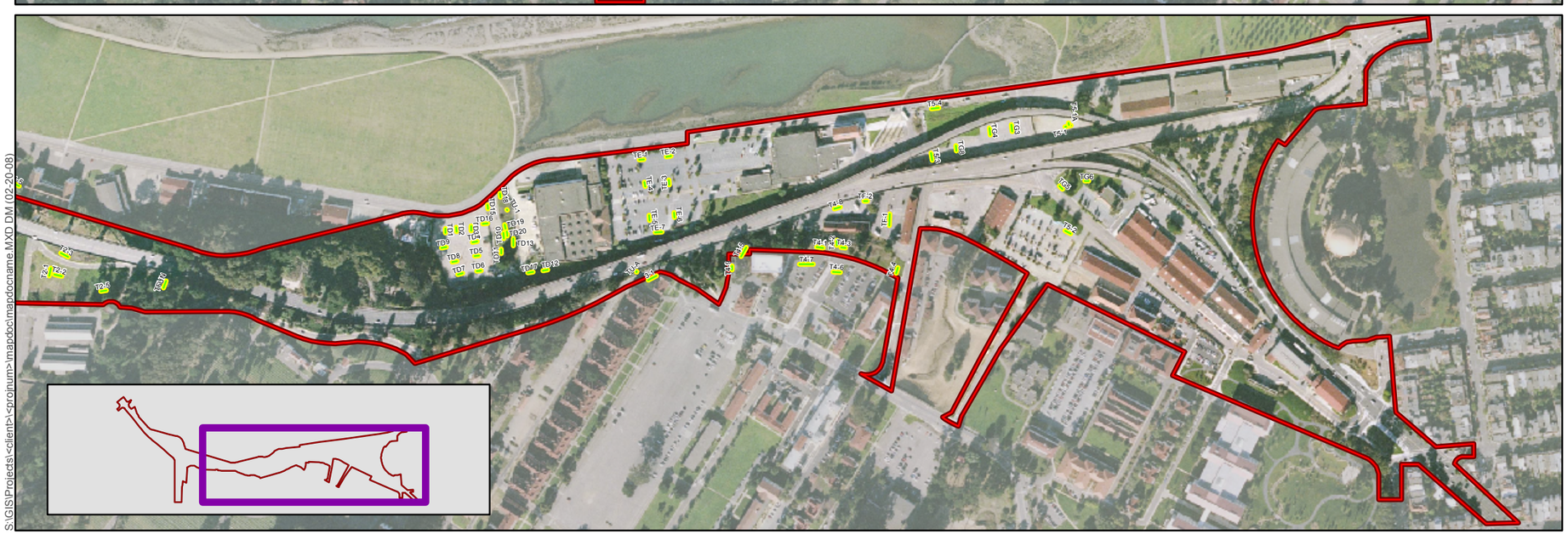


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Figure 9
Previously Excavated Archaelogical Exploratory Trenches in the Area of Potential Effects

Legend

Trenches

Archaeological Area of Potential Effects

N

0 495 990
Feet

0 150 300
Meters

Source: Jones & Stokes and Albion 2002

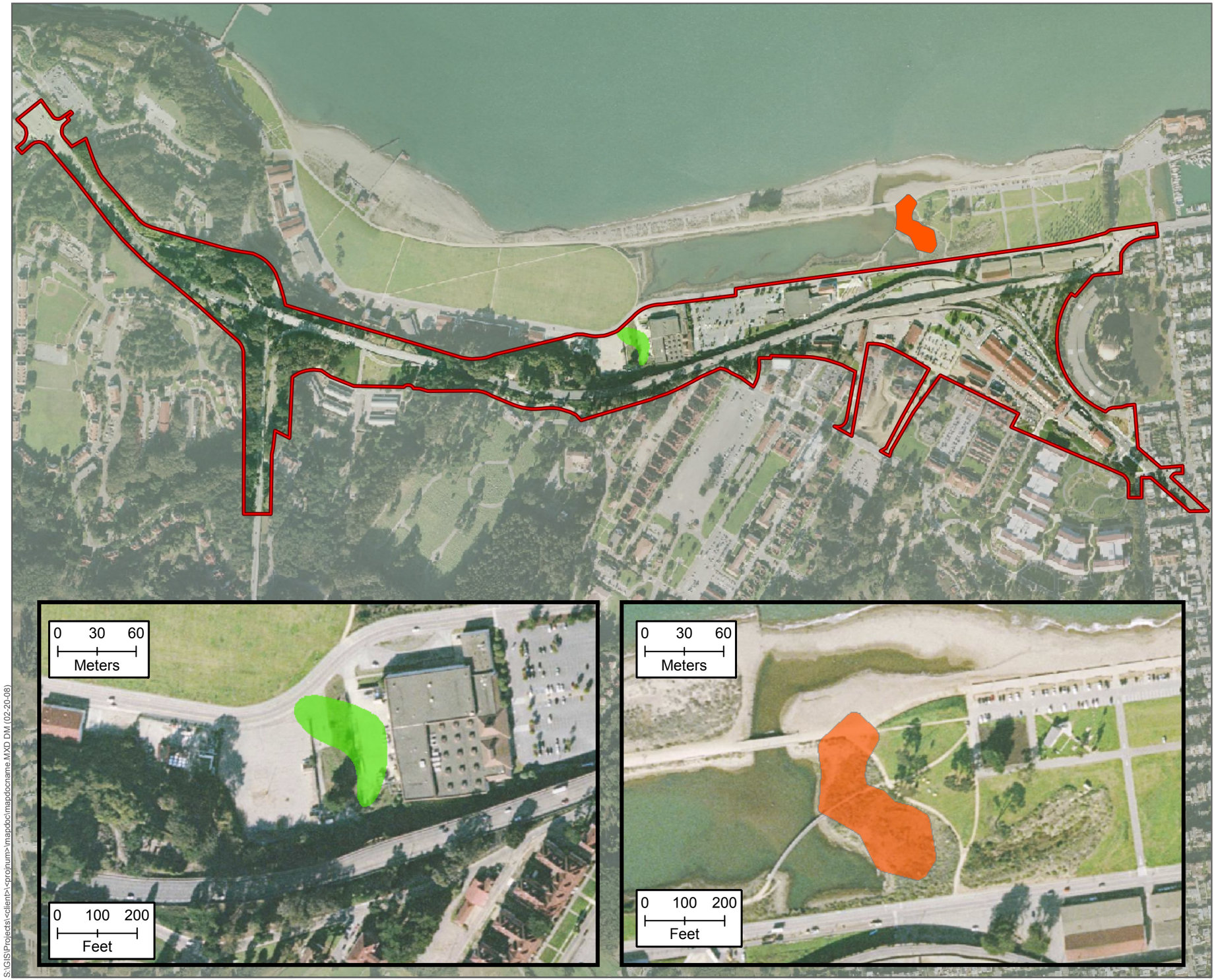

Figure 10
Previously Recorded Prehistoric Sites in and adjacent to the Area of Potential Effects

Legend

- Archaeological Area of Potential Effects
- CA-SFR-129
- CA-SFR-6/26

N

0 1,000 2,000
Feet

0 250 500
Meters

Source: PRESIDO TRUST

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CA-SFR-26, had been recovered in the 1970s from the same location (Moratto and Heglar 1972); at that time the midden site was not encountered, and the burial, including a cut-and-polished bird-bone fragment, was considered an isolated find (Moratto 1984:267). Trenching was conducted at CA-SFR-6 as part of the Doyle Drive Project (Giambastiani and Fitzgerald 2001). A radiocarbon sample from the midden of CA-SFR-6 and a sample of human remains (CA-SFR-26) yielded similar radiocarbon dates in the late prehistoric period. No other evidence of archaeological deposits was identified during the testing program. CA-SFR-6 was evaluated as eligible for the NHRP under Criterion D, for its potential to make important contributions to various research issues identified in the research design; it may also be eligible under Criterion A, for traditional or other values attributed to ancestral sites by the modern Ohlone community. According to the authors, CA-SFR-6 also appears to constitute a historical resource for the purposes of CEQA (Jones & Stokes and Albion Environmental 2002b) (see Figure 10).

Although not within the APE, CA-SFR-129, known as the Crissy Field site, is in the immediate vicinity of the Project (see Figure 10). The site was investigated by Holman & Associates for NPS's Crissy Field marshland restoration project (Clark 2001). CA-SFR-129 is an intensively used site that dates to Phase 2 of the Late Period (ca. 1500 AD); it yielded a large faunal assemblage of shellfish, marine mammals, marine and migratory birds, terrestrial mammals, and fish. The site was determined to be eligible to the NRHP and was avoided for marshland restoration (Jones & Stokes and Albion Environmental 2002b).

Also investigated for the Crissy Field Restoration Project was the Presidio's historic-era Quartermaster's Dump (Holman & Associates 1999). Test-phase investigations revealed the presence of a large deposit of material relating to the Presidio's organized system of dumping from the 1880s to 1912. In 1912, the area was covered with dredged bay sands in preparation for construction of buildings for the Panama-Pacific International Exhibition. Based on the findings of the test excavations, several areas within Crissy Field were evaluated as potentially contributing to the Presidio's NHL, and data recovery excavations were undertaken (Ambro and Clark 2003). Over 500,000 artifacts were recovered; the artifacts represent a variety of military and domestic activities, as well as those associated with a port city on the Pacific (see Figure 11, *Projected Location of the Quartermaster Dump Site*).

The Presidio was designated an NHL District in 1993 (Alley et al. 1993): several historic sites and features that may extend into the Project APE were found to be contributing elements to the district (see Table 2 in Jones & Stokes and Albion Environmental 2002a). None of these were identified by the 2001 testing program by Jones & Stokes, probably due to the extensive grading and fill removal that have occurred in this area. Jones & Stokes archaeologists concluded that the few historic-period features and objects identified during the testing program do not contribute to the NHL district.

In 2006, the Anthropological Studies Center at Sonoma State University conducted a subsurface geoarchaeological survey in the Building 207/231 area of the Presidio (Dalldorf et al. 2006) within the current APE. The work was conducted in response to a Corrective Action Plan developed by MACTEC (2005), which proposed to remove contaminated materials and soil related to past releases of petroleum (i.e., fuel oil, diesel) during the U.S. Army tenure at the Presidio. Nine backhoe trenches ranging from 10 to 20 ft. (3.1 to 6.2 m) in length and 4 to 15 ft. (1.2 to 4.6 m) in depth were excavated in the Project Area (see Figure 12, *Geologic Trenches Dug for the Building 207/231 Project*). No prehistoric artifacts were identified; however, two paleosols (or "old soil" representing stable land surfaces in the past) were revealed: an upper and lower dune, dating to the Holocene/historic era and Holocene, respectively. The soils were poorly formed, suggesting that they were available for human use

only for a limited period of time. The historic surface soils were also identified under fill. Several historic-era artifacts were identified within fill deposits; all were judged to lack of research value.

Recently (June and July 2008), as part of an ongoing environmental remediation program by the Trust to remove landfills, tanks and pipelines, and other contaminated materials and debris resulting from Army activities at the military post, the site of a buried historic period dump was located in the open space adjacent to the former incinerator buildings (No. 669) (see Figure 20, *Known and Predicted Historic Resources Locations* in Chapter 7 for general depiction of the Incinerator Site historic period dump location). The dump lies within the current Project APE and is bounded by Incinerator Rod to the east, Crissy Field Avenue to the north, McDowell Avenue to the west, and Cowles Street to the south. The goal of the Trust project was to define the extent of the dump and remove the potentially hazardous contents. Excavations for the remediation project focused on the eastern half of the open space where a tractor-mounted backhoe created a large open exposure (0.39 acres [~ 1,576.59m^2]) as the dump's contents were removed. To the west of the exposure, a series of ten trenches were excavated, presumably to delimit the boundaries of the materials. A site inspection and recording were undertaken by Caltrans archaeologist Christopher Caputo on July 16 and 23, 2008, in attempt to identify the nature (i.e., age, integrity, artifact quantities) and extent (i.e., length, width, depth) of cultural deposits within the exposed portions of the site. Site deposits were found to extend over most of the open exposure and were present in more than half of the trenches excavated to the west of the exposure. A relatively arbitrary site boundary based on the areas excavated for the project indicates that the site has a lateral limit of just over 197 ft. (60 m) east-to-west and148 ft. (45 m) north-to-south within the APE. However, it should be noted that observations were constrained by the areas exposed for the remediation project and deposits were observed to extend beyond these boundaries to the east, south, and west. Furthermore, a large portion of the site's deposit had been previously removed for the remediation project and was not available for inspection. In most areas, the deposits appeared in densely deposited stratigraphic packages averaging a meter thick with some areas as thick as 6.5 ft. (2 m). In other areas, excavations did not appear to go deeper than the deposit. The entire deposit appeared to be capped by at least 3.3 ft. (1 m) of imported soil and as much as 6.5 ft. (2 m) in some locations.

The artifact assemblage indicates that the historic period deposit in this location may be characterized as an early 20th century dump composed of a diverse range of variably fragmented and incinerated domestic, military, and medical refuse. Horizontal and/or vertical patterning across the site was not readily apparent, but one location (Trench 8) appeared to exhibit a spatially isolated deposit of military ceramics. In addition, a partially intact architectural feature may represent the remains of an incinerator or associated structure that predates the existing incinerator building (ca. 1936) and is depicted near this location on maps dating to 1912. Site integrity was found to be highly variable across the site according to where the Trust remediation project had removed deposits and the ensuing constraints of this investigation.

Figure 11
Projected Location of the Quartermaster Dump Site

Legend

- QuartermastersLandfill
- Undetermined Extent
- Archaeological Area of Potential Effects

N

0 200 400
Feet

0 50 100
Meters

Source: PRESIDO TRUST

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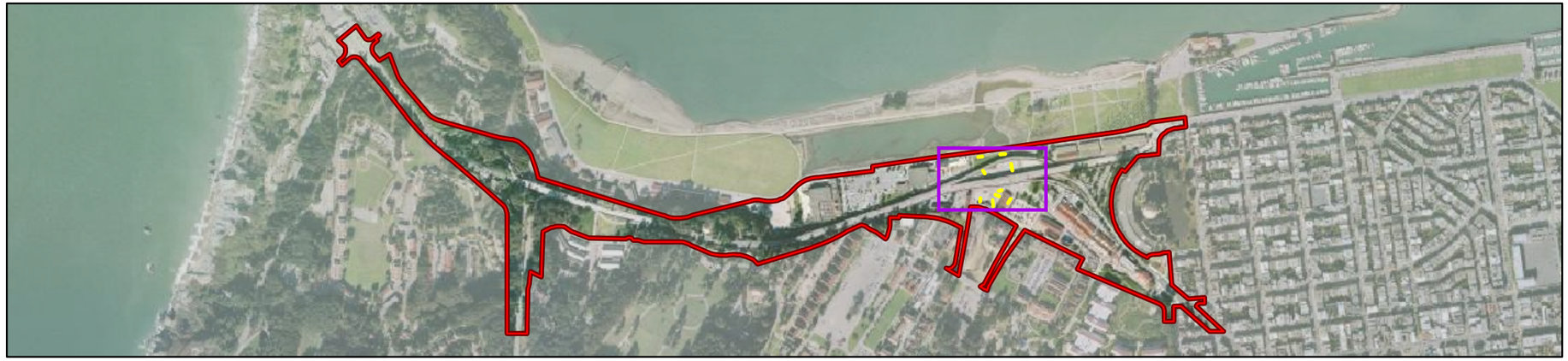

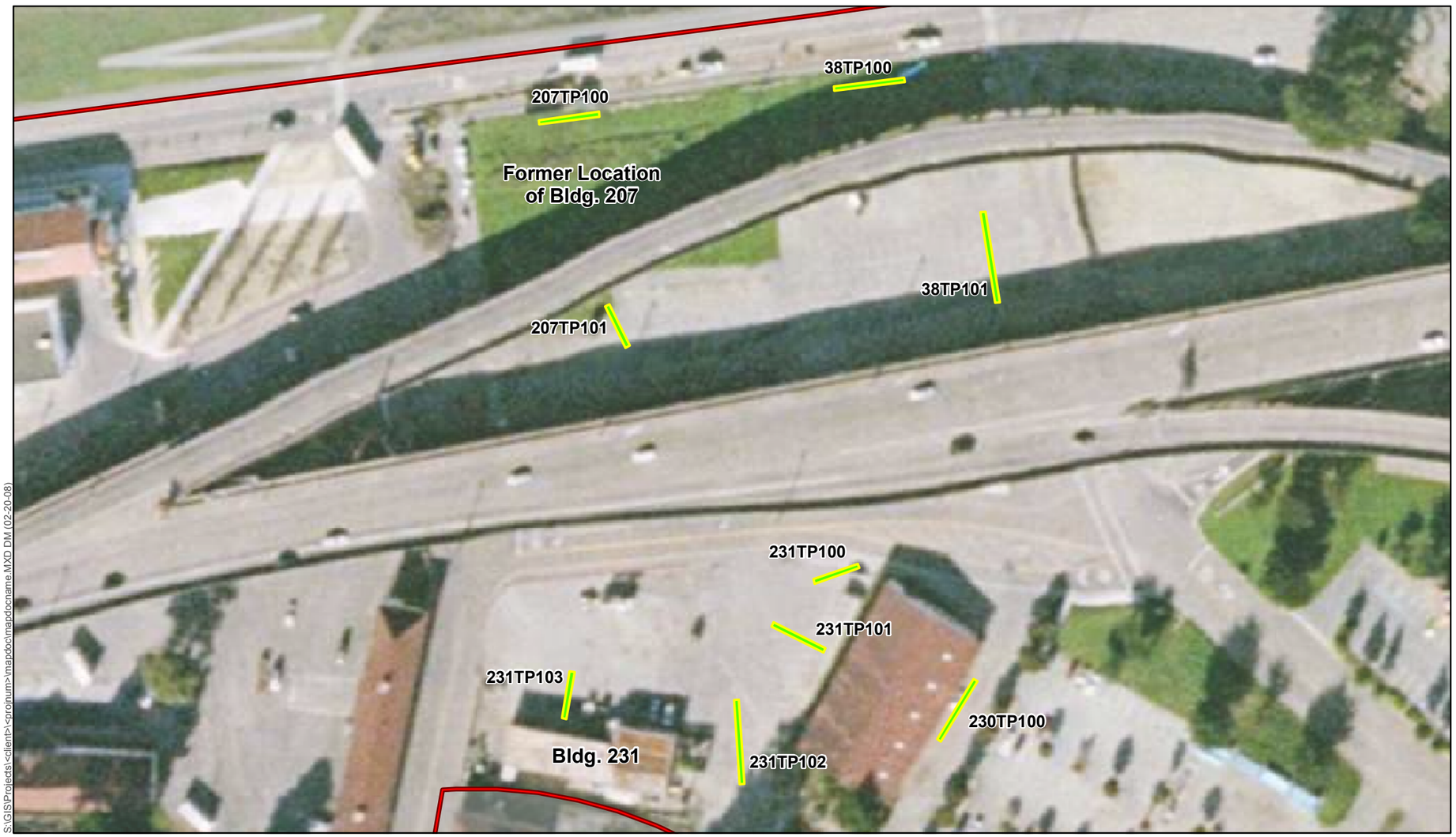

Figure 12
Geological Trenches Dug for the Building 207/231 Project

Legend

Trenches

Archaeological Area of Potential Effects

N

0 100 200
Feet

0 25 50
Meters

Source: Dalldorf et al. 2006

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SECTION 7: ASSESSMENT OF ARCHAEOLOGICAL SENSITIVITY

The assessment of the archaeological sensitivity of the APE has determined that there is the potential to encounter as yet unrecorded prehistoric and historic archaeological sites in the APE that are either individually eligible for the NRHP or contributors to the Presidio NHL. The following discussion first considers the archaeological sensitivity of the APE and then considers the various kinds of significant archaeological resources (anticipated property types) it is reasonable to expect in the APE and where they may be encountered. Those predictions provide the basis for defining where treatments measures are appropriate later in this plan.

7.1 DEPOSITIONAL HISTORY

Prior to modifications in the American era, the northern shore of the Presidio was a windswept open beach, backed by sparsely vegetated but stable dunes (see Figure 13, *Marsh Estuary System in the San Francisco Presidio*). South of the beach and dunes, a fresh- to saltwater brackish pond marsh/tidal slough system paralleled the shore, draining west to east from near the Fort Point bluff to near the Fort Mason area. East of the shifting beach sand and freshwater pond/marsh, stable dunes over a stable substrate formed a permanent dry "island," designated "Sand Island," "Strawberry Island," or "Strawberry Point" on early maps and later serving as the location of the second Presidio Wharf. This dune area and the inland marsh/estuary system behind it provided a myriad of resources for the prehistoric Native American population living in and around the APE. In contrast, the later Spanish, Mexican, and American military occupants viewed the estuary as a stagnant, odorous, unhealthy wasteland to be drained and made useful for "modern" civilization.

There is very little evidence of changes to the landscape during the Spanish and Mexican eras (Bowman 1946; Thompson 1997; Land and Community Associates 1991; Desmond and Blind 2000). The marsh/slough was filled along lineal alignments for roads and causeways beginning early in the American Period. As mapped in 1851 (U.S. Coast & Geodetic Survey 1851a, 1851b), the Bay margin/beach was at least 147.6 ft. (45 m) and perhaps up to 76 m south of its present location. Beginning in the 1890s or earlier, Army engineers gradually filled the inland estuary as the installation expanded. During the 20th century, this reclaimed land area was extended farther into the Bay, using rubble and fill to stabilize the beach before covering it with sand.

Another major modification of the natural environment of the Presidio resulted from the beautification program initiated in the 1880s to transform the barren dunes of the post into a forested, park-like landscape. Although they were confined largely to the southern part of the Presidio lands, groves of eucalyptus and other nonnative plantings, as well as both native and nonnative grasses, replaced the natural dune landscape of the Presidio right down to the estuary bluff. The linear precision with which the planting program was carried out emphasized this transformation as one imposed by humans and lent no natural effect to the landscape at all.

In general, prehistoric shellmound and midden sites are expected to occur in lowland contexts, either within the confines of marsh habitat or at the mouths of freshwater drainages entering marshy areas (see Figure 14, *Historic Waterways in the San Francisco Presidio*). Such locations would have been preferred for resource extraction and processing, as a wide variety of plant and animal foods occur in marshland settings. The Bay Area is replete with

shellmounds located in coastal wetlands, and archaeological evidence all along the central coast also testifies to the prevalence of estuarine sites (Dietz et al. 1988; Hildebrandt 1997; Jones 1992, 1995; Jones and Waugh 1995). Locally, Milliken (1995, 1996) also suggests that a few ethnohistoric winter *Yelamu* villages were located at the mouths of Mission and Visitation Creeks. The majority of recorded archaeological sites in San Francisco have been located buried beneath sterile dune sands and resting on clayey silt (CA-SFR-6/26) or dark clayey sands (CA-SFR-2, -112, -113, -114). This suggests that cultural occupations tended to originate on stable well-vegetated dunes and were later buried by less stabile, migrating aeolian sands.

As for the estuary bluff, it is likely that many portions of its face were less steeply pronounced in the past than they are presently. Some sections were cut away to provide fill for the slough in 1895, while others were removed during the construction of Doyle Drive. In particular, those sections of bluff fronting the Young Street parking lot and just below Building 211 are exceedingly vertical, presumably the result of substantial earth removals. Furthermore, the surface of the estuary bluff has also changed dramatically since the 19th century. Early sketches of the Presidio portray the coastal bluffs as a largely treeless expanse (Choris 1816 [1932]; Smyth 1826), a landscape of natural dunes with relatively sparse groundcover. The extensive groves of pine and eucalyptus trees now present were planted between 1880 and 1910 during a Presidio “beautification” project, and various native and nonnative grasses abundant on the bluff today were also established during this landscaping effort.

There is little evidence in the Bay region suggesting that area of open bluff margin away from stream corridors or mouths would have been choice locations for aboriginal occupation. Such situations would have been fully exposed, offering no shelter and few, if any important food resources. There are some known sites on bluff margins at Point Lobos in San Francisco (CA-SFR-5, -21, and -24), but these were established along a rocky, open coastline where marshland habitats were absent. Sites at Fort Mason (CA-SFR-29, -30, and -31) were situated well back from the bluff margin, occurring within a sandy dune environment, as was site CA-SFR-129 at Crissy Field. Most shellmounds around the Bay were also established near freshwater outlets (Bickel 1981; Nelson 1909; Wallace and Lathrap 1975), although the known distribution of these sites is surely biased towards larger, more visible deposits and the geographic layout of smaller sites could diverge from this pattern. Indeed, while there are innumerable sites in the Bay Area and along the central California coast that do occur on coastal bluffs, it seems that many were placed adjacent to freshwater streams or estuaries while others were located on open bluff margins where such confluences were absent (Bouey and Basgall 1991; Hylkema 1991; Jones 1992; Jones and Waugh 1995). In other situations, sites on coastal terraces were positioned inland from bluff habitats in order to access terrestrial and coastal resources from the same locations (Hylkema 1991 Jones 1992). These variations in site location surely reflect differences in coastal habitats, but they may also be indicative of more general preferences for protected coast over open coast situations.

In this sense, certain dune environments would also have been favored places for aboriginal campsites, being close to slough resource areas while offering some protection from sun and wind. Within the Project Area, the large dune system flanked by the bay to the north and the estuary to the south may have been an important location for the placement of short-term task sites poised to exploit marshland resources. Site CA-SFR-129 is a good example of this kind of deposit, as are the middens at Fort Mason (CA-SFR-29, -30, and -31), and there may have been other similar deposits in dunes once located southeast of CA-SFR-129 and west of the Palace of Fine Arts building.

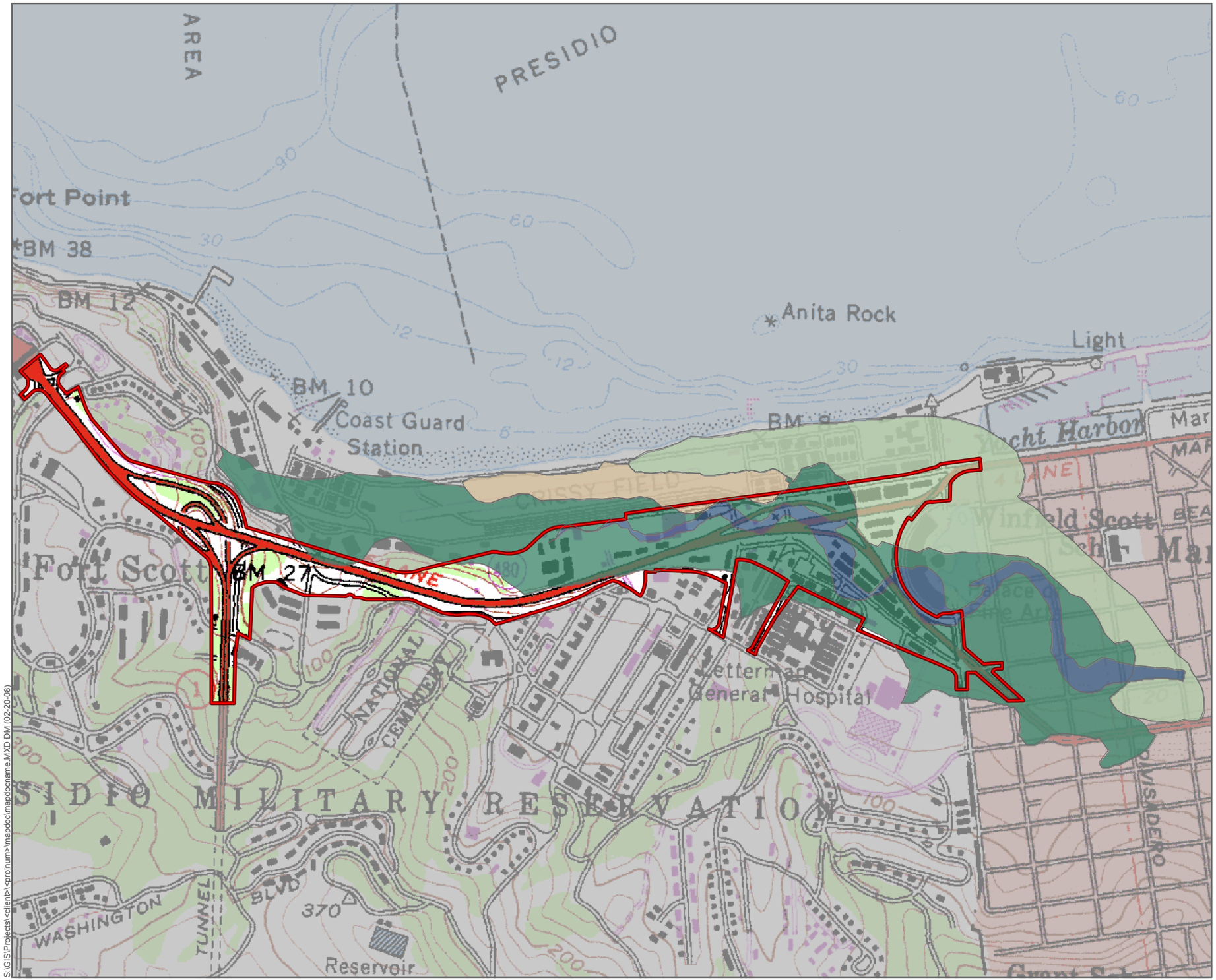

Figure 13
Marsh Estuary System in the San Francisco Presidio

Legend

- Archaeological Area of Potential Effects
- Beach
- Channel
- High Dune
- Marsh

N

0 1,000 2,000
Feet

0 250 500
Meters

Source: PRESIDO TRUST

USGS Quadrangle 1:24,000
"SAN FRANCISCO, NORTH"
N3745 - W12222.5/7.5
1973

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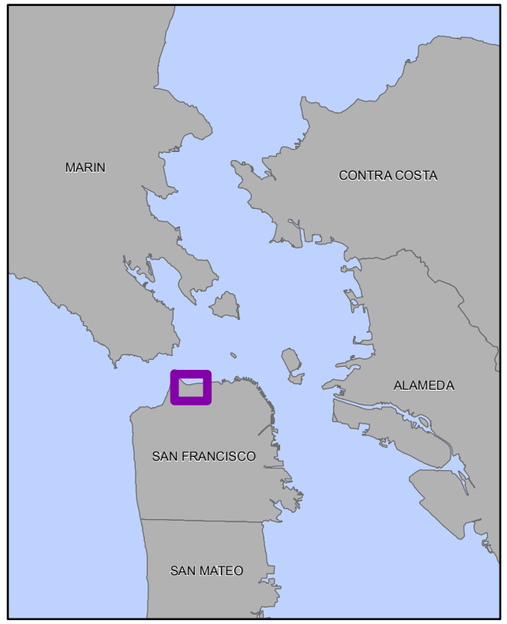
Figure 14
Historic Waterways in the San Francisco Presidio

Legend

Archaeological Area of Potential Effects

1871 Historical Waterways



N

0 1,000 2,000
Feet

0 250 500
Meters

Source: PRESIDO TRUST

If the mouths of freshwater creeks and adjacent bluff margins, the slough corridor, and dunes were good places for aboriginal occupation, it is expected that prehistoric sites buried within the Project APE should occur north of the highway overstructure, though some may occur on the bluffs adjacent to Bank Street and south of CA-SFR-6/26, and uphill from Building 203 along Halleck Street. All of the known sites in the Presidio (CA-SFR-6/26 and CA-SFR-129) are situated within the former marsh. The character of sites CA-SFR-6/26 and CA-SFR-129 is also consistent with Jones's (1992) interpretation of late prehistoric settlement patterns, which implies the Presidio marshlands were used only logistically over the last 1,000 years or so primarily for the procurement of shellfish and plant resources rather than for extended residential stays.

Maps by Wheeler (1851) and Barnaal (2001) depict an extensive marshland reaching from what is now the heart of the Marina district on the east to well beyond the former Crissy Field location on the west (see Figure 13). A narrow beach once fronted the slough immediately to the north, and an extensive series of high dunes paralleled it to the northeast and east. Most of the lowland APE east of the 101/19th Avenue interchange passes through former marsh habitat, ending where a stretch of high dunes was once situated north of the Palace of Fine Arts building. Wheeler's (1851) map also shows two major streams coursing northward down through the Presidio bluffs, one entering the marsh just south of site CA-SFR-6/26 at the end of Bank Street and the other at Halleck Street near the position of Building 203.

Based on these maps, the Trust and NPS have, in the past, depicted a large zone within the northern half of the Presidio as having *Indigenous Sensitivity*. Nearly all of the Project APE falls within this zone except for the portion of Doyle Drive between the Golden Gate Bridge Toll Plaza and the east side of the US-101/Highway 1 Interchange. In fact, the entire lower post of the Presidio has previously been designated as prehistorically sensitive, that portion between Doyle Drive and Mason Street being of particular interest to the current Project. The testing plan that was implemented in 2002 that resulted in the relocation of site CA-SFR-6/26 was largely based on this assessment of sensitivity. The current sensitivity analysis for the ATP is not based on the *Indigenous Sensitivity* model; however, it will be taken into account during the predictive modeling for the Project.

7.2 PREVIOUS CORING AND GEOARCHAEOLOGY STUDIES

Three previous studies have examined parts of the subsurface stratigraphy of the Project APE (Basin 2001; Meyer 2001; Dalldorf et al. 2006).The work conducted by Basin 2001, and Meyer 2001,were a product of the Doyle Drive Project. Work by Dalldorf et al. 2006 was not related to the current Project but took place within portions of the Project and has therefore been utilized in this ATP. Each Study is briefly described below.

7.2.1 Basin Research Associates (2001) Geologic Coring Study

Basin Research Associates (2001) produced a coring program report based on the results of 88 cores in and around the Doyle Drive area (see Figure 8). The report found no evidence of prehistoric sites or cultural materials. Some of the cores did return positive results for historic-era cultural material. In September 2001, Jack Meyer, then of Sonoma State University, conducted a geoarchaeological review of Basin Research Associates coring program, resulting in a sensitivity analysis for the area (Meyer 2001) (see Appendix A. Geoarchaeological Sensitivity Study).

7.2.2 Meyer's Geoarchaeological Analysis (2001) of Basin Research's Coring Study

The purpose of Meyer's review was to assess the accuracy and utility of Basin Research Associates' core data for estimating the potential for buried archaeological resources within the Doyle Drive Corridor. This review consisted of a physical examination of selected cores and a comparison of the cores with the information provided in the coring report. Finally, recommendations were provided regarding further analysis, and archaeological testing within the project corridor. Some of the work that Meyer conducted for this 2001 study included the current Project APE and therefore is summarized in more detail below and in Appendix A to this report.

Meyer's (2001) analysis of Basin Research Associates cores produced several important findings regarding the possible age, nature, and extent of geological deposits that have significant implications for any further archaeological studies in the archaeological APE, such as the current Project. These findings concern the locations of deposits of Pleistocene-age alluvium, holocene-age dune and beach sand, and holocene-age estuarine sediments. Historic to recent artificial fill was identified in the cores.

- Artificial fill deposits were found in the upper 2 to 17 ft. (1 to 5 m) of each core, suggesting that most or all of the APE is covered by some amount of artificial fill. Artificial fill deposits were generally thicker in the northern parts (lowland) of the APE and thinner in the southern parts (upland) of the APE; however, as much as 10 ft. (3 m) of fill was identified in one location in the uplands (Core 80, near the intersection of Girard Road and Lincoln Boulevard). Thus, Meyer concluded that archaeological materials could be buried at many places within the APE.
- Formerly stable land surfaces marked by buried soils (paleosols) were identified in both upland and lowland parts of the APE. The surfaces are generally buried by artificial fill deposits in the upland segments and by natural and artificial fill deposits in the lowland segments of the APE. However, deposits of Holocene to Historic-age dunes were identified in portions of the uplands east of Highway 1 approximately 125 meters south of Doyle Drive (Core 35 and 36).
- Meyer noted that soils formed in the upland segments are generally well developed, indicating that they formed during a prolonged period of relative landform stability that is consistent with Pleistocene-age deposits. The soils formed in the lowland segments are generally weakly to moderately developed, indicating that they formed during brief periods of landform stability that probably occurred during the Holocene. Some evidence for an older/higher dune was indicated by the presence of a moderately well developed soil in a location just south of northbound Richardson, between Marshall Street and Lundeen Road (Core 70).
- Ample evidence of Historic-age marsh/slough deposits were found in several of the cores from the lowland segment along Doyle Drive from the Palace of Fine Arts to just west of CA-SFR-6/26 (Cores 40, 50, 53, 54, 63, 64, 76, 77, and 94).
- A variety of organic materials suitable for radiocarbon dating were identified in several of the cores from the lowland segment (e.g., peat, wood, roots, and soil).
- There was a conspicuous lack of coring data from depths of more than 20 ft. (6 m) in the holocene-age lowland segments of the corridor, with the exception of a core taken at the corner of Lincoln Boulevard and Montgomery Street (Core 40:24.5 ft. [7.4 m]). Meyer suggested that the lack of deeper cores was problematic if Project-related earth

disturbing activities would extend beyond depths of 20 ft. (6 m) or more. As such, Meyer felt it impossible to fully assess or estimate the potential for buried archaeological materials that may lie beneath the dune and marsh deposits within the lowland segments.

- The presence of a well-developed soil at a depth of 10 ft. (3 m) west of McDowell Avenue, South of Doyle Drive, and East of Highway 1 (Core 92) suggested to Meyer that is the area was also sensitive for prehistoric sites.
- The presence of a well-developed soil at a depth of 7.5 ft. (2.3 m) in Core 70, just south of northbound Richardson, between Marshall Street and Lundeen Road, suggests that the area is sensitive for prehistoric sites.
- The presence of weak to moderately developed buried soils in some portions of the upper 10–15 ft. (3–4.6 m) of lowland segment suggested to Meyer that there is some potential for buried prehistoric sites.

7.2.3 Dalldorf's Geoarchaeological Study of Building 207/231 (2006)

Recently, Dalldorf et al. (2006) of the Anthropological Studies Center at Sonoma State University conducted a subsurface geoarchaeological survey of the building 207/231 area, which is within the Project APE. This study was conducted for the Presidio Trust as part of a CAP (MACTEC 2005) developed for the removal of contaminated soil and materials, deposited during the U.S. Army tenure at the Presidio, in the vicinity of buildings 207/231. The subsurface geoarchaeological survey was conducted to identify archaeological deposits in the Project Area that might be affected by excavation activities (Dalldorf et al. 2006). As directed by an archaeologist, nine backhoe trenches ranging from 10 to 20 ft. (3 to 6 m) in length and 4 to 14 ft. (1 to 4 m) in depth, for a total of 527 yards^3 (482 m^3), were excavated in the Building 207/231 area and placed in predetermined locations (Figure 12).

No prehistoric artifacts were identified. Two paleosols (representing stable land surfaces in the past) were revealed: an upper and lower dune, dating to the Holocene/historic era and Holocene, respectively. The soils were poorly formed, suggesting that they were available for human use for only a limited period of time. Based on the known timing of regional landscape changes (such as sea level rise) and on relative soil development, the oldest aeolian deposits in the Project Area was estimated to have been deposited in the Early to Middle Holocene, while the youngest aeolian deposits clearly dated to the Late Holocene or historic period.

The data obtained through backhoe trenching informed Dalldorf et al.'s description of the depositional history in the vicinity of buildings 207/231.

> The maximum age of the aeolian deposits is constrained to a point after which eustatic sea-level change caused sea levels to rise sufficiently to enter the San Francisco bay and deposit beach sands that served as a sediment source for dunes on the San Francisco peninsula, probably during the Early Holocene. The maximum age of slough deposits is also constrained by such a date, after which sea levels reached sufficient height to locally inundate portions of the dune deposits, probably the interdune troughs. A radiocarbon date of 5040±60 cal years BP, obtained on peat from a location about 1,312 ft. (400 m) west of the Building 207/231 project area at a depth of 5.9 ft. (1.8 m), may represent this early period of inundation (Jones & Stokes and Albion Environmental 2002c). While the exact timing of either the earliest slough or dune deposits remains unclear because dune deposits can migrate upslope, it seems likely that the earliest

> slough deposits post-date the earliest dune deposits. Apart from the soil immediately underlying fill, two buried soils were noted in the dune deposits exposed in the southeastern trenches. The deepest appears truncated as was buried as a result of increased aeolian activity, likely during the Late Holocene.
>
> The interfingered beach and slough deposits were formed by a combination of shore and near-shore processes in a relatively active geomorphic setting. These varied deposits represent periods of slough expansion, perhaps as a result of increased precipitation, or a change in the boundaries of the slough. The interfingered beach and slough deposits also likely represent delta deposition at the point where the stream that drains Tennessee Hollow entered the slough. Given the slough's location in unconsolidated aeolian deposits, its exact boundaries may have shifted fairly frequently in response to changes in wind direction and velocity, or increased precipitation and more intense wind storms. Changes in such environmental conditions would also likely result in a corresponding expansion or contraction of the dunes surrounding the slough, or of the slough itself. (Dalldorf et al. 2006:23-24)

Dalldorf et al. (2006) concluded that dune deposits and shell-laden slough deposits discovered within the Building 207/231 project area lends credence to the general accuracy of the slough boundaries depicted on late 19th-century maps of the Presidio. The historic surface soils was also identified under fill deposited in historic times as a result of activities related to military use of the area, as well as for the Panama Pacific International Exposition. Several historic-era artifacts were identified within fill deposits; all were isolated items without research value.

7.3 PHASE I EXTENDED SURVEY REPORT/PHASE II EVALUATION REPORT, DOYLE DRIVE CORRIDOR PROJECT

The *Phase I Extended Survey Report/Phase II Evaluation Report for the Doyle Drive Corridor Project* (Jones & Stokes and Albion 2002b) provides useful information in regards to areas within the APE that have been previously tested (Figure 9). The Phase I/Phase II prehistoric testing included 36 mechanical trenches and one 3 x 3 ft. (1 x 1 m) unit hand-dug unit which resulted in the rediscovery of Nelson mound, CA-SFR-6, which was later combined with nearby isolated burial, CA-SFR-26, to become one site now known as CA-SFR-6/26 (Figure 10). Due to the massive scale of the Doyle Drive Corridor Project APE and restrictions imposed on the testing program by underground utilities and other conditions, all of the areas of the APE could not be tested.

The areas targeted for testing were intended to serve as representative sampling units for lowland contexts within it. Only those areas deemed as having a high or moderate archaeological potential were examined during the testing program. A series of trenches was placed judgmentally within each sampled area. As much as possible, the distribution and orientation of trenches followed a consistent pattern, being set in parallel rows or perpendicular to each other depending on the locations of unmovable surface obstacles (like buildings) and the layout of buried utilities. In general trenches measured between 16–33 ft. (5–10 m) in length and reached depths of approximately 6–13 ft. (2–4 m). Trenches were excavated to the maximum depth of the backhoe arm where possible. Unfortunately, very loose soil and high water table conditions prevented deep trenching in many cases. Where no cultural deposits were encountered but unstable soils or other constraints prevented excavation to maximum depths, trenches were terminated. Figure 9 depicts all the trench locations associated with the Jones & Stokes and Albion (2002b) testing program. It was important that trench excavation

have as little impact on Presidio traffic as possible. Also, given the history of activities on the lower post, it was anticipated that hazardous materials might be unearthed in any of the test locations.

The prehistoric testing program (Jones & Stokes and Albion 2002b) resulted in the rediscovery of CA-SFR-6 and one obsidian projectile point in the backdirt of a trench dug in an area designated as sensitive for historic-era resources. No other prehistoric materials or native ground surfaces were noted during this excavation.

The historic archaeological trenching program conducted by Jones & Stokes and Albion (2002b) consisted of 26 trenches, ranging in length from 12.4 to 58.7 ft. (3.8 to 17.9 m), strategically placed to locate the presence of intact historical archaeological remains. All trenches were excavated as deeply as possible with the intention of reaching sterile deposits of Colma formation soil. Approximately half of the mechanical units could not be excavated to this level due to deep deposits of dune sand or to encounters with underground utilities and potential hazards.

The only features identified during the 2002 Doyle Drive Corridor Project historic trenching program were several water or drain pipes made of ceramic or metal, a deposit of broken bricks, and a deposit of mixed historic and modern refuse north of Building 106. The diverse stratigraphy in test trenches placed throughout the APE demonstrates large-scale cutting and filling operations historically undertaken by the Army and Caltrans. The top of the bluff around the early Quartermaster complex was extensively examined during this investigation. Several trenches in this area indicated the presence of thick (more than 10 ft. [3 m]) secondary deposits of more or less clean fill, most likely transported to this location from a nearby source. Other trenches in close proximity to those filled areas encountered natural soil, Colma Formation, at less than 4 ft. (1.2 m) below the surface. The diverse stratigraphy identified in such a relatively small area on the post led archaeologists to hypothesize that the top of the bluff had been graded and recontoured at least once in the history of the Army occupation of the Presidio.

It should be noted here that another excavations conducted for the Crissy Field Restoration Project (Holman 1999) resulted in the identification of the Quartermaster Dump (post refuse dump and landfill) located immediately north of the current Project APE (see Figure 11). It is possible that the landfill extends into the current Project APE. Other previous archaeological investigations at the Presidio have encountered remnants of one or more of the Presidio's historic water systems within the Project APE (National Park Service 1999), and monitoring of a geological test trench in the rear of Building 104 revealed partially intact kitchen refuse pit or privy pit associated with the Civil War-era laundresses' quarters on the Main Post (Voss 1994). The recent geoarchaeological survey of Buildings 207/231 within a portion of the current Project APE (Dalldorf et al. 2006) located a few isolated historic-period artifacts; however, no deposits of sufficient integrity, volume, or association to be of research value were identified in the Project Area. Dalldorf et al. (2006) concluded that any such deposits are unlikely to have survived 20th-century demolition and clean-up episodes at the Presidio.

Before the 2002 Doyle Drive Corridor Project trenching program took place, it was anticipated that testing could encounter large quantities of structural rubble and refuse from 20th century development on the lower post. It is now evident that much of the area has been subjected to large-scale landfill and earthmoving activities, in particular the extensive reclamation and filling of the lowland marsh that began in the 1880s and continued through the 1920s. Although no historical features were encountered during previous testing projects in the APE, there still

remains a moderate to high potential to encounter historic features in areas not previously tested.

7.4 THE PRESIDIO CUT/FILL MODEL

The Trust Cut/Fill Model (Appendix B) was developed by the Trust in 2005 in an effort to better identify the potential for archaeological deposits within the Presidio NHLD (see Figure 16, *Cut/Fill Model*). This model was developed by overlaying current elevation readings over an 1872 historic topographic map to identify which areas within the Presidio have been cut and where fill soils have been placed. The model also included calculations of how much cut and how much fill has affected the native ground surface.

This model was used in this ATP to determine which areas need to be further explored for archaeological resources and to identify which areas will need to be monitored within the Project APE. This was accomplished by applying the Cut/Fill Model to predict the areas of native ground surface (also known as *"no-change" from 1872*). It should be noted here that the areas depicted in Figure 16, as taupe or khaki in color represent the areas that are identified as "native" or "no-change." These areas have a +/- 2 foot (1 m) margin of error that should be taken into account when discussing the area as strictly "native" in nature.

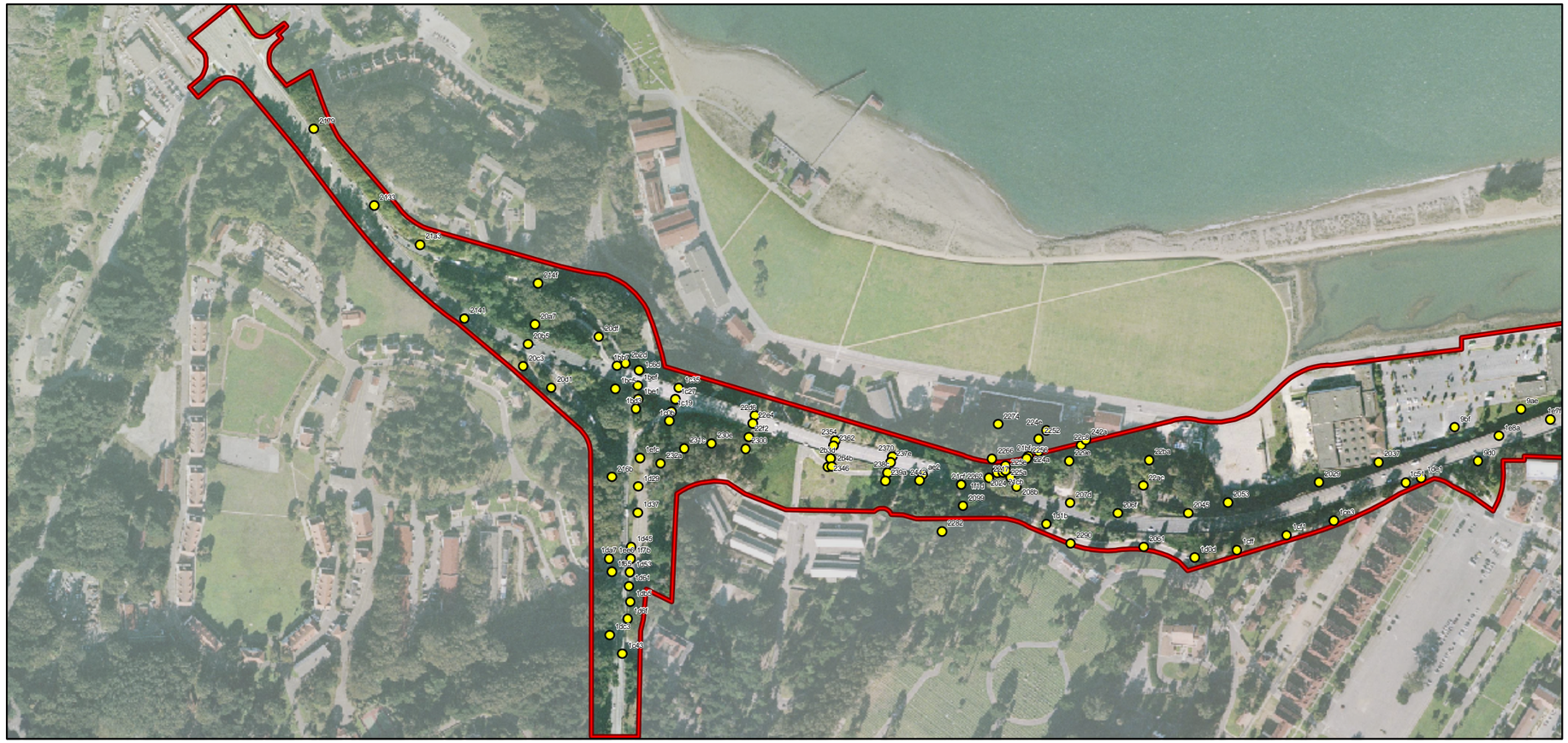
When the Cut/Fill Model was compared to the Project APE for this report, it was determined that approximately 42% of the Project APE is within areas thought to be native or no-change ground surface, while the majority (58%) has been subject to ground disturbance such as cut or filling. This information was then used by the authors of this report (in combination with other data such as soils types, historic waterways, historic estuary system, known archaeological site locations, etc.) to determine low, moderate and high prehistoric and historic archaeological sensitivity in the APE, with low sensitivity corresponding to areas that have been cut, moderate sensitivity being areas that have been filled, and high sensitivity areas coincident with a native ground surface.

7.5 2007/2008 GEOTECHNICAL CORING BY ARUP AND CALTRANS

From 2007 to 2008, Arup and Caltrans conducted a coring program along the preferred alternative to provide an opportunity to examine the cores for archaeological materials, the data of which will be used to refine the project design if necessary (see Figure 15, *2007/2008 Geotechnical Coring Locations in the Area of Potential Effects*). An archaeologist from ICF Jones & Stokes monitored all boreholes and core penetration test locations. The monitoring consisted of examining the bores for archaeological material and, if such materials were encountered, noting the finds and the materials collected. To date, only isolated cultural materials have been observed in the boreholes, and all have been observed within fill material. The cores themselves have produced additional information on the depositional setting of the APE, including a number of buried soils, discussed in Section 7.6, Prehistoric Sensitivity. ICF Jones I Stokes is currently preparing a report documenting the results of the archaeological monitoring activities of this coring program.

7.6 PREHISTORIC SENSITIVITY

Prehistoric sensitivity in the APE was based on previous Trust and NPS sensitivity mapping for the Presidio, the mapped locations of sites CA-SFR-6/26 and CA-SFR-129, interpretations of data from previous and most recent subsurface coring programs and geoarchaeological analyses, and geodetic surveys of the lower post projecting the previous locations of sloughs



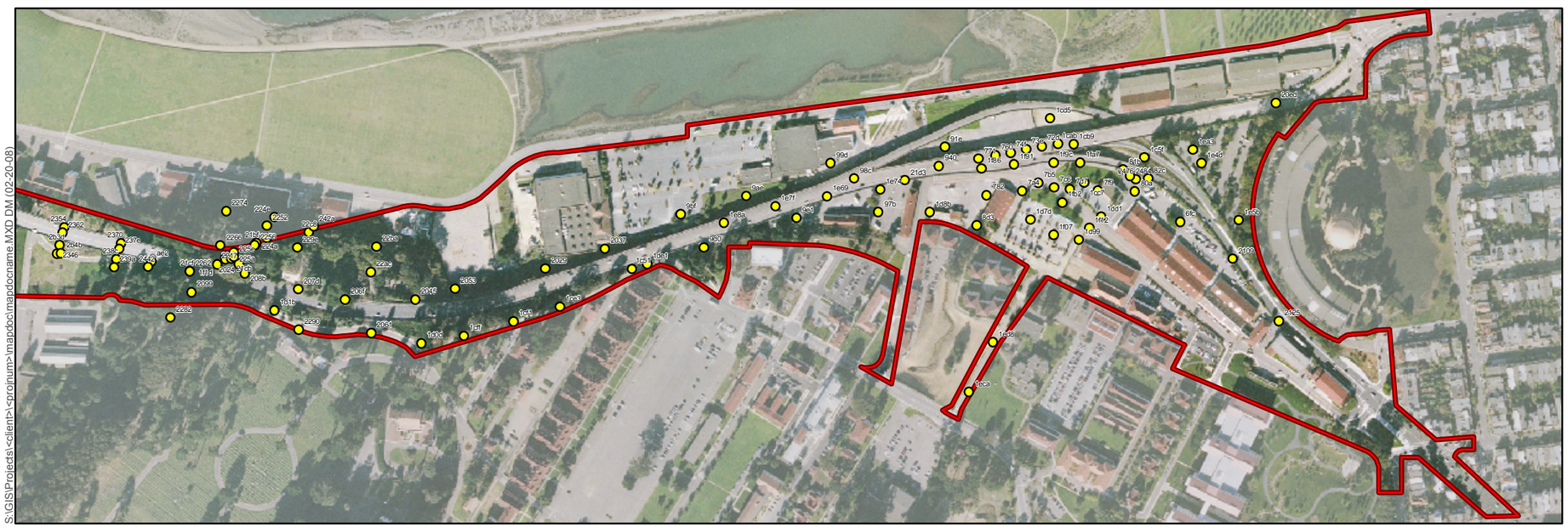


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Figure 15
2007/08 Geotechnical Coring Locations in the Area of Potential Effects

Legend

- Cores
- Archaeological Area of Potential Effects

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Feet

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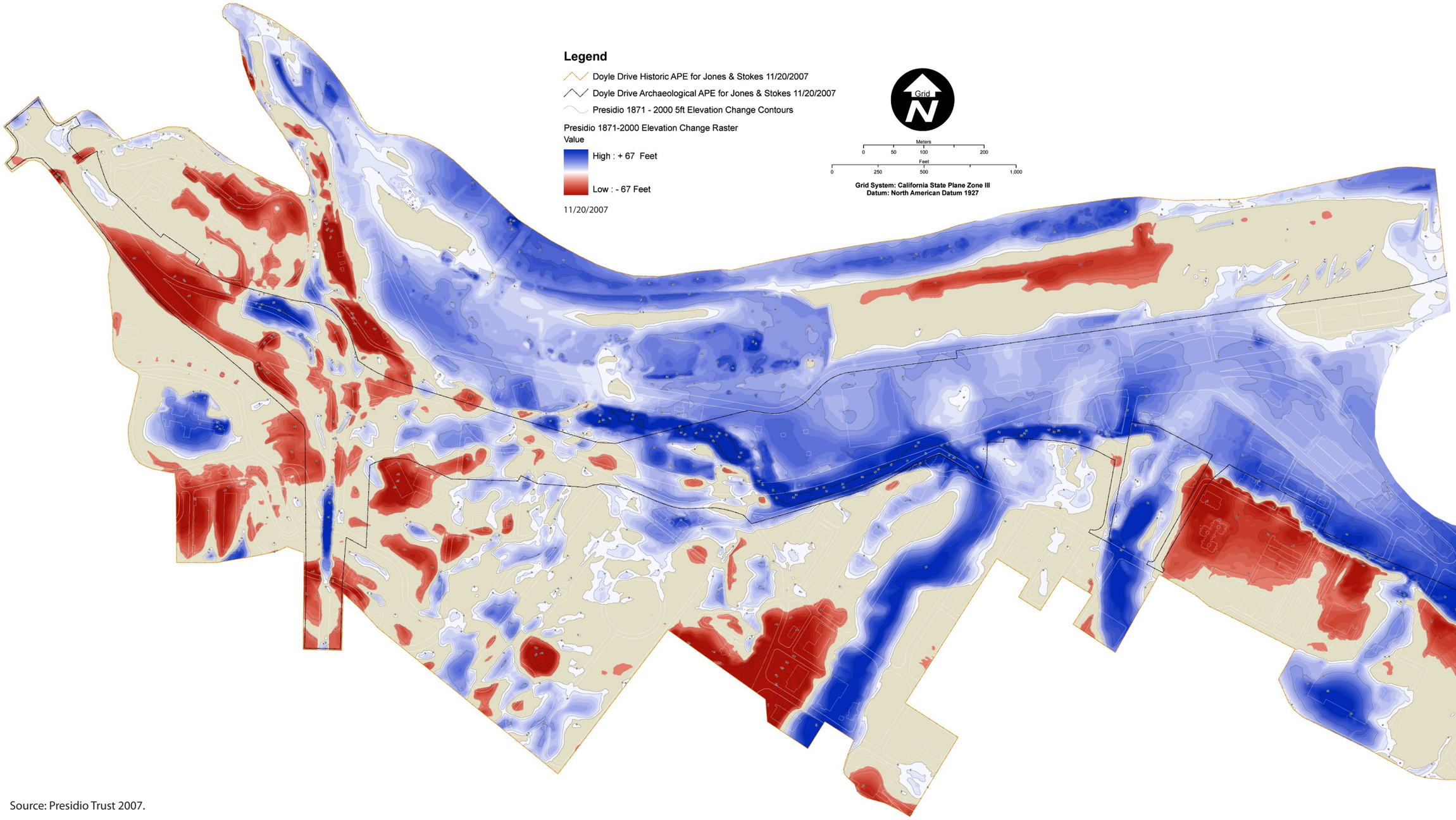
Meters

Source: Arup 2008



Source: Presidio Trust 2007.

Presidio 1871 - 2000 Elevation Change Model
Showing Jones & Stokes Cultural and Archaeological APE Areas | Doyle Drive Project 2007

04548.04 (8-08)

Figure 16
Cut/Fill Model

and marshes. Additional resources helped to inform the sensitivity assessment, including an understanding of prehistoric land use and subsistence patterns in the Bay Area the Trust and NPS Cut/Fill Model, and an archival review of major ground-disturbing activities in the Presidio during the last 150 years (see Figure 17, *Prehistoric Sensitivity*).

The distributions of the major geological deposits across the APE are based on work completed by Knudsen et al. (2000) (see Figure 4), the Presidio Trust (2005), and discussed in Meyer (2002). As discussed in Chapter 5, there are five major geological deposits in the APE: pre-Quaternary bedrock (br), Early to Middle-age Pleistocene Alluvium (Qoa), Late Pleistocene to holocene-age alluvium (Qa), holocene-age dune and beach sand (Qhs), and historic period artificial fill (af). Subsurface data from Meyer (2001) and Dalldorf (2006) suggested there is the potential for buried soils to exist at three locations in the APE. The identification of soils on stable land surfaces is an important indicator in predicting the potential for archaeological sites. This is because only stable land surfaces (surfaces that are not affected by deposition or erosion) can provide the opportunity for a mature soil horizon can develop. The longer a land surface is stable, the better the soil development and the longer a population can occupy such a location. Consequently, a surface that is stable for only a short period of time will only allow weak soil development, indicating a shorter period of time on which humans can occupy a surface (Meyer 2002).

Based on the known geologic deposits in the APE and the known locations of sites CA-SFR-6/26 and -129, it is the opinion of the authors of this ATP that there are three areas in the APE with the highest potential to contain archaeological sites. These areas include one area of high archaeological sensitivity and two areas of moderate archaeological sensitivity (see Figure 17).

7.6.1 Area of High Archaeological Sensitivity

The first area is in the central portion of the APE surrounding site CA-SFR-6/26 and extending west to the northwest corner of the National Cemetery. This area of the APE is at the base of the bluffs and has high potential sensitivity for prehistoric deposits where late Pleistocene to Holocene alluvial (i.e., tidal marsh) deposits are present (see Figure 17). This area is where CA-SFR-6/26 is located, and there may be additional as-yet-undiscovered sites is this depositional context. Presidio Trust's Cut/Fill shows this is an area of historic fill activity, which would serve to bury potential archaeological deposits (see Figure 16). Additionally, Meyer (2002) indicates there may be a Late Pleistocene buried soil at about -70 ft. (-21 m) below sea level below and north of CA-SFR-6/26, which would indicate a stable landform in this area.

Additionally, buried soils were identified during the Arup/Caltrans 2007-2008 coring program in the western half of this area of high sensitivity, as demonstrated in cores BTNB-R4 and BTSB-R3-PZ-D in Transect 1 and core RW8-R2 in Transect 2, presented in Figures 18a, *2007/2008 Core Program Profile Locations*, 18b, *2007/2008 Coring Program Profile – Transect 1* and 18c, *2007/2008 Core Program Profile – Transect 2*.

The area of buried soil corresponds to the location of the proposed northbound and southbound Battery Tunnels, as shown in Figure 18b in core BTSB-R3-PZ-D (buried soil between 12-14 feet below surface), and in Figure 18c in core RW8-R2 (buried soil at 17-19 feet below surface). The buried soil ranges from one to five feet thick and lies below historic period fill that ranges from three to 23 feet thick. The buried soil becomes thinner going west, and at the west end of the Battery Tunnels, historic period fill lies directly on bedrock.

Construction excavation of the Battery tunnels will vary along its alignment. Excavation will be approximately 40 feet below the ground surface on the east tunnel entrances, decreasing linearly west to approximately 20 feet below ground surface at the west end of the northbound Battery Tunnel, and to approximately 30 feet below ground surface at the west end of the southbound Battery Tunnel.

Construction depths along the Battery Tunnels will exceed the depths of the buried soil and Upper Colma Deposits. The buried soil horizon beneath the Battery Tunnels lies on sandy silts and sandy clays, which are underlain by Colma deposits, the surfaces of which lie between 10-25 feet below surface. Upper levels of Colma Deposits are likely late Pleistocene to early Holocene in age, and the buried soils above the Colma Deposits are of Holocene age, and are sensitive for the presence of archaeological deposits.

7.6.2 Areas of Moderate Archaeological Sensitivity

Two portions of the APE exhibit moderate archaeological sensitivity. The first consists of the northeastern portion of the APE, southeast of CA-SFR-129. According to Presidio Trust's Cut/Fill Model, there has been a significant amount of historic period fill activity in the this area. This fill was placed in an area of extensive Holocene dune sand (Qhs) where additional archaeological deposits may be located. Cores DNB-R5 and CNB-R6 in Figure 18b show these deposits lying between five to 36 feet below surface. This is the same sort of depositional context in which CA-SFR-129 was located, and there may be additional as-yet-undiscovered sites is this depositional context.

The third area of moderate archaeological sensitivity exists along the west end of the APE south of Doyle Drive from McDowell Street, curving to the west and turning south along the eastern side of Highway 1, where Lincoln Boulevard parallels the highway (see Figure 17). This area contains localized distributions of Holocene dune sand above bedrock and also contains localized areas of cut and fill. Two areas of potential sensitivity were discussed by Meyer (2002).

The first occurs at McDowell Avenue and Doyle Drive in an area that does not exhibit any cut/fill activity. This area is composed of dune sand and possibly a buried soil horizon, and lies below 10 ft. (3 m) of artificial fill (core number 92-2039, in Meyer 2002). Another potential buried soil occurs at Lincoln Boulevard and Doyle Drive under approximately 5 ft. (2 m) of artificial fill (core number 44-1887, in Meyer 2002). These areas correspond to cores 34-0160-B3 and A2-R1 in Figure 18d, *2007/2008 Coring Program Profile – Transect 3*. It is anticipated that the likelihood of locating archaeological deposits along the bluffs is low. Nevertheless, strata containing Holocene dune sands observed in bores indicate these areas could be appropriate locations for archaeological deposits.

7.6.3 Areas of Low Archaeological Sensitivity

Areas of the APE possessing low sensitivity for the presence of prehistoric archaeological deposits consist of locations of bedrock (br), Early to Middle Pleistocene alluvial deposits, found in Colma Formation deposits (Qoa), and areas of Middle Pleistocene age or earlier that are overlain by artificial fill (af) (see Figure 17).

The Main Post Tunnels will be constructed in an area of low archaeological sensitivity. Depth of construction excavation will vary along the length of its alignment elevation. On the east end of the tunnels. Excavation will be approximately 15 feet deep, decreasing steadily to the west

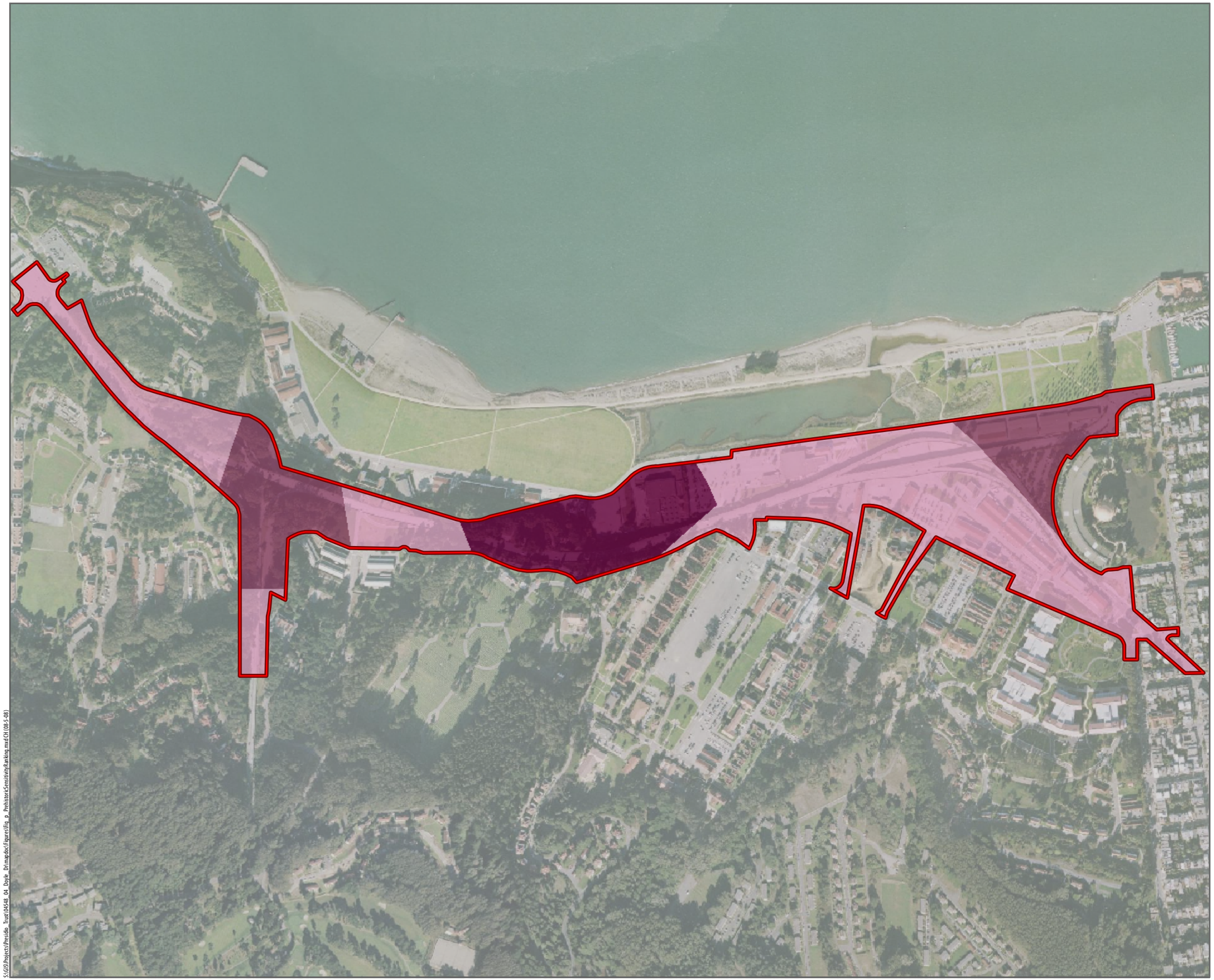


Figure 17
Prehistoric Sensitivity in the Area of Potential Effects

Legend

Archaeological Area of Potential Effects

Sensitivity

Low

Moderate

High

N

0 1,000 2,000
Feet

0 250 500
Meters

Source: ICF Jones and Stokes

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Figure 18a
2007/2008 Coring Program
Profile Locations

Legend

Archaeological Area of Potential Effects

Transects

Bore Locations

- Transect 1
- Transect 2
- Transect 3

N

0 1,000 2,000
Feet

0 250 500
Meters

Source: Arup 2008

S:\GIS\Projects\Presidio Trust\04548 04 Doyle Drive\mapdoc\Figures\Fig 18d Core Profile Locations.mxd CH (08-15-08)

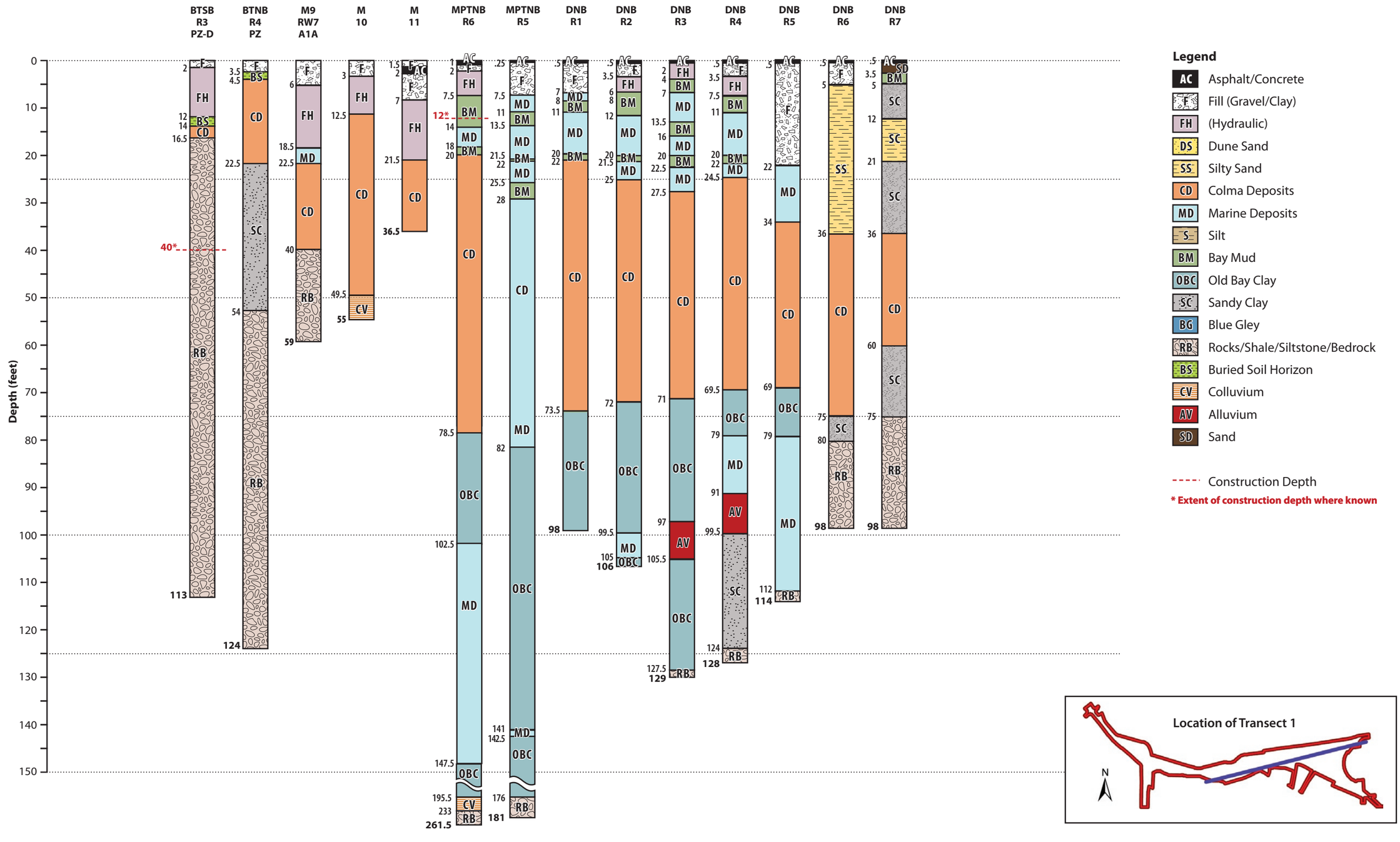
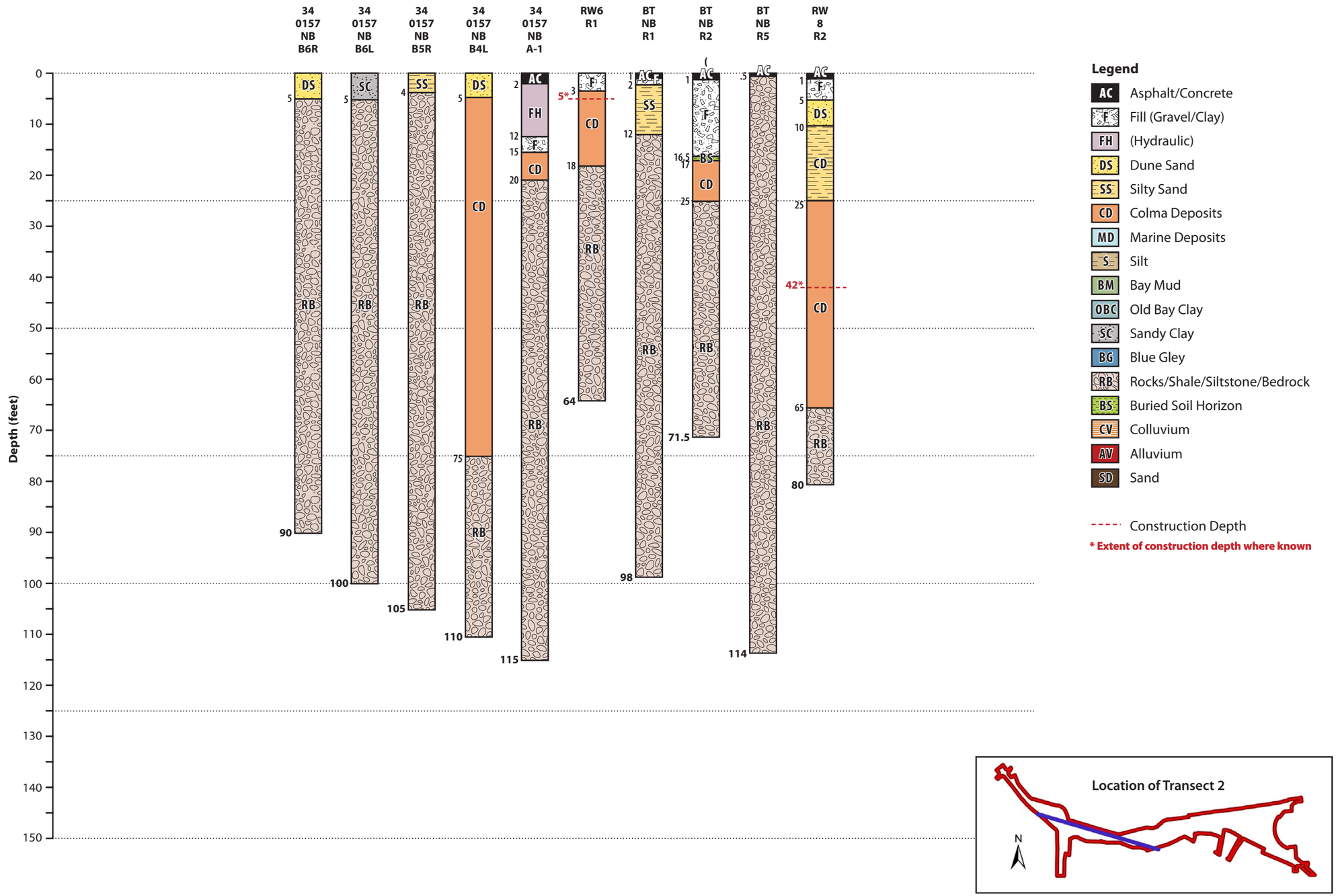


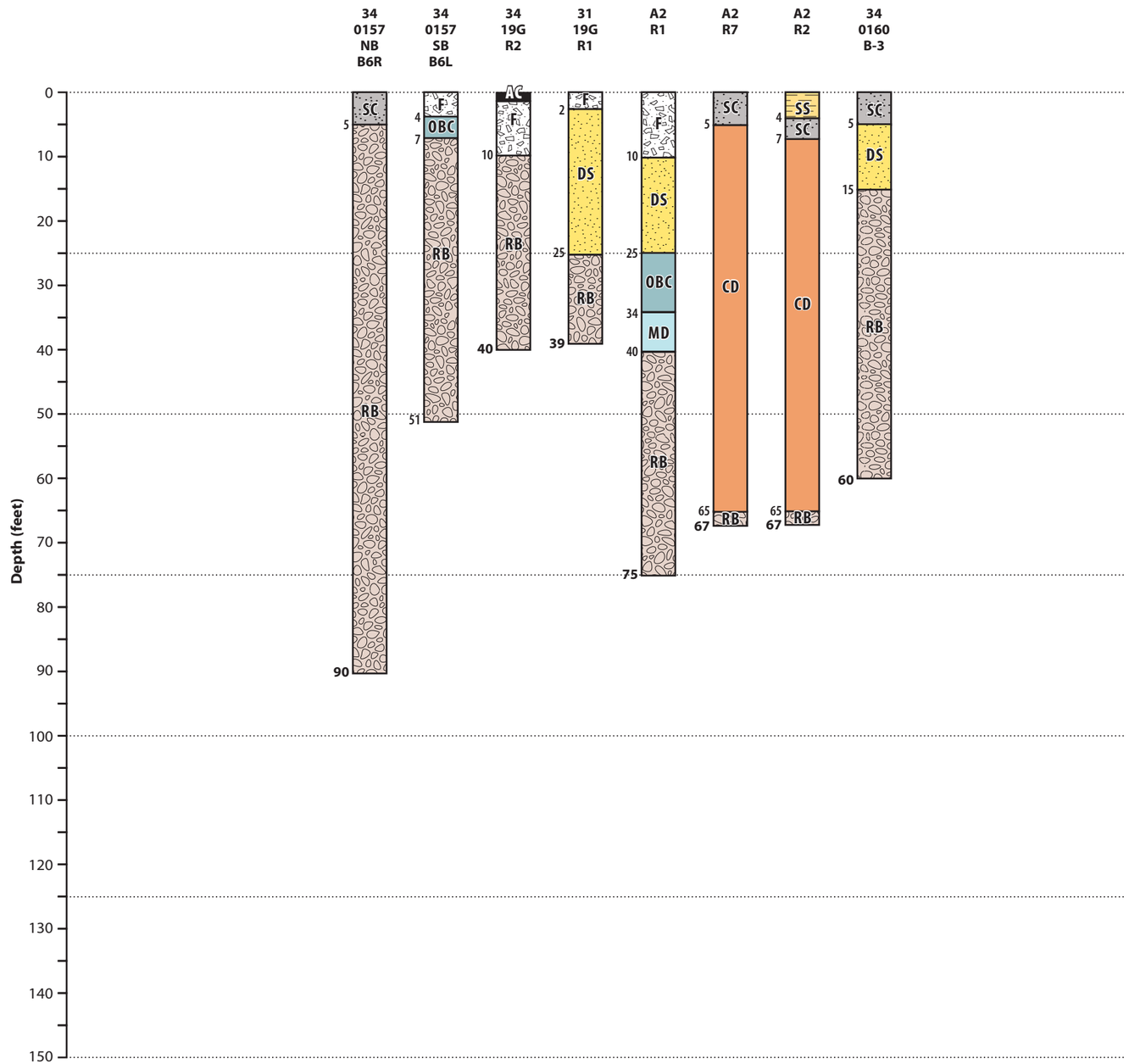
Figure 18b
2007/2008 Coring Program Profile—Transect 1

04548.04 (8-08)



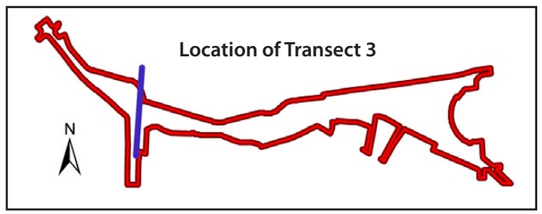
04548.04 (8-08)

Figure 18c
2007/2008 Coring Program Profile—Transect 2



Legend

- AC Asphalt/Concrete
- F Fill (Gravel/Clay)
- FH (Hydraulic)
- DS Dune Sand
- SS Silty Sand
- CD Colma Deposits
- MD Marine Deposits
- S Silt
- BM Bay Mud
- OBC Old Bay Clay
- SC Sandy Clay
- BG Blue Gley
- RB Rocks/Shale/Siltstone/Bedrock
- BS Buried Soil Horizon
- CV Colluvium
- AV Alluvium
- SD Sand



04548.04 (8-08)

Figure 18d
2007/2008 Coring Program Profile—Transect 3

for approximately 200 feet, where excavation depth will be approximately five feet below surface. In order to support the tunnels, the subsurface matrix will be reinforced with concrete mixed with soil in a grid pattern extending along the length of the tunnels. This grid will extend between 22 and 25 feet below surface.

7.7 ANTICIPATED PREHISTORIC PROPERTY TYPES

The following is a discussion of the prehistoric property types that could be encountered in the APE based on the aforementioned sensitivity analysis of the Project. Table 4 summarizes prehistoric property types and their characteristics.

TABLE 4. ANTICIPATED PREHISTORIC PROPERTY TYPES AND THEIR CHARACTERISTICS

Residential and Midden Sites	Midden soils in conjunction with evidence of long- or short-term residence (house floors, fire-affected rock, or rock concentrations); ash, shell, and faunal material; flaked-stone artifacts; groundstone artifacts, including mortars, pestles, manos, and milling slabs; and shell beads and other ornaments. Dark, friable, or greasy soil midden constituents may include all or some of the following: shell, bone ash, charcoal, fire-affected rock, baked clay, worked bone, flaked and groundstone, house floors, and human burials
Lithic Sites	Flaked-stone debitage, projectile points, and flaked-stone tools; may also include some groundstone.
Burial Sites	Deliberately interred burials, cremations, or human bone; beads and other ornaments (e.g., charmstones and pendants) may be interred with burials.
Isolates	Artifacts found without association with other artifacts or features; they frequently lack stratigraphic integrity and significant spatial patterning.
Contact Sites	A contact site is an example of any of the above property types that was created, occupied, or used by Native Americans after contact with non-Indian travelers or settlers but prior to major alteration of traditional lifeways. (More recent Native American sites that are dominated by nonnative housing, tools, and mass-produced domestic goods should be tested and treated using the methods of historical archaeology.)

7.7.1 Residential and Midden Sites

Residential sites are multicomponent sites that represent the places where people lived and carried out their daily activities. Residential sites often include midden deposits (described in the following paragraph), and comprise large occupation sites such as villages and small sites such as seasonal or task areas. *Villages*, which are defined as permanent or semipermanent residential sites, were occupied by multiple family groups. Cultural deposits from these types of sites usually have full assemblages of flaked stone and groundstone debris within organic midden deposits, faunal remains, and cooking features and may also have features that provide evidence of dwelling structures as well as burials. These sites represent the highest end of data potential in terms of chronology, cultural complexity, subsistence, settlement patterns, exchange, and social organization because they contain a wide array of artifactual and ecofactual remains, diagnostic artifacts, hearth and storage features, and complex living facilities.

Along seacoasts and rivers, a common component of the residential site is the *midden*, an accumulation of shells, bones, and cultural materials that is the remains of continuous long-term or periodic, short-term human habitation. Middens can vary greatly in size. They are usually distinguished by a high organic that causes soil to be noticeably darker and are usually found where people ate shellfish and other invertebrates, fish, birds, and sea mammals. These food sources leave a great amount of debris that was customarily piled up where the food was processed and eaten. People sometimes lived on the middens but, more often, their shelters were close by, away from the debris. Middens were sometimes used as burial sites when members of the community died.

Shellmounds (also known as shell middens) are so named because of the high proportion of marine shell found in the midden matrix—40 to 70% of the matrix (according to Gifford 1916). The internal stratigraphy of the shellmound is generally quite complex, with individual, event-specific, and aggregate features making up one or several shell beds. Shellmound contents are dominated by refuse associated with the collection of processing food and materials. In addition to the rich and varied shell inventory, the sites may also contain marine and terrestrial vertebrate taxa and abundant charcoal containing plant macrofossils (Gifford 1916).

Middens can also result in an area that was used seasonally, such as a short-term camp used when people made their annual round, hunting, fishing, and gathering the various food resources throughout their territory. Short-term camps represent habitations that were visited for short durations of the year or places that were routinely revisited over several years. Most site locations of this type were chosen for pragmatic reasons, such as the proximity to a shellfish source, availability of water or plant resources, or abundance of tool-making materials such as obsidian or Franciscan chert. Some short-term campsites were occupied repeatedly year after year and were often situated in areas with a particularly rich resource base for game or vegetal foods. These types of camps were visited frequently during a particular time of the year for the purpose of harvesting or acquiring a seasonally available resource (e.g., acorns, hazelnuts, or seasonal fowl).

7.7.2 Lithic Sites

Lithic sites are collections of flaked stone and/or groundstone debris, including tools and debitage that relate to post-quarry reduction and tool manufacturing efforts. Lithic sites are perceived primarily as daily or overnight task-oriented camps where a limited range of activities were conducted. These sites may or may not contain chronological information, depending on the presence and quantity of diagnostic items, such as projectile points, or dateable materials, such as obsidian. Lithic scatters can be perceived as simple, containing only flaked stone debitage and tools, or complex, having primarily flaked stone debris but some groundstone as well.

7.7.3 Burial Sites

Burial sites are places located where Native Americans intentionally buried their dead. Burial sites range from isolated burials in shallow holes to elaborate interments and whole cemeteries that encompass numerous bodies. Burials may be found in middens, under the floors of house pits, or in specially designated areas away from occupied zones. At times, certain cemeteries or sections of a cemetery may have been reserved for persons of one sex, age, or social rank. Data gleaned from burials frequently provide archaeologists with invaluable information on past social organization. For example, both the location of a burial and elaboration of its

contents may be taken as indicators of wealth, social status, and sometimes the occupation of the deceased. Regardless whether a single individual or numerous individuals are interred at a particular location, burial sites are places of important spiritual and cultural meaning to Native Americans.

7.7.4 Isolates

Isolates are single artifacts found without association with any other artifacts or features. Although isolates reflect the past activities of groups or individuals, the lack of spatial clustering or functional patterning largely prevents archaeologists from making inferences about prehistoric behavior. Sometimes, however, an isolate may be temporally significant, especially if it is diagnostic of a particular period, such as a corner- or side-notched Franciscan chert projectile point or an Olivella spire-lopped bead.

7.7.5 Contact Sites

This property type can yield important information on the effects of intergroup interaction, such as ethnic boundary maintenance, social structure adjustments, subsistence and technological adaptations, and other human approaches to dealing with radical culture change. Information from contact sites can also enhance understanding of local history, as Native Americans were poorly represented in the early documentary record.

7.8 HISTORIC SENSITIVITY

Historic sensitivity in the APE was based on previous Trust and NPS sensitivity mapping for the Presidio, mapped locations on known historic resources and historic features in the APE, the Trust and NPS Cut/Fill Model, previous archaeological investigations within the APE, and the mapped and predicted boundaries of the Quartermaster Dump (see Figure 19, *Historic Sensitivity* and Figure 20, *Known and Predicted Historic Resources Locations*). Based on this information, the authors of this ATP made predictions of the relative high, moderate, and low sensitivity to encounter historic resources in the APE. The discussion below talks specifically about those areas identified in the APE as containing high and moderate sensitivity. Areas of the APE possessing low sensitivity for the presence of historic archaeological deposits were identified based on the amount of modification and disturbance that has previously taken place in these areas as well as information about what may or may not have been located in those areas historically. Table 5 summarizes in tabular format the following discussion and includes a column that identifies whether the resource has been evaluated under the NHL.

7.8.1 Domestic Services—Laundresses

Domestic services on military posts of the 19th century largely were limited to those of servants employed in individual households (usually officers' households) and to laundry services, which generally were supplied by the Army. Laundresses first were placed on U.S. Army rosters in 1802, when Congress authorized a maximum of four to a company. Although many were the wives of enlisted men, laundresses were Army employees and were entitled to quarters, rations, a fixed pay of 75 cents a month for washing soldiers' laundry and 1 dollar for every dozen officers whose laundry they accepted. Although very little has been written about Army laundresses, they were described by post officers and visitors as industrious, "red-

armed" women who, because many were from the Irish working class, were thought to have excitable tempers and on occasion were known to brawl viciously with one another (Knight 1978: 67–69). Post laundresses lived in shanties located in sheltered, out-of-the-way areas and washed clothes in the backyards, using "big black laundry kettles." After 1878, reductions in Army expenditures led to the elimination of separate allowances of quarters and rations for laundresses, but they were permitted to remain on the rosters until their husbands were discharged (Knight 1978: 6, 69–70). In 1895, published Army regulations stated that post exchanges would operate laundries, generally located in old buildings that the Army could not use for any other purpose. In March 1909, the Quartermaster Corps (QMC) was authorized to establish its own laundries (Army Quartermaster Foundation 2000).

The Presidio population census for the year 1870 enumerates seven laundresses, four of whom were born in Ireland and three who were from Germany (Dean 1999). Several other Irish and German women were also identified in the 1870 Census as servants to both officers' and soldiers' families. Most of the women, whether laundresses or servants, had at least one child with them at the Presidio (Dean 1999). The 1880 census enumerates approximately the same number of foreign-born women living singly on the Presidio or as servants in officers' homes, but possibly because of the change in Army regulations concerning laundresses after 1878, the women stated their occupation as "widows" instead of laundresses (Dean 1999).

In the western portion of the Project APE, in what was formerly a sheltered cove along the road to Fort Point, a laundresses' row was established sometime before 1870—probably as early as 1861 when Companies A and B of the 3rd Artillery and six companies of California volunteers, all reportedly accompanied by their laundresses, arrived to occupy Fort Point (Thompson 1997: 74) (see Figure 20). The enlisted men were housed in barracks closer to the fort, near the current location of the Fort Point wharf. The Fort Point laundresses' quarters are indicated on the Wheeler map (1870) of the Presidio. Surface examination of this area revealed fragments of brick; ceramic whiteware; and glass, including a toiletry bottle fragment (Appendix B:San Francisco North-1). A core sample from this area also revealed a fragment of brick, although it was located 12 ft. (4 m) beneath the surface. Limited testing in this area during the 2002 Doyle Drive Corridor Project (Jones & Stokes and Albion Environmental 2002b) investigation did not reveal any features associated within the laundress' quarters; however, the area is still considered highly sensitive for historic resources (as previous testing was extremely limited in this area) (see Figure 19).

7.8.2 Quartermaster Supply and Transportation

The QMC, established in June 1775, is one of the oldest supply agencies of the military. The QMC has been largely responsible for all the transportation, construction, storage, and supplies of the Army since its inception prior to the Revolutionary War. The modern development of the Quartermaster Department began during the Civil War, as the Quartermaster General's office became a commodity-type organization that handled the purchase and distribution of specific types of supplies. After 1912, the QMC assumed additional responsibilities from the subsistence department and became responsible for feeding and paying the Army. The actual distribution of camp supplies was completed by post Quartermasters, who submitted requisitions to the Quartermasters of the territorial departments. They, in turn, forwarded the requisitions to the depot Quartermasters. The depot Quartermasters were responsible for procuring, storing, and issuing supplies to fill the requisitions. This coordination tied the QMC to the nationwide market center system. Expansion of the armed forces brought about by the Spanish-American War and World War I

Figure 19
Historic Sensitivity in the Area of Potential Effects

Legend

Archaeological Area of Potential Effects

Sensitivity

High

Medium

Low

N

0 1,000 2,000
Feet

0 250 500
Meters

Source: ICF Jones and Stokes

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Figure 20
Known and Predicted Historic Resources Locations

Legend

- Archaeological Area of Potential Effects
- CA-SFR-129
- Archaeological Excavation Units - Crissy Field
- Bank Street
- Brick Gutter c1896
- Building 603 Submerged Dump 1880-1912
- Buried Stone Wall Unknown Period
- Firing Range c1860-c1899
- Halleck Street
- Halleck Street Armoring Unit c1870
- Historic Wall c1937
- Iron Foundations
- Presidio Creek Ravine Dump 1870-1890
- Presidio Quartermaster's Landfill 1880-1912
- CA-SFR-6/26
- Incinerator Site Historic Period Dump
- Barker 1992 Predictive Historcally Sensitive Sites

N

0 1,000 2,000
Feet

0 250 500
Meters

Source: PRESIDO TRUST

made it increasingly more difficult for the Quartermaster department to supply the Army. As a result, the Purchase, Storage, and Traffic Division absorbed the QMC prior to World War I, but it was reestablished in 1920 by the National Defense Act, making the QMC once again responsible for the supply, construction, and transportation activities of the Army. By 1939, the QMC consisted of less than 12,000 military personnel and approximately 37,000 civilians providing services through the Washington, D.C. headquarters on a commodity basis, similar to the supply process used during the Civil War. The QMC also played a vital role during World War II by anticipating the needs of the Army being mobilized for the war.

Presidio Quartermaster Complex

The historic Quartermaster complex at the Presidio was quite large. The early Quartermaster complex (circa 1860–1895) was located on the upper bluff of the main post and contained numerous buildings, including stables, storehouses, gun and wagon sheds, shops, a blacksmith shop, and granaries. The upper bluff complex (in the vicinity of Building 211 and to its east) represents the earliest Quartermaster supply and transportation services on the post. The need to significantly expand this complex in the 1890s triggered one of the first large-scale phases of landfill and reclamation that would eventually create what is now known as the lower post. Additional facilities, including larger stables, a corral, a second blacksmith shop, and a veterinarian hospital were constructed in this area. The older, upper bluff portion of the Quartermaster complex gradually was phased out, and the buildings were removed.

The earliest facilities of the Main Post or upper bluff complex were constructed during the Civil War and included four stables, two wagon sheds, a gun shed, and a blacksmith shop. The post stable measured 30 x 6.5 ft. (9 x 2 m) and included stalls, carriage room, harness room, and granary. The first Cavalry stables for Troop M measured approximately 30 x 215 ft. (9 x 66 m), with seventy-five 5-foot (2 m) stalls. The light artillery stable consisted of seventy-four 5-foot (2 m) stalls in a building that measured 30 x 179 ft. (9 x 55 m). The Quartermaster used a stable that measured 60 x 130 ft. (18 x 40 m) and contained ninety 5-foot (2 m) stalls (Thompson 1997:200). The blacksmith shop was located in one of the three Quartermaster shops on the main post, adjacent to the carpenter and saddler. A forge and fire furnace were located in the vicinity of the blacksmith shop (Thompson 1997:200). By 1882, Building 52 (a wagon shed) also was being used as sleeping quarters for the trainmaster and as a Catholic Chapel. An 1880 map also identifies a cottage (occupant unknown) and a furrier's shop in the Main Post complex (Jones 1880). By 1909, a granary (Building 49) and two shops (Buildings 75 and 47) had been added.

Quartermaster facilities on the lower post consisted of several large Cavalry and Quartermaster's stables, a guardhouse (Building 374), and the Quartermaster storehouse (Building 338). These facilities were constructed between 1896 and 1903, after partial filling of the slough and wetland areas on the lower post. The cavalry stables complex, which included its own blacksmith shop and a veterinary hospital, housed stables structures that were approximately 35 ft. wide x 200 ft. long (11 x 61 m), each with a yard measuring 50 x 200 ft. (15 x 61 m) for picket line. However, the marshy lower post proved to be an unsuitable environment for both animals and stables, and the construction of permanent brick stables at the base of the Fort Point bluff began only about 10 years later. Most of the Quartermaster buildings on both the Main Post and the lower post were removed prior to the 1915 Exposition, although a few remained in use through World War I (Office of Civil Engineers 1918). Previous testing in the predicted Quartermaster Complex area for the Doyle Drive Corridor Project (Jones & Stokes and Albion Environmental 2002b) did not reveal any deposits associated with

the Quartermaster Complex; however, the known boundaries of the Quartermaster Complex that extend into the APE are still considered highly sensitive for historic resources and the areas immediately east and west of the complex are considered moderately sensitive as there still may be potential to encounter historic deposits associated with the Quartermaster Complex during deconstruction and utilities relocation(see Figure 20).

7.8.3 Refuse Disposal

Dumping refuse on the outskirts of towns or into natural depressions or valleys has long been the favored practice of human societies for disposing of unwanted materials. Sometimes the garbage was covered with dirt or burnt slowly onsite but, generally, it was simply left in the open. The garbage attracted vermin and scavengers, and wind scattered litter and a repulsive odor—issues that created a whole range of health and environmental problems. It was a cheap solution, and health and environmental issues were not a priority. In the 18th century, population increases in European cities resulted in large amounts of accumulated trash, but no programs for its disposal. During this time, numerous outbreaks of cholera, typhoid, and typhus caused widespread death throughout much of Europe. Although the problem of public health in urban settings was widely recognized, it was not until in the early- and mid-18th century that studies conducted by French researchers established the relationship between poverty, unsanitary living conditions, and higher rates of mortality, and it was not until the early-19th century that scientific discoveries confirmed the belief that poor drainage, dirty water, and unsanitary waste disposal procedures were a direct cause of fevers and epidemics (Porter 1997).

In America, the garbage problem took a little longer to surface due to smaller and less dense populations in urban areas. Not until the latter half of the 19th century did refuse disposal in cities become a serious problem. This was no doubt somewhat related to a change in the type of garbage being produced. Prior to the turn of the century, the bulk of waste was organic kitchen and food scraps. After 1900, refuse contained more combustible and noncombustible materials such as wood, paper, rags, bottles, and metals as the packaging of goods increased. This new increase in materials that do not break down as rapidly as organic material was one of the factors that influenced the development of garbage incinerators.

Burning garbage has been a common means of disposal throughout history, but public incinerators, then called “cremators,” did not become prevalent in America until the1890s. Invented in the 1870s in England, the first U.S. incinerator was built in 1885 on Governor’s Island, New York. By 1892, more than a dozen incinerators were operating in the United States, and they became increasing popular as the years went on. Unlike their European counterparts, few American incinerators were used to generate power. Most of the incinerators in America were built and operated under short-term contracts and generally were not as trouble free as those built in Europe. Shortcuts in their design and construction also meant that the incinerators tended to burn at lower temperatures, thus producing more smoke and odors and leaving more refuse unburned. By the 1920s, incineration had become one of the most common methods of waste disposal in the United States. For the next 50 years, landfills and incineration would alternate as the preferred method of waste disposal.

The disposal of garbage has long been an issue of controversy for San Francisco residents and elected officials. The first documentation that can be found regarding the disposal of waste in San Francisco can be traced back to February 17, 1896, when city officials took active steps to prohibit the rampant dumping of refuse throughout the city. To accomplish this, an

ordinance was adopted that provided for the erection and operation of an incinerator and made it illegal to deposit refuse in any location other than the authorized incinerator. An incineration franchise was awarded the Sanitary Reduction Works, a private company that operated the facility until March 8, 1909. At this time, the City embarked on the issuance of bonds to acquire this entity and constructed additional incineration plants. The City experienced significant difficulties in building a new operation, while continuing to run the existing incinerator (City of San Francisco 2007).

Efforts for organized refuse collection in San Francisco did not begin until January 1919, when the mayor of San Francisco appointed a special committee—consisting of the Health Officer and Assistant City Engineer and a member of the Bureau of Governmental Research—to solve the existing refuse collection problems, including numerous refuse collectors fighting over turf and commercial customers (City of San Francisco 2007). Local debates about using trash for fill in San Francisco Bay and the public health impacts of proposed municipal incinerators were a fixture of local politics for much of the first half of the 20th century. (SF Solid Waste Forum 1997)

Presidio Refuse Disposal

At first glance, the Presidio's location on the Bay would appear not to require a detailed discussion of the process by which daily refuse was eliminated from the post. Surprisingly, however, historical records from the Presidio are not without references to frequent problems associated with refuse disposal. In the late 19th and early 20th centuries, such problems were primarily related to the sheer quantity of refuse generated by large numbers of incoming and outgoing troops. During the Colonial, early American, and Civil War Periods, post refuse most likely was deposited directly onto Presidio lands in any convenient, out-of-sight, and downwind location. Although there is no known historical record of such practices during the Spanish and Mexican Periods, the most obvious disposal location may have been just outside the *El Presidio* walls. After the walled quadrangle of the Spanish and Mexican Periods was replaced by a larger, rectangular parade ground surrounded by picket fences, the Americans likely moved their refuse dumps further away from the Main Post, typically disposing of materials in depressions or ravines where it could be eventually and easily buried.

As the post population grew and the quantity of daily refuse increased, the base Quartermaster may have combined maintenance and waste disposal procedures with early reclamation of the tidal slough and marshes along the northern edge of the Presidio. Refuse could easily have been transported along the wagon road to the wharf and deposited into the slough or anywhere along the road through the wetlands. Historic records indicate that the sand spit north of the slough (Strawberry Island) frequently was used as the post refuse dump, presumably because the tides would subsequently remove most of the material. Correspondence from the Presidio Quartermaster in 1898 revealed that the post was in dire need of a garbage incinerator, as the "present system of dumping the refuse of the garrison upon the bare, flat space northeast of the slough, near bay shore, results in the stench from this deposit and millions of flies being driven daily by the prevailing winds, into the post" (Office of Quartermaster 1898).

After the construction of the first garbage crematory near the Presidio wharf at the turn of the 20th century, combustible garbage was burned, and noncombustible materials such as ashes, tin cans, and stable waste were deposited onto the flat, south of the corral at the Bay's edge (Thompson 1997:444). As Thompson states in *Defender of the Gate,* "the gulls and tides in the

slough and marshlands helped to dispose of kitchen refuse, while the manure from the stables filled the holes and ravines on the lower post" (Thompson 1997:292) and "[d]ead horses and other animals also were cremated and dumped in this region (Thompson 1997:420).

The dumping of over 700 tons of garbage from Camp Merriam into the remaining wetlands, over the span of 3 months, added to the problem of waste management while the lower post was undergoing reclamation in the early 1900s (Thompson 1997:292). Additional incinerators were constructed between 1900 and 1936. A photograph from 1930 indicates two such facilities, one at the wharf and a new incinerator on the Letterman complex (Appendix D:"Incinerator on Main Post"). A second new incinerator was built on the post in 1936, located adjacent to the brick stables. This incinerator (Building 669) burned garbage and refuse from the Presidio, Crissy Field, Fort Winfield Scott, Fort Mason, and the Army transports docking at Fort Mason (Thompson 1997:644). The GGBHTD constructed two additional incinerators on the Main Post in 1937, each having a capacity of 0.5 ton and the ability to operate continuously for 8 hours (Office of the Civil Engineer 1940).

Previous archaeological investigations for the 2002 Doyle Drive Corridor Project did not result in the identification of Presidio Creek Ravine Dump (1870–1890); however, this area is still considered highly sensitive for historic archaeological deposits (see Figure 19). Holman's (1999) efforts for the Crissy Field Restoration Project resulted in the identification of the Quartermaster Dump (post refuse dump and landfill) located immediately north of the current Project APE (see Figure 11). Testing for the Quartermaster Dump did not extend into the Project APE, but it is predicted that the boundaries of the Quartermaster Dump does extend into the APE. There was limited testing in the APE for the 2002 Doyle Drive Corridor Project (Jones & Stokes and Albion Environmental 2002b). This testing did not result in the identification of deposits associated with the Quartermaster Dump, but it is still considered a highly sensitive area for historic archaeological deposits (see Figure 19). Historic maps indicate that an earlier incinerator was in operation at this location in 1912 (the remains of which have recently been uncovered by a hazmat remediation project).

7.8.4 Post Engineering

Along with transport and supply, all military post facilities, and the infrastructure and engineering required to support these facilities, were historically the domain of the Quartermaster's division. The impacts of post engineering activities on the Presidio environment during most of the 19th century are relatively minor. Comprehensive road improvements on Presidio lands may have resulted in the construction of the first road crossing the Presidio estuary to Strawberry Island; however, this road appears on the Wheeler Map of 1870 and most likely was built during the Civil War. The road not only provided convenient access to the Presidio wharf on Strawberry Island but also opened up access to the estuary itself for purposes of refuse disposal and landfill. Although there is no known evidence of specific landfill programs during this period, the division and bridging of the marsh and slough at an early date would have made such programs possible, and it is likely that the post engineers began some level of estuary reclamation during the 1870s and 1880s.

Landfill

As early as 1892, plans were initiated to begin reclamation of the "swampland" along the north front of the Main Post. Between 1893 and 1903, the post engineers awarded a series of contracts to dredge and landfill companies with the equipment and resources necessary to

move large quantities of earth. Old box flumes installed to control flooding in the tidal marshes were replaced with a new drainage system. Strawberry Island, the sand spit that enclosed the Presidio estuary, was graded inland to fill as much of the marsh and slough as possible. The remaining marsh was filled with material removed from the estuary bluff, particularly in the area of the future hospital complex. Fill material also was collected from other portions of the post and from outside the post. During this 10-year period, millions of cubic yards of fill were dumped into the estuary (Office of the Quartermaster 1893–1903).

The correspondence files of the Presidio Quartermaster discussed the cutting of regions north and southeast of the National Cemetery in 1895 to provide fill for the slough area. At that time, 71,000 cubic yards were removed from the southeast side of the cemetery, and an additional 160,000 sq. ft. (48,768 sq. m) of sand was taken from the hollow north of the cemetery to fill the slough for the new cavalry stables to be built at the base of the bluff, beneath Building 211 (Office of the Quartermaster 1895). The upper bluff of the Main Post also was cut away to provide fill material during reclamation of the lower post for the construction of the Quartermaster's stables, storehouses, and the Cavalry stables. According to a letter written by the Chief Quartermaster of California in 1893, the fill was procured from the bluff "by grading it off gradually from a line about 100 ft. (30 m) from the marsh" (Office of the Quartermaster 1893).

In conjunction with the 1890s program to drain and fill the lowlands for construction of the Quartermaster's stables, storehouses, and cavalry stables, fill material was also placed on the upper bluff in 1895 (Office of the Quartermaster 1895). This may have been done to resurface overused areas or to otherwise improve the surface conditions in and around the old stable complex still standing on the upper bluff after 1895. Correspondence from Lt. Colonel A.S. Kimball, Deputy Quartermaster of California, wrote that the new Guardhouse (Building 210) was constructed back from the road because the ground closer to the road had recently been filled (Office of the Quartermaster 1895). This location was reportedly selected because the foundation in a newly filled area would be more expensive to construct and the location away from the road provided a better view of the new stables and buildings being constructed below the bluff.

The eastern portion of the lower post (east of the current Post Exchange) was subject to the next major phase of landfill in conjunction with the 1915 Panama-Pacific Exposition. Preparation of the lowlands for these facilities necessitated large-scale filling and grading that began in 1912 and took nearly a year to complete. Additionally, the hydraulic line constructed for the Exposition involved the deposit of 300,000 cubic yards of fill into the entire bay-front portion of the exposition area. This construction was necessary for constructing buildings, exhibits, and streets for the exposition (Ewald and Clute 1991:13). Following the exposition, additional filling, grading, and resurfacing of the northern area of the post was conducted for the construction of Crissy Field. This area was extensively filled to prepare the landing strip and airfield in 1921 and was subsequently resurfaced and graded for maintenance. Correspondence from the Army Quartermaster in 1926 states that Crissy Field was resurfaced in 1926 by filling the field with excavations from San Francisco (Office of Civil Engineers 1926). From this evidence, it appears possible that the field was being used as a "free dump" from construction excavations occurring throughout San Francisco.

Yet another portion of the bluff near the Main Post was cut away for the construction of Doyle Drive in the 1930s. A photograph showing the excavation corridor for the elevated highway illustrates its subtractive effect along the face of the bluff north of Building 211 (Appendix D in the ASR/HSR 2002: *Construction of Doyle Drive, 1934, Indicating Cutting of Bluff*). Bluff areas

north of Building 106 and Building 211 also were cut away for the construction of Doyle Drive in the 1930s, as was the central bluff area, which resulted in the partial burial of Battery Baldwin and Battery Slaughter. These areas of landfill are considered moderately sensitive for historic archaeological deposits (see Figure 19). It should be noted that no deposits associated with land filling activities were identified during the 2002 Doyle Drive Corridor Project archaeological investigations of the Doyle Drive APE (Jones & Stokes and Albion Environmental 2002b).

7.8.5 Sea Coast Defense Facilities

The program to establish Endicott-era defense armaments at the Presidio and at other Pacific Coast forts was implemented after the Spanish-American War. The roots of this construction campaign go back to the findings of a board chaired by Secretary of War William Endicott. Between 1885 and 1886 this board gave rise to recommendations for a whole new program for defense armaments, particularly at strategic coastal defense points. Technological advances, including new steel breech-loaders, improved propellants and projectiles, electric mines, and the experimental pneumatic dynamite gun, dictated that a new series of fortifications should replace the Presidio's "Third System" defenses and the interim East and West Batteries. The emplacements constructed over the next 16 years formed one of the most up-to-date defense systems in the nation, and included one of the rare installations of the new dynamite guns. Today, these massive structures of reinforced concrete represent some of the best-preserved examples of "Endicott-era" defenses in the country.

After the Spanish-American War was over, attention was turned to increasing the number of batteries in the Bay Area, as well as improvements in seacoast defense systems—many of which were implemented at the Presidio. Although not completed until well after the close of hostilities, Battery Slaughter (three 8-inch [203 mm] breech-loading rifles) was constructed during this period. At this time, military strategists realized the efficiency of minefields and the new rapid-fire guns in protecting the inner reaches of the harbor. This realization made the 8-inch (203 mm) batteries obsolete, and a series of batteries for rapid-fire guns immediately were constructed around and just inside the Golden Gate, including Batteries Sherwood, Blaney, and Baldwin.

Batteries Baldwin, Sherwood, Slaughter, and Blaney are located in the APE along the estuary bluff, in the north-central portion of the Presidio. Batteries Baldwin and Slaughter were partially buried by the initial construction of Doyle Drive in the 1930s, although a large portion of Battery Slaughter is still visible aboveground. These areas are considered highly sensitive for historic archaeological deposits (see Figure 19). It should also be noted that a portion of Fort Point extends into the western most edge of the APE, and this area is also considered highly sensitive for historic archaeological deposits.

7.8.6 World War I and World War II Temporary Facilities

Many of the former motor transport shops, constructed as temporary facilities between World War I and throughout World War II, are located in the APE. Modern identification of portions of the APE near the pervious location of the temporary buildings as a hazardous materials area likely can be attributed to refuse and liquid waste associated with historic motorpool activities. The World War I military buildup on the post included the construction of the North Cantonment and several motor transport buildings in and near the current Project Area. An ambulance shelter, garage office, motor truck shelter, and garage from this period were located on the

lower post (Quartermaster General 1918). Temporary Buildings 608, 617, 619, 628, and 629 were motor transport shops built circa 1925 and were demolished during the 1980s (U.S. Army 1984). These standard, military temporary buildings had concrete foundations, wood frames, and asphalt roofs. When they were removed in the second half of the 20th century, many of the building materials probably were salvaged. Some additional buildings, which were still standing after the construction of Doyle Drive, were removed after 1940. The motor transport barracks (Building 261) also was located within this zone. These barracks first appear on a map of the Presidio dating to January 1918 and were converted to storehouses by 1926. The possibility remains that some of the foundations were not removed but were buried by dirt and fill. These areas are considered moderately sensitive for historic archaeological deposits, as any resources identified would not be considered eligible under the NHL district but still may have importance on their own, independent of the NHL district.

7.8.7 Pet Cemetery

The Presidio pet cemetery (first used circa 1940) is also located within the APE. The earliest interment of pets in this cemetery was of Army guard dogs housed at the Presidio during World War II. Officers at the Presidio began burying their own pets in the cemetery after receiving permission to do so from the U.S. Army sometime after the 1950s (National Park Service 1991). The pet cemetery has been used continuously from the 1940s to the present, as evidenced by dates on grave markers. It contains the remains of dogs, cats, rabbits, rodents, and reptiles dating mostly to the 1960s–1990s. The Presidio pet cemetery has been determined to be a noncontributing element of the NHL (Alley et al. 1993). This area is considered to have low sensitivity for historic archaeological deposits.

7.9 ANTICIPATED HISTORIC PROPERTY TYPES

Four broad research contexts were identified in the NHL nomination for consideration when determining whether historic archaeological properties identified at the Presidio contribute to the Landmark; this determination was made by assessing whether or not they contribute to our knowledge of:

- physical layout and design/functional intent,
- construction techniques and individual building design/function,
- social and economic history, and
- technological history.

The first task in developing the research design for this study was to provide specific research domains or themes for categorizing archaeological property types and subtypes that can also be related to the broader historical contexts of the NHL. Because the Project Area for this project historically provided the scene for a wide variety of activities, the research themes are primarily functional (e.g., domestic services, post engineering). The second task was to identify the property types and subtypes that are known or anticipated to exist in the Project APE for each research domain. Third, research questions for these properties are derived from a review of comparative literature, focusing on those research issues that proved relevant in the investigation of similar property types. Finally, the types of data required for archaeological properties to address one or more of the research questions are presented.

A property type is a grouping of properties that share important characteristics, distinguishing them from other property types (e.g., residences are one property type, incinerators are another). Archival research and field observations conducted for this Project, along with research previously completed by the NPS, indicate that a wide variety of archaeological property types and subtypes are likely to be present in the APE for the Project. These property types include domestic habitation/occupation sites; storage warehouses and sheds; animal habitations; refuse pits, scatters and dumps; remnants of water systems and transportation systems; industrial facilities and activity areas; and defense armaments. It should be noted that properties rarely sort neatly into one type or another; instead they are often a combination of two or more types. For example, laundresses' quarters served as both a domestic dwelling and a specialized activity area, and archival evidence also suggests that some facilities in the Quartermaster's complex may have served double duty as barracks or living quarters. Properties are thus classified by their primary function, followed by a discussion of any secondary functions. These property types and the associated feature types are summarized in tabular format in Table 6.

7.9.1 Laundresses' Quarters Property Types

Comparative research, as well as previous archaeological investigations at the Presidio, suggests that specific property types associated with post laundresses' facilities are likely to be structural remnants and refuse deposits, including both sheet refuse and refuse or privy pits. Laundresses' quarters at both locations on the Presidio were occupied well before organized refuse disposal practices were instituted at the post, and excavation of other dwellings at the Presidio dating to the same time period have contained both sheet and pit refuse deposits (Voss 2000). Material culture expected to be associated with the laundresses' quarters include building materials (possibly brick chimney/hearth remains) and domestic artifacts, including laundry utilities and items from clothing (e.g., buttons). These property types and artifact assemblages, if identified in the Project APE, represent a unique and important archaeological resource associated with an underdocumented historical population.

7.9.2 Quartermaster Complex Property Types

The Quartermaster Depot at military posts typically housed and distributed all items and supplies needed to transport and support an army, including the construction and maintenance of permanent facilities as well as mobilization encampments. A Quartermaster Depot included warehouses, wharves, and other loading/unloading facilities; storage sheds; offices and barracks; and stables and granaries (later motor pools, fuel stations, and maintenance yards). The Quartermaster storehouse was considered by many to be the most important building on a post because it housed the majority of supplies on the post. Several archaeological investigations have focused on Quartermaster Depots at western military posts. For example, Fort Snelling archaeologists identified structural remains of the Quartermaster storehouse measuring approximately 112 ft. (34 m) in length and 24 ft. (7 m) in width (Clouse and Steiner 1996). Stratigraphic excavation within the building revealed four features, including the foundation and builder's trench excavated for construction of the foundation. Through archival research and archaeological investigations, researchers were able to compare the Quartermaster storehouse plans to the actual architectural remains found in the ground.

Fort Vancouver has undergone extensive archaeological and historical investigations, several of which encountered the remains of Quartermaster buildings. Excavations in the vicinity of the

Quartermaster complex were selected to analyze pre-1860 site settlement patterns, ethnicity, and architectural patterns. It was not known if the pre-1860 building functions and locations were accurately plotted on historic maps, and archaeologists hypothesized that the omission of certain buildings from maps may have reflected bias on the part of the mapmakers (Chance and Chance 1974). The remains of a saddler's shop not previously depicted on historic maps were identified during excavation. The archaeological evidence indicated that their hypothesis was true (at least in part), in that buildings often were omitted from the early maps.

Archaeological and historical research on the Quartermaster depot at Fort Laramie identified several buildings, a wagon yard, and a corral associated with the Quartermaster supply and transportation activities. Research was focused on reconstructing the daily lives of the fort's occupants, including both the domestic and military lives of the soldiers and civilians on the post and the economic and social structure of the camp residents. The primary purpose of conducting excavations at the Quartermaster Depot was to investigate marginal activities that may have occurred on the edge of the fort's settlement in the Quartermaster Depot area (Walker 1998). Marginalized activities include illicit and socially condemned behaviors, such as drinking, gambling, and prostitution. Historical research on the Quartermaster Depot revealed Quartermaster employee quarters adjacent to the Quartermaster storehouses and shops. Historical research regarding the Presidio Quartermaster complex suggests that it contained quarters for a limited number of personnel or employees, although historic maps do not indicate the presence of barracks or other official quarters.

Stables

Prior to World War I, equestrian support was central to the mobilization of any army, and horsemanship was a valued part of military training. The U.S. Cavalry was one of the most important branches in the Army during the early 20th century. World War I raised doubt in the military concerning the future value of the cavalry, and subsequent increases in mechanization during World War I resulted in a significant reduction of the cavalry by the early 1920s. Organization of armored car troops was an indication of the Army's increasing reliance on mechanization. By 1940, the cavalry was almost entirely replaced by armored divisions, formed primarily from the First and the Thirteenth Cavalry regiments.

Archaeological investigations at Fort Snelling, Minnesota, identified the remains of the post stables built in 1825. The stables were constructed on a lower elevation away from the core of the post, probably because of their odor and unsanitary conditions. The demolition of the stable and the subsequent construction of several roads, garages, and parking lots over the years hindered the ability to relocate the old stable area. Excavations in the vicinity of the stable area relocated structural remains of the stables, including the foundation, stone and wood floor, and several partitions. Because no plans or drawings of the stables existed, archaeological excavation yielded valuable historical information regarding its plan and construction and also suggested that the stables were used to house a variety of animals (Clouse and Steiner 1996: 415).

Excavation and geophysical investigations were conducted on the archaeological remains of the Cavalry stables at Fort Laramie in Wyoming (Walker 1994). The investigations revealed a cache of metal artifacts in association with the stable area; however, no detailed analysis or interpretation has been written. Excavations at the Quartermaster's depot stables complex (circa 1850–1870) at Fort Vancouver uncovered multiple structural features from the stables buildings, including masonry footings, floor girders, brick pedestals, and concrete blocks.

Later interpretation of these remains stated that the stables originally had been designed to be more temporary (Walker 1994).

Blacksmith shops and historic blacksmithing activities typically consisted of fullering, upsetting, chiseling, bending, punching, splitting, welding, and brazing of metal to produce all manner of tools, building materials, and machine parts required to maintain and supply an Army post. Archaeological remains of a blacksmith shop may be identified by the presence of slag, soot, metal spills, and other associated artifacts. Excavations at the blacksmith shop at Fort Vancouver revealed a depression filled with ash that later was identified as the remains of an anvil base. Archaeologists recognized several separate activity areas within the remains of the blacksmith shop, including the bellows/storage anteroom and the forge. The majority of the artifact assemblage from the Fort Vancouver blacksmith shop is comprised of hardware and structural artifacts, including nails (hand wrought and machine made), bricks, an axe, and blacksmith tongs. Stratigraphic excavations in this feature revealed a sharp increase in the deposition of archaeological materials between 1853 and 1859, correlating with an increase in the size and the expansion of the Army during those years (Chance et al. 1982:150). Archaeological excavation at the Fort Smith blacksmith area recovered 1,154 metal artifacts, 96% of which were remnants of ferrous metal hardware and tools: wire and iron stock forms, horseshoes, nuts, bolts, picks, forks, wrenches, an axe, a chisel, a hammer, files, and knives. A limited amount of copper and brass materials were identified, including ten drops of melted copper resulting from seam-welding (Coleman 1990:215-229).

Additionally, soil chemistry analysis in conjunction with archaeological studies revealed new data from a 19th century farm blacksmith shop in northern Delaware (Custer et. al. 1986). A systematic soil chemistry analysis identified concentrations of calcium, magnesium, potassium, and phosphate within the farmstead site, while soil from the blacksmith's activity area contained increased potassium levels typically associated with wood ash deposits from the blacksmith's forge. According to the researchers, archaeological excavation revealed low artifact densities in the blacksmith's activity area; however, the increased concentration of potassium helped to define this area and to separate domestic and industrial activity areas (Custer et. al. 1986: 90-94).

7.9.3 Property Types for Refuse Disposal

The Quartermaster Dump has been identified as potential refuse disposal location within the APE. Accounts of the Quartermaster Dump identify it as the central location for the disposal of Presidio refuse, a combined dump/landfill that extends over a large area and was in use for a long period of time. It is so named because of its proximity to the Quartermaster complex and also because maintenance of the post was the responsibility of the Presidio Quartermaster department, whose personnel would have operated and maintained the dump. Extensive research on the Quartermaster Dump has been undertaken for the Crissy Field Restoration Project. Preliminary findings suggest that stratified, discrete trash features are buried in landfill deposits on the lower post that contain data to address important research questions (Holman et al. 1999). These deposits most likely extend into the Project APE and are anticipated along historic Bank Street (the original road across the marsh/estuary to the Presidio wharf) and adjacent to later roads connecting the Main Post to the Presidio wharf (vicinity of Halleck Street).

7.9.4 Military Cemeteries Property Types

The second post cemetery was built in the 1850s or 1860s (Thompson 1997:399). In 1886, the cemetery, which occupied a rectangular area of 9.5 acres (38,445 m^2), was expanded south and west to encompass 15.5 acres and substantially improved by the addition of landscaping and enclosing walls with iron fences. The post cemetery, located west of the Main Post, was designated as a National Cemetery in 1884. This official cemetery was designated the San Francisco National Cemetery and underwent a major expansion in the 1880s and 1890s. The northeast portion of the present National Cemetery encompasses the oldest gravesites. The northern boundary of the National Cemetery is located within the Project APE.

Other early forts apparently also experienced similar abandonment and redevelopment of cemetery areas, as observed at the Presidio. For example, at Fort Vancouver historical maps show a cemetery dating to before the 1860s that by 1866 was described as being extant, 4 acres in size, enclosed by a rail fence, and containing 20 graves. The report indicated that the plot was overgrown, many of the graves lacked headstones, and no order or system seemed to have been observed in laying out the interments. By 1886, the cemetery was no longer plotted on maps, and quarters had been built in the same location. Researchers at Fort Vancouver did not report whether they found any records of relocation and reburial.

7.9.5 Property Types for Defense Facilities

Comparative research revealed that a very limited number of batteries have been the subject of excavation and of those that had, most date to earlier periods, such as the Civil War. The excavation undertaken at Fort Stevens, Oregon was the notable exception. Battery Freeman was constructed in 1902 and was in use until 1920. A total of 5,000 artifacts were found in a ditch surrounding the battery, which had been filled in after it was abandoned. Although not *in situ*, the artifacts were located within recognizable stratigraphic features that allowed for the differentiation of several different artifact assemblages, including a fill component, a feature thought to be an incinerator, the floor of the battery, and a pre-Battery Freeman bulkhead wall. Of these, the fill component and the possible incinerator feature are the most relevant to the Project. Substantial work went into illuminating the architecture of Battery Freeman, largely possible because over 40% of the recovered materials related to the battery's architecture. Unfortunately, the mixed nature of the fill deposit did not permit the observation of any spatial patterning.

A historical map from 1909 indicates that the coastal defenses within the APE had a variety of firepower, including Battery Baldwin with two 3-inch (76 mm), rapid-fire guns, Sherwood with two 5-inch (127 mm) guns, Slaughter with three 8-inch (203 mm) guns, and Blaney with four 15-pounder, rapid-fire guns. According to historian John Martini, these four batteries never served as residential structures during the era being studied. In terms of associated outbuildings and features, Martini indicates that each of the batteries had their own latrines and that the latrine for Battery Slaughter is buried under the present Doyle Drive (Martini pers. comm.).

Because these buildings post-date 1900, it is unlikely that extensive archaeological deposits will be identified in association with the batteries. NPS maintenance activities have uncovered numerous bottles in the vicinity of the batteries at the Presidio, and these appear to be associated with the troops posted to guard the batteries (Martini pers. comm. 2001). No substantial refuse deposits associated with these defense facilities have ever been identified (Martini pers. comm.). According to the NPS historical archaeologist, Leo Barker, additional

military materials such as machinery parts, munitions, and structural elements of the batteries and guns have been identified near the batteries, which indicates that a sheet scatter of refuse may surround the batteries (Barker pers. comm.).

SECTION 8: RESEARCH THEMES AND QUESTIONS

This chapter presents prehistoric and historical research themes for guiding archaeological testing, excavation, and analysis within the Project APE. The goal of the research design is to provide context in which a site and archaeological materials can be evaluated for their eligibility for listing in the NRHP and/or CRHR. The development of research themes is the archaeologist's attempt to understand and explain the history of human culture for a given region. In California, the primary areas of prehistoric research continue to be focused on chronology, cultural complexity, settlement and subsistence, human response to environment, exchange, buried site formations, and predictive geomorphic modeling, among others. Another crucial element of the understanding of prehistoric populations is the importance of the study of prehistoric people and cultural to the present day Native American descendents of the people that once inhabited California.

All historical archaeological deposits possess information. Evaluating the significance of a site requires determining if this information is important, and if so, if it could be obtained in a more cost-effective and straightforward manner than through excavation (i.e., through documents, oral history, or other nonarchaeological data sources instead). The archaeological research design should link the information contained in sites to historically important topics of current research.

The research themes developed in this report are based on a review of recent archaeological research in California, with a focus on Bay Area topics of concern. This research design considers the previous research conducted at known archaeological sites within the Project Area, as well as previous archaeological studies conducted at similar archaeological sites throughout the region. If significant archaeological deposits associated with the known (i.e.,CA-SFR-6/26) or unknown sites in the Project Area are discovered, it is likely that the artifact assemblage would have the ability to address important questions regarding prehistoric or historic cultures in the Bay Area as described here.

8.1 PREHISTORIC RESEARCH THEMES, RESEARCH QUESTIONS, AND PERTINENT DATA SETS

8.1.1 Settlement Patterns

Research concerning the settlement patterns of prehistoric populations along the California coast has centered largely on the central and southern regions, from Monterey Bay to Santa Barbara. Models proposed for interior California and the central coast have been extended to the Bay, with few attempts made to directly synthesize the archaeological record of the Bay Area.

When reviewing the settlement models below, it is important to keep in mind that discussions of prehistoric settlement models for the Bay Area tend to gloss over discussions of the relative paucity of Early Holocene sites relative to the abundance of Mid to Late Holocene sites in this region. The problem is one of archaeological visibility, where Early Holocene sites have been obscured due to dynamic landscape changes resulting from climatic variability. Many Early Holocene sites in the Bay Area are doubtless on Pleistocene/Early Holocene riverine terraces and estuarine margins now submerged under Bay waters. On a more local level, archaeological visibility in the Project APE is limited by either natural processes that include

burial by migrating dune sands or alluvial processes or by destruction or burial as a result of rapid urban and industrial development in the historic period (White and Meyer 2002). The following review includes settlement models and propositions advanced specifically for the San Francisco Bay and for the Monterey Bay/San Luis Obispo coastline, as hypotheses developed for both areas are related.

San Francisco Bay Settlement Models

In 1970, T. F. King speculated on the evolution of cultural complexity in the Bay Area. His model of culture history was expanded in later works (King 1972, 1974; King and Hickman 1973) and eventually developed into what is now called the "Bayshore Village" model. Although it was first applied to work in the Santa Clara Valley, King's model (King and Hickman 1973) contained implications that were seized on by archaeologists frustrated with attempts to apply the Central California Taxonomic System to the Bay Area record. In particular, aspects of the model concerning the development of sedentism had ramifications for the age and locations of village sites. For instance, King and Hickman (1973:72) state that "sedentary village life will develop in areas where many food resources are available in all seasons." This statement implies that coastal habitats, where marine foods are available year-round and terrestrial foods can be obtained seasonally, were likely places for the development of semipermanent or permanent village sites. King and Hickman (1973:V-3) perceived that early Millingstone Horizon (7000–4000 BP) adaptations on the central coast, around the Bay, and in the north Coast Ranges were extensions of earlier developments along the southern California coast. Among other things, they suggest that the appearance of Millingstone Horizon traits in central California resulted from southern populations "budding off" to the north and that "a sequence of Millingstone sites on the central coast should show a progression from pioneering to established (sedentary) to overpopulated villages" (King and Hickman 1973:V-3). The authors also suggest that, due to the effects of early Holocene sea-level rise, "Millingstone villages would appear rather suddenly on the central coast at the time when sea level approaches its present stand" (about 5,000–6,000 years ago) (King and Hickman 1973:V-3). Earlier Millingstone sites on the central coast supposedly were abandoned due to the increase in sea level, forcing groups to occupy more inland locations. It should be noted here, however, that there are virtually no sample sites in the Bay Area dating to earlier than 5000 BP, so King and Hickman's model is prospective at best. Jones (1992:12) interprets most sites on the central coast dating between 5500 and 2800 BP as residential bases but questions whether they were occupied year-long or only seasonally. Although he cites Moratto's (1984) suggestion that sedentary villages were present in the Bay Area by 4500 BP, Jones still finds it likely that major residential bases on the coast were used in conjunction with seasonal inland camps. Recent work by Jones et al. (2002) at the Cross Creek site (CA-SLO-1797), which has a well-developed Early Holocene strata, indicates the site was used for a substantial amount of time each year, suggesting relatively low mobility during a time when most scholars believed groups to be highly mobile (Jones et al. 2002:226).

For the ensuing time period (4000–1500 BP) King and Hickman state that "the Middle Horizon represents a period when maritime/littoral adaptation along the California coast permitted and impelled a large-scale population increase in sedentary coastal villages, culminating in periodic population pulses into the interior" (King and Hickman 1973:V-4). The temporal framework offered for coastal village sites was consistent with the inferred ages of many Bay Area shellmound sites (Heizer and Baumhoff 1956) but provided ammunition for archaeologists

who contested Heizer's (1949) assumption that the shellmounds were "occupied by interior people and not vice versa."

Jones (1992) supports the emergence of extended coast occupations during the Middle Period in the Bay Area but offers that the abundance of sites in bayside contexts is indicative of residential movement. He proposes that year-round residences were established at inland valley locations in addition to those on the coast (Jones 1992:13). These opinions give the impression that Middle Period settlement patterns had a coastal focus, with interior sites being important but ancillary, perhaps seasonal habitations.

In addition, the King/Hickman model had implications for settlement patterns during the late prehistoric, or "protohistoric" period (1500–400 BP). The model states that, on the central coast, "There should also be evidence of the disintegration of large organized groups, reflected in the denucleation of the settlement system" (King and Hickman 1973:V-5). Breschini and Haversat (1994) testify to the contemporary validity of the King/Hickman model, suggesting that it best explains the presence of large Middle Period coastal villages and the lack of such sites during the Late Period. King (1974) later developed a late prehistoric subsistence model for the Bay Area based on the King/Hickman hypothesis, one that was eventually modified by Parkman (1980). This model incorporates the idea that residential sites were only seasonal winter occupations, unlike the semisedentary coastal occupations of the previous interval. Larger groups at winter villages fragmented with the onset of spring, individual families moving to locations in the bay foothill/bay plain contact zone to take advantage of ripening bulbs and greens. These camps were maintained into the summer months, when seed grasses became available. In fall, residential bases were relocated to foothill oak groves for the acorn harvest. Acorns routinely were transported to winter village locations for storage in anticipation of the coming season (King 1974; Parkman 1980, 1994). Parkman (1994) argues that this model still holds, although he assumes that large shellmounds in the Coyote Hills area (ALA-12, -13, -328, and -329), as well as a few others, represent winter villages of the Tuibun Ohlone tribe. Only one of these sites has produced a radiocarbon date in support of this notion (ALA-329), while components at a few others have been assigned to the Augustine Pattern (ALA-13, ALA-328, Component 2) based on assemblage characteristics (Simons 1992).

Simons (1981) evidently found support for the King and Parkman models in faunal assemblages from shellmounds at Stege and Ellis Landing, positing a seasonal round made between winter bayshore villages and summer inland camps. Jones (1992) suggests that open coast residential sites in the southern Bay were abandoned around 1000–800 BP and thus cannot provide support for the King and Simons models. Bocek (1987:336) contrasts this view, suggesting that inland villages along San Francisquito Creek were occupied for most of the year, but Jones (1992:15) proposes that Bocek's main site (SMA-204) is more accurately interpreted as a seasonal camp rather than a semipermanent village. Instead of the King/Simons model, Jones (1992:15) notes the scarcity of Late Period shoreline sites in the Bay Area and finds it more plausible that settlement systems at this time "involved fairly permanent occupation of inland valleys and logistical use of both foothill and bay resources." He also points out that the number of coastal sites decreases while the number of inland sites increases and that the few coastal sites depicting residential use during the Late Period show increased procurement of small marine mammals, especially sea otters (Jones 1992; Simons 1992; Broughton 1994). Presumably, these coastal sites were inhabited by small groups for the specific purpose of exploiting marine habitats.

Recent work by Milliken (1995, 1996, 2007) with Mission texts only adds to the divergence of Late Period/Contact Period settlement reconstructions for the Bay Area. Working primarily from the writings of Francisco Palóu between 1773 and 1786 (Palóu 1913, 1926), Milliken (1995, 2007) notes the existence of five villages along the upper peninsula; *Chutchui, Sitlintac, Tubsinte, Amuctac, and Petlenuc.* He places the village of *Chutchui* in Mission Valley along the banks of Mission Creek, some 2–3 miles inland at the site where Mission San Francisco (Dolores) later was established. *Sitlintac* and *Tubsinte* were located at the mouths of Mission and Visitation Creeks, respectively; *Amuctac* was located near Visitation Valley, and *Petlenuc* just east of the Golden Gate "perhaps near the site of the Spanish Presidio compound" (Milliken 1995:261; 1996:1, Map 1). All of these sites are referred to as "seasonal" villages, those inland (*Chutchui* and *Amuctac*) being summer/fall encampments and those along the coast (*Sitlintac*, *Tubsinte*, and *Petlenuc*) serving as winter residences. Milliken suggests that the Yelamu population was divided into three "semi-sedentary" groups of families, one group making seasonal use of the "beach area facing the sea and the Golden Gate," another alternating between the villages of *Sitlintac* and *Chutchui*, and a third shifting from *Amuctac* to *Tubsinte* at different times of the year.

Taken at face value, the descriptions presented by Milliken imply a pattern of transhumance comparable to the King and Simons models. Seed grasses, acorns, and other inland plant foods likely were targeted from inland camps during summer and fall while shellfish provided fresh staples for coastal villagers in winter, when diets relied heavily on stored food. Groups wintering at these villages may have been able to exploit populations of larger mussels (*Mytilus californianus*) that prevail in rough winter surf when smaller species (e.g., *Mytilus edulis* [*M. trossulus*]) are carried off (Schoenherr 1992). Of course, food resources from terrestrial and marine habitats could be obtained from either inland or coastal sites, and it is likely that the availability of labor-intensive foods, especially acorns, influenced the timing and locations of residential shifts more than anything else.

Central Coast Settlement Models

Reconstructions of aboriginal settlement patterns on the central California coast are also relevant to the present study. Following Binford (1978, 1980), initial research efforts characterized coastal sites as either residential bases or special-purpose locations, and the overall settlement systems these sites functioned within as being "forager" or "collector" types (Breschini and Haversat 1980; Dietz and Jackson 1981; Dietz et al. 1988). Prior to about 2000 BP, coast populations used a mobile, "forager" settlement strategy, moving seasonally between a series of coastal and interior residential camps placed in proximity to available food resources (Dietz and Jackson 1981). During annual subsistence rounds, residential bases were occupied for relatively brief periods but were revisited on a regular basis. Few task-specific sites were developed in association with these sites, as foodstuffs were processed and consumed at residential camps. According to this model, residential sites would have been located within complex coastal habitats containing both terrestrial and marine resources.

After this time, researchers have argued that a new population using a "collector" strategy entered the Monterey Bay area (Breschini 1983; Dietz and Jackson 1981; Dietz et al. 1988). Breschini (1981) and Dietz and Jackson (1981) suggest that this change indicates a replacement of Hokan speakers by Penutian speakers throughout the region. The new Penutian subsistence pattern involved the establishment of residential bases in centralized locations from which a variety of foods and raw materials could be obtained through short-distance logistical forays. Such sites were occupied for longer intervals and supported by

various short-term task sites, where resources were processed or obtained. Plant foods, particularly acorns, often were stored at residential sites for winter use as part of this subsistence strategy. Dietz and Jackson (1981) suggest that an emphasis on acorn use promoted year-round occupation of residential sites that were located along interior drainages in forested habitats, where oaks were abundant. Other "seasonal residential bases" were coastal occupations inhabited from spring to fall. Although focusing on marine resources, procurement efforts also took advantage of foodstuffs available in coastal and pine forest environments. "Field camps" and temporary procurement sites were placed within a variety of interior and coastal habitats but are less archaeologically visible than residential bases. Breschini and Haversat (1980) also suggested that coastal midden deposits fit into two discrete functional/temporal categories: "middens with shell," produced by foraging groups and dating prior to 2000 BP, and dense "shell middens," created by collector groups and less than 2000 years old. More recent interpretations of coastal settlement patterns have expanded on or modified the initial hypothesis offered by Breschini/Dietz and Jackson (Bouey and Basgall 1991; Hildebrandt 1997; Hylkema 1991; Jones 1995; Jones and Waugh 1995). For the San Mateo and Santa Cruz coast, Hylkema (1991:381–382) argues that the dispersed nature of oak woodland habitat in this region prohibited the high degree of acorn reliance seen elsewhere in central California. He indicates (1991:389) that Late Period groups in the Bay Area were able to "manipulate both the coast and bayshore in collector fashion," but farther south "a forager strategy along the coast of San Mateo and Santa Cruz Counties coexisted with a collector strategy which surrounded the study area" (Hylkema 1991:391).

Jones and Waugh (1995) find no support for the forager-collector/population replacement dichotomy at Little Pico Creek (SLO-1259). Instead, they see a fairly sedentary coastal adaptation beginning as early as 5500 BP, followed by a gradual economic intensification during the next few millennia. By the Late Period (after circa 2000 BP), they suggest that major residences along the Monterey and Big Sur coasts were abandoned and relocated inland as a response to increasing reliance on acorn use. At Big Sur, Jones (1992:16; 1995:216) attributes this inland push to limitations of the marine environment, suggesting that the overexploitation of shellfish and marine mammals led coast populations into direct economic intensification to storable, interior resources (e.g., acorns). However, he also suggests that a period of environmental degradation between 1000 and 600 BP (the Medieval Warm Period) adversely affected terrestrial resources and led to a decline in coastal populations; this event ultimately triggered a reoccupation of coastal villages, as marine habitat productivity was not as drastically affected (Jones 1995:218).

The presence of several Middle Period (5000–600 BP) sites at Point Piedras Blancas in northern San Luis Obispo County (Bouey and Basgall 1991) is consistent with the notion that coastal habitats were regularly exploited by early (pre–Late Period) foraging groups. However, the authors note that it is difficult to tell if subject sites were used as short-term residential bases by small groups of foragers or as specialized logistical camps by collector task groups (Bouey and Basgall 1991:224). Breschini and Haversat's (1980) typology for coastal midden deposits would label the Piedras Blancas sites as "middens with shell," thus implying a forager-type, pre-2000 BP origin. Unfortunately, without a better understanding of interior archaeological patterns in San Luis Obispo County, it is impossible to link the Piedras Blancas sites to any specific settlement pattern (Bouey and Basgall 1991:225).

Speaking from an interior perspective, Hildebrandt (1997; also Hildebrandt and Mikkelsen 1993) claims that sites in the southern Santa Clara Valley reflect a high degree of mobility prior to 2500 BP and the exploitation of coastal habitats at Elkhorn Slough at this time. Between 2500 and 850 BP, however, sites show a decline in quantities of bay mussel and a rise in

amounts of interior wetland resources (e.g., elk, fish, waterfowl, and freshwater mussel). Hildebrandt (1997:221) interprets this change as a reflection of reduced access to coastal habitats, a conclusion that is broadly consistent with the outcome of a decline in marine productivity between circa 2000 and 1000 BP predicted by Jones (1992, 1995). Although Jones (1997) and Jones and Waugh (1995) would argue that Elkhorn Slough was unproductive during the Early Period, and thus could not have figured prominently in Santa Clara Valley settlement systems, a Late Period emphasis on terrestrial and lacustrine resources looks to be supported by both sides.

Prehistoric Settlement Pattern Summary

Any discussion of prehistoric settlement models in central California coastal areas must acknowledge the paucity of Early Holocene sites relative to the abundance of Mid to Late Holocene sites in the region. The problem is one of archaeological visibility, where Early Holocene sites have been obscured due to dynamic landscape changes resulting from climatic variability. Any settlement model posited for the Bay Area should consider the likelihood that early sites are likely submerged under the Bay or may lie on ancient Pleistocene terraces obscured deposition or vegetation but lying above sea level and that, if discovered, have the potential to contain evidence of a well-developed coastal foraging lifeway vastly different than traditionally envisioned and which is now still poorly defined.

Settlement models advanced for the Bay Area and the central coast posit changes through time in group mobility, subsistence orientation, site types, and location, but they are at odds in some respects. The King/Hickman model implies that early (pre-5000 BP) adaptations in the Bay Area have centered on large, sedentary coastal villages, as does research by Jones (1992, 1995) at Big Sur. Viewpoints expressed by Dietz and Jackson (1981), Breschini (1983), and Bouey and Basgall (1991) differ to some extent, indicating or implying that early populations of mobile foragers occupied coastal residences on a less extended, seasonal basis. Irrespective of how “permanent” coastal villages were at this time, they likely were supported by seasonal inland camps from which a range of terrestrial plant and animal resources could be obtained.

Subsequent adaptations (4000–2000 BP) may still have involved a fairly high degree of residential mobility (Dietz and Jackson 1981; Breschini 1983; Hildebrandt 1997), although King and Hickman (1973) see continued population growth in sedentary coastal villages and Jones (1992) corroborates the extended nature of coast habitations at this time. Settlement systems may have retained their earlier coastal orientation, as exemplified by continued occupations at many shellmound sites around the Bay, but there is evidence that the use of interior areas was becoming more and more important to subsistence strategies by this time.

In some form or another, most contemporary reconstructions of coast settlement patterns refer to an “abandonment” or cessation of permanent seaside villages after about 2000–1500 BP (Jones 1992; Jones and Waugh 1995; Hildebrandt 1997). This may be only a reflection of a seasonal mobility pattern in which residential bases were maintained throughout the year in different habitats, but it also may signal intensified hunting practices that overexploited populations of larger marine mammals. Jones (1995) suggests that a period of climatic degradation and a decline of interior resource productivity between 1000 and 600 BP may have forced the relocation of inland camps back out to the coast, but there seems to be little evidence of this along the shoreline of San Francisco Bay. Broughton (1999) notes that late prehistoric components may have been removed from the upper layers of many Bay Area

shellmounds prior to their investigation, thus eliminating a large part of the recent archaeological record, but this claim is largely speculative. Most likely, Jones' (1992:15) suggestion that Late Period settlement systems made "logistical use of both foothill and bay resources" from semi-permanent inland villages is more to the point and may fit the archaeological record of the Presidio area quite closely.

Some questions pertinent to settlement patterns, subsistence, and site function might include the following.

Question: What archaeological evidence is available regarding site function?

Question: Was the site occupied year round, seasonally, or intermittently? If the settlement was temporary, was its use seasonally cyclical, episodic, periodic, or ephemeral? Is there evidence, in the portion of the site investigated of sedentary or semi-permanent settlement, such as concentrations of human remains or evidence of substantial structures such as house floors, dance floors, and sweathouses?

Question: Do Early Holocene sites exist, either at locations inundated by sea level rise or on buried landforms in the Project APE? If so, are features and deposits suggestive of continuous or short-term episodic use, and how might they differ from similar sites dating to later periods?

Question: What is the apparent functional range of the artifact assemblage? Does it appear to be specialized, or does it contain the full range of artifact types and stages of manufacture?

Question: Is there evidence of feasting behavior or other ritual activity?

Question: If burials are present, are they contemporaneous with the matrix in which they were interred?

Data Requirements

- Artifact Assemblage: Range of activities carried out during occupation.
- Faunal Assemblage: Species present and their sources, quantification, speciation, sex and age analysis, body part analysis, butchering studies, and environmental niches represented.
- Botanical Remains: Species present and their sources, seasonality, environmental niches represented, flotation studies.
- Human Internments: Human remains and associated artifacts, depositional evidence; may provide data on ceremonial practices and insight into hypotheses of ceremonial uses of the site, particularly in conjunction with depositional studies and faunal analyses.
- Archaeological Features: Occupation features, hearths, storage pits, house floors, or structural remains; may be significant to the determination of occupation type and site function; range of activities carried out during construction.

- Depositional Data: Analyses of depositional patterns and other spatial patterning of artifacts and features; evidence of period of intensification or decreased activity.
- Geoarchaeology: Identification of paleosols or buried landforms that may contain Early Holocene cultural deposits.

8.1.2 Subsistence Adaptations and Site Seasonality

Because coastal shellmounds and middens normally contain sizable assemblages of invertebrate and vertebrate faunal remains, such sites can provide information concerning certain aspects of prehistoric subsistence strategies and about changes in those strategies through time. Column samples removed from any sites found within the APE could contribute to a few broad research issues pertaining to past human adaptations in the Bay Area and along the central California coast.

Estuarine/Marshland Adaptations

Archaeological interest in the roles of wetland and marshland habitats originates from the many discoveries of late Pleistocene/early Holocene artifacts and sites along the shores of ancient pluvial lakes and in marshlands throughout western North America, finds which led to conclusions that wetlands were of major importance to post-Pleistocene human adaptations. Some early research efforts in the Great Basin (Bedwell 1970; Heizer and Napton 1970; Napton 1969) posited an adaptive model of “limno-sedentism” in which the abundance and variety of wetland food resources allowed human groups to have long-term residential stability. Contemporary archaeology has verified the importance of wetland habitats to past human populations, but it appears such environments were not the cornerstones of subsistence adaptations as previously thought. Instead, studies compiled by Janetski and Madsen (1990) and research efforts by Basgall (1993), Kelly (1985), Hartzell (1992), and Madsen (1988) have shown that wetland adaptations were only one part of an extensive settlement/subsistence system and that the benefits of wetland resources were probably situational, not always being greater than those of resources in terrestrial habitats.

The last few decades of archaeological research along the California coast have seen a focus on the role of estuary and marshland habitats in prehistoric subsistence strategies. Jones (1991; Jones et al. 2002) has identified the priority of lakeside and estuarine settings in early occupational patterns of the California coast. He proposes that the concentration of resources in these habitats, and in particular the presence of freshwater and marine shellfish, would have provided an optimal situation for the earliest human groups entering California. Erlandson (1988) and Erlandson and Yesner (1992) would agree, arguing that many early Holocene groups on the California coast were “maritime” hunter-gatherers. Hildebrandt (1997) also finds strong support for the exploitation of estuarine resources by early hunter-gatherers but argues that, while inland lacustrine settings were in use throughout the Holocene, their intensive exploitation is a relatively late phenomenon. Indeed, the relative timing and importance of estuarine versus lacustrine habitat use are questions that have spurred much recent debate (Hildebrandt 1997; Hildebrandt and Mikkelsen 1993; Jones 1997; Jones and Waugh 1995).

Recalling the archaeological context of the present study, the discovery of buried sites within the Project APE could provide information about the importance of estuarine resources to occupants of the northern San Francisco peninsula. Sites found along the course of the former slough on the lower post are expected to contain quantities of freshwater shellfish, particularly

mussel (*Anodonta* spp.), but may also include coastal mussels (*Mytilus* spp.), clams (*Macoma nasuta*), and other marine shellfish. Midden deposits also could harbor evidence of estuarine faunal exploitation and of estuarine plant use, in the forms of fish and waterfowl remains and microbotanical residues, respectively. Through the analysis of stratigraphic column samples, it may be possible to determine changes in the significance of estuarine foods through time relative to either coastal or terrestrial resources.

Coastal versus Terrestrial Adaptations

Along the lines of the previous topic, current research in central California and in the Bay also has focused on the balance between coastal and terrestrial resources in prehistoric native diets. The notion that one or the other may have been more or less important at different times in the past stems from recognized variability in coastal shellmound locations, some of these deposits occurring along interior watercourses and others in bayside contexts.

Recent work by Jones et al. (2002) at the Cross Creek site (CA-SLO-1797) near San Louis Obispo resulted in the discovery of one of the oldest coastal sites in California, dating to between 10300 and 9650 BP. This terminal Pleistocene/Early Holocene site is a mainland shell midden situated on a Pleistocene marine terrace later buried by Holocene alluvium (Jones et al. 2006:216). At the time of its occupation, the site was located approximately 10.6 miles (17km) away from the open coast but only 5.6 miles (9km) from the one-time location of a marine estuary. The site contains numerous artifacts attributed to the Millingstone Horizon. Millingstone Horizon sites are typically found within 93.2 miles (150 km) of the coast and are virtually absent from inland deserts and mountain ranges.

The millingstone toolkit consists of well-made milling slabs, handstones, and expediently-made core/cobble tools, flake scrapers, and hammerstones. The Millingstone Horizon is accepted to be a Mid-Holocene cultural manifestation spanning occurring from approximately 7000-8000 to 5500 BP. This toolkit bears no resemblance to the sophisticated biface-oriented lithic technology of the interior Paleoindian toolkit for which the Early Holocene is noted. Jones et al. suggest the core/cobble tools at SLO-1977 bear closer ties to the Pebble Tool Tradition of the Pacific Northwest, ultimately originating in late Pleistocene littoral cultures of northeastern Asia. The milling toolkit, radiocarbon dates, and floral and faunal evidence the form of estuarine shell, seeds, and charcoal from SLO-1797 augmented with data from Daisy Cave (CA-SMI-261) on the Channel Islands, indicate Early Holocene coastal populations were focused on broad-based foraging in which marine and vegetal resources played an important part of the diet, rather than on a highly-specialized hunting adaptation that focused on big game.

Jones et al. go so far as to posit that evidence from SLO-1797 may indicate a separate, coastal migration into western North America, one separate from the Pleistocene big-game hunters of interior North America. This alternate model of New World colonization diverges significantly from more traditional models which are focused on the primacy of Paleoindian migrations into interior North America. Jones et al.'s investigation reinforced the argument that not all subsistence adaptations necessarily followed the same trajectory toward intensification and that some populations may have been practicing some forms of resource intensification much earlier than has been traditionally assumed. Finally, the Cross Creek site may reveal a well developed coastal adaptation that may change accepted ideas about early Holocene hunter-gatherer mobility.

Simons (1992) has discussed shifts in mammal hunting represented at sites on the San Francisco bayshore, indicating a long-term trend away from the capture of large marine

pinnipeds (sea lions and seals) and terrestrial artiodactyls (deer and elk) toward the intensive exploitation of smaller marine mammals (primarily sea otters). Broughton (1991) and Hildebrandt and Jones (1992) have argued that populations of artiodactyls became depressed as a result of overhunting by prehistoric coast inhabitants; Broughton (1994, 1999) has concluded that geographic differences in the natural abundance of artiodactyl prey, along with Late Period decreases in human foraging areas brought about by demographic pressures, combined to reduce the efficiency of artiodactyl hunting and redirect hunting efforts to other smaller mammal species (e.g., otters). This alteration is consistent with modes of subsistence "intensification" seen in the Late Period archaeological record across California (see below).

The combined results of many shellmound analyses also have noted long-term changes in the use of different marine shellfish species. At some locations, trends have shown shifts through time from an emphasis on mussels and oysters to mussels and clams (Clark 2001; Greengo 1951; Nelson 1909; Uhle 1907); in other cases, they have depicted general changes from mussels to clams (Nelson 1910a; Gifford 1916; Pastron and Walsh 1988a). Whether these differences are site specific or represent broader patterns of shellfish exploitation is still open to debate, but they do imply a shift from the use of open coast environments to a preference for bay/tidal flat habitats through time.

It is anticipated that sites within the APE will contain at least moderate assemblages of marine and terrestrial fauna. This was certainly the case with sites at Fort Mason (Eschmeyer and Schoenwald 1981), at Crissy Field (Clark 2001), and within the city of San Francisco (Pastron and Walsh 1988a, 1988b), although it appears that large fractions of faunal collections cannot be speciated due to high degrees of fragmentation and poor preservation. Again, it is hoped that vertical column samples can be obtained from any discovered sites so that relative fractions of invertebrate and vertebrate fauna can be compared to show temporal changes in subsistence strategies.

Models of Subsistence Intensification

Working from the tenets of evolutionary ecology and optimal foraging theory, the concept of "intensification" has been applied to the subsistence adaptations of prehistoric hunter-gatherers on the California coast. Put simply, subsistence intensification is seen as an outcome of population pressure resulting in a change in procurement strategies toward an emphasis on higher-cost, lower-return food resources. In the context of growing population, increased competition for resources, and decreased foraging areas, human groups may respond by switching procurement strategies from preferred, high-ranked species (offering large-calorie packages with relatively little investment of time and energy in capture and processing) to low-ranked species (offering smaller-calorie packages with more investment).

Since the late 1980s, archaeologists have advanced intensification models in trying to explain observed changes in coastal settlement and subsistence patterns during the Late Prehistoric Period (after circa 1500 BP). Three of these models are pertinent to the present study and are briefly summarized below.

Acorn Economy

Much has been written about the importance of the acorn to native California groups because of its value as a staple as well as how the acorn shaped native California group economies (Gifford 1936 cited in Morgan 2006). Scholars have targeted the success of the acorn economy as the primary reason native California groups never adopted corn agriculture

(Baumhoff 1963). Additionally, much has been written about how the intensification of the acorn, with its high processing costs, shaped and promoted cultural complexity and the sexual division of labor in native California culture, perhaps most notably by McCarthy (1993) in her work on the political economy of Western Mono acorn production.

Ethnographic data first established the significance of the acorn as a dietary staple among many California aboriginal populations (Barrett and Gifford 1933; Baumhoff 1963; Gifford 1936; Kroeber 1925). The oldest direct evidence of acorn use suggests an antiquity of about 3000 BP, but an association of mortars and pestles with acorn processing may place its inception somewhat earlier (around 4000 BP) in the Bay. The intensive use of acorns, however, probably did not begin until around 2500 BP and was not in full swing until sometime in the Late Period (Basgall 1987; Wohlgemuth 1996).

The shift toward an intensive acorn "economy" must have affected settlement patterns to some degree. A heavy reliance on acorns would have required the establishment of at least seasonal residences in inland foothill zones, thus necessitating a reorganization of settlement systems that may previously have centered in coastal environments. Jones and Waugh (1995) postulate this very scenario, suggesting that Late Period residences on the Monterey and Big Sur coasts were relocated to the interior in response to the growing reliance on acorns. Jones (1992, 1995) suggests that this shift may have been triggered by limitations of marine habitats and the overexploitation of shellfish and marine mammal populations. In order to continue access to coastal resources, late prehistoric groups may have maintained seasonal residences or processing camps in coast locations. This could explain the presence and function of known shellmound and midden sites at the Presidio and Fort Mason, at the same time providing a set of predictions for the kinds of sites that may still lie buried within the APE.

Deer Hunting Economy

According to Simons (1992), the "deer economy" model suggests an emphasis on the capture of deer and other upland fauna in foothill environments of central and northern California. A focus on deer hunting has been documented in ethnographic writings (Beals and Hester 1960, 1974), and Simons (1988) and Simons and Quinn (1988) indicate that this hunting adaptation extends into prehistoric times. The fact that the deer economy was a coharvesting strategy, taking deer as primary prey and smaller fauna as secondary prey, leads Simons (1992) to postulate a similar coharvesting strategy that focused on both terrestrial and marine mammals. Broughton (1994, 1999) has examined the relationship between deer hunting and sea otter hunting at Bay Area shellmound sites, recognizing a gradual increase in otter hunting through time but a Late Period spike in deer exploitation at the Emeryville Shellmound. Given that deer and acorns are both available in foothill environments, there was probably some articulation of deer and acorn economies when seasonal settlement moves brought coastal groups to the interior. Regarding the present study, however, faunal assemblages recovered from tested sites may provide insight as to the relative importance of deer hunting as compared to marine mammal exploitation in coastal habitations.

Sea Otter Hunting Economy

Already touched upon in earlier discussions, there is evidence that late prehistoric populations in the Bay Area became increasingly reliant on sea otter hunting as a means of subsistence intensification (Gerow and Force 1968; Hildebrandt and Jones 1992; Jones 1992; Simons 1992; Broughton 1994, 1999). A decline in deer exploitation that appears to accompany increased otter procurement at many sites has led researchers to correlate the two trends by

suggesting that the overexploitation of deer and large marine mammal populations eventually forced prehistoric hunters to redirect their targets to smaller marine species, particularly sea otters. Broughton's (1999) analysis of the Emeryville Shellmound fauna indicates that such a shift may be largely situational, dependent on local variations in the size of deer populations and in the level of competition for them, but his earlier (Broughton 1994) analysis of data from more than a dozen Bay Area shellmounds supports a gradual decline in artiodactyl (deer) hunting over time.

Should any shellmound or midden sites be unearthed during the testing program, it is possible that vertical column samples could recover marine and terrestrial faunal assemblages that may yield some insights concerning the Late Period Intensification of sea otter hunting. Samples of deer, elk, and sea otter bone were recovered from SFr-129 (Clark 2001) and from sites at Fort Mason (Eschmeyer and Schoenwald 1981), but none of these sites has a sufficient time span to show any temporal shifts in deer versus otter procurement. However, the facts that all sites date within the Middle and Late Periods (post-2000 BP) and that otters are prevalent in assemblages from all locations support the otter intensification model. Similarities between known sites at the Presidio and those at Fort Mason also imply that any additional cultural deposits revealed during the testing program have the potential to yield valuable faunal data regarding this subject.

Site Seasonality

Faunal assemblages and macrobotanical remains from sites found in the Project APE might facilitate speculation about seasonality of site use. Age and sex profiles for various faunal species can be interpreted with models of animal reproduction and ecology to infer the time of year in which they were captured. Analyses of plant remains can work in the same way, as certain seeds and nuts are known to ripen at different times of the year and their presence in macrobotanical profiles can serve as seasonal indicators of plant procurement. Recalling that reconstructions of prehistoric settlement systems often point to seasonal transhumance, data on site seasonality can help place discovered sites within the context of hypothetical, year-round residential and subsistence patterns. These kinds of data can be secured through the removal of bulk column samples from buried sites.

Some subsistence adaptation and site seasonality questions that might be addressed through the archaeological investigation include the following.

Question: Can the archaeological faunal assemblage contribute to the examination of local or regional differences in hunting strategies?

Question: Does the assemblage contain a sufficient number and variety of faunal specimens or paleobotanical specimens to contribute to analysis of the seasonality and exploitation of these resources?

Question: Does the archaeological deposit have sufficient integrity and yield to produce well-dated archaeofaunal and archaeofloral assemblages indicative of diet and organization?

Question: Does the archaeological deposit have the potential to fit into a time series providing insight into the development of regional resource intensification?

Data Requirements

- Site Structure: Features (storage or refuse pits; sheet scatters representing butcher areas) containing faunal remains.
- Dating: Associated organic or obsidian materials for dating faunal assemblages; associated stylistically distinctive artifacts; clear stratigraphy for relative dating purposes.
- Artifactual: Tools for butchering and other processing of animal remains; bone tools, gaming pieces, or other artifacts representing animals captured.
- Faunal/Botanical: Faunal assemblage of sufficient size to allow valid statistical analysis; data on shifting frequencies per species and body part; natural history, ethnographic, and ethnoarchaeological information on hunting strategies, environments exploited, and seasons occupied; large, macrobotanical and invertebrate faunal assemblages to complete the dietary and land-use picture.

8.1.3 Exchange Systems

Several types of formed artifacts, if found at project sites, can be associated with regional prehistoric and contact-period exchange systems. Beads and ornaments are obvious candidates, having been traded from the coast across central California and into the Great Basin during much of the Holocene (Bennyhoff and Hughes 1987; Gifford 1947; Hughes 1994). The movement of marine shell beads (mainly *Olivell*a shell) and ornaments (primarily abalone [*Haliotis*]) into the Great Basin may have reached a peak between about 4000–2200 BP; other types of shell beads, particularly clam disk beads, were traded widely throughout California but did not continue into the Great Basin (Hughes 1994; Jackson and Ericson 1994). In California, *Olivella* callus beads were used to approximate currency after about 1500 BP, being traded in standardized amounts (Chagnon 1970; King 1971, 1978). Glass beads are indicative of cross-cultural trade during the Euro American contact period (post-1760 BP), having eventually replaced shell beads as currency (Motz and Schulz 1980; Sorenson and LeRoy 1968; Steward 1933).

The presence of obsidian at sites on the San Francisco peninsula also indicates exchange transactions between distant groups. Most of the obsidian found at sites in San Francisco has been traced to sources in the north Coast Ranges (e.g., Glass Mountain in Napa County and Annadel State Park in Sonoma County), but some originates from the east side of the Sierra Nevada (e.g., Casa Diablo [Lookout Mountain] in Mono County, California). Most likely, groups inhabiting the San Francisco peninsula received obsidian from both of these locations through some type of “down-the-line” trade, in which goods are passed on through a series of trading partners. Coast Miwok on the Marin peninsula and Bay Miwok groups along the Delta may have provided obsidian directly to Costanoan groups in this fashion.

In 2005, three obsidian artifacts from the Presidio site were subjected to obsidian hydration analysis (Origer 2005a) and X-ray fluorescence (XRF) geochemical source analysis (Hughes 2005). One of the artifacts, a lanceolate biface, was sourced to Lookout Mountain (Casa Diablo) and indicated a date of manufacture of approximately 3100 years BP. This artifact showed signs of reworking approximately 250 years BP. Another artifact, a piece of debitage from the Napa volcanic source, produced an age of 1600 BP with reworking approximately 300 BP. Hydration rim values on the third artifact, a corner notched point from the Napa geochemical source, indicated a date of manufacture of 250 BP.

The hydration data indicates that in the vicinity of the Presidio site, older artifacts had been scavenged and reworked approximately 250 years ago. Additionally, XRF analysis indicates the oldest artifact comes from a volcanic source hundreds of miles away, while the other artifacts come from a source very close to the northern peninsula. Although the obsidian sample is extremely small, this data does raise questions regarding the nature of toolstone acquisition and exchange.

Some questions reflecting on this topic might include the following.

Question: Does this assemblage include concentrations of materials that might suggest special use or resource focus on the site? What is the proportion of obsidian or other exotic material in the assemblage?

Question: What is the proportion of finished tools to manufacturing debris in the assemblage? In what form did obsidian arrive at this site? Is the amount of abalone debris consistent with the number of ornaments present? What do these facts suggest about manufacturing and trade at the site?

Question: What is the nature of obsidian source distribution? Was obsidian obtained by direct procurement or through an indirect exchange network? Can we detect a change over time in obsidian source distribution and what does a change is access to obsidian say about changing economic relationships?

Data Requirements

- Artifact Assemblage: Obsidian sourcing and hydration; stages of manufacture and quantification of manufacturing debris; quantification of exotic versus local materials; artifact type and material frequencies.
- Faunal Materials: Speciation, quantitative indications of emphasis on specific resources.
- Human Interments: Grave lot analyses with respect to frequency of exotic materials may provide insight into the role of exchange in the social system.
- Comparative Analyses: Comparison with other sites regarding expected proportions of materials and material types in the assemblage.

8.1.4 Chronology

Discoveries of Early Holocene sites along the California coastal mainland are reminders that the modern coastline contains only a portion of the regional archaeological record. Geologic processes (discussed in Chapter 5) have had the effect of submerging old shorelines below present day sea level in the Bay Area. In addition to submerged sites, early Holocene sites may be found inland on old Pleistocene terraces. The Cross Creek shell midden site (CA-SLO-1797), discussed above, is one of the oldest coastal sites in California, dating to between 10300 and 9650 BP and situated on a Pleistocene marine terrace later buried by Holocene alluvium (Jones et al. 2006:216). At the time of its occupation, the site was located approximately 10.6 miles (17 km) away from the open coast but only 5.6 miles (9 km) from the one-time location of a marine estuary. At present, the site lies 5.6 miles (9 km) from the modern shoreline.

Similar to the Cross Creek site, Duncan's Point Cave (CA-SON-348/H) is situated on an old Pleistocene terrace formed by wave action approximately 100,000 years ago. The site contains a midden, nearly 9.8 ft. (3 m) deep, that dates to at least 8200 BP and is the oldest site in north of the Bay (Schwaderer 1992). The well-preserved site constituents demonstrate that the cave was used intensively and repeatedly for five millenia, from approximately 8200 to 3200 BP. A preponderance of clam and oyster shells in the lower strata of the cave (dating to approximately 8000–5000 BP) indicates that groups were focusing resource extraction activities along a low-energy, early Holocene protected bay or estuary, subsequently submerged by rising sea levels (Schwaderer 1992). Other faunal evidence and paleobotanical evidence suggest the site was used in every season and acted at the very least as a long-term residential base during some periods and possibly as a year-round habitation site in other periods.

Although it is generally believed that most Early Holocene sites are submerged as a result of sea level rise, the two sites described above are located above modern sea level and both date to Early Holocene. It may be useful in the future to focus not on the problem of locating submerged sites under the Bay but to focus attention on identifying ancient Pleisticene terraces that may lie above modern sea level.

Although it is unlikely that any prehistoric sites encountered during test excavations will date to the Early Holocene or be so substantial as to offer chronological data for an extended interval, sampling strategies will be able to recover dateable organic materials and possibly some diagnostic artifacts so that sites and/or components can be placed into existing temporal frameworks. As compared to other parts of the Bay Area, relatively few sites have been excavated within the city of San Francisco or on the northern peninsula, and thus local chronologies rely on those developed for other areas. The earliest evidence of prehistoric occupation in San Francisco comes from the BART burial (so named because it was discovered when the Bay Area Rapid Transit [BART] tunnel was dug beneath the Bay), which implies an age of about 4900 BP (Henn and Schenk 1970). Most of the actual sites around the city have been dated to the last 2000 years or so, but the overall database of radiocarbon determinations from San Francisco remains slim. Chronological placements of sites found in the APE would not only add to the establishment of a local chronology but also may provide age estimates for any adaptive shifts identified in recovered faunal assemblages.

In addition to any radiometric assays, shell and glass beads, projectile points, and obsidian artifacts (through hydration) also can provide indirect or direct dating estimates for project sites. Specific chronological questions that may be addressed through investigation in the Project Area include the following.

Question: What are the absolute dates of occupation of the portion of the deposit investigated?

Question: What other local/regional sites were settled concurrently?

Question: How does the assemblage correlate chronologically and culturally with other assemblages around the Bay and further afield?

Question: Was the site occupied protohistorically or ethnohistorically? If so, what was the nature of Spanish, Mexican, or American influence on Native American activities or material culture at the site?

Data Requirements

- Artifact Assemblage: Artifacts from the historic period; evidence of changes in patterns, faunal debris or in tool materials or types.
- Organic Materials: Carbon or other organic materials that can yield reliable radiocarbon dates; preferably carbon in clear association with features (such as house floors or burials), with formal artifacts for which dating would be meaningful, or in well-defined stratigraphic contexts.
- Lithics: Obsidian hydration readings for correlation with absolute dates and other dated sites around the Bay.
- Deposited data: Stratigraphic superimposition in the deposit; relatively intact deposit.
- Comparative collections: Comparison with artifact assemblages or types for which absolute dates have been obtained; comparative range of radiocarbon dates and obsidian hydration readings.

8.1.5 Lithic Technology

Because of their scarcity relative to shellfish and faunal remains in shellmound sites, lithic artifacts are usually downplayed in analyses of shellmound constituents. The current program does not anticipate the recovery of large quantities of lithic artifacts from any buried sites, but it is possible that sample sizes will be large enough for the production of technological analyses. Such examinations can easily lead to inferences about on-site stoneworking efforts, subsistence resource use, and site function, but they can also allow for speculation concerning the placement of sites within broader settlement systems (Basgall 1989; Nelson 1991; Shott 1986). Knowing the geologic sources of raw materials used to manufacture stone tools also can be informative as to the geographic positioning of settlement systems and their associated toolstone procurement strategies. Cherts can be particularly useful in this regard, as they can often be distinguished visually and traced to general locations along the coast (Monterey Chert) or in uplands of the Coast Ranges (Franciscan Chert). Analytical programs will be developed to take full advantage of any and all technological and lithic source data that become available.

Some questions that might be asked of lithic technologies include the following.

Question: Does the archaeological deposit possess sufficient integrity and artifact/assemblage yield to permit lithic analysis?

Question: Are artifacts present that might contribute to regional typological studies?

Question: Can the source of obsidian be determined?

Question: Can the lithic reduction sequences for each glass source be characterized?

Question: Can changes in the distribution of obsidians from various sources be correlated with hypothesized cultural changes in the region?

Data Requirements

- Lithics: Significant quantities of lithic materials (e.g., obsidian, chert, etc).

8.2 HISTORIC RESEARCH THEMES, RESEARCH QUESTIONS, AND PERTINENT DATA SETS

Research Issues for Domestic Services (Laundresses)

With the exception of diaries and travel accounts written by the educated wives of Army officers, there is little documentation in the historical record of women who lived at frontier military posts, and virtually no record of the lives of either male or female domestic servants in the military. What is known about Army laundresses is based on historical accounts associated with a small number of installations. Archaeological research of Army laundresses' quarters has been promising but limited in scope. If intact foundations, work areas, or refuse deposits associated with the laundresses' quarters are identified during the Project, these features could have a very high potential to yield important information regarding a little-known military role for women in the 19th century and how this role was fulfilled at the Presidio. The following are specific questions that might be addressed by these data.

Question: How is the laundresses' ethnicity, as documented in the historical record, apparent in the archaeological record?

Question: What were the consumer patterns of Presidio laundresses and their families?

Question: What were the health and sanitation practices of Presidio laundresses compared with other post occupants?

Question: How did laundresses fit within the regimented military class structure of the 19th century?

Question: Can the social and economic status of laundresses at the Presidio be identified and compared to that of domestic servants in the adjacent city?

Question: What can the archaeology of post "Laundry Rows" tell us about the lives of military servicewomen in the second half of the 19th century?

Data Requirements

- Archaeological: Feature and/or layer interfaces, broad exposure.
- Historical: Known association with laundresses' quarters.
- Archival: Understanding of Army laundresses' roles and function on military base.
- Ceramic, Glass, Metal Containers: MNI frequency/proportion, maker's marks.
- Faunal Remains: Frequencies of types/domesticates/wild; presence/absence of types; butchering cuts.
- Botanical Remains: Frequencies of types—domestic/wild; presence/absence of types.

Research Issues for Quartermaster Transportation and Supply

The growth of the capitalist economy, specifically facilitated by the Industrial Revolution, affected the global and national market economy, labor social structure, and trade networks throughout the country. In *The Modern World System*, Immanuel Wallerstein (1979) argues that the history of postmedieval nations in Europe and the territories they interacted with cannot adequately be explained without examining them within the larger world system, in which the economies of all the affected areas are interconnected in a web of mutual dependence. An integrated world system of capitalist economies began to emerge in 19th century America, subordinating new people into global corporate hierarchies of production, consumption, and power (Crowell 1997:1). The three structural positions in a world economy include the core, periphery, and semiperiphery (Wallerstein 1979:18). Convergence of strong local governing bodies and economic mechanisms created a core, while the lack of local governing bodies combined with weak economic mechanisms in peripheral areas led to weak ties to the economic system (Wallerstein 1979:18). According to Wallerstein, capitalism thus involves "not only appropriation of the surplus value by owner from a laborer, but an appropriation of surplus of the whole economy by core areas" (Wallerstein 1979:18–19). Because the world economy is a dynamic system, the core and periphery areas are also changing. According to Wallerstein, world systems have remained largely politically stable because of the concentration of military strength in the hand of dominant forces of the economic system (Wallerstein 1979:22).

The concept of world systems is best applied to the Presidio in terms of how the early peripheral supply network of the West, specifically San Francisco and therefore the Presidio, evolved over time and eventually became a core area in the market system where goods and services were produced, imported, and exported. When the United States obtained control of California after the Mexican-American War in 1848, the West was very much a frontier community with weak supply and economic links to eastern and international markets. The early U.S. Army occupation of the Presidio was not as extensive as posts in the east and Midwest that were readily accessible to the Army headquarters in Washington and the vast supply networks in the east. As California continued to grow in economic importance after the Gold Rush, and maritime transportation became stable, San Francisco developed stronger ties to the capitalist economy and the national market. More stable supply networks were established, which benefited the supply for the Army at the Presidio. With the opening up of western markets and the completion of the transcontinental railroad in 1869, San Francisco was connected to large trade networks within the larger world system and transformed from a peripheral economy into a core of the world system. With the improvement of supply networks into and out of the Presidio, supplies requisition from the Quartermaster department may have improved coinciding with the increasing importance of the post. The Presidio increased in military importance during its period of nationalistic expansion (1891–1914), including an increase in the strength of its military presence and numerous improvements in the supply and transportation systems on the post. The post's increase in military importance was evident in during the Spanish-American War in 1898, when the Presidio was used as a marshalling area for troops bound for the Philippines (Alley et al. 1993: 58). The Quartermaster department would have played an important role in the provisioning of the temporary encampments on the post and the troops being shipped to the Philippines.

The Quartermaster was vital to the procurement of the goods and supplies of the post. Additional studies on military forts have identified a decrease in the types of goods and supplies coming into the forts as their importance as a military post declined (Riordan 1985: 27). Riordan discusses the Fort Mackinac example where supplies became poorer in quality,

as demonstrated by the shift from ceramic platters in the early period to bowls. This shift in ceramics also indicated a change in diet from good cuts of meat to stews and soups made with poorer cuts of meat, supported from the faunal materials recovered during excavation. The purpose of these analyses was to demonstrate the decline in the post's social position and the consequent loss in military status. The opposite seems to have been true for the Presidio. The Presidio rapidly increased in military importance from a struggling frontier post in the 1850s to the most important Army headquarters in the West by the 1890s. It may be possible to view this increase in military importance archaeologically if goods and supplies improved as the Presidio's military status improved.

Such changes in the supply networks, and the spatial and temporal changes in the frontier as part of the world system, should be reflected in the patterning identified during archaeological analysis. According to Kenneth Lewis, "the regional organization of the frontier activities requires that their study be carried out on a scale larger than that of the individual site" (Lewis 1984: 4). The transportation network interaction sphere was vital for transporting materials between the frontier and the heartland, including the supplies necessary to operate a military post in California. Both documentary and archaeological data can provide insight into the changing role of the U.S. Army, in conjunction with the expanding national and global economic system, in supplying the Presidio—beginning with the early U.S. occupation until World War II.

During the 50 years that the Presidio Quartermaster complex was in use, the Quartermaster responsibilities of furnishing the Army with transportation, housing, and all manner of supplies remained essentially the same. Through procurement of supplies and goods, the QMC division was directly involved in the capitalist world system, including trade networks and interaction spheres. Although the Presidio Quartermaster kept meticulous records of their supply acquisition and distribution system, little is known about the Quartermaster personnel themselves and how they interacted with other military personnel and with civilian services available in the adjacent city. Below are specific research questions that may be addressed by archaeological properties and artifact assemblages associated with the Presidio Quartermaster.

Question: Did the Quartermaster complexes include domestic spaces, such as housing for guards or workers?

Question: Were support facilities, such as the blacksmith's shop and the veterinary hospital, manned primarily by servicemen or by civilian employees?

Question: Is there evidence that employees of the support facilities belonged to different ethnic groups?

Question: What was the state of veterinary medicine at the Presidio, and how did the practice of the discipline vary between the military and the outside world?

Question: What kinds of blacksmithing practices took place and how skilled were the repairs and fabrications?

Question: Did the quality of goods and supplies requisitioned by the Quartermaster improve as the military importance of the Presidio increased?

Question: How was the national market access of the Presidio affected by the increase in western interaction spheres of the world system?

Data Requirements

- Archaeological: Period interface composed of feature and layer interfaces; various households and/or site types.
- Historical: Associations for each stratum.
- Documentary: Understanding of Quartermaster complex and functions contained within.
- Archival: Ethnic identification, historical background.
- Ceramic, Glass, Metal Containers: MNI frequency/proportion and maker's marks.
- Faunal Remains: Frequencies of types/domesticates/wild; presence/absence of types; butchering cuts.
- Botanical Remains: Frequencies of types—domestic/wild; presence/absence of types.
- Architectural: Foundations and deposits associated with specific operations, buildings, and/or functions (i.e., blacksmithing, veterinary practice, etc.).

Research Issues for Refuse Disposal

Similar to the rest of California, as the Presidio's population grew, increasingly large quantities of both domestic and industrial refuse were generated. It is thought that expedient refuse disposal areas were moved further away from the Main Post and, by the late 19th century, largely were abandoned in favor of using refuse materials to fill the lower post. Fill deposits dating to this time period may provide information on the post's institution of organized refuse collection in more remote locations.

By the turn of the century, incinerators were added to the methods of refuse disposal used at the Presidio. Archaeological deposits associated with the former incinerator located in the APE are likely to consist of the charred remains of incinerator clean-out episodes. Excavation of a feature at Fort Steven, Oregon, that was thought to be the remains of an incinerator did reveal some information worth noting. Artifacts associated with the feature, not surprisingly, consisted primarily of metal, glass, and ceramics, as well as a large number of bricks. A metal patent for the gas jets of the incinerator (with the manufacturer's name and date patented of 1905) also was found, indicating that the incinerator was gas powered. The feature also contained a large number of clinkers, which the author reported as indicting an association with blacksmithing activities. This, in addition to some archival information, points toward there being a forge in the area. Clark suggested that there might have been a blacksmith shop operating at this location during the construction of a nearby battery. However, clinkers also are associated with incinerators, these being the incombustible masses that remain after the combustion process is completed. Since no archival information was found regarding the incinerator or the possible forge, the relationship between these features remains a mystery.

Comparative research suggests that refuse deposits potentially can provide data on three general topics: (1) refuse disposal patterns through time, (2) land modification practices at the Presidio, and (3) basewide material culture and how it changed over time. Presidio refuse

deposits likely can address questions focused on refuse disposal patterns through time because they span from the time when refuse was expediently disposed to the time that organized refuse disposal was instituted. These deposits can also be compared with what is known about national and regional refuse patterns to determine whether the military was setting the pace for sanitary reform, as some researchers have suggested (Porter 1997). This can be accomplished by comparing the sanitary practices practiced at the Presidio with those observed for San Francisco.

Refuse deposits at the Presidio can contribute information reflecting refuse disposal patterns across the base and are anticipated to contain artifact assemblages representing the historic living conditions, consumer patterns, and health and sanitary practices of the Presidio. The following are specific questions that may be addressed by refuse features and their contents.

Question: Can post refuse be associated with specific households, population segments, or functions, shedding light on their differing adaptations and social and economic circumstances?

Question: How did post refuse disposal patterns at the Presidio change over time?

Question: How was the national move toward better sanitation practices manifested at the Presidio?

Question: Can post refuse provide data on topics like consumer preferences and national market access?

Question: Can post refuse deposits provide data on the dietary practices or heath of post occupants?

Question: Were localized pits, cisterns, and privies used for trash disposal until a certain time and then abandoned in favor of centralized disposal locations?

Question: When did throwing refuse “out the back door” become unacceptable?

Question: Was refuse collection and disposal the responsibility of one entity (Quartermaster) or did each dwelling or military unit manage the disposal of its own refuse?

Question: How does refuse associated with habitations or specialized activity areas reflect the lives of those who lived and worked at the Presidio in the mid- to late-19th century (e.g., changes in behavior within the military, increasing regularity/professionalism in all aspects of behavior, relative affluence of post occupants, changing roles of dependents, changes in prevalence of illicit activities, changes in consumption patterns through time)?

Question: Can all of the refuse found at the Presidio be attributed to Presidio functions?

Data Requirements

- Archaeological: Feature and/or layer interfaces, broad exposure.

- Historical: Associated with households/functions/businesses of known ethnic, socioeconomic, or occupational affiliations.
- Faunal Remains: Economic scaling and ranking of butchering cuts (Schulz and Gust 1983); frequencies of types—domestic/wild; presence/absence of types.
- Botanical Remains: Frequencies of types—domestic/wild; presence/absence of types.
- Ceramic and Glass Function: MNI frequency/proportion.
- Social Science: Explicit social, economic, and status categories.
- Household Demography: Size, composition, life-course.
- Documentary: Mail-order catalogues, advertisements, commercial inventories, merchants' and household accounts.

Research Issues for Post Engineering

Little archaeological work has been conducted specifically with the infrastructure facilities of military posts, and few historical studies have been conducted on large-scale land engineering operations. Refuse disposal sites archaeologically documented at other military bases appear to have been largely the result of direct dumping or sanitary landfill rather than the result of land reclamation. In fact, the Presidio is the only military installation where such an occurrence has been observed. As a result, no comparative data could be found to apply to this research domain. However, considerable research of water conveyance facilities and railroads has been conducted for nonmilitary settings, although this work has largely focused on historical research and accurate recordation rather than evaluation or excavation.

In general, more comprehensive research of post engineering activities (rather than archaeological excavations) would serve to address the following research questions and provide a better understanding of the development of Presidio infrastructure through time and as compared with other military installations.

Question: How was the landscape in the APE engineered over time and how was this dependent on technological advances?

Question: How and why were the upper and lower posts modified to accommodate new construction and facilities?

Question: How did economic factors affect post engineering and infrastructure development?

Question: Are the landfill sequences documented in the historic record supported by archaeological evidence?

Data Requirements

- Historical/Documentary: Maps, historical photographs, engineering and construction notes, etc.

- Archaeological: Documenting of landfill sequences, specific landfilling events, across time and space, excavations over a broad expanse; geomorphological documentation of fill episodes in trenches.

Research Issues for Military Cemeteries

Few military cemeteries have been excavated for archaeological purposes; however, a number of studies have been completed for other types of cemeteries, and the same type of research avenues generally would be applicable. Primary research avenues include biological anthropology and the understanding of the health, disease, and cause of death of early post occupants. Research that illuminates early mortuary practices, especially in relation to later, more regularized practices, might also be relevant. Further, the presence of tombstones might also permit the correlation of burials with known occupants of the Presidio. Tombstones, especially in the early years of military occupation, may have been personalized and reflect the social status and ethnicity of individuals. It has also been possible that iconographic analyses of headstones could be conducted if highly stylized headstones are found. Specific questions that may be addressed by military cemeteries include the following.

Question: What were early burial practices at the Presidio?

Question: Do the burials differ from each other and from other known military interments?

Question: What was the health and nutrition of early post occupants?

Question: What nationalities were the early interees?

Question: What was the social status of early post occupants?

Question: What were the demographics of early post occupants?

Data Requirements

- Artifact Assemblage: Grave-associated artifacts; frequency or occurrence of types.
- Human Interments: Individual human remains; burial population, rather than single burials, is most informative in population studies; basic descriptive osteological data, including metric analyses, age and sex; data on osteological anomalies and pathologies.
- Comparative Studies: Chronological, cultural, and possibly genetic population comparisons.

Research Issues for Defense Facilities

Two possible objectives of archaeological research pertaining to the batteries have been suggested by the NPS staff: (1) to obtain design information that is not currently available from historical records, and (2) to locate and characterize the armament and ammunition assemblage that might be associated with the batteries. Because of the very large area surrounding the batteries that would need to be explored, we suggest that it would be effective

and cost efficient to explore the potential for archaeological deposits during the preconstruction and construction phases of the Project. In addition, considerably more historical research may be required on the batteries to determine exactly what types of archaeological data are needed to fill in information gaps in their history.

Question: What additional data on the design of the batteries can be obtained through archaeological excavation?

Question: What ammunition and armaments were used at the batteries?

Data Requirements

- Archaeological: Discrete, associated deposits and/or subsurface foundation and armament features. Associate ammunition.
- Historical: Associated with known batteries and specific time-periods of use.
- Documentary: Maps, historic photographs, notes, or operations of batteries/armaments in question.

8.2.1 Twentieth-Century Development

Buildings constructed in the APE for the 1915 Panama-Pacific Exposition included the racetrack and the livestock buildings (dairy, poultry, and stock exhibits). After the exposition ended in December 1915, materials that could be salvaged from the buildings included statues and decorative motifs; however, the vast majority of these facilities were completely demolished by early 1917 (Ewald and Clute 1991:127–129). Archaeological materials remaining from the exposition could include demolished structural materials, the remains of discarded exhibits, and miscellaneous debris associated with the exposition itself. Whether these materials can be distinguished from contaminated landfill or other refuse deposits in the Project APE cannot be determined at this time. Specific research questions associated with the Exposition might include the following.

Question: How does refuse associated with the exposition reflect the diversity of events and exhibit themes?

Data Requirements

- Archaeological: Feature and/or layers interfaces, broad exposure.
- Historical: Associated with known events/operations associated with the exposition.
- Documentary: Information pertaining to the events/exhibits associated with the exposition (e.g., catalogs, brochures, newspaper articles).
- Ceramic and Glass Function: MNI frequency/proportion, maker's marks.

SECTION 9: TREATMENT APPROACHES

This chapter outlines the methods to be used during the identification, evaluation, and recovery of data. In this section, a clear distinction between the initial pretesting phase and test evaluation phase is made; however, it should be the aim of field crew to move seamlessly and quickly from one phase into the next. The distinction between test evaluation and data recovery is less defined in practice because data is recovered during evaluation. Field methods used to evaluate resources are briefly discussed and will draw from data recovery methods, which are discussed in more detail. Laboratory analysis will be presented in this chapter as well. Thus, approaches presented in this chapter involve four treatment strategies consisting of (1) delineation of Environmentally Sensitive Areas (ESA) associated with known archaeological sites in the APE; (2) pretesting to better define anticipated resource locations; (3) construction monitoring and plans for unanticipated discoveries; and (4) test, evaluation, and data recovery procedures for identified archaeological deposits. Each strategy is carefully articulated and its application to specific areas is shown in Figure 17 and Figure 19. Subsequent sections then consider safety plans, Native American participation, and plans for reporting and interpreting the results of the treatment program. A MIP may be prepared if appropriate to coordinate the scheduling of the archaeological treatment with construction phasing. Native American consultation during project implementation will include Native American monitoring when a prehistoric archaeological site requires archaeological evaluation and if human remains of Native American origin are discovered. At present, the only known prehistoric archaeological site within the APE is CA-SFR-6/26, which will be avoided during construction by implementation of an ESA boundary.

9.1 ARCHAEOLOGICALLY SENSITIVE AREAS

Testing recommendations for archaeologically sensitive areas identified within the APE are presented in Chapter 7. Based on those areas and recommendations, locations for testing during the initial phase of pretesting are identified in Chapter 7 and mapped on Figures 17 and 19.

9.2 ENVIRONMENTALLY SENSITIVE AREAS

The establishment of an ESA boundary around CA-SFR-6/26 is necessary to protect it from construction impacts associated with the Project. Figure 21, *Environmentally Sensitive Area Map for CA-SFR-6/26*) depicts the ESA for CA-SFR-6/26. When construction details or methods for the area near and adjacent to CA-SFR-6/26 are known, any additional consultation, including Native American consultation, that might be required will be included in the MIP. The ESA will then be discussed during the preconstruction meeting. The importance of the ESA will be discussed with construction personnel, and it will be stressed that no construction activity (including deconstruction, utilities replacement, storing and/or staging equipment) should occur within the ESA and that workers must remain outside of the ESA at all times. Additionally, construction personnel will be informed of historic preservation laws that protect archaeological sites against disturbance or removal of artifacts. ESA fencing, which includes a 10-foot buffer zone around the recorded boundary of CA-SFR-6/26, will be set up prior to any ground-disturbing activities in the areas including deconstruction and/or utilities relocation. The Resident Engineer will notify the consultant archaeologist, Caltrans, the Trust, and NPS at least 1 week in advance of anticipated ground disturbance. An archaeologist, in

consultation with Caltrans, the Trust, and NPS, will be present to monitor fence installation. The ESA will be monitored regularly throughout the entire extent of the Project. Caltrans will be notified immediately of any ESA breach. Caltrans will then notify SHPO within 48 hours of the ESA breach and consult with SHPO immediately to determine how the breach will be addressed. The Resident Engineer will inform the consultant archaeologist, Caltrans, the Trust, and the NPS when construction is finished. The construction contractor, under supervision of the Resident Engineer, and the consulting archaeologist (in consultation with Caltrans, the Trust, and NPS) will remove the ESA fencing at the conclusion of construction.

An ESA boundary for the Quartermaster Dump cannot be established at this time, as the boundaries of the site are unclear and a DPR form mapping the known extent of the site has not been published at the date of this report. As additional construction information becomes available and when a site record for the deposit is produced, an ESA will be established if necessary and documented in the MIP.

9.3 PRETESTING

Two testing methodologies will be employed during the pretesting phase and will be conducted prior to construction. First, deconstruction monitoring of all soil moving demolition activity and utilities replacement in areas that have the potential to impact cultural resources is necessary. Second, a series of mechanical test trenches will be used to establish stratigraphy within the APE and to test for deeper, buried resources. Attempts will be made by the testing crew to fit the trenching program within the demolition schedule. This may include testing areas opened for demolition and/or utilities replacement prior to the commencement or completion of demolition.

Monitoring of Deconstruction and Utilities Replacement

The proposed program of pretesting will partly consist of archaeological monitoring for any deconstruction and utilities relocation activities that might impact surface or subsurface archaeological material. The exact locations of deconstruction activities and utilities replacement have not been identified. Areas to be monitored will be refined when construction plans are made available. If potentially significant features or other resources are identified, their location and character should be recorded, and the degree of immediate threat evaluated. If the resources are immediately threatened, plans for mitigation must be considered in consultation with Caltrans, Trust, and NPS representatives. Monitors should meet with demolition crews (in consultations with Caltrans, Trust, and NPS representatives) in order to discuss demolition plans, safety issues, and procedures of data recovery measures during demolition. If possible, demolition activities in the Project Area should be conducted in a manner where archaeological monitors can safely investigate and mitigate potential significant resources and in a manner that limits the impact on soils that may contain potentially significant resources. The monitor will keep a daily field log of activities and may take digital photographs or make sketch maps and/or profile drawings to document finds within the field. All activities associated with deconstruction and utilities relocation observed during archaeological monitoring will be summarized in a pretesting report to be written at the conclusion of this phase of work and/or incorporated into the MIP.

The essence of the proposed monitoring strategy is that only those areas that are most likely to contain legally significant archaeological properties (e.g., identified as high to moderate sensitivity for prehistoric and/or historic archaeological resources), determined on the basis of

Figure 21
Environmentally Sensitive Area Map for CA-SFR-6/26

Legend

- 10 Foot Buffer - No Disturbance
- CA-SFR-6/26

N

0 200 400
Feet

0 50 100
Meters

Source: PRESIDO TRUST

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the sensitivity analysis in Chapter 7, will be examined. A general project-wide monitoring program is not recommended as long as project deconstruction and utilities relocation remains within the areas specified on construction plans. If construction plans change and larger areas are opened, spot-monitoring of deconstruction and utilities relocation may be initiated.

Testing

The proposed pretesting program will also include the placement, excavation, and evaluation of a series of mechanical test trenches within the APE. Each test trench will be excavated with a backhoe in increments of no more than one foot (30 cm), until the backhoe cannot safely or efficiently dig any deeper or until the maximum depth of excavation is reached. Throughout this phase of the pretesting program, detailed notes will be made on Trench Excavation Records. The testing recommendations given in Chapter 7 call for trenches to be placed in several locations identified as moderate to highly sensitive for either prehistoric and/or historic resources in several locations of the APE. These general locations are shown on Figures 18 and 20. The testing recommendations do not give exact trench placement as trench locations will be based on the findings of the pretesting monitoring of deconstruction and utilities replacement and previous trenches (associated with the current pretesting program) dug in the area. Trenches will also be placed to address construction or safety considerations. The details of the trenching program, number of trenches, length of trenches, etc. will be determined after pretesting monitoring. Based on the locations identified as moderate to highly sensitive, it is anticipated that no more than 40 trenches, approximately 20–40 feet in length depending on location, will be placed in the Project APE during testing.

The prehistoric archaeological testing of specific areas of the APE has been designed to investigate areas sensitive for prehistoric habitation and activities and in areas where archaeological sites have been recorded (e.g., confirm the site boundaries of CA-SFR-6/26). The primary selection factor for historic archaeological trenches is evidence compiled from the historic record regarding the location of specific historic sites and activities in the APE. A second criterion for selecting historical trench locations was previous excavation work in the APE and surrounding areas. Historical trenching will also include investigation of the southern and eastern boundaries of the Quartermaster Dump (see Chapter 7).

Identification of Potentially Significant Archaeological Resources

The goal of the pretesting program is to test for the presence or absence of potentially significant archaeological resources. Locations recommended for testing are based on the identification of archaeologically sensitive areas presented in Chapter 7. Upon encountering cultural materials during pretesting, the area will be exposed to the extent necessary to determine the character of the deposit. Cultural material encountered during deconstruction and utilities relocation monitoring and test trenching will be exposed in plan view, not from the side. This exposure may be limited by construction or safety restrictions.

Identifying Prehistoric Resources

In regard to prehistoric resources within the APE, prehistoric materials are not expected to occur within the first several feet, and therefore mechanical test trenches will be used to test for these materials. Trench locations will be mapped. All soils encountered will be recorded. As appropriate, soils will be bagged and labeled as samples or will be spot screened. Upon encountering prehistoric archaeological material or buried paleosols (which may contain

prehistoric materials), the overburden from the deposit will be removed to the extent that the integrity and character of the deposit can be determined. Soils that are visually identified as possibly containing prehistoric materials will be spot screened through 1/8-inch (3 mm) mesh screens. The presence of dark, organic-rich matrix and/or several species of shell, shell mixed with fauna, or the presence of modified materials are the general criteria for determining the presence of a prehistoric cultural deposit. In general, if any prehistoric cultural material is encountered and the deposit has any integrity, it will be tentatively deemed a potentially significant resource, requiring further investigation and evaluation.

At this point the test evaluation phase (see below) will be entered and representatives from Caltrans, the Trust, and NPS will be notified. If human burials are found during the pretesting program, the protocol summarized below will be followed including notification of Ohlones.

Identifying Historic Period Resources

Property types for the historic period have been identified based on land use history and the findings of previous archaeological investigations. The archaeological crew will be briefed on the property types expected and associated research questions applicable to each archaeologically sensitive area before the commencement of the pretesting phase. Test trenches will be employed for the initial identification of historic resources as it anticipated that most will be buried under significant amounts of fill materials. Should an intact historic period resource be encountered, areal exposure (if possible) will be used to further investigate the extent of the resource. Areal exposures may be used in these areas at the discretion of the Field Director in consultation with Caltrans, Trust, and NPS representatives.

Upon encountering any historic period cultural material, the overburden from the deposit will be removed, and the deposit will be excavated to the extent that the integrity and character of the deposit can be determined. All cultural material encountered will be recorded, mapped, and photographed. It is up to the discretion of the Field Director (in consultation with Caltrans, Trust, and NPS representatives) to determine the extent of excavation necessary prior to determining whether the cultural material requires further investigation and whether the test evaluation phase should be entered (see below). In general, any expected property type that has the potential to answer research questions presented in Chapter 8 will be treated as a potentially significant resource that requires further investigation and recovered during the field effort. In the interest of reducing construction delays, this procedure will be followed even when there is disagreement between the parties regarding a resource's potential significance. The need for additional analysis or treatment of the disputed resource will then be resolved by the parties following the field effort.

Treatment of Unexpected Cultural Resources

There is always a chance that documents and maps upon which research is based will prove inaccurate or that additional events that impacted the Project Area were undocumented. In the event that unanticipated cultural remains are uncovered during the course of pretesting, they will be investigated until a determination can be made about their potential significance. Section 106 criteria and evaluation guidelines presented in the *Test Evaluation* section below will be used in determining the potential significance of these unexpected resources.

Reporting during Pretesting

During the testing program, weekly updates will be drafted on monitoring and testing findings and submitted to Caltrans, the Trust, and NPS. At the completion of the pretesting phase, a Summary of Findings will be compiled and submitted to all interested parties. Due to the fact that pretesting may be conducted in stages throughout the APE, a Summary of Findings report will be created at the end of each phase of pretesting (or as appropriate).

9.4 CONSTRUCTION MONITORING AND UNANTICIPATED DISCOVERIES IN APE DURING CONSTRUCTION

The final phase of identification will consist of archaeological monitoring during construction in those areas identified to likely contain potential historic properties (high to moderate sensitivity) that could not be accessed during the pretesting phase. Low sensitivity locations will be periodically spot-checked during construction monitoring because there is a slight potential to encounter resources in these areas. Because of the engineering constraints, areas such as the existing piers of the Doyle Drive overpass may not be accessible prior to construction. Thus, the only time that identification would be permissible is during construction. The archaeological monitor would only be present in those areas that are mostly likely to contain legally significant archaeological properties (to be determined in the MIP). It also may be necessary to monitor construction in areas where pretesting was unable to completely access areas that showed indications of archaeological deposits because of engineering or environmental constraints.

Procedures for monitoring will follow those outlined above. All activities associated with the construction monitoring will be summarized in a monitoring report to be written at the conclusion of this phase of work and/or incorporated as an appendix into the archaeological testing and evaluation report for the Project.

If potentially significant resources are encountered, the archaeological monitor may temporarily halt or redirect construction activities surrounding the discovered resources that require further investigation to determine significance. The newly discovered resource may also be fenced off to protect it from vandalism and inadvertent intrusions by machinery. Construction activities must avoid any archaeological discovery until the archaeological monitor indicates in writing to the Residential Engineer that the site area avoidance fencing can be removed and construction can resume in the area.

Testing and evaluation of the unanticipated discovery would be implemented following procedures described below under the *Archaeological Test Evaluation/Data Recovery* section below. The manual excavation methods employed would depend on several factors, including site structure and the type of materials present. If historic properties identified during construction monitoring are in danger of being disturbed by construction, they will be assumed eligible to the NRHP for the purposes of the field effort and will be recovered following the procedures described below. Eligibility determinations will be made in the laboratory and the materials either curated or discarded following the discard and deaccession procedures discussed later in this chapter.

9.5 ARCHAEOLOGICAL TEST EVALUATION/DATA RECOVERY

The Test Evaluation phase will be entered if cultural materials that may meet the standards of potentially significant archaeological resources are identified during the pretesting program outlined above. The goal of this phase of the testing program is to evaluate whether potentially

significant archaeological resources exist within the APE. This section outlines the evaluation process for identifying cultural materials as potentially significant or unique archaeological resources. It additionally outlines the general field methodology to be employed during the Test Evaluation phase.

If deposits are determined to be historically significant, they will be fully excavated and brought back to the lab for processing. If a determination cannot be made in the field, collected materials may be brought back to the lab for further analysis. The methods to be used for excavation and collection of materials are also outlined below. No destructive testing on collected materials will be conducted prior to consultation and consideration of the views of the Ohlones/Costanoans. If at any time a deposit is determined not to be significant in accordance with federal and state criteria, archaeological investigation of the deposit will be abandoned.

9.5.1 Determination of Resource Significance

The evaluation of cultural materials means determining their research potential or their ability to answer research questions and to add to the body of existing archaeological or historical knowledge. This can be an ongoing process that may start in the field and require further analysis and research in the laboratory. If questions or a dispute arises in regards to the significance or potential significance of discovered resources during project implementation, members of the TOP will be consulted.

The goal of the following section is to outline the guidelines used to assess the research potential of all potentially significant or unique cultural material identified during deconstruction and utilities relocation and/or the pretesting phase. The land use history and past archaeological investigations have illustrated that a range of activities may have left a broad spectrum of potential significant archaeological features within the APE. Although each feature is interesting in its own right, funding limits and time constraints require thoughtful analysis as to how to most effectively mitigate adverse impacts from construction while maximizing the resource's research value.

Previous Assessments of Significance

Most of the known and predicted archaeological sites or features in the Project APE were identified in the NHL study (Alley et al. 1993) as contributing elements of the landmark. Studies conducted for the Crissy Field Restoration Project (Holman et al. 1999) also revealed the Quartermaster Dump, a resource that the NPS believes has extensive data potential and that contributes to the NHL. Jones & Stokes and Albion's (2002b) previous work for Doyle Drive also relocated Nels Nelson's shellmound site, CA-SFR-6, and combined its site boundaries with CA-SFR-26 to become CA-SFR-6/26. Although CA-SFR-6/26 is not considered a contributor to the NHL, it is significant under Criterion D for individual inclusion in the NRHP. Other potentially contributing features (e.g., funerary monument dump, railroad tracks, target range), have been informally documented by NPS archaeologists or have been identified through field survey or archival research conducted for the current Project. It has been the policy of the Trust and NPS to manage known and predicted archaeological resources as part of the NHL, although very few have been archaeologically investigated.

Resources dating to the 20th century, such as the large structural developments of the lower post completed for World Wars I and II, were identified in the NHL study as having "insufficient data or disciplinary research to suggest that archaeological remains would contribute

substantially to the Landmark" (Alley et al. 1993). In fact, all archaeological resources post-dating 1890 were identified in the NHL study as having a diminishing contributive value, noting that this position would be subject to change in the future. Only one feature located in the APE, the Presidio pet cemetery, has been designated as a noncontributing element of the landmark, largely because it postdates the NHL's period of significance. Although not a historic property, the protection and avoidance of the Presidio pet cemetery will be considered during the current Project.

Archaeological remains associated with the 1915 Panama-Pacific International Exposition also may be found in the APE but would not contribute to the NHL because they do not relate to its military theme of significance. Nevertheless, it is possible exposition-related deposits will be identified that will require evaluations independent from the significance of the Presidio NHL. Similarly, prehistoric sites do not contribute to the landmark but may be individually eligible for inclusion in the NRHP.

Significance Assessments for the South Access to the Golden Gate Bridge—Doyle Drive Project

The goal of the Test Evaluation/Data Recovery phase of this Project is to determine if the contributing resources contain subsurface deposits that have both morphological integrity and the ability to address relevant research questions. Test excavations and analyses also will take into account the possibility that contributing resources not predicted in the NHL documentation or identified during the current research and archaeological sensitivity analysis will be encountered during this phase of the investigation. Additionally, it is possible that resources might be found during testing that would not contribute to the NHL but could be eligible for inclusion in the NRHP under other criteria.

A number of resources identified as possibly being present within the APE may be significant under criteria other than Criterion D. These include remains of architectural resources, such as the water system, the railroad, and other structures. Additionally, significance under Criterion D for both the National Cemetery and the early American (possibly Spanish-Mexican) cemetery would be a secondary consideration since both are contributing features to the NHL and are significant under Criterion A. Additionally, NRHP Criteria consideration (g), for designated or public cemeteries, would not apply to the archaeological remains of the early post cemetery. Similarly, the batteries that lie within the APE have significance under both Criteria A and C, in addition to their potential for significance under Criterion D.

The treatment of structures that have been identified in the APE under criteria other than Criterion D, including the National Cemetery and the batteries, are being addressed in the BETP.

Integrity

Integrity is the degree to which a property has retained characteristics needed to convey its significance. The NRHP recognizes seven types of integrity: location, design, setting, materials, workmanship, feeling, and association. The level of integrity for properties being evaluated for their research potential (Criterion D) is defined by their ability to address important research questions outlined in a formal research design (NPS 1991). For prehistoric and historic archaeological sites, integrity of location, materials, and association are generally most crucial. To address important research topics, archaeological deposits usually must be in their original location, retain depositional integrity, contain adequate quantities and types of

materials in suitable condition to address important research topics, and have a clear association. Associations may be defined at different social scales (household or specific activity, Presidio, or even city) and across various temporal spans (brief or longer term). Although more narrowly focused associations will have relatively higher research value, deposits with broader association also may contribute to the NHL as judged in relation to the research design.

Deposits that have been disturbed by ground-moving activities such as grading, trenching, and looting often lack the ability to address important questions because depositional relationships have been lost, deposits from widely different periods and associations have been mixed, or the contents of the deposit have been skewed by selective removal of materials. However, some disturbed deposits may still retain the ability to address important research topics (Talmage and Chesler 1977). For example, a disturbed deposit that contains Mexican or Spanish period materials mixed with 20th century refuse may still be useful for interpreting Hispanic-era use of the Presidio. The contributions of disturbed deposits will be assessed during this testing program in terms of their ability to help interpret life at the Presidio during the 19th century. Those interpretive qualities will be based on criteria defined in the research design, which focus on the presence of whole, unique, and handmade articles.

Data Potential

Essentially, archaeological properties are considered to have data potential if they (1) retain integrity and (2) have the ability to answer relevant research questions. Prehistoric sites also have the potential for significance under additional criteria due to the value attributed to them by Native Americans as traditional cultural properties. In addition to the archaeological testing required to locate such sites and assess their integrity, the results of consultation with interested Native American groups and individuals must be evaluated in order to assess traditional values of prehistoric or ethnographic sites.

Based on a review of research conducted for historic period property types similar to those likely to be present in the APE, it is clear that some of the resources listed in Table 6 are likely to have considerably more data potential and interpretive value than others. The research design was developed to assess whether the archaeological sites and features in the Project APE can address important research domains, answer relevant research questions, or contribute to public interpretation. The research domains developed in this report are based on a review of historic archaeological studies conducted at historic military installations and at other sites where similar types of archaeological deposits have been found. These research domains were then adapted to account for specific activities (e.g., domestic services, Quartermaster transport and supply) that emerged from archival research, and also in consideration of the broader research themes (social and economic history, technological history) outlined in the NHL study.

Association

Several levels of association may be attributable to historic sites and features in the Project APE. At the broadest level, all archaeological deposits resulting from historic Presidio activities are associated with Presidio occupants and events. Research at other institutions, such as the Phoenix Indian School in Arizona, has suggested that historical archaeological deposits associated only at this broadest level can still be useful in helping to better understand the history of the institution through time. Examples of remains at the Presidio that can be expected to exhibit this type of association include the Quartermaster Dump located north of

(and possibly in) the Project APE, burned refuse deposits from the historic Presidio incinerators, and debris-contaminated landfill resulting from large-scale engineering activities conducted in the lower post area.

The temporal span, composition, and degree of integrity of archaeological deposits with this broad level of association will determine how they may contribute to our knowledge of the Presidio's history. Although it is tempting to argue that debris-contaminated landfill can be associated with specific groups or activities based on the composition of an assemblage (e.g., higher quality materials equal the officers, Chinese ceramics equal Chinese employees), this approach has not proven successful elsewhere, and the argument is circular. Thus, questions concerning the institution as a whole are the only questions that likely can be addressed using data from this deposit. Very early refuse deposits (pre-1880s) that are not mixed or disturbed may have greater contributive potential if they provide information about refuse disposal practices over time.

Properties that can be associated with specific Presidio activities constitute another level of association. This type of association can be determined through temporally or functionally diagnostic artifacts that can be exclusively related to a specific event (e.g., the 1906 earthquake) or activity (e.g., blacksmithing, veterinary practices) and by the location of features in proximity to known activity areas. However, not every deposit that can be associated with a Presidio function has the capacity to yield important research data by addressing pertinent issues, and it is clear that the known and anticipated remains in the Project APE will not have equal research potential. For example, remains associated with 19th century domestic services at the Presidio (e.g., the laundresses' quarters) would have a very high research potential because very little is known about these services and the population groups that provided them. On the other hand, remains associated with Presidio defense fortifications may not have as high a contributive value because the development of defense facilities and even the routine military activities that take place at these sites are well documented in the historic record. Similarly, although the engineering records for the Presidio may not be comprehensive or complete, the archaeological remains of water pipes and other post infrastructure features would contribute little knowledge to the more meaningful aspects of post engineering.

Interpretive Value

The capacity for archaeological sites and features in the Project APE to yield artifacts and interpretive value is also an important consideration of this ATP. Because the Presidio is a National Historic Park, both the NPS and the Trust have ongoing interpretive programs for the archaeological programs being conducted at the Presidio. However, considerable data have been gathered over the years on the mass-produced materials that historic features most often contain (Rock 1989; Miller and Sullivan 1991; Jones 1999; Wells 2000). It is likely that the majority of materials recovered from test excavations in the Project APE will be the same, and indiscriminately adding "type collection" artifacts to the collections of the Trust and NPS is not an objective of this ATP. The pretesting and testing plan include a provision for the collection of individual artifacts that are found to have interpretive value, based on condition (whole items) and on unique or rare diagnostic qualities (e.g., unusual items, handmade materials).

9.5.2 Field Methods

The following general field methodology will be used during the Test Evaluation phase in order to further the investigation and evaluation of any potentially significant archaeological

resources. The minimum level of effort necessary to evaluate the significance of a resource will be undertaken. If a deposit is determined not to meet the above guidelines at any time, all archaeological work will be halted. The work already undertaken and the reasons for the determination will be recorded.

Prehistoric Resources

In general, to assess the ability of prehistoric cultural material to yield important information to prehistory (Criterion D), postfield analysis needs to occur. The following field methods will be used to evaluate and investigate potentially significant prehistoric resources identified during the initial pretesting phase. A summary of general lab methods and special studies appears below.

Feature Excavation

Potentially significant prehistoric resources encountered during the initial pretesting phase will be hand excavated (if possible). Special samples will be obtained when appropriate. They will be fully documented through recordation on Excavation Sheets and Feature Sheets, as well as through field photography, cartography, and videography, as appropriate. In the event that a large prehistoric site is encountered within the APE, which would presumably contain various feature types, a specific plan for archaeological test unit excavation will be formulated and implemented as part of a brief, focused Archaeological Data Recovery Plan. This plan would be prepared through consultation with the archaeological consultant, Caltrans, Trust, NPS, and Native American representatives. However, this section presents a general Archaeological Data Recovery Plan for prehistoric cultural resources that will be used as a guideline for data recovery for archaeological deposits encountered during the preconstruction testing program.

Special Studies Sampling

Special studies such as obsidian hydration and geochemical sourcing, pollen and microbotanical analyses, and radiometric dating analyses will be incorporated into the Project, as appropriate, during the Test Evaluation phase. No destructive testing will be conducted without prior consultation and consideration of the views of the Ohlones/Costanoans. Soil samples for soil analysis and flotation for pollen and microbotanical remains will be collected from each excavation test unit in the form of a column sample comprising 5% of the excavated soils form that test unit. Obsidian artifacts obtained from test excavation unit, pretesting trenches, auger borings, and surface collection will be sampled for obsidian hydration and geochemical sourcing. Whenever possible, *in situ* charcoal and other organic materials will be sampled for radiometric dating.

Screening Techniques

When appropriate, excavated soils will be placed in buckets and passed through 1/8-inch or 1/4-inch (3 mm to 6 mm) mesh screens. This dirt will be screened in one location to allow the soil to be easily returned to the unit once excavation is complete. Column samples will ensure volumetric analysis of cultural deposits. Water screening may be used depending on the type of archaeological resource and the associated soils.

Field Documentation

Field documentation of prehistoric cultural deposits will consist of a variety of documentation methods and media, listed in brief below.

Site Cartography: A site map for the site will be made and updated daily with test excavation trenches and unit locations, proveniences of surface finds, locations of features and burials, auger boring location, and any other relevant provenience data.

Level Records: For each level in test excavation units (whether dug in arbitrary 10 or 20 centimeter levels or dug by observed stratigraphic layers), a Level Record will be completed that includes basic information on soil characteristics, cultural materials, and other relevant data obtained in excavation of the level. If features or burials are found within the excavation units, they will be given an arbitrary number and documented on the Level Record, as well as in more depth on the Feature and Burial records. This Level Record also includes a space for drawing of *in situ* artifacts and other relevant data.

Feature Records: Once identified and exposed, each feature will be recorded using a Feature Record. This form records basic information such as the feature's number and type; its provenience and cultural associations; a general description including associated artifacts; a description of the soil matrix within and surrounding the features; special samples, photographs or videos taken; and general remarks. A scale drawing of each feature will be made on a separate sheet of graph paper, and in the case of complex or large features, a soil profile drawing will also be included.

Burial Records: Each burial encountered if the field will be assigned an arbitrary number and documented on a burial record. The procedures for documentation of human remains in the field will likely need to be refined on the basis of consultation with local Native American groups as some prefer the burials not be fully exposed, photographed or removed and some allow in-depth osteological and archaeological research on their ancestors' remains. Prior to the excavation of any human burial, a strict procedure will be followed, as described in the *Burial Treatment and Procedures* section below.

However, given the above caveat, any burials encountered during the course of pretesting or during project construction should be fully exposed, documented, and removed for more detailed laboratory analysis. The Burial Record includes basic information such as the burial number and provenience, description of the soil matrix within and surrounding the burial pit, bones absent (or present in the case of partial or disturbed burials), sex, age, condition of the bones, pathology, type of disposal (burial versus cremation), position (flexed, tightly flexed, etc.), side exposed (left, right, back, face, sitting), position of the head (left, right, back, face, or facing a particular direction), orientation of the burial, and size of the grave or burial pit. In addition, the Burial Record includes space for recording associated artifacts and features as well as a section for general remarks. Field photographs are taken of burials to further document them (in consultation with Native American representatives), and a detailed scaled drawing is prepared on a separate sheet of graph paper to be included with the Burial Record.

Soil Profiles: Upon completion of excavation units, a soil profile will be drawn of at least two walls of the unit, showing all identified soil strata; any features encountered along the unit edges; and any cultural and naturally occurring objects, roots, and bioturbation seen in the unit walls. A key to these soil profiles will be included, properly describing each soil layer and feature, as well as labeling the unit number and wall that is drawn. These soil profiles will be used to create an idealized soil profile, combined with data regarding soil stratigraphy collected during the excavation of test trenches and auger borings.

Field Photography: Field excavation and monitoring activities will be documented through the use of digital and 35 mm photography. Excavation photos will include a scale and north arrow.

Field Video Documentation: Field digital video documentation will be utilized as appropriate to supplement field forms and photographs. This additional documentation will allow the research team to present a video chronicling the archaeological process on the subject property if desired, as well as aid in the analysis and full documentation of the archaeological deposits once fieldwork is complete.

Historic Period Resources

The following general field methodology will be used during the Test Evaluation phase in order to evaluate the significant or unique archaeological resources. Methods for data recovery in the field are also presented in this section. A summary of general lab methods and special studies appears below.

Field Methods

For features identified during the pretesting phase as potentially significant, the area under investigation will be expanded areally until the horizontal boundaries of the feature can be determined, taking into account construction, safety, and security concerns. The minimum level of effort will be undertaken in order to evaluate the resources. Hollow refuse features will be halved and excavated by stratigraphic layer. Refuse pits or sheet scatters will be sampled and associated soils will be screened as appropriate. Architectural and infrastructure features should be cleared to establish integrity and to determine the extent of any associated material or temporal markers.

With the exception of fragments of wood, concrete, or brick (which would be noted but not collected) and some diagnostic ceramic and glass fragments, all of the cultural materials encountered would be systematically recovered and saved in appropriately labeled bags for later laboratory analysis and interpretation. If a feature is determined not to be significant or unique, all collected materials will be redeposited on site. (The possibility of saving artifacts for either teaching collections or interpretive purposes will be taken into consideration.) All excavation should be mapped and recorded, material types noted, and the reasons for abandoning the feature should be clearly articulated.

It is anticipated that some features, such as wells or privies, will extend deep into the ground. OSHA requirements limit confined space entries, so when such features are encountered, the surrounding soil will be removed by heavy equipment to achieve an acceptable slope. Within reason, features will only be excavated to the depth that they will be impacted by planned construction.

If small and intact features, such as wells and privies, extend below the proposed depth of construction activities, they will be excavated to their bases to determine the range of dates in which they were deposited. Determining the absolute range of dates of a deposit or a feature is crucial to establishing association of the feature with particular residences, industries, or historic events relevant to addressing research questions outlined in Chapter 8.

If a large feature is encountered that extends below the level of impact of planned construction, a sampling strategy will be developed and implemented in order to obtain an adequate sample for subsequent analysis. Such a strategy might include the excavation of test units, augers, or shovel probes to determine the depth and stratification of the feature.

Hand excavation of archaeological features will allow the archaeological research team to better control the exposure of artifacts so that establishment of their dates of deposit can be

ascertained. In addition, hand excavation of features will provide better provenience of artifacts and structural remnants to allow for analysis of spatial patterns relevant to addressing research questions described in Chapter 8. The Field Director, in consultation with Caltrans, Trust, and NPS representatives, will determine the proper level of effort. As a general rule, the minimum amount of excavation should be performed to allow an evaluation.

When appropriate, excavated soils will be passed through 1/4-inch or 1/8-inch (6 mm or 3 mm) mesh screens to document all classes of artifacts. Obtaining a representative sample of all classes of artifacts in encountered features will be important to address relevant research themes. Soils samples, seed samples or other deposits will be taken, as necessary, for further analysis, such as pollen and microbotanical analyses. Recovered materials will be bagged according to provenience. Materials will be documented on field notes as appropriate. Artifacts from features meeting the standards will be retained for laboratory analysis. Those not meeting the standards will be reburied on site or retained for outreach efforts.

Field Documentation Methods

Recordation methods on historic period archaeological deposits will employ feature sheets and documentation of soil profiles for each feature. Each feature will be assigned a number and described on a Feature Sheet. The Feature Sheet allows the recorder space to provide an overview of the feature and includes a description of the feature itself as well as overview of the materials it contained.

After excavation, the excavator will complete a soil profile drawing and Feature Evaluation Sheet for the feature that the Field Director will review. The Feature Evaluation Sheet summarizes knowledge about the feature, evaluates it, and registers the determination of eligibility. Such documentation will ensure that the archaeological potential of the feature has been adequately addressed. The project team will provide periodic updates to Caltrans, the Trust, and NPS to summarize the information contained in the Feature Evaluation Sheets.

Field Documents

Documentation of historic period cultural deposits will consist of a variety of documentation methods and media, which are briefly discussed below.

Site Cartography: A site map for the site will be made and updated daily showing the extent of any areal exposures, unit location, feature locations, and any other relevant provenience data.

Level Records: All historic period features will be dug by stratigraphic layers. A Level Record will be completed that includes basic information on soil characteristics, cultural materials, and other relevant data obtained in excavation of the level.

Context Records: In addition to level records, context records will be used to record historic-era deposits association to each other. This is particularly useful in the recordation of subsurface refuse features such as privies and trash pits because it provides information on the relationship between soils differences and concentrations of artifacts; thus, information on differing deposit episodes across time, but within the same feature and/or level. Features within contexts or contexts within features will be recorded. Feature records are discussed further below. The soil characteristics and cultural materials within each context will be recorded. Each context will be assigned a separate, arbitrary number for recording purposes.

Feature Records: Once identified and exposed, each feature will be recorded using a Feature Record. This form records basic information such as the feature's number and type; its provenience and cultural associations; a general description including associated artifacts; a

description of the soil matrix within and surrounding the features; special samples, photographs or video taken; and general remarks. A scaled drawing of each feature will be made on a separate sheet of graph paper, in the case of complex or large features, a soil profile drawing will also be included.

Field Photography: All field excavation and monitoring activities will be documented through the use of digital and 35 mm photography. All excavation photos will include a scale and north arrow.

Field Video Documentation: Field digital video documentation will be utilized as appropriate to supplement field forms and photographs. This additional documentation will allow the research team to present a video chronicling the archaeological process on the subject property if desired, as well as aid in the analysis and full documentation of the archaeological deposits once fieldwork is complete.

9.6 SAFETY

An approved health and safety plan (HSP) is required by the Trust and Caltrans prior to beginning any fieldwork. The safety plan should summarize known health hazards within the APE and contain precautions for field personnel. The HSP will address areas of concern including wearing appropriate safety equipment such as hard hats around heavy equipment, washing hands prior to eating when working in lightly contaminated soils, and use of other protective equipment as necessary. It will include directions to the closest hospital and procedures to follow in an emergency, and it will designate at least one Site Safety Officer. There are known hazardous materials areas present within the Project APE. The HSP will also address these contaminated areas and how and/or if archaeological fieldwork will take place. This plan will be submitted to the Trust's health and safety coordinator when it is complete. The Trust will review the HSP and place a copy on file; copies will also be distributed to all field personnel and acknowledged by each in writing. Additionally, the procedures outlined in the HSP will require routine field meetings to ensure that all applicable health and safety precautions are carried out on a daily basis. It is noted here that *Protocols for Contaminated Archaeological Artifacts on Presidio Parks Lands* (Praetzellis 2005) has been developed and will be implemented should contaminated artifacts requiring laboratory processing be recovered.

9.7 LABORATORY AND ANALYSIS PROCEDURES

Please note that the *Presidio Trust Archaeology Laboratory Manual* is currently in progress (as of August 2008). If this manual is complete at the time that the archaeological investigations for the Project are conducted, the laboratory and analysis procedures outlined below should be replaced by those in the manual pending review and approval by the responsible agencies.

A field laboratory facility will be established on site for use in the initial cleaning and sorting of the collection. Final processing of the collection, including cataloging and analyses may be accomplished at an off-site laboratory, unless specifically prohibited by Native American agreements. It should be noted that all materials recovered from the Project will stay on the Presidio unless written permission is granted by the federal landowner (Trust) to remove for testing and analyses. All artifacts and specimens, as appropriate, will be entered into a computerized database—assigned individual or lot numbers—to facilitate data manipulation and management of the collection. Materials will be placed in clean 4 mm plastic bags marked with catalog number and the collection organized by artifact class into archive boxes.

All cultural materials will be cleaned prior to cataloging, with the possible exception of delicate and perishable materials. Historic artifacts will then be sorted by provenience and functional type. Because selected historic artifacts from trench profiles and historic artifacts from samples will be collected in the field, some nondiagnostic and fragmentary materials may be discarded during laboratory processing. Prehistoric materials will be washed, separated by artifact class and provenience, weighed and counted, and cataloged. All artifacts and specimens, as appropriate, will be entered into a computerized database—assigned individual or lot numbers—to facilitate data manipulation and management of the collection. Materials will then be placed in clean 4 mm plastic bags marked with catalog number and the collection organized by artifact class into archive boxes.

9.7.1 Prehistoric Laboratory and Analysis

Cultural materials recovered during mechanical and manual testing will be returned to appropriate laboratory facilities for processing and analysis. Only appropriate nonperishable materials will be washed; bone, shell, or other constituents subject to deterioration will be cleaned with dry brushes. Upon receiving accession numbers from the designated curation facility, items will be assigned a unique catalog number (individual for artifacts, lots for debitage or organics). Data will be entered into a computer database program (e.g., Microsoft Excel, Microsoft Access, etc.) that permits retrieval and sorting by multiple variables (e.g., provenience, material, artifact type). All recovered materials will be segregated according to gross artifact/ecofact class and turned over to appropriate personnel for analysis.

The flaked stone analysis will be minimally designed to assess patterns of stone tool morphology, acquisition and manufacture, use, and discard, with a primary goal of understanding the organization or represented technologies according to discrete raw materials categories. Classification will be consistent with regional typologies as far as possible, with attendant information pertaining to general form (dimensions and weight), use-wear (type and location modification), manufacturing patterns (core form and reduction stage), and condition (fragment type, secondary wear). Basic attributes will be provided by individual artifact in appendix form, summarized by site, unit, or component in report text. Technological analysis will be performed on a sample of debitage from the site, to include both size-sorting and identification of diagnostic flake types. These data will be used in conjunction with formed tools to infer technological trajectories, importantly informing questions regarding mobility and exchange patterns.

Ground and battered stone implements will be segregated into standard morpho-functional classes (e.g., mortar, pestle, millingstone, handstone, cobble tool, hammer) and compared to established regional typologies. Each tool will be assessed with regard to form, kinds and location of use-related modification, and condition, with the goal of understanding how these technologies were organized. Measurements and characteristics of all wear surfaces will be provided by individual artifact in appendix form, summarized by site, unit, and/or component in the report text.

Other artifacts (shell, stone, and bone tools and ornaments) will be measured and described as appropriate. Where feasible, items will be classified according to regional typologies, the location, kind, and extent of modification characterized, and functional affinities will be suggested on the basis of form and wear.

Vertebrate faunal (mammal, bird, and fish) remains will be identified to taxon. These figures will be used to develop a taxonomic profile for the site, assess the mode of bone origin, quantify

specific taxa (number of identified specimens, MNI), gauge seasonality of occupation, and discuss overall dietary patterns. All invertebrate fauna (shellfish) will be analyzed by species because the expected amounts of recovery are not expected to be high. Flotation samples recovered from discrete contexts which contain carbonized plant remains will be used to explore paleodiet and seasonal exploitation patterns.

Temporally indicative data (time-sensitive artifacts such as projectile points or beads, radiometric assays, obsidian hydration measurements) will be described and employed as possible to date deposits at the sites; artifacts will be typed according to local and regional chronological frameworks, with any radiocarbon determinations corrected as needed for material requirements and obsidian hydration reported in raw form and converted into calendric estimates using established rate parameters. Distributional data from the general site(s) deposits and data from discrete spatial units (features, individual strata, etc.) will be used to reconstruct the depositional structure, define single-component assemblages, and identify intrasite functional variation.

No destructive testing will be conducted on prehistoric archaeological materials without prior consultation and consideration of the views of the Ohlones/Costanoans.

9.7.2 Historical Laboratory and Analysis

All artifact related to the historic-era collected during the course of the Project will be processed and cataloged according to currently accepted standards. Artifacts will be cleaned, sorted by material type, and labeled with appropriate provenience information. They will be cross-mended whenever possible and cataloged according to currently accepted functional categories consistent with other relevant projects in the Bay Area. Classification of archaeological materials according to function is based on a model initially developed by Stanley South (1977) and subsequently modified for many sites in the west (see Table 7 below).

TABLE 7. FUNCTIONAL CATEGORIES AND SUBCLASS EXAMPLES FOR HISTORIC-ERA ARTIFACTS

Group	Class	Subclass Examples
Activities	Collecting	Stalactites, coral
	Commerce	Coins, banks, scale pans
	Communications	Newspaper, telephones
	Entertainment	Musical instruments
	Firearms	Guns, ammunition
	Games	Checker pieces, dominos
	Painting	Brushes, containers
	Pets	Bird feeders, dog collars
	Tools	Axes, files, rulers
	Transportation	Carriage parts, horse shoes, harness parts

Group	Class	Subclass Examples
	Writing	Pens, pencils, ink bottles, slate
Domestic	Clothing maintenance (sewing)	Needles, darning eggs, bluing balls
	Food preparation	Kitchen (e.g., baking pans, skillet), serving (e.g., platters, teapots), tableware (e.g., plates, forks), drinking vessels (e.g., stemware, tumblers)
	Food refuse	Bone, edible seeds/nuts, edible shellfish
	Food/food storage	Canning jars, crocks, retail food containers
	Furnishings	Furniture, flower pots, vases
	Heating	Stoves, coal
	Lighting	Lamps, light bulbs, candles
Indefinite use (items with more than one potential original use)	—	Identified Items with more than one potential original use
	Bead	Beads with more than one potential original use
	Bottles and jars	Bottles, jars, cans with unidentified contents
	Closure	Closures associated with contents of indefinite use
	Metal items	Hardware, metal (e.g., wire, sheet metal, tubes)
Industrial use	Machinery	Spark plugs, gears
Personal	Accoutrement	Purses, eyeglasses, jewelry
	Clothing	Garments, buttons, buckles
	Footware	Shoes, shoe parts (leather, eyelets, soles)
	Grooming	Toiletry items (e.g., perfume, brushes, chamber pots)
	Health	Medicine bottles (e.g., patent/proprietary, pharmacy, bitters, vials), syringes
	Social drugs	Retail alcohol beverage containers and closures (e.g., wine, beer, champagne, distilled beverages), spittoons, tobacco tins, pipes, opium lamps
	Toys (see also Games above)	Dolls, tea sets, marbles

Group	Class	Subclass Examples
Structural	Building material	Window glass, bricks
	Fixture	Sinks, toilets
	Hardware	Door knobs, hinges, brackets
	Nails	All nails
Unidentified	—	Unidentified items (e.g., melted glass, amorphous metal)

Analysis of materials from each artifact type will be conducted following generally accepted methods. The MNI will be calculated as will the proportion of the class each type represented. Glass materials will be sorted by functional category, color, and type following methods developed by Parks Canada (Jones and Sullivan 1989). Glass artifacts can provide information on past lifeways such as consumer behavior, general health, and evidence of social display in the form of decorative items. Ceramics will be sorted for functional type, form, fabric, decorative elements, with special attention paid to makers' marks. The appropriate analysis will determine artifact production date ranges based on marks, manufacture methods, materials, and soil context, using that information in turn to establish a *terminus post quem* for each sampled soil context and feature (which may contain several soil layers as fill). Other analyses such as South's mean dating, time lag factors, and George Miller' s economic scaling (Miller 1980) may also be employed. Information gained from artifact analysis allows the archaeologist to make comparative statements about purchasing power and consumer choice, associations, and periods of deposition at the household level. Faunal remains will be sorted by taxon, element, side, butchering cut, age, and weight. Butchering cuts will be analyzed according to period retail values established by Schulz and Gust (1983). Meat weights will also be calculated for all faunal remains. Food bone will be used to study retail and home butchering, ethnic foodways, consumer behavior, and adaptive strategies within rural settings. Botanical remains will be analyzed to determine the most specific taxon, likely use, and abundance. Parisitological analysis also may be employed if suitable features are encountered.

9.8 COLLECTIONS MANAGEMENT/DISCARD AND DEACCESSION POLICY

Guidelines for collection management and a discard and deaccession policy developed in the Trust's *Archaeological Collection Management Policy* (Clevenger 2008) will be followed for the current Project (see Appendix C Archaeological Collection Management Policy). The Trust's collections management program was designed to serve the needs of its compliance field work, and research programs, which generate artifact collections. The collections management program provides for long-term curation of these collections compliant with federal laws and regulations such as the National Historic Preservation Act, the Archaeological Resources Protection Act, and 36 CFR 79 - The Curation of Federally-Owned and Administered Collections. As a result, the scope of the Lab's collections is restricted to archaeological resources recovered from Area B of the Presidio.

The Presidio Archaeology Lab may occasionally dispose of or deaccession objects it has acquired or accessioned. Reasons for deaccession or disposal may include incompatibility of use or theme as outlined in the *Levantar,* the *Scope of Collections*, the *Acquisition* and *Discard Guidelines* (in development), or the *Research Design for El Presidio and the Main Post*.

Additionally, collections management concerns such as redundancy or material instability may lead to deaccession or discard. Effort will be made to repurpose deaccessioned items for use in other Presidio Archaeology programs, such as education or interpretation. Potential deaccessions must be evaluated using the *Criteria for Deaccession* outlined in Appendix C.

9.9 OHLONE/COSTANOAN PARTICIPATION IN ARCHAEOLOGICAL INVESTIGATIONS

Ohlone/Costanoan descendants and representatives have expressed an interest in participating in the archaeological investigations for the Project. Nine representatives were interviewed for the preparation of the Project ASR/HSR. That document contains three recommendations: use of the Crissy Field Restoration Project *General Agreement* as a model for the current Project, Ohlone/Costanoan monitoring of archaeological excavation, and one or more informational open-houses during fieldwork. The following sections provide guidelines for these recommendations.

9.9.1 Monitoring

A Native American monitor of Ohlone/Costanoan descent will monitor the evaluation efforts of prehistoric archaeological sites in the APE only. As noted above, the only known prehistoric archaeological site currently identified within the APE is CA-SFR-6/26, which will be avoided during project implementation through the establishment of an ESA boundary. This will allow for the identification of prehistoric archaeological sites and features prior to initiating consultation with Ohlone/Costanoan descendants Ohlone/Costanoan consultation will take be initiated immediately upon identification of a prehistoric archaeological site/feature that requires evaluation and/or the identification of human remains thought to be of Native American origin. The Native American monitor would be responsible for keeping a daily field log of project activities and informing others in the Native American community of the findings at the project site. Other interested members of the Native American community will be invited to visit the excavation site, as well laboratory processing area (during predetermined times) while working at prehistoric test areas. Native American visitors other than the designated Native American monitor would be participating as observers. All observers would be required to check-in with the archaeological field director or Resident Engineer to comply with all standard safety measures.

9.9.2 Treatment of Prehistoric Archaeological Materials

All excavated prehistoric materials will be handled with respect and care. Materials will be analyzed at facilities on the Presidio. No destructive testing will be conducted without prior consultation with and consideration of the views of the Ohlones/Costanoans.

Materials will be curated and stored in accordance with *35 CFR Part 79,* "Curation of Federally-Owned and Administered Archaeological Collections." Ohlone/Costanoan respondents will have the opportunity to view and comment upon laboratory and short term storage facilities at the beginning of fieldwork. Long term storage will consider the views and opinions of Ohlones/Costanoan respondents.

9.9.3 Discovery of Archaeological Remains

If prehistoric archaeological materials are discovered in the course of construction, all respondents will be notified immediately by phone. Any subsequent archaeological evaluation efforts of prehistoric sites/features discovered during the course of construction will be monitored by an Ohlone/Costanoan respondent. The MIP will include protocol that should be followed by construction teams should archaeological remains be discovered. Once the Trust and Caltrans are contacted regarding the finds, the Trust will ensure consultation with the appropriate Ohlones/Costanoans (as identified in the ASR) is made prior to evaluation of prehistoric sites/features.

9.9.4 Open Houses

The Project will host a 2-hour open house once during the first 7- or 10-day work cycle. The Field Director will present findings and initial analysis and lead a guided tour of the laboratory. Additional open-houses will be conducted if the work extends past 10 days and if the parties feel it is productive.

9.10 BURIALS, HUMAN REMAINS, AND RELATED MATERIALS

Upon the discovery of human remains during the pretesting and/or testing and evaluation program, the Field Director will follow the regulations outlined by NAGPRA.

9.10.1 Archaeological Treatment of Human Remains

In the event that human remains are discovered during archaeological pretesting and/or testing, the following procedures will be followed.

If suspected human remains are discovered, all work in the area will stop immediately and the area will be secured. The Field Director or responsible archaeologist will first determine that the remains are human, and second that they are Native American, by visual analysis of the remains or by association with prehistoric cultural materials. If the remains cannot be positively identified as Native American, the Field Director will contact the San Francisco County Coroner. If the remains are believed to Native American in origin, the area will remain secured and there will be no further activity in the area until Caltrans, the Trust, and Ohlone/Costanoan consultants are contacted and compliance with NAGPRA begins. The Field Director or responsible archaeologist will seek the advice and active participation of the Native American monitor in the treatment of the remains, and will ensure that all other Native Americans participants in the Project (as identified in the ASR) are informed of the findings

If human remains (or suspected remains) are discovered in trench spoils or in the backhoe bucket, those soils will immediately be segregated and screened to isolate human remains, related artifacts, and all other cultural materials. Work will immediately stopped in the area and procedures described above will be followed. The materials will be bagged and stored at a secure facility at the Presidio.

If human remains (or suspected remains) are detected in a trench floor or sidewall, the materials will be subjected to in-field analysis and stabilized using trench shoring or other practical means. Again, if the remains are determined to be Native American in origin work in

that portion of the trench will be abandoned and the trench will be covered with a steel plate sufficient to deter undesirable visitors. Procedures described above will be followed.

After consultation and consideration of the views of Ohlones/Costanoans, in-field analysis may be comprised of measurement of exposed remains, photography, and drawing of remains and associated materials.

9.11 REPORTING

Reporting on the results of archaeological work to Caltrans, the Trust, and NPS, as well as the professional archaeological community and the public, is a crucial component of any archaeological project. A comprehensive technical report will be prepared subsequent to analysis of the recovered materials. Based on the findings of the pretesting and testing programs recommendations for further investigations will be made. Further archaeological investigations may include the drafting of a plan for further data recovery and recommendations for monitoring during construction.

9.11.1 Reporting on Findings

Site Records (CA DPR 523 series) will be prepared in the event that significant archaeological deposits are encountered. These site records will include a description of the site, its areal extent and boundaries, a summary of the raw data of artifacts encountered within the site, and information on the analysis of those artifacts. Drawings, photographs, and maps will be included with the site report.

9.11.2 Comprehensive Technical Report

The final decision regarding the format of the final archaeological resources report will be based on the finding of the pretesting and testing programs. However, following the guidelines established by the Secretary of the Interior's *Standards for Archaeological Documentation* and the State Historic Preservation Office's *Preservation Planning Bulletin* Number 4(a): Archaeological Resources Management Reports, the comprehensive technical report will likely include the following elements:

- Executive Statement;
- Summary of project scope, including location and geologic and environmental setting;
- Summary of previous research, both prehistoric and historic;
- Prehistoric and ethnographic context;
- Historic context summarized fro archival research;
- Research themes identified in the research design;
- Field methodologies;
- Laboratory methodologies and cataloging categories;
- Interpretation of site findings, including relevance to research themes and recovered materials;
- Conclusions;

- References cited;
- Artifact catalogs (included as an appendix);
- Results of special artifact studies (included as an appendix); and
- Other information relevant to the Project, including additional diagrams, illustrations or photographs.

9.12 INTERPRETATION

A public interpretation program of archaeological data is encouraged by the Secretary of the Interior's *Standards for Archaeological Documentation* when merited by the findings. In the event that significant archaeological deposits are encountered during the course of the Project, every effort will be made to make those findings available to the professional archaeological community and the general public. This can be accomplished through a variety of channels. At a minimum, the resulting technical reports and site records will be submitted to the NWIC of the CHRIS. In addition, publications of significant findings may be prepared for submission to various professional, peer-reviewed, archaeological journals such as *American Antiquity* and *Journal of Historical Archaeology*. The archaeological research team may also present significant findings at the Society for California Archaeology or Society of Historical Archaeology annual meetings. The Trust will post biannual progress reports for the Project on its website as one means of dissemination of information to the public. In addition, should the Project produce specific archaeological and/or historical information that is determined of interest to the general public, the information would be made accessible through a public interpretation document, such as a nontechnical pamphlet, a website, an interpretive board or plaque, or some other format deemed appropriate. The topics for public interpretation would be decided upon by Caltrans, the Trust, and NPS after the technical report has been completed.

It should also be noted here the Trust's, *Archaeological Collection Management Policy* (Clevenger 2008) includes suggested uses of archaeological collections generated from projects that take place on Trust management lands (see Appendix C). Some of the collections uses include physical and virtual access to the collections, availability of the collection for research, consumptive use (i.e. destructive analysis), educational use, traditional and cultural uses, exhibition, reproduction use (e.g., photography and physical reproduction on a limited basis), and commercial use. All use of Trust collections are pending the approval of the Laboratory Director and Archaeological Collections Specialist. Further details can regarding Trust collections use can be found in Appendix C to this report.

9.13 OWNERSHIP AND CURATION OF ARCHAEOLOGICAL MATERIALS

All archaeological material, except human remains and associated grave items, will remain the property of the Trust. Upon the completion of the final report of the archaeological investigations the collection will be transferred to the Trust Archaeological Laboratory facility for permanent curation, where it will be available for study by researchers in the future. In addition to an electronic catalog, artifacts, soil samples, ecofacts, etc., the facility will also receive copies of field notes, drawings, photographs, special studies, copies of relevant historical documents, and the final report.

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APPENDIX A: GEOARCHAEOLOGICAL SENSITIVITY STUDY (MEYER 2002)

GEOARCHAEOLOGICAL SENSITIVITY STUDY OF THE DOYLE DRIVE CORRIDOR, CITY AND COUNTY OF SAN FRANCISCO, CALIFORNIA

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Nature and Scope of Study

This study provides a preliminary assessment of the potential and probability for buried archaeological resources within portions of the Doyle Drive project corridor. The assessment is based on a geoarchaeological review and interpretation of data obtained from subsurface borings, cores, and trenches that have been excavated at various locations within the project area. This information was gathered from previous geotechnical studies and core logs that included Army Corps of Engineers (1987), Basin Research Associates, Inc. (2001), and Harland Tait Associates (1998). The review also included a physical examination of selected cores (currently stored at the Presidio) that were obtained as part of the Basin Research study. These served as the primary data sources for this study, along with previously published geological maps and studies.

The content and quality of the subsurface data varied greatly within and between reports, which made it difficult to fully assess and interpret the information. It was found that subsurface data was not available from certain critical areas within the corridor, such as near the base of bluffs or footslopes. Additionally, very few borings or cores had been excavated to depths greater than 16 ft. (4.9 m) below surface, thus there is an obvious lack of deeper subsurface data. It was also found that most of the data had been recorded with engineering or environmental purposes in mind, which resulted in a lack of the kinds of information that could answer specific questions about the age and nature of the subsurface deposits. Despite these limitations, the review provided enough information to interpret and summarize the subsurface stratigraphy, which then allowed the potential for buried archaeological resources to be estimated in portions of the project corridor.

Geoenvironmental Setting

The San Francisco Bay Area has undergone a series of significant environmental changes since people first entered and inhabited the region. Studies suggest that climatically induced

environmental fluctuations, such as Holocene sea-level rise, were responsible for large-scale landscape changes in the Bay Area (Atwater 1979; Atwater et al. 1979; Atwater, Hedel, and Helley 1977; Bickel 1978a, 1978b; Borchardt 1992; Koltermann and Gorelick 1992; Rogers 1988). These changes included repeated episodes of widespread sediment deposition that buried large portions of the landscape that was once available for human use and occupation. Such large-scale paleoenvironmental changes were likely responsible for significant fluctuations in the availability and/or productivity of particular resources that influenced the pattern of human settlement and/or subsistence activities (Atwater et al. 1979). As a result, the region's archaeological record does not accurately reflect the timing or extent of human use, because older sites tend to have been destroyed, buried, or obscured by Holocene landscape evolution (Meyer 1996, 2000; Meyer and Rosenthal 1997).

More than 12,000 years ago, the ocean had not yet entered San Francisco Bay because worldwide sea levels were at least 100 meters (approximately 330 feet) lower than today. At that time, much of the bay was a broad inland valley, crossed by several stream or river channels, which supported grassland and riparian plant and animal communities. The runoff carried by these streams and rivers combined to form a single watercourse just north of Angel Island that flowed to about the Farallon Islands, where it emptied into the Pacific Ocean (Atwater, Hedel, and Helley 1977). If prehistoric people inhabited the Bay Area at this time, it seems likely that the riparian corridors and perennial water sources would have been targeted for human settlement and subsistence activities. As the continental ice sheets began to melt toward the end of the Pleistocene, the oceans of the world experienced a rapid rise in sea level, causing the Pacific to migrate eastward and enter San Francisco Bay near the Golden Gate by about 10,000 years ago (Atwater, Hedel, and Helley 1977). Current radiocarbon estimates indicate that the sea levels rose 25 to 30 meters (m) between about 10,000 and 8,000 years ago, covering most of the present San Francisco Bay Estuary. The rate of sea-level rise in San Francisco Bay decelerated dramatically between about 8,000 and 6,000 years ago (Atwater 1979; Atwater, Hedel, and Helley 1977; Stanley and Warne 1994; Wells 1995; Wells and Goman 1994).

As the rate of sedimentation began to outpace the rate of submergence, extensive tidal flats and marshes were formed around the margins of the bay (Atwater et al. 1979) and covered the lower floodplains of the inland valleys. Evidence of these buried floodplains has been identified at depths ranging from 9 m to 40 m (29.5 ft. to 131 ft.) below mean sea level (BMSL), and radiocarbon-dated from 10,920 to 9,760 cal B.P. (Atwater, Hedel, and Helley 1977: Story, Wessels, and Wolfe 1966). It

is likely that many archaeological sites associated with these former floodplain surfaces were destroyed and/or submerged by the advancing sea (Atwater 1979; Bickel 1978a; Louderback 1951). Streams and rivers entering the bay were forced to adjust to a progressively higher baseline (lower hydrologic gradient) caused by the rising sea, emerging wetlands, and increased sedimentation rates. In response, the lower reaches of many channels were overwhelmed with sediments that were spread onto the surface of surrounding floodplains (Helley et al. 1979). During this time, existing floodplains were subject to intensive erosion and lateral channel migration as the upper reaches of many streams and rivers attempted to adjust to the rising baseline. These changes led to the formation of an "alluvial apron around the bay plain and the extensive valleys of the region" that is graded to the present sea level (Helley et al. 1979:18).

During the Middle and Late Holocene, the San Francisco Bay–Estuary continued to expand due to the decomposition, compaction, and subsidence of the intertidal deposits around the margins (Atwater 1979; Atwater et al. 1979; Atwater, Hedel, and Helley 1977). By the 1850s, tidal marshes covered twice as much surface area as all the inland water of the bay and delta combined (Atwater et al. 1979). It is possible that Middle and Late Holocene human populations relocated settlements progressively farther inland due to continued estuary expansion; a pattern which might be detected within the Doyle Drive project area.

Geologic studies of northern California hillslopes demonstrate that colluvium was stored less frequently in the Late Pleistocene and Early Holocene than in later periods (Borchardt, Rice, & Talyor 1980; Dietrich & Dorn 1984; Dietrich, Wilson, and Reneau 1986; Reneau et al. 1986, 1990; Rypins et al. 1989). Radiocarbon dating of basal colluvium from nine locations in the San Francisco Bay Area suggests that a lowering of storm intensity is responsible for the trend toward colluvial storage during the Holocene (Dietrich, Wilson, and Reneau 1986). While the mobilization of debris-flows and colluvial landslides in the North Coast Ranges is generally associated with periods of intense rainfall (Rypins et al. 1989:84), they may also be triggered by periods of decreased precipitation as indicated by a study in the Central Coast Ranges (Lettis 1982). This finding suggests that colluvial deposition is associated with regional paleoclimatic transitions, and that archaeological remains, particularly those that are Early Holocene or younger in age, may be stored in association with colluvial deposits.

Both geological and geoarchaeological studies confirm that many of the Late Pleistocene and Early Holocene land surfaces in the San Francisco Bay region are often overlain by alluvium that are generally less than 6,000 years old (Borchardt 1992; Helley et al. 1979; Meyer 1996; Meyer and Rosenthal 1997; Pape 1978; Rogers 1988). The older land surfaces often exhibit well-developed buried soil profiles (paleosols), which are indicative of formerly stable land surfaces. A *paleosol* is an "old soil" that formed during a prolonged period of near-surface weathering on a relatively stable land surface in the past but is not actively forming at the present (Retallack 1988; Waters 1992; Yaalon 1971). The recognition of paleosols is crucial for geoarchaeological studies because they represent relatively stable land surfaces that were potentially available for human occupation. A paleosol may represent hundreds or thousands of years of non-deposition and soil development, depending on the duration of relative landform stability. If a stable landform is buried by sediment, the process of soil formation must start again at the surface of the new deposit. Once buried, these surfaces reflect certain environmental conditions that occurred during a period of landform stability at or near the ground surface (Birkeland, Machette, and Haller 1991). As such, buried paleosols are useful stratigraphic markers that have been used to locate buried archaeological deposits and correlate depositional sequences in different parts of the Bay Area (Meyer 2000).

The San Francisco Bay area has undergone a series of significant environmental changes since prehistoric people may have first inhabited the region. Such changes played a pivotal role in the evolution of the bay area landscape (Atwater 1979; Atwater, Hedel, and Helley 1977; Borchardt 1992; Koltermann and Gorelick 1992; Rogers 1988), which undoubtedly influenced the distribution of plant, animal, and human communities in and around the bay. Geoarchaeological studies indicate that changes of such magnitude were accompanied by repeated episodes of widespread sediment deposition that buried many older prehistoric sites, creating a biased and incomplete picture of the region's archaeological record (Meyer 1996, 2000; Meyer and Rosenthal 1997).

Geoarchaeological Research Context

One of the most difficult issues faced by archaeological investigations in the Coast Ranges is the problem of locating sites that may be buried by natural depositional processes such as those that have occurred in the San Francisco Bay Area. This problem is compounded in areas where sites may also be hidden beneath portions of the built environment, such as those found in the Presidio. A *buried site* refers to any concentration of archaeological remains that is concealed from view by

overlying natural or artificial deposits, and/or by built structures. Because buried sites generally lack visible and/or obtrusive features that would otherwise indicate their presence to an observer in the field, the use of pedestrian survey methods is often inefficient or completely ineffective for locating buried archaeological sites (Bettis 1992:120). Surveys that are designed to locate and estimate the potential of buried sites must rely on other methods and techniques, such as mechanically excavated exploration trenches, to avoid the sampling biases introduced by conventional surface surveys.

Although it has long been known that many archaeological sites may have been buried by natural geological processes in California, the use of geoarchaeological studies to address issues of human occupation, landscape evolution, and archaeological visibility has received little attention in the state. Consequently, buried sites are most often discovered after being inadvertently exposed by natural erosion or mechanical earth-moving, and only rarely are they intentionally found as a result of conventional surface surveys. Buried sites identified in other parts of North America have often been found to supplement portions of the archaeological record that were otherwise unknown or underrepresented. As such, the investigation of buried sites can provide unique research opportunities for archaeological studies that seek to understand the cultural history and/or settlement pattern of an area or entire region. Another research value of buried sites is related to the process of burial, which often preserves the systemic context of archaeological materials that would otherwise be disturbed or destroyed by on-going processes at or near the surface. Buried sites can also contain considerable information about the nature and timing of past events and environmental conditions that contributed to their burial (Waters 1992).

Researchers in California have often interpreted the frequency and distribution of Late Holocene archaeological deposits as prima facie evidence of relatively abrupt settlement and population changes beginning in the upper Archaic and Emergent periods (e.g., Bouey 1987:66; Broughton 1994; Schulz 1981:184). At first glance, the predominance of Late Archaic and Emergent-period sites in California seem to support the notion of population increases. Current models view these demographic changes as attendant with more intensive subsistence strategies, which eventually led to increased organizational complexity (Basgall 1987; Beaton 1991; Bouey 1987; Broughton 1988, 1994; Jones 1992). These models suggest that the economic intensification characteristic of later adaptations was initiated by an imbalance between human population and available resources during the Middle Archaic (Basgall 1987; Beaton 1991; Bouey 1987; Broughton 1994; Jones 1992).

While it is reasonable to assume that late Archaic and Emergent period populations were greater than those of preceding periods, the mechanisms and overall trajectories of prehistoric population growth in California are poorly understood (Beaton 1991:950-951). This situation is largely a product of the paucity of Lower to Middle Archaic archaeological deposits that can provide direct evidence of human settlement and population. Some researchers have acknowledged that large-scale landscape changes have likely buried these older sites in central California (Banks, Orlins, and McCarthy 1984; Bickel 1978a; Beaton 1991:948; Fredrickson 1980; Jones 1992:8; Schulz 1981:184), an assumption verified by the discovery of deeply buried archaeological sites in the Bay Area that date from 5,000 to nearly 10,000 years ago (Henn, Jackson, and Schlocker 1972; Hildebrandt 1983; LaJoie, Peterson, and Gerow 1980; Meyer and Rosenthal 1997; Origer 1993). Even so, there has been no systematic investigation of the potential influence of large-scale geological processes on regional site-distribution patterns in the San Francisco Bay area.

The fundamental connection between people and the landscape is the tendency for human groups to use and occupy relatively stable portions of the landscape. Soil formation is a byproduct of sustained or prolonged land stability, while erosion and deposition are signatures of land instability. Landforms with well-developed soils have been stable and available for human use or occupation longer than those with weakly or moderately developed soils. Erosional and depositional processes can sometimes remove or bury part or all of a previously stable landform. Thus, there is a strong correlation between land stability, soil formation, human occupation, and the storage of archaeological materials.

A geoarchaeological approach is considered as the most effective and efficient approach for identifying potential buried archaeological resources within the project corridor. This approach attempts to locate buried archaeological resources by targeting segments of the landscape (landform-sediment assemblages, or LSAs) that were most stable and available for human use and occupation. At the same time, the approach attempts to rule out certain landform deposits that may have been either unavailable or too unstable. The primary goal of this approach is to reduce the area and/or volume of sediments that need to be searched, thereby increasing the likelihood that potentially buried archaeological resources are identified—not to locate every buried site that may exist in a study area. The ability to locate buried sites ultimately depends on the whether or not sensitive landform-deposits can be adequately explored using appropriate methods for evidence of past human activity.

Geology, Soils, and Landforms

The Doyle Drive project area is located in the north part of the Presidio military base, which lies in the northwest part of the San Francisco peninsula. Geologic mapping (Knudsen et al. 1997) indicates that the project corridor crosses at least five major types of geological deposits, which include Pre-Quaternary bedrock (br), Early to Middle Pleistocene-age alluvium (Qoa), Late Pleistocene to Holocene-age alluvium (Qa), Holocene-age dune and beach sand (Qhs), and deposits of Historic to recent artificial fill (af) (see Figure 1).

The upland hillslope portions of the corridor are underlain by bedrock and Pleistocene-age alluvium, which are mantled in some areas by Holocene-age sand dunes and artificial fill deposits. A small area of Pleistocene to Holocene-age alluvium is located in or near part of corridor, in the area just north of the U.S. Post Office. Late Holocene to Historic-age alluvium, dune and beach sand, tidal marsh, and artificial fill deposits underlie the northern and eastern parts of the corridor. Historic maps indicate that two main channels carried runoff from the uplands northward to an extensive marsh in the lowland segment of the project area (San Francisco Estuary Institute 1999). The nature and extent of the marsh was documented before it was filled for land reclamation purposes during the late 19th and early 20th centuries (see this report).

FINDINGS

The following concepts and terms were used to identify the natural and/or cultural stratigraphy in the selected borings and cores. Stratigraphic units (strata) were identified on the basis of physical composition, superposition, relative soil development, and textural transitions (fining-upward sequences). Buried soils or paleosols, representing formerly stable ground surfaces, were identified on the basis of color, structure, horizon development, bioturbation, and the nature of the upper boundary (contact) with the overlying deposit (Birkeland et al. 1991; Retallack 1988). These methods are consistent with those outlined by Birkeland et al. (1991), Schoeneberger et al. (1998), and the Soil Survey Staff (1998).

Subsurface Stratigraphy

The available subsurface data were used to reconstruct the subsurface stratigraphy of major geological deposits across the project corridor. Two separate cross-sections were created using selected boring and cores to show the relationship of the subsurface deposits along the long (A-A',

West-East) and a short-axis of the corridor (B-B', North-South). The location of each transect is shown in Figure 2, and the subsurface stratigraphy along each transect has been illustrated in Figure 3 and Figure 4.

Based on these stratigraphic reconstructions, the lowland portion of the corridor that lies roughly between McDowell Avenue, Mason Street, Baker Street, and Doyle Drive, appears to be overlain by about 2 to 10 ft. (0.6 to 3.0) of artificial fill deposits consisting of a combination of fill sand and historic debris (Figure 3). The artificial fill was found to overlie the prehistoric midden deposits identified at site SFr-6/26, as shown in Figures 3 and 4. This relationship is consistent with historical accounts as discussed elsewhere in this report.

The fill is underlain at depths of about 1 to 3 ft. (0.3 to 1.0 m) above mean sea level (AMSL) by beach, dune, and marsh deposits, which vary considerably over relatively short distances (Figures 3 and 4). Contained within these deposits are beds of peat and lenses of clay-rich mud, which are associated with slough and/or marsh development. These deposits also contained thin, weakly developed soils that appear to have been buried by dune formation and/or migration (too small to show in stratigraphic figures). The buried soils indicate that the dunes underwent short periods of stability and vegetation growth before they were eroded by dune migration and/or covered by blowing sands. Although the age of the buried soils was not directly determined, they are estimated to have formed during the Late Holocene (past 4,000 years) based on their youthful appearance and a radiocarbon date of 1190 + 120 B.P. from the base of the deposit at site SFr-6/26, which appears to overlie these buried soils. Given the stratigraphic position of these deposits below artificial fill, it appears that they may range from about 4,000 years old to the historic period.

The Late Holocene deposits are in turn underlain at depths of about 15 to 25 feet below mean sea level (BMSL) by thick deposits of dune sand (Figures 3 and 4). The upper portion of the dune deposit is marked by a moderately developed soil indicating that these dunes underwent prolonged period of stability and vegetation growth. It appears that the surface of this deposit may slope from south to north from the bluffs toward the bay as shown in Figure 4. Although the age of the buried soil associated with these dunes was not directly determined, it is estimated to have formed during the Middle Holocene (7,000 to 4,000 years ago) based on it's stratigraphic position and the nature and age of the overlying deposits.

The Mid-Holocene dune sands are underlain either by bedrock or by a buried soil that may be Pleistocene-age (more than 11,000 years old). In the upland segment of the corridor near McDowell Avenue, a very well developed soil appears to underlie dune sand (Figure 3). In the lowland segment, another well-developed soil seems to occur below the dunes at a depth of about 62 to 68 ft. (18.9 to 20.7 m) BMSL (Figures 3 and 4). Given the difference in the depth of this soil between boring 2F-84-114 and 2F-84-105, it appears that the surface of this deposit may slope from south to north from the bluffs toward the bay as shown in Figure 4. Although the age of this buried soil was not directly determined, it is estimated to have formed during the Late Pleistocene or Early Holocene (14,000 to 7,000 years ago) based on it's stratigraphic position and the nature and age of the overlying deposits. The underlying bedrock consists of sandstone, shale or serpentine rocks that are millions of years old.

Summary and Interpretations

Five major geological deposits, Pre-Quaternary bedrock (br), Early to Middle Pleistocene-age alluvium (Qoa), Late Pleistocene to Holocene-age alluvium (Qa), Holocene-age dune and beach sand (Qhs), and deposits of Historic to recent artificial fill (af), are mapped as occurring at the surface of the project area (see Figure 1). In addition to these surface deposits, the subsurface data indicates that two or more buried soils are present in the central part of the lowland segment of the corridor (Figures 3 and 4). These soils appear to mark a sustained period of relative landform stability during the Late Pleistocene or Early Holocene and another during the Middle Holocene. In addition to these, alternating bands of thin, weakly developed soils marking short periods of land stability were found to occur within some of the Late Holocene dune sands identified in the corridor's lowland segment. The nature, extent and apparent age of these deposits is important for (1) estimating the potential for buried archaeological deposits, (2) locating archaeological sites that may be buried, (3) understanding relationships between people, landscape change, and the nature and completeness of the archaeological record, and (4) future planning and development within the project area.

Based on these findings, it appears that there *is* potential for archaeological deposits other than site SFr-6/26 to be buried within certain portions of the project corridor. Given the nature, extent, and estimated age of the deposits mapped at the surface, archaeological sites may have been buried by (1) artificial fill (af), (2) Holocene dune and beach sand (Qhs), and Late Pleistocene to Holocene alluvial deposits (Qa), as shown in Figure 1. In addition, human occupation, and hence archaeological deposits, may be associated with one or more of the better developed buried soils identified in the lowland segment (i.e., Late Pleistocene or Mid-Holocene buried soil). If

archaeological materials are associated with these buried soils, it seems probable that they may tend to be distributed along the surface of former dunes or alluvial fan/floodplain located just below the bedrock bluffs, as these positions may have afforded prehistoric people some sheltering from the prevailing western winds while providing the opportunity to access marine (lowland) and freshwater (upland) resources; a common prehistoric settlement pattern in the Coast Ranges.

In contrast, it appears that there is *little or no* potential for archaeological deposits to be buried in areas mapped as (1) bedrock (br), (2) Early to Middle Pleistocene alluvial deposits (Qoa) as shown in Figure 1. Some exceptions may occur in some areas where these deposits are locally overlain by enough artificial fill to cover the former ground surface. In addition, little or no human occupation, and hence archaeological deposits, are expected to be associated with any of the weakly developed buried soils identified in the Late Holocene dune deposits within the lowland segment. Thus, given the nature and estimated age of these deposits, they can be omitted from further review.

It should be emphasized that one or more of the buried soils may not be impacted from the preferred project alternative, given their depth. This is particularly true of the possible Late Pleistocene-age buried soil, which lies at depths of 70 ft. (21 m) or more below the present ground surface in the corridor's lowland segment. However, the Mid-Holocene soil may be impacted if the preferred alternative extends to depths of more than 18 ft. (5.5 m) below surface in the lowland part of the corridor. Likewise, buried soils may be encountered at more shallow depths in the upland segments of the corridor. Given these possibilities, it will be necessary to understand the design and location of the preferred project alternative before developing more specific statements regarding the corridor's archaeological sensitivity.

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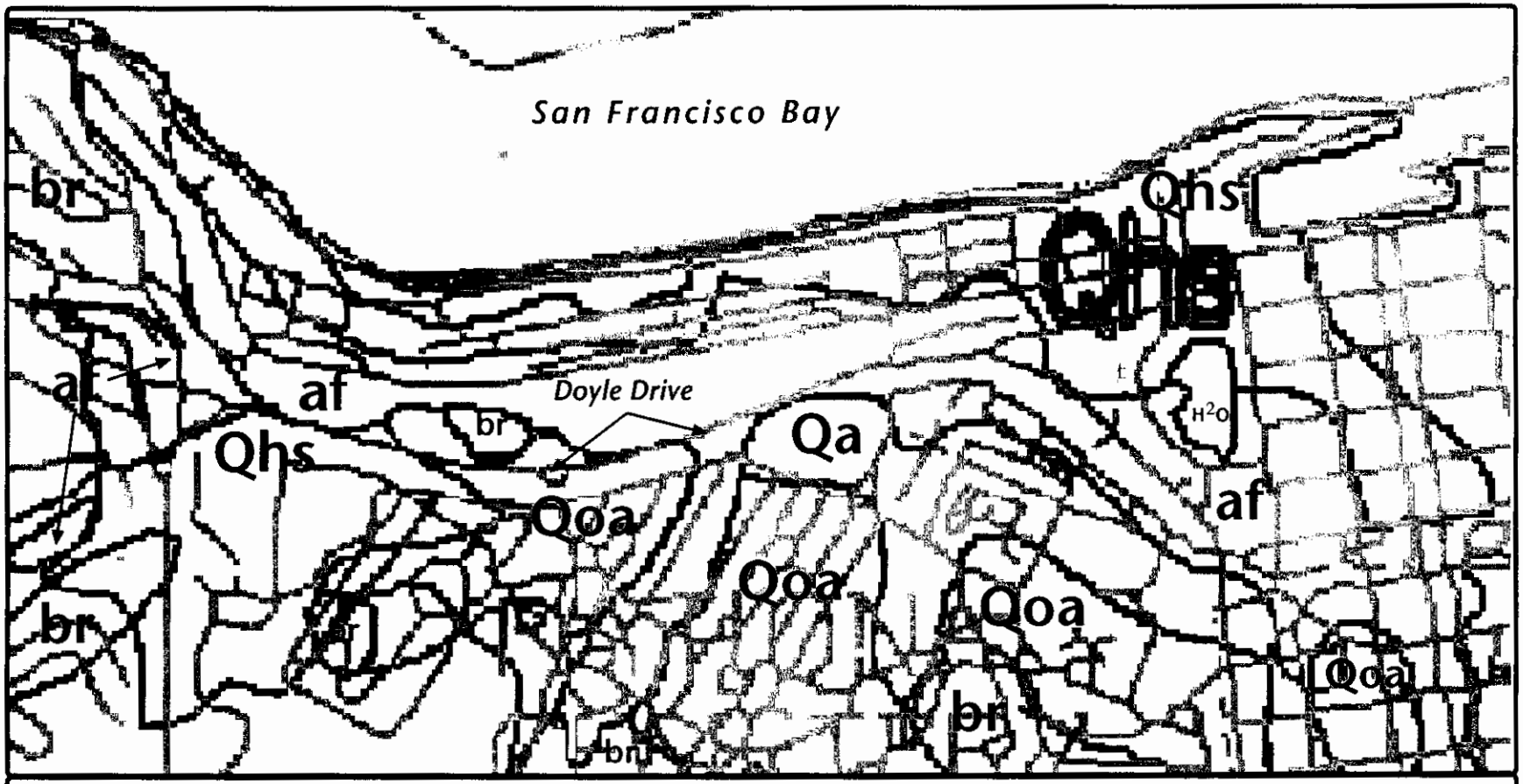

af	Artificial fill (underlain by alluvial, dune sand, and marsh/slough deposits)
Qhs	Holocene dune and beach sand
Qa	Late Pleistocene to Holocene alluvial deposits
Qoa	Early to Middle Pleistocene alluvial deposits ("Colma formation")
br	Pre-Quaternary bedrock

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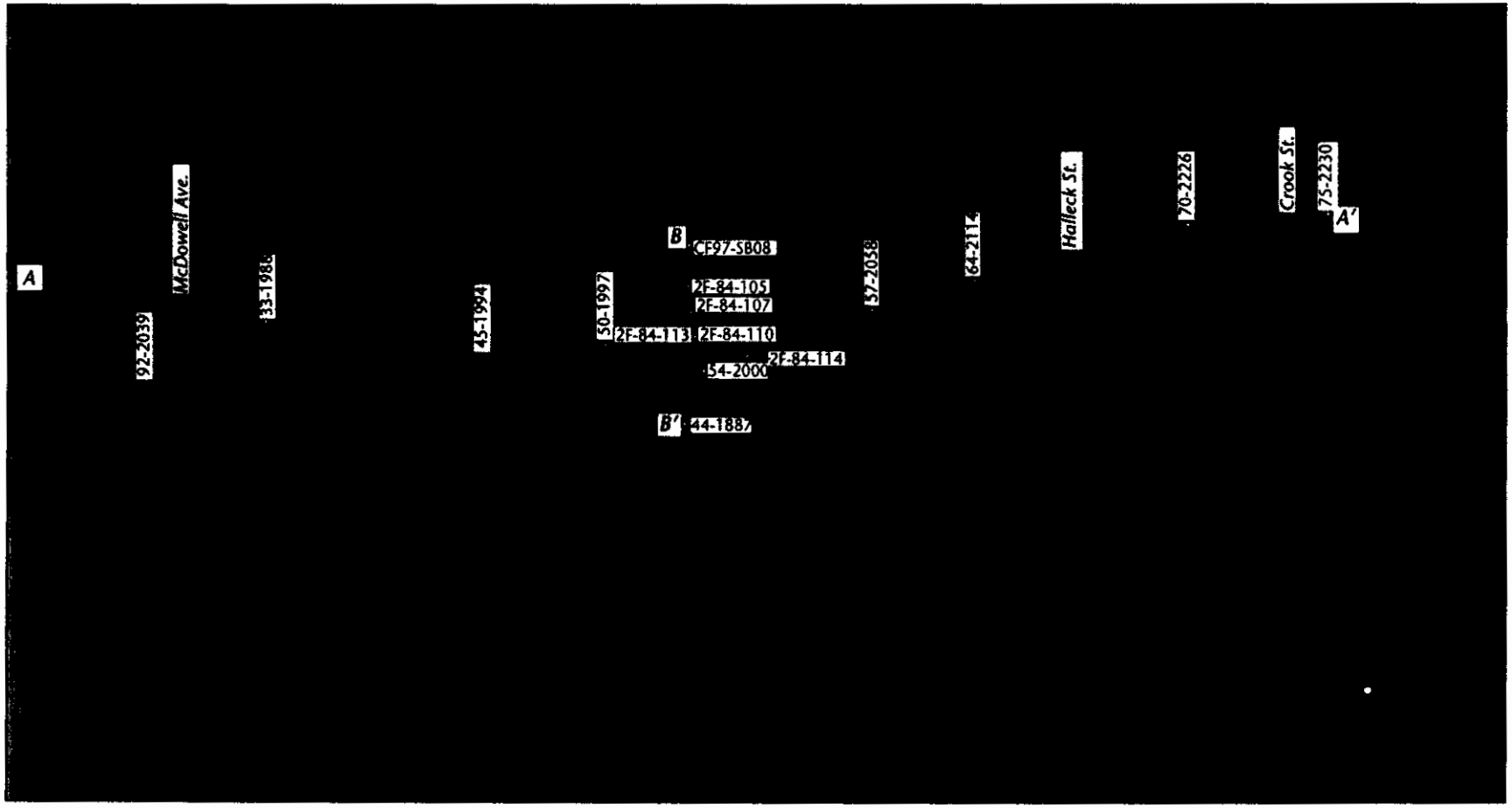
Figure 1
Distribution of Major Geological Deposits in the Vicinity of the Doyle Drive Project Corridor (adapted from Knudsen et al. 1997)



Adapted from Basin Research Associates, Inc. 2001: Figure 3

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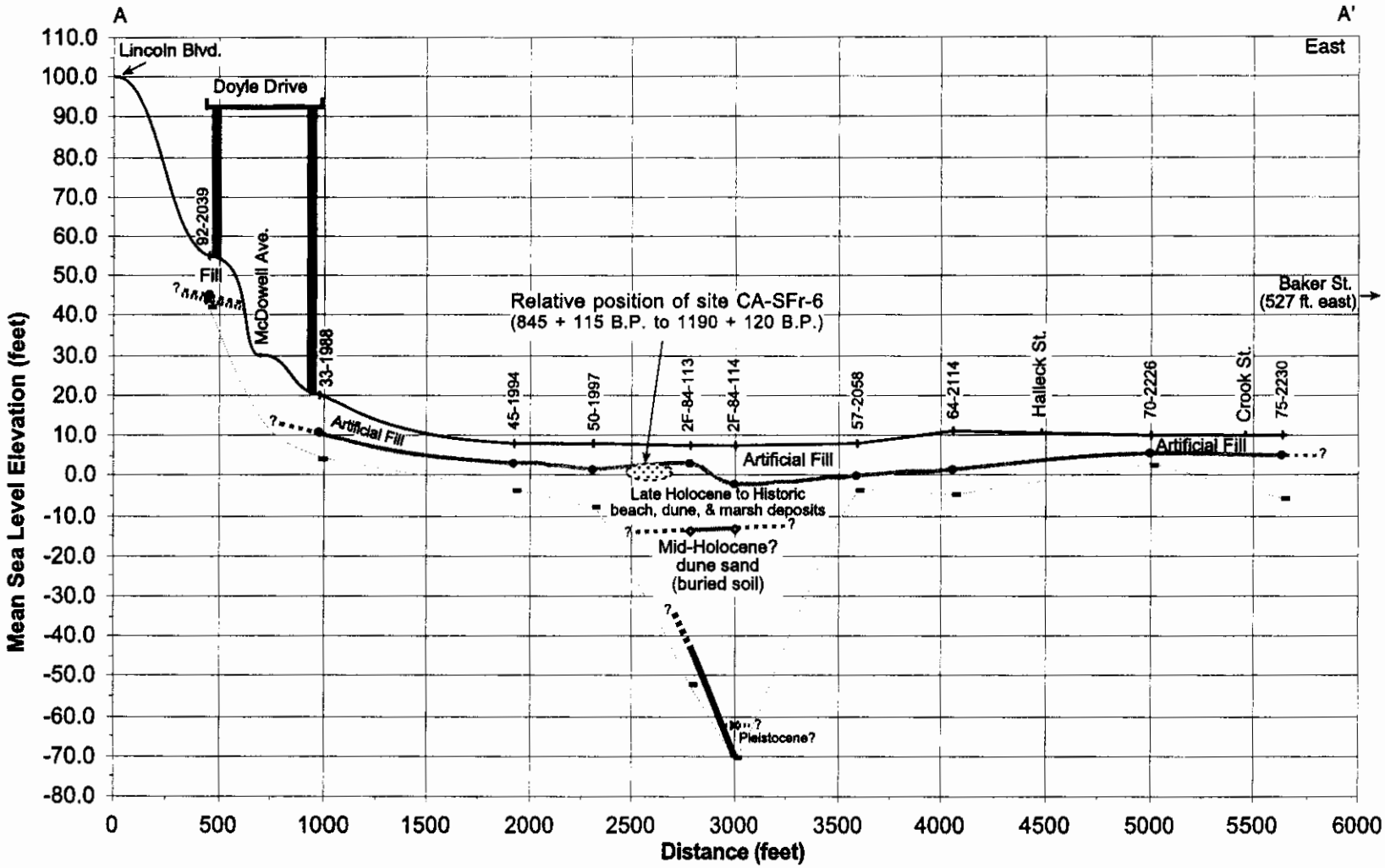
Figure 2
Location of Selected Subsurface Stratigraphic Cross-Sections in the Doyle Drive Project Corridor, Presidio, San Francisco, California



Note: Vertical scale exaggerated; contacts dotted where uncertain; surface elevations estimated where unavailable; freeway structure not to scale.

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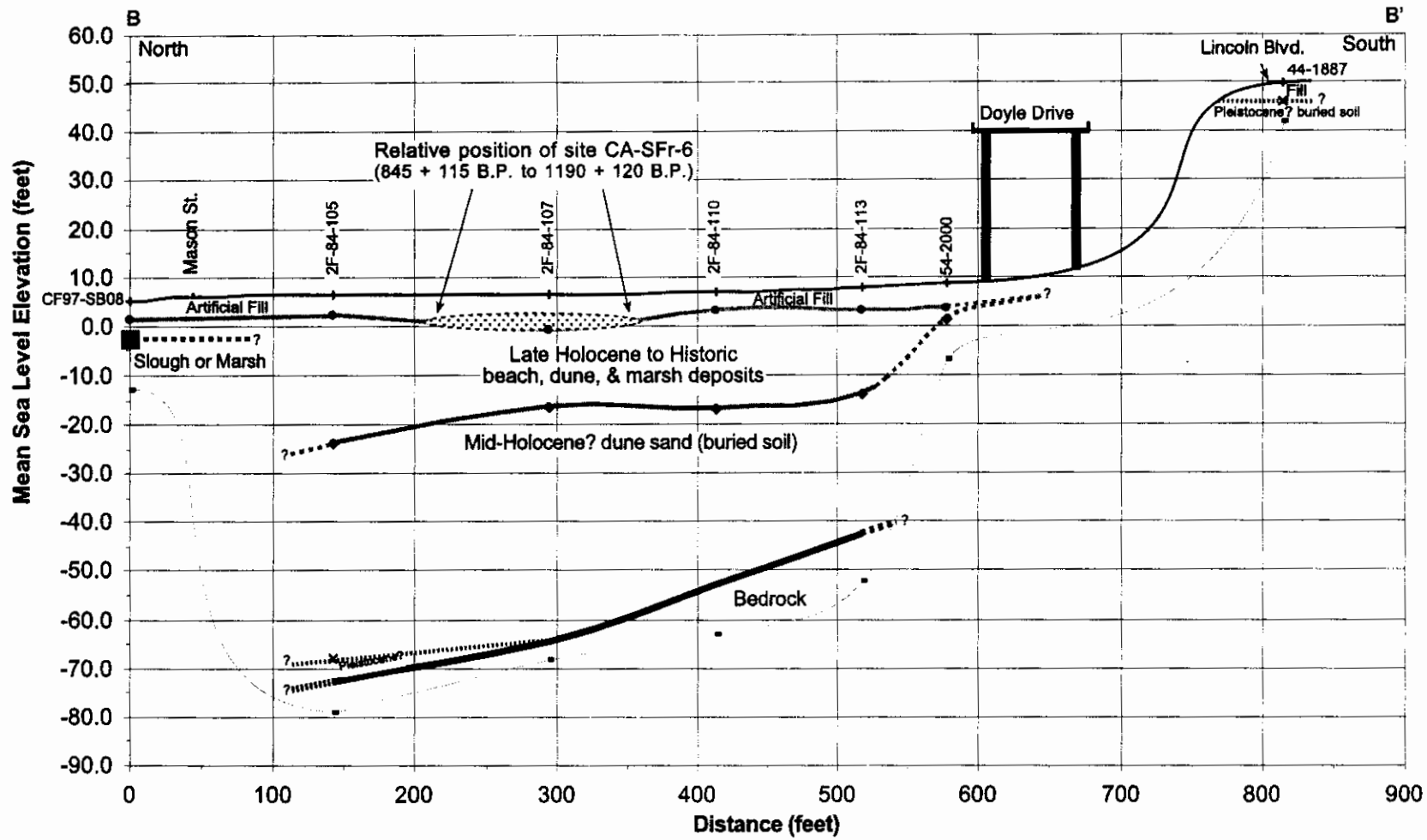
Figure 3
Subsurface Stratigraphy (West–East) in Part of the Doyle Drive Project Corridor, Presidio, San Francisco, California



Elevation (ft.) of boring or core
Holocene dune sand (buried soil)
Late Pleistocene? buried soil
Base of boring or core
Beach, dune, & marsh deposits
Holocene Marsh "Bay Mud"
Bedrock contact
CF-, 2F-, 54- Boring or core designations

Note: Vertical scale exaggerated; contacts dotted where uncertain; surface elevations estimated where unavailable; freeway structure not to scale.

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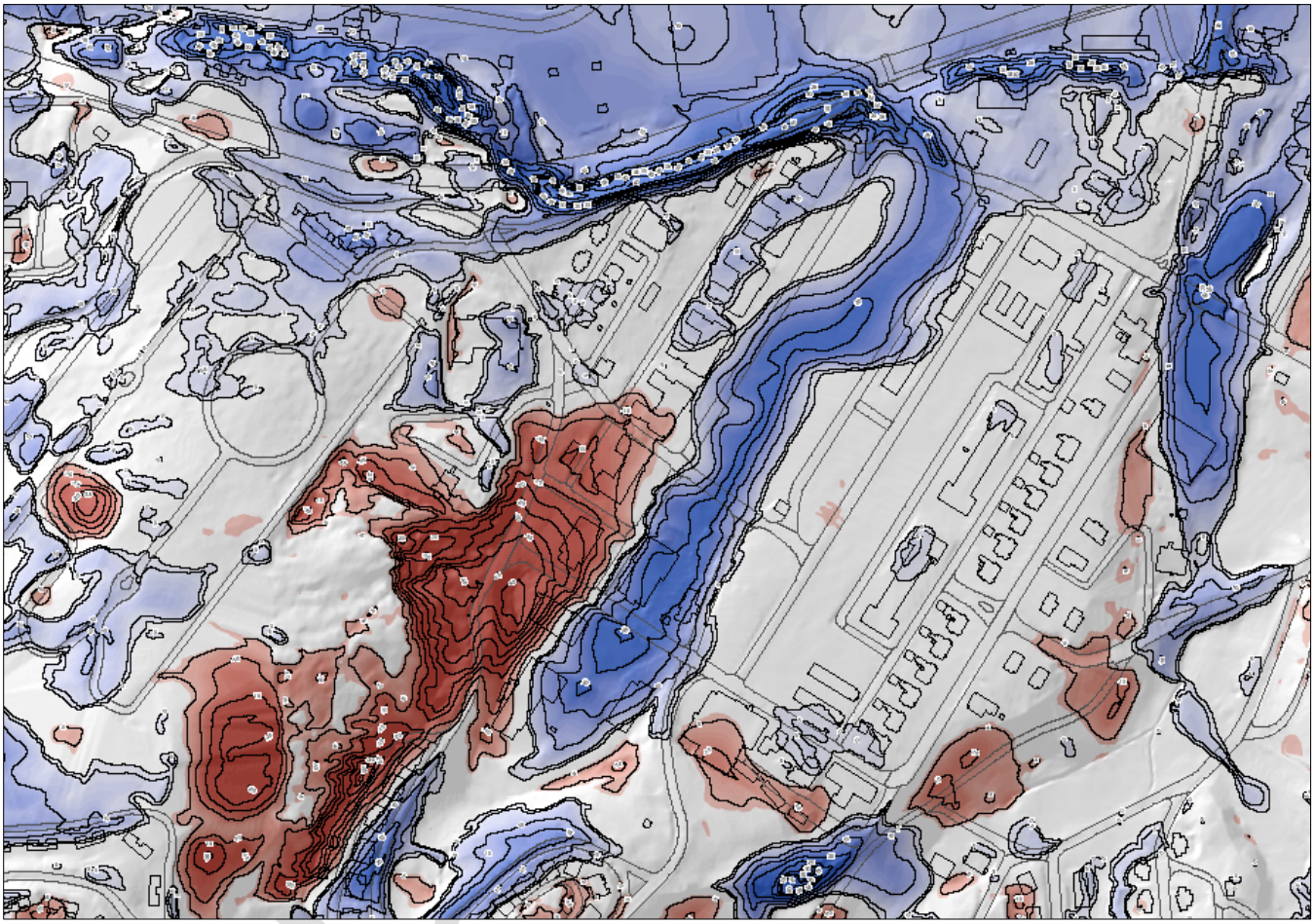
Figure 4
Subsurface Stratigraphy (North–South) in Part of the Doyle Drive Project Corridor, Presidio, San Francisco, California

APPENDIX B: PRESIDIO TRUST CUT/FILL MODEL

Cut Fill Model

Calculating Topographic Change at the Presidio between 1871 - 2000



Hans Barnaal
Presidio Trust GIS Specialist
2007

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Field Observations vs. the Model	x

Background

The Presidio cut fill model was developed by the Presidio Trust in 2005 in an effort to better understand potential archaeological deposits in the Presidio of San Francisco's Quartermaster's area. While the model was created for the Quartermaster's area the model itself had to be created on a Presidio wide scale.

Digitization of 1871 Hammond Hall Map

One of the best topographic maps of the Presidio was surveyed in 1871 by Topographic Engineer William Hammond Hall under the direction of the Board of Engineers for the Pacific Coast. This map is highly detailed for the period and represents the landforms of the post with 6 foot contour lines. In 2000 Eric Blind (Presidio Trust Staff archaeologist) with help from Hans Barnaal (NPS GIS Specialist) digitized the elevation contours from the 1871 map into AutoCAD and assigned the elevations shown in the historic map to each contour. This was done to create a 3-Dimentional digital map of the Presidio at a time prior to major human induced landscape modifications.

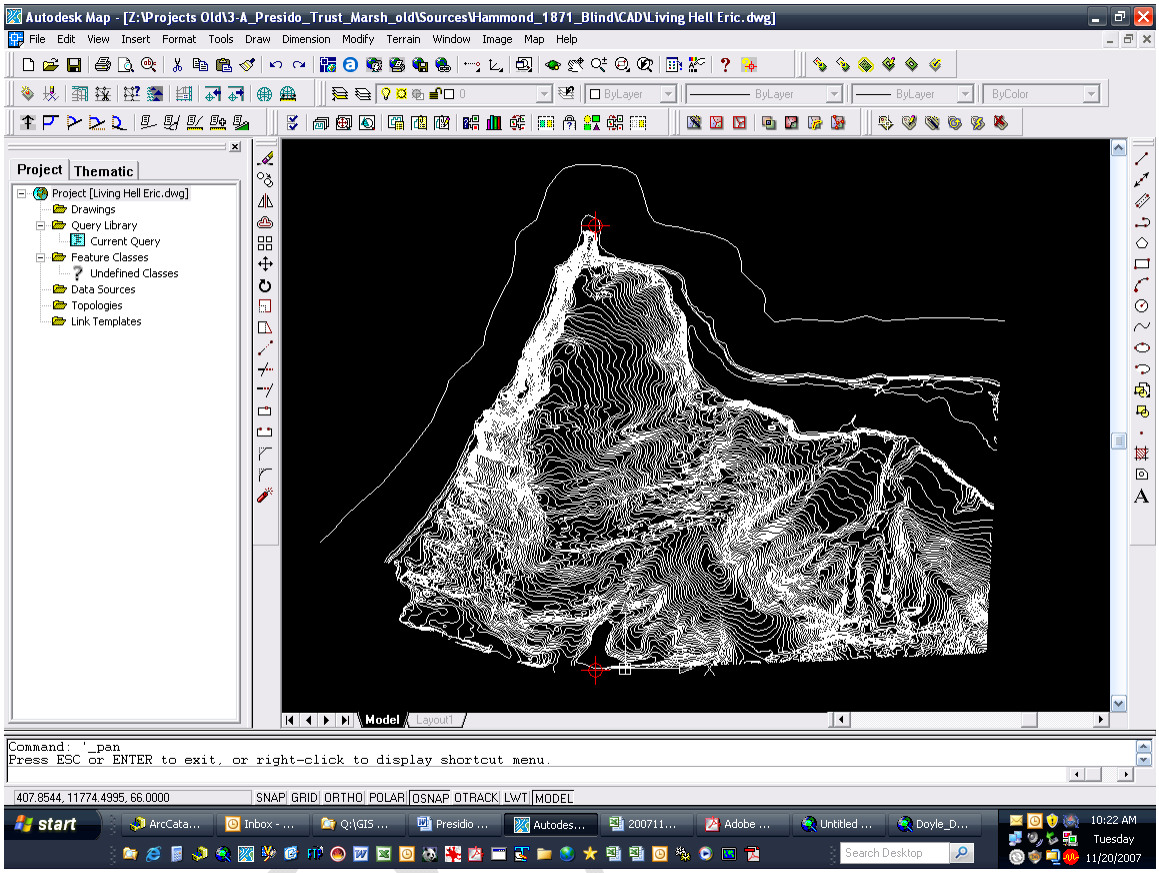
For digitization, the 1871 map was registered to an arbitrary coordinate system by choosing two points shown on the historic map which are known to exist today. These points are the stone monument just south of Mountain Lake and the south eastern corner of the Fort Point building. The historic map was scaled using the distance shown in modern mapping (8594.28ft) between these same two points. In AutoCAD the stone monument was set as the origin (0,0) of the grid and the Fort Point corner set at 8594.28 feet grid north of the stone monument.

1871 Digitization Registration Points for Initial Digitization of 1871 Map

Registration Points	Northing (Y) feet	Easting (X) feet
Mtn. Lake Stone Monument	0	0
Fort Point Bldg. SE Corner	8594.28	0

DRAFT

Screenshot of Digitized Hammond Hall Map in AutoCAD



*the original CAD drawing with registration points shown in red

Historic Vs. Modern Elevation Datum

In 2005, ground surveys conducted during archaeological excavations at the Presidio's West Battery recorded stationary battery features dating from the 1870's – 1890's. These same features were recorded on historic Army Corps of Engineers (USACE) plans and plans of the battery, and it's reasonable to assume the USACE used the same elevation datum thought the 1800's and early 1900's. Calibrating these data sources determined that the historic elevations were within 1 of each other when compared with the modern North American Datum of 1988 (NAVD88). The historic battery plans only report elevations to the nearest foot, thus the comparisons between the existing battery features in NAVD88 and their historic plan elevations are only good to the nearest foot.

The elevation reference is stated as the following on the 1871 historic map:

> *"The Place of reference of this Survey is that of the mark from which a map was complied by Lt. Thos H. Handbury under the direction of the Board of Engineers (USACE)for the Pacific Coast in 1870.*
>
> *It is 15.5ft below the level of the inside edge of the coping of the new sea wall. 8.6 feet below the level of the Coast Survey benchmark or 0.5ft below ordinary low water mark."*

Because the first two vertical references no longer exist, the value of the ordinary low water (OLW) mark was pursued. The modern datum Mean Low Water (MLW) is probably closest to the historic reference to ordinary low water and is defined by the National Oceanic and Atmospheric Administration as, "The line to which low water normally reaches under natural conditions, but not including droughts or severe meteorological conditions." http://www.csc.noaa.gov/ptd/glossary.htm

Tidal And Fixed Datums Commonly References At The Presidio Of San Francisco
(KAMMAN HYDROLOGY & ENGINEERING, INC. C2001)

(elevations in feet)
HIGHEST OBSERVED WATER LEVEL (01/27/1983) 8.87
MEAN HIGHER HIGH WATER (MHHW) 5.83
MEAN HIGH WATER (MHW) 5.23
MEAN TIDE LEVEL (MTL) 3.18
MEAN SEA LEVEL (MSL) 3.13
NATIONAL GEODETIC VERTICAL DATUM-1929 (NGVD) 2.84
MEAN LOW WATER (MLW) 1.13
PRESIDIO LOWER LOW WATER (PLLW) 0.20
NORTH AMERICAN VERTICAL DATUM-1988 (NAVD) 0.14
MEAN LOWER LOW WATER (MLLW) 0.00
LOWEST OBSERVED WATER LEVEL (12/17/1933) -2.67

So…

If MLLW = 0

1.13ft	MLW (approximate Ordinary Low Water from Historic Map)
-0.5ft	depth below Ordinary Low Water "place of reference" from historic map
0.63ft	MLW place of reference (0 elev) for historic map
-0.06ft	differential between MLW and NAVD88
0.57ft	NAVD88 place of reference (0 elev) for historic map

After calculating the estimated differential between the OLW and NAVD88 by it was decided that the measurement at West Battery was a more direct measurement than estimate. Therefore no correction was applied to either elevation system and the 1 foot of uncertainty in the West Battery measurements were accepted.

Historic Sea Level Rise

The U.S. Coast Survey tide station installed in San Francisco Bay, Calif., on June 30, 1854, is now being recognized for having produced a 150-year water level record — making it the longest continuous running series of tidal observations in the Americas. (source: NOAA)

From 3,000 years ago to the start of the 19th century sea level was almost constant, rising at 0.1 to 0.2 mm/yr.[1] Since 1900 the level has risen at 1 to 2 mm/yr; since 1993 satellite altimetry from TOPEX/Poseidon indicates a rate of rise of 3.1 ± 0.7 mm yr–1 (source: Widipedia)

DRAFT

Horizontal Registration of the Historic Map to Modern Coordinate System

The first step in producing the cut/fill model was to register the CAD file which existed in an scaled arbitrary coordinate system (CS) into the California State Plane, North American Datum of 1927 CS. This was done in ArcMap/ArcInfo using the spatial adjustment toolbar. An affine transformation was used to make an initial three point adjustment to the drawing file using carefully chosen current and historic boundary monuments and Fort Point.

Step 1 Affine Adjustment Control Points:

	Origin		Destination	
Point Name	X (arbitrary digitized grid)	Y (arbitrary digitized grid)	X (California State Plane NAD27)	Y (California State Plane NAD 27)
Mtn. Lake Stone Monument	0	0	1430774.83	474702.59
Old SE Boundary Corner (80ft east of current corner along southern boundary bearing)	7606.16	363.30	1437978.29	476355.32
SE corner of Fort Point building	0	8594.28	1429307.00	483207.00

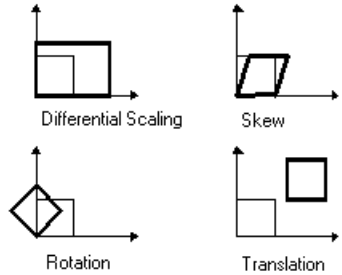
Affine Transformation: An affine transformation can differentially scale the data, skew it, rotate it, and translate it. The graphic below illustrates the four possible changes.

The affine transformation function is:

$x' = Ax + By + C \quad | \quad y' = Dx + Ey + F$

where x and y are coordinates of the input layer and x' and y' are the transformed coordinates. A, B, C, D, E and F are determined by comparing the location of source and destination control points. They scale, skew, rotate, and translate the layer coordinates. The affine transformation requires a minimum of three displacement links.

Affine Example Graphic:



Source: ArcMap/ArcInfo help file

DRAFT

After the affine transformation was applied a single rubber-sheeting control point was use used on the main post to adjust horizontal distortion still present and recognizable in the main post area.

Rubber-sheeting Control Points:

	Origin		Destination	
Point Name	X (affine result)	Y (affine result)	X (California State Plane NAD27)	Y (California State Plane NAD27)
Officers Club's Contour Adjustment	1434216.38	478383.87	1434343.43	478418.75

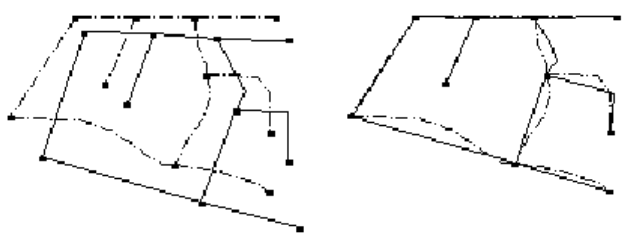
Rubbersheeting Transformation: Geometric distortions commonly occur in source maps. They may be introduced by imperfect registration in map compilation, lack of geodetic control in source data, or a variety of other causes. Rubbersheeting corrects flaws through the geometric adjustment of coordinates.

The source layer (drawn with solid lines) is adjusted to the more accurate target layer. During rubbersheeting, the surface is literally stretched, moving features using a piecewise transformation that preserves straight lines. Similar to transformations, displacement links are used in rubbersheeting to determine where features are moved.

The closer features are to displacement links, the further they will move. Locations that are known to be accurate, such as those that already match the target layer, can be held in place with another type of link called an identity link. Identity links "nail" down the surface at the specified point. Additionally, you can specify an area in which rubbersheeting occurs to further localize the adjustment.

Rubbersheeting is commonly used after a transformation to further refine the accuracy of the features to an existing layer or raster dataset.

Rubber Sheeting Example Graphic:



Source: ArcMap/ArcInfo help file

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Cut-Fill Analysis

The elevation contours for 2000 and the registered 1871 AutoCAD drawing were converted to a 2ft resolution raster digital elevation model (DEM) and overlaid in ArcMap. The raster math subtract tool was used in ArcINFO to subtract the 1871 DEM from the 2000 DEM resulting in the elevation differential (change) raster whose values for each 2ft cell represent the positive or negative change in elevation between 1871 and 2000.

Contours were then created from the cut/fill raster into 5' cut/fill change contours. Also coloration was applied to the cut/fill raster with red representing elevation loss and blue representing elevation gain to aid map users in the final map. Raster cells with less than two feet of positive or negative elevation change were removed from the coloration to smooth for local variation and noise and are represented as areas of no change.

Sources of Error in the Model:

1) Existing horizontal and vertical map error in the 1871 and 2000 map data.
2) Registration error of the 1871 map to modern coordinate system.
3) Tree canopy areas on the 2000 survey where the photogrammetrical mapping technician could not see the ground in aerial photos. Area may appear higher in the 2000 survey resulting in increased fill value in the model.

Areas of Known Problems:

1) South western area of the Presidio west of the Public Health Hospital and south of the Wherry Housing complex. It appears to be somewhat poorly mapped in 1871.
2) Highway One elevated roadway section east of the Kobby Housing area. Elevated contours in the 2000 roadway were not removed (accidentally) before running to model.

Field Observations vs. The Cut/Fill Model

No formal efforts have been made to field check the model, but it has been recognized by both the archaeological and the remediation departments at the Presidio Trust that the model generally follows what they've seen in the field. Several actual episodes of digging have the shown the model as correct.

Examples:

1) National Park Service archaeological excavations in 2006 for buried portions of Battery East directly to the west of the East Battery parking lot. Elevation change model showed that the top of the battery should be 19ft down below the current surface. The excavation showed it was buried 19 below the current surface.

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2) Test pits dug near the Nike Missile Silo area during a plant restoration project in 2007 on the west side of the Presidio correctly predicted discrete areas of cut and fill in all three of the pits.
3) Archaeological excavations near Building 39 on the main post found 3 feet of fill which the model correctly shows.
4) Model correctly shows all major remediation landfill sites in the Tennessee Hollow Area, West Bluff Area.

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APPENDIX C: ARCHAEOLOGICAL COLLECTIONS MANAGEMENT POLICY (CLEVENGER 2008)

Archaeological Collections Management Policy

prepared by

Liz N. Clevenger

Presidio Archaeology Lab
The Presidio Trust

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Statement of Purpose

The Presidio Archaeology Lab[1] (Lab) is a department of the Presidio Trust (Trust), a federal corporation established in 1996 by the United States Congress.[2] The Trust manages a portion of the Presidio of San Francisco in cooperation with the Golden Gate National Recreation Area (NPS-GOGA) and the National Park Service. The Presidio Trust is an independent federal agency, separate from the National Park Service (NPS) and the Department of the Interior (DOI).

The purpose of this collections management policy is to guide the collections and curation-related activities of the Lab. In doing so, this policy will assist the Lab in achieving its mission and in complying with federal laws and regulations that govern the curation of archaeological collections. Furthermore, it will assist the Lab in adhering to ethical, professional collections management standards and applying best practices of the field.

This policy formalizes and supersedes extant informal practices and procedures relating to archaeological collections management currently employed by the Lab.

Presidio Archaeology Lab Mission

As set forth in *Levantar*, the Trust's archaeological management strategy for the archaeological site of El Presidio de San Francisco, the Lab's mission is "to further the understanding and preservation of the significant aspects of our Nation's heritage as embodied in the archaeological resources of the Presidio of San Francisco for the benefit of current and future generations." The Lab aims to achieve this mission through the accomplishment of the following goals:

- Identify, investigate and conserve significant archaeological resources
- Conduct scholarly research and share the results
- Create a compelling destination for visitors to learn about archaeology and commemorate the cornerstone of this park— El Presidio de San Francisco
- Foster public and private partnerships and encourage stewardship through community participation and education
- Demonstrate leadership in the field of archaeology

Collections management and curation of archaeological artifacts is but a small portion of the Lab's programs, which include archival research and field work, ARPA permitting and other compliance actions, site preservation, education, and public outreach, in addition to collections management. However, because the Trust is a federal corporation, the Lab's archaeological collections are held in public trust; their proper care is necessary to fulfill the Lab's duty to the public. Furthermore, their continued curation is vital to our collective understanding of the Presidio's past. Through a combination of scholarly study, conservation, and documentation, the archaeological collections will continue to

[1] The Presidio Archaeology Lab is a joint physical facility of the Presidio Trust and the National Park Service that houses the Trust's archaeology program as well as a portion of the NPS's cultural resources program. For the purpose of this document, "Lab" refers only to the Presidio Trust archaeology program and staff.

[2] 16 U.S.C. § 460bb appendix

inform and be actively incorporated into all areas of the Lab's operations. These collections management activities address the Lab's goals and assist in fulfilling its mission as laid out in *Levantar* and described above.

More information about the Presidio Archaeology Lab and programs can be found online at http://www.presidio.gov/history/archaeology.

Statement of Authority

Presidio Trust Management

The Presidio Trust is governed by a seven-member board of directors. An executive director reports to the board and oversees staff with expertise in environmental restoration, historic preservation, operations and maintenance, landscape design, planning, resource management, real estate development, public affairs and programs, law, and finance.

More detailed information about the Presidio Trust and the Trust's managerial staff can be found online at http://www.presidio.gov/trust/.

Presidio Archaeology Lab Director

The Lab's operations are overseen by the Director of the Presidio Archaeology Lab (Lab Director), a supervisory-level historical archaeologist. The Lab Director coordinates all of the Lab's programs, including historical research, field work, collections, education, compliance, and site preservation; these programs are described in *Levantar*, the Lab's management strategy for archaeological resources in the Presidio. The Lab Director is ultimately responsible for the collections-related activities of the Lab, but delegates specific authorities and responsibilities to the archaeological collections staff. The Lab Director is authorized to act as the designated Federal Agency Official for the Presidio Trust in relation to archaeological collections management, per the definition set out in 36 CFR Part 79: Curation of Federally-Owned and Administered Archaeological Collections. The Lab Director is responsible for accession and deaccession decisions, and shares authority to approve or deny loans and collections access with the Archaeological Collections Specialist. The Lab Director reports on collections activities and other Lab programs to the Trust's senior management, including the Federal Preservation Officer.

Archaeological Collections Specialist

The Lab's archaeological collections staff uses collections management policies and procedures to carry out day-to-day tasks of collections management. Currently, the collections staff consists solely of the Archaeological Collections Specialist, who is responsible for the processing, preservation, monitoring, and physical care of the collections, along with administrative tasks including the preparation of accessions and deaccessions, loans, and other documentation. The Archaeological Collections Specialist sets the schedule for ongoing collections tasks a well as specific projects. The Archaeological Collections Specialist has the authority to make decisions regarding laboratory and collections procedures, and shares authority to approve or deny loans and collection access with the Lab Director. The Archaeological Collections Specialist is responsible for the preparation of an annual collections management report summarizing collections activities and compliance with the collections management policy. The Archaeological Collections Specialist is assisted in some duties by volunteers, interns, and contractors, though they have no responsibilities pertinent to this policy save for legal and ethical conduct.

Archaeologist

Although the Lab's staff archaeologist does not share any direct responsibility for collections management, s/he may accept field collections on behalf of the Lab, may suggest purchase of items for the collection, and may make incoming loan suggestions. S/he jointly decides on incoming loans and web-based collections content along with the Lab Director and the Archaeological Collections Specialist.

Federal Preservation Officer

The Trust's Federal Preservation Officer will provide guidance for Lab staff in the event a NAGPRA compliance situation arises. S/he reviews deaccession recommendations along with the Lab Director, although the Lab Director has final sole authority to make deaccession decisions. Finally, the Federal Preservation Officer will be consulted in the revision of this collections management policy.

Scope of Collections

The Lab's collections management program was designed to serve the needs of its compliance, field work, and research programs, which generate artifact collections. The collections management program provides for long-term curation of these collections compliant with federal laws and regulations such as the National Historic Preservation Act, the Archaeological Resources Protection Act, and 36 CFR 79 - The Curation of Federally-Owned and Administered Collections. As a result, the scope of the Lab's collections is restricted to archaeological resources recovered from Area B of the Presidio.[3] The Lab manages all archaeological assemblages recovered from Area B of the Presidio, regardless of whether the collection of the assemblage was made before or after the establishment of the Presidio Trust in 1996.[4] However, it is not within the scope or storage capacity of the Lab to act as a repository for non-archaeological collections or for archaeological collections which were not generated in Area B of the Presidio (Presidio). Minor exceptions are noted below and further described in the *Definition of Collections*.

Introduction to Collections

Collections included in the Lab's holdings are primarily archaeological assemblages related to the occupation and use of the Presidio by various cultures and groups over the last several thousand years. The items have been recovered from archaeological sites in the park, most notably from the site of El Presidio de San Francisco, Spain's northernmost military post in Alta California. Objects in the collections derive from a number of cultural periods in California's history, including Native California (to 1776 A.D.), Spanish Colonial (1776-1821), Mexican Republican (1821-1846), and United States Army (1846-1993) eras. The Lab's archaeological collections are generated primarily through research and resource management activities. Additionally, isolated finds are reported by park staff and members of the public.[5]

Materials in the archaeological collections include archaeological artifacts and associated documentation. Archaeological artifacts curated by the Trust number at least 500,000. There are approximately 1700 linear feet of artifacts and 50 linear feet of associated records. The archaeological artifact collections include both organic and inorganic artifacts, stable artifacts as well as those with a range of conservation needs, oversize artifacts requiring special storage, and potentially contaminated and off-gassing materials. Associated records include hard-copy field and lab records, reports, digital and print photographs and slides, other digital media and records, and miscellaneous project documents. The archaeological collections are used by a variety of audiences, including Lab staff, other Trust and National Park Service staff, professional colleagues, researchers, interns, volunteers and students. Current uses include comparative research, resource management, planning, exhibits, education, and other outreach.

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[3] Area B refers to the 1,168 acre parcel of land the Presidio Trust has jurisdiction over as laid out in the Presidio Trust Act. The Presidio Trust Management Plan describes land use policies for this area.

[4] For further discussion of this issue, please see the section on *Specific Legal Issues* at the end of this document.

[5] Not all artifacts reported as isolate finds or recovered from excavations at the Presidio are acquired or accessioned by the Lab. For more information refer to the *Acquisition and Accession Policy* (below) and the *Acquisition* and *Discard Guidelines* (in development).

In addition to these archaeological collections, a small number of isolate historic artifacts recovered in non-archaeological settings are also curated at the Lab; these artifacts are all recovered from buildings or locations on the Presidio of San Francisco. Finally, a small number of artifacts in the type collection may derive from non-Presidio sources, including artifacts from other archaeological sites and replicas from the commercial market. Methods of acquisition for all classes of objects are described in more detail in the *Acquisition and Accession* section, below.

Future Directions

The Lab will develop a more detailed Scope of Collections Statement (SOCS) which provides additional information on the nature and extent of the type of collections curated by the Lab which establishes minimum documentation standards for the collections. The SOCS will take into account themes outlined in the Research Design currently being prepared for the Main Post Planning District of the Presidio, which will be available as part of the Supplemental EIS for the Presidio Trust Management Plan. As part of this refined SOCS, the Lab will seek to minimize non-archaeological historic object holdings and will seek to identify and establish acceptable alternative procedures for the storage of such finds.

Definition of Collections

The Presidio Archaeology Lab curates the following types of collections:

Permanent Archaeological Collection

The permanent archaeological collection consists of archaeological assemblages and associated documentation generated via excavation at the Presidio of San Francisco by the Lab, its partners or contractors, which are completely cataloged and therefore ready for permanent curation. Artifacts and materials in these collections have been accessioned in accordance with the *Acquisition and Accession* policies, below. To be accessioned into the permanent collection, an assemblage must also be completely cataloged, have been culled of materials subject to the *Acquisition* and *Discard Guidelines* (in development), and must meet a strict level of documentation, including demonstrable provenience and research potential. These assemblages and associated documentation may be used for further research, exhibition, or interpretation. All of the policies subsequently outlined in this document are applicable to the permanent collection.

Type Collection

The type collection consists of accessioned objects used as reference items for research and advanced student training. These artifacts are archetypal examples of objects found (or likely encountered) during archaeological excavations on the Presidio or other material culture related to the occupation of the Presidio. They originate primarily from other Lab collections, but may also be purchased or donated, providing these actions conform to legal and professional ethical standards, and to the policies outlined in *Acquisition and Accession*, below. (For example, purchased artifact replicas or adequately documented materials donated through another institution's deaccessioning actions may be included in the type collection.) Objects in the type collection are cataloged using the prefix "REF." Removal of objects in the type collection from the Lab facility is discouraged, and must be approved by the Archaeological Collections specialist via a loan agreement. All of the policies subsequently outlined in this document are applicable to the type collection.

Non-Accessioned Archaeological Collection

The non-accessioned archaeological collection consists of artifact assemblages and associated documentation generated via excavation at the Presidio of San Francisco by the Lab, its partners or contractors, which are currently being processed and prepared for formal accession. These assemblages may be inventoried, cataloged, analyzed, researched and otherwise documented. These assemblages may be used for research, exhibition, or interpretation. They are subject to all of the policies laid out in subsequent sections of this document. Assemblages from the non-accessioned archaeological collection may be accessioned once cataloging is complete, the *Acquisition* and *Discard Guidelines* (in development) have been applied, and recommendations are made for which portions of a given assemblage should be permanently curated. Although they are not accessioned, the collection and care of these materials is nonetheless subject to applicable federal laws and codes of professional ethics.

Non-Accessioned Historic Object Collection

The non-accessioned historic object collection consists of three dimensional (3-D) objects related to the occupation and use of the Presidio, but not recovered through archaeological excavation. This collection includes items such as caches of objects discovered in and around historic buildings. These objects may be used for further research, exhibition, or interpretation. Because objects in the non-accessioned historic material collection are not formally accessioned they are therefore not subject to the policies set out in this document. Although they are not accessioned, the collection and care of these materials is nonetheless subject to applicable federal laws and codes of professional ethics.

Education Collection

The education collection consists of objects suitable for consumptive use in K-12 educational programming and other public outreach. This collection may include artifact reproductions (i.e. plaster and plastic casts of real artifacts), replica artifacts (e.g. modern, non-artifactual flaked stone, majolica, or faunal remains), and artifacts which are disposed from the Lab's permanent and non-accessioned archaeological collections. The Archaeological Collections Specialist and the Lab Director must approve objects for inclusion in the education collection. Objects in this collection are cataloged using the prefix "EDU." Objects in the education collection are not accessioned and therefore are not subject to the policies set out in this document, with the exception of the acquisition policy described in the *Acquisition and Accession* section, below. The education collection is managed jointly by the Lab's collections and education staff.

Library Collection

The library collection consists of print and digital materials used for reference by Lab staff, volunteers, interns, partner organizations and contractors. The library collection does not include associated documentation for artifact assemblages, which is included in the permanent and non-accessioned archaeological collections. Reference materials in the library collection are generally related by geographic, subject, material, disciplinary, or theoretical theme to the archaeology and history of the Presidio. Materials in the library collection are not accessioned and therefore are not subject to the policies set out in this document.

Future Directions

During the first routine revision of this policy, these collection definitions will be evaluated and revised as necessary. The Lab will also seek to minimize non-archaeological historic object holdings and will seek to identify and establish acceptable alternative procedures for the storage of such finds.

Acquisition and Accession

The Lab acquires collections in order to further the understanding and preservation of the Presidio's unique archaeological resources. All objects must be acquired with the scope of collections, goals, and mission of the Lab in mind. The Lab acquires objects through primarily through field collection, as a result of field work, research, and compliance actions. In special instances, objects may be acquired through donation or purchase. These methods of acquisition are described in more detail below; each section details the type of collection as well as any special considerations for acquisition. Acquisitions may be accepted by the Lab Director, Archaeologist, and Archaeological Collections Specialist. Acquired objects which are not accessioned by the Lab may be disposed of using the options provided in the section *Methods of Disposal*, below.

The act of acquiring an object does not imply that it will be accessioned by the Lab. However, all acquired objects are evaluated for accession and permanent curation using the *Criteria for Accession*, below. Accession recommendations then are made by the Archaeological Collections Specialist to the Lab Director, who is vested with the authority to approve or deny accession recommendations.

The Archaeological Collections Specialist will maintain records of all acquisitions and accessions. All acquisitions and accessions made by the Lab will follow relevant collections management policy, written procedures for carrying out policy, and federal law governing collections management.

Methods of Acquisition

Field Collection. In most instances, objects which are acquired by field collection are generated by archaeological excavations in area B of the Presidio. These excavations are permitted by the Trust under the auspices of the Archaeological Resource Protection Act and Section 106 of the National Historic Preservation Act. These excavations may be carried out by Trust staff, academic and other partner organizations, or contractors. A very small percentage of field collections are isolate objects recovered in the Presidio independently by park staff performing their duties or by members of the public; these isolates are turned over to the Lab for curation.

Field collections from the Presidio are the property of the United States government because they originate on federal land. As a result, clear title exists for all such field collections, provided that appropriate documentation exists to authenticate their origins and provenience. Where field collections result from the actions of a partner organization or contractor, contractual documents will include language that clearly indicates the federal government's legal ownership of the physical collections and associated documentation.

Field collections are accepted at the Lab by the Lab Director, Archaeologist, or Archaeological Collections Specialist, and a written acknowledgement of their receipt is generated by the Archaeological Collections Specialist.

Purchase. Certain types of objects may be acquired through purchase for the type or education collections. Lab staff must be explicitly aware of professional standards guiding ethical conduct with respect to trade in historic and archaeological objects, in particular the 1970 UNESCO Convention on the Means of Prohibiting and Preventing the Illicit Import, Export and Transfer of Cultural Property. Under

no circumstances are artifacts recovered from archaeological excavations to be purchased by any member of Lab staff. For more guidance, refer to the *Ethics* section of this document.

Suggested purchases must be limited to reproduced (i.e. cast) artifacts or modern replicas. Purchase suggestions may be made by the Archaeological Collections Specialist or Archaeologist. All purchases must be approved by the Lab Director.

The following criteria apply to purchased objects:

- The object must not originate from an archaeological excavation.
- The object must be well-documented, including demonstrable non-archaeological origin or provenance.
- The objects must be of geographic, subject, or other thematic relevance to the Presidio, as outlined in the *Scope of Collections*.
- The objects must be relevant to the uses outlined in the *Definition of Collections* for the type collection.
- Purchase of the object must not violate the 1970 UNESCO Convention or other laws and professional ethical guidance governing the trade of antiquities.

Donation. Objects which are donated to the Presidio Archaeology Lab may be acquired for the type or education collections. Donations may consist of, but are not limited to, objects deaccessioned by other institutions or objects from personal collections, provided that the donor is able to demonstrate ownership and other documentation of the object. Potential donations are reviewed by the Archaeological Collections Specialist, but the final decision regarding acquisition and acceptance must be made by the Lab Director.

The following criteria apply to donations:

- The donor must be able to demonstrate ownership of the object(s).
- The donor must be able to provide at least minimal documentation of the objects, including location of discovery or collection, provenience, and any related documentation.
- The donor must agree to donate the object(s) free of restrictions, including future use, exhibit, deaccession, or disposal.
- The object(s) must be of geographic, subject, or other thematic relevance to the Presidio, as outlined in the *Scope of Collections*.
- The object(s) must match the themes and uses of the type collection as outlined in the *Definition of Collections*.
- Acquisition of the object must not violate the 1970 UNESCO Convention or other laws and professional ethical guidance governing the trade of antiquities.

Criteria for Accession

The following criteria apply to all objects under consideration for accession by the Lab on behalf of the Presidio Trust:

- The object(s) must be relevant to the Lab's mission and goals as outlined in *Levantar*.
- The object(s) must fit the themes outlined in the *Scope of Collections*.

- The Lab's *Acquisition* and *Discard Guidelines* (see *Future Directions,* below) must be applied to the object(s) under consideration for accession.
- The object(s) must have documented provenience and meet the minimum requirements for archaeological association and documentation as outlined in the *Definition of Collections.*
- Except in extenuating circumstances, the object(s) must have demonstrably originated from an approved, NHPA or ARPA-permitted excavation on the Presidio.
- The object(s) must be completely cataloged.
- The object(s) must be evaluated for NAGPRA applicability.
- The quantity and volume of objects to be accessioned must be evaluated for redundancy against the Lab's current holdings.
- The quantity and volume of objects to be accessioned must be evaluated with regard to long-term collections management concerns, including material stability, potential conservation requirements, and cost of storage.
- The object(s) can be curated in compliance with professional standards outlined in 36 CFR Part 79: Curation of Federally-Owned and Administered Archaeological Collections and by the Society for Historical Archaeology Standards and Guidelines for the Curation of Archaeological Collections.

Native American Graves Protection and Repatriation Act Compliance

The Lab will not knowingly acquire or accession artifact(s) or collection(s) protected by the Native American Graves Protection and Repatriation Act (NAGPRA). In the event that an approved excavation generates NAGPRA-eligible collections, the Lab staff will develop and follow measures to comply with NAGPRA under the guidance of the Federal Preservation Officer. A history of NAGPRA compliance for Presidio collections that precedes the establishment of the Presidio Trust is maintained on file at the Presidio Trust Library. Additional information is available in the *NAGPRA Compliance History* section, below.

Future Directions

The Lab will develop *Acquisition* (or *Field Collection*) and *Discard Guidelines* designed to guide the collection and retention of archaeological materials in light of the legal and ethical responsibilities of the Presidio Trust.

Deaccession and Disposal

The Presidio Archaeology Lab may occasionally dispose of or deaccession objects it has acquired or accessioned. Reasons for deaccession or disposal may include incompatibility of use or theme as outlined in the *Levantar,* the *Scope of Collections*, the *Acquisition* and *Discard Guidelines* (in development), or the *Research Design for El Presidio and the Main Post*. Additionally, collections management concerns such as redundancy or material instability may lead to deaccession or discard. Effort will be made to repurpose deaccessioned items for use in other Presidio Archaeology programs, such as education or interpretation.

Potential deaccessions must be evaluated using the *Criteria for Deaccession* outlined below.[6] The Archaeological Collections Specialist may make suggestions for deaccession and disposal to the Lab Director. The Lab Director reviews these recommendations in conjunction with the Presidio Trust's Federal Preservation Officer. However, the Lab Director has the sole final authority to make deaccessioning and disposal decisions. Deaccessioned objects may be disposed of in a number of ways, outlined below in *Methods of Disposal.* The Archaeological Collections Specialist will maintain records of all deaccessions and disposals.

All disposals and deaccessions made by the Lab will follow relevant collections management policy, written procedures for carrying out policy, and federal law governing collections management.

Criteria for Deaccession

The following criteria apply to all objects under consideration for deaccession by the Lab on behalf of the Presidio Trust:

- The object(s) are found to be inconsistent with the Lab's mission and goals outlined in *Levantar*.
- The object(s) are found to be inconsistent with the themes outlined in the *Scope of Collections*.
- The object(s) are found to be inconsistent with the purposes outlined in *Definition of Collections*.
- The object(s) lack documented provenience and fail to meet the minimum requirements for archaeological association and documentation as outlined in the *Definition of Collections.*
- The object(s) or object type is slated for discard or non-collection under the *Acquisition* and *Discard Guidelines* (in development).
- The object(s) are redundant in the permanent collections.
- The object(s) have minimal research, exhibit, or interpretive value.
- The object(s) have been found to pose long-term collections management problems, including conservation problems, deterioration/instability, hazardous materials contamination, and other associated costs or risks to other collections holdings or to Lab staff.
- The object(s) have been determined NAGPRA-eligible.

[6] Non-accessioned objects are not subject to the *Criteria for Deaccession*; they may be discarded and slated for disposal using the Lab's *Acquisition* and *Discard Guidelines* (in development). The *Methods of Disposal* do apply to non-accessioned objects.

Methods of Disposal

The following methods may be used for disposal of deaccessioned materials:

- Transfer to an appropriate tribe under NAGPRA.
- Transfer to the Lab's educational collection for hands-on use in K-12 educational programming.
- Transfer to another appropriate institution, such as a repository, park, museum, scientific or educational institution.
- Repurpose for use in archaeological landscaping (e.g. used for fill in paving) or for use in art.
- Destroy or dispose in municipal trash. [The Lab will seek to destroy or dispose of deaccessioned material in the municipal trash only as a last resort.]

Preservation

Preservation of archaeological collections is a central tenet of the Presidio Archaeology Lab's mission. Professional collections care will be directed and documented by the Archaeological Collections Specialist, and carried out with the help of Lab interns, volunteers, and contractors. This section lays the groundwork for preservation and collections care, including environmental control, integrated pest management, artifact conservation, disaster preparedness, artifact handling, preservation education, data migration, and collection reformatting. The Lab will adhere to federal and professional standards for collections care, including guidance laid out in 36 CFR Part 79: Curation of Federally-Owned and Administered Archaeological Collections and by the Society for Historical Archaeology Standards and Guidelines for the Curation of Archaeological Collections.

Environmental Control

The Lab will monitor temperature and relative humidity of all collection storage and exhibition areas. The Lab will strive to control dust and ambient light to the extent possible in the current storage and exhibition areas. Plans for a new laboratory and storage facility will take into account the need for better environmental control, including a central HVAC system and limited and/or UV-filtered lighting.

Integrated Pest Management

The Lab will work with Trust pest control staff to develop an integrated pest management plan (IPMP) for the Lab facility, collections storage and exhibit areas.

Artifact Conservation

Artifact conservation needs within the Lab's collections will be identified. Priorities will be established for both preventative and remedial conservation needs. The Lab will maintain its current capability to conduct on-site conservation of limited material types, and will explore additional on-site conservation capacity. Freezers and refrigerators will be maintained for use in conservation projects, including long term storage of some organic and waterlogged materials. Other conservation needs will be met through outside contract. Records will be kept by the Archaeological Collections Specialist to document all conservation treatments.

Disaster Preparedness

Ensuring the proper care of collections in the face or wake of a disaster is a crucial part of professional, ethical collections management. The Lab is situated in a major urban city which may be prone to urban, human disasters, and is also located in a geographic environment where earthquakes are prevalent and other natural disasters, such as flooding and tidal waves, are potential threats.

Toward these ends, the Lab will develop and maintain a disaster preparedness plan that seeks to establish preventative precautions for both natural and human disasters, and which also provides procedures to follow in the event of a disaster, including mitigation measures to resolve threats to the collection. The Lab's disaster preparedness plan will augment but not supersede other life, health and safety plans developed by the Trust.

Artifact Handling and Preservation Education

All persons granted physical access to the Lab's collections, including Lab staff, will be trained in the proper handling of archaeological and historic artifacts. Lab staff will also be educated on the theory, policy, and methods of preservation. All persons granted physical access to the Lab's collections will read and sign an *Artifact Handling Guidelines and Procedures* form.

Collection Reformatting and Data Migration

The Lab's collections have been processed by a number of different organizations using various standards for cataloging, packaging, and labeling. The Archaeological Collections Specialist will develop standardized laboratory procedures and identify priorities for reformatting older collections to match these new standards. The Archaeological Collections Specialist will document all instances of collection reformatting.

Digital data migration, including collections management files and associated documentation, will be managed by Lab staff, including the Archaeological Collections Specialist and GIS Specialist. They will establish a schedule and procedures for reformatting and migrating digital data in order to maintain or improve its accessibility. The Trust's IT Department will provide or recommend additional technical support for Lab staff.

Collections Information

The ongoing curation of archaeological collections held by the Presidio Archaeology Lab is vital to our collective understanding of the Presidio's past. As a part of this process, the Lab maintains documentation relating to the creation, acquisition, character, and management of the collections it curates. This documentation serves legal, research, and educational purposes. The documentation maintained by the Lab establishes ownership and demonstrates appropriate stewardship of the collections. It also increases their accessibility to and usability by the public.

The Lab maintains several different levels of documentation to ensure the appropriate curation of its collections. General collections management files are maintained for the holdings of the Lab; these include but are not limited to an Acquisition Log, Accession Register, Collections Summary, Collection Inventories, Conservation Log, and Outgoing Loan Log. Specific collections management files are also generated for individual collections; these include but are not limited to Acquisition and Accession Receiving Reports, Finding Aids, and Digital Catalogs. All of the collections management files are maintained by the Archaeological Collections Specialist, and are updated regularly. Paper copies are stored at the Lab facility, and digital copies are maintained on a server which is backed up routinely by the Trust's IT Department.

The collections management files maintained by the Lab document the following:

- origin and nature of acquisitions and accessions
- description, condition, and inventory of collections upon accession
- storage location for all collections
- project and processing history for individual collections

Furthermore, their routine maintenance demonstrates and ensures:

- professional collections management and collections stewardship
- sustainability of collections management program

In addition to these collections management files, the Lab also curates associated documentation for each collection, which may include but is not limited to field notes and field forms; lab forms; original artifact catalogs; photographs, slides, and other visual media; GIS and other digital data; project reports and other unpublished (grey) literature; administrative documents including permits and contracting documents. Associated documentation for all collections is housed at the Lab's facility in a set location and is accessioned as part of the permanent collection. The Archaeological Collections Specialist is responsible for the maintenance and care of associated documentation.

Future Directions

A single database will be developed to perform integrated data management for artifact catalogs and collections management tasks and increase the accessibility of digital data for both Lab staff and the public. Associated documentation will be organized and archived in a manner that facilitates its access and preservation. Appropriate collections information will be digitized and made available online for research purposes (see also *Access*, below). Hard copies of associated documentation and collections

management files will be made and stored in an off-site facility as a backup measure. Methodology for the backup of digital data will be developed in conjunction with the Trust's IT department. The Archaeological Collections Specialist is responsible for leading these improvements.

Inventory

As a part of collections management activities undertaken to ensure the proper curation of its collections, the Lab conducts routine inventories of its holdings. These inventories establish accountability for the Lab, ensuring the proper, professional care of the collections it holds in public trust. Routine inventories will be directed and documented by the Archaeological Collections Specialist, and performed in conjunction with other Lab staff, interns, volunteers, and contractors.

Two types of inventories are conducted by the Lab:

- A biannual Shelf Inventory provides up-to-date maps of the Lab's storage areas. It records the shelf number and the name of the collection(s) stored on that shelf.
- An annual Box Inventory maintains more detailed collection records. It will record, for each artifact box, the relevant shelf number, collection name, and contents.

Future Directions

Pending complete cataloging and integrated data management, a third type of inventory will be developed and implemented. This inventory will be an audit, performed every five years, which requires Lab staff to locate specific artifacts within the collections, report on their status, and keep detailed records of any problems encountered in the audit process. The Archaeological Collections Specialist is responsible for leading these improvements.

Risk Management and Security

In order to properly maintain and preserve the Presidio Trust's archaeological collections, the Presidio Archaeology Lab will seek to provide a safe, secure collections storage environment. A secure environment is created through the combination of physical measures and Lab policy regarding facility access.

The current Lab facility is a World War I warehouse which encompasses offices, collections storage, exhibition and processing areas. The facility is equipped with a life-safety system that includes alarm and fire suppression systems. The fire suppression system was upgraded in 2005 and consists of fire detectors and water sprinklers throughout the building. The Presidio Fire Department makes annual inspections of the lab building, including the fire suppression system.

Building access, including the collections storage areas, is available during working hours. During non-work hours, access to the building is controlled via a motion-detecting alarm system, installed in 2005. The Lab Director makes decisions about after-hours building access and delegates distribution of access codes and monitoring of personnel with access to the Archaeological Collections Specialist. It is Lab policy that unpaid staff, interns, volunteers, and non-archaeological staff of the Presidio Trust and NPS will not be granted independent access to the Lab. The exception is that certain Life, Health and Safety personnel, including the United States Park Police (Park Police) and the Presidio Trust Duty Officer retain Lab keys and alarm codes for emergency purposes. The building alarm is monitored by the Park Police, who are required to respond in person to any event that triggers the alarm. The Park Police also maintain a file with personnel who have after-hours access to the building.

An evaluation of the current Lab facility was conducted by the U.S. Army Corps of Engineers (USACE) Mandatory Center of Expertise for the Curation and Management of Archaeological Collections (MCX-CMAC) in 2005. Their findings indicated that the current facility is substandard for the purpose of collection repository and is not compliant with federal laws and regulations. In particular, the building lacks both physical security and environmental control in collections storage areas and is not ADA-accessible in public areas. Physical improvements to the facility necessary to bring it into compliance were estimated in the hundreds of thousands of dollars.

Future Directions

The Trust will either (1) identify a new facility for collections storage that is compliant with applicable federal laws and regulations or (2) identify funds to bring the current facility in compliance as identified in the USACE report. New facility plans will take into account the standards for collection repositories, and will consolidate collections storage areas and provide proper physical and environmental security for these areas.

In the interim, additional measures aimed at increasing the safety and security of the collections will be made as feasible. These may include but are not limited to programmatic improvements including the development of policies such as this document, an IPMP, and a disaster preparedness plan, and physical improvements such as increased security measures for artifacts on display in public areas and an environmental monitoring program. The Archaeological Collections Specialist is responsible for leading these improvements.

Access

Access to the collections curated by the Lab must balance the need for the preservation of the collections with the Lab's mission to benefit current and future generations through scholarly research, stewardship, and education. Both physical and virtual access to the collections will be granted to the extent possible, while ensuring and prioritizing the safety and security of the collections and associated documentation. The Lab views digital access and the exhibition of artifacts as the best methods for increasing public access to the collections while maintaining the safety and security of the collections so that they will continue to be preserved and remain accessible to future generations.

Physical Access

Physical access to all collections and associated documentation is restricted, and requests for access must be submitted in writing to the Archaeological Collections Specialist. Requests for access may be approved or denied by the Archaeological Collections Specialist, except in special instances as outlined in *Collections Uses*, below. Individual collection finding aids provide detail on any additional access or use restrictions. Access to the collections is granted for approved uses only, as outlined in the *Collection Uses* section; these uses span a breadth of activity from scientific research to traditional cultural use.

On-site access may be made available at the Lab facility. Off-site access is only available through a formal loan with an approved institution or individual (see *Loans*, below). All individuals granted physical access to the collections will be trained in proper artifact handling and Lab procedures by the Archaeological Collections Specialist. All instances of physical access will be documented by the Archaeological Collections Specialist.

Virtual Access

Virtual access to some collections and associated documentation will be made possible through the development of online finding aids, artifact catalogs, photograph databases, and interpretive materials. Access to certain information may be limited or restricted from public viewing, such as locational information and certain artifact classes. The content of web-based collections information will be determined by the Lab Director, Archaeological Collections Specialist, and Archaeologist, and in certain instances, the Education Coordinator. The Lab Director has the ultimate authority for approving or denying web-based collections decisions. Additional access is made possible through the exhibitions at the Lab facility and other Trust venues.

Collection Uses

The Lab's collections may be used to achieve the Lab's goals, including scholarly research, information dissemination, education, and outreach. Use of the collections curated by the Lab must balance these goals with the mandate for long-term preservation of the collections. Oversight and enforcement of approved collection uses is the responsibility of the Archaeological Collections Specialist. All individuals granted physical access to the collections will be trained in proper artifact handling by the Archaeological Collections Specialist; persons performing research will also be trained in laboratory procedures. The Lab Director must approve all requests to access and use the collections for consumptive use, external exhibition, and reproduction.

Research

Research and scholarly utilization of the Lab's collections forms the majority of their use. Lab staff, interns, volunteers, partners, and contractors may use the collections for research. Access, including loans, must be arranged according to the policies set out in the *Access* and *Loans* sections of this document. Research results and data acquired must be provided to the Lab under the conditions outlined in the *Intellectual Property Rights Management* section, below. All research publications must credit the Presidio Archaeology Laboratory per the *Intellectual Property Rights Management* section.

Consumptive Use

Consumptive use (i.e. destructive analysis) of archaeological collections can be an important part of scientific research, providing significant data that justifies the judicial and partial destruction of artifacts. Consumptive use requests will be considered individually and must be submitted in writing to the Lab's Archaeological Collections Specialist. Appropriate background material, including a research design and methodology, must be supplied to the Lab along with the request. Consumptive use of any portion of any collection curated by the Lab must be expressly authorized in writing by the Lab Director and concurred by the Archaeological Collections Specialist. Artifacts that will be damaged or destroyed will be carefully documented prior to consumptive use, per the Lab's guidance. Results of and data acquired during destructive analysis must be provided to the Lab under the conditions outlined in the *Intellectual Property Rights Management* section, below. All research publications must credit the Presidio Archaeology Laboratory per the *Intellectual Property Rights Management* section.

Education

Artifacts from the Lab's collections may be used in limited circumstances for educational purposes. The Type Collection may be used in a hands-on manner to train advanced interns and volunteers, but is not appropriate for use with K-12 educational programming or other public outreach. Use of objects from the Permanent and Non-Accessioned Collections in education is restricted to the creation of facsimiles, either replica objects or photographs of artifacts from these collections.

Digital information associated with the Permanent and Non-Accessioned Collections may be freely used in education, with restrictions as outlined in the *Access* section, above. Artifacts on exhibit may also be available for educational purposes.

The Lab maintains a collection of artifacts (Education Collection) for hands-on use in K-12 educational programming, but this collection is not part of the formal collections of the Lab and is not subject to the policies laid out in this document.

Traditional and Cultural Use

Artifacts from the collections will be made available for non-consumptive traditional or cultural use by groups culturally affiliated with both the pre- and post-contact habitation of the Presidio. Traditional and cultural use requests will be reviewed on an individual basis, and will be approved or denied by the Lab Director, and concurred by the Archaeological Collections Specialist.

Exhibition

Artifacts from the collections may be used for exhibition in Presidio Trust venues that can demonstrate secure, pest-free display options. Such internal exhibitions are not subject to loan policy, but require documentation of the temporary removal of artifacts from collections storage. External exhibit requests may be articulated via loan request, which must be submitted in writing to the Archaeological Collections Specialist. External exhibit requests are reviewed on an individual basis following the policy set out in the *Loans* section, below, and will be approved or denied by the Lab Director and concurred by the Archaeological Collections Specialist.

Reproduction

Artifacts from the collections may be photographed or physically reproduced on a limited basis. Access requests must describe any intent to create reproductions, as well as reproduction methodology. Destructive or damaging reproduction methods will not be approved. The requestor assumes responsibility for any loss, damage or destruction that occurs during the reproduction process. Reproductions must be financed and arranged for by the requester. Reproduction requests will be reviewed on an individual basis and will be approved or denied by the Lab Director and concurred by the Archaeological Collections Specialist. All reproductions must credit the Presidio Archaeology Laboratory per the *Intellectual Property Rights Management* section, below.

Commercial Use

Artifacts from the collections may be used for commercial purposes on a limited basis. Access requests must describe any intent of commercial use. The requestor assumes responsibility for any loss, damage or destruction that occurs during the use of the collections. Commercial use requests will be reviewed on an individual basis, and will be approved or denied by the Lab Director, and concurred by the Archaeological Collections Specialist. All commercial use must credit the Presidio Archaeology Laboratory per the *Intellectual Property Rights Management* section, below.

Future Directions

During the first routine revision of this policy, these categories of use will be evaluated and revised as necessary.

Loans

Loans of collections curated by the Presidio Archaeology Lab must balance the need for the preservation of the collections with the Lab's mission to benefit current and future generations through scholarly research, stewardship, and education. As part of its mission to preserve artifacts in the public trust, the Lab may make loans of artifacts to qualified individuals or organizations for research or exhibition. Loans will be granted to the extent possible, while ensuring and prioritizing the safety and security of the collections and associated documentation. Management of the loan process is the responsibility of the Archaeological Collections Specialist, who oversees all applications for and administration of loans.

This policy supersedes all previous loan agreements including any currently outstanding loans.

Incoming Loans

Incoming loans will generally not be sought by the Lab except under special circumstances for major exhibitions. Incoming loans requests may be suggested by the Archaeological Collections Specialist, Archaeologist, or Lab Director, and must be concurred by all three parties.

Outgoing Loans

Collection objects may not be removed from the Lab facility without an approved loan agreement, except in the case of exhibition in other Presidio Trust venues (see *Collection Uses* for more information).

All applications for loans must be submitted in writing to the Archaeological Collections Specialist at least 30 days prior to the requested initiation date. Applications must include detailed information about the borrowing institution, the purpose of the loan and an accompanying research design and/or contractual document, the objects to be loaned, insurance information, and shipping and packing information. Loan agreements will be approved or denied by the Lab Director and concurred by the Archaeological Collections Specialist. The initial loan agreement will not exceed one year in length.

Loan extension requests must be submitted in writing to the Archaeological Collections Specialist 45 days prior to the original loan termination date. The Archaeological Collections Specialist and the Lab Director will jointly approve or deny extension requests. Up to two extensions of one year each may be approved. Artifacts on extended loan may be recalled by the Lab at any time with 15 days written notice.

Loans may be negotiated as part of contractual or agreement documents for excavation or research projects performed by the Trust's contractors or partners. In all cases, a separate loan form must be filled out and submitted to the Lab for approval as outlined above.

Criteria for Outgoing Loans

Outgoing Loans Applications must meet the following criteria in order to be considered for approval:

- The borrower must hold an advanced degree in Archaeology, Anthropology, or a related discipline, or must be co-sponsored by a qualified individual or institution. Qualified institutions include but are not limited to research organizations, museums, curation facilities, federal agencies, and other scientific or educational institutions.
- The stated purpose of the loan must be consistent with the Lab's mission and goals outlined in *Levantar* and with the themes outlined in the *Scope of Collections*.
- The stated purpose of the loan must be consistent with appropriate uses as outlined in *Collections Uses*.
- The loan application will include a research design or exhibit plan with specific methodology for artifact handling, transportation, exhibition, and analysis, as appropriate.
- The loan application must stipulate intent to perform destructive analysis or to create reproductions, as outlined in the *Collections Uses* section, above.
- The borrower must read and comply with the approved uses of collections as outlined in the *Collections Uses* section and follow any guidelines applicable to their intended use of the artifact(s) on loan.
- The borrower agrees to give credit to the "Presidio Archaeology Lab" and the "Presidio Trust" in all published or formally presented work, including exhibitions and conference presentations.
- The borrower agrees to return to the Lab all artifacts, original associated documentation, and copies of new materials, samples, and documentation, published or unpublished, produced under the loan agreement (e.g. thin sections, material samples, artifact catalog, photographs, reports, papers, dissertations, articles, posters, etc.).
- The borrower will read and comply with the policies outlined in the *Intellectual Property Rights Management* section, below.
- The borrower will be trained in proper artifact handling and Lab procedures by the Archaeological Collections Specialist.
- The borrower or borrowing institution assumes full responsibility for loss, damage, or destruction of the artifact(s).
- The borrower will not, under any circumstances, clean, conserve, label, or intentionally alter the artifact(s) in any way unless written approval is granted by the Archaeological Collections Specialist.
- The borrower will not make loans of any Lab collection to a third party for any purpose, including scientific analysis. All desired third party loans must be executed directly between the third party and the Lab.

Future Directions

The Archaeological Collections Specialist will enforce compliance with this policy by following up with borrowers of all current and outstanding loans. Copies of this policy will be provided to all borrowers, who will be given 45 days to comply with this policy from the date of notification.

Intellectual Property Rights Management

Managing property rights associated with the Presidio Archaeology Lab's collections, including physical and intellectual property ownership, is a crucial step in the Lab's collections management process. Appropriately managed and understood property rights are necessary to provide public access to the collections in a manner that is mutually agreeable to the public and to the Trust and which allows maximum accessibility of the collections for public benefit.

The archaeological collections managed by the Lab are the property of the federal government of the United States of America. The Trust, and by proxy the Lab, assumes responsibility for managing these collections in a legal, ethical, and professional manner. The collections and all data generated by the Lab are owned by the federal government and managed by the Lab on behalf of the Trust and the United States government.

The Lab will strive to make all non-sensitive collections and collections data as accessible to the public as possible, through the development of virtual access such as online artifact catalogs, photo databases, and other outreach and educational tools.

The Lab reserves shared rights to all data generated by excavations, loans, contracts, agreements, or other actions permitted or facilitated by the Trust.

Notice of publication must be given to the Lab for all documents which make use of materials or data provided by the Trust, or which derive from projects permitted or facilitated by the Trust. The Lab reserves the right to approve such documents. The "Presidio Archaeology Lab" and "The Presidio Trust" must receive credit in such documents. The Lab does not imply ownership of such documents nor their contents, which are the property of the respective author(s).

Future Directions

As a part of the first routine revision of this policy, intellectual property rights will be revised and strengthened.

Specific Legal Issues

The Presidio Archaeology Lab and its archaeological collections management program face a number of specific legal issues special to federal agencies, to archaeological repositories, and very particular to the Presidio Trust. The sections below explain these legal issues and requirements in more detail.

Federal Laws and Regulations

Because the Presidio Trust is a federal entity, a number of pieces of legislation and regulation must be adhered to in the course of archaeological collections management. These include

Antiquities Act of 1906
National Historic Preservation Act
Archaeological Resource Protection Act
Archaeological Data Preservation Act
National Environmental Policy Act
Native American Graves Protection and Repatriation Act
Curation of Federally-Owned and Administered Collections
The Presidio Trust Act

This Collections Management Policy serves to provide direct guidance for adhering with these laws and regulations. The Lab Director has ultimate responsibility for enforcing compliance with these laws and regulations.

Presidio Trust Management Plan

More specific mandates are also provided by the Presidio Trust Management Plan (PTMP). Sections 1.4 (Protect archeological resources for future research and interpretation) and 1.5 (Preserve significant Presidio collections and existing significant objects in the landscape) detail a number of necessary actions, including cataloging, storing, displaying, conserving and managing Presidio collections. These sections are reproduced in Appendix A, below. The PTMP also specifically cites 36 CFR 79 – Curation of Federally-Owned and Administered Collections as the guiding document for federal collections management.

In addition, the PTMP mentions Presidio Trust and National Park Service collaboration with regard to the management of archaeological resources and collections, but it fails to lay out any specific advice or parameters for the collaboration, save that "the Trust and the NPS will develop an agreement for management of Presidio collections that ensures the preservation of, and public access to, Presidio artifacts" (PTMP 1.5). Since the PTMP was adopted in 2002, no progress has been achieved with regard to establishing a formal agreement with the NPS for archaeological collections management. The working relationship between the NPS and Trust archaeology and collections management staff fails to adequately provide for compliant collections management.

Through the creation of this policy, the Presidio Trust asserts its ability to provide legal, ethical, and professional collections management for archaeological collections. The Trust assumes management responsibility for all Area B archaeological collections, whether made before or after the creation of the

Trust in 1996, and whether previously accessioned by the NPS or not. The collections management and related archaeological staff employed by the Trust for the purpose of managing archaeological collections will meet or exceed federal requirements. Staff will be increased as feasible to provide increasingly commensurate collections management. Annual reports detailing collections management activities will be developed by the Archaeological Collections Specialist; these reports will be made available to the public including the National Park Service.

NAGPRA Compliance History

In March 1996, the United States Army Corps of Engineers (USACE) prepared an evaluation of extant archaeological collections from the Presidio of San Francisco for the purpose of assisting the United States Army and National Park Service with NAGPRA compliance. This research was presented in a document entitled "An Archaeological Collections Summary for the Presidio of San Francisco," prepared by the USACE St. Louis District for the U.S. Army Environmental Center, Environmental Compliance Division, Aberdeen Proving Ground, Maryland. A copy of this document is on file at the Presidio Trust Library.

As of March 1996, all extant human remains and funerary items excavated at the Presidio are believed to have been repatriated; a more detailed summary of the findings is available in the USACE report. The Presidio Trust was also established in 1996. Since then, the Lab has not knowingly acquired artifacts or collections protected by NAGPRA. In the event that a future excavation generates NAGPRA-eligible collections, the Lab staff will develop and follow measures to comply with NAGPRA under the guidance of the Federal Preservation Officer.

Ethics

Ethical conduct is an important element of professional collections management, which is meant to complement purely legal conduct. All Lab staff, interns, and volunteers (personnel) will be educated in and adhere to the following professional ethics regarding collections. Collections ethics education and monitoring is the responsibility of the Archaeological Collections Specialist.

All personnel:

- will be trained in proper handling and care of collections.
- will understand and enforce the security of the collections.
- will understand the balance between public accessibility and preservation.
- will not knowingly or intentionally damage, destroy, or endanger Trust collections.
- will not, under any circumstances, provide authentication or appraisal services for non-Trust collections.
- will not, under any circumstances or for any purpose, purchase or accept donations of artifacts recovered from archaeological contexts.
- will not personally collect archaeological artifacts.
- will not seek personal monetary profit from any disposal or deaccession of artifacts, or from any Lab activity.

This ethics policy augments but does not supersede ethical conduct outlined in the Presidio Trust Employee Handbook and other regulations governing the ethical conduct of federal employees.

Monitoring and Revising Policy

Compliance with this policy will be achieved through the development of a collections management procedure manual. Annual collections management reports will summarize yearly activities undertaken with regard to this policy, and will provide a means of evaluating and monitoring adherence to this policy. The Archaeological Collections Specialist is responsible for the production of the annual collections management report.

This collections management policy document will be revised on a regular schedule and also in light of major institutional changes. Such changes include departmental reorganization, increases or changes in Lab staff, and major policy or protocol changes, directly or indirectly related to collections management. Aside from these instances, this policy will be regularly reviewed every three years and updated and revised as necessary. The Archaeological Collections Specialist will lead the revision effort, in conjunction with the Lab Director, Archaeologist, and Trust's Federal Preservation Officer.

Approval of the original version of this document is the responsibility of the Presidio Trust Executive Director. The Lab Director will have the authority to approve all subsequent revisions of the original policy document.

Appendix A

Selections from the Presidio Trust Management Plan

1.4. Protect archeological resources for future research and interpretation.

Both prehistoric and historic resources have been discovered and recorded within the park, and additional sites are believed to exist in several areas. (See Figure 1.3.) These sites are important because archeological remains can reveal information about past conditions, uses, and lives of the Presidio's inhabitants, and can tell the stories from periods in the Presidio's history that left little or no above-ground evidence. The Presidio Trust will evaluate identified archeological resources for significance and integrity and will document and manage these resources to allow for future research and interpretation. To locate additional sites, the Trust will use a variety of inventory methods, including remote sensing, predictive modeling, geomorphologic reconstruction, sensitivity mapping, surveys, and subsurface investigations such as coring, trenching, and archeological testing.

Recordation of Archeological Sites - The Trust will require archeological review before undertaking or permitting ground-disturbing activities. Any ground-disturbing activities that may affect potential or known archeological sites will be evaluated, and may be subject to a range of requirements including, but not limited to, avoidance of the sites, remote sensing, monitoring, coring or trenching, testing, and/or data recovery. Newly discovered archeological sites, including prehistoric sites related to the Ohlone or other indigenous Native American populations, will be evaluated for eligibility for listing in the National Register of Historic Places, either independently or as part of the National

Historic Landmark District. All artifacts found will be cataloged and properly stored or displayed according to standards set forth by the Code of Federal Regulations, 36 Part 79, Curation of Federally Owned and Administered Archeological Collections.

An archeological management plan is being prepared for the historic El Presidio site, where the Presidio of San Francisco was founded in 1776. As part of the ongoing El Presidio research, additional investigation will be conducted to define the building episodes, boundaries, configurations, features, and conditions of the historic Spanish and Mexican quadrangles of El Presidio de San Francisco. The remnant adobe wall (circa 1812-1815) within today's Officers' Club will be studied and an "Historic Structures Report" will be prepared.

Agency Collaboration - The Presidio Trust and National Park Service (NPS) jointly operate an archeological lab and have collaborated to create a database of the Presidio's archeological resources. The Trust and the NPS are also collaborating with academic institutions in northern California to provide opportunities for documentary research, field schools, and specialized artifact analyses. The Trust and the NPS also offer volunteer and educational opportunities through a variety of archeological programs. The Trust hopes to expand these types of programs through additional partnerships with academic and preservation organizations.

1.5. Preserve significant Presidio collections and existing significant objects in the landscape.

Conservation and Cataloging - The Presidio Trust, in collaboration with the National Park Service (NPS), will identify, conserve if appropriate, and catalog objects, significant material discovered during construction and excavation work, archival material, and documents such as oral histories according to the standards set forth in 36 CFR Part 79, *Curation of Federally Owned and Administered Archeological Collections*. A process for monitoring and evaluating collection storage will be established, and opportunities for display or exhibition of Presidio materials explored.

Collection Management - The existing Golden Gate National Recreation Area (GGNRA) Park Archives and Records Center, located in Building 667, manages, preserves, and provides public access to the Presidio's collections, including the Army's former collections and a reference library. This function will continue, though the location and scale of the facility may change. Presidio libraries managed by both the NPS and the Presidio Trust contain documents on current activities as well as publications on the military history of the Presidio and the Bay Area. The Trust and the NPS will develop an agreement for management of Presidio collections that ensures the preservation of, and public access to, Presidio artifacts.