Draft

SEISMIC UPGRADE OF BAY DIVISION PIPELINE NOS. 3 AND 4 AT HAYWARD FAULT

Archaeological Research Design and Treatment Plan / Historic Property Treatment Plan for Site CA-ALA-576

CONFIDENTIAL – NOT FOR PUBLIC DISTRIBUTION

At the request of the Historic Preservation Commission, sensitive cultural resources information has been redacted

October 2010

Prepared for:

San Francisco Planning Department
1650 Mission Blvd.
San Francisco, CA 94103

and

San Francisco Public Utilities Commission
1145 Market Street, 5th Floor
San Francisco, California 94103

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TABLE OF CONTENTS

Seismic Upgrade of Bay Division Pipeline Nos. 3 and 4 at Hayward Fault ARDTP/HPTP for Site CA-ALA-576

Page

1. Introduction 1-1
- 1.1 Regulatory Context 1-1
- 1.2 Project Overview 1-3
- 1.3 Area of Potential Effects 1-12
- 1.4 Potential Construction Impacts to CA-ALA-576 1-12

2. Site Description 2-1
- 2.1 Site CA-ALA-576 2-1

3. Site Significance and Research Issues 3-1
- 3.1 Cultural Context 3-1
- 3.2 Regional Research Issues 3-3
- 3.3 Data Requirements 3-8

4. Proposed Investigation 4-1
- 4.1 Methodological Approach 4-1
- 4.2 Subsurface Investigation 4-2
- 4.3 Field Methods 4-3
- 4.4 Monitoring and Compensatory Mitigation Measures 4-11
- 4.5 Native American Coordination 4-13
- 4.6 Human Remains 4-14
- 4.7 Laboratory Methods 4-15
- 4.8 Field Documentation and Mapping 4-18
- 4.9 Curation 4-18
- 4.10 Required Permits and Schedule 4-19

5. Data Recovery Report and Dissemination of Results 5-1
- 5.1 Report Structure 5-1
- 5.2 Report Distribution 5-1

6. Personnel and Consultants 6-1
- 6.1 Personnel 6-1
- 6.2 Consultants 6-1

7. References Cited 7-1

Page

Appendices

A. SHPO Correspondence A-1
B. Locations of Previous Investigations B-1
C. CA-ALA-576 DPR Forms C-1
D. Native American Contact D-1

List of Figures

Figure 1 Regional Location Map 1-5
Figure 2 Project Location Map 1-6
Figure 3 Project Area and Area of Potential Effects 1-7
Figure 4 Existing Facilities and Limits of Archaeological Site CA-ALA-567 1-9
Figure 5 Planned Trench and Boring Locations 4-6

List of Plates

Plate 1 BDPL No. 3 Installation (SFPUC, 1951). 1-4
Plate 2 SFPUC ROW (1959). 1-10
Plate 3 SFPUC ROW (2002). 1-11

List of Tables

Table 1 Construction Work with Potential Direct Impacts to Site CA-ALA-576 1-13
Table 2 Summary of Previous Archaeological Investigations Within and Near Site CA-ALA-576 2-2
Table 3 Artifacts Recovered from CA-ALA-576 During 1999 Testing Program 2-4
Table 4 Investigation Approaches 4-4

CHAPTER 1
Introduction

This Archaeological Research Design and Treatment Plan (ARDTP) and Historic Property Treatment Plan (HPTP) was prepared for the San Francisco Public Utilities Commission (SFPUC), the Planning Department Major Environmental Analysis Department (MEA), and the US Army Corps of Engineers (Corps) to satisfy both the City and County of San Francisco's responsibilities under the California Environmental Quality Act (CEQA), and the Corps' responsibilities under Section 106 of the National Historic Preservation Act (NHPA). The Corps has consulted with the State Historic Preservation Officer (SHPO) and it was determined that archaeological site CA-ALA-576 will be adversely affected by the proposed Seismic Upgrade of Bay Division Pipeline (BDPL) Nos. 3 and 4 at Hayward Fault Project (project) (SHPO letter dated April 28, 2009 in Appendix A). Prepared as an attachment to the Memorandum of Agreement (MOA) for the project, this ARDTP/HPTP contains the plan for the resolution of adverse effects through archaeological data recovery of site CA-ALA-576. Data recovery will be conducted in a phased approach that will first seek to determine whether significant site components contributing to the overall site's eligibility are located in the project Area of Potential Effects (APE). If significant site components are present in the impact area, data recovery will be employed to recover the important scientific data contained in the deposits.

BDPL Nos. 3 and 4 are part of the Hetch Hetchy Regional Water System, and the project is a component of the SFPUC's Water System Improvement Program (WSIP). The BDPL Nos. 3 and 4 carry water from the Irvington Tunnel in Fremont to customers in the East Bay, South Bay, and Peninsula through turnouts along the pipelines. These pipelines cross the Hayward fault in Fremont. Without the proposed improvements, a large earthquake on the Hayward fault could rupture both pipelines at the project location, causing substantial damage to surrounding features, localized flooding, and loss of water supply to the San Francisco Bay Area.

1.1 Regulatory Context

The following section summarizes the federal, state, and local regulations and guidelines for the project.

Federal Regulations

Archaeological resources are protected through the NHPA of 1966, as amended (16 United States Code 470f), and its implementing regulations. Prior to implementing an "undertaking" (e.g., issuing a federal permit), Section 106 of the NHPA requires federal agencies to consider the effects of the

undertaking on historic properties and to afford the Advisory Council on Historic Preservation (ACHP) a reasonable opportunity to comment on any undertaking that will adversely affect properties listed or eligible for listing in the National Register of Historic Places. Under the NHPA, a property is considered significant if it meets the National Register listing criteria in Title 36 of the Code of Federal Regulations, Section 60.4 (36CFR 60.4). Site CA-ALA-576 qualifies under criterion D as a site that has yielded or may be likely to yield information important in prehistory. The site was determined eligible to the National Register by the SHPO on December 29, 1999.

The Section 106 process involves a four-step procedure, which is described in detail in the implementing regulations (36 CFR Part 800):

1. Identify historic properties in consultation with the SHPO and interested parties;
2. Assess the effects of the undertaking on historic properties;
3. Consult with the SHPO, other agencies, and interested parties to develop an MOA that addresses the treatment of historic properties and notify the ACHP; and
4. Proceed with the project according to the conditions of the agreement.

This plan and associated MOA represent Step 3 in the process. The MOA and the Final ARDTP/HPTP will be sent to the ACHP with an invitation to participate and comment.

State Regulations and Legal Compliance

The State of California implements the NHPA through its statewide comprehensive cultural resource surveys and preservation programs. The California Office of Historic Preservation (OHP), as an office of the California Department of Parks and Recreation, implements the policies of the NHPA on a statewide level. The OHP also maintains the California Register of Historical Resources (CRHR). The SHPO is an appointed official who implements historic preservation programs within the state's jurisdictions.

California Environmental Quality Act

CEQA, as codified in Public Resources Code (PRC) Sections 21000 et seq., is the principal statute governing the environmental review of projects in the state. CEQA requires lead agencies to determine if a proposed project would have a significant effect on important archaeological resources, either historical resources or unique archaeological resources.

The CEQA Guidelines define a historical resource as: (1) a resource listed in the CRHR; (2) a resource included in a local register of historical resources, as defined in PRC Section 5020.1(k) or identified as significant in a historical resource survey meeting the requirements of PRC Section 5024.1(g); or (3) any object, building, structure, site, area, place, record, or manuscript that a lead agency determines to be historically significant or significant in the architectural, engineering, scientific, economic, agricultural, educational, social, political, military, or cultural annals of

California, provided the lead agency's determination is supported by substantial evidence in light of the whole record.

If a lead agency determines that an archaeological site is an historical resource, the provisions of PRC Section 21084.1 and CEQA Guidelines Section 15064.5 apply. If an archaeological site does not meet the CEQA Guidelines criteria for a historical resource, the site may meet the threshold of PRC Section 21083 regarding unique archaeological resources.

As defined in PRC Section 21083.2, CA-ALA-576 qualifies as a "unique" archaeological resource because it contains information needed to answer important scientific research questions and there is a demonstrable public interest in that information.

Resources listed in or eligible for listing in the National Register (as is CA-ALA-576) are considered eligible for listing in the CRHR and are therefore considered historical resources for purposes of CEQA.

Local Requirements

The Major Environmental Analysis (MEA) Division of the San Francisco Planning Department has developed its own set of guidelines for the identification, evaluation, and treatment of archaeological resources located within the APE of WSIP projects. This ARDTP/HPTP incorporates WSIP *Archaeological Guidance No. 7*, *Archaeological Research Design and Treatment Plan,* which specifies content and treatment of a known archaeological resource that will be impacted by a project. The primary purposes of an ARDTP are:

- To develop an updated research design that addresses the specific research potential of the affected resource. The level of effort will be dependent, in part, on the level of effect on the resource and on the potential significance of the data. The greatest effort will be required for a site that possesses a substantial potential to address a wide range of research issues and that will be substantially or completely disturbed by project activities;

- To provide a data recovery investigation plan (for excavation, laboratory work, research and analysis, and creation of technical report) that will maximize the data potential of the affected (portion of the) site;

- To identify any additional products (e.g., videos, booklets) that may help reduce the effects of the project to a less-than-significant level; and,

- To present a schedule, in consultation with MEA, and a budget to cover these efforts.

1.2 Project Overview

This section describes the project and its location, provides a brief history of the pipeline construction, and provides a brief overview of the construction scenario. The original construction of the SFPUC right-of-way (ROW) and BDPL Nos. 3 and 4 is discussed to address the level of previous disturbance within the APE.

Project Location and Description

BDPL Nos. 3 and 4 cross the Hayward fault in the city of Fremont, Alameda County (**Figures 1 and 2**). The sections of the pipeline to be upgraded are located within the 24.4-meter (80-foot) SFPUC ROW between the existing South and North Shutoff Stations near the intersection of Interstate 680 (I-680) and Mission Boulevard (**Figure 3**). Within the project area, the pipelines cross I-680, three I-680 on-ramps, Mission Boulevard, Agua Caliente Creek (contained within a concrete culvert), and Agua Fria Creek (a creek that crosses the pipeline ROW and flows within its natural bed within the ROW). The SFPUC ROW traverses residential areas on both the north and south ends.

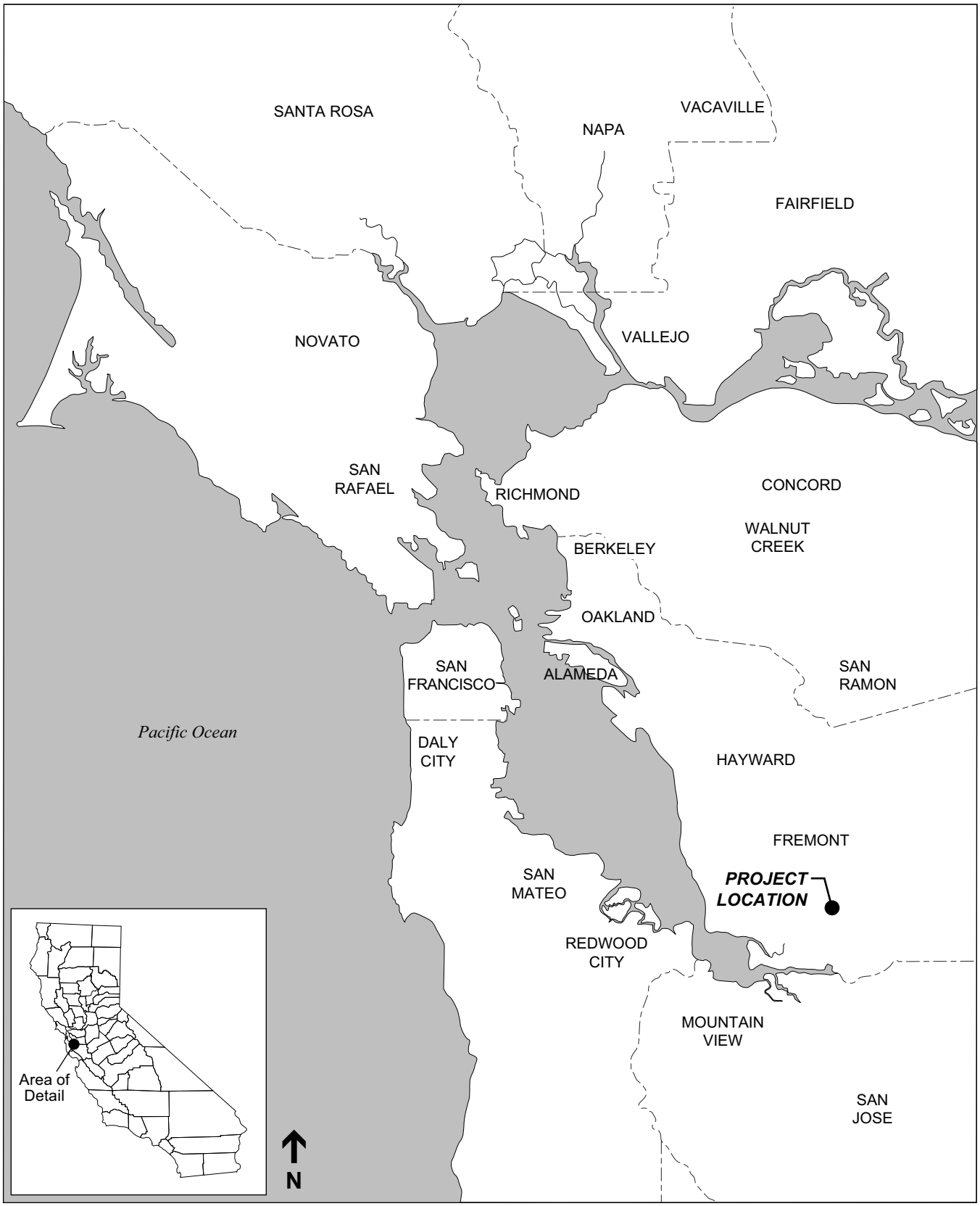
The project consists of the installation of approximately 719 meters (2,360 feet) of 1.8- to 2.0-meter (72- to 78-inch)-diameter welded steel pipe (BDPL No. 3X) directly adjacent to the existing 2.0-meter (78-inch)-diameter BDPL No. 3 between the North and South Shutoff Stations. In addition, upgrades to the existing BDPL No. 4 will be implemented to seismically strengthen the pipeline where it crosses all three traces of the Hayward fault, and to prevent damage to the new BDPL No. 3X should BDPL No. 4 fail. The new BDPL No. 3X will parallel the two existing pipelines at a depth comparable to or below the existing BDPL Nos. 3 and 4, and all facilities with the exception of access structures will be constructed below ground. All improvements will be constructed within the 24.4-meter (80-foot) SFPUC ROW between the existing South and North Shutoff Stations, and temporary bridges will be constructed across Mission Boulevard and the I-680 on-ramps where they are crossed by the ROW to facilitate traffic flow during construction. For planning purposes, the project area has been divided into eight construction zones, as indicated on Figure 3, and includes four staging areas where grading (but no excavation) will occur.

History of Pipeline Construction

The 24.4-meter-wide (80-foot-wide) SFPUC ROW was assembled in the late 1940s in anticipation of the construction of what was then the "new" 34-mile-long Bay Division Pipeline (ESA+Orion, 2009). Construction of BDPL No. 3 began in 1950 and was completed in 1952. BDPL No. 4 was constructed parallel to and 4.6 meters (15 feet) east of BDPL No. 3, between 1966 and 1973. Both pipelines were installed using open trench excavation and backfilling operations (SFPUC, 1951) (Plate 1).

Plate 1. BDPL No. 3 Installation (SFPUC, 1951)

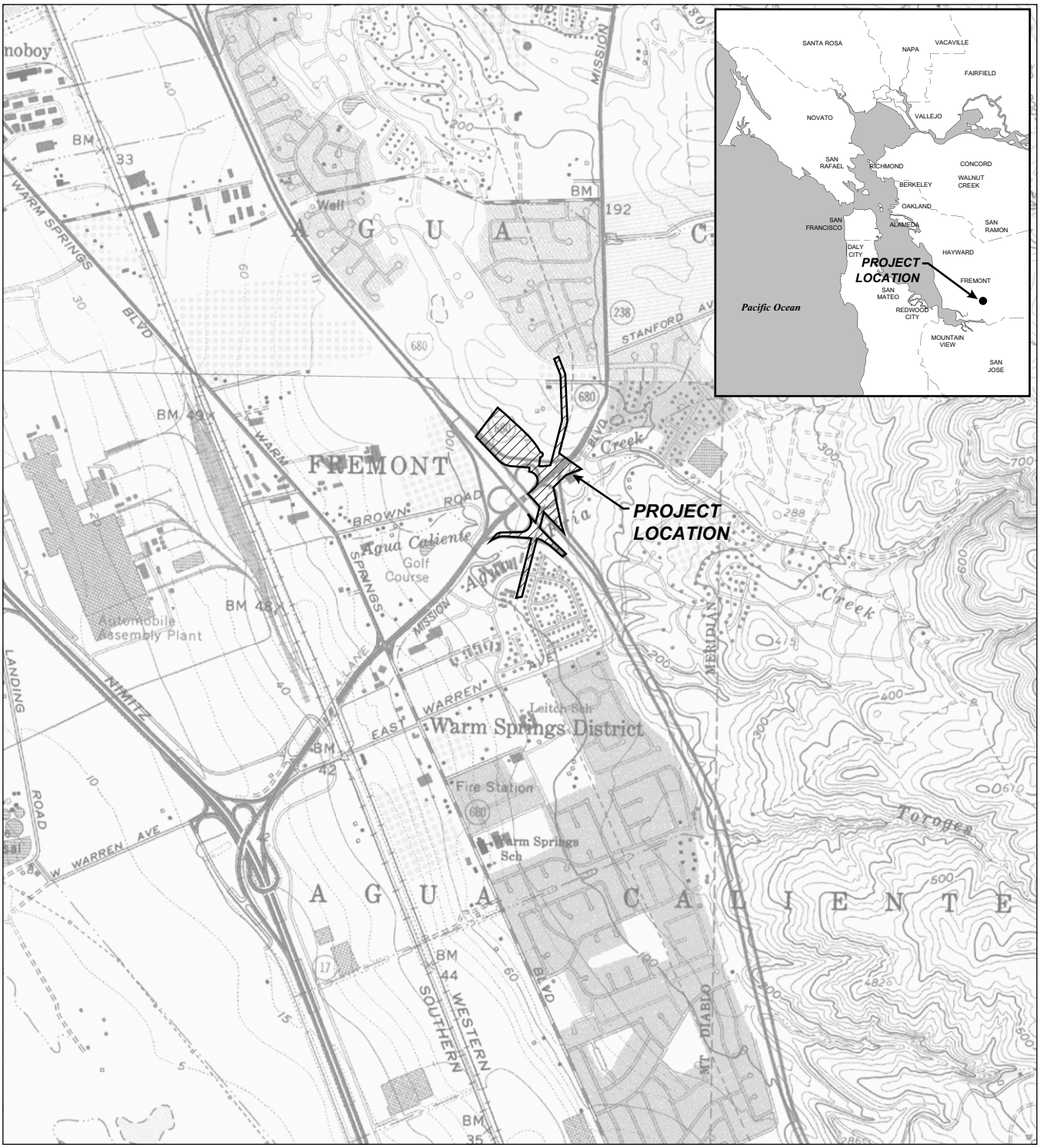
The existing BDPL No. 3 consists of a 2.0 meter (78-inch)-diameter pipe constructed primarily of reinforced-concrete cylinder pipe between the North and South Shutoff Stations (**Figure 4**), although some sections beneath Agua Fria Creek and across Trace B of the Hayward fault



Seismic Upgrade of BDPL Nos. 3 and 4 at Hayward Fault . 206166.06

SOURCE: ESA

Figure 1
Regional Location Map



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SOURCE: ESA

Seismic Upgrade of BDPL Nos. 3 and 4 at Hayward Fault . 206166.06

Figure 2
Project Location Map

Sensitive Culture Resources Information

REDACTED

Area of Potential Effects

Archaeological Site CA-ALA-576

Existing BDPL No. 3

Existing BDPL No. 4

Seep and Potential Other Waters of the United States

0 400

Feet

SOURCE: GlobeXplorer; ESA+Orion, 2009, 2008; URS, 2008a

Note: the entire project area may be used for construction staging

Seismic Upgrade of BDPL Nos. 3 and 4 at Hayward Fault . 206166.06

Figure 3

Project Area and

Area of Potential Effects

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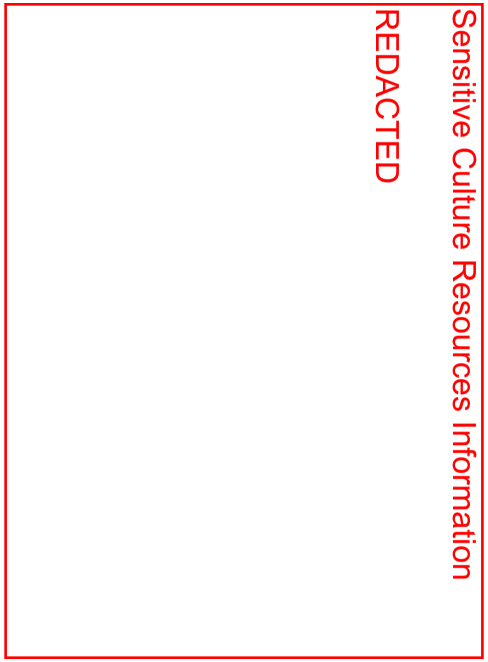

Primary Rupture Zone at Trace A

Primary and Secondary Rupture Zones at Traces B and C

Notes
PCCP: Prestressed Concrete Cylinder Pipe
RCCP: Reinforced-Concrete Cylinder Pipe
CMP: 114-inch Diamter Corrugated Metal Pipe Segment

0 400
Feet

SOURCE: ESA+Orion, 2009; URS, 2008a

Seismic Upgrade of BDPL Nos. 3 and 4 at Hayward Fault

Figure 4

Existing Facilities and Limits of Archaeological Site CA-ALA-576

are constructed of welded steel. The existing BDPL No. 4 consists of a 2.4-meter (96-inch)-diameter pipe constructed of pre-stressed concrete cylinder pipe and welded steel. Both pipes are located underground, although the depth below ground surface (bgs) varies across the project area. A slip joint was installed on both pipelines in 1995 immediately south of the Trace B crossing to accommodate fault creep at this location. The vault that houses these slip joints is visible in Plate 2, below.

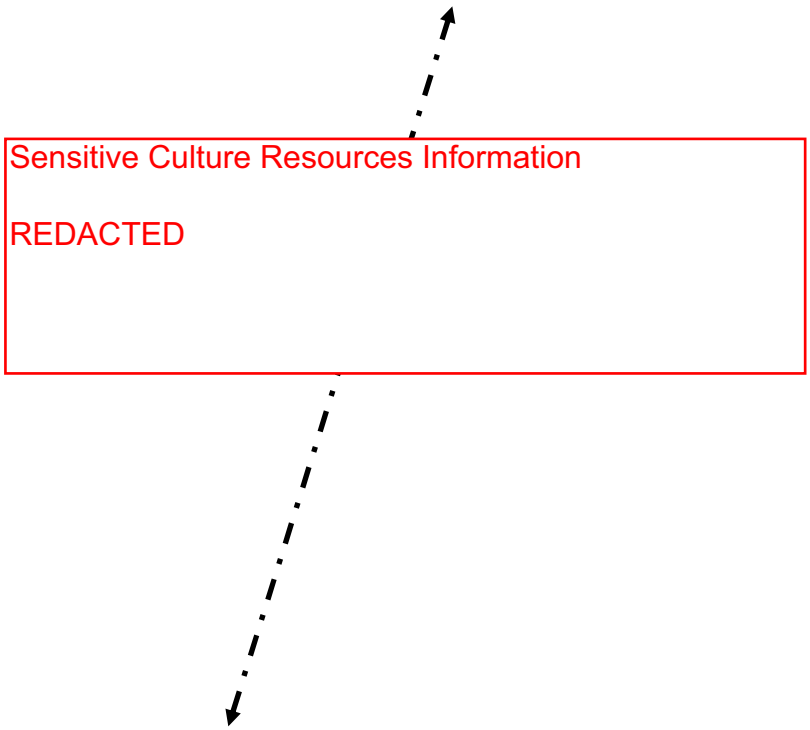

Plate 2. SFPUC ROW (1959)

When the I-680 freeway was originally constructed in 1969, the California Department of Transportation (Caltrans) installed three 2.9 meter (114-inch)-diameter segments of corrugated-metal pipe (CMP1, CMP2, and CMP3, shown on Figure 4) beneath the freeway and the associated on-ramps to facilitate future installation of new BDPL pipeline segments with minimal disruption to I-680 and the on-ramps. CMP1 is located within site CA-ALA-576, beneath Mission Boulevard and the northbound loop on-ramp. CMP2 is located beneath I-680 and the north end is also located within site CA-ALA-576. CMP3 is located beneath the I-680 southbound diamond on-ramp, outside of the known boundaries of site CA-ALA-576.

Historic aerial photographs from 1948, 1959, 1966, 1979, 1980, 1987, 2000, 2002, and 2005 were reviewed during preparation of this ARDTP/HPTP. The 24.4-meter-wide (80-foot-wide) SFPUC ROW (historically known as the Hetch Hetchy Aqueduct); can clearly be seen on the 1959

(Plate 2) and 1966 aerial photographs. Vegetation over the ROW is visibly modified from the surrounding landscape, suggesting that the entire ROW was either cleared of vegetation, graded, and/or excavated and backfilled during construction of BDPL Nos. 3 and/or 4. However, the exact width and depths of the primary excavations remains unknown. Plate 3 is an aerial view of the project area and the approximate ROW location as it appeared in 2002.

Sensitive Culture Resources Information

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Plate 3. SFPUC ROW (2002)

Construction Scenario

The project area consists of the 24.4-meter-wide (80-foot-wide) BDPL 3 and 4 ROW between the North and South Shutoff Stations and Staging Areas 1 through 4. All pipeline improvement activities, equipment and materials staging, soil stockpiling, and parking will occur within this project area. Pipeline improvements will involve: (1) the installation of a new pipe, BDPL No. 3X, between the two shutoff stations; (2) the abandonment of the existing BDPL No. 3; and (3) upgrades to the existing BDPL No. 4 and slip-joint vault. The new BDPL No. 3X will parallel the two existing pipelines at a comparable depth or lower. For planning purposes, the project area has been divided into eight construction zones (Figures 3 and 4). Specific construction activities within the project APE are discussed below.

1.3 Area of Potential Effects

An archaeological APE was delineated for the project pursuant to 36 CFR Part 800.4(a)(1) as part of the cultural resources identification phase (ESA+Orion, 2009) (Figure 3). The APE for archaeological resources includes the area (both surface and subsurface) that could experience ground disturbance as a result of project activities, including locations of pipeline construction, affected utilities, temporary bridges, and staging areas. For the project, the horizontal APE consists of the entire 24.4-meter-wide (80-foot-wide) SFPUC ROW, as well as the four staging areas, as shown on Figure 3. The vertical APE varies in depth from the existing ground surface, where activities such as vehicle traffic and staging will occur, to 9.1 meters (30 feet) bgs, the maximum depth of excavation. SHPO concurrence with the archaeological APE was obtained by the Corps in a letter dated April 28, 2009 (see Appendix A).

As presently recorded, site CA-ALA-576 is located [redacted] (see Figures 3 and 4). [redacted] Based on previous excavations (Gmoser et al., 1999: Table II-19) the site extends to depths of at least 3.0 meters (10 feet) bgs and is capped by artificial fill within the SFPUC and Caltrans ROWs. None of the previous investigations indicate that cultural materials were present within fill materials (see Chapter 2 below for a complete description of previous investigations).

The maximum horizontal extent of site CA-ALA-576 located within the APE measures approximately 122 meters (400 feet) (north/south) by 244 meters (800 feet) (east/west). However, the site boundaries located [redacted] are uncertain. It is possible that the site extends [redacted]

1.4 Potential Construction Impacts to CA-ALA-576

Based on the recorded location and previous investigations of National Register-eligible site CA-ALA-576, portions of the site are located within the area delineated as the project APE, [redacted] Depending on the locations of site components and the degree of any previous disturbances in this portion of the APE, construction work and activities in these areas will directly impact CA-ALA-576. **Table 1** describes the construction activities, including the depths of disturbances, proposed in these areas. Although Construction [redacted] is located outside of the identified boundaries of site CA-ALA-576, this specific area has not been previously investigated for the occurrence of cultural materials as discussed in Chapter 2. Therefore, construction activities in this zone are considered to have the potential to encounter

TABLE 1
CONSTRUCTION WORK WITH POTENTIAL DIRECT IMPACTS TO SITE CA-ALA-576

Construction Zone	Construction Method	Length	Width	Depth
BDPL No. 3X Construction				
Construction [redacted]	Place BDPL No. 3X in open cut excavation.	18.3 meters (60 feet)	3.2 meters (10.5 feet)	10.7 meters (35 feet)
	Driving pit (to be located within [redacted] for trenchless construction method in [redacted] (Option B).	38.1 meters (125 feet)	9.1 meters (30 feet)	9.1 meters (30 feet)
Construction [redacted] – Option A: Use existing CMP	Place BDPL No. 3X in existing [redacted]	No excavation will be required; access to the corrugated metal pipeline will be through the open cut excavation in Construction [redacted]		
Construction [redacted] Option B: Trenchless	Trenchless construction beneath I-680	The pipeline will be installed at a depth of 6.1 meters (20 feet) using trenchless construction which would be below the known extent of the site. This method will not result in an impact to the site within [redacted] However, the receiving pit, proposed in [redacted] may directly impact the site and is discussed below.		
Construction [redacted]	Place BDPL No. 3X in open cut excavation.	53.3 meters (175 feet)	3.2 meters (10.5 feet)	5.5 meters (18 feet)
	Receiving pit (to be located within [redacted] for trenchless construction method in [redacted] (Option B).	12.2 meters (40 feet)	6.1 meters (20 feet)	9.1 meters (30 feet)
Construction [redacted]	Install and remove [redacted] at [redacted]	[redacted] on installed piles.		
	Place BDPL No. 3X in open cut excavation	39.6 meters (130 feet)	3.2 meters (10.5 feet)	4.6 meters (15 feet)
Construction [redacted]	Install and remove temporary bridges at [redacted]	Bridges will be supported on installed piles.		
	Remove existing [redacted] and construct articulated vault beneath Mission Boulevard.	91.4 to 121.9 meters (300 to 400 feet)	9.1 meters (30 feet)	8.5 meters (28 feet)
BDPL No. 4 Improvements				
Construction [redacted]	Construct [redacted] BDPL No. 4	6.1 meters (20 feet)	4.6 meters (15 feet)	10.7 meters (35 feet)
Construction [redacted]	Strengthen [redacted] BDPL No. 4	No excavation required, work would be conducted within the inside of the pipeline.		
Construction [redacted]	Construct [redacted] for BDPL No. 4 or [redacted] lining	9.1 meters (30 feet)	4.6 meters (15 feet)	9.1 meters (30 feet)
Construction [redacted]	Strengthen [redacted] by excavating a trench on either side of the vault to expose the pipeline and encasing it in concrete.	13.7 meters (45 feet) (x2)	6.1 meters (20 feet) (x2)	6.1 meters (20 feet) (x2)

TABLE 1 (Continued)
CONSTRUCTION WORK WITH POTENTIAL DIRECT IMPACTS TO SITE CA-ALA-576

Construction Zone	Construction Method	Length	Width	Depth
BDPL No. 4 Improvements (cont.)				
[redacted]	Heavy equipment and excavated soil storage and vehicular parking.	No excavation or grading will be required.		
[redacted]	Removal of [redacted] and replacement with [redacted] and [redacted] at the [redacted]	<30 meters (100 feet)	< 1.2 meters (4 feet)	< 0.3 m (1 foot)

cultural materials until it is demonstrated by activities described in this ARDTP/HPTP whether cultural materials are present or absent within this construction zone.

Specific activities to be conducted in the [redacted] where impacts to site CA-ALA-576 may occur are described below.

BDPL No. 3X

The proposed BDPL No. 3X will run parallel to the existing BDPL No. 3 for approximately 719 meters (2,360 feet), between the South Shutoff Station and the North Shutoff Station. BDPL No. 3 will be left in place and abandoned.

Construction [redacted] Open cut excavation will be performed for the installation of the new BDPL No. 3X in [redacted] across the [redacted] In this zone, the excavation will be approximately 18.3 meters (60 feet) long by 3.2 meters (10.5 feet) wide by 9.1 meters (30 feet deep). Following installation of the pipeline, the trench will be backfilled. The excavation of this trench may result in a direct impact to the site within [redacted] if cultural materials are present within this construction zone.

If Option B is chosen as the installation method for BDPL No. 3X across Construction [redacted] (discussed below), the driving pit will be excavated within Construction [redacted] and will extend into Construction [redacted] The driving pit will measure approximately 38.1 meters (125 feet) long by 9.1 meters (30 feet) wide by 9.1 meters (30 feet) deep. The excavation of this pit may result in a direct impact to the site within Construction [redacted] if cultural materials are present within this construction zone.

Construction [redacted] Construction in this zone includes two options: placement of BDPL No. 3X through the existing corrugated-metal pipe segment CMP2 (Option A) or by trenchless methods (Option B).

> *Option A*: The preferred method of installation is through the existing corrugated-metal pipe segment CMP2 located beneath I-680 and the northbound loop on-ramp. Access will

be provided via the open cut excavation in both Construction [redacted] on either side of [redacted] Once the pipeline installation is completed, the excavations on either side of the [redacted] will be backfilled. This option will not result in a direct impact to the site within [redacted] because the pipeline will be installed through the existing CMP2 and access to [redacted] will be provided via the open cut excavations in Construction [redacted]

Option B: If [redacted] is found to be unsuitable for installation of the proposed BDLP No. 3X, repairs to the corrugated-metal pipeline could be made or BDPL No. 3X could be installed using trenchless construction methods. For trenchless methods, the driving pit will be located in [redacted] CA-ALA-576, but in an area that has not been previously investigated for cultural materials. The [redacted] which will be located [redacted] The receiving pit, which will be located within the northbound loop on-ramp in [redacted] is discussed below.

Construction [redacted] Open cut excavation will be performed for the installation of the new BDPL No. 3X in [redacted] across the [redacted] In this zone, the excavation will be approximately [redacted] Following installation of the pipeline, the trench will be backfilled. The excavation of this trench may result in a direct impact to the site within [redacted]

If Option B is chosen as the installation method for BDPL No. 3X across [redacted] (discussed above), a receiving pit will be excavated within [redacted] CA-ALA-576. The receiving pit will measure approximately [redacted] by 9.1 meters (30 feet) deep. The excavation of this pit may result in a direct impact to the site within [redacted]

[redacted] Cut-and-cover excavation will be employed for construction of the new BDPL No. 3X in [redacted] In this zone, the existing [redacted] by 4.6 meters (15 feet) deep. The trench will be backfilled after the pipeline installation is completed. The trenching may result in a direct impact to the site within [redacted]

Because the excavation will [redacted]

[redacted]

[redacted]

[redacted] Construction of the articulated vault will involve removal of the existing [redacted] by 8.5 to 9.1 meters (28 to 30 feet) deep. The new [redacted] will be constructed within the excavation. [redacted]

[redacted]

BDPL No. 4

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]Because the site is presently capped by up to 6 feet of artificial fill, no direct impact to the site is expected in [redacted]

[redacted]

In addition to the repairs of the pipeline, additional impacts to CA-ALA-576 may occur during the [redacted] The [redacted] will include the addition of [redacted] The current length of [redacted] is uncertain at this time; however the estimated length is less than 30 meters (100 feet). Impacts include [redacted] 30 cm (1 foot) bgs.

CHAPTER 2
Site Description

2.1 Site CA-ALA-576

As presently recorded, site CA-ALA-576[redacted]The vertical extent of the site varies from 0.8 meter (2.6 feet) to 3 meters (10 feet) bgs (King, 1968; Gmoser et al., 1999).

Previous archaeological investigations have been conducted in five areas within or adjacent to the site's known boundaries (see Appendix B for an index map showing the locations of previous investigations and figures showing sampling locations for each of the investigations discussed). These include: (1) the Chester King 1968 investigation,[redacted] (2) the Galvan and Thompson ca. 1998 investigation,[redacted] (3) the Gmoser et al. 1999 investigation,[redacted] (4) the Price and Holson 1999 investigation,[redacted]and; (5) the Rosenthal 2006 investigation, located[redacted] None of these investigations were conducted within the SFPUC ROW. **Table 2** summarizes the results of these previous investigations.

The site was originally identified as two separate deposits (CA-ALA-342 and CA-ALA-509) (Appendix C). Site CA-ALA-342 was first recorded by Conger and Burris (1966) and was mapped [redacted] Site CA-ALA-509 was first recorded by Cartier (1989) and was mapped [redacted] The two sites were determined to be one large site and were designated as CA-ALA-576 (Gmoser et al., 1999). Portions of the site have been dated to the early Middle to Late Period (2,500 to 600 years before present day). The site has been described as a habitation site with an extensive midden deposit, numerous human burials, rock ovens, and a variety of other features and artifacts. All cultural materials were recovered from intact soils. None of the previous investigations indicate that cultural materials were present within fill materials.

TABLE 2
SUMMARY OF PREVIOUS ARCHAEOLOGICAL INVESTIGATIONS WITHIN AND NEAR SITE CA-ALA-576

Investigation	Location	Depth of Cultural Materials Recovered	Types of Cultural Materials Recovered
1) Chester King, 1968	[redacted]	0.8 to 1.4 m (2.6 to 4.6 feet)	29 human burials; 19 hearth/ oven features; flaked stone; stone/bone tools; groundstone; charmstones; glass/shell beads; shell ornaments
2) Galvan and Thompson ca. 1998	[redacted]	Unknown	52 human burials; rock features
3) Gmoser et al., 1999	[redacted]	Up to 3 m (10 feet)	1 human burial; flaked stone; groundstone; faunal remains; shell; floral remains; 4 hearth/oven features
4) Price and Holson, 1999	[redacted]	No cultural materials identified	None
5) Rosenthal, 2006	[redacted]	No cultural materials identified	None

1) Chester King 1968 Investigation

The site was first excavated in 1968 (as site CA-ALA-342) by Chester King. The original site maps indicate that the primary midden deposit was located [redacted] (Gmoser et al., 1999: II-61-63; Rosenthal, 2006: 4) (see Appendix B for investigation location map). The investigation area was located [redacted] Numerous human burials, rock cooking features, and a variety of artifacts were uncovered. King noted cultural deposits ranging from 80 to 140 centimeters (32 to 55 inches) in depth bgs (King, 1968: 5).

Nineteen hearths or rock oven features were excavated by King (1968: 4). The features contained rocks and lumps of baked clay, along with the remains of corms (bulbs), suggesting bulb roasting. The features lacked artifacts and faunal remains overall. King (1968: 5) also excavated seven large pits, ranging in depth from 80 to 140 centimeters (32 to 55 inches) bgs and from 1 to 2 meters (3.3 to 6.6 feet) in diameter. King speculated that the pits were used for storage of bulbs or other materials.

Twenty-nine burials were discovered during the course of fieldwork, with approximately one-half located in the southwest quarter of the excavation area. Burials were generally flexed. King (1968: 6) noted that most grave goods were recovered from infant burials.

The majority of artifacts were clustered in the southern portion of the site, near the storage pits, suggesting that production activities took place in this area (King, 1968: 6). Artifacts recovered include bone awls, antler flakers, hammerstones, large cores, flake scrapers, projectile points, pestles, mortars, and battered stones. Non-subsistence-related artifacts recovered include charmstones and shell ornaments/beads. Charmstones consisted of roughly grooved small pebbles and finely polished plummets. The most common type of shell beads were thin-lipped callus beads and *Olivella* spire-ground beads, most of which were recovered from burials (King, 1968: 6-7).

King (1968: 7-9) suggested that this was a village site, occupied primarily in the spring for the harvesting and processing of corms. He did not uncover evidence of house floors or temporary shelters. The site was likely occupied in the fall, for the gathering of acorns. Differential use of the part of the site excavated suggests separate storage areas, flaked stone tool production areas, and resource preparation areas.

2) Galvan and Thompson ca. 1998 Investigation

Additional investigations by Galvan and Thompson (ca. 1998 [as mentioned in Rosenthal, 2006]) focused on deposits within a housing development located [redacted] (see Appendix B for investigation location map). This area was located only partially within the APE, [redacted] Fifty-two burials were encountered, as well as rock features and a variety of artifacts. No report of findings is known to have been completed for this investigation (Rosenthal, 2006: 4).

3) Gmoser et al. 1999 Investigation

Investigations in 1999 revealed that the site was one large deposit, and the Northwest Information Center (NWIC) assigned it a new trinomial (CA-ALA-576) and primary number. The investigation encompassed the southern portion of the site as well as areas to the west and south of the site. Part of the investigation was located outside of the project APE. Testing demonstrated that cultural materials were located [redacted] and, despite the extensive modern disturbances in the area, a substantial amount of the site remained intact and extended to a depth of 3 meters (10 feet) or more below the present-day ground surface (Gmoser, 1999; Gmoser et al., 1999). The site boundaries were enlarged to include the work areas of both King and Galvan and Thompson, and [redacted]

Sixteen backhoe trenches were excavated during the 1999 testing program (see Appendix B for trench locations), resulting in the removal of approximately 135 cubic meters (4,770 cubic feet) of soils, with approximately 41 cubic meters (1,450 cubic feet) excavated within the site boundaries (Gmoser et al., 1999: II-77, II-102). Artifacts recovered from CA-ALA-576 are summarized in

Table 3 and include three flaked stone tools and cores; 62 pieces of debitage; five ground or battered stone items; 1,658 mammal bones; 1,990 fish bones; 664.6 grams of shell; a shaped clay object; and an assortment of ochre, baked clay, charcoal, and floral remains (Table 3) (Gmoser et al., 1999: II-87).

TABLE 3
ARTIFACTS RECOVERED FROM CA-ALA-576 DURING 1999 TESTING PROGRAM

Artifact Type	Quantity	Artifact Type	Quantity
Biface	1	Fish Bone	1,990
Core	2	Clay Object	1
Debitage	62	Ochre	1
Pestle	2	Baked Clay	16
Handstone	1	Charcoal	1
Battered Cobble	2	Shell	664.6 grams
Bird/Mammal Bone	1,658		

SOURCE: Gmoser et al., 1999.

Four features and one burial were encountered within the trenches. The burial was left in place, but the features were excavated using 1-meter by 1-meter units; one of the features dated to the early Middle Period, and the other three dated to the Late Period. The features were thought to have been hearths or stone ovens. Flotation samples were obtained from the features and produced seeds, nuts, bulbs, mammal bone, and marine fish bone.

Remains from the early Middle Period component at CA-ALA-576 contained a vertebrate faunal assemblage composed largely of jackrabbits and small schooling fishes. The Late Period assemblage was characterized by a majority of freshwater, saltwater, and pelagic fish remains. Like the early Middle Period assemblage, the majority of these fish remains were from small schooling fishes from the herring family. Small amounts of bone representing rodents, birds, artiodactyls, and one sea otter were present (Gmoser et al., 1999: II-92-96).

Invertebrate faunal remains from the early Middle Period component consisted primarily of California horn snail. Oyster was the second-most-abundant species, followed by clam. Mussel was absent. The Late Period assemblage maintained the same pattern, though a small amount of freshwater mussel and crab were also present (Gmoser et al., 1999: II-97).

Gmoser et al. (1999: II-97-101) noted some atypical patterns regarding plant utilization at CA-ALA-576, indicating primary processing of plant resources other than nuts (acorns). Recovered specimens indicated an early Middle Period reliance on goosefoot. Bulbs and *Clarkia* capsule also occurred in high frequencies. Goosefoot and acorn appeared to decline over time, while *Clarkia* capsules and hazel nut appeared to rise in frequency.

During the 1999 testing program, one 1.2-meter (4-foot)-long trench (designated 5-18-3) was placed [redacted]

[redacted] It was excavated to a depth of 2.2 meters (7 feet) bgs. Artificial fill was present from 0 to 120 centimeters (0 to 47 inches) bgs. Disturbed soils were present from 120 to 190 centimeters (47 to 75 inches) bgs. An intact cultural deposit was present from 190 to 220 centimeters (75 to 87 inches) bgs. The trench was terminated at 220 centimeters (87 inches) in cultural soils, with the full extent of the deposit remaining unexplored. Cultural materials observed in the trench included fire-affected rock and baked clay (Gmoser et al., 1999: II-74). Gmoser et al. (1999: II-67) concluded that "these findings indicate that the archaeological deposits [redacted]"

Gmoser et al. (1999: III-2-3) recommended the site as eligible for listing on the National Register under Criterion D for its ability to yield important information in prehistory. The SHPO concurred with this determination in a response dated December 29, 1999 (see Appendix A).

4) Price and Holson 1999 Investigation

Subsurface testing by Price and Holson (Pacific Legacy) [redacted]

A total of seven backhoe trenches were excavated during this testing program, resulting in the removal of almost 120 cubic meters (4238 cubic feet) of soil. The trenches extended from depths of 2.5 to 4.8 meters (8 to 16 feet) bgs, deeper than the maximum depth of known components of site CA-ALA-576 identified by Gmoser in 1999 (3 meters, or approximately 10 feet) bgs (Gmoser et al., 1999). No archaeological materials were recovered during the course of this testing (Price and Holson, 1999), indicating that site CA-ALA-576 [redacted]

5) Rosenthal 2006 Investigation

Additional testing in 2006 resulted in the [redacted] Three backhoe trenches were excavated within the [redacted] (see Appendix B for trench locations). The investigation was located [redacted]

The testing indicated that recent fill deposits extending between 1.5 and 3.0 meters (5 to 10 feet) bgs exist in this area. No archaeological materials were recovered during the investigation. Therefore, the [redacted] (Rosenthal, 2006: 8).

CHAPTER 3
Site Significance and Research Issues

This section presents: (1) a cultural context for the proposed project area; (2) regional research issues that will be addressed during the data recovery program; and (3) data requirements necessary to address the research issues.

3.1 Cultural Context

Prehistory

Archaeological investigations in the San Francisco Bay Area began in earnest in the early 1900s. Investigations centered on establishing cultural chronologies for the numerous large shell middens in the region. The most notable of these large midden sites were the Emeryville shellmound (CA-ALA-309), the Ellis Landing site (CA-CCO-295) in Richmond, the Fernandez site (CA-CCO-259) in Rodeo Valley, and the West Berkeley site (CA-ALA-307) (Moratto, 1984). Radiocarbon dates from some of these sites indicate an occupation of the area at about 2,300 years Before Present (B.P.). However, substantial evidence from the Bay Area suggests that human occupation in the region extends back as early as 7,000 years ago (Davis and Tregnaza, 1959).

Archaeologists have developed individual cultural chronological sequences tailored to the archaeology and material cultural of each sub-region of California. Each of these sequences is based principally on the presence of distinctive cultural traits and stratigraphic separation of deposits. Hylkema (2002) identified a sequence of four general cultural periods for the southern San Francisco Bay Area based on a combination of chronologies developed by early researchers and changes in bead types (see also Milliken et al., 2007). The sequence is defined as follows:

- Early Period – ca. 4,000 to 2,500 B.P.
- Middle Period – 2,500 to 1,300 B.P.
- Middle to Late Transition – 1,300 to 600 B.P.
- Late Period – 600 B.P. to A.D. 1769

The Early Period of the present-day southern San Francisco Bay Area included characteristics similar to those of cultural groups along the southern California coast. In addition to the presence of distinctive shell bead types, this cultural period is characterized by the presence of flexed burials with red pigment. Most Early Period cultural characteristics are distinct to the immediate Bay Area, but some are considered similar to traits identified in the Sacramento-San Joaquin Delta (Hylkema, 2002).

The presence of large and small cobble mortars and varied pestle types is common in Middle Period assemblages and suggests an increased reliance on acorns. Manos and milling stones continue to be present in Middle Period assemblages of the South Bay as well, suggesting a similar continued reliance on hard seeds. Contracting-stemmed and lanceolate projectile points are the most common forms of points, but this artifact type is less common than during the Early Period as a whole. Other artifact types common in Middle Period assemblages include bone fish spears; serrated bone scapulas; beveled elk antler wedges; flexed burials in residential sites; and expressions of cosmological beliefs, such as animal burials, charmstones, quartz crystals, and bone whistles (Hylkema, 2002).

The Middle to Late Transition Period initiates a phase of significant social changes, including increased social hierarchy and localized economic systems. Burials and associated grave goods indicate an emphasis on wealth. During this period, the importance of *Olivella* shell beads increases; edge-incised and banjo-style *Haliotis* pendants become common; tubular tobacco pipes appear; and bone fish spears are replaced by new harpoon styles (Hylkema, 2002).

The social change that began during the Middle to Late Transition Period continued and developed further during the Late Period, as indicated by the elaboration of associated ceremonial grave goods. Various artifacts exhibit stylistic changes, with fine workmanship, decoration, and elaboration of forms. Small obsidian Stockton serrated points increase in Late Period assemblages, indicating the introduction of the bow and arrow during this time. An additional indication of external interactions comes from the introduction of bone and antler harpoon styles from northern California. This has led some researchers to hypothesize a movement of northern populations south into the San Francisco Bay area following the withdrawal of the Middle Period Meganos Culture (Hylkema, 2002).

Ethnography

The APE is within the traditional territory of the Ohlone people, also referred to as Costanoan, Mutsun, and Rumsun (Levy, 1978). These people, collectively referred to by ethnographers as Ohlone, were actually distinct sociopolitical groups that spoke at least eight languages of the same Penutian language group. The Ohlone occupied a large territory from San Francisco Bay in the north to the Big Sur and Salinas Rivers in the south. The primary sociopolitical unit was the tribelet, or village community, which was overseen by one or more chiefs. The APE is in the greater *Chochenyo* language area and was occupied by the *lisyan* tribelet (Levy, 1978).

Economically, the Ohlone engaged in hunting and gathering. Their territory encompassed both coastal and open valley environments that contained a wide variety of resources, including grass seeds, acorns, bulbs and tubers, bear, deer, elk, antelope, a variety of bird species, marine resources, and small mammals. The Ohlone acknowledged private ownership of goods and songs, and village ownership of rights to land and/or natural resources; they appear to have aggressively protected their village territories, requiring monetary payment for access rights in the form of clamshell beads, and even shooting trespassers if caught. After European contact, Ohlone society was severely disrupted by missionization, disease, and displacement.

3.2 Regional Research Issues

Regional research issues are presented as part of this ARDTP/HPTP to provide a framework in which to address research questions during the data recovery program. As is typical for significant archaeological sites, site CA-ALA-576 was determined eligible under National Register Criterion D for its potential to yield information of importance in prehistory. The importance of a site's archaeological components under Criterion D can only be measured in relation to the ability of those components to contribute data to the overall body of archaeological information that exists for a region.

In preparation for the Caltrans San Francisco Central Freeway Replacement Project, White and Meyer (2002) identified several prehistoric research themes for the San Francisco Peninsula. Several of the themes are applicable to the project and have been adapted for use herein. Additional research topics relevant to the San Francisco Bay Area have been gleaned from Milliken et al. (2007) and are discussed below.

Culture Chronology

The period of use for a site can generally be understood using two dating techniques: (1) relative dating and; (2) absolute dating. Relative dates can be obtained by comparing materials recovered from a site—e.g., projectile points, pottery, beads—to established artifact typologies for the region. Relative dates can also be established for a site through seriation and stratigraphy. Absolute dating includes radiometric techniques such as carbon-14 dating. Radiometric dates are obtained from materials such as charcoal, bone, and shell. Valid samples are obtained from vertically stratified deposits. Another dating technique, obsidian hydration, can be used as both a relative and absolute technique depending on conditions at a site.

Site CA-ALA-576 contains both early Middle Period and Late Period components, based on four radiocarbon dates and two obsidian hydration values obtained during subsurface investigations in 1999 (Gmoser et al., 1999). Based on artifact types, King (1968) dated the portion of the site he excavated to the Augustine tradition, which corresponds to the Late Period.

Research Questions:

- *Can deposits at CA-ALA-576 confirm the early Middle Period and/or Late Period occupations of the site?*
- *Are previously unknown temporal components, which can contribute to our understanding of past settlement/migratory patterns, present at the site?*

Trade and Exchange

Items that are not native to a particular region, often referred to as *exotics*, are best understood as having arrived in an area through a process of trade or exchange. Exotic items indicate the range of a group's interaction sphere. The presence of shell beads at inland sites and obsidian at sites that are great distances from quarries are two examples of trade and exchange in prehistory.

Five obsidian samples were sent for obsidian hydration sourcing as a result of field investigations by Gmoser et al. (1999). Two samples were sourced to Napa Valley, two were sourced to Annadel, and one was sourced to Bodie Hills. The Napa Valley and Annadel sources are located approximately 75 miles north of Fremont, and the Bodie Hills source is located about 165 miles east of Fremont. The results indicate that obsidian was obtained primarily from nearest sources. Other lithic materials recovered (chert, quartz, and igneous stone) were locally available, as indicated by the presence of cobbles and cores. Given the availability of a desirable stone tool material (chert), the obsidian may have been imported.

Research Questions:

- *The presence of obsidian suggests a trade network. Previous obsidian sourcing of samples taken from CA-ALA-576 indicate that trade was localized and not far-reaching. Will findings during this field effort support this model?*

- *What types of non-native materials are present at the site and are the materials from nearby or distant sources?*

Social Complexity

The primary sociopolitical unit among Bay Area groups was the tribelet, or village community, which was overseen by one or more chiefs. The tribelet consisted of a well-defined territory with a core village and ancillary settlements. The chief, religious leader(s), and craft specialists resided within the core village where surplus goods were stored (Kroeber, 1925). White and Meyer (2002) suggest that evidence of pre-tribelet social formation may be recognizable in the archaeological record.

Milliken et al. (2007) noted that "evidence of ritual treatment of the dead is one of the few archaeological windows for viewing the emergence of social complexity in the past." In his report of findings for excavations at CA-ALA-576 (previously CA-ALA-342), King (1968) noted that most of the grave goods were found with infants. This finding may suggest an inherited status and some degree of social complexity at CA-ALA-576.

Other evidence of emerging or existing social complexity is indicated by numerous storage pits and a production area in the portion of the site excavated by King (1968).

Research Questions:

- *Is there evidence of a social hierarchy at CA-ALA-576? For example, are burials that contain grave goods present within the deposit?*

- *What evidence is there of craft specialization? For example, are there discrete work areas?*

- *What evidence is there of production for exchange or surplus storage? For example, what types of caches of food resources are present?*

Settlement Systems

Settlement patterns in the region surrounding CA-ALA-576 indicate a small initial occupation of the region during the Early Period followed by a struggle between unrelated bay shore and inland groups for dominance during the Middle Period. Previous researchers held that, during the Late Period, population and settlement increased in the San Francisco Bay Area. More recent researchers have suggested that population and settlements decreased and shifted from bay shore to inland localities during the Late Period (Milliken et al., 2007). However, settlement patterns during the Middle to Late Period may be more convoluted than previously thought. Milliken et al. (2007) concluded that settlement shifts from bay shore to inland localities was fluid and that no one model encompasses all localities. Further research is necessary to understand settlement patterns in this region.

Research Questions:

- *What evidence is there at CA-ALA-576 that may contribute to the understanding of settlement shifts through the Middle and Late Periods?*
- *What evidence is there for seasonal occupation or permanent/semi-permanent villages at CA-ALA-576?*
- *What was the population of CA-ALA-576 and how did it change over time?*

Subsistence Patterns

Subsistence refers to the procurement and consumption of food. Subsistence trends are generally reconstructed based on food remains and the types of tools present in an archaeological deposit. Food remains most often include bone, shell, and seeds. These remains can be speciated and quantified to determine whether a broad spectrum of food types were being exploited at a given site or whether site activities focused on the exploitation of a single resource. Degree of resource intensification can also be gleaned from food remains. Evidence of resource intensification can indicate a growing reliance on increasingly labor-intensive food items due to environmental change, overexploitation, or circumscription.

Research Questions:

- *What were the predominant subsistence patterns at this site and how did they change over time?*
- *To what degree do temporally distinct site components reflect differing subsistence patterns?*

Vertebrate Faunal Assemblages

Resource intensification has been suggested to explain the shift from exploitation of large-bodied pinnipeds during the Early Period to terrestrial large mammals in the Middle Period to sea otter and harbor seals in the Late Period (Milliken et al., 2007). However, others have suggested that the Middle to Late Period shift to sea otter exploitation is related to the Meganos Complex, and that sea otters were hunted primarily for their pelts and not as a food source (Milliken et al., 2007).

Other trends observed in the archaeological record appear to contradict each other. Research at CA-ALA-309 indicated that, after an increased reliance on small mammals, a resurgence of artiodactyls occurred (Milliken et al., 2007). However, research at CA-MRN-254 indicated a shift from deer exploitation during the Middle Period to a more diversified economy in the Late Period (Milliken et al., 2007). It should be noted that these observed patterns were based on small discrete samples.

A recent comparative analysis of sites in inland Santa Clara Valley, the East Bay, and western Solano County supports the broad spectrum coharvesting exploitative strategy model. This model proposes that populations are adaptive and flexible in resource procurement and shift from one resource to the next as availability increases/decreases. The study found that variations in quantities of deer, elk, and pronghorn remains were related to geography and not time. The study suggests that "differences in faunal assemblages over the past 2,500 years are attributable to geography and habitat, not intensification over time" (Simons, as quoted in Milliken et al., 2007).

Previous work at CA-ALA-576 resulted in an early Middle Period component that contained a vertebrate faunal assemblage composed largely of jackrabbits and small schooling fishes. The Late Period assemblage is characterized by a majority of freshwater, saltwater, and pelagic fish remains. The majority of these fish remains are from small schooling fishes from the herring family. Small amounts of rodent, birds, artiodactyls, and one sea otter were present (Gmoser et al., 1999).

Research Questions:

- *How did the inhabitants of CA-ALA-576 use terrestrial versus marine/riverine resources?*
- *What evidence is there of resource shifts at CA-ALA-576?*
- *The lack of fish hooks at CA-ALA-576 suggests the utilization of nets or other means to procure fish. How can the types and quantities of fish remains at CA-ALA-576 clarify the types of technology used in resources exploitation?*

Invertebrate Faunal Assemblages

Invertebrate remains recovered in the Bay Area reflect a shift from oyster to mussel to clam over time, except for South Bay localities where clams never became an important dietary staple. Suggested causes for the temporal change include resource overexploitation, sedimentation, and the Meganos intrusion. All of these causes are worthy of consideration and require further study (Milliken et al., 2007).

Another observed trend is an increased Late Period horn snail yield in the South Bay. It has been suggested that horn snails either supplanted mussels during the off-season or were a luxury item gathered despite greater labor requirements (Milliken et al., 2007).

At CA-ALA-576, California horn snail comprises the majority of the assemblage during the early Middle Period. Oyster is the second-most abundant species, followed by clam. Mussel is absent. The Late Period assemblage maintains the same pattern, although a small amount of freshwater

mussel is also present (Gmoser et al., 1999). The pattern at CA-ALA-576 varies from the pattern reflected at other localities, and appears to support the model of differentiation due to geographical location and not intensification over time.

- *Do data from CA-ALA-576 provide evidence of differentiation due to geographical location, as opposed to intensification over time, in terms of shellfish resource exploitation?*
- *What evidence is there for a shift from oyster to mussel to clam over time?*
- *South Bay horn snail yields increased at the onset of the Late Period. Horn snail remains comprised the majority of the early Middle Period and Late Period invertebrate faunal assemblages at CA-ALA-576. Do deposits at CA-ALA-576 reveal an increased exploitation of horn snail, or did yields remain steady through time? What are the implications of these data for social complexity at CA-ALA-576?*

Plant Remains

Archaeological research in the Bay Area indicates that acorn processing began as early as 5,700 years ago, as evidenced by the presence of mortars. During the Early Period, passive acorn leaching occurred, bulb use peaked, and some small seeds were utilized. The processing of acorn flour increased during the Middle Period. The Late Period is characterized by increased small seed use. However, these trends are not reflected at some sites on the shore of the Bay. Three sites (CA-ALA-309, CA-ALA-310, and CA-ALA-604) lacked acorns and small seeds in the Late Period component, and only spare amounts were recovered from Middle Period components. One early Middle Period site, CA-SCL-478, yielded unusually high quantities of goosefoot, along with acorn and other seeds (Milliken et al., 2007).

Gmoser et al. (1999) noted some atypical patterns regarding plant utilization at CA-ALA-576, indicating primary processing of plant resources other than nuts (acorns). Recovered specimens indicate an early Middle Period reliance on goosefoot, consistent with the finding at CA-SCL-478. Bulbs and *Clarkia* capsule also occur in high frequencies. Goosefoot and acorn appear to decline over time, while *Clarkia* capsules and hazel nut appear to rise in frequency.

King (1968) suggested that the site was a village, occupied primarily in the spring for the harvesting and processing of corms. The site was likely also occupied in the fall for the gathering of acorns.

- *What evidence is there to contribute to the current understanding of plant use over time within the Bay Area?*
- *The presence of mortars and pestle suggests acorn exploitation. What evidence is there for substantial acorn exploitation, or was acorn use incidental?*
- *What evidence is there at CA-ALA-576 of bulb and acorn processing? Is one resource more common in the deposit, indicating seasonality in occupation of the site?*
- *What evidence is there to confirm or refute the decline in goosefoot and acorn relative to Clarkia and hazel nut?*

3.3 Data Requirements

The key to productive archaeology is to obtain sufficient quality and quantity of archaeological materials from a site that address key regional research issues so that new or contributing information is generated. Generally, the following data requirements are necessary to address the relevant research questions outlined above:

- Temporally discrete archaeological components that can be securely dated to the prehistoric and/or protohistoric periods;
- Stratigraphic integrity of soil layers and features;
- Discrete archaeological features or sufficient quantities of ecofacts and artifacts that will allow for analysis and interpretation; and
- Intact burials with associated grave goods.

Specific types of materials required to address the aforementioned research issues include, but are not limited to:

- Debitage (waste produced during the production of flaked/chipped stone tools), to determine the types of lithic reduction strategies that took place at the site.
- Floral remains, including bulbs, acorns, *Clarkia* capsules, goosefoot, hazel nut, to determine the types of plant resources utilized at the site.
- Groundstone tools, such as mortars and pestles, which suggest acorn processing.
- Vertebrate faunal remains including large and small marine mammals (specifically large pinnipeds, sea otters, and harbor seals), large terrestrial mammals, artiodactyls (deer, elk, pronghorn), small mammals (jackrabbits), fish (including small schooling fishes such as herring, freshwater fishes, and pelagic fishes), birds, to determine the types of animals processed and/or consumed at the site.
- Invertebrate remains including clam, oyster, mussel, horn snail, to determine the types of riverine/marine resources utilized at the site.
- House pits, to determine degree of occupation and settlement systems.
- Storage pits, to determine seasonality and duration of occupation.
- Human remains with burial goods, to address degree of social complexity
- Non-native materials such as obsidian, turquoise, steatite, to determine degree of trade and exchange present at the site
- Hearths, to assist in determining types of resources consumed on site.
- Sufficient quantities of carbonaceous materials to conduct radiocarbon dating (per Beta Analytic standards).

CHAPTER 4
Proposed Investigation

4.1 Methodological Approach

This ARDTP/HPTP incorporates a phased approach to data recovery at site CA-ALA-576. The first phase will consist of subsurface testing to determine whether significant site components contributing to the overall site's eligibility are located in the project APE and will be affected by the project. If significant site components are discovered in the construction impact area, the second phase will consist of a data recovery program aimed at recovering the important scientific data contained in those site components prior to their destruction. This phased approach is consistent with the guidelines outlined in 36 CFR 800.4 (b) (2) and the Secretary of Interior's Standards and Guidelines for Archaeology and Historic Preservation (36 CFR 68), and will serve to identify the presence of contributing elements to CA-ALA-576 in the APE, and resolve adverse effects of the undertaking.

During the initial testing phase, an in-field assessment of the recovered materials and site structure will be conducted to assess the eligibility of site components within the area of impact. The assessment will include a determination of the deposit's integrity and its potential to yield data adequate to address the regional research issues outlined above. The assessment will consider the deposit's scientific value to determine if the portion of the site to be impacted contributes to the site's eligibility for the National Register. Methods employed will include mechanical trenching, soil borings, and shovel test pits (STPs), as described in detail below.

If a contributing element is found, the data recovery phase will be implemented. The location and extent of data recovery will be determined by the materials and soil types observed in trenches, borings, and STPs. General guidelines for data recovery methods are outlined below; however, the data recovery program will be flexible and subject to modification in the field depending on the nature and extent of the archaeological deposits encountered. WSIP archaeological guidelines cite "potential shifts in excavation strategy based on findings" and allow for such flexibility. Significant adjustments to the data recovery phase will be made by the Field Director in coordination with the MEA Archaeologist or Designee, the Corps, and the Native American representative (described in Section 4.5, Native American Coordination).

4.2 Subsurface Investigation

The nature of construction techniques to be employed will preclude archaeological investigation in some portions of the site (as discussed in Section 4.3). However, investigations will be conducted within the following accessible portions of site CA-ALA-576 that will be subject to ground disturbance: (1) [redacted]

[redacted]

[redacted]

Subsurface investigations will be aimed at determining the extent of cultural deposits, if any, located within the construction impact area. In addition, archaeologists will look for the presence or absence of A-Horizon soils (the soils most likely to contain remnants of past human occupation) within the construction impact area. Subsurface investigations will not extend beyond the vertical or horizontal limits of the construction impact area, unless specifically requested by an overseeing agency. All subsurface investigations will be directed by a qualified

archaeologist and will be monitored by an archaeologist and Native American representative (discussed in Section 4.5, Native American Coordination).

4.3 Field Methods

Previous investigations have shown that site CA-ALA-576 is largely buried. Because the horizontal and vertical extent of the site within the project APE has yet to be precisely determined, the testing phase will include a combination of mechanical trenching, soil borings, and STPs in areas where construction activities could adversely affect the site or the boundaries of the site are uncertain. In addition, drill cuttings will be monitored during secant pile wall installation in [redacted] The investigative approach for each construction zone, summarized in **Table 4**, is dependent on accessibility for investigation and existing underground facilities located in the area to be investigated. These investigative methods are further described below. Prior to conducting any ground disturbing activities, USA North will be contacted to locate underground utilities, and these planned locations may be adjusted slightly in the field to avoid conflicts with any identified underground utilities. All investigation activities will be supervised by a qualified archaeologist and Native American representative (discussed in Section 4.5, Native American Coordination).

[redacted] where there are no conflicting utilities or underground SFPUC facilities. Excavation of the trenches will facilitate the removal of fill materials and will allow archaeologists to observe deep subsurface soil stratigraphy within the testing areas. The trenches will help inform the data recovery effort by determining the locations and extent of cultural deposits, if any, located within the construction impact area.

[redacted] Drill cuttings produced during installation of the secant pile walls will also be monitored for the presence of archaeological materials and/or human remains.

Archaeologists will be observing trenches and soil borings for cultural materials, such as artifacts and faunal remains. Stratigraphy will also be observed to determine at what depths, if any, intact deposits or A-Horizon soils (the type of soil most likely to contain cultural deposits) are present. Examination of trench excavations and soils borings will allow archaeologists to determine the presence of any intact cultural deposits that may be present within the construction impact area.

STPs will be used adjacent to the existing slip-joint vault in [redacted] Soils from STPs will be examined for the presence of cultural materials and/or human remains.

TABLE 4
INVESTIGATION APPROACHES

Construction Zone	Construction Activity	Limitations/Problems for Archaeological Investigations	Proposed Investigation Approach
BDPL No. 3X Construction			
[redacted]	[redacted]	[redacted]	[redacted]
	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]
	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]

TABLE 4 (Continued)
INVESTIGATION APPROACHES

Construction Zone	Construction Activity	Limitations/Problems for Archaeological Investigations	Proposed Investigation Approach
BDPL No. 3X Construction (cont.)			
[redacted]	[redacted]	[redacted]	[redacted]
BDPL No. 4 Improvements			
[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]

* Archaeological trenches will be placed at least 1.5 meters (5 feet) west of BDPL No. 3. If stepping or benching is needed for excavation safety, the trenches will be stepped or benched to the west **only** and according to OSHA standards. If used, trenches and stepping/benching must remain within the confines of the SFPUC ROW. Steel trench boxes or shields may also be used according to OSHA standards.

Sensitive Culture Resources Information

REDACTED

Corrugated Metal Pipe Segment

Archaeological Site CA-ALA-576

Primary Rupture Zone at Trace A

Primary and Secondary Rupture Zones at Traces B and C

T-1 Archaeological Trench Location

B-1 Archaeological Boring Location

Notes
PCCP: Prestressed Concrete Cylinder Pipe
RCCP: Reinforced-Concrete Cylinder Pipe
CMP: 114-inch Diamter Corrugated Metal Pipe Segment

0 400
Feet

SOURCE: URS, 2008a; ESA+Orion, 2009

Seismic Upgrade of BDPL Nos. 3 and 4 at Hayward Fault

Figure 5

Planned Trench and Boring Locations

An onsite laboratory station will be set up during the testing phase to expedite the field process. All archaeological materials will be processed in the field laboratory according to the methods described in the Laboratory Methods section below.

Mechanical Trenching

Three 4.6-meter (15-foot)-long trenches (Archaeological Trenches 1through 3) will be placed within the portion of CA-ALA-576[redacted] One 4.6-meter (15-foot)-long trench (Archaeological Trench 4)[redacted]Trenches will be located in the area of proposed ground disturbance.

Based on previous archaeological investigations within the [redacted] it is anticipated that intact cultural materials may be present beginning at 1.2 meters (3.9 feet) bgs. These previous investigations suggest that construction fill will be present from 0 to 1.2 meters (4 feet) bgs. Known intact archaeological deposits located[redacted] extend to at least a depth of 2.2 meters (7 feet) bgs; the trench containing intact cultural materials was terminated before the bottom of the deposits was reached (Gmoser et al., 1999). Therefore, the site is likely to extend beyond 2.2 meters (7 feet) bgs in this area. The vertical extent of site CA-ALA-576 extends to at least 3 meters (10 feet) bgs in other parts of the site.

The backhoe used for the trenching will be equipped with a 91.4-centimeter (36-inch)-wide smooth bucket. Trenches are anticipated to extend to depth of no more than 4.6 meters (15 feet) bgs and will not extend beyond the vertical limit of the construction impact area, unless requested by an overseeing agency. They will be placed at least 1.5 meters (5 feet) to the west of BDPL No. 3. For excavation safety, the trenches will be stepped or benched to the west only because of the proximity of the existing BDPL No. 3 to the east. Shoring will be placed along the eastern excavation sidewall, closest to the existing pipeline. All shoring and excavation benching will be in accordance with CalOSHA standards. Trenches and stepping/benching will remain within the confines of the SFPUC ROW. The total volume excavated for each trench will be approximately 20 cubic meters, or 27 cubic yards, of soil, exclusive of the amount of excavation required for benching of the excavation, if needed.

Soil samples from each trench will be screened through 6-millimeter (1/4-inch) hardware cloth. Sample size will be measured in the field so the volume of matrix screened can be estimated upon conclusion of the testing phase.

Mechanical trenching will cease once the archaeological deposit is reached and the data recovery program will be implemented. Mechanical trenching may be horizontally extended to remove fill over the archaeological deposit so that the extent of the deposit can be assessed. The horizontal exposure of the deposit will not extend beyond the SFPUC ROW onto lands owned by other entities.

Under no circumstances will mechanical trenching continue if human remains are uncovered unless the remains are discovered out of context such as in a spoil pile, and not associated with

the trenching. In the event that human remains are uncovered in situ during mechanical trenching, mechanical excavation will cease and hand excavation will be employed to carry out the approved burial treatment plan (described in Section 4.6, Human Remains).

Any archaeological features uncovered within the trench will be explored through hand excavation methods. Exploration and documentation of features will proceed according to the methods discussed in the Data Recovery section below. Extensive features may be left intact until the data recovery program is implemented.

All trenches will be documented by the archaeologist. A stratigraphic profile (including Munsell readings) will be prepared for each trench. Sample portions of the trench walls will be photographed. Trench locations will be mapped with a sub-meter Global Positioning System (GPS) unit and/or total station.

Soil Borings

It is unclear if site CA-ALA-576 extends to the [redacted] Because trenches cannot be constructed in these areas without disruption of traffic, Borings 1 through 5 will be installed at the approximate locations shown on Figure 5 to evaluate the extent of the site in these areas.

The borings will be installed using a Geoprobe System, or similar small and portable drilling rig. The drilling rig will be used to obtain continuous core samples that will be examined by a qualified geoarchaeologist to determine the presence/absence of A Horizon soils and to determine the presence and vertical extent of site CA-ALA-576 in these construction zones. The borings will be drilled to a minimum depth of 6 meters (20 feet) [redacted]

Monitoring of Drill Cuttings

Drill cuttings for the installation of the secant pile walls in [redacted] will be monitored by a qualified archaeologist and Native American representative (described in Section 4.5, Native American Coordination). As described by project engineers, the soil produced during this type of ground-disturbing activity consists of a slurry or mush. Monitors will examine the soils by hand using dry screening, wet screening, or other techniques. Monitors will be looking for cultural materials and human remains present within the soils. Given that the provenience of the items will not be known, no laboratory analysis will be performed. The items will be recovered for indication of the presence/absence of site CA-ALA-576 in this area and out of respect for Native American values. All materials recovered will be stored for later treatment, such as reburial of human remains and/or associated grave goods.

The amount of soil produced may require the presence of additional monitors and the number of monitors will be determined on-site during the initial stages of the secant pile wall installation in consultation with the Principal Investigator, MEA, Corps, and Native American representative underground utilities. All investigation activities will be supervised by a qualified archaeologist and Native American representative (discussed in Section 4.5, Native American Coordination).

Shovel Test Pits

The proposed project includes excavation along the existing [redacted] will be constructed and on either side of the existing slip-joint vault. Excavations for the new slip joint(s) and vaults(s) will be approximately 6.1 to 9.1 meters (20 to 30 feet) long, and excavations on either side of the existing slip-joint vault will be approximately 13.7 meters (45 feet) long. The top of BDPL No. 4 is approximately 0.9 to 6.1 meters (3 to 20 feet) bgs in these areas, and mechanical trenching is prohibited due to the proximity to BDPL No. 4. Therefore, STPs will be used to determine the presence/absence of cultural materials and/or human remains in the areas of the new slip-joint vault(s) and adjacent to the existing slip-joint vault.

During the archaeological testing phase, a minimum of 15 STPs (4 on each side of the existing slip-joint vault, and 3 to 4 at each new slip-joint vault location, spaced at intervals of 3 meters or 10 feet) will be hand excavated. The STPs will be placed down the centerline of the proposed construction trenches. Each STP will measure 30 centimeters (1 foot) in diameter and extend to a depth of 60 centimeters (2 feet). It is anticipated that less than 2 cubic meters (2.6 cubic yards) of soil will be excavated as a result of the STPs. Each STP will be excavated in arbitrary 10-centimeter levels until culturally sterile soils are reached (maximum depth 60 centimeters (2 feet) due to underlying BDPL No. 4). Soils will be screened through 6-millimeter (1/4-inch) hardware cloth and the findings documented on standard STP forms.

If human remains and/or significant amounts of cultural materials are present in this area, additional STPs may be excavated at the discretion of the Field Director. The number and placement of additional STPs will be decided by the Field Director in consultation with the MEA, the Corps and Native American representative, and may be influenced by the presence of underground utilities. All investigation activities will be supervised by a qualified archaeologist and Native American representative (discussed in Section 4.5, Native American Coordination).

Monitoring of [redacted]

The modification of existing sidewalks near the intersection of [redacted] will be monitored by a qualified archaeologist and Native American representative (described in Section 4.5, Native American Coordination). As described by project engineers, there will be very little soil produced during this type of ground-disturbing activity as the removal of the concrete will not descend below the bedding material. The actual amount of soil disturbing activity will not penetrate below 30 cm (1 foot) bgs. Monitors will be looking for cultural materials and human remains present within the soils. Given that the provenience of the

items will not be known, no laboratory analysis will be performed. The items will be recovered for indication of the presence/absence of site CA-ALA-576 in this area and out of respect for Native American values. All materials recovered will be stored for later treatment, such as reburial of human remains and/or associated grave goods.

Assessment

After subsurface testing is completed, any recovered materials will be assessed in the field laboratory by archaeologists in consultation with the MEA, the Corps, and the Native American representative (described in Section 4.5, Native American Coordination) to determine the eligibility of the site component within the area of impact. The integrity of the deposit will be determined in relation to its potential to yield data adequate to address the regional research issues outlined in the previous chapter. If no archaeological materials are discovered, or if deposits are found to retain insufficient integrity or data value, then a decision will be made in consultation with the MEA, the Corps, and the Native American representative as to whether further data recovery is warranted. This decision will be memorialized in a letter to the SFPUC, MEA, Corps, Native American representative, and SHPO.

Data Recovery

If a contributing element of CA-ALA-576 is discovered within the area of impact, the archaeological Field Director and MEA Archaeologist or Designee, in consultation with the Corps and the Native American representative (described in Section 4.5, Native American Coordination), will determine the appropriate extent of data recovery for the deposit. Baseline data available from the testing phase will be used to address whether the site component retains both sufficient integrity and data to be considered a National Register eligible element contributing to the significance of the site as a whole; and provide the logistical plan and justification for the types, number, and locations of data recovery excavations that will constitute the data recovery effort. Data recovery methods include control unit excavation, feature excavation, and special studies sampling, as described below.

The following methods will only be feasible for eligible site components located within [redacted] where access to the subsurface is not restricted by [redacted] Data recovery in these zones will not extend beyond the limits of the construction area of impact, unless specifically requested by an overseeing agency.

Control Unit Excavation

Control units are standard-sized excavation units—generally either 1-meter by 1-meter, 1-meter by 2-meter, or 2-meter by 2-meter. Unit designations are derived from the unit's location relative to the permanent site datum. The number and placement of units depend on the results of the testing phase. For example, if large features such as house floors, special use areas, or multiple burials are encountered, units will be grouped together to expose the entire feature.

In the absence of cultural stratification, control units are excavated in arbitrary 10-centimeter levels, with depths measured from a unit datum corner using a line level. Typically, small hand tools, such as trowels and picks, are used. Depending on soil conditions, shovels and dig bars may be used. Soils excavated from units will be screened through either 3-milimeter (1/8-inch) or 6-milimeter (1/4-inch) hardware cloth, at the discretion of the Field Director.

Units will be documented on unit level forms. All artifacts will be mapped before removal. A plan view for each level will be drawn. A stratigraphic profile for one wall will be drawn upon completion of the unit's excavation.

All artifacts will be bagged in resealable polypropylene bags and labeled with pertinent information, including site number, provenience, and date. Artifacts from each level will be placed in a level bag. Artifacts from each unit will be placed in a large unit bag. All artifacts will be turned in to the Field Director at the end of each field day. Artifacts will be retained in a secure storage area while in the field.

Feature Excavation

Archaeological features such as hearths, filled pits, and house floors will be treated in a more specialized manner. Each feature will be hand excavated using hand tools, and soils will be removed in either arbitrary 10-centimeter levels or by natural stratigraphy, if discernible, with the goal of documenting the relationships between archaeological features and artifacts. Features will be numbered sequentially as they are discovered. Separate feature forms will be used to document the find, and each level will be mapped. Soils will be screened through 3-millimeter or smaller mesh. Samples for archaeobotanical studies or dating will be bagged separately for later processing.

Special Studies Excavation

Column samples will be taken from units for later detailed analysis of archaeobotanical remains, faunal remains, radiocarbon dating, or other studies as appropriate. Column samples are typically 0.25 by 0.25 meter, and are bagged in arbitrary 10-centimeter levels. Column samples will not be screened until processed by the relevant specialist.

4.4 Monitoring and Compensatory Mitigation Measures

All construction-related ground disturbance within the boundaries of site CA-ALA-576, as defined after data recovery is completed, will be subject to archaeological and Native American monitoring. In addition, since the loss of data is likely to occur by the nature of some types of construction activities related to this project [redacted] the implementation of compensatory mitigation will be performed.

Monitoring

Monitoring will be required for all construction-related ground disturbing activities within the boundaries of site CA-ALA-576, as defined after data recovery is completed. Monitoring will be conducted during ground disturbing activities by an archaeologist and Native American representative. All investigation activities will be supervised by a qualified archaeologist and monitored by a Native American representative (discussed in Section 4.5, Native American Coordination).

The monitor(s) will conduct archaeological monitoring of ground disturbing activities, such as pavement/asphalt removal, demolition, grubbing, brush removal, boring, trenching, excavating, grading, utilities removal and installation, and pile driving because of the potential risk these activities pose to archaeological resources and to their depositional context. The monitor(s) will continue to monitor until the monitor, MEA Archaeologist and/or Designee determine that project construction activities could have no effects on significant archaeological deposits. Monitors will observe soils for the presence of culturally significant materials, including Native American human remains. If a potentially significant find is unearthed, monitors may, at their discretion, request that equipment be diverted to other areas until the discovery can be assessed.

During all construction activities that involve soil disturbance, the following policies will be implemented:

a. Archaeological monitoring will be conducted for all ground-disturbing activities including, but are not limited to, pavement/asphalt removal, demolition, grubbing, brush removal, boring, trenching, excavating, grading, utilities removal and installation, and pile driving.

b. Archaeological monitors and Native American representatives will have the authority to temporarily halt or redirect work to permit the exploration, identification, evaluation, and/or recovery of archaeological materials. If archaeological resources are encountered by construction personnel in portions of the APE where a monitor is not present, work in the immediate vicinity shall be suspended until the archaeological monitor and Native American representative investigate the discovery and determine appropriate treatment.

c. Monitoring will be conducted on a full-time basis during soil disturbance activities within the boundaries of site CA-ALA-576, as defined after data recovery is completed.

d. The qualified archaeologist shall be present at the pre-construction meeting to explain the established procedures to the construction contractors, supervisors, and workers.

e. The qualified archaeologist will prepare monthly progress reports to be provided to SFPUC, MEA, and the Corps.

f. If archaeological materials are uncovered, appropriate field data forms will be used to record the location and document the find. The qualified archaeologist and/or Native American representative will provide recommendations for further treatment of the resources to the MEA, the Corps, and the Native American representative. Archaeological materials will be transported to a facility meeting the Secretary of Interior's Standards.

g. Upon completion of all construction-related ground-disturbing activities within site CA-ALA-576, an Archaeological Resources Monitoring and Mitigation Report shall be prepared documenting construction activities observed, including copies of all daily archaeological monitoring logs. If discoveries are made during ground-disturbing activities, the report will also document the archaeological materials and the methods of treatment as determined appropriate by the qualified archaeologist and Native American representative. The report will be filed with the client, the lead agencies, and the appropriate repositories.

Compensatory Mitigation

It is anticipated that some permanent loss of data will occur during the course of construction for this project. In particular, the installation of the secant pile walls for support of the [redacted] must be completed before any excavation can begin [redacted] This prohibits testing and data recovery prior to their installation. If, after the completion of data recovery fieldwork and monitoring it is determined by SFPUC, MEA, and the Corps in consultation with the Principal Investigator, that important data have been lost as a result of the soil borings conducted as part of the investigation described in this ARDTP/HPTP, the installation of the secant pile walls, or archaeological monitoring, then compensatory mitigation commensurate with the scale of information loss shall be implemented. Compensatory mitigation measures shall be chosen in consultation with affected Native American groups.

Suggested compensatory mitigation measures include, but are not limited to, the following:

- Support for Native American basketry workshops
- Interviews with Native American elders
- Collection of Ohlone ethnographic data
- Assisting with the dissemination of information on site CA-ALA-576 to the scientific community
- Support for local indigenous language education
- Brochure/booklet and/or website display about Ohlone culture

4.5 Native American Coordination

The project falls within the traditional territory of the Ohlone peoples. The Ohlone are represented by five or more entities in the vicinity of the project area. None of these groups are federally recognized tribes. Consultation with interested Native American representatives has been conducted under ACHP's regulations (36 CFR 800.2(c)(2)) and at the direction of the lead federal agency, the Corps, as well as in accordance with the CEQA process.

Consultation with interested Native American representatives was initiated for this project in April 2008 by MEA (ESA+Orion, 2009). A record of additional contact efforts is provided in Appendix D.

From the beginning of fieldwork at CA-ALA-576, a Native American representative subcontracted by the archaeological consultant will be onsite to monitor excavation (including trenching, boring, and hand excavation related to the testing and data recovery phases, as well as ground disturbance during construction), as stipulated in the WSIP *Archaeological Guidance No. 7, Archaeological Research Design and Treatment Plan*. The Native American representative will be included in discussions between the archaeological consultant, MEA Archeologist, and the Corps regarding treatment of archaeological materials and any significant shifts in field methods from those described herein.

In addition to observing archaeological investigations, data recovery, and construction-related ground disturbance, the Native American representative shall advise the field archaeologists, MEA, and Corps on the treatment of archaeological materials, and act, as requested, as a conduit of information about the project to the Native American community.

4.6 Human Remains

If human remains are encountered during either the testing or data recovery phase or during construction-related ground disturbance, work in the immediate area will be halted, a 100-foot-diameter buffer established, and arrangements shall be made to protect the remains in place until their disposition has been arranged according to this section. Human remains and any associated burial goods will be handled according to WSIP Projects Standard Archaeological Mitigation Measure I, which states:

> The treatment of human remains and of associated or unassociated funerary objects discovered during any soil-disturbing activity shall comply with applicable State laws. This shall include immediate notification of the coroner of the county within which the project is located and, in the event of the coroner's determination that the human remains are Native American, notification of the California State Native American Heritage Commission (NAHC), who shall appoint a Most Likely Descendant (MLD) (PRC Section 5097.98). The archaeological consultant, project sponsor, and MLD shall make all reasonable efforts to develop an agreement for the treatment, with appropriate dignity, of human remains and associated or unassociated funerary objects (CEQA Guidelines Section 15064.5(d)). The agreement should take into consideration the appropriate excavation, removal, recordation, analysis, custodianship, curation, and final disposition of the human remains and associated or unassociated funerary objects. California Public Resources Code allows 48 hours to reach agreement on these matters. If the MLD and the other parties do not agree on the reburial method, the project will follow Section 5097.98(b) of the California Public Resources Code, which states that "the landowner or his or her authorized representative shall reinter the human remains and items associated with Native American burials with appropriate dignity on the property in a location not subject to further subsurface disturbance."

Based on previous archaeological investigations at CA-ALA-576, the likelihood of uncovering Native American human remains within the project APE is high. Prior to the implementation of this ARDTP/HPTP, potential Most Likely Descendants (MLDs) will be identified from the

NAHC's list of MLDs for this portion of Alameda County. Following the discovery of human remains the NAHC will be contacted to appoint a MLD and develop an agreement for the treatment of human remains and associated or unassociated funerary objects.

In the event that the MLD declines to submit a treatment plan, the archaeological consultant shall, in coordination with MEA, PUC, and the Corps, develop a Human Remains Treatment Plan in accordance with State law. Recommended treatment measures will likely include the excavation of burials in blocks to maintain the surrounding soil matrix, minimally invasive osteological studies, and the examination of all unidentifiable bone by a zooarchaeologist and/or bioarchaeologist to identify potential human remains. It may be recommended that human remains and associated burial goods be reinterred within the boundaries of CA-ALA-576 in an area that will not be subject to further ground disturbance.

4.7 Laboratory Methods

Archaeological materials recovered during both the testing and data recovery phases will be transported to an archaeological laboratory facility for analysis and assessment; however, artifacts encountered in associated with human remains may be required to remain on site, as determined by the Human Remains Treatment Plan. Most artifacts will be cleaned through dry methods only and analyzed as appropriate to determine site chronology and function. All archaeological materials will be catalogued in an Excel spreadsheet or Access database. Any artifacts identified as burial goods will be treated respectfully and in coordination with the MLD. After the laboratory analysis is completed, artifacts will be placed in 4-milliliter resealable polypropylene bags and prepared for curation.

Special Studies

Special studies such as radiocarbon dating, obsidian hydration, x-ray flouresence (XRF), protein residue analysis, vertebrate faunal remains analysis, and archaeobotanical studies may be subcontracted to outside specialists. Outside specialists will be contacted prior to the start of fieldwork and guidelines for field/lab collection/processing of special studies samples will be established.

AMS radiocarbon dating is available for materials such as charcoal, shell, pollen, bone, teeth, plant seeds, fish otoliths, phytoliths, and organic sediments. The most common types of materials collected for radiocarbon dating at archaeological sites are charcoal, wood, bone, and shell. Radiocarbon dating allows researchers to determine the period of use at a site (within certain limits). Samples for radiocarbon dating should be collected following the guidelines of the testing facility (e.g. Beta Analytic) and recommended preventative measures should be implemented to decrease/eliminate sample contamination.

XRF is a non-destructive technique used primarily on obsidian samples to obtain the source location of the material (other volcanic materials that can be sourced are dacite, andesite, and basalt). This information can be used to assist researchers in re-creating trade and exchange

networks. Samples for XRF should be collected following the guidelines of the testing facility (e.g., Geochemical Research Laboratory) and recommended preventative measures should be implemented to decrease/eliminate sample contamination

Obsidian hydration is a destructive process that may consume very small samples. Since XRF is non-destructive, XRF should be completed prior to samples being sent for hydration. Obsidian hydration allows for the relative dating of obsidian artifacts (and sometimes an estimated absolute date). Obsidian hydration samples should be prepared and packaged according to the processing facility's (e.g., Origer's Obsidian Laboratory) recommendations.

Protein residue analysis can be used to determine the types of animals killed or processed by recovered artifacts. The types of artifacts typically tested for protein residue are flaked stone and groundstone, and ceramics. Soils from suspected processing and/or kill areas can also be tested. Samples should be collected following the guidelines of the special studies consultant (e.g., Paleo Research Institute) and recommended preventive measures should be implemented to decrease/ eliminate sample contamination. Control samples should also be collected.

Vertebrate faunal remains may require analysis by a zooarchaeologist, faunal specialist, and/or bioarchaeologist. A specialist who has expertise in distinguishing animal bone from human remains may be required on-site. It is possible that the Human Remains Treatment Plan will not allow for the removal of human remains from the area. Therefore, the specialist may be required to travel to the site to examine the vertebrate bone collection.

Archaeobotanical studies may include pollen, starch, macrofloral, and phytolith analysis. These studies assist researches in reconstructing the past ecosystem. Pollen analysis can be used to determine resource exploitation and types of construction materials utilized in the past. Starch grains and phytoliths, if present, can assist in determining types of plant resources stored and consumed. The types of features that are prime for archaeobotanical studies include: hearth/roasting or storage pits; burials; living surfaces (house pits); and ceremonial/ritualistic caches. Types of artifacts that are usually sampled include groundstone items (e.g., metates) and ceramics. Samples should be collected following the guidelines of the special studies consultant (e.g., Paleo Research Institute) and recommended preventive measures should be implemented to decrease/eliminate sample contamination.

Stone Artifacts

Flaked stone will be classified according to material type, morphology, and function. Each flaked stone tool will be individually measured, weighed, and catalogued according to provenience. Debitage will be sorted by provenience, material type, and size, and then catalogued in bulk units. The flaked stone analysis will focus on determining the types of activities that took place at the site by examining lithic reduction strategies and discard patterns.

Groundstone will be catalogued according to material type, form, and function. Each surface will be examined to determine the presence of wear or faceting. Groundstone analysis will focus on determining the presence of modification through intentional shaping and use-wear patterns.

Special studies such as protein residue analysis are not proposed for the testing phase, but may be included in the data recovery phase to further elicit relationships between tool types and the kinds of resources processed.

Bone and Shell Artifacts

Information that will be gathered from bone and shell artifacts includes size (diameter, length, width, and thickness), perforation types (conical, biconical), weight, and species, if known. Shell beads will be temporally assigned using Bennyhoff and Hughes' (1987) bead typology. A representative sample of bone and shell artifacts will be chosen for line drawings to be included in the final report.

Bone artifacts include awls, saws, sickles, and sweat removers. Awls, often shaped from deer bone, were used in basketry and leather working. Saws, sickles, and sweat removers were often shaped from scapulae. Hammers and flakers, used in flaked stone tool production, were usually made from antlers. Analysis of bone artifacts requires specialized knowledge of animal bone morphology and the careful examination of surfaces to determine modification by human action.

Bone beads and ornaments are fashioned from bird, fish, and small mammal bones. Bone ornaments consist primarily of pendants, disk beads, and tubes. Bone artifacts will be carefully inspected for the presence of incised lines, punctuation, or pigment.

Shells were manufactured into beads, pendants, and ornaments. Shell beads were worn as necklaces and bracelets, but were also used to decorate garments and basketry. The species of shell manufactured into beads include *Olivella*, *Haliotis*, *Dentalium*, and clam. Shell beads could also be used as currency. Other shell artifacts include fishhooks and bowls.

Vertebrate Faunal Remains

Analysis of vertebrate faunal remains will begin by classifying specimens into identifiable and unidentifiable categories. Identifiable specimens will be classified by taxon, element, body side, fragment type, age, and gender. Unidentifiable specimens will be grouped into general categories, such as large mammal, small mammal, bird, fish, reptile, etc., and then weighed and catalogued by provenience. Notations will include burned/unburned, cut marks, polish, and taphonomy. Comparative collections will be utilized as necessary to identify genus and species.

Invertebrate Faunal Remains

Invertebrate faunal remains (likely to consist primarily of shell) will be classified by genus and species, counted, weighed, and catalogued by provenience. Identification of growth rings, seasonality, and burned/unburned will be noted when possible.

Plant Remains

Plant remains will be identified by taxon, weighed, and catalogued by provenience. Column samples will be processed through flotation and examined for microfloral remains such as pollen and phytoliths.

4.8 Field Documentation and Mapping

All excavations related to the testing and data recovery phases will be documented through photography, hand and digital mapping methods, and appropriate field forms.

Standard field forms include unit level records, feature forms, and STPs forms. Each unit level will be mapped using a plan view. Each feature will be mapped on graph paper. Stratigraphic profiles will be drawn for all trenches, units, and features. Profiles will include a description of soils, including Munsell readings.

The site will be mapped in the field by the use of a sub-meter GPS and/or a total station. The site datum established and used by Galvan and Thompson (ca. 1998 [as mentioned in Rosenthal, 2006]) and Gmoser et al. (1999) will be located and reused if possible. After the archaeological investigations are completed, the site will be mapped to sub-meter accuracy. Archaeological data will be linked to construction data so that archaeological deposits can be plotted on construction maps.

4.9 Curation

Upon completion of the laboratory analysis, all artifacts will be placed in 4-milliliter resealable polypropylene bags and prepared for curation at the Anthropological Study Center Archaeological Curation Collections Facility, Sonoma State University, California. Artifacts will be grouped according to the requirements of the curation repository and placed in archival-quality boxes. Documents accompanying the artifacts—e.g., the artifact catalog, field notes, maps, the final report—will be printed on acid-free paper. An electronic copy of the artifact catalog and digital photographs will be provided on CD or DVD. A signed curation agreement between the SFPUC and the David A. Fredrickson Archaeological Collections Facility at Sonoma State University will be required before the start of archaeological testing/excavation. The facility meets the following Secretary of Interior's Standards and Guidelines (36 CFR 79):

- Curation facilities contain adequate space, facilities, professional personnel;
- Archeological specimens are maintained so that their information values are not lost through deterioration, and records are maintained to a professional archival standard;
- Curated collections are accessible to qualified researchers within a reasonable request time; and
- Collections are available for interpretive purposes, subject to reasonable security precautions.

4.10 Required Permits and Schedule

Implementation of this ARDTP/HPTP will require drilling permits from the Alameda County Water District, an encroachment permit from Caltrans, and may require additional internal permits from the SFPUC.

Implementation of this ARDTP/HPTP will require approximately six months from the start of field activities (started once permitting is completed) through curation, reburial of human remains, and reporting. This includes approximately two weeks for subsurface testing, one month for data recovery, four to six weeks for laboratory assessment of archaeological materials recovered, and three months for curation of recovered artifacts, reburial of human remains, and final reporting. This schedule may be shortened or lengthened, depending on the amount of data recovery required. Implementation of compensatory measures will extend beyond this six month time frame, and will be implemented according to a schedule agreed to by the consulting Native American groups.

Archaeological monitoring, including monitoring of drill cuttings during installation of the secant pile walls, will be conducted during construction. Monitoring will only be required during ground-disturbing activities within the limits of site CA-ALA-576, as modified as a result of data recovery operations conducted in accordance with this ARDTP/HPTP.

CHAPTER 5

Data Recovery Report and Dissemination of Results

5.1 Report Structure

Upon completion of the data recovery, a comprehensive report will be prepared documenting the methods and findings of the data recovery program. The report will interpret the results, address the research questions outlined in the ARDTP/HPTP, and discuss any necessary protective measures (e.g., avoiding environmentally sensitive areas, following archaeological and Native American monitoring requirements) to be carried out during construction. The report structure will follow the *WSIP Archaeological Guidance No. 8*: *Archaeological Data Recovery Report* and meet Secretary of Interior Standards and Guidelines (48 FR 44716).

Additional products to be produced may include a booklet/brochure or a website display about the site or Ohlone culture. The necessity for these products will be determined by SFPUC, MEA, and Corps in consultation with the Principal Investigator and the Native American consultant on the basis of the results of the data recovery. These additional products may be used in part to comply with the compensatory mitigation measures.

5.2 Report Distribution

A draft report will be submitted to the MEA, PUC, and Corps for review and comments. After the final report is completed, hard copies of the report will be submitted to the SFPUC, MEA, Corps, and the SHPO along with the NWIC, and a searchable document in pdf format will be created. Depending on the results of the work, appropriately edited hard copies of the report may be sent to research libraries, local historical societies, and other interested parties.

CHAPTER 6
Personnel and Consultants

6.1 Personnel

All supervisory personnel for the project, including the Principal Investigator, Project Archaeologist, and Field Director, must meet or exceed professional qualification standards for archaeology as set forth in the Secretary of the Interior's Standards and Guidelines for Historic Preservation Projects (48 FR 44738-44739).

Those minimum professional qualifications include a graduate degree in archeology, anthropology, or closely related field, as well as the following:

1. At least one year of full-time professional experience or equivalent specialized training in archeological research, administration, or management;

2. At least four months of supervised field and analytic experience in general North American archeology; and

3. Demonstrated ability to carry research to completion.

In addition to these minimum qualifications, a professional in prehistoric archeology must have at least one year of full-time professional experience at a supervisory level in the study of archeological resources of the prehistoric period.

6.2 Consultants

Special studies, such as radiocarbon dating, obsidian hydration, XRF, vertebrate faunal remains analysis, and archaeobotanical studies, may be conducted by outside specialists as appropriate. Sub-consultants will be chosen in consultation with the MEA Archaeologist or Designee.

CHAPTER 7
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APPENDIX A

SHPO Correspondence

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STATE OF CALIFORNIA – THE RESOURCES AGENCY

ARNOLD SCHWARZENEGGER, *Governor*

OFFICE OF HISTORIC PRESERVATION
DEPARTMENT OF PARKS AND RECREATION
P.O. BOX 942896
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calshpo@ohp.parks.ca.gov
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April 28, 2009

In Reply Refer To: COE090417A

Mitch Marken, Ph.D.
Practice Leader
Cultural Resources Director
ESA, Inc.
225 Bush Street, Suite 1700
San Francisco, California 94104

Re: San Francisco Public Utilities Commission (SFPUC) Water System Improvement Program, BDPL Pipeline Nos. 3 and 4 at Hayward Fault Seismic Upgrade Project, Fremont, Alameda County, California.

Dear Mr. Marken:

Thank you for seeking my consultation regarding this undertaking. The U.S. Army Corps of Engineers (COE), San Francisco District, is requesting comments regarding their efforts to comply with 36 CFR Part 800 (as amended 8-05-04) regulations implementing Section 106 of the National Historic Preservation Act. The proposed undertaking, the BDPL Pipeline Nos. 3 and 4 at Hayward Fault Seismic Upgrade Project, will affect waters under the jurisdiction of the United States and requires authorization by the COE pursuant to Section 404 of the Clean Water Act and additionally requires a permit pursuant to Section 10 of the Rivers and Harbors Act. The COE has identified these actions as an undertaking pursuant to Section 106 of the NHPA and has authorized ESA+Orion to act on their behalf regarding this consultation. In addition to your letter of April 6, 2009, and attachments, you have submitted the following report as documentation of your efforts to identify and evaluate historic properties in the project Area of Potential Effects (APE):

- *Seismic Upgrade of Bay Division Pipeline Nos. 3 and 4 at Hayward Fault Project, Fremont, Alameda County, California: Historic Context and Archaeological Survey Report* (ESA+Orion: April 2009).

The project will involve the installation of approximately 2,360 linear feet of 72-78 inch diameter welded-steel pipe in an alignment directly adjacent to the existing 78-inch diameter BDPL No. 3. The project location is between the North and South Shutoff Stations in the 80-foot wide SFPUC right-of-way (ROW) near the intersection of Interstate 680 and Mission Boulevard in the City of Fremont. This section of the SFPUC ROW crosses two traces of the Hayward Fault. The APE includes the ROW along the entire 2,360-foot project length as well as four staging locations. The vertical extension of the APE (depth) will range from 15-35 feet. Project construction will largely consist of

open-trench cut-and-fill, with jack-and-bore techniques employed to cross under roadways (I-680 and off ramps) and Agua Fria Creek. Several existing buried utilities in the project APE will also be relocated and minor upgrades will be installed to the existing BDPL No. 4 to seismically strengthen the pipeline where it crosses the two Hayward Fault areas.

Historic property identification efforts indicated that one previously recorded archaeological site, CA-ALA-576, was located within the project APE. The COE has determined that, based on previous archaeological studies completed on portions of CA-ALA-576, it is eligible for the National Register of Historic Places (NRHP) under criterion D for the significance of its data potential. After reviewing our files and database, I find that CA-ALA-576 was determined eligible for the NRHP by SHPO consensus in 1999 (SHPO letter of December 27, 1999: File FHWA991123A).

The COE has determined that the undertaking as proposed will have an adverse effect to CA-ALA-576 and that avoidance through project redesign is not feasible due to the constraints of the APE, which is restricted to the SFPUC ROW corridor. Based on my review of your letter and supporting documentation, I concur that a finding of Adverse Effect is appropriate pursuant to 36 CFR Part 800.5(d)(2). I will be available to continue this consultation following the receipt of a Memorandum of Agreement (MOA), pursuant to 36 CFR Part 800.6(c), and an Historic Properties Treatment Plan (HPTP) that will be carried out in accordance with the MOA to resolve the adverse effect of this undertaking to CA-ALA-576.

Thank you for seeking my comments and for considering historic properties in planning your project. If you require further information, please contact William Soule, Associate State Archeologist, at phone 916-654-4614 or email wsoule@parks.ca.gov.

Sincerely,

Susan K Stratton for

Milford Wayne Donaldson, FAIA
State Historic Preservation Officer

cc:

Kathleen Ungvarsky
Department of the Army
San Francisco District
U.S. Army Corps of Engineers
1455 Market Street
San Francisco, California 94103-1398

APPENDIX B

Locations of Previous Investigations

Sensitive Culture Resources Information

REDACTED

APPENDIX C

CA-ALA-576 DPR Forms

Sensitive Culture Resources Information

REDACTED

APPENDIX D

Native American Contact

SUMMARY OF NATIVE AMERICAN CONTACTS
SEISMIC UPGRADE OF BAY DIVISION PIPELINE NOS. 3 AND 4 AT HAYWARD FAULT PROJECT

		DATE					
Name	**Organization**	**Initial Contact from SFPUC**	**USACE Contact with HCASR**	**Follow up Call**	**Sent draft HPTP**	**Repsonse**	**Follow up Call**
Debbie Pilas-Treadway	Native American Heritage Commission	1/31/2008	N/A	3/15/2010	N/A	None	N/A
Jakki Kehl	Ohlone/Costanoan Tribal Band	4/1/2008	10/23/2009	4/23/2010 requested copy of HPTP and EIR	4/23/2010	None	5/7/2010
Ann Marie Sayers	Indian Canyon Mutsun Band of Costanoan	4/1/2008	10/23/2009	4/23/2010 requested copy of HPTP	4/23/2010	None	5/7/2010
Katherine Erolinda Perez	Ohlone/Costanoan	4/1/2008	10/23/2009	4/23/2010 left message	N/A	N/A	N/A
Rosemary Cambra	Muwekma Ohlone Indian Tribe of the San Francisco Bay Area	4/1/2008	10/23/2009	4/23/2010 left message	N/A	N/A	N/A
Irene Zwierlein	Amah/Mutsun Tribal Band	4/1/2008	10/23/2009	4/23/2010 left message	N/A	N/A	N/A
Andrew Galvan	Ohlone Indian Tribe	4/1/2008	10/23/2009	3/16/2010 initiated emails	4/12/2010	Email 4/23/2010	5/7/2010
Ramona Garibay	Trina Marine Ruano Family	4/1/2008	N/A	4/23/2010 left message	N/A	N/A	N/A

NOTES:
EIR = Environmental Impact Report
HCASR = Historic Context and Archaeological Survey Report
HPTP = Historic Properties Treatment Plan
SFPUC = San Francisco Public Utilities Commission
USACE = U.S. Army Corps of Engineers