Cultural Resources Assessment of the
Los Vaqueros Reservoir Expansion Project
Alameda and Contra Costa Counties, California

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Management Summary

William Self Associates, Inc. (WSA) has been contracted by Environmental Science Associates (ESA) to perform a cultural resource assessment of the Contra Costa Water District’s (CCWD) proposed expansion of the Los Vaqueros Reservoir (project). The project will involve expansion of the existing dam, expansion of the reservoir pool from the current capacity of 100,000 acre ft. (TAF) to 275 TAF, and construction of new water pipelines, electrical power lines, and associated facilities. This report has been prepared pursuant to the requirements of the National Environmental Protection Act (NEPA), Section 106 of the National Historic Preservation Act (NHPA), as amended, and the California Environmental Quality Act (CEQA). The U.S. Bureau of Reclamation (Reclamation) is the lead federal agency, and CCWD is the lead state agency.

The Cultural Resources Technical Report (report) defines the study area for the project, identifies cultural resources within the study area, evaluates their significance, assesses the potential impacts from the project to each resource listed or eligible for listing on the National Register of Historic Places (NRHP) and the California Register of Historical Resources (CRHR), and recommends mitigation to reduce impacts to a less-than-significant level (CEQA) and reduce adverse effects (Section 106).

The identification phase included a records search and cultural resources survey. The records search at the Northwest Information Center included a study area of a ¼-mile radius of the project. Fifty-nine previous cultural resources studies have been undertaken in some portion of the study area. A mixed strategy archaeological survey focused on the Area of Potential Effects (APE) relocated previously recorded cultural resources and identified and recorded previously unrecorded cultural resources. The proposed expansion of the Los Vaqueros Reservoir could adversely impact 41 cultural resources listed, or eligible for listing on the NRHP and the CRHR, the Kellogg Creek Historic District, and one sensitive location. A consultation with the Native American Heritage Commission (NAHC) July 10, 2008 revealed no known sites in the sacred lands file.

Mitigation strategies are proposed to offset adverse effects to individual historic properties and to the Historic District during project construction, operation, and maintenance. Should any resources be discovered during construction, their significance would have to be determined in relation to the criteria for eligibility to the NRHP and to the CRHR.
1.0 Introduction

William Self Associates, Inc. (WSA) has been contracted by Environmental Science Associates (ESA) to perform a cultural resources assessment of Contra Costa Water District’s (CCWD) proposed expansion of the 100,000 acre ft. (100 TAF) Los Vaqueros Reservoir to a capacity of 275 TAF. The Cultural Resources Technical Report (report) defines the study area for the project, identifies cultural resources within the study area, defines the Area of Potential Effects (APE) and evaluates the significance of resources within the APE, assesses the potential impacts from the project to individual resources listed or eligible for listing on the National Register of Historic Places (NRHP) and the California Register of Historical Resources (CRHR), and to the Kellogg Creek Historic District. The report recommends mitigation strategies to reduce project and cumulative impacts to a less-than-significant level (CEQA) and reduce adverse effects (Section 106).

The project is subject to both state and federal regulations. The Contra Costa Water District (CCWD) is the lead state agency for the project. The U.S. Bureau of Reclamation (Reclamation) is the lead federal agency. The Western Area Power Administration (Western) serves as a cooperating federal agency. This report is conducted pursuant to the requirements of Section 106 of the National Historic Preservation Act (NHPA) as amended, the National Environmental Policy Act (NEPA), and the California Environmental Quality Act (CEQA) and serves as a supporting document for the combined Environmental Impact Statement (NEPA) and Environmental Impact Report (CEQA).

Cultural resources studies related to the installation of the 100 TAF Los Vaqueros Reservoir in the late 1990s resulted in the documentation of 75 historic properties1 and one sensitive location2 within the Upper Kellogg Creek Watershed. Large portions of the study area have been previously surveyed. In 1992, the Upper Kellogg Creek Watershed was declared a Historic District eligible for listing on the National Register of Historic Places (NRHP), and many contributing historic properties were identified and adverse project effects mitigated as a result of the installation of the 100 TAF Los Vaqueros Reservoir. Geoarchaeological studies conducted under the auspices of CCWD for the original 100 TAF Los Vaqueros Reservoir identified areas with a high potential to yield prehistoric cultural deposits and human burials that have been buried beneath alluvium and are not visible on the modern ground surface (Meyer 1996; Meyer and Rosenthal 1997) and the results are used as a predictive model in this report.

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1 Historic properties are districts, sites, buildings, structures, and objects that are listed or eligible for listing in the NRHP.
2 The sensitive location is the reburial site for Native American human remains displaced during the construction of the original Los Vaqueros reservoir project.
WSA implemented a complete record search of a ¼-mile radius surrounding all proposed project components, and conducted an archaeological field survey and impact assessment within a more restricted study area including those areas that would be impacted during project construction, operation, and maintenance, for all project components and alternatives under consideration. In May, June, and November 2007, and February and April 2008, WSA staff conducted a mixed strategy pedestrian survey of the reservoir expansion area, the proposed pipeline corridors, the electrical power corridors, and associated facilities. In the reservoir expansion area, surveyors targeted known historic properties between the existing 100 TAF reservoir and the proposed 275 TAF expansion area with an additional buffer of 200 ft. All previously recorded and evaluated sites were relocated and examined for evidence of disturbance. Any new cultural resources were mapped and recorded. Each of the proposed pipeline corridors (Delta-Transfer, Transfer-LV, and Transfer-Bethany), power line corridors, Delta intake sites and associated facilities that had not been previously surveyed (Transfer Facility expansion area, staging and borrow areas north of the dam) were examined on foot using 4-m transect intervals. Archaeologists searched for evidence of past cultural activities older than 50 years, including concentrations of flaked stone, groundstone, charcoal, fire-affected rock, locally dark soil, shell and/or bone fragments, shards of ceramic or glass, and other historic-era materials such as brick, nails, wire, foundations, fencerows, and irrigation ditches.

CCWD will conduct Native American consultation once the Area of Potential Effects of the project has been finalized. This report presents the results of the research conducted to identify and evaluate cultural resources within the study area. Those cultural resources that are either listed on the NRHP (or CRHR) or recommended as eligible for listing on the NRHP (or CRHR) are further assessed in terms of the project description and potential adverse impacts from project construction, maintenance, and use. Mitigation strategies are recommended for each significant cultural resource (historic property) and the Historic District that would serve to reduce the adverse impacts to a less than significant level (CEQA) or provide no adverse effect with mitigation (Section 106).

1.1 Project Description

The proposed Los Vaqueros Reservoir Expansion Project is located in parts of Alameda and Contra Costa counties (Figures 1 and 2: Vicinity and Location Maps). The reservoir and associated facilities fall within the Upper Kellogg Creek Watershed. Some proposed facilities and proposed pipelines designed to bring water to and from the Los Vaqueros Reservoir cross reclaimed delta and swamp lands between the Watershed and the Old River to the east. The study area, which includes the proposed Area of Potential Effects (APE), is depicted on portions of six U.S. Geological Survey 7.5 minute topographic quadrangle maps including Brentwood (1978), Byron Hot Springs (1953, photorevised 1968), Clifton Court Forebay (1978), Tassajara (1991), and Woodward Island (1978).
Figure 1

Project Vicinity

ESA
Los Vaqueros Reservoir Expansion
Alameda & Contra Costa Counties
Figure 2

LEGEND
- Area of Potential Effects (APE)
- Study Area
- Western Marina Road
- Western Hiking Trail/Access Road
- Eastern Trail Alignment
- Existing Access Roads

Project Location, Study Area and Project Components
The following project description provides information relevant to evaluating potential project impacts to cultural resources. For the Cultural Resource Assessment, WSA mapped and assessed the Area of Potential Effect (APE) of the reservoir expansion project. The maximum potential impact area includes all the 275 TAF reservoir expansion and associated facilities proposed under Alternative 1, expansion of the Old River Intake and Pump Station proposed under Alternative 3, and a borrow site proposed under Alternative 4. There is not a separate assessment for a 160 TAF reservoir alternative (Alternative 4) or the other project alternatives in this report. The project description below summarizes facility and construction information from Chapter 3 Project Description found in the project EIS/EIR. Please refer to Figure 2 of this report for locations of the project components discussed in the text.

Expansion of the Los Vaqueros Reservoir from the existing storage capacity of 100 TAF to 275 TAF would involve raising the dam by building over the existing facility to raise and strengthen it to support the larger reservoir. The capacity of CCWD’s existing Old River Intake and Pump Station would be expanded, or a new Delta Intake and Pump Station would be constructed along the Old River channel. The capacity of the existing conveyance facilities that move water from the Delta to the Los Vaqueros Reservoir would also be expanded by: a) installing an additional pipeline parallel to the existing pipeline that extends from the Delta to the Transfer Facility and then from the Transfer Facility to the reservoir; and, b) adding expanded facilities at the existing Transfer Facility site (which includes a pump station, surge tanks, regulating reservoir and flow control station). Finally, a new conveyance pipeline would be constructed between the Transfer Facility and the South Bay Aqueduct Pumping Plant, located at Bethany Reservoir. Additional electrical power supply would need to be extended to proposed project facilities from the existing Western Area Power Authority (Western) and/or Pacific Gas and Electric (PG&E) power utilities that serve existing CCWD facilities. Existing recreation facilities within the Los Vaqueros Watershed that are disturbed or displaced by the reservoir expansion project would be relocated if necessary, replaced and augmented.

Dam Reconstruction

Raising the existing dam for expansion to 275 TAF would require building on top of both the upstream and downstream shells of the dam. The dam axis would move approximately 45 ft. upstream. Upstream work would require that the reservoir be empty during construction. The majority of the materials required for the 275 TAF dam raise are claystone and sandstone that comprise the upstream and downstream shells. These materials would be obtained from an approximately 36-acre borrow area that would be developed on the south facing slope of the left abutment ridge immediately upstream from the dam. This borrow area would be an extension of the borrow area developed for the construction of the existing dam. The clay for the central core of the 275 TAF reservoir dam would be excavated from the alluvial clay deposits naturally occurring on the floor of the reservoir from the general vicinity that the
core materials for the existing dam were obtained. This area is currently inundated by the existing reservoir.

Once the remaining water has been removed, a groundwater cutoff trench would be installed upstream of the dam footprint to enable excavation of the foundation upstream of the toe of the existing dam. A temporary cofferdam would be constructed upstream of the cutoff trench. A temporary diversion pipe would be installed to divert any inflows from Kellogg Creek to the bottom port of the existing dam. About 1,000,000 cubic yards of wet alluvium and spoil from the existing dam would be excavated between the groundwater cutoff and the upstream shell of the dam. Excess earthen materials would be disposed within the reservoir inundation zone at a suitable distance from the dam to avoid interference with reservoir operations.

**Intake and Pump Station**

CCWD’s existing Old River Intake and Pump Station is located on an approximately 17-acre site along Old River east of Byron and immediately south of State Route 4. The five existing pumps will be replaced and additional fish screens will be installed. The motor control center building and electrical transformer yard will be enlarged. All expansion work would occur within the existing facility site.

**Delta Intake and Pump Station**

The new Delta Intake and Pump Station facility would be located along Old River south of CCWD’s existing Old River Intake and Pumping Station. An approximately 20-acre site would be required to accommodate this new intake and pump station facility. Additional engineering and geotechnical investigation is required to select the final site location. Therefore a broader siting zone has been evaluated within which the 20-acre facility would be located. A pipeline connecting the Delta Intake and Pump Station to the Old River Intake and Pump Station as well as an access road and a 69 kV electrical transmission line would need to be installed within this siting zone. The access road may be co-located with the existing levee along the east side of the siting zone.

The Delta Intake and Pump Station would include a trapezoidal concrete water intake structure with fish screens. An inlet channel and wet well would be located downstream from the intake structure. An earthen setback levee would be installed to provide protection during construction of the intake and maintain continuity of the road system along the dike following construction. Additional components include five pumps, approximately five 40-ft. tall-surge tanks, a motor control center building, a control building, an electrical transformer yard, and a new permanent access road from State Route 4 or another secondary road.
The subsurface conditions in the siting zone for the Delta Intake and Pump Station are likely comprised of a series of fine sands, silts, clays, and peat that are highly compressible and of low strength. Accordingly the facility would need to be supported on a foundation system such as driven concrete or steel piles or stone columns. A preliminary plan includes piles that would be founded at an approximate elevation of -50 ft. msl and spaced approximately 15 ft. apart on a square grid. In addition to the piles, soil densification would likely be required beneath the intake and setback levee to reduce the liquefaction potential of the soil and to improve its lateral strength during seismic events. Preloading of the soils beneath the levee may also be required to reduce long-term settlement of the levee. For the Delta Intake and Pump Station as well as the Expanded Transfer Facility, the ground would be completely cleared and excavated, if required. Excavation for a new tank would remove 270,000 cubic yards of material.

**Delta-Transfer Pipeline**

An additional pipeline would be necessary to connect the Expanded Old River Intake and Pump Station or the New Delta Intake and Pump Station to the Expanded Transfer Facility. The pipeline would extend approximately 6.5 miles and would generally parallel the Old River Pipeline alignment within the existing Old River Pipeline permanent right-of-way for a majority of the route. The pipe would be approximately 78 inches in diameter. Where unrestricted, the total construction easement for this pipeline would be approximately 200 ft. wide. Pipeline materials (e.g., piping, backfill material, etc.) would be stored along the pipeline route within the construction easement. The active work area would generally be 25 to 50 ft. on both sides of the trench. The minimum right-of-way for construction would be 85 ft. wide. Details of pipeline installation are provided below.

**Transfer Facility Expansion**

At the existing Transfer Facility the motor control center building and transformer yard would be expanded. The new facilities would be located on the northern portion of the CCWD-owned property, adjacent to the existing Transfer Facility and would include a pumping station with five pumps, new surge tanks, an additional steel reservoir, and permanent access roads to the new facilities and around the steel reservoir. The existing and new steel reservoirs would also be interconnected. The steel tank would be built on a reinforced concrete ring footing foundation with a layer of asphaltic cement (AC) pavement laid beneath the tank in the area encompassed by the ringwall footing. For the Expanded Transfer Facility, the ground would be completely cleared and excavated, if required. Excavation for a new tank would remove 270,000 cubic yards of material.
Transfer-LV Pipeline

An additional pipeline, the Transfer-LV Pipeline, would be necessary to convey water from the Transfer Facility to and from the expanded Los Vaqueros Reservoir. The Transfer-LV Pipeline would generally parallel the existing Transfer Pipeline alignment within the existing Transfer Pipeline permanent easement right-of-way for a majority of the route. The additional pipeline, about 3.7 miles in length, would be 72-inches in diameter.

Inlet and Outlet Pipelines

The Transfer-LV Pipeline would connect to the inlet pipeline that would deliver water through the dam and into the reservoir. In the same corridor, an outlet pipeline would deliver water out of the reservoir. Construction of the inlet and outlet pipelines would require an 85-foot construction corridor.

Transfer-Bethany Pipeline

The approximately 9.0 miles, 132-inch pipe of the new Transfer-Bethany pipeline would connect the Expanded Transfer Facility to the Bethany Reservoir in one of the following two ways:

1. Water would be diverted from the Delta through the new Delta Intake and Pump Station, Old River Intake and Pump Station and/or AIP, conveyed though the Delta-Transfer Pipeline to the Expanded Transfer Facility and then delivered directly to the Bethany Reservoir via the Transfer-Bethany Pipeline.

2. Water would be released from the expanded Los Vaqueros Reservoir through the Transfer Pipeline to the Expanded Transfer Facility and then delivered to Bethany Reservoir via the Transfer-Bethany Pipeline.

Water could then be pumped from the Bethany Reservoir into the SBA via the South Bay Pumping Plant, or could be transferred downstream via the California Aqueduct to the San Luis Reservoir for delivery to SCVWD.

Where unrestricted, the total construction easement for this pipeline would be about 300 ft. wide. The work area has been restricted along a portion of Armstrong Road. Pipeline materials (e.g., piping, backfill material, etc.) would be stored along the pipeline route within the construction easement. The active work area would generally be 25 to 50 ft. on both sides of the trench. The minimum right-of-way for construction is generally 85 ft. wide, with the exception of the 70-ft. wide portion along Armstrong Road. CCWD would likely need to acquire an 85-ft. wide permanent easement for this pipeline alignment.
Tunnel Portals, Access, Staging and Spoils Disposal

The tunnel entry portal site would be approximately three acres. Access to the site would be via an existing gravel road, approximately 35 ft. wide, which begins at the terminus of Byron Hot Springs Road, heads south past a large gravel pad before it traverses westward. Approximately 2,000 ft. past the existing gravel pad, the access road makes a hairpin turn and traverses down a hill. From the bottom of the hill, a new temporary access road would need to be installed to the entry portal site. The existing access roads would be widened to approximately 35 ft. and a new approximately 1,150-ft. long segment would also be installed to the tunnel entry portal site.

The exit portal would be approximately one acre. Access to the site would be via existing access roads in and around the Bethany Reservoir. No new temporary access roads are anticipated to be installed.

An approximately 4.5 acre existing gravel pad near the terminus of Byron Hot Springs Road would be used as a staging area for the boring and/or pipeline construction activities associated with the Transfer-Bethany Pipeline. The site would be used to accommodate the tunnel boring, excavation equipment, pipeline and other materials storage as well as temporary housing/parking for crews, trucks, and other requirements. Two spoil disposal areas, occupying approximately 22-acres, have been sited near the terminus of Byron Hot Springs Road for disposal of tunnel waste rock and spoils.

For the Tunnel/Trench Option, the pipeline would include two smaller tunnel segments under the SBA. Access to the entry and exit pits for both tunnels would be via existing roads. Modification/widening of these roads may be required. The staging area and spoil disposal areas associated with the Tunnel Only Option, discussed above, would also be used for this option.

Blow Off and Air Valves

Blow off and air valves would be required along the new pipelines. Blow off valves and air valves are permanent release valves for water and or air during abnormal operating conditions that are installed at low points and high points respectively. The actual location of these valves will be dependent on the pipeline alignment; however, for purposes of this analysis, approximately one air valve would be installed every 1,000 ft. and one blow off valve every 2,000 ft. The valve structures have a concrete base with a medium diameter pipe extending about two feet above the base for a total height of about 2-4 feet above the ground.
Pipeline Construction

Installation of pipelines would use open-trench construction methods for pipeline installation and bore-and-jack methods for crossings where trenching methods are not feasible or where restrictions warrant other construction methods (e.g., major roadways and intersections, railroad lines, flood control channels, or sensitive wetlands/sloughs).

The trench width for the conveyance pipeline installation would range from 35 to 70 ft.; trench depth would range from 15 to 55 ft., depending on the size of the pipeline being installed, but would typically be 20 ft. The minimum soil coverage required is approximately 4 to 6 ft. Trenches would be braced with a trench box or speed shoring to minimize their width and to provide a safe working environment. The active work area along the open trench would generally extend about 25 to 50 ft. to both sides of the trench. The minimum construction right-of-way would be approximately 85 ft.; the maximum construction easement would be 300 ft. wide.

Staging areas would be set up along the pipeline alignment, and construction equipment and other materials would be located at selected locations to facilitate the movement of materials, equipment, and construction crews. Staging areas would be selected to minimize hauling distances and long-term disruption and avoid sensitive environmental resources that may be present.

Boring and Jacking
Bore-and-jack construction techniques would be used for crossing flood control channels, major roadways, railroad crossings, and wetlands, sloughs, and other environmentally sensitive locations. The bore-and-jack method involves using a horizontal boring machine or auger to drill a hole and a hydraulic jack to push a casing through the hole. As the boring proceeds, a steel casing pipe is jacked into the hole; the pipeline is then installed in the casing. The casing is pushed using a large hydraulic jack in a pit located at one end of the crossing. In some cases, the pits would extend below the water table, requiring the use of sheetpiles and dewatering pumps. Bore-and-jack undercrossings below the water table would require enclosure of the jacking pits with sheetpiles and special bulkheads at the jacking portals.

Pipeline Tunneling
The Transfer-Bethany Pipeline includes two options, both of which would have 12-ft. wide tunnel segments. The tunnels would be constructed using a tunnel-boring machine or other tunneling machine for the shorter segments that would operate between boring pits constructed at the ends of the tunnel segment. Diesel generators would be required. For the Tunnel Only Option, the access portal would occupy an approximately three-acre area, while the exit portal would require approximately one acre to accommodate the tunnel boring,
excavation equipment, pipeline and materials storage, pipeline connectors, and temporary housing/parking for crews, trucks, and other requirements. For the Trench and Tunnel Options, the northern 700-ft. long tunnel entry and exit pits would be no larger than 1,800 square ft. (i.e. 30 by 60 ft.). For the southern, approximately 4,000 ft. tunnel, the exit pit, on the east side of the SBA pits would be no larger than 1,800 square ft. (i.e. 30 by 60 ft.), however, as discussed above, the entry pit area would be approximately one acre to accommodate the tunnel boring, excavation equipment, pipeline and materials storage, pipeline connectors, and temporary housing/parking for crews, trucks, and other requirements.

The construction of the Westside Option would create about 60,000 cubic yards of waste rock and tunnel spoils and the Eastside Option would generate about 35,000 cubic yards of waste rock and tunnel spoils. The spoils would consist of a fine, flour-like waste that would be hauled from the tunnel excavation for temporary onsite storage and/or subsequent, final disposal. Larger waste rock and tunnel muck would be disposed at three potential locations: (1) at two designated disposal area occupying up to 22 acres near the terminus of Byron Hot Springs Road, or (2) along project access roads where it would be consolidated and used as a roadway sub-base or surface.

Power Supply Infrastructure

There are four existing transmission lines in the project vicinity. The westernmost line traversing near the Transfer Facility is a 230 kV line operated by Pacific Gas & Electric (PG&E). The lines to the east between Vasco Road and Old River are two 500 kV line operated by PG&E as well as a 230 kV line operated by Western Area Power Administration (Western), a federal agency, which transmit 69 kV to the existing Old River Intake and Pump Station. There are two options under consideration, and both were included in the cultural resources assessment.

Option 1

Western would use its existing 230 kV transmission line from the Tracy substation to supply power to a new substation. This new substation site would require approximately 2 acres near the terminus of Camino Diablo Road and would need to have the capacity to step power down from 230 kV to 69 kV and 21 kV. Like the proposed Delta Pump Station, the exact location for the new substation has not been determined; therefore a siting zone has been defined for purposes of this impacts analysis. It is assumed that permanent impacts would not exceed 2-acres for the facility and that a permanent access road to the facility most likely from Camino Diablo Road or another auxiliary road would be required.
From the new substation, an existing single-circuit power line to Old River Intake and Pump Station would be upgraded to a double-circuit power line by one of the following methods: (1) placing new insulator arms and additional conductors on the existing poles; (2) pole for pole replacement of the existing power line with collocation of the existing single-circuit line; or (3) a new set of pole and conductors would be installed parallel to the existing power line. For the Expanded Transfer Facility, a new 21 kV distribution line would be installed from the new substation paralleling the existing 230 kV Transmission Line until it intersects with the Delta-Transfer Pipeline alignment. At that point the new power line would head westward, generally traversing the same alignment as the Delta-Transfer Pipeline to the Expanded Transfer Facility. For both power and distribution alignments it is assumed that if new poles would be required, they would be approximately 50 ft. tall and installed in up to 300-ft. spans.

Option 2
To provide power to the Delta and/or Old River Intake and Pump Stations, a new 69kV double-circuit power line would be constructed from the Western substation (adjacent to the CVP’s Jones Pumping Plant) to the intersection of the existing 69 kV single-circuit power line that extends to the Old River Intake and Pump Station. The existing single-circuit portion of the power line would be upgraded to a double-circuit power line by one of the following methods: (1) placing new insulator arms and additional conductors on the existing poles; (2) pole for pole replacement of the existing power line and collocation of the existing single-circuit power line; or (3) a new power line would be installed paralleling the existing power line.

The power line would begin at the Tracy Switchyard near the Jones Pumping Plant and traverse north within the existing right of way of the eastern most 230 kV transmission line. Near the eastern terminus of Camino Diablo Road, the power line would continue in a northeasterly direction to the delta intake facilities within an existing right of way.

For the Expanded Transfer Facility, a new PG&E distribution substation would be located in the Watershed with the capacity to step power down from an existing 230 kV PG&E transmission line to 21 kV. The substation would require approximately two acres and would be enclosed with fencing. The approximately 1.5 mile distribution line would follow an existing distribution line route to the Expanded Transfer Facility property. The existing distribution line would be upgraded by one of the following methods: (1) placing new insulator arms and additional conductors on the existing poles; (2) pole for pole replacement of the existing distribution line and collocation of existing distribution on the new poles; or (3) a new distribution line would be installed paralleling the existing distribution line. If new poles were required, they would be approximately 50 ft. tall and installed in increments of 200-300 ft. apart. Six (6) conductors would be installed on each wood pole.
Power/Distribution Line Construction Methods
Typical construction sequencing for both the Western power line and the PG&E distribution line would include vegetation removal at the pole site, auguring the pole holes, setting the framed poles, backfilling as necessary and stringing the overhead distribution lines. Pole removal would consist of loosening, removing and disposing of the pole in accordance with Contra Costa County regulations.

Installation of the conductors would require pull and tension sites as well as work areas within the construction corridor and/or right of way. Pull and tension sites could temporarily disturb approximately 6,250 square ft. per site (assumed 125 by 50 ft.). Work areas would be limited to 25 ft. on either side of centerline for installation of the new power/distribution line and would also be sited to avoid sensitive resources.

For both the proposed Western power facilities and the PG&E power facilities, access to and from the power/distribution line corridors and substation locations would generally be from existing roadways within the project area. Depending on the final site locations for the substations, some overland access may be required. Typical construction methods for the proposed substations would include vegetation removal, grading, excavation, and construction of subsurface footings and concrete slabs for aboveground structure and equipment.

Recreational Facilities
Recreational facilities would be provided to replace and/or expand the recreational facilities that would be displaced with the reservoir expansion. A replacement marina would be composed of a parking and staging area, a picnic area, a pier, a marina, and a connected dock providing access to the reservoir. This marina site would be about 1,500 ft. west of the new dam on the site of the dam material borrow area that would be excavated in the adjacent hillside. A flat zone of about 11 acres would be created during borrow area excavation to accommodate the marina, dock, and the parking, staging, and picnic areas. Movable floating docks would connect to the appropriate bench, depending on the reservoir surface elevation. The new marina facility would be accessed from a new road constructed over the top of the raised dam and extended westward along the reservoir edge to the marina site.

Interpretive Center
Construction activities associated with the reservoir expansions in the vicinity of the existing interpretive center would require that the facility be closed during the construction period. During construction the interpretive parking could be used for worker parking, minor staging and/or materials/equipment storage. Upon completion of construction, the interpretive center would be reopened to the public.
Fishing Piers
Four fishing piers would need to be relocated due to the 275 TAF reservoir expansion. Two additional fishing pier locations have been proposed. One pier would be located at the marina and one would be located on the peninsula south of the marina.

Day-Use Facilities
In addition to inundating the existing facilities at the marina, increasing the reservoir to 275 or 160 TAF water levels would inundate the Los Vaqueros staging area, the Oak Point Picnic Area, and the Knoll Picnic Area. For a 275 TAF expansion one replacement picnic area would be located at the new northern marina, and a second would be located at the fishing pier on the peninsula south of the new marina facility. A third picnic area would be established at the new parking area, and hiking trail access would be provided at the south end of the reservoir. Under the 160 TAF reservoir expansion, replacement facilities would be located generally upslope of the existing facilities.

User Parking
Under the 275 TAF reservoir expansion, parking would be provided at the marina facility, the westside trail access point, and the south end of the reservoir. Under a 160 TAF expansion, parking would be provided generally upslope of the existing parking.

Access Roads
Under the 275 TAF reservoir expansion, approximately 2.25 miles of paved access road to the existing marina would be inundated. A total of 12.5 miles of an unpaved non-public all-weather service road along the western shoreline would also be inundated and would require relocation to provide access to the western area of the watershed for fire prevention and suppression activities, public safety, and environmental compliance. This westside access road would remain closed to the public. Under the 160 TAF reservoir expansion, approximately 0.93 mile of paved access road would be inundated along with just over 5 miles of the unpaved west side access road. These roadway segments would be relocated along the perimeter of the expanded reservoir.

Hiking Trails
Under the 275 TAF reservoir expansion, approximately 8.1 miles of the existing Los Vaqueros, Peninsula, Canada, Adobe, and Oak Savannah Trails (hiking-only) would be inundated in the northwest portion of the reservoir. Due to steep topography and hot, windy climate, the hiking trails are lightly used. Southern access to the westside trail would be available from Vasco Road. A parking lot would be located near the upper inundation limit and would provide direct access to the trailhead. The site would have picnic tables, toilets, and a water station. A new eastside hiking trail could be installed to link existing access roads at the southeast and northeast ends of the reservoir.
1.2 Regulatory Setting

The project is subject to both state and federal regulations. The Contra Costa Water District (CCWD) is the lead state agency for the project. The U.S. Bureau of Reclamation (Reclamation) is the lead federal agency. The Western Area Power Administration (Western) serves as a cooperating federal agency. Cultural resource studies have been conducted in compliance with Section 106 of the National Historic Preservation Act (NHPA) and the California Environmental Quality Act (CEQA).

The major cultural resource protection and management documents that were prepared for the construction and operation of the 100 TAF Los Vaqueros Reservoir, associated facilities and recreation elements are listed below. This series of agreement documents and plans follow from compliance with NEPA, and in some cases, with CEQA. These documents must be updated and/or renegotiated for the Los Vaqueros Reservoir Expansion Project.

- **Programmatic Agreement** among the Bureau of Reclamation, Contra Costa Water District, California State Historic Preservation Officer, and the Advisory Council on Historic Preservation Regarding the Implementation of the Los Vaqueros Project (Bureau of Reclamation 1992)

- **Evaluation, Request for Determination of Eligibility, and Effect for the Los Vaqueros Project**, Alameda and Contra Costa Counties, California (Sonoma State University Academic Foundation (SSUAF), 1992)

- **Memorandum of Understanding** regarding the Respectful Treatment of Native American Graves and Human Remains Discovered During Pre-Construction and Construction of the Los Vaqueros Project (CCWD 1993a)

- **Agreement for Curation** of Archaeological Collections from the Los Vaqueros Project Area between the Anthropological Studies Center and the Contra Costa Water District (SSUAF 1993a)

- **Final Stage 2 Environmental Impact Report/Environmental Impact Statement** for the Los Vaqueros Project (CCWD 1993b)


- **Los Vaqueros Cultural Resource Management Plan** (Brady and Associates, Inc. and LSA 1999)

The Programmatic Agreement (PA) is the basis for the protection of historic properties within the Area of Potential Effect (APE) for the 100 TAF Los Vaqueros Reservoir Project. The PA stipulates that the project be defined, and that historic properties that will be affected by the project will be identified, evaluated, and managed through the development and
implementation of Historic Property Treatment Plans (HPTPs). Reclamation served as the lead federal agency for the existing Los Vaqueros Project and was responsible for establishing the PA. CCWD, the lead state agency, is responsible for implementing the PA. The PA commits CCWD to manage properties deemed eligible for the NRHP within the project APE in a manner consistent with the preservation of these resources. The PA also establishes that no further consideration need be given properties Reclamation, the State Historic Preservation Officer (SHPO), and the responsible and/or cooperating agencies agree are not eligible for inclusion in the NRHP. The Corps and the SWRCB were the cooperating federal and state agencies, respectively. The SHPO and the Advisory Council on Historic Preservation (Council) were parties to the agreement. All of the subsequent management documents follow from the PA. The existing PA is still in effect, and the PA may be renegotiated among the cooperating agencies, with Reclamation as the lead agency, for the Los Vaqueros Reservoir Expansion Project.

The Los Vaqueros Watershed was extensively surveyed for cultural resources and the results were presented in the *Evaluation, Request for Determination of Eligibility, and Effect for the Los Vaqueros Project* (Evaluation) (SSUAF 1992), an inventory and evaluation of all cultural resources within the project area known at that time. This evaluation served as the basis for consultation by Reclamation with the SHPO to determine which properties were eligible for listing on the NRHP; the effect of the project on eligible resources; and procedures for the management and mitigation of effects on the NRHP-eligible properties within the Los Vaqueros Watershed as required by the PA. The SHPO’s comments or concerns were addressed to Reclamation. The results of the evaluation were presented in the Final Stage 2 Environmental Impact Report/Environmental Impact Statement (CCWD 1993b) in order to satisfy NEPA and CEQA requirements. Reclamation must prepare an updated *Evaluation, Request for Determination of Eligibility, and Effect* for the Los Vaqueros Reservoir Expansion Project and consult with SHPO for concurrence with a Determination of Effect.

The Memorandum of Understanding (MOU) between CCWD and interested tribal entities of Contra Costa and San Joaquin Counties lays out the role of all parties during construction and Watershed management and the responsibilities of all parties regarding the treatment of and disposition of Native American burials, funerary objects, and other cultural resources on Watershed lands. Reclamation is only involved in such MOUs if and when federally recognized tribal entities have interests in the project area. In this case, although there were several Native American individuals and groups with ties to the project area, none of them belong to federally recognized tribal entities, and thus the MOU was established by CCWD with no Reclamation involvement. The existing MOU remains in effect, however with the federal recognition of the Ione Band of Miwok Indians, Reclamation may take a more active role and renegotiate or reformulate an MOU for the Los Vaqueros Reservoir Expansion Project.
The Curation Agreement details documentation, inventory, and packaging requirements for curated collections, assesses curation fees, and provides curation policies for cultural materials recovered in connection with the Los Vaqueros Project. CCWD is responsible for establishing and following the Curation Agreement. The Curation Agreement remains in effect.

A series of phased HPTPs were created for the 100 TAF Reservoir Project to avoid or minimize project effects on historic properties (SSUAF 1993a, 1994, 1995, 1998, 1999). HPTPs are required in accordance with the PA when Project plans affect NRHP-eligible properties. The HPTPs detail specific mitigation measures that, when followed, result in a Determination of No Adverse Effect under Section 106 of the NHPA. These measures may protect and conserve sites or detail the kinds of data recovery and analysis that will be undertaken for those sites subject to adverse effects. Reclamation was responsible for creating the HPTPs, which were reviewed by the SHPO. CCWD is responsible for carrying out the HPTPs. Once the new Evaluation has SHPO concurrence, Reclamation must prepare new HPTPs appropriate for the new project effects associated with the Los Vaqueros Reservoir Expansion Project.

The Cultural Resources Management Plan (CRMP) incorporates and updates the Evaluation (Brady and Associates, Inc. and LSA 1999) and is presented by CCWD as part of the Resource Management Plan. The CRMP summarizes the cultural resources that are eligible for listing on NRHP and details plans for their management. The CRMP remains in effect, but may be updated to reflect the results of mitigation from the 100 TAF Reservoir, and the addition of cultural resources eligible for listing on the NRHP, and implications for cultural resource management.

In summary, Reclamation as lead federal agency established the PA with the SHPO, Council, and CCWD as signatories for the 100 TAF Reservoir. Reclamation presented the Evaluation to the SHPO for review and addressed any concerns raised by the SHPO. That document established which properties would be protected and how they would be impacted by the project. In the meantime, CCWD made use of the materials in the Evaluation to prepare the EIR/EIS to comply with CEQA and NEPA, established an MOU and a Curation Agreement, and developed a CRMP as part of the Resource Management Plan. Pursuant to the PA, Reclamation oversaw the preparation of a series of HPTPs. Reclamation’s responsibility ended once the HPTPs were in place. CCWD remains responsible for carrying out the HPTPs and adhering to the PA. Reports resulting from work done in accordance with these agreement documents are submitted to Reclamation and the SHPO for review. In association with the Los Vaqueros Reservoir Expansion Project, Reclamation must prepare a new Evaluation, negotiate an updated PA, and prepare new HPTPs to reflect a new set of project impacts. They may negotiate a new MOU. CCWD must prepare a new EIR/EIS. They may
renegotiate an updated MOU with non-federally-recognized tribal entities, and they may update their Curation Agreement, and CRMP.

1.3 Study Area and Area of Potential Effect

The Los Vaqueros Expansion Study Area (study area) includes the expanded reservoir, new pipelines including two alternatives under consideration, and new and expanded facilities, surrounded by a ¼-mile buffer (refer to Figure 2). The study area has been designed to capture all anticipated impacts from construction, operation, and maintenance of the expanded 275 TAF Los Vaqueros Reservoir, pipelines, and facilities. The ¼-mile buffer was used in the records search ensuring a broad research domain in order to develop a representative prehistoric and historical context for the study area. The survey area more closely followed the Area of Potential Effects (APE).

As defined in 36 CFR 800.16(d), an APE is "the geographical area or areas within which an undertaking may directly or indirectly cause alterations in the character or use of historic properties, if any such properties exist." The minimum APE for archaeological properties is generally the required right of way, plus areas subject to ground-disturbing activities, such as equipment staging areas, storage, disposal, or borrow sites. The APE is more constrained than the study area.

When filled to maximum capacity, the 275 TAF Reservoir should reach an elevation of 560 ft. amsl. The APE includes this area plus a buffer of 200 ft. upslope to allow for any disturbance due to construction, operation, and maintenance of the expanded reservoir, including construction of a replacement hiking trail and access road around the western side of the reservoir. Expanding the APE beyond the maximum water line also allows for analysis of the potential for increased erosion, and the potential for vandalism and illegal collecting due to increased access. The APE includes 200-ft. corridors centered on the proposed pipeline alignments, with the exceptions of a 300-ft. corridor for the Transber-Bethany alignment, and the inlet and outlet pipelines corridor of 1,000-ft. to allow for staging and storage areas, access roads, and facilities. The study includes two alternatives for the intake facility (expand the existing Old River Intake, or build a new Delta intake facility). The final APE will include only one of these.
2.0 Setting

2.1 Environmental Setting

The Los Vaqueros study area is located within southeastern Contra Costa County and northeastern Alameda County. Large portions of the study area are within the unsectioned Cañada de los Vaqueros land grant (USGS Byron Hot Springs, California, 7.5' series topographic quadrangle, 1953, photorevised 1968).

Los Vaqueros Reservoir lies within the upper section of the Kellogg Creek watershed. A pipeline conveys water from the Old River Pump Station on the west side of Old River within the Sacramento-San Joaquin Delta, to the reservoir. Kellogg Creek headwaters flow through a deep canyon that opens onto the broad valley near the center of the watershed, which was inundated to create the reservoir. The valley system is surrounded by hills varying in height from approximately 130 to 1,100 ft. amsl, while further to the north the topography flattens out, with elevation ranging from sea level in the east to 125 ft. amsl in the west.

Springs exist throughout the watershed, and attracted both prehistoric hunters and gatherers, and historic period ranchers. The most well-known of these springs emanated from the lower hills south of the Vasco Adobe site (CA-CCO-470H), and was referred to as the Poso, Spanish for ‘watering hole’.

The following discussion summarizes the extensive research and writing conducted for the original 100 TAF Los Vaqueros Reservoir project, drawing primarily from Sonoma State University Academic Foundation, Inc. (SSUAF) (1992), Meyer and Rosenthal (1997), and Praetzellis et al. (1997).

Climate

The Mediterranean climate of the study area undergoes mild to moderately cold, wet winters, and hot, dry summers. High winds blow through the hill country within this area, and are strongest during the winter. The Kellogg Creek valley provided some shelter from the strong winds, and, as a result, was preferred by early stock raisers who would bring their cattle to the area to graze. Rockshelters also provided protection from the weather, and those at Vasco Caves (just outside of the study area) and in the upland areas were used by both settlers and their stock.

Approximately 90% of the annual precipitation occurs from November through April. Seasonal averages range from 13 to 17 inches. This relative aridity has influenced the history of land use and occupation of the watershed. Pasture grasses are scarce and forage is meager
during the summer and fall. Dry-farming could be practiced in certain portions of the watershed, though neither irrigated agriculture nor small truck gardens were economically viable.

Geology

The Kellogg Creek watershed terrain ranges from flat to hilly and mountainous. Upper Cretaceous marine sedimentary rocks approximately 65 million years old underlie most of the uplands (SSUAF 1992:8). These rocks of the Panoche Formation consist of concretionary sandstone, shale, siltstone and conglomerate lenses that exhibit massive weathering. The Meganos, Moreno, and Deer Creek formations are also present in the study area. These are similar to the Panoche Formation. Bedrock is relatively shallow, lying at depths of 8 m or less below the ground surface, and outcropping on ridges and hilltops. The bedrock ranges from soft and fractured to hard, massive formations. The Piper Formation, consisting of sandy loam and loamy sand, can be found in the northern lowlands of the study area, and may be buried beneath the Oakley sand (Cook and Elsasser 1956; Praetzellis et al. 1997:8). Low lying areas have accumulated recent alluvial deposits from the adjacent upland materials. The sandstone outcrops were of importance to Native Americans as locations for shelter and bedrock milling stations.

Soils

Soils found within the Kellogg Creek watershed include the Altamont-Diablo-Fontana and the Brentwood-Rincon-Zamora soil associations. The Altamont-Diablo-Fontana soils, formed on steep slopes, include well-drained clays and silty clays. The Brentwood-Rincon-Zamora soils, found in the nearly level surfaces of the lowlands, include well-drained clay loams and silty clay loams (Praetzellis et al. 1997:8).

Within the Los Vaqueros area, extensive and frequently deep Holocene alluvium and fan deposits cover lowland areas. Archaeological deposits and human burials have been located at depths of greater than 12 m (40 ft.) within indurated Piper sands in lowlands in the project vicinity.

Vegetation and Associated Wildlife

The study area encompasses a biogeographical transition zone, ranging from lowland grasslands to higher elevation woodland and chaparral environments. Geoarchaeological and archaeobotanical studies have suggested that during a large part of the late Holocene period, the study area was more wooded than it is today. Intensive grazing and logging activities through the 1850s and 1860s significantly altered this landscape. While the study area is less wooded than formerly, paleobotanical analyses suggest that many of the same species exist.
today as in the past, including manzanita, buckeye, acorn, wild cucumber and gray pine. A more detailed discussion of the vegetation and wildlife can be found in Praetzellis et al. (1997:9-13).

The range of topographic and soil settings influence the variety and type of plant communities within the study area. Annual grasslands and valley needlegrass grasslands cover hillsides and uplands with well-drained soils, as well as bordering alkali wetlands. Buckeye, blue and interior live oak, or occasional shrubs, may also sparsely occupy the grasslands. Grassland habitats support a range of animal species, including frogs, lizards and snakes, a range of birds, and mammals such as black-tailed deer, coyotes, desert cottontails, deer mice, California ground squirrels and striped skunks.

Oak woodlands inhabit valley bottoms, and gently to steeply sloping hillsides and uplands with well-drained soils. Communities include live oak woodland, valley oak woodland, blue oak woodland, and mixed north slope cismontane woodland. Oak woodlands provide food, shelter and nesting habitats for a range of birds, amphibians and reptiles. Mammals, such as the black-tailed deer and western gray squirrels, are also present.

Chaparral communities cover the rocky east and north facing ridge slopes west of Vasco Road, as well as other dry, rocky slopes and ridges, and disturbed areas. Diabloan sage scrub and northern mixed chaparral communities consist of "evergreen, woody shrubs with a subshrub layer, and a variety of annual and perennial herbs" (Praetzellis et al. 1997:10). A range of amphibians, reptiles, birds and small mammals use the chaparral communities. Black-tailed deer and gray foxes also share this environment.

An assortment of seasonal alkali wetland communities grow on valley floors, where flat or gently sloped alkali soils form on deep alluvium. Drainages and northern claypan vernal pools also occur in this context. Along Brushy and Kellogg Creeks alkali marshes intermingle with alkali meadows. These marshes support halophytic species as well as common freshwater marsh species such as tule and cattail. Alkali wetland communities are located within the study area in the northeast and south-central areas of the Kellogg Creek watershed. A variety of shorebirds, waterfowl, songbirds and northern harriers rely on the alkali marsh habitats, and several species of amphibians use the vernal pools for reproduction and rearing their young. During the dry season, alkali meadows also support various small mammals.

Meandering, deeply incised intermittent creeks cut through the valley floors. Marsh vegetation occupies the channels, and rarely willow or cottonwood trees, or small stands of riparian woodlands exist along the creek banks. The riparian woodland communities are located along Kellogg and Brushy Creeks, and include central coast live oak riparian woodland, willow-cottonwood riparian woodland, and mixed riparian woodland. Riparian
woodlands support a wide variety of animal species, including several amphibians and reptiles, insectivorous birds, and small mammals. Raptors use the trees to nest in, as do bats, squirrels and raccoons. Striped skunks, badgers, black-tailed deer, raccoons, and red and gray foxes use the woodlands to forage and for cover and travel.

2.2 Paleoenvironment

Development of the Bay and Delta System

During the last glacial maximum, the San Francisco Bay was a broad inland valley, referred to as the ‘Franciscan Valley’. The runoff from the Sacramento and San Joaquin Rivers converged to form the ‘California River’ which flowed through the Carquinez Straits, into the Franciscan Valley. Runoff from smaller streams and rivers draining this valley merged into the river, and emptied into the Pacific Ocean near the current location of the Farallon Islands. The melting of the ice sheets and concurrent rising of the oceans pushed the Californian coastline eastwards. Between 11,000 and 8,000 calibrated years before present (cal B.P.), rising sea levels inundated the lower areas of the Franciscan Valley and California River. Sediments carried by the California River were deposited on the floor of the valley. Continued rising of the sea level resulted in the development of freshwater marshes (Praetzellis 2004:9).

Between 7,000 and 6,000 cal B.P. there was a decline in the rate of sea level rise worldwide, and flooding of the Franciscan Valley continued more gradually. This more gradual rise permitted the development of extensive tidal-marsh deposits during the middle Holocene. It was during this period that the extensive saltwater/freshwater tidal marshland of the Sacramento-San Joaquin Delta began to develop. Large alluvial floodplains were also formed at this time as a result of accumulated materials spilling from the lower reaches of streams and river channels onto existing fans and floodplains. As a result of these changes, bay and marsh deposits now covered several previously stable Holocene-age land surfaces. Throughout the late Holocene, the San Francisco Bay grew in size, marshlands expanded, and large tidal mudflats and peat marshes were formed. This promoted the continued deposition of sediment around the Bay margins (Praetzellis 2004:11; Ziesing 2000:29).

Studies within the Bay region confirm that several late Pleistocene and early Holocene land surfaces were covered by alluvium that was generally deposited within the last 6,000 years. These deposits average 2 to 3 m in thickness but can exceed 10 m thick in a few areas. They often exhibit well-developed buried soil profiles (paleosols) which show a marked stratigraphic boundary. Archaeological deposits older than 6,000 years would likely have been inundated by sea level rise and/or buried by sediment deposition (Praetzellis 2004:11).
Although the timing of lowlands development surrounding the Sacramento-San Joaquin Delta is not well dated, it is thought to have followed the same basic pattern as the San Francisco Bay Area. Water, sediment, and marsh plants began to be deposited on the lowlands following a period of non-deposition during the late Pleistocene and early Holocene. This raised the base level of streams and rivers flowing into the Delta during the mid-Holocene, causing active channels to change alignments and depositing a large amount of sediment onto older land surfaces. These active channels, including Kellogg Creek, caused the formation of large alluvial fans and levee deposits. These Holocene deposits range in thickness from an estimated 3 m near the Delta and Bay margins to approximately 15 m near the heads of alluvial fans (Meyer and Rosenthal 1997:II.7).

**Geology and Subsurface Archaeological Testing**

Meyer (1996) undertook geoarchaeological research in the Los Vaqueros area for his thesis submitted as part of a Master of Arts in Cultural Resources Management at Sonoma State University. He reasoned that subsurface archaeological materials could be predicted by identifying paleosols (buried land surfaces) that may have been available for occupation in the past. Meyer conducted a subsurface survey program that was designed to assess the accuracy of previously reported geological data, to identify and date any existing paleosols or previous watercourses that may have been used prehistorically, to find and date subsurface archaeological materials, and to establish the sequence of landform-sediment assemblages within various valleys in eastern Contra Costa County (Meyer 1996:iv). His work has since been used as a predictive aid to avoid and/or mitigate for areas with high potential for undiscovered buried cultural deposits and human burials.

Meyer’s thesis work was undertaken as part of the original Los Vaqueros Project, which involved construction of a water conveyance system extending from the northern end of the Los Vaqueros Reservoir to the Neroly Blending Facility, near Antioch. The Los Vaqueros Project included the Old River Pipeline (from the Old River to the Reservoir) though Meyer discounted subsurface archaeological testing within this portion of the study area because:

1. the route consists primarily of thick deposits of relatively recent alluvium that are unlikely to contain paleosols…
2. the thickness of the alluvium exceeds that depth that can be reached using a backhoe;
3. the high ground water levels along the route would likely prohibit the subsurface deposits to be examined safely or effectively; and
4. the design specifications suggest that the depth of the pipeline excavation is not likely to exceed the depth of the relatively recent alluvium (Meyer 1996:41).

Meyer conducted test trenching in Upper Kellogg Creek (upstream, midstream and downstream sections), Middle Kellogg Creek and Lower Kellogg Creek. Figure 3 depicts the
Figure 3: Geoarchaeological Testing Areas and Areas of Archaeological Sensitivity
CONFIDENTIAL; NOT AVAILABLE FOR PUBLIC REVIEW
locations of Meyer’s testing with relation to the current Reservoir Expansion study area. No
testing was conducted within the Camino Diablo Hillfront area as the hillslope deposits were
formed prior to human existence. In addition, the slope deposits were formed by erosive
forces, and the overlying soil is a mix of in-situ weathering of deposits and colluvium that
has moved downslope. As such, any archaeological deposits are likely to have been disturbed
and displaced by the movement of deposits due to erosion (Meyer 1996:40).

Meyer excavated seven backhoe trenches within the area closest to the dam in Upper Kellogg
Creek. Intact prehistoric archaeological deposits were located in association with a paleosol
in an area north (downstream) of the dam footprint in the spillway and stilling basin area.
The prehistoric deposit, CA-CCO-637, which included 24 Native American burials, extended
from 60 to 150 cm below the present ground surface within a gently sloping alluvial fan.
Radiocarbon dates obtained from a hearth feature produced a date of 2585 cal B.P. Meyer
determined that there was a high potential for more archaeological remains within this area

Three other alluvial fan deposits were tested within the upstream portion of the Upper
Kellogg Creek, north of the existing dam, though no paleosols or archaeological deposits
were encountered. These deposits were thought to be at least Pleistocene in age, and
subsurface archaeological potential within this area was considered to be lacking (Meyer
1996:49). Test trenches were also excavated near CA-CCO-447/H to confirm the presence of
prehistoric materials at that site. Possible prehistoric remains had previously been identified
at 250 cm below surface in a geotechnical test pit. Sparse naturally occurring shell was
found, and some flaking debris was located within the upper alluvium though no formal
artifacts or high concentrations of archaeological materials were found at this time. A
paleosol that had been truncated through erosion was found at 275 cm below surface. By
removing materials, erosion reduced the potential of finding subsurface archaeological
deposits in this area. In addition, testing revealed two stream terraces along the upstream
portion of the Upper Kellogg Creek with no potential for archaeological deposits (Meyer
1996:49-50). The entire upstream of Upper Kellogg Creek was deemed to have high
subsurface archaeological potential as a result of this testing.

The expectation for subsurface prehistoric deposits in this area later proved to be accurate. In
1998, excavation of a waterline trench through CA-CCO-447/H exposed the remains of two
individuals. The burials were located around 60 cm below surface. In addition, heat-affected
rock, chert and obsidian flakes, and a rim fragment of an andesite, groundstone, bowl mortar
were excavated. A hearth feature and a rock line indicative of relatively intact remains of a
living surface were also exposed (Meyer and Meyer 2000:42, 44, 46, 47).
To the northeast, within the midstream section of the Upper Kellogg Creek, two more stream terraces bordering Kellogg Creek were located. The lower, younger terrace contained some historic debris most likely associated with the historic period ranch site CA-CCO-446H. Meyer judged that there was no potential for prehistoric archaeological materials within this terrace given its relatively young age. Although the older, upper terrace exhibited a single, well-developed soil profile signifying that it had remained stable for an extended period of time, no paleosols were found within the terrace profiles and hence there is little to no potential for prehistoric archaeological materials associated with the stream terraces in the midstream portion of Upper Kellogg Creek (Meyer 1996:52).

Along the cutbank on the south side of Kellogg Creek in the midstream section, a paleosol was identified roughly 120 to 180 cm below surface. The paleosol was covered by recent alluvial deposits and appeared to be limited to the floodplain to the south of Kellogg Creek. The paleosol appeared to be intact within this area and Meyer (1996:52-54) considered the area to have low to moderate potential for subsurface archaeological deposits. However this southern area of midstream Upper Kellogg Creek was subsequently excluded from the proposed pipeline route as a result of design changes and was not included in Meyer’s summary of archaeological potential for the midstream section of Upper Kellogg Creek (Meyer 1996:54).

No test trenches were excavated in the downstream section of the Upper Kellogg Creek, as it exhibited the same landform-sediment assemblages that had already been tested. Most of the downstream section has low potential for prehistoric archaeological materials. There was a small area described as being "near the base of the hillslope west of the former Vasco Road and southwest of Kellogg Creek" (Meyer 1996:54) that resembled the midstream portion of Upper Kellogg Creek, which had a paleosol (the floodplain that was subsequently excluded from Meyer’s study area). As this area may also contain a paleosol the archaeological potential is considered low to moderate.

Five test trenches were excavated within the Middle Kellogg Creek portion of the pipeline route. Small areas of elevated landforms consist of older alluvium with a single, well-developed soil profile. This alluvium was found to be Pleistocene in age, and while archaeological potential within the alluvium was considered low, Meyer (1996:55) believed that deposits may exist on the portions of these landforms that are now covered by younger alluvium.

An intact paleosol was found within the almost level floodplain that constitutes the majority of the Middle Kellogg Creek area. The paleosol, dated to 8775 cal B.P., was found approximately 137 cm below surface in the middle reaches of the floodplain. The overlying alluvium was dated to 2970 cal B.P. indicating that the paleosol was available for occupation.
for approximately 5000 years. Meyer (1996:57) identified a moderate potential for subsurface archaeological deposits within this area.

The Lower Kellogg Creek portion of the pipeline route, where the Old River Pipeline (Delta-Transfer Station Pipeline) intersects the Transfer Pipeline (Transfer Station-Los Vaqueros Pipeline), was found to be similar to the Middle Kellogg Creek segment. The upper 240 cm of soil was excavated revealing a single, moderately developed soil profile within alluvium considered to be late Holocene in age. Based on the likelihood of related depositional histories between the Lower and Middle Kellogg Creek areas, Meyer (1996:57-58) predicts that a paleosol may exist deeper than 240 cm below surface, and there is therefore a moderate potential for subsurface archaeological deposits in this area.

Meyer’s test trenching continued north of the current study area. In all, Meyer identified paleosols in five of the six valleys that he tested, ranging in depth from 70 to 440 cm below surface, with an average depth of 164 cm below surface. This is similar to the mean depth (141 cm) of subsurface archaeological sites found within the San Ramon Valley in western Contra Costa County northwest of the study area (Meyer 1996:69). The presence of prehistoric archaeological deposits buried beneath sterile alluvium has also been noted within the Walnut Creek floodplain and in the Livermore Valley, and several sites within the interior Alameda and Contra Costa counties revealed cultural materials in association with paleosols (Meyer and Rosenthal 1997:II.4). Meyer’s predictions for the subsurface archaeological potential that apply to the current study area are summarized in Table 1 (refer to Figure 3).

<table>
<thead>
<tr>
<th>Landscape Segment</th>
<th>Early Holocene</th>
<th>Middle Holocene</th>
<th>Late Holocene</th>
</tr>
</thead>
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<td></td>
<td></td>
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<tr>
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<tr>
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<td>Low</td>
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<tr>
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<td>Moderate</td>
<td>Low</td>
</tr>
<tr>
<td><strong>Camino Diablo Hillfront</strong></td>
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<td>None</td>
<td>None</td>
</tr>
<tr>
<td><strong>Lower Kellogg Creek</strong></td>
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<td>Moderate</td>
<td>Low</td>
</tr>
</tbody>
</table>

The subsurface archaeological testing was invaluable for the 100 TAF Los Vaqueros Reservoir Project cultural resources compliance with Section 106, as the method, study, and approach established by Meyer using geology to predict potentials for buried, intact archaeological deposits, removed much of the guesswork from cultural resources mitigation. The predictive model that resulted from his study also applies to large portions of the expansion project and is considered throughout this assessment report.
2.3 Cultural Setting

This section provides background information pertinent to the evaluation of the cultural resources within the study area. The following summary is necessarily brief. The archaeological and archival research and recording of oral histories, conducted on behalf of CCWD for the 100 TAF Los Vaqueros Reservoir project has resulted in a comprehensive historical framework for the Los Vaqueros area. Researchers investigated Native American as well as immigrant and first generation American ties with the area. The prehistory of the region has been extended thousands of years deeper into the past through geoarchaeological testing, construction monitoring, and related archaeological data recovery that accessed previously unknown deeply buried sites in the valley floor. The following cultural setting integrates the results of the SSUAF studies for the 100 TAF Reservoir project.

Prehistory

Evidence gathered from recent archaeological investigations conducted under the auspices of CCWD in the Upper Los Vaqueros Watershed has revealed nearly 10,000 years of occupation, one of the longest sequences of human presence yet documented in a single locality in the broader San Francisco Bay Area (Meyer and Rosenthal 1997; Milliken et al. 2007). The most recently updated prehistory of the San Francisco Bay Area, as presented by Milliken et al. (2007), incorporates the findings of archaeological research conducted in the Los Vaqueros area. The prehistory presented in Meyer and Rosenthal (1997), is summarized below to provide a context within which to evaluate cultural resources and develop potential research questions to guide recommendations for mitigation. The interested reader is referred to Milliken et al. (2007) for an updated prehistory of the broader San Francisco Bay Area.

Meyer and Rosenthal (1997:V.13) have organized the prehistory of the Los Vaqueros region into five periods including:

- Lower Archaic period 10,000 to 6,000 B.P (8050 to 4050 B.C.)
- Middle Archaic period 6,000 to 2,500 B.P. (4050 to 50 B.C.)
- Upper Archaic period 2,500 to 1,500 B.P. (50 B.C. to A.D. 450)
- Upper Archaic/Emergent period transition 1,500 to 700 B.P. (A.D. 450 to 1250)
- Emergent period 1,000 to 200 B.P. (A.D. 1250 to ca. 1750)

Two different chrono-cultural frameworks are commonly used to organize the archaeological record in the San Francisco Bay Area. One system comprises the Early-Middle-Late period divisions established by Beardsley (1954), commonly referred to as the Central California Taxonomic System (CCTS) (Gerow with Force 1968). The other system is based on the Archaic-Emergent period chronology established by Fredrickson (1973, 1994). The CCTS

3 When dates are presented in B.P., the corresponding B.C./A.D. dates are provided in parentheses as a conceptual aid.
system divisions are primarily based on changes in material culture, including stylistic changes in artifacts such as shell beads, and the presence or absence of various artifact types or classes. Some temporal subdivisions have been refined to 200-300-year intervals on the basis of shell bead horizons that have recently been recalibrated using the radiocarbon dating technique (e.g., Groza 2002). The Archaic-Emergent period chronology represents changes in subsistence and settlement patterns, economic strategies, as well as stylistic elements of the material culture. Choice of chrono-cultural framework depends upon the research questions and the nature of the archaeological record being studied. It is interesting to note that Milliken et al. (2007) use a hybrid system for their recent reevaluation of the prehistory of the San Francisco Bay Area, applying a combination of the temporal sequence of the CCTS, and the cultural sequence of the Archaic-Emergent framework (ibid.:101).

As Meyer and Rosenthal (1997:II.12) point out, the Los Vaqueros study area had not been widely studied prior to the Los Vaqueros Reservoir Project studies, which began in the 1980s, and the archaeological record was not well-known compared to those of the neighboring San Francisco Bay and the Delta regions. The CCTS had been developed in ignorance of the true time depth of the Los Vaqueros occupation; with the earliest period beginning after people had been living in the Los Vaqueros area for thousands of years. Due to both the relative lack of archaeological studies, and a general scarcity of temporally diagnostic artifact types, such as shell beads, from those sites that had been investigated, the divisions of the CCTS, based largely on changes in temporally diagnostic artifact types, were not as effective for linking discrete deposits from the Los Vaqueros area to time-specific subperiods of the CCTS. For these reasons, Meyer and Rosenthal frame their analysis with the Archaic-Emergent scheme, which allows for greater time depth. This framework also places the interpretive focus on behavioral changes, such as shifts in economic strategies and mobility patterns, though these are identified in part by temporally diagnostic artifacts, such as millingslabs or mortars. Nonetheless, with the accumulation of evidence in the 1990s from the archaeological excavations undertaken as part of the mitigation for the Los Vaqueros Reservoir, Meyer created a chrono-cultural sequence, depicted in Figure 4, largely based on artifact types for the Los Vaqueros area (adapted from Meyer, depicted in Milliken et al. 2007:122-123). This sequence presents the updated Los Vaqueros scheme in relation to both the Archaic-Emergent scheme (e.g., Fredrickson 1974) and the Early-Middle-Late scheme (e.g., Bennyhoff and Hughes 1987).

Meyer’s chart summarizes notable developments and refinements of the chrono-cultural framework for the Los Vaqueros area, directly resulting from the cultural resources mitigation measures stemming from compliance with both CEQA and NEPA, including:

- Extending the Lower Archaic 2000 years deeper in time to at least 10,000 B.P. (8050 B.C.), formerly the province of the Paleoindian period according to Fredrickson (1974); and a time not covered by the CCTS (e.g., Bennyhoff and Hughes 1987).
Figure 4: Chrono-cultural Sequence for the Los Vaqueros Region

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• Extending the beginning of the Middle Archaic 1000 years back in time to around 6000 B.P. (4050 B.C.), whereas the Fredrickson Middle Archaic originates around 5000 B.P. (3050 B.C.) (1974).

• Dividing the Upper Archaic to include an Upper Archaic/Emergent transition period.

• Dividing the Emergent period into a Lower and an Upper Emergent period.

Prehistoric components from sites investigated in the project area include one from the Lower Archaic, four from the Middle Archaic, six from the Upper Archaic, seven from the Upper Archaic/Emergent transition, and six from the Emergent.

LOWER ARCHAIC PERIOD

The earliest occupation of the study area, during the Lower Archaic period is characterized by high residential mobility evidenced by short-term occupation of sites. Milliken et al. (2007:114) refer to this as a generalized mobile forager pattern. Artifacts characteristic of this period include millingslabs and handstones for processing plant resources such as seeds and nuts, and wide-stemmed projectile points. The radiocarbon date of 7920 cal B.C. represents the earliest date for cultural deposits from this period in the Kellogg Creek valley, obtained from a discrete charcoal concentration beneath an inverted millingslab at CA-CCO-696. The deposit lies at a depth of between 390 and 415 cm.

Other characteristics of the Lower Archaic period include the importation of obsidian from the North Coast Ranges and the preference for a tightly flexed burial position. CA-CCO-696 yielded a tightly flexed burial at a depth of 325 cm, radiocarbon-dated to 5490 cal B.C. A few hundred meters from CA-CCO-696, the oldest documented grave in the Kellogg Creek valley was recovered from CA-CCO-637, radiocarbon-dated to 6570 cal B.C. (Meyer and Rosenthal 1998).

MIDDLE ARCHAIC PERIOD

During the Middle Archaic period residential mobility had decreased and base camps were established in the Kellogg Creek valley. Groundstone mortars and pestles replaced handstones and millingslabs by 4000 cal B.C. (Milliken et al. 2007:115). A wooden mortar was recovered with a groundstone pestle at CA-CCO-637, radiocarbon-dated to 3800 cal B.C. (Meyer and Rosenthal 1997). A groundstone mortar was recovered in association with deposits containing the remains of acorns and wild cucumber, dating to at least 5,700 years ago, at CA-CCO-696 (Rosenthal and Meyer 2004:34-35; Wohlgemuth 2004:143). In addition to acorns, Kellogg Creek occupants ground manzanita seeds and grey pine nuts. Despite the shift in plant resource processing tools, there is no documented change in associated floral
assemblages throughout the Archaic period (Meyer and Rosenthal 1997:V.14). During the Middle Archaic period burial position became more variable, ranging from flexed to extended positions. The first cut shell beads are found in mortuary contexts. Valley occupants continued to obtain obsidian from distant sources.

**UPPER ARCHAIC PERIOD**

During the Upper Archaic period residential mobility decreased and fixed villages were established. Plant resources from both the uplands and grassland-savanna were gathered, with an increased use of small seeds, but a continued preference for acorns. Bedrock milling stations, characterized by mortar cups ground into boulders and bedrock outcrops, first appeared between 1600 and 1300 B.P. (A.D. 350 to 650), based on stratigraphic evidence (Meyer and Rosenthal 1997:V.14). Bedrock milling stations are difficult to date because the mortars in the bedrock outcrops are only rarely found in stratigraphic association with intact midden containing datable evidence.

The Upper Archaic period burial customs once again show a preference for flexed burials. A difference in social status has been inferred from the differential distribution of uniformly made shell beads and ornaments in mortuary contexts. The shell also indicates the continuing importance of trade and exchange.

**UPPER ARCHAIC/EMERGENT PERIOD TRANSITION**

During the Upper Archaic/Emergent period transition there was a shift in burial practices and land-use patterns. Bedrock milling stations offer tangible evidence that more locations in the valley were utilized, but in contrast to the preceding period, occupations were brief and were probably associated with resource acquisition and processing. Occupation of the valley was more varied, including shorter-term use of both the lowland and the upland, where bedrock milling stations were often located. Burial customs shifted once again, to a preference for extended positions (Meyer and Rosenthal 1997:V.15). Obsidian use increased from earlier periods, but other exchange items were absent.

**EMERGENT PERIOD**

By the Emergent period fixed villages were once again established in the lowlands and bedrock milling stations continued to be used for bulk processing of grassland-savanna small seed resources and upland nut and berry crops. Obsidian use increased, inferred by the importation of obsidian cobbles and minimally modified flake blanks, exclusively from Napa Valley sources (Meyer and Rosenthal 1997:V.15). Milliken et al. (2007:116) note the introduction of the bow and arrow at the beginning of this period. The people, traditions and culture of the Emergent Period in the Kellogg Creek valley and vicinity were most likely
those encountered by the earliest European visitors to the area in the second half of the 18th century.

Native American History

SSUAF produced a volume entitled *Native American History Studies for the Los Vaqueros Project: A Synthesis* (Fredrickson et al. 1997) in which several authors discuss the history of Native American occupation and use of the study area, and establish the nature and extent of Native American ties to the study area today. The following discussion briefly summarizes their findings.

Milliken has conducted extensive research on the likely proto-historic Native American occupants and their territories within the Los Vaqueros study area. Evidence for the physical connections of various family and tribal groups to the study area are tenuous. Attempts to reconstruct them have involved careful reading and analysis of mission records and linguistic analyses that include interpretations of historical relationship based on linguistic similarity and difference. Prior to missionization, the first records of Native Americans were written by Spaniards traveling through Native American lands. During the mission period the Spanish padres kept records of births, deaths, and marriages of Native Americans who were assimilated into the mission system. Based on extensive analyses of these records, Milliken has concluded that while a general picture of tribelet territories can be inferred, precise tribelet boundaries cannot be determined (Milliken 1997a:8). His examination of historical documents indicates that the Kellogg Creek drainage was near the boundary of two neighboring political groups, the Volvons (speakers of the Bay Miwok language) and the Ssaoams (speakers of the Costanoan/Ohlonean language), at the time of Spanish settlement in California.

The Volvon territory may have included the peak of Mt. Diablo and the adjoining rugged lands to the east. Volvon villages were located along the Marsh Creek drainage, possibly also at Clayton to the north of Mt. Diablo, or to the southeast in the Kellogg Creek drainage. The Ssaoams lived in the hill and valley country surrounding Brushy Peak and Altamont Pass, which separated the Livermore Valley from the San Joaquin Valley. Their territory may also have encompassed the high lands south and east of Kellogg Creek, including the Vasco Caves, and possibly the valley of Kellogg Creek itself. Portions of the pipeline corridors extend into what was Tamcan territory, to the east of the Volvon and Ssaoam territories. The Tamcans lived along the Old River branch of the San Joaquin River, east of the current town of Byron, and spoke Far Northern Valley Yokuts (Milliken 1995:255, 256, 259; 1997a:8-10, 24, 26, 28). Due to their location within a semi-arid environment, the Volvon and Ssaoam tribelets may have been less sedentary than their neighbors living in better watered locales. However, a benefit of their situation may have lain in their strategic trading position, between the Livermore and San Joaquin valleys (Milliken 1997b:37). Trade items that passed between
the San Joaquin River Delta and areas closer to the San Francisco Bay included baskets and basketry materials, arrow shafts, finished arrows and pieces of obsidian, bows, shell beads, tobacco, preserved foods, bird feathers and minerals for paint (Milliken 1997b:42).

The arrival of the Spanish explorers in 1775 threatened the cultural and political organization of these native groups. The Franciscan priests were intent upon changing the native people of California into Catholic agriculturists, which led to a rapid and major reduction in native Californian populations. The native peoples living in the Mount Diablo region (including the present-day Los Vaqueros area) suffered a complete Spanish takeover of their lands by the end of the eighteenth century. The Spaniards founded Mission San Francisco de Asis (now called Mission Dolores) in 1776, Mission Santa Clara the following year, and Mission San Jose in 1797. While some natives were drawn to the mission life by their interest in Spanish technology and religion, others were opposed to the Spanish settlement and most were eventually forced to join the missions, retreat into the hinterlands, or were killed (Milliken 1997c:88).

Under Spanish missionization of the San Francisco Bay Area, the native populations continued to decrease in numbers. Seven missions were eventually established in what was once Ohlone territory and those natives who were living and working under the authority of the missions were baptized as Catholics (Levy 1978). Between 1803 and 1807, 108 Volvons were baptized, with half of the baptisms occurring at Mission San Jose and the other half at Mission San Francisco. One hundred and eight Ssaoam people, the entirety of the surviving Ssaoam population, were also converted at Mission San Jose during this same period. One hundred and thirty-seven Tamcan people were baptized at Mission San Jose between 1806 and 1824, with the majority of baptisms taking place in 1911. (Milliken 1995:256, 259; 1997a:24, 26, 28; 1997c:88). By the autumn of 1806, all members of the Ssaoam and Volvon tribelets had been removed to the missions or had passed away. Higher mortality rates from introduced diseases, social strain from disrupted trading networks, and environmental pressures resulting from encroachment of livestock on what were formally Native American lands served to largely eradicate aboriginal life ways (Milliken 1997c:88). The abandonment by the Ssaoam and Volvon people gave the Tamcans the opportunity to expand westward outside of their Delta territory (Milliken 1997c:105-106) until they too were subsumed under the mission system.

By 1832, the population had decreased to less than one-fifth of its number at the time of initial contact with the Spanish (Levy 1978). Only nine of the original Ssaoam neophytes and 11 Ssaoam descendents were living at Mission San Jose at the close of 1836. Likewise, only six original Volvons and five Volvon descendents survived at Mission San Jose (Milliken 1997d:137). Many of the surviving "converted" natives worked as vaqueros for the missions and spent much time grazing cattle. At that time, the Los Vaqueros area remained unclaimed and was one of the areas used by missions for cattle ranching.
Beginning in the mid-1830s, the missions became secularized resulting in more than 800 patents of land that comprised more than 12 million acres that were issued to individuals by the Mexican government in what is now California (Ziesing 1997a). After missionization, Native Americans dispersed and were most often lost to historical record keeping. Native Americans had few choices, and limited or no legal rights, once the mission system broke down. Under Spanish, and later Mexican, law, mission lands and stock were to be allocated to the mission Indians following disbandment of the mission. This almost never happened and much of the mission lands, including those areas previously used for cattle-grazing, were quickly divided up among elite Mexican families leaving the remaining Indian population with nothing. As a result, many native peoples migrated back to their homelands and began working as vaqueros or servants for the new owners of the land. Others did not join the system and lived apart from the ranchers, occasionally stealing livestock, especially horses (Milliken 1997d:137, 138).

Demand for Indian vaqueros to work on the large cattle ranches was so strong that raids on Native American villages were conducted to obtain Indian workers (Davis, Stewart and Hitchcock 1997:146). When Francisco Alviso, Antonio Higuera and Manuel Miranda were granted Cañada de los Vaqueros in 1844, they hired Native Americans to develop and maintain the rancho while they themselves resided elsewhere. Milliken was unable to determine how long this arrangement continued, but by 1860 no listings of Native American families at Los Vaqueros were included in the U.S. Census. The mid-1850s through the 1860s mark the first time that non-Native American land owners lived at Los Vaqueros (Davis, Stewart and Hitchcock 1997:145, 149; Milliken 1997d:142-143).

By at least the late-1880s, there is again evidence that Native Americans were living at Los Vaqueros. Site CA-CCO-450/H (the Upper Vasco Ranch Adobe Dwelling Site), has been identified, on the basis of historical records, as a ranch headquarters that may have accommodated Native Americans living slightly apart from the ranch complex who may have served as cowboys and household servants. Talking about the adobe ranch structure inhabited by the then landowners, Juan and Lorenzo Suñol, informants recalled that, at least by the late 1880s, an Indian rancheria was located approximately 1,000 ft. west of the adobe structure (Davis, Stewart and Hitchcock 1997:150). An archaeological study of the various components of this complex site could potentially reveal details of the nature of Native American-Immigrant rancher interaction and cultural exchange during the mid-1800s.

Milliken notes that the extensive research on the path of Ssaoam and Volvon (and by extension, Tamcan) descendents into the late 19th and 20th centuries has not yet been conducted. Due to large gaps in record keeping, this is likely to be a very difficult process (Milliken 1997d:144). Beginning in the early 1900s, academic interest in the fast-disappearing cultures of the Californian Native Americans resulted in a number of ethnographic and linguistic studies, primarily by staff and students of the Anthropology
Department at the University of California, Berkeley. However, their research focused on the reconstruction of pre-contact lifeways, rather than on what was happening contemporaneously (Davis, Hitchcock and Mertz 1997:156-157).

A group of Native Americans who had ties to the Los Vaqueros Reservoir area prior to missionization moved to an area in the foothills of the Sierra Nevada mountain range near the town of Ione. Lobo (1997) conducted interviews with Native American Ione residents who had ties to the Los Vaqueros area. The Ione area shares many physical characteristics of the Kellogg Creek landscape, although certain resources such as the reeds used in basketry, are not available in the Sierra foothills. Ione has long been a place of refuge for Native Americans who inhabited the Los Vaqueros region. In pre-contact times, people would migrate to the Sierra foothills during times of flooding (Lobo 1997).

Native Americans living in Ione have made visits to the Los Vaqueros area at various times throughout their lives, to which they express having strong emotional and spiritual ties. In the past, they traveled with relatives to visit other relatives and friends, many of whom are now deceased. Oral histories recorded by Lee Davis in 1993 revealed that the mother of Henry Alvarez, an Ohlone elder informant, used to take him to collect medicinal plants along Kellogg Creek and Vasco Road (Davis, Hitchcock and Mertz 1997:158). The Vasco Caves (which are outside of the study area) are notable landscape elements. The grinding stones (bedrock milling stations) at Los Vaqueros are another familiar and central element of the cultural landscape. Those at Los Vaqueros are very similar to those located in the Ione area (Davis, Hitchcock and Mertz 1997:161; Lobo 1997). Significant places such as Mount Diablo, the Upper Kellogg Creek valley, or Ione, are conceptualized as focal points by today’s Ione Miwok people. Lobo (1997:171) defines a focal point as "culturally significant gathering points or hubs within a region". The focal point contrasts with the boundary concept most commonly used by archaeologists. She argues that this concept allows a more realistic understanding of a people’s relationship to the natural environment and their social world. For more detailed information on the importance of the Ione and Mount Diablo regions to Native Americans refer to Lobo (1997) and Ortiz (1997).

**Historical Background**

The report details the historical background because the project area encompasses a Historic District and the project has the potential to adversely impact individual historic properties as well as the District. There would potentially be cumulative adverse effects to individual properties and the Historic District from the 100 TAF Reservoir and the proposed project. The detailed historical background provides a context within which to evaluate the resources and the project effects and to proposed research questions and future mitigation measures.
The founding of Mission San Jose in 1797 by Spain marked the start of European influence in the East Bay (Praetzellis et al. 1997:15). Settlements were established inland and reached nearly to the Los Vaqueros watershed, for maintenance of the Mission system’s expanding grazing lands. At that time, the control of the Missions was focused around the more accessible San Francisco Bay. It was not until after Mexico’s secession from Spain in 1821 that land was granted to private citizens, a practice that increased significantly after the 1833 act of the Mexican legislature that established the secularization of the missions.

During the 1820s the Los Vaqueros study area, then known as Poso de los Vaqueros (Spring of the Cowboys), was not yet settled although nearby surrounding areas were occupied by "mission outstations" (Praetzellis et al. 1997:15). The study area was, however, used for the Mission’s yearly rodeo or cattle round-up (Praetzellis et al. 1997:15-17) which involved the separation and gelding of the free ranging Mission cattle.

Between 1835 and 1836 the Mexican government began offering grants of Mission grazing land primarily to Californios (both Spanish speaking descendants of European settlers, and Mestizo and Europeanized Natives) and Mexican colonists. By 1839, the areas surrounding the Los Vaqueros watershed had all been claimed (Praetzellis et al. 1997:17). At that time, the Los Vaqueros study area was still communal grazing land used for annual rodeos by the surrounding ranches in the same fashion as it had been under the Mission system (Praetzellis et al. 1997:17).

In 1836, Mission San Jose shut down, freeing the Indian neophytes to return to their villages, or take up work on the newly granted ranches. The secularization of the Missions was intended to be the final step of the process to make the Indians Spanish (Rawls and Bean 1998:26-27), after which the neophytes living in the communities surrounding Mission San Jose were to be granted half of the Mission land (Rawls and Bean 1998:59). However, this policy was never properly implemented and many neophytes were reduced to raiding horses from the local ranches, which resulted in violence and Mexican reprisals against them, as well as a general opposition to settling near the San Joaquin Valley (Stewart 1994:57-59).

It was not until February of 1844 that the Los Vaqueros study area was granted as a rancho (Ziesing 1997a:27). Three brothers-in-law, Francisco Alviso, Antonino Higuera, and Manuel Miranda first requested the Cañada de Los Vaqueros (Valley of the Cowboys) in May of 1841, when Alviso had built a corral for livestock he had begun grazing on the land, but the grant was not formally awarded until 1844. The Rancho consisted of an area of 4 leagues (17,754 acres), and was bounded by property owned by John Marsh to the north (Los Meganos), Antonio Maria Pico to the east (Cañada de Buenos Ayres), Robert Livermore and Jose Noriega to the south (Las Positas), and Jose Dolores Pacheco to the east (Rancho Santa Rita).
Alviso and his family did little to improve the land other than erecting tents and temporary shelters for the *Californios* and Native Americans they employed as ranch hands (Praetzellis et al. 1997:19). The land grant was intended to be a place for the owners to graze their herds while they resided further to the west in more populated regions (Ziesing 1997a:27).

In 1847 Francisco Alviso and his wife sold what was claimed to be the entire Los Vaqueros land grant to Jose Noriega and Robert Livermore, the owners of Rancho Las Positas located to the south. It was alleged that the other original grantees of the rancho, Manuel Miranda, Antonino Higuera, and their wives had transferred their interest to Alviso in 1846 (Praetzellis et al. 1997:24). At the time it was contested whether the deeds from Manuel Miranda and Antonino Higuera granting their thirds of the land were legitimate. If not, Francisco Alviso legally could only transfer the one-third of the grant to which he held title.

Robert Livermore, originally a merchant marine by trade, was known amongst the landed families of the area with whom he had associated since his arrival in Monterey in 1829 (Praetzellis et al. 1997:25). He had married into the Higuera family, and was the godfather to the first child of Manuel Miranda and his wife Maria. This connection may have been part of the reason for the family’s inclination to acquire Los Vaqueros, just north of Livermore’s Las Positas rancho. Livermore had known Jose Noriega since his early days in the area; the two had met at Mission San Jose in 1830. In 1835, they agreed to establish their own rancho, and in 1839 received the land grant for what would become Las Positas (Praetzellis et al. 1997:25).

Livermore and Noriega filed their claim to Los Vaqueros in February of 1852, and in September of 1855 the Board of Land Commissioners confirmed this (Praetzellis et al. 1997:24-25). In 1853, however, while waiting for the confirmation of the combined Los Vaqueros/Las Positas land grant, Noriega purchased full ownership of Los Vaqueros from Livermore to whom he in turn granted his share of Las Positas as part of the bargain (Praetzellis et al. 1997:25), thus separating the two grants.

Livermore however had already transferred his interest in the Los Vaqueros to his wife and children in 1852, a fact which he neglected to reveal to his partner. The deception was uncovered that same year and Livermore was forced to compensate Noriega (Ziesing 1997a:38) who retained rights to the property.

Jose Noriega, then believing he owned the entire Los Vaqueros land grant, sold half in April 1853 to Dr. Benjamin Cory, who in turn sold it to William Akenhead. Akenhead then lost his interest due to an unpaid debt and it was purchased by Juan Suñol in 1856 at a "sheriff’s sale" (Praetzellis et al. 1997:25). Meanwhile, in 1855, Noriega had transferred the remaining half of Los Vaqueros to Massimo Fernandez, his brother-in-law (Praetzellis et al. 1997:25).
On November 14, 1857, Lorenzo Suñol (Juan’s brother) purchased Fernandez’s interest, while a group of Basque or Basco settlers purchased Juan Suñol’s share from Etiene Garat (who received this portion of Los Vaqueros from Suñol in March of 1857) (Ziesing 1997a:38). When Lorenzo Suñol died intestate in 1866, Juan claimed his interest in the property (Praetzellis et al. 1997:57).

It is possible that the Bascos’ and Suñols’ purchase of two halves of the Los Vaqueros land grant was orchestrated as a partnership (Praetzellis et al. 1997:28). The families operated on the Los Vaqueros land grant together for approximately 10 years, but despite any agreement they may have had going into the purchase of the land, they feuded constantly over grazing rights (Praetzellis et al. 1997:30). The Suñols and Bascos used the land in a fashion similar to that of the first grantees – primarily for grazing. During this period the rancho owners built living structures for themselves and their hands (Ziesing 1997a:28), but they only improved a very small portion of the land, amounting to approximately five acres (Ziesing 1997a:32).

In 1860, Simon Blum, a merchant originally from France but who had operated in northern California since the early 1850s, purchased the one third interest of Manuel Miranda as well as smaller interests from the heirs of Antonino Higuera, whose shares were alleged to have been sold by Francisco Alviso years prior to Livermore and Noriega. In 1862, Blum attempted to make a legal claim for his right to half of the Los Vaqueros rancho - he filed a suit against the Suñol and Basco families which would carry on for years before any resolution could be reached (Ziesing 1997a:38).

In 1864, Louis Peres, another Frenchman, and Pedro Altube, a Basque, were partners in the wholesale cattle-butchering business (Ziesing 1997a:65). The two acquired the Basco share of the Los Vaqueros grant, which they believed to be half of the total property (Ziesing 1997a:29). Peres would be one of the first ranchers in the area to fence his property, a decade before county law required such protections, although this improvement may have been an attempt to prevent encroaching land claims such as those of Simon Blum (Praetzellis et al. 1997:31).

By 1871 Pedro Altube had sold most of his interest in Los Vaqueros to Peres so that he could focus on investments in Nevada. It was during this period, in the late 1870s, that Peres began subdividing Los Vaqueros into smaller leased properties that paid a portion of their crops as rent. Under Peres’ management as much as two-thirds of the property was improved for agriculture by 1880 (Ziesing 1997a:32). Family farms began replacing the large scale ranches that had existed in the area before, and, as a result, the local population expanded and communities began to develop.
Beginning in the 1870s, wheat became an important crop in the California agricultural economy. Shortages in the labor necessary for its harvesting led to increased mechanical specialization which resulted in California becoming one of the United States’ leading agricultural producers at the time (Ziesing 1997a:87). During the 19th century California saw a number of such specialized ‘booms’ that increased due to technological improvements, such as improved transportation (Ziesing 1997a:87), and more rapid communication, both of which allowed for a more flexible and potentially variable market economy. Most farmers in the Los Vaqueros area however practiced mixed-agriculture at that time, combining hay and grain farming with the raising of sheep, cattle, and horses. As a result, such rapid changes in demand were felt, but not to the same degree as elsewhere in the state (Ziesing 1997a:87).

During the latter half of the 19th century, Los Vaqueros was the subject of a number of court cases due to the numerous illegitimate or contested claims to the land grant. Two of the most important of these lawsuits, *Louis Peres et al. v. Juan Suñol* and *Simon Blum v. Suñol* focused on the legality of Juan Suñol’s claim to half of the property (Ziesing 1997a:38).

In 1870, the court decided that in *Louis Peres et al. v. Juan Suñol*, the Suñol land claim was invalid, giving Louis Peres legal right to one-sixth of the Los Vaqueros property (Praetzellis et al 1997:57). In the case of *Simon Blum v. Suñol* that went on until 1883, the case was decided for both plaintiff and defendant after appeals, and in the face of another appeal, Blum eventually settled for $8,500, obtaining the rights to the Suñol portion of the property, which amounted to two-thirds of the total land grant (Ziesing 1997a:38-40).

At the same time, Blum also persuaded Pierre Dupuy, who held half of the original estate granted to Cory by Noriega (one-sixth of the total Los Vaqueros land grant), to foreclose on Peres with whom he had a large mortgage (Ziesing 1997a:39-40). Peres received money from ‘Railroad Baron’ Charles McLaughlin in order to pay this debt. McLaughlin claimed that Peres sold him the property for the money he used to pay off his mortgage, while Peres claimed that he only borrowed from McLaughlin and used the Los Vaqueros property as surety (Ziesing 1997a:38). By 1890, Charles McLaughlin’s estate gained ownership of the majority (five-sixths) of the Los Vaqueros landholding (Dupuy still held a one-sixth interest), although McLaughlin himself was killed in 1883 by the plaintiff in another lawsuit against him (Ziesing 1997a:101). Between 1881 and 1890, McLaughlin and his family made a number of improvements to the Los Vaqueros land grant, including petitioning the county to form the Vasco Grant School District and build a schoolhouse for the children of tenants. During this period, 4,000 to 5,000 acres of the grant were leased for a share of the tenants’ crop, and 10,000 to 12,000 acres were leased for cash as cattle grazing land (Praetzellis et al. 1997:82). For more detail on the complex and somewhat confused exchanges of title and litigation regarding the Los Vaqueros land grant during the second half of the 19th century, see Ziesing (1997a:25-73) and Praetzellis et al. (1997:50-76).
Kate McLaughlin, Charles’s wife, died shortly after her husband was killed in 1883. The McLaughlin Estate was left to adopted daughter Mary Crocker, and niece Kate Dillon (who married into the Winship family) and became known as the Crocker/Winship Estate, although it was most commonly associated with Crocker.

In June 1929 Mary Crocker, then owner of the Los Vaqueros land grant, was killed in an automobile accident (Praetzellis et al. 1997:91), and shortly thereafter the Wall Street stock market crash of 1929 took place. The crash caused crop prices to fall so dramatically that tenants could no longer afford the rent on the land of the Crocker estate that they farmed (Praetzellis et al. 1997:94). The Crocker/Winship Estate owned the Los Vaqueros land grant until 1935 when it was divided and sold off in portions (Ziesing 1997a:148).

In the Vasco (a popular name for the Los Vaqueros land grant) falling crop prices were felt by tenants before owners, and by 1930 tenancy rates were dropping. Tenants were further affected as the Crocker estate began dividing and selling the original Los Vaqueros land grant. In 1936, Charles and Sue Nissen purchased 2,394 acres, and by 1940 they owned approximately 3,500 acres, farming some of the land and leasing the rest to many of the Crocker’s former tenants (Ziesing 1997a:148-149). Oscar Starr, whose father-in-law and brother established the Caterpillar Tractor Company in the 1920s (Praetzellis et al. 1997:95), purchased 7,883 acres in 1935. Starr used the land as a sheep and cattle ranch, grew grain and hay, and built shops where he experimented with farm machinery, and in particular, developed the diesel version of the Caterpillar Tractor (Ziesing 1997a:152-153).

The Nissen portion of the land (in the south and east of the grant) was sold to the Jackson family in the 1950s. In the north, the Grueninger family, who had farmed the land for a number of years, at first as tenants, had acquired 640 acres by 1940 and by the late 1960s or early 1970s had sold their portion of the property to the Kaiser Construction Company. Other smaller landholders (especially in the Black Hills region) held onto their property into the 1960s (Ziesing 1997a:148-149).

Meanwhile, to the north of the Los Vaqueros land grant, another large land holding, Rancho de Los Meganos had been going through its own series of changes (a section of the Transfer Station-Los Vaqueros Pipeline Corridor traverses the eastern portion of Los Meganos). In 1836, near the end of the Mexican period, John Marsh arrived in Los Angeles, Alta California. While riding north in search of a place to settle down, he met Jose Noriega. Noriega agreed to accept all of Marsh's money, $500, in exchange for Noriega's Rancho de Los Meganos. Marsh thus became the first Anglo-American to settle in Contra Costa County (Emanuels 1993:204).

From 1838 until he built what became known as the "Stone House" in 1856, Marsh lived on the rancho in a small adobe structure. This adobe was apparently located very close to a
group of Indians, likely to have been Bay Miwok. When twin brothers William and Joseph Smith moved their families from Massachusetts to California in 1849, John Marsh was there to greet them. Accounts vary somewhat, but it seems clear that shortly after their arrival the brothers were met by Marsh and quickly acquired land, either from Marsh’s vast holdings or from an unknown party (Kyle 1990:64; Munro-Fraser 2000:671). The brothers were both carpenters and ordained ministers and they quickly found jobs in ‘New York of the Pacific,’ today known as Pittsburgh, constructing housing for the flood of migrants coming to California in search of gold. Joseph died of malaria that first winter.

The following summer, William received news that a ship docking in San Francisco was carrying passengers from Maine wanting to settle permanently in California (Kyle 1990:64). He immediately went to greet them and offered each family a lot at Smith’s Landing on which to build a home. Approximately half of the families accepted his offer, and the settlement they created was named Antioch at their 1851 Fourth of July picnic (Munro-Fraser 2000:672-3).

On June 24, 1851, Marsh, who was then in his 50s, married Abbie Tuck. She was a devout Baptist living with missionaries near San Jose. He took her to live in his four-room, earthen-floor adobe house. In 1854 he hired artisans to build a more permanent and stately structure, later to be known as the Stone House. The cost of the building was about $20,000 (Historic Record Company 1926:381). Abbie Marsh died in August 1855 before the house was finished, leaving behind John Marsh and their young daughter, Alice (Emanuels 1993:204).

On September 24, 1856, Marsh was stabbed to death on the road just outside Martinez by Jose Olivas, Juan Garcia, and Felipe Moreno, three disgruntled employees who felt he had cheated them out of their wages. They overtook his buggy on mustangs while he was traveling to Martinez. They lassoed him, pulled him off his buggy, and then stabbed him to death. His driverless horse and buggy continued on to Martinez, where it was spotted by some citizens, who went back and found his body (Historic Record Company 1926:382).

After a series of events, Marsh’s rancho was finally acquired by James T. Sanford. According to Emanuels (1993:199) the only noteworthy aspect of Sanford was his sale of a few acres to the San Pablo and Tulare Railroad, thereby defining the land for the village of Brentwood. Sanford, together with John F. Williams, owned all of the Brentwood Coal Company, which also held partial title to the Marsh land. In 1878, Sanford missed his mortgage payments on the Marsh property, and the Savings and Loan Society wasted no time in acquiring it (Emanuels 1993:200).

The Savings and Loan Society of San Francisco kept most of the rancho land for 22 years, renting it out to dry-land farmers. Rent was paid in the form of wheat or barley at a rate between one-quarter to one-third of their crop (Emanuels 1993:200). On October 23, 1900, a
group of Scottish investors, Balfour-Guthrie Investment Company, bought Rancho de Los Meganos from the Savings and Loan Society for $200,799.43. Even though Balfour-Guthrie purchased the land in 1900, it took until 1913 for the firm to obtain a portion of the ranch still owned by the estate of James T. Sanford (a little more than 5.25 percent of the land), which they offered $50,000 for the parcel. At the same time, the company acquired another 500 acres from Peter G. King (Hohlmayer 1991a).

On September 16, 1912, a permit was issued by the chief of the U.S. Army Corps of Engineers and authorized by the Secretary of War to divert 200 cubic ft. per second of water from Indian Slough, a branch of Old River (which, in turn, was a branch of the San Joaquin River) in Contra Costa County (Hohlmayer 1991a). Balfour-Guthrie spent $500,000 that same year building an irrigation system to spread water over more than 22,000 acres, including lands near the cities of Brentwood and Knightsen, Discovery Bay to the east, and the town of Oakley to the north.

The development of this irrigation system changed the land use in the area from cattle, grain, and alfalfa production to dairy farms, orchards (walnuts, cherries, almonds, apricots, peaches, and plums), and vineyards (Hohlmayer 1991b). Planting of other crops, such as tomatoes, strawberries, and beans began in the 1950s.

Further to the east, the Delta lands, through which the Delta-Transfer Station Pipeline Corridor runs and upon which the Old River Pump Station is situated, were in the process of being reclaimed. Development of the Delta began in 1850 with the Swamp and Overflow Land Act, which transferred ownership of all swamp and overflow lands, including the Delta marshes, from the Federal government to the State government. This transfer was on condition that the State allocate revenue from land sales towards swamp reclamation, including the construction of levees and drains. Land in the Delta was available for private purchase and state laws enacted in 1855 and 1858 set the acreage limit and price per acre to prevent monopolies and speculation. Reclamation was at the whim of the land holder and so was undertaken in a piecemeal and uncoordinated manner (Hittell 1872:604; Mitchell 1994:411-412; State of California, Department of Water Resources 2007:2-3).

In 1861, the Board of Swamp-Land Commissioners was developed to manage reclamation projects. The Board failed to implement large-scale reclamation projects or flood-control plans which left it open to political criticism. Five years after its formation, the Board was disbanded and its authority reassigned to county boards of supervisors (Hittell 1872:598; Mitchell 1994:412-413; State of California, Department of Water Resources 2007:3). In 1868, a new law was adopted that authorized reclamation districts and allowed tax assessments to be supervised at the county level. County boards of supervisors could form reclamation districts, controlled by trustees who were elected by land holders. Acreage
limitations were removed allowing large-scale investment in swampland reclamation. By 1871, nearly all delta swampland was in large private holdings (Mitchell 1994:414).

The first levees within the Delta were hand-built using some horse power. Most of the laborers were Chinese. The costs of maintaining the levees within the unstable Delta soils became prohibitive. In the late 1870s, steam-powered dredges were introduced to move alluvial soils from the channels for large levee construction at around half the cost of hand-powered labor. By the end of World War I, nearly all of the Delta marshland had been reclaimed, and the number of operating dredges markedly decreased. The transformation of the Delta into the series of channels and leved islands as it appears today was almost complete (State of California, Department of Water Resources 2007:3).

In 1936, the Contra Costa Water District (CCWD) was formed by a popular vote for the purpose of "contracting, purchasing, and distributing the water provided by the U.S. Bureau of Reclamation" (Ziesing 1997a:149). The construction of the Contra Costa Canal in 1948 greatly facilitated this, but by 1960 customer demand began to force the development of a new intake and a backup reservoir (Ziesing 1997a:149). The Kellogg Creek valley became the prime target for this new development due to the generally underdeveloped farming and grazing land along the creek, and steep terrain ideal for damming (Ziesing 1997a:149-150).

The process of planning and negotiating the Los Vaqueros Reservoir progressed slowly through the 1970s, and it was not until 1985, under the threat of impending development, that the CCWD was finally forced into action. By 1988, funding was obtained for the project and over the next decade the necessary land was purchased (Ziesing 1997a:150).

The Kellogg Creek Historic District

The Upper Kellogg Creek Watershed was designated a Historic District in 1992. Most recorded sites within the Watershed comprise the Kellogg Creek Historic District. The National Register of Historic Places defines a ‘district’ as:

[A] geographically definable area, urban or rural, possessing a significant concentration, linkage, or continuity of sites, buildings, structures, or objects united by past events or aesthetically by plan or physical development. A district may also comprise individual elements separated geographically but linked by association or history (NPS NRHP 2004).

The District encompasses both archaeological and architectural properties from the prehistoric and historic periods. SSUAF, author of the 'Evaluation, Request for Determination of Eligibility, and Effect' for the original Los Vaqueros Project, stated that "While the determination of continuous occupation awaits further investigation, these resources appear to be linked because they illustrate settlement and subsistence patterns
through time within an intermediate zone situated between the Delta/Sacramento Valley, San Francisco Bay Area, and the Coast Ranges" (SSUAF 1992:65). As well as occupational continuum, SSUAF based their assessment on physiographic features, historic land-holding boundaries, and establishment of a district as a management tool (SSUAF 1992:78). They recommended the inclusion of 68 historic properties comprising 69 cultural components within the District. The prehistoric period is represented by 12 open sites, 16 milling stations, 8 rock shelters and a rock art site. A ranch site represents what SSUAF refers to as the "ethnohistoric" period (historic period occupation by Native Americans), and the historic period includes an ancillary farm or ranch complex, a water management feature, five stone fences and corrals, 23 farm or ranch headquarters, and a site of unknown characteristics (SSUAF 1992:80). In addition to these, two prehistoric milling stations and five water management features recorded by Ziesing in 2000 are considered eligible for NRHP district status, bringing the total of historic properties within the District to 75. The Los Vaqueros Expansion study area encompasses a portion of the historic district and a subset of these properties. Although the Expansion study area does not coincide with the historic district boundaries, the historic district will continue to be treated as a historically coherent and significant unit and all historic properties that have been evaluated and found eligible for listing on the NRHP as contributing elements to the historic district will maintain that status.

**EXPECTED PROPERTY TYPES**

Property types were defined by SSUAF to aid in the process of evaluation and protection of cultural resources (SSUAF 1992:37-40). SSUAF developed a site taxonomy based on a combination of visible traits (e.g., rockshelter, midden) and inferred site function (e.g., base camp). Property types share some attributes but the type distinctions emphasize the major attributes. Prehistoric property types typically found in the Kellogg Creek Historic District and in the lands to the east (west of the Old River) include but are not limited to the following classification, largely based on the SSUAF property type taxonomy:

**Open Sites** exhibit prehistoric deposits that may or may not be visible on the surface. These sites have an open setting, often with an overview of valley lands. They may include features such as burials and/or bedrock milling stations. The deposits include materials associated with domestic activities such as concentrations of debitage, fire-affected rock, burned and unburned animal bone, and/or shell, which are common components of midden. For this reason some open sites have been interpreted as occupation sites. Open sites with less diverse materials may represent special-purpose stations. Examples of open sites within the study area include CA-CCO-447/H and -458/H.

**Large Occupation Sites or Small Villages** are similar to open sites, or base camps, but are larger in size and have a higher degree of diversity of materials. None of the sites identified during the original Los Vaqueros cultural resource studies has been classified as a large
occupation/small village. The nearest example is CA-CCO-320 in Round Valley, just north of the study area.

**Milling Stations** are identified by the presence of bedrock mortars (bedrock milling stations). Such sites may also contain prehistoric cultural deposits such as concentrations of debitage, fire-affected rock, burned and unburned animal bone, and/or shell, or other rock features, but these deposits are often sparse, if present. There are many milling stations within the study area. Examples include CA-CCO-462 and -463.

**Rockshelters** are often found in large rock outcrops and may contain associated features such as midden (prehistoric cultural deposits with concentrations of debitage, fire-affected rock, burned and unburned animal bone, and/or shell), bedrock milling stations, or rock art. None of the known historic properties in the study area have been classified as rockshelters.

**Lithic Scatters** are concentrations of flaked stone materials such as obsidian or chert that represent the remains of stone tool production. These typically lack other cultural materials or features. Although SSUAF did not include this property type in their original classification, lithic scatters are often the initial identifier of buried prehistoric sites. The property type is included here because surface surveys may identify a lithic scatter that may later be redefined on the basis of subsurface testing and data recovery. Thus, it is a useful category for classifying initial finds before mitigation has been undertaken.

**Rock Art Sites** include the painting, pecking, or engraving on rock faces, which can occur in isolation or in association with bedrock milling stations, midden, rockshelters, and/or subsurface deposits. The rock faces may be found on isolated or grouped boulders or rock shelter interiors. Painting on rock surfaces in Central California is both a rare occurrence and highly susceptible to, and easily degraded by, vandalism. The petroglyph boulder CA-CCO-597 is the sole example of a rock art site within the study area.

**Ranch Sites** date to the Post-Mission period, represent Native American ranch laborer occupations in proximity to ranch headquarters, and are characterized by Native American materials (e.g., flaked stone artifacts and debitage) located near historic-period ranch structures. Such sites are relatively recent and show little evidence of significant soil modification. SSUAF believes that CA-CCO-450/H is a representative of this property type, an interpretation partially based on historic accounts.

In summary, the prehistoric and ethnohistoric period property types found within the study area include a ranch site, rock art site, milling stations, and open sites. Property types found within the vicinity but not within the study area include large occupation sites or small villages, and rock shelters.
Historic property types commonly encountered in the Kellogg Creek Historic District but also found in the lands to the east (west of Old River) include but are not limited to the following:

**Ranch or Farm Headquarters** include ranching or farming structures as well as domestic features. These may include: living quarters, structural remains such as building platforms, terracing, footings, cellar holes, chimney bases, hand-dug wells, privies, cisterns, barns, corrals, or non-native vegetation, roads, and fences. These properties are either the historically documented headquarters of farming or ranching operations or contain archaeological features that indicate such use. The Perata/Bonfante tenant ranch, CA-CCO-427H, is an example of a ranch headquarters.

**Ancillary Farm/Ranch Complex** represents a temporary domestic occupation associated with some animal management feature, such as a corral. Site CCO-454H, the Los Vaqueros sheep camp, is an ancillary ranch complex.

**Isolated Refuse Dump** can be identified by the presence of historic-period refuse without any of the other features listed under farm/ranch headquarters. The historic component of CA-CCO-458/H was classed as a refuse dump and recommended as not eligible for listing on the NRHP in 1992.

**Water Management Feature** defines individual or associated features used for the storage or manipulation of water. They include: dams, reservoirs, stockponds, water tanks, spring improvements, creek improvements, wind pumps/troughs, and ditches. Associated water management features comprise the historic component of CA-CCO-467/H.

**Livestock Features** are built elements used for the maintenance of livestock. They include stone and wood corrals and fences. The three-sided stone structure at CA-CCO-726/H has been interpreted as a livestock feature.

**Historic Artifact Scatters** are defined by debris and refuse concentrations and caches from the historic period characterized by materials such as glass (e.g., fragments of window pane, bottles), ceramics (e.g., table ware, storage containers), metal (e.g., wire, nails, farm equipment), brick, and/or wood. They are represented by such deposits and are also defined by the absence of structural remains, standing or collapsed.

In accordance with federal guidelines, deflated or collapsed buildings are treated as archaeological phenomena, while standing structures are considered architectural properties.
3.0 Literature and Records Search

The cultural resources of the Los Vaqueros Watershed have been studied extensively by CCWD starting in the mid-1980s. The EIS/EIR for the original Los Vaqueros Project was certified in the early 1990s and the reservoir was filled with water in 1998. Since that time, the cultural resources of the Watershed have been managed and monitored by CCWD staff. In 2001 the Los Vaqueros Study Team began to thoroughly review all the documentation regarding cultural resources in the study area and to verify the locations of selected sites in areas that would be directly affected by reservoir expansion. This cultural assessment effort was concentrated within the Los Vaqueros Watershed, although data were also collected for the potential conveyance corridor alternatives in the lands that lie between the reservoir to the west and the Delta to the east. The staff of the Northwest Information Center (NWIC) of the California Historical Resources Information System conducted records searches October 22, 2001 (NWIC File No. 01-970), October 30, 2003 (NWIC File No. 03-249), January 8, 2004 (NWIC File No. 03-458), and March 20, 2007 (NWIC File No. 06-1316). An additional records search was conducted by Heidi Koenig of ESA on April 16, 2008 (NWIC File No. 07-1482). Staff reported locations of known cultural resources and previous cultural resources studies within the study area and adjoining ¼-mile area on USGS 7.5-Minute Topographic Maps of Brentwood (1978), Byron Hot Springs (1953, photorevised 1968), Clifton Court Forebay (1978), Tassajara (1991), and Woodward Island (1978).

The NWIC staff also searched the Office of Historic Preservation Historic Properties Directory with archaeological determinations of eligibility (September 18, 2006); the California Inventory of Historical Resources (March 1976); the Historic Resources Inventory of Contra Costa County (1989); and the following Historic maps: 1861 Rancho Cañada de los Baqueros Plat Map; 1861 Rancho Los Meganos Plat Map; 1862 GLO Plat Maps T1N R2E, T1N R3E, T1S R2E, and T1S R3E; 1871 GLO Plat Map T2S R2E; 1879 Smith & Elliott (publishers) Map of Contra Costa County and Part of Alameda County; 1898 (reprinted 1947) USGS Mt. Diablo Quadrangle; and the 1916 (reprinted 1948) USGS Byron Quadrangle. Results are presented by project component below.

3.1 Previous Studies

A total of 59 previous studies have been conducted in portions of the study area. Table 2 lists these studies in chronological order by author and report number (NWIC filing system), year, type of study, and the project component(s) of the Los Vaqueros Expansion that they overlap. Full bibliographic references for these studies are presented in the References section.
## Table 2. Previous Cultural Resources Studies

<table>
<thead>
<tr>
<th>Author/Report No.</th>
<th>Year</th>
<th>Survey/Study Type</th>
<th>Comments</th>
<th>Project Component(s)</th>
</tr>
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<tr>
<td>Brown, Kyle, Adam Marlow, Thomas Young, James Allan and William Self S-029590</td>
<td>2004</td>
<td>mixed survey strategy, pedestrian &amp; windshield</td>
<td>includes P-01-010702, Brushy Creek Ranch</td>
<td>LV-SBA Pipeline</td>
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<td>Chavez, David and Jan M. Hupman S-026870</td>
<td>2003</td>
<td>intensive pedestrian survey</td>
<td>no significant cultural materials observed</td>
<td>Transfer-Bethany Pipeline</td>
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<td>Giliberti, Joseph S-027445</td>
<td>2002</td>
<td>mixed survey strategy, pedestrian and windshield</td>
<td>no significant cultural materials observed</td>
<td>Delta-Transfer Pipeline</td>
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<td>Stoyka, Michael and Michael Meyer S-023758</td>
<td>2001</td>
<td>intensive pedestrian survey</td>
<td>includes CCO-427H &amp; CCO-459</td>
<td>275 TAF Reservoir</td>
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<tr>
<td>Hattersley-Drayton, Karana S-022707</td>
<td>2000</td>
<td>Site-specific investigations</td>
<td>relates to CCO-450/H</td>
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<td>SSUAF S-022918</td>
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<td>Praetzellis, Mary, Jack Meyer and Suzanne Stewart S-021899</td>
<td>1999</td>
<td>Historic Property Treatment Plan</td>
<td>includes CCO-9, -397, -446, -447/H, -452, -459, -463, -535H, -725, -726/H &amp; P-07-000791</td>
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<td>New Dam</td>
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<td>Brady and Associates, Inc. and Sonoma State University Anthropological Studies S-018558</td>
<td>1996</td>
<td>regional overview &amp; management plan</td>
<td>includes CCO-9, -397, -458/H, -459, -466, -467/H &amp; -535H</td>
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<td>New Delta Intake and Pump Station</td>
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<tr>
<td>Moratto, Michael J. (ed) S-023674</td>
<td>1995</td>
<td>survey</td>
<td>no significant cultural materials observed</td>
<td>Delta-Transfer, Transfer-LV &amp; Transfer-Bethany Pipelines</td>
</tr>
<tr>
<td>Holman, Miley Paul S-013839</td>
<td>1992</td>
<td>mixed survey strategy, pedestrian</td>
<td>no significant cultural materials observed</td>
<td>Transfer-Bethany Pipeline</td>
</tr>
<tr>
<td>Bramlette, Allan G., Mary Praetzellis, Adrian Praetzellis, Katherine M. Dowdall, Patrick Brunmeier and David A. Fredrickson S-013256</td>
<td>1991</td>
<td>mixed survey strategy, pedestrian</td>
<td>no significant cultural materials observed</td>
<td>Delta-Transfer Pipeline; Expanded Old River Intake and Pump Station; Transfer-LV, LV-SBA, &amp; Transfer-Bethany Pipelines; Expanded Transfer Facility</td>
</tr>
<tr>
<td>Fong, Michael R. and Donna M. Garaventa, Stuart A. Guedon, Steven J. Rossa and David G. Brittin S-014597</td>
<td>1991</td>
<td>intensive pedestrian survey</td>
<td>no significant cultural materials observed</td>
<td>Transfer-Bethany Pipeline</td>
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<tr>
<td>Romano, Melinda S-012275</td>
<td>1990</td>
<td>intensive pedestrian survey</td>
<td>no significant cultural materials observed</td>
<td>Delta-Transfer Pipeline</td>
</tr>
<tr>
<td>Jackson, Thomas L., Michael J. Moratto, Richard M. Pettigrew, C. Kristina Roper and Randall F. Schalk (eds) S-012300</td>
<td>1990</td>
<td>intensive pedestrian survey</td>
<td>no significant cultural materials observed</td>
<td>Delta-Transfer &amp; Transfer-Bethany Pipelines</td>
</tr>
<tr>
<td>Bramlette, Allan, Mary Praetzellis, Adrian Praetzellis, Margaret Purser and David A. Fredrickson S-012800</td>
<td>1990</td>
<td>mixed survey strategy, pedestrian</td>
<td>CCO-447/H, -458/H, -467/H, -636, -637 &amp; -726/H</td>
<td>275 TAF Reservoir; Transfer-LV, LV-SBA, Transfer-Bethany, &amp; Inlet-Outlet Pipelines; New Access Road</td>
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<tr>
<td>Bramlette, Allan, Mary Praetzellis, Adrian Praetzellis and David A. Fredrickson S-010040</td>
<td>1988</td>
<td>mixed survey strategy, pedestrian</td>
<td>includes CCO-9, -397, -427H, -445H, -446H, -447/H, -450/H, -452, -458/H, -459, -462, -463, -464, -467/H, -468, -469, -470H &amp; -535H</td>
<td>275 TAF Reservoir; New Dam; Borrow Area; Dam Stockpile; Transfer-LV, LV-SBA &amp; Inlet-Outlet Pipelines; Marina Facility; Interpretive Center Options; Fishing Access; Day-Use Facilities; User Parking; western Access Road</td>
</tr>
</tbody>
</table>
### Table 2. Previous Cultural Resources Studies (continued)

<table>
<thead>
<tr>
<th>Author/Report No.</th>
<th>Year</th>
<th>Survey/Study Type</th>
<th>Comments</th>
<th>Project Component(s)</th>
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</thead>
<tbody>
<tr>
<td>Holman, Miley Paul S-010461</td>
<td>1988</td>
<td>mixed survey strategy, pedestrian</td>
<td>P-01-010702 is within the survey area but not recorded</td>
<td>LV-SBA Pipeline</td>
</tr>
<tr>
<td>Bramlette, Allan G. S-008969</td>
<td>1987</td>
<td>mixed survey strategy, pedestrian</td>
<td>no significant cultural materials observed</td>
<td>LV-SBA Pipeline</td>
</tr>
<tr>
<td>Bramlette, Allan and Albert J. Villemaire S-009385</td>
<td>1987</td>
<td>archaeological monitoring</td>
<td>encountered CCO-696</td>
<td>275 TAF Reservoir; Inlet-Outlet Pipelines</td>
</tr>
<tr>
<td>Keswick, Janet A., Allan G. Bramlette and David A. Fredrickson S-009400</td>
<td>1987</td>
<td>mixed survey strategy, pedestrian</td>
<td>no significant cultural materials observed</td>
<td>LV-SBA Pipeline</td>
</tr>
<tr>
<td>Orlins, Robert I. S-009466</td>
<td>1987</td>
<td>record search only</td>
<td>no significant cultural materials on record at NWIC</td>
<td>LV-SBA Pipeline</td>
</tr>
<tr>
<td>Eidsness, Janet P. and Randall A. Milliken S-008108</td>
<td>1986</td>
<td>mixed survey strategy, pedestrian</td>
<td>CCO-397 &amp; -535H</td>
<td>Stockpile Area; Transfer-LV Pipeline; Interpretive Center North Option</td>
</tr>
<tr>
<td>Frederickson, David A. S-008757</td>
<td>1986</td>
<td>review of previous studies</td>
<td>no significant cultural materials</td>
<td>275 TAF Reservoir</td>
</tr>
<tr>
<td>Holman, Miley Paul S-008912</td>
<td>1986a</td>
<td>mixed survey strategy, pedestrian</td>
<td>CCO-597 within survey area but not recorded</td>
<td>Transfer-Bethany Pipeline</td>
</tr>
<tr>
<td>Holman, Miley Paul S-008913</td>
<td>1986b</td>
<td>mixed survey strategy, pedestrian</td>
<td>no significant cultural materials observed</td>
<td>Transfer-Bethany Pipeline</td>
</tr>
<tr>
<td>Jensen &amp; Associates S-010509</td>
<td>1986</td>
<td>intensive pedestrian survey</td>
<td>CCO-397</td>
<td>Transfer-Los Vaqueros Pipeline; LV-SBA Pipeline; Transfer-Bethany Pipeline</td>
</tr>
<tr>
<td>Holman, Miley Paul S-007679</td>
<td>1985</td>
<td>mixed survey strategy, pedestrian</td>
<td>no significant cultural materials observed</td>
<td>LV-SBA &amp; Transfer-Bethany Pipelines</td>
</tr>
<tr>
<td>Holman, Miley Paul S-006699</td>
<td>1984a</td>
<td>mixed survey strategy, pedestrian</td>
<td>no significant cultural materials observed</td>
<td>LV-SBA Pipeline</td>
</tr>
<tr>
<td>Wiberg, Randy S. S-006701</td>
<td>1984</td>
<td>mixed survey strategy, pedestrian</td>
<td>no significant cultural materials observed</td>
<td>LV-SBA Pipeline</td>
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<tr>
<td>Holman, Miley Paul S-006710</td>
<td>1984b</td>
<td>mixed survey strategy, pedestrian</td>
<td>no significant cultural materials observed within APE</td>
<td>LV-SBA Pipeline</td>
</tr>
<tr>
<td>Holman, Miley Paul S-007090</td>
<td>1984c</td>
<td>mixed survey strategy, pedestrian</td>
<td>no significant cultural materials observed</td>
<td>LV-SBA Pipeline</td>
</tr>
<tr>
<td>Clark, Matthew R. S-005869</td>
<td>1983</td>
<td>intensive pedestrian survey</td>
<td>no significant cultural materials observed</td>
<td>Transfer-Bethany Pipeline</td>
</tr>
</tbody>
</table>
Table 2. Previous Cultural Resources Studies (continued)

<table>
<thead>
<tr>
<th>Author/Report No.</th>
<th>Year</th>
<th>Survey/Study Type</th>
<th>Comments</th>
<th>Project Component(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Frederickson, David A.</td>
<td>1983</td>
<td>intensive pedestrian survey</td>
<td>no significant cultural materials observed</td>
<td>Transfer-Bethany Pipeline</td>
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<tr>
<td>S-006007</td>
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</tr>
<tr>
<td>Holman, Miley Paul</td>
<td>1983</td>
<td>mixed survey strategy, pedestrian</td>
<td>no significant cultural materials observed</td>
<td>275 TAF Reservoir</td>
</tr>
<tr>
<td>S-006123</td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Clark, Matthew R.</td>
<td>1984</td>
<td>mixed survey strategy, pedestrian</td>
<td>no significant cultural materials observed</td>
<td>Transfer-Bethany Pipeline</td>
</tr>
<tr>
<td>S-006489</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>S-005763</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>West, G. James</td>
<td>1982</td>
<td>mixed survey strategy, pedestrian</td>
<td>no significant cultural materials observed</td>
<td>Delta-Transfer Pipeline</td>
</tr>
<tr>
<td>S-010508</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Porter, Cris D., Jennie</td>
<td>1980</td>
<td>mixed survey strategy, pedestrian</td>
<td>CCO-9 &amp; CCO-427H</td>
<td>275 TAF Reservoir</td>
</tr>
<tr>
<td>Goodrich and Michael</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Baldrica S-002310</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Albee, A. D.</td>
<td>1979</td>
<td>intensive pedestrian survey</td>
<td>no significant cultural materials observed</td>
<td>Transfer-LV Pipeline</td>
</tr>
<tr>
<td>S-002621</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Coles, George R.</td>
<td>1966</td>
<td>surveyed</td>
<td>possibly included CCO-397, -447/H &amp; -726/H</td>
<td>Transfer-LV, LV-SBA &amp; Inlet-Outlet Pipelines; Interpretive Center North Option; Stockpile Area</td>
</tr>
<tr>
<td>S-002329</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Treganza, Adan E.</td>
<td>1964</td>
<td>surveyed</td>
<td>CCO-397 recorded; CCO-446H, -447/H, -535H, -637 &amp; -726/H</td>
<td>Stockpile Area; Transfer-LV, LV-SBA &amp; Inlet-Outlet Pipelines; SBA Pump Station; Interpretive Center Options</td>
</tr>
<tr>
<td>S-002330</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Figure 5 depicts the portion of these studies that overlap with the project study area. Those areas not covered by previous surveys, or for which the surveys were more than 10 years old, were surveyed for the Los Vaqueros Reservoir Expansion project.
Figure 5 Areas Previously Surveyed

CONFIDENTIAL; NOT AVAILABLE FOR PUBLIC REVIEW
3.2 Recorded Cultural Resources

The records and literature search yielded 42 previously recorded cultural resources within the study area and one sensitive site, the Reburial Site. The confidential locations of these resources are depicted on Figure 6. It is important to note that only 35 of these are within the project APE. Most of these have been recommended as eligible for listing on the NRHP as contributing elements to the Kellogg Creek Historic District, and/or as individual properties. Table 3 summarizes the previously recorded cultural resources and lists their status with regard to eligibility for listing on the NRHP as recommended in the 1992 Evaluation (SSUAF 1992). Many of the recorded cultural resources within the Los Vaqueros Expansion study area were included in the original Los Vaqueros Reservoir studies. The study area and APE for the 100 TAF Los Vaqueros Reservoir project encompassed the entire Upper Kellogg Creek watershed.

The study area and proposed APE for the Expansion project does not include the entire watershed, and extends beyond the watershed to cover facilities and pipelines. In addition, NRHP status changed for two of these resources as a direct result of archaeological testing and data recovery findings during mitigation for the Los Vaqueros Reservoir project in the 1990s. Section 7.3 presents an updated NRHP status for each cultural resource, based on published reports of archaeological investigations and other mitigative actions in the 1990s and early 2000s, as well as field surveys conducted by WSA in 2007.

3.3 Previous Prehistoric Period Research within the Study Area

The records search revealed 29 sites with prehistoric period components within the Los Vaqueros Reservoir Expansion Project study area (refer to Figure 6). These include CA-CCO-9, -143, -144, -310, -397, -417, -447/H, -450/H, -452, -455, -456, -458/H, -459, -462, -463, -464, -467/H, -468, -469, -597, -621/H, -636, -637, -653, -696, -725, -726/H, -755, and P-07-002640. Of these, thirteen were subjected to some level of mitigation under the 100 TAF Los Vaqueros Reservoir Project (CA-CCO-447/H, -450/H, -458/H, -459, -468, -469, -621/H, -636, -637, -653, -696, -725, and -726/H). This mitigation has been reported in various documents produced by SSUAF under the auspices of CCWD and is summarized below. A single site, CCO-621/H was determined not eligible for listing. The historic component of CCO-458/H was found ineligible for listing on the NRHP.
Figure 6 Cultural Resources Locations

CONFIDENTIAL; NOT AVAILABLE FOR PUBLIC REVIEW
### Table 3. Previously Recorded Cultural Resources within the Study Area

<table>
<thead>
<tr>
<th>Resource</th>
<th>Property Type</th>
<th>Previous Mitigation</th>
<th>NRHP Status as of 1992</th>
<th>Within APE</th>
</tr>
</thead>
<tbody>
<tr>
<td>CA-CCO-9</td>
<td>Milling Station</td>
<td>Avoided</td>
<td>Eligible, individual and district</td>
<td>Yes</td>
</tr>
<tr>
<td>CA-CCO-143</td>
<td>Lithic Scatter</td>
<td>No Known Mitigation</td>
<td>Not evaluated</td>
<td>No</td>
</tr>
<tr>
<td>CA-CCO-144</td>
<td>Lithic Scatter</td>
<td>No Known Mitigation</td>
<td>Not evaluated</td>
<td>No</td>
</tr>
<tr>
<td>CA-CCO-310</td>
<td>Rock Shelter</td>
<td>Avoided</td>
<td>Eligible, individual and district</td>
<td>Yes</td>
</tr>
<tr>
<td>CA-CCO-397</td>
<td>Open Site, Milling Station</td>
<td>Avoided</td>
<td>Eligible, individual and district</td>
<td>Yes</td>
</tr>
<tr>
<td>CA-CCO-417</td>
<td>Rock Shelter</td>
<td>Avoided</td>
<td>Eligible, individual and district</td>
<td>Yes</td>
</tr>
<tr>
<td>CA-CCO-427H</td>
<td>Ranch Headquarters</td>
<td>Phased Data Recovery</td>
<td>Eligible, district only</td>
<td>Yes</td>
</tr>
<tr>
<td>CA-CCO-445H</td>
<td>Ranch Headquarters</td>
<td>Phased Data Recovery</td>
<td>Eligible, district only</td>
<td>Yes</td>
</tr>
<tr>
<td>CA-CCO-446H</td>
<td>Ranch Headquarters</td>
<td>Avoided; screened from view</td>
<td>Eligible, district only</td>
<td>Yes</td>
</tr>
<tr>
<td>CA-CCO-447/H</td>
<td>Livestock Management Feature; Open Site (burials)</td>
<td>Phased Data Recovery; screened from view</td>
<td>Eligible, district only</td>
<td>Yes</td>
</tr>
<tr>
<td>CA-CCO-448H</td>
<td>Ranch Headquarters</td>
<td>No Known Mitigation</td>
<td>Ineligible</td>
<td>Yes</td>
</tr>
<tr>
<td>CA-CCO-450/H</td>
<td>Ranch Headquarters; Open Site, Milling Station</td>
<td>Phased data recovery; Avoid adobe and structures</td>
<td>Eligible, individual and district</td>
<td>Yes</td>
</tr>
<tr>
<td>CA-CCO-452</td>
<td>Milling Station</td>
<td>Avoided</td>
<td>Eligible, district only</td>
<td>Yes</td>
</tr>
<tr>
<td>CA-CCO-454H</td>
<td>Ancillary Farm/Ranch Complex</td>
<td>Phased Data Recovery</td>
<td>Eligible, individual and district</td>
<td>Yes</td>
</tr>
<tr>
<td>CA-CCO-455</td>
<td>Rock Shelter</td>
<td>Avoided</td>
<td>Eligible, individual and district</td>
<td>Yes</td>
</tr>
<tr>
<td>CA-CCO-456</td>
<td>Rock Shelter</td>
<td>Avoided</td>
<td>Eligible, district only</td>
<td>Yes</td>
</tr>
<tr>
<td>CA-CCO-458/H</td>
<td>Historic Artifact Scatter; Prehistoric Open Site (burials)</td>
<td>Phased Data Recovery</td>
<td>Historic: ineligible. Prehistoric: eligible, individual and district</td>
<td>Yes</td>
</tr>
<tr>
<td>CA-CCO-459</td>
<td>Open Site with Milling Station (burials)</td>
<td>Phased Data Recovery</td>
<td>Eligible, district only</td>
<td>Yes</td>
</tr>
<tr>
<td>CA-CCO-462</td>
<td>Milling Station</td>
<td>Avoided</td>
<td>Eligible, district only</td>
<td>Yes</td>
</tr>
<tr>
<td>CA-CCO-463</td>
<td>Open Site with Milling Station</td>
<td>Avoided</td>
<td>Eligible, individual and district</td>
<td>Yes</td>
</tr>
<tr>
<td>CA-CCO-464</td>
<td>Milling Station</td>
<td>Avoided</td>
<td>Eligible, district only</td>
<td>Yes</td>
</tr>
<tr>
<td>CA-CCO-467/H</td>
<td>Water Management Features, Milling Station</td>
<td>Avoided</td>
<td>Eligible, individual and district</td>
<td>Yes</td>
</tr>
<tr>
<td>CA-CCO-468</td>
<td>Open Site with Milling Station</td>
<td>Phased Data Recovery</td>
<td>Eligible, individual and district</td>
<td>Yes</td>
</tr>
<tr>
<td>CA-CCO-469</td>
<td>Milling Station</td>
<td>Phased Data Recovery</td>
<td>Eligible, district only</td>
<td>Yes</td>
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</table>
Table 3. Previously Recorded Cultural Resources within the Study Area (continued)

<table>
<thead>
<tr>
<th>Resource</th>
<th>Property Type</th>
<th>Previous Mitigation</th>
<th>NRHP Status as of 1992</th>
<th>Within APE</th>
</tr>
</thead>
<tbody>
<tr>
<td>CA-CCO-470H</td>
<td>Ranch Headquarters</td>
<td>Phased Data Recovery</td>
<td>Eligible, individual and district</td>
<td>Yes</td>
</tr>
<tr>
<td>CA-CCO-533H</td>
<td>Ranch Headquarters</td>
<td>Avoided</td>
<td>Eligible, district only</td>
<td>No</td>
</tr>
<tr>
<td>CA-CCO-534H</td>
<td>Ranch Headquarters</td>
<td>Avoided</td>
<td>Eligible, district only</td>
<td>No</td>
</tr>
<tr>
<td>CA-CCO-535H</td>
<td>Ranch Headquarters</td>
<td>Phased Data Recovery; demolish buildings; avoid subsurface deposits</td>
<td>Eligible, district only</td>
<td>Yes</td>
</tr>
<tr>
<td>CA-CCO-596H</td>
<td>Ranch Headquarters</td>
<td>Avoided</td>
<td>Not included in 1992 Evaluation</td>
<td>Yes</td>
</tr>
<tr>
<td>CA-CCO-597</td>
<td>Rock Art Site</td>
<td>Avoided</td>
<td>Not included in 1992 Evaluation</td>
<td>Yes</td>
</tr>
<tr>
<td>CA-CCO-621/H</td>
<td>Ranch Headquarters; Lithic Scatter</td>
<td>Phased Data Recovery</td>
<td>Not included in 1992 Evaluation; Determined ineligible after testing</td>
<td>Yes</td>
</tr>
<tr>
<td>CA-CCO-636</td>
<td>Milling Station</td>
<td>Phased Data Recovery</td>
<td>Eligible, individual and district</td>
<td>Yes</td>
</tr>
<tr>
<td>CA-CCO-637</td>
<td>Surface Lithic Scatter; Open Site (burials)</td>
<td>Phased Data Recovery</td>
<td>Eligible, individual and district</td>
<td>Yes</td>
</tr>
<tr>
<td>CA-CCO-650H</td>
<td>Historic Artifact Scatter</td>
<td>15 Uncontrolled Shovel Probes</td>
<td>Ineligible after testing</td>
<td>Yes</td>
</tr>
<tr>
<td>CA-CCO-653</td>
<td>Open Site with single human burial</td>
<td>Phase 1 inventory</td>
<td>Not included in 1992 study or Evaluation</td>
<td>No</td>
</tr>
<tr>
<td>CA-CCO-696</td>
<td>Deeply buried Open Site (burials)</td>
<td>Data Recovery; construction monitoring</td>
<td>Discovered after 1992 Evaluation; treated as eligible</td>
<td>Yes</td>
</tr>
<tr>
<td>CA-CCO-725</td>
<td>Open Site</td>
<td>Level 2 Data Recovery</td>
<td>Discovered after 1992 Evaluation; treated as eligible</td>
<td>Yes</td>
</tr>
<tr>
<td>CA-CCO-726/H</td>
<td>Historic Artifact Scatter; Open Site</td>
<td>Construction monitoring</td>
<td>Discovered after 1992 Evaluation; treated as eligible</td>
<td>Yes</td>
</tr>
<tr>
<td>CA-CCO-755</td>
<td>Buried Open Site</td>
<td>Construction monitoring</td>
<td>Discovered after 1992 Evaluation</td>
<td>Yes</td>
</tr>
<tr>
<td>P-07-002640</td>
<td>Isolated pestle</td>
<td>Construction monitoring</td>
<td>Discovered after 1992; treated as ineligible</td>
<td>No</td>
</tr>
<tr>
<td>P-07-000791</td>
<td>Water Management Feature</td>
<td>Not relocated (suspected covered by silt)</td>
<td>Discovered after 1992; treated as eligible</td>
<td>Yes</td>
</tr>
<tr>
<td>P-01-010702</td>
<td>Ranch Headquarters</td>
<td>Not in original study area</td>
<td>Not included in 1992 study or Evaluation</td>
<td>No</td>
</tr>
</tbody>
</table>
Mitigation is designed and implemented for specific project impacts on specific historic properties or historical resources (those cultural resources that have been listed or are eligible for listing on the NRHP and/or on the CRHR). It is possible that new projects could have potential adverse effects on sites that have been the subject of previous mitigation, therefore requiring further mitigation. Each resource is described in some detail in the following sections in support of the evaluations and mitigation measures recommended in section 6.0.

Prehistoric Sites Mitigated for the 100 TAF Reservoir Project

CA-CCO-447/H - Open Site (burials)

This site is located in the Middle Kellogg Creek Valley in close proximity to the creek. It was originally recorded as historic-era, but was reassigned as multi-component following the discovery of subsurface prehistoric archaeological material (two pieces of flaked stone in association with a layer of freshwater shells at 145 cm below surface) in a geotechnical test pit. During Level 1 archaeological testing of the historic foundation feature in 1994, three stone flakes were excavated. None of the flakes were in their primary context (Ziesing 1996:59).

In 1997, CA-CCO-447/H was tested as part of the mitigation for the Los Vaqueros 100 TAF Reservoir Project. The site area was re-surveyed, and backhoe trenching and feature excavation was undertaken. Survey transects spaced a maximum of 1 m apart were walked within a 50-m radius of the previously recorded site boundary. A few pieces of debitage were located during this surface examination (Meyer and Rosenthal 1997:III.3). Three test trenches were excavated in the area of the original geotechnical test pit. The geotechnical pit was relocated and re-excavated. The deposit that had been recorded as a prehistoric site was found to be material that had been redeposited in conjunction with channel sediments (Meyer and Rosenthal 1997:III.5) and the site was determined to lack any significant intact prehistoric component (Meyer and Rosenthal 1997:iii, I.2). During this test trenching phase, a buried paleosol was identified at over 225 cm below surface, though the upper portion of the paleosol had been eroded.

A single rock feature was also found at 20 to 30 cm below surface. Meyer and Rosenthal (1997:III.5) described the feature as "a small concentration of angular sandstone cobbles that appeared to have been heat-affected." A small number of chert flakes along with some fragments of bone were found in association, though no formal tools were encountered. Meyer and Rosenthal (1997:III.5) suggest that the rock feature may be associated with the historic component of CA-CCO-447/H.

In 1998, excavation of a waterline trench through CA-CCO-447/H exposed human bone. The trench averaged 120 cm in depth and human skeletal material was found in two locations.
within the trench alignment. The burials were excavated and a number of artifacts and heat-affected rock were also recovered. Burial 1, located 60 cm below surface, was identified as a young adult. Burial 2 was found at around the same depth of Burial 1, and was determined to be an adult male. The body had been placed in a semi-extended position. A radiocarbon date of 4555 cal B.P. (2605 B.C.) was obtained for this individual. A rim fragment of an andesite groundstone bowl mortar was recovered approximately 70 to 75 cm below surface. A cooking feature was found at a depth of 30 to 40 cm and a rock line indicative of a relatively intact remains of a living surface was found 30 to 50 cm below surface (Meyer and Meyer 2000:42, 44, 46, 47).

The prehistoric component of this site has been interpreted as a food processing location and an occupation camp used at least intermittently (Meyer and Meyer 2000:47). This would fall under the historic property type of open site with human burials associated with the Middle Archaic period.

CA-CCO-450/H – Open Site with Milling Station and possible Ranch Site

In 1996, prehistoric artifacts were found eroding out of a cutbank near the projected high-water mark following the proposed inundation of the Los Vaqueros Reservoir (referred to as the High Water Site and included as part of CA-CCO-450/H). It was thought that this site would potentially be disturbed and/or destroyed by erosion and wave action, and hence further archaeological investigations to determine the nature of the prehistoric deposit were initiated. An intensive surface survey was undertaken and 21 test trenches were excavated over a 7,000 square meter area. A few isolated artifacts were found over a wide area though no concentrations of cultural materials were identified. Three of the artifacts were found on the ground surface while the other three were excavated from over 60 cm below surface. The cut bank was re-inspected. Archaeological materials, including flaked stone debitage and heat-affected rock, were found in association with a buried paleosol at this location. Artifact analyses date the occupation of this portion of the site to within the last 1,500 years and the Upper Archaic through Emergent periods (Meyer 1998:8-12).

During archaeological monitoring of the demolition of a portion of a stone fence (historic-era component) for construction of Road 3A through the edge of the site, a handstone fragment was found within the backdirt removed from the western side of the roadbed, at the location where it intersected the stone fence (Meyer and Meyer 2000:33). The handstone fragment, made of greywacke, shows polishing and smoothing on one face, pecking along three sides, and some smoothing along the fragmented end. Meyer and Meyer (2000:33) suggest that the handstone may have historically been included in the rubble fill that supported the upper portions of the stone fence, and therefore, was discovered in secondary context. Nonetheless the presence of this artifact type associated with the Lower Archaic period and the earliest
occupation of the area, suggests that there may be intact evidence, albeit deeply buried, somewhere nearby and in the vicinity of CA-CCO-450/H.

The site CA-CCO-450/H may yield evidence of Native American lifeways in the historic period as well. The site has many remnants associated with Native American archaeological sites, including bedrock milling stations, a rich midden, and possible housepits that have yet to be investigated or dated. Historic accounts mention a Native American settlement in the vicinity of the ranch headquarters at CA-CCO-450/H though the exact location of this settlement has not been determined. There are two bedrock milling station complexes, CA-CCO-467/H and CA-CCO-461, a short hike north of the site center of CA-CCO-450/H, and the High Water Site at the eastern boundary of the extensive site area. The relationship between these locations is not yet understood, but it is likely that the location has been used repeatedly for at least the last 1,500 years, and possibly much longer, if the handstone found in the historic period stone fence came from nearby intact deposits.

CA-CCO-458/H – Open Site (burials)

The prehistoric component of CA-CCO-458/H is a midden deposit, composed of flaking debris, and burnt bone, shell, baked clay, groundstone and heat-altered rock (Meyer and Rosenthal 1997:III.7). This site lies under the 100 TAF Reservoir pool adjacent to Kellogg Creek. Prior to inundation the site was subject to Level I and II archaeological investigations. Testing (Level I) included surface survey, mechanical trenching, surface grid unit excavation, site mapping and cutbank examination. Data recovery (Level II) included vertical unit excavation and areal exposure (Meyer and Rosenthal 1997:III.7). Ten features and three human burials were discovered. The features included a prepared clay floor, a hearth, refuse-filled pits, and an ash layer. A portable mortar and refuse scatters were also observed. The artifact assemblage consisted of flaked stone (debitage, modified flakes, bifaces, cores, bipolar cores, core tools, cobble tools, and projectile points), groundstone (block mortar, bowl mortar fragment, pestles and pestle fragments), soapstone and shell beads and ornaments, baked clay, faunal bone and shell (Meyer and Rosenthal 1997:III.12-III.15).

The archaeological remains were widely distributed at or near the surface of the site, but primarily concentrated in two loci. The East Locus yielded a sparse assemblage of flaked stone artifacts, fauna, and lumps of baked clay but no features or temporally diagnostic pieces. Obsidian hydration evidence suggests that the East Locus was used from the Upper Archaic period to the first part of the Lower Emergent period. The West Locus yielded a rich and diverse assemblage including thousands of pieces of flaked stone debris, three diagnostic points, floral and faunal remains, and fire-cracked rock. All ten features and the three burials were found with this assemblage. Obsidian hydration evidence, a radiocarbon date and temporally diagnostic artifacts indicate that the West Locus was used during the Emergent period (Meyer and Rosenthal 1997:iv, III.7). Meyer and Rosenthal (1997) and Wohlgemuth
(1997) have interpreted CA-CCO-458/H as a small residential site with very short term occupations in the earlier East Locus, and with an intensive use of acorns and small seeds during the Emergent period in the West Locus.

**CA-CCO-459 – Open Site with Milling Station (burial)**

This site was originally recorded as comprising five bedrock mortar cups situated on two sandstone outcrops. Archaeological investigations were undertaken at this site between 1994 and 1997 including surface survey, site mapping, and backhoe trenching. This was followed by vertical unit excavation and areal exposure, mortar recording and flotation sampling (Meyer and Rosenthal 1997:III.19). Previously unrecorded bedrock mortar cups were located during the surface survey. Four features associated with a buried paleosol located between 78 and 92 cm below surface were encountered during test excavations, including a pit, refuse scatter, a pit with a refuse scatter, and a rock hearth. Flotation samples were taken from these features revealing an intensive use of both acorns and small seeds (Meyer and Rosenthal 1997:III.21-III.23; Wohlgemuth 1997:H-2). In addition, the remains of a single human infant were recovered (Meyer and Rosenthal 1997:III.22). The locale has been interpreted as a site for processing plant resources either in the spring or fall (Meyer and Rosenthal 1997; Taite 1997:I-5; Wohlgemuth 1997:H-33).

The artifact assemblage consisted of flaked stone (debitage, modified flake, cores and a cobble tool), groundstone (portable mortars, a pestle fragment), modified bone fragments, a baked-clay tube fragment and a baked-clay artifact that had been shaped. Faunal bone and a few grams of freshwater shellfish were also recovered (Meyer and Rosenthal 1997:III.23). Based on the results of radiocarbon and obsidian-hydration dating, the site appears to represent an Upper Archaic/Emergent period component (Meyer and Rosenthal 1997:III.24).

In 1999, an intensive pedestrian survey was conducted around the reservoir inspecting the area between the high-water line and the water’s edge, as recommended in the Cultural Resources Management Plan for the Los Vaqueros Resource Management Plan. An isolated bedrock mortar was located in close proximity to the known and mapped bedrock mortars and the boundary of CA-CCO-459 was extended (SSUAF 2000:6). Also in 1999, a temporary exclusion zone was staked out at this site, as recommended in the 'Historic Property Treatment Plan for the Phase I Recreation Program and for Late Discoveries' (Praetzellis 2000:2), while work was conducted nearby.

**CA-CCO-468 – Open Site with Milling Station**

This site is currently located at the edge of and partially inundated by the 100 TAF reservoir pool adjacent to a tributary of Kellogg Creek. It consists of a number of milling stations with bedrock mortar cups, two portable hopper mortars and a rock alignment. Archaeological
investigations were undertaken at this site between 1994 and 1997, including surface survey, site mapping, mortar recording, backhoe trenching, shovel test units, vertical and areal exposure unit excavation and flotation sampling (Meyer and Rosenthal 1997:III.19). A total of six bedrock mortars were located and measured, and a concentration of fire-affected sandstone was uncovered just below surface level, possibly representing a cooking hearth. The artifact assemblage, found at or near the surface, consisted of flaked stone, including four Stockton series projectile points, two block mortars, faunal bone, and a piece of marine shell. Based on radiocarbon dating, obsidian-hydration analyses and temporally diagnostic artifacts, site usage was dated to the Upper Emergent period (Meyer and Rosenthal 1997:III.26-III.27).

CA-CCO-469 – Milling Station

This site, inundated by the 100 TAF reservoir pool, is characterized by several bedrock mortars found adjacent to a tributary of Kellogg Creek in relatively flat topography. Level 1 archaeological investigations, including surface survey, mortar recording, and backhoe trenching yielded sparse archaeological material, no temporally diagnostic artifacts and no materials for either radiocarbon or obsidian hydration testing, and so this site has not yet been associated with a particular prehistoric period (Meyer and Rosenthal 1997:iii, III.30).

CA-CCO-621/H – Non-Site (formerly Lithic Scatter)

Located outside of the Kellogg Creek Watershed, this cultural resource lies in the lowland delta just west of the Old River, adjacent to one of the oldest drainage ditches in the study area. A level 1 investigation with testing failed to locate intact prehistoric deposits at this site. The site is no longer considered to have a prehistoric component. The original report of lithic debitage on the site surface has been interpreted as materials that were in secondary context having most likely arrived at the site as fill (Meyer and Rosenthal 1997: iii, I.2, III.3).

CA-CCO-636 – Open Site

This site, currently inundated by the 100 TAF Reservoir pool, lies adjacent to Kellogg Creek at the foot of a hillslope. It was originally recorded as a sparse lithic scatter with hopper mortar slabs. Archaeological investigations undertaken at this site between 1994 and 1997 included surface survey, backhoe trenching, shovel test units, and vertical unit excavation and areal exposure (Meyer and Rosenthal 1997:III.33). The only identified feature was a historic-era cobblestone pavement, inferred to be a rock-lined floor which would have supported a superstructure. The sparse artifact assemblage consisted of flaked stone (including a Stockton series projectile point and a biface tip), and groundstone (including a pestle fragment and block mortars). Equally sparse faunal bone and shell from freshwater mussel was associated with the artifact assemblage and concentrated in two main loci (Meyer
and Rosenthal 1997:III.34-III.35). Use of the site has been dated to the Upper Archaic and Emergent periods, based on temporally diagnostic artifacts, a radiocarbon date, and obsidian hydration evidence.

CA-CCO-637 – Open Site (burials)

Site CA-CCO-637 lies deeply buried at the narrowest part of the Upper Kellogg Creek Valley under the footprint of the dam. This site was originally recorded as a sparse lithic and shell scatter visible on the surface, covering an area of roughly 90-x-180 m. Archaeological investigations were undertaken at this site between 1994 and 1997, including surface survey, site mapping, backhoe trenching, shovel test units, vertical unit excavation and areal exposure. Archaeological monitoring of construction activities at CA-CCO-637 was also undertaken (Meyer and Rosenthal 1997:III.37, III.39).

Archaeological testing yielded a single human burial, two baked clay hearths, one rock hearth, and four refuse scatters. The artifact assemblage included flaked stone (projectile points, bifaces, modified flakes, debitage, cores, core tools, and cobble tools), groundstone (pestles and mortars), marine shell beads and ornaments (primarily *Olivella* End-Ground, Spire-Lopped and Thick Rectangular beads found in association with a burial, and a fragment of a possible *Haliotis* shell ornament found in association with another burial), baked clay, faunal bone (mammal, bird and fish), and faunal shell (Meyer and Rosenthal 1997:III.41-III.44). Subsequent construction unearthed the remains of 24 individuals, some associated with extensive bead assemblages. These burials are among the oldest in central California (Meyer and Rosenthal 1997:iv). Meyer and Rosenthal (1998:ii) report a radiocarbon date of 8530 B.P. from one of the deepest burials.

Most of the cultural remains were found associated with a buried paleosol between 70 and 130 cm below surface (Meyer and Rosenthal 1997:III.40). Primary use of this temporary campsite was during the Middle Archaic period, based on radiocarbon dates, obsidian hydration evidence, and temporally diagnostic artifacts. An analysis of seasonality based on faunal remains suggests that the site was primarily in use during the spring to mid-summer (Taite 1997:I-5). By contrast, a seasonality assessment based on floral remains suggests summer and fall residence (Wohlgemuth 1997:H-33). There is some indication that the site may have been used sporadically through the Emergent period (Meyer and Rosenthal 1997:iv).

CA-CCO-653 – Open Site (single burial)

Site CA-CCO-653 is located in open agricultural land, approximately 850 m west of Italian Slough. This site was recorded as a sparse surface distribution of flaked and ground stone, faunal debris, and a single human burial located in the southern portion of the site. Surface
artifacts found at this site include one obsidian serrated projectile point tip, two obsidian biface fragments, eight pieces of debitage, one mano, one pestle fragment, and one shaped baked clay fragment. Two large obsidian concave base points were found associated with the burial. No obvious midden soils were apparent. The site measures 200 m north-south; the east-west dimensions are unknown, due to the fact that surface observations were limited to the pipeline ROW because of an access dispute with the landowner. The burial was discovered during excavation of a “mud-mixing hole”, at a depth of 1.5m below the surface. As of September 27, 1992, the burial is unexcavated and its integrity is unknown. Mitigation was limited to a Phase 1 inventory level. (P. Bouey et al. 1992).

*CA-CCO-696 – Open Site (burials)*

Discovered in a backhoe trench during archaeological subsurface testing, this site is composed of two components at different depths with evidence for human use of the site from the Lower Archaic through the Emergent periods. Component 696 Deep dates to the early Holocene and has been interpreted as a temporary camp. Component 696 West has been dated to the Upper Archaic and Emergent periods and appears to represent a residential community, or village site. The site is located between CA-CCO-458/H and -637 adjacent to the former pathway of Kellogg Creek and underneath the upstream footprint of the dam. The site was first discovered during geoarchaeological testing in 1994. Archaeological investigations were undertaken at the site between 1994 and 1997, including backhoe trenching, test units, vertical unit excavation and areal exposure, burial removal, and feature recordation. Archaeological monitoring of construction activities was also undertaken (Meyer and Rosenthal 1997:III.47).

The upper component of the site (696 West) is an extensive and diverse deposit including at least 169 human burials, shell beads and ornaments, flaked stone tools, points, and debris, groundstone tools, floral and faunal remains, and residential features. This component is associated with a paleosol formed in the Vaqueros deposit. Features found within 696 West include baked clay hearths, rock hearths, refuse scatters, storage pits, daub concentrations, concentrations of milling equipment, an antler cache/work area, post holes, and a possible outline of a house (Meyer and Rosenthal 1997:iv, III.56). The floral assemblage shows a prevalence of buckeye, a resource requiring a great amount of processing. An increase in small seeds was also noted. The seeds indicate that the upper west component was occupied during a fuller range of seasons than the deep component (Wohlgemuth 1997:H-33). Freshwater mussel shell was found throughout the west deposit as part of the midden, in and around the burials.

The lower component, associated with a paleosol in the Kellogg deposit, includes a temporally diagnostic wide-stemmed projectile point, handstones, millingslabs, flaked stone core tools and some floral and faunal remains. The floral remains of the deep component
include acorn, wild cucumber, and manzanita, with very few small seeds. These resources could have been found in the immediate vicinity of the site, indicating a highly mobile, short-term occupation during summer and fall (Wohlgemuth 1997:H-33).

Radiocarbon dates from the deep component indicate an age of more than 9000 B.P. (7050 B.C.). This is the oldest archaeological deposit dated in the greater San Francisco Bay Area (Meyer and Rosenthal 1997:iv). This site also yielded one of the oldest central Californian radiocarbon-dated human burials at 7400 B.P. (5450 B.C.).

CA-CCO-725 – Open Site

Located on the hillslope above the floodplain of a major tributary of Kellogg Creek, this site is represented by a large fire-affected rock feature, interpreted as a hearth or cooking feature that was discovered during the construction of Road 3A following the western shore of the reservoir. The feature was exposed, sampled and documented, then paved over. The feature was described as "a concentration of angular to sub-angular cobbles that exhibited extensive fracturing and reddish discoloration typically associated with intense and/or repeated exposure to high temperatures" (Meyer and Meyer 2000:24). It was found to measure roughly 3.8 m in length, 1.8 m in width and 0.2 m in thickness. Material excavated from the feature matrix was screened with ¼-inch mesh, as was a portion of the backdirt that had been graded from above the feature. Several fragments of heat-affected rock and an obsidian flake were retrieved from the screen. A charcoal sample was also collected, which yielded a date of 1185 cal B.P. (A.D. 765), placing the feature within the Upper Archaic/Emergent transition period. In addition, soil samples were collected and subjected to a flotation analysis. Wood charcoal and a small number of seeds, representing species of herb, bean and grass, were recovered. It was thought that this site would have been used intermittently or for a short period as a camp or food processing station (Meyer and Meyer 2000:21, 24, 26, 28).

CA-CCO-726/H – Open Site

The prehistoric component of CA-CCO-726/H, also known as the Powerline Site, was located during archaeological monitoring of a waterline trench excavation in 1998 (Meyer and Meyer 2000:50). The feature consisted of a concentration of angular to sub-angular cobbles that showed signs of heat-alteration at a depth of approximately 80 to 100 cm below surface. The feature was exposed using hand tools and sampled. Excavated material was screened through ¼-in. mesh along with a large portion of the backdirt removed from around and outside of the feature. No artifacts were retrieved though heat-affected rock and a large amount of wood charcoal were found. A charcoal sample produced a radiocarbon date of 790 cal B.P. (A.D. 1160), placing the feature within the Upper Archaic/Emergent Transition period. Flotation analyses of soil removed from the feature matrix revealed numerous pieces
of charcoal and some seeds, primarily grass species. The feature was interpreted as the remains of a cooking pit (Meyer and Meyer 2000:50, 54).

Archaeological monitoring of the construction of two detention ponds revealed a greywacke cobble-core tool. One end of the tool has been bifacially flaked to produce a rough working edge and battering or use-wear was observed along a portion of the margin (Meyer and Meyer 2000:55).

Prehistoric Sites with No Previous Mitigation

CA-CCO-9, -452, -463, and -464 Milling Stations

A cluster of four milling stations including CA-CCO-9, -452, -463, and -464 lines the southern approach to the Los Vaqueros Reservoir. They are situated on either side of Kellogg Creek and Vasco Road above the current level of inundation. They will be inundated, or in the case of -464 at water’s edge, with the expansion of the reservoir pool to 275 TAF. CA-CCO-9 and -452 are on the gently sloping east side of the creek and road, while -463 and -464 are in markedly steeper terrain on the west side of the creek and road. In addition to bedrock mortars, a cupule rock and a grooved petroglyph have been observed at CA-CCO-9 (SSUAF 1992).

No mitigation has been undertaken at these four bedrock milling stations. The two sites east of Kellogg Creek in gentler terrain (-9 and -452) both appear to be much more extensive and complex than the two smaller and higher western sites in steeper terrain (-463 and -464). No dates have been obtained for the prehistoric use of these sites. Their temporal and functional relationship to the deeply buried, complex and rich sites with burials in the valley bottom remains to be explored.

CA-CCO-143, -144 Lithic Scatters

These two lithic scatter sites are located in open, flat agricultural land, approximately 1 km west of the Italian Slough. Both sites were first recorded in 1948 as separated by a few yards, but since then they are considered to have been combined as a result of decades of agricultural disturbance. Site CA-CCO-143 consists of a scatter of broken rocks, a spire-ground Olivella bead, two obsidian flakes and at least one artifact (a possible quartzite chopper). The site has been leveled, plowed, and planted in barley. The depth of the site is unknown, although investigation of a nearby irrigation ditch yielded no evidence of subsurface deposits. Site CA-CCO-144 could not be relocated as of 1990.
CA-CCO-397 Open Site with Milling Station

This site is located on a low bench and sloped area in a cluster of bedrock outcrops amid grassland with scattered oaks at the edge of the valley floor of Kellogg Creek. The site consists of a midden deposit and lithic scatter with nine bedrock mortars. Both chert and obsidian debitage were observed on the site surface, along with a sandstone milling slab and fire-cracked rocks. The site is part of the Kellogg Creek Historic District. In 1982 a barbed wire fence was mapped cutting through the site separating one bedrock mortar from the rest of the site (Baldrica and Davis 1982). A list of measurements and profile sketches of 7 mortars (DPR Archaeological Site Record by Eidsness et al. 1986; Updated DPR Site Record by Stoyka and Gassner 2000) accompany an updated sketch map showing the relationship of the site to Kellogg Creek and a new road alignment that cuts through the site (Stoyka and Gassner 2000) as part of the most recent site record update on file at the NWIC. This updated site record was prepared when the road passing through CA-CCO-397 became integrated into the Los Vaqueros trail system. No artifacts or features were observed during a field reconnaissance conducted at this time (Praetzellis 2000:2). The site was disturbed by cattle grazing and a metal water trough in addition to the roadway and wire fence. No archaeological testing or data recovery has been conducted at this site.

CA-CCO-462 Open Site with Milling Station and CA-CCO-467/H Milling Station

These two milling stations lie on fairly steep upland terrain adjacent to small tributaries of Kellogg Creek. Neither of these sites has been mitigated. Portions of both of these sites will be inundated by the expansion of the reservoir.

CA-CCO-310, -417, -455, -456 Rockshelters

These four sites include a cluster of 20 possible rockshelters, 7 caves, 23 BRMs, and areas of midden soil, spread out over an area of 1 ¼ by ¼ mile. These resources are situated along the slopes of an east-west trending ridgeline (310, 455, and 456) and down into a NE-SW trending valley (417), through which flows a seasonal creek. Another seasonal drainage, running E-W, is located to the south of the ridgeline upon which the sites are located. Cultural constituents include obsidian flakes, dietary and artifactual mammal bones, charcoal flecks, possible groundstone and stone tools. These sites are in good to excellent condition, as of 1996. Site CA-CCO-417 was originally recorded as Locus 11 within site CA-CCO-434 (Vasco Caves); site 434 lies outside of the APE, therefore it will not be affected by the construction of the eastern hiking trail. Site CA-CCO-310 was combined with the historic site CA-CCO-454H as of 1995, due to the presence of historic period artifacts within site 310. These sites are all part of the Kellogg Creek Historic District.
CA-CCO-597 Rock Art Site

This petroglyph boulder lies outside of the Kellogg Creek Watershed in gently hilly terrain west of the flat reclaimed agricultural lands of Old River. The temporal and functional relationship of this isolated petroglyph boulder to the prehistory of the Kellogg Creek Watershed remains to be established. The site lies in the pathway of the proposed Transfer-Bethany Pipeline, and has not previously been studied or evaluated.

CA-CCO-755 – Buried Open Site

CA-CCO-755, the Gas Line Site, was located in 2002 during a spot check as part of archaeological monitoring of construction activities. The Gas Line Site is situated on a terrace at the mouth of Mariposa Canyon, above an ephemeral stream near its junction with Kellogg Creek. A concrete valve box and parallel-running gas pipelines have disturbed the site. The artifactual material, consisting of four bone fragments (unidentified to species), two obsidian flakes and a heat-affected rock that may be a fragment of a milling slab, were found in the builder's trench fill of the valve box. No artifacts were observed on the surface of the surrounding area, leading the recorders to surmise that the cultural deposit is buried (Meyer and Meyer 2002).

P-007-002640 Isolate

This isolated pestle was uncovered during trenching for the installation of a buried waterline in 2003. It is located between a pvc blow-off valve and a wood bridge which crosses Kellogg Creek, on a peninsula bordered by an unnamed tributary and Kellogg Creek. The pestle is a flattened elongated cylinder, measuring 51.7 mm to 57.8 mm in diameter by 145.6 mm in length. No other cultural materials were noted. There has not been any testing for subsurface deposits (Meyer 2003).

Discussion and Significance of Previous Prehistoric-Era Research

Archaeological investigations undertaken on behalf of CCWD for the Los Vaqueros Reservoir cultural resources mitigation in the 1990s have expanded the prehistory of the study area. Evidence of human occupation 5,000 years older than previously thought was found at depths of up to 4 m below surface in the Upper Kellogg Creek valley in proximity to the present-day dam. Studies that have helped refine the prehistory of the Los Vaqueros area include analysis of floral flotation samples from five prehistoric components at four sites (Wohlgemuth 1997), faunal analysis of samples from 10 components at seven sites (Taite 1997), shellfish identifications from six sites (Huddleson 1997), and archaeological interpretation of deposits, including radiocarbon dating from eight sites (Meyer and Rosenthal 1997, 1998). Assemblages representing all periods of prehistory, from the Lower
Archaic through the Upper Emergent, have been investigated. Following a presentation of previous historical research within the study area, the contributions from the prehistoric studies are discussed with relation to the research questions guiding those studies (e.g., SSUAF 1992) and evaluated in order to present a modified set of research questions for the purposes of this assessment report and recommendations for future mitigation.

3.4 Previous Historical Research within the Study Area

The records search yielded 16 sites with historic period components within the study area. These include CA-CCO-427H, 445H, 446H, 447/H, 448H, 450/H, 454H, 467/H, 470H, 533H, 534H, 535H, 650H, 726/H, the Spring Box Site (P-07-000791) and Brushy Creek Ranch (P-01-010702). Twelve of these were subject to some level of mitigation under the 100 TAF Los Vaqueros Reservoir Project (CA-CCO-427H, 445H, 446H, 447/H, 450/H, 467/H, 470H, 533H, 534H, 535H, 650H, and 726/H). Much of the historical records research and oral history research for the majority of the historic period properties was undertaken by Hattersly-Drayton (1993) and summarized in Praetzellis et al. (1997). Mitigation conducted as part of the 100 TAF Los Vaqueros Reservoir Project has been reported in various documents produced by SSUAF under the auspices of CCWD and is summarized below.

CA-CCO-427H, the Perata/Bonfante Place, Ranch Headquarters

The site was the center of a 300-acre tenant ranch complex in the Cañada de los Vaqueros land grant. This property has been partially inundated by the Los Vaqueros Reservoir since 1998. The site consisted of a foundation of dry-laid sandstone slabs, a hand-dug well, the remains of a wooden water tank, and a scatter of historic debris. The original structure shown on the 1916 USGS Byron quadrangle was thought by Fredrickson to have burned down, and was then built over with existing modern structures including a small wooden barn and a complex of corrals (Fredrickson 1982). A brief summary of the tenancy and land use follows.

<table>
<thead>
<tr>
<th>Year</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1885-1908</td>
<td>Leased from Mary Crocker and occupied by the Perata family, Italian immigrants and general farmers.</td>
</tr>
<tr>
<td>1908-1927</td>
<td>Leased from Mary Crocker and occupied by the Bonfante family, Italian immigrants and relatives of the Peratas. The Bonfantes grew hay and grain.</td>
</tr>
<tr>
<td>1927</td>
<td>Almeida family leased and occupied for a short period of time.</td>
</tr>
<tr>
<td>1927-1929</td>
<td>Cardoza brothers leased and occupied primarily for dairying.</td>
</tr>
<tr>
<td>1935</td>
<td>No longer occupied as a domestic site; sold to Oscar Star as part of the 7,883-acre Mary Crocker estate parcel.</td>
</tr>
<tr>
<td>1947</td>
<td>Sold to the Bankheads</td>
</tr>
</tbody>
</table>
Descendents of the Bonfantes interviewed by SSUAF provided a sketch of the layout of the ranch during the occupation by the Bonfante family. A simple redwood dwelling with two bedrooms, a living room, and a kitchen wing served as the house. The ranch also included a barn that accommodated up to 20 horses, a blacksmith shop, pig sty, granary, chicken house, bunkhouse, and two-hole outhouse (Hattersly-Drayton 1993).

The site was subject to data recovery excavation in 1995 (Ziesing 1996). An area of more than 12,000 square ft. was cleared of vegetation and topsoil and four 3-ft.-wide trenches varying in length from 6 to 21 ft. were excavated. Five structures were identified and an additional three buried features were excavated. Excavated material was not screened. An oral historian interviewed two Bonfante sisters who had lived at the site when they were young.

The first area of activity, referred to as the ‘domestic complex’, revealed a cellar hole that corresponded to a wine cellar. A living surface covered with artifactual material, several stone footings, a portion of stone paving, a well, and a linear concentration of artifacts was also located within the domestic complex area. Within the cellar hole were items related to domestic and personal use, food and beverage consumption and storage, medicinal artifacts, agricultural activities and structural items. The occupation surface artifact assemblage consisted of primarily personal items including clothing, and grooming and medicinal artifacts. Games and toys, agricultural items, horse and wagon materials, coins, tablewares, serving wares, storage items, furnishings, some structural materials and sheep bone with no evidence of butchery were also represented. The linear artifact debris feature consisted almost entirely of materials relating to food processing, consumption and storage. The material from this area dated to the early 20th century with a mid-20th century component representing the Bonfante post-abandonment period (Ziesing 1996:121-139).

The second area identified by Ziesing was the barn area. A concentration of stones was thought to represent disturbed foundation wall from the barn, while a stone platform in one portion of the barn location was inferred to have functioned as either an entryway or a special-use platform. Sandstone slabs and stacked fieldstones along one edge were described by Ziesing (1996:141) as forming a combined foundation, floor surface and terrace wall. Two test trenches were excavated within this area. No cultural material was found beneath the level of the stones, though horseshoes and a butchered cow bone were found within the barn area. The barn is thought to have been built in the late 1800s (Ziesing 1996:139-145).

The third area comprised a blacksmith shop. An area measuring 30-x-33 ft. was cleared mechanically and further excavated by hand. The blacksmith shop itself was represented by wooden posts and planking. Two 3-ft.-long lines of fieldstones were thought to have formed the base of a forge. Artifact concentrations included blacksmithing tools and worked iron, a coal concentration, a slag deposit, and a cache of at least 55 alcohol bottles. A large number
of blacksmithing tools and artifacts were found in association with milled boards and was thought to be the remains of a wall that collapsed outward (Ziesing 1996:145-176). Based on the range of artifacts found in association with the blacksmith shop, Ziesing (1996:173) suggested that the site was more likely to have been a multi-use workshop, used for repair work and manufacturing of a variety of household and farming or ranching items.

The fourth activity area was referred to as stream improvements and consisted of stacked rock along both sides of a nearby seasonal drainage, inferred to represent the remains of a bridge. No artifacts were found in association with this feature (Ziesing 1996:176-179).

A stone-lined cellar hole cut was the fifth activity area defined by Ziesing. The feature was surface-cleared, and then excavated by hand. A 3-x-14 ft. trench, dug to a depth of 4½ ft., was excavated through a portion of the feature. At the time the Bonfante sisters lived at that location, the cellar was used by their father to store animal feed. No artifacts were found dating to the construction period of the cellar (likely the late 1800s), however a wide variety of artifacts were found from the early 1900s representing the following categories: food preparation, consumption and storage, furnishings, grooming and health, heating and lighting, clothing, footwear, sewing, ironing, hunting, games, indulgences (alcohol), hardware, transportation, and agricultural machinery (Ziesing 1996:179-198).

In 1999, an intensive pedestrian survey was conducted around the reservoir inspecting the area between the high-water line and the water’s edge, as recommended in the Cultural Resources Management Plan. At this time, it was found that the stone foundations of the barn and a bridge had been exposed by erosion (SSUAF 2000:9).

In summary, features at CCO-427H include an occupation surface, a trash scatter, a cellar hole near the house, a well, remains of a barn, a storage cellar, stone revetments on the creek bank, and the remains of a blacksmith shop. Based on oral history the structures were probably built in the 1800s, but most of the artifactual material probably dates to the Bonfante family occupation from 1908 to 1927 (Ziesing 1996:iv). Praetzellis et al. (1997) predict that there remain as yet unidentified buried features.

**CA-CCO-445H, the Weymouth/Antone Rose Place, Ranch Headquarters**

The site was the center of a 300-acre tenant ranch complex in the Cañada de los Vaqueros land grant. This property is a historic ranch complex that has been inundated by the 100 TAF Reservoir since 1998. Prior to inundation the site consisted of features located in two areas separated by a tributary of Kellogg Creek. In the area on the south side of the creek, historic evidence included a three-sided stone foundation with two wooden beams lying in the center, a well, a wooden tripod with gears and wind pump blades. Portions of the creek bank were lined with stone, and historic debris was eroding out of the bank. An earthen dam was
installed south of the stone foundation. Sandstone slabs were clustered on the north side of
the creek forming a flat surface presumed to be a house foundation. Additional finds included
cast-iron plow fragments and turn-of-the-century historic debris. A brief summary of the
tenancy and land use follows.

1880-1884  Weymouth leased from Peres and grew hay and grain. In 1881, Peres
transferred ownership along with Weymouth’s lease, to McLaughlin.

1884-1894  Estrada, a French immigrant, leased and farmed the property.

1895-mid-1920s  The Rose brothers, Portuguese immigrants, leased and farmed the land but
reportedly had little livestock.

Mid-1920s  Cabral took over the lease to raise livestock. By 1929 Cabral was leasing
several neighboring properties and the property was vacant and fell into
disrepair. A 1929 inventory listed several standing buildings including an
eight-room house, two sheds, two barns, a granary, a well, and a windmill.

1941  Sold to Oscar Starr by the Mary Crocker estate.

The site was subject to data recovery excavation in 1995 (Ziesing 1996). Within the first
stage of data recovery the surface area of the site was cleared by hand and by backhoe, and
seven 2-to-3½-ft.-wide test trenches varying in length from 8 to 75 ft. were excavated. As a
result, seven structures were exposed and recorded, and six subsurface features were
excavated. Excavated material was not screened and for the most part artifacts were recorded
and cataloged in the field. Ziesing divided the site into three distinct areas including the barn
complex, the house area and the stream area (Ziesing 1996:69-70).

The barn complex portion of the site comprised the three-sided stone foundation, the remains
of a sandstone surface and/or foundation (now disturbed), and a line of fieldstones. A 3-x-75-
ft. trench was excavated through the three-sided foundation, and a second trench of a similar
size was excavated to a depth of 8 inches through the space between the three-sided
foundation and the sandstone surface. The fieldstone alignment was encountered within this
trench. Another two trenches were excavated through two sides of the larger, more intact
structural remains measuring roughly 50-x-50 ft. This structure was identified as having been
a barn. Artifacts retrieved from this area included wire and cut nails, horseshoes, bailing
wire, metal hardware, glass fragments, a porcelain button, long carriage bolts, an adjustable
pipe wrench, and horse-harness grommets and buckles. Artifacts excavated from the area of
the smaller barn included a wire nail, a fragment of a canning jar, an iron ring that may have
been a pipe fitting, horseshoes and a harness buckle. However, the artifacts were found in
association with post-occupation slopewash deposits, and were, therefore, in secondary
context (Ziesing 1996:72-77).
A 2-x-25-ft. trench was excavated through the house area. Following this, surface clearing, exposing an area measuring roughly 70-x-100 ft., and removal of the upper 1 to 8 inches of topsoil was undertaken. At this time an extensive artifact scatter (covering approximately 50-x-60 ft.) was located and only minimal structural features, including three redwood posts and a terrace or border wall constructed of fieldstones. The artifact scatter, which had been disturbed by plowing or discing, consisted primarily of domestic or personal refuse such as bottle and glass fragments, canning jar fragments, tin food cans, ceramic sherds, glass tableware, silverplate flatware, butchered animal bone, a whetstone, stove parts, lamp parts, glass beads, a hair curler, fragments of a watch, a marble, a Christian medallion, and metal, bone, porcelain and shell buttons. The structural and tool assemblages were represented by a door knob, door hardware, a door hinge, bolts, iron spikes, cut and wire nails, a copper-alloy drain guard, a red brick fragment, furniture hardware, an ax head, nail pulling pliers and a claw hammer head. In addition, iron machinery or pump parts, harness buckles and horseshoes, mower pieces, and a shotgun shell and a .22 caliber bullet casing were also excavated (Ziesing 1996:78-85).

Removal of a further 8 inches of soil revealed three historic trash pits, each containing one episode of fill with two of the refuse pits having been burned in place. Artifacts excavated from the unburned pit included food cans, bottles and jars, a milk can, fragments of earthenware vessels, a furniture spring, shoe fragments, minimal structural material, and cow and sheep bones. One of the burned pits contained cut and wire nails, earthenware and glass fragments, wire, and cow and sheep bones. The other burned pit contained cut and wire nails, window glass, egg shell, a light bulb fragment, an earthenware vessel, canning jar lid liners, and cow, sheep, pig and chicken bones (Ziesing 1996:78-83). The artifact scatter and pit features were thought to relate to 20th century occupation of the area by the Rose household (Ziesing 1996:86).

Within the stream area, the third area defined by Ziesing, six discrete features were investigated and two test trenches were excavated. Features included a well, a stacked-stone bridge footing along the creek bank (previously described as stone terracing), a small rectangular stone footing, the remains of a stone-lined cellar, a stone retaining wall along the creek bank, and a buried artifact concentration and historic ground surface located roughly one ft. beneath the latest alluvial deposit.

Portions of a windmill and pump surrounded the redwood plank-lined well. Artifacts found in association with the well included earthenware sherds, bottle finishes, a canning jar lid liner, iron hardware, and a silver-plated watch surround. Cultural material found with the stone lined cellar included canning jar fragments, earthenware vessels, a glass tumbler, ceramic sherds, glass fragments, porcelain dolls, buttons, a leather shoe, cut nails and other structural fasteners, a box wrench, various pieces of agricultural machinery, and cow, sheep and pig bones. Artifacts associated with the stone footing included decomposed cloth or
leather, clothing/tack rivets, sundry iron fittings, nails, coal, and sheep bones. Ziesing (1996:92) considered that it may have been a footing for a water tank. The presence of wagon bolts, a toggle, a whiffletree hook, and various items from at least one harness set up indicated to Ziesing (1996:97) that this feature may also have been used to store wagon gear. The buried artifact concentration contained a wide variety of artifact types including kitchenware, ceramics and glassware, medicinal items, clothing and footwear, toys, furnishings, lighting, structural hardware, wagon hardware, and faunal material. The windmill and the cellar were dated to the late 1800s. The creek bank stone features dated to post-1906 (Ziesing 1996:87-113). Praetzellis et al. (1997) do not offer comments on the potential for additional in situ deposits.

CA-CCO-446H, the Raffett Place, the French Frank Place, Ranch Headquarters

This tenant ranch complex lies at the extreme northern edge of the Cañada de Los Vaqueros land grant, in the alluvial valley north of the Los Vaqueros Reservoir dam. Site features include two cellar holes, a chimney base, three stone-lined building platforms each with stone terracing, additional stone terracing and a possible hand-dug, stone-lined well, and a sheet deposit of historic artifacts. A mound may be the remains of an adobe referred to by Minnie Bordes in a letter dated 1878 (Praetzellis et al. 1997:132). A brief summary of the tenancy and land use follows.

1870s Bordes family, French immigrants, leased the property and produced grain.

1880 Frank Raffett (French Frank), French immigrant, joined the Bordes family; he took over the lease from the Bordes when they moved. He maintained a bocce ball court.

By 1908 The lease was taken over by Cabral to raise livestock; Raffett left to grow hay on 160 acres he purchased nearby.

1929 Appraisal lists unoccupied three-room house, barn, and shed.

1941 Property sold to Oscar Starr by Mary Crocker estate; property leased by Starr to Souza and Pimental who eventually purchase the land.

The site was recorded but never subject to data recovery as the site was located outside the area of direct effects of the 100 TAF Reservoir project. However, since increased access was anticipated as a result of the nearby recreation area, the site was enclosed by metal fence stakes and nylon tape. Praetzellis et al. (1997) report good to excellent site integrity. Some features appear to be untouched, but depressions may be the result of pot hunting. Alternatively, the depressions have been interpreted as cow wallows.
CA-CCO-447/H, Livestock Management Feature

This site is located in a narrow canyon in the Kellogg Creek valley north of the Los Vaqueros Reservoir dam. The historic component of this site consists of a square, three-sided, dry-laid, sandstone foundation, dating to the early 19th century and associated with livestock management, and two circular depressions (Meyer and Meyer 2000:39; Ziesing 1996:45). No historical information is provided by Praetzellis et al. (1997) regarding the property ownership, tenancy, or land use, and minimal information is included within Ziesing (1996). A brief summary of the ownership, tenancy and land use follows.

post-1888 Mary Crocker leased the ranch, possibly to Frank Raffett (refer to CA-CCO-446H)

A Level 1 testing program was undertaken in 1994, involving excavations within the area of the stone foundation. Two parallel trenches were excavated across the foundation. Excavation of another trench bisecting one of the circular depressions was recommended but following surface exposure the depression was determined to be natural and no data recovery was undertaken (Ziesing 1996:47). An area measuring 25-x-25 ft. around the foundation was surface-cleared allowing recordation of the feature. A 3-x-25 ft. trench was excavated within the structure, running diagonally. A second 6½-ft.-wide trench began outside of the structure, crossed the northwest wall and connected to the first excavated trench (Ziesing 1996:49-53).

The foundation was laid in a U-shape within an excavated ditch. The walls were up to 18 inches thick. The southwest wall measured 12½ ft. long, the northwest wall was 10 ft. long, and the northeast wall measured 6½ ft. in length (Ziesing 1996:49). A builders’ trench ran along the outside of the northwest wall, and four possible postholes were found within 3 inches of the trench. While no floor was observed, some wood plank fragments were found below the surface within the foundations (Ziesing 1996:49, 51, 54). The structure was determined to be a livestock shelter or holding pen, and may have been associated with a nearby ranch (site CA-CCO-446H) (Meyer and Meyer 2000:41).

The cutbank of a nearby creek was inspected during this phase of data recovery. A cultural layer of fine-grained silty clay containing charcoal and glass fragments was observed at this location. The cultural layer was observed within a 28-ft.-long portion of the creek bank, and was not observed on the opposite bank (Ziesing 1996:57).

Artifactual material retrieved from excavations surrounding the structure was highly fragmented, and included pieces of bottle glass, porcelain, cast iron, sheet metal, cut and wire nails, a lead seal, a copper alloy rivet, a brick fragment, bits of asphalt, concrete, asbestos, a piece of window glass, a trouser rivet, buttons, tobacco pipe fragments, .22 caliber rim fire bullet casings, and bone (primarily rodent) (Ziesing 1996:57-59). There were few
chronologically diagnostic artifacts within the assemblage. Based on the evidence, Ziesing assumes a late-19th to early-20th century date for the materials (Ziesing 1996:59).

The historic component of this site lies just outside of the area of direct impact for the 100 TAF Reservoir project. Once exposure and excavation of the foundation was complete, the excavation was backfilled and the site was designated an Environmentally Sensitive Area and monitored during the installation of the water conveyance pipeline. Praetzellis et al. (1997) do not offer predictions regarding the potential for additional historic era features or deposits in the vicinity.

CA-CCO-448H, Fragulia Tenant Ranch

This ranch headquarters site is located in the hills east of Vasco Road, near the head of a northwest trending seasonal tributary of Kellogg Creek. Elements of the site include a stone foundation, fruit trees and structural remains. Sometime after 1882, the construction of two roads disturbed the site. Because of this destruction, 448H was considered to be ineligible to the National Register in the 1992 Evaluation. Oral history interviews from 1993 indicate that features may exist at the Fragulia Place (cellar, privy) that are deep enough to have survived the destruction. Therefore, this site still has the potential to contain important information and should be considered potentially eligible to the Kellogg Creek Historic District (Praetzellis et al., 1997). A brief summary of the ownership, tenancy, and land-use follows.

ca. 1886 Andrew Fragulia settles in the Vasco

1887 Andrew Fragulia and his wife, Maria Volponi had their first child, Jane on the ranch.

1893-1925 The Fragulias reside on the property, raising crops and selling them in town. They had one of the few substantial truck gardens in the Vasco.

1924 Andrew and Maria retire, and sell their personal property to their two oldest sons, Louis and Andrew.

1929 Significant improvements were made to the Fragulia Place; the property now consisted of a six-room house, a large barn, an old barn, a well and windmill, a bunkhouse, blacksmith shop, chicken houses, a separator house, and a two-seater privy out back.

1933 Maria Fragulia dies of a heart attack. Andrew Fragulia dies two years later.

1935 James Fragulia takes over the ranch, but could not afford to buy it for $16,000 when it was offered for sale.

Late 1930s The Fragulias move to Livermore

1941 The Fragulia Place was within the parcel sold to Oscar Starr by the Crocker estate.
CA-CCO-450/H, the Suñol Adobe/Dario Place, Ranch Headquarters

This rancho site is located at the confluence of two seasonal creeks at the base of a northeast-facing slope. Marshy land bordering the 100 TAF Reservoir lies nearby but the reservoir does not reach the site. Historic features include an adobe mound, built around 1852 and reportedly the remnants of the first permanent dwelling on the Cañada de Los Vaqueros land grant, and rock walls sometimes referred to as stone alignments or fences (Praetzellis et al. 1997:138-39). The more modern ranch complex built on the same site by Ordway around 1950, consists of a log cabin residence called the Cowboy House, a large barn, and associated corrals, sheds, and wooden and wire fencing. The barn and corrals appear to be in use as of June 2007. The Cowboy House has been surrounded by a high cyclone fence to discourage entry and windows have been boarded over with plywood. A brief summary of the ownership, tenancy and land use follows.

- **ca. 1852** Adobe built by Lorenzo Suñol, Spanish immigrant, who was a squatter on the property.

- **1856-1866** The Suñol brothers occupied the adobe and raised livestock and grain, as part of an extensive ranching network that was documented in the 1860 census.

- **1856-1871** Feuding over ownership of Cañada de Los Vaqueros land grant between Suñol and Peres; lawsuit settled in favor of Peres.

- **1870** The Suñol Adobe was owned by Peres and Altube, Spanish immigrants.

- **1880** The property is occupied by the Frank Viala household, French immigrants, who raised hay and grain.

- **1886** The Darios, French immigrants, occupied the property, raised hay and grain.

- **1927** The Almeida family leased the property; a four-room house, lean-to, and two barns are documented.

- **1930** Nunez leased the property and raised hay and grain

- **1935** The property was sold to Oscar Starr as part of Mary Crocker estate. Starr had others raise hay and grain, but he did not occupy the property.

- **1948** Starr sold the property to Ordway who occupied and built the half-log cabin and barn that stand there today.

The historic component of this site lies outside of the area of direct impact for the 100 TAF Reservoir Project and very little data recovery associated with mitigation has been performed to date. An approximately 40-ft. portion of a roughly 800-ft.-long rock wall, or stone fence, in the southern portion of the site has been exposed and mapped (Meyer and Meyer 2000). This portion of the fence was demolished as part of Road 3A construction. Excavation was undertaken by shovels, hoes, trowels and brooms. The soil removed from the first 10 ft. of the wall, as well as a sample of soil from the remaining section of the excavated fence, was...
screened through a ¼-inch mesh. Following its exposure, a series of overhead photographs were taken of the fence, and a 2-ft. cross-section was excavated through the fence. Following recordation, the fence was reburied (Meyer and Meyer 2000:33). Excavations revealed that the fence had been constructed of dry-stacked local stone in two parallel rows, spaced approximately 3 ft. apart, with rubble placed in between. The fence was generally one course high and Meyer and Meyer (2000:33, 37) inferred that the upper portion of the fence had at some time been removed. Artifacts found in and around the fence included a mower tooth, part of a plow blade, three fragments of ferrous metal strap, two .22 caliber shell casings, two 12-gauge shell casings, and several pieces of two-strand, two-point, barbed wire. The artifacts were reburied along the fence that runs adjacent to Road 3A. Meyer and Meyer (2000:37) suggest that the stone fence, along with another roughly parallel fence to the north, may have been constructed during the 1850s or 1860s during the period that the land title was being disputed.

In 1999, following discing of recreation trails within the watershed, CA-CCO-450/H was re-inspected. At this time, Praetzellis (2000:1) noted that "no significant damage to the archaeological deposits was observed."

The Cowboy House and barn were formally described and evaluated as part of a Historic Architectural Survey Report (Hattersly-Drayton 2000). Barriers, in the form of boulders, were placed to prevent damage to the adobe mound and other sensitive areas. The adobe remains and any associated buried features are significant as they may represent the earliest permanent residential structure in the watershed. The split log cabin lies above a lined cellar that may be a remnant of an older building (Hattersly-Drayton 2000). The cabin itself has historical significance and may require further documentation prior to demolition and inundation.

**CA-CCO-467/H, Melies Cash Entry, Water Management Features and Possible Domestic Complex**

The historic component of this site consists of: two spring boxes; a rock-lined well; a water tank; a square, three-sided, stone structure; and historic debris. These historic features are presumably associated with a domestic complex that now lies beneath an adjacent reservoir. A brief summary of the ownership, tenancy and land use follows.

1876 On behalf of Peres, Melies purchased 160 acres from the government including this site.

1878 Ownership transferred to Peres.

1881 Sold as part of 880 acres to McLaughlin.
The historic features and debris were left by a tenant rancher during the McLaughlin ownership, but the property is not specifically mentioned in lease agreements; the historic features and debris may be related to occupation of the Dario Place (CA-CCO-450/H) located nearby to the east (Praetzellis et al. 1997:149).

The site was not directly impacted by the Los Vaqueros Reservoir and there has been no mitigation or data recovery to date. A relatively new, small reservoir has been built in the immediate vicinity. The stone structure is within the reservoir and is occasionally covered by water. Praetzellis et al. (1997) anticipate the potential for buried historic features within the reservoir. Historic research has failed to reveal a link between the historic features and debris, and a known and documented household or tenant and so the potential of this site to yield historically important information may be limited by comparison with other historic sites in this study area.

**CA-CCO-454H, Los Vaqueros sheep camp**

This site is a seasonally occupied sheep camp dating to the late 19th and early 20th century. A Level 1 data-recovery excavation was implemented in July 1993 during the pre-construction phase for the installation of a natural gas pipeline, which passes between sites 310 and 454H. Forty Surface Transect Units (STU) and two Vertical Units (VU) were excavated, yielding a small collection of both historic- and prehistoric-period artifacts. No testing was done within the site boundaries; the Area of Direct Impact (ADI) for the pipeline did not extend into the sites. This site has been combined with site CA-CCO-310, a prehistoric rockshelter site, due to the close proximity of the two sites and the presence of historic-period artifacts at 310. No information is available as to ownership or tenancy of this site.

**CA-CCO-470H, Vasco Adobe/Starr Ranch, Ranch Headquarters**

This site was the center of a ranching complex from the 1850s through 1995 and now lies submerged beneath the 100 TAF Reservoir pool. Basque ranchers built the Vasco Adobe and associated outbuildings in the mid-1850s. After purchasing the property in 1935, Oscar Starr built three residences, a barn, workshop, shed, and silo. A brief summary of the ownership, tenancy, and land use follows:

- **ca. 1844** From this time the property was used for communal grazing by neighboring ranchers.
- **1857** Basque immigrants (e.g., Altube and Arrambide) settled at the adobe and grazed cattle in the area.
- **1871** Most Basques moved to Nevada to continue cattle ranching.
1873 Peres listed on map at the location of 470H as the head of a large household.

1880 Peres had accumulated title to most, if not all, of the 17,752-acre rancho.

1881 Peres turned the property over to McLaughlin to secure a loan; Peres remained as tenant.

1882 Leased by Silva family, Portuguese immigrants who occupied and farmed. The family lived in the adobe house. After 1890 they lived in a brown wood-framed house with gabled roof.

By 1897 Peres had lost all court cases to regain his land.

1915 Cabral leased the property on behalf of his cousin, Domingo, an immigrant from Azores; occupied and farmed.

1929 An inventory listed a 6-room house, bunkhouse, blacksmith shop, shed, two chicken houses, large barn, granary, well, and windmill.

1935 Property was sold to Oscar Starr as part of the Mary Crocker estate; Starr had others raise livestock on the ranch while he lived elsewhere; the complex fell into ruins.

1948 Property was sold to Ordway who made additions to the main residence, offset the road, installed a pool in the front, and added an adobe wall.

The entire site has been inundated by the Los Vaqueros Reservoir since 1998. Data recovery was undertaken at the Vasco Adobe in 1994 (Ziesing 1997b). As part of the investigations, interviews were conducted with local people who may have been able to identify the location of structures at the site. A surface survey of the area was undertaken to determine areas requiring further examination. A mound of sandstone rocks which may have been the remains of the stairway leading into the adobe was identified as warranting subsurface investigation. A 40-x-75-ft. area was cleared around this feature revealing two activity areas. A 3-ft.-wide, 44-ft.-long trench was excavated through the first activity area, the site of the originally identified sandstone mound. Exposed features included a flagstone surface, a dry-laid sandstone wall, and a feature described as a "7½ -ft squarish configuration of sandstone blocks…with fired adobe-style brick fragments in the center of it" (Ziesing 1997b:45). The bricks had been crudely fired as opposed to having been sun-dried. Nineteenth-century artifacts were found in the soil deposits overlying this feature. Further testing within the adobe structure identified a kitchen area with a bread oven and fireplace, and the main room to the east of the kitchen. Few artifacts were found associated with occupation of the adobe, but those that did remain included: glass bottles; cans; serving dishes and tableware; a lead pencil; lamp glass; a handle; cut and wire nails; wire; various metal items such as strap metal, gear, nut and bolt; a clay pipe; buttons; fabric; brick and mortar; window glass; and a bullet casing (Ziesing 1997b:95-100). The post-occupation cultural deposits included a wide range of artifacts encompassing the following categories: food; food preparation; consumption and storage; furnishings; heating and lighting; clothing and footwear; accoutrements; grooming...
and health; entertainment; indulgences-alcohol and tobacco; structural hardware and material; farming; hunting; ranching; tools; transportation; and writing (Ziesing 1997b:G-1-G-15).

The second activity area comprised rocks and scattered bricks adjacent to a metal well casing. A 25-x-30-ft. area was cleared and a brick surface surrounded by a low trough was revealed. These bricks were standard sized construction-grade bricks (Ziesing 1997b:45, 26). A cast-iron water pipe suggests that the brick surface or platform was used for some kind of water-related function, and the trough may have been caused by walking on wet ground. This feature may not have been associated with the adobe, but rather the subsequent ranch occupation (Ziesing 1997b:175).

A survey using a metal detector was conducted to try to locate a blacksmith shop that had been recorded in a historic document. Various artifacts were found scattered throughout the site area by this method. The remains of two dry-laid stone bridge abutments, as well as possible wooden bridge remnants, were found along Kellogg Creek during the survey (Ziesing 1997b:46, 49). The exposed areas were further cleared to reveal an area with maximum dimensions of 120-x-75 ft. A remote sensing survey using a magnetometer was undertaken to locate stone walls, floors or similar features. Areas described by Ziesing as being of high and very low magnetic resistivity were excavated though only one additional feature was revealed. This feature was a historic trash pit (Ziesing 1997b:49, 52).

Another stone surface was also identified. A number of cobbles and artifacts such as cut nails had been observed on the surface in this location, and the area was cleared to expose this feature. Artifacts retrieved from the overlying alluvial soil were predominately structural materials, but also included a piece of farming equipment, bullet casings, clothing related items, and fragments of white earthenware. The purpose of the surface was not determined, though it may have been related to 19th-century grain farming (Ziesing 1997b:178-181).

The 1999 CRMP noted the potential for additional buried deposits associated with the adobe and the later wood-frame dwelling. An architectural study of the National Register-eligible buildings standing at the Starr Ranch was prepared in 1996 (Solari and Upton 1996). These include the hot-riveted buildings constructed by Starr, who developed the diesel Caterpillar tractor. This report includes a historical background, measured drawings, and high definition photographs.

**CA-CCO-533H – Everson Farmstead**

This property was a ranch headquarters located on public land within the valley of Kellogg Creek. The site consists of sandstone rock alignments and aggregations that suggest structural footings and the remains of a windmill. The sandstone rock alignment due east of a recent
wooden enclosure may be the corner of a structural footing. A linear sandstone alignment may also represent a footing, while dispersed sandstone rocks may be disturbed footing materials. Domestic refuse deposits were not noted on the surface, but may be buried under alluvium. The physical integrity of the site appears good. The integrity of potentially buried deposits remains unknown (Praetzellis, 1997: 155). A brief summary of the ownership, tenancy, and land use follows:

1870 Louis Everson filed a Cash Entry on the 160-acre parcel containing the site. He lived and farmed here with his wife and three infant children.

1875 The Eversons sold the property to Henry McCabe, son of Thomas and Maria McCabe. It is unknown whether Henry McCabe and his family lived on this site; they are not shown on the census.

1891 Henry McCabe sold the property to Myrtil Blum, son of Los Vaqueros land speculator Simon Blum; Myrtil quickly transferred it to William Brown.

1906 William Brown sold the property to John Brown

1910 Widow Catherine Brown lived in this location with her two adult sons; they were general farmers.

1924 The John Brown estate auctions off the property to the highest bidder, Edward Grueninger for $5,426.

This site has not undergone any mitigation measures as of 1996, because there have not been any plans to develop the area in which it is located. As a result, it is not as well understood as other sites in the Los Vaqueros watershed. If impacts to the site cannot be avoided, an HPTP outlining a phased data recovery program should be developed and implemented.

CA-CCO-534H – Andrews/Barkley/Bakers Farmstead

This site is a ranch headquarters located in the valley of Kellogg Creek at the base of a hill to the west of Vasco Road. The site consists of the structural remains of a collapsed barn and possible outbuilding, consisting of stone alignment and raised platform; a possible dwelling footing; associated water-management features; and a sheet-refuse deposit consisting of wire and cut nails, toy wagon and tricycle, white improved and black-transfer-printed earthenware, and salt-glazed stoneware bottle sherds. Exotic vegetation includes a fruit tree, two pepperwood trees, and a walnut tree. An earthen levee measuring approximately 3 ft. wide by 1.5 ft. high by 1,000 ft. long originates at the base of a hill and terminates immediately north of a standing windmill frame. In addition, the site contains a concrete cistern filled with recent debris. The physical integrity of the site appears good to excellent.
Los Vaqueros Reservoir Expansion  William Self Associates, Inc.
Cultural Resources Assessment Report  February 2009

(Praetzellis 1997: 156). The integrity of potentially buried deposits remains unknown. A brief summary of the ownership, tenancy, and land use follows:

1870  According to a U.S. Census of 1870, James and Anna Andrews and their seven children had been living and farming at site CA-CCO-534H.

1872  James Andrews purchased the 160-acre parcel containing the site from the General Land Office (GLO) with Agricultural College Scrip in December.

1875  Andrews filed a Homestead Entry on a neighboring 80-acre parcel; the time period on this entry expired and the GLO canceled it in 1885.

1889  Andrews purchases the 80 acres with a Cash Entry patent in April.

1902  The Savings and Loan sold the 160-acre parcel to Frank Baker.

1910  According to the U.S. Census, the Barkley family continued to rent the property, until they moved a short distance up the creek, taking their house with them; the house was moved three times, eventually ending up in Brentwood.

1920  Frank Baker built a new house on the property and retired there. After his death a few years later, the parcel, along with the neighboring 80-acres passed to his widow, Mary Baker.

1925  Chris Christenson and his bride, Vivian Morchio moved into the Baker place.

1940  Edward Grueninger purchased the 240-acre parcel after Mary Baker’s death for $6,375. The Baker house was sold to Dell Hansen, who moved it to the yacht harbor, where it eventually burnt down.

This site is located within the Los Vaqueros Reservoir watershed that may be impacted by increased access. It may be affected by vandalism or by other as yet unidentified impacts. Site preservation is preferred to data recovery; plans should be developed to avoid damage to the site. If impacts cannot be avoided, a phased data recovery program should be developed and implemented. The location of the Barkley child’s grave should be determined by interviews with members of the Barkley family.

CA-CCO-535H, Easton/Morchio/Grueninger Farmstead, Ranch Headquarters

This property was a ranch headquarters in the broadest part of Kellogg Creek Valley. In 1986 the site consisted of numerous standing barns and outbuildings, exotic vegetation, and a dispersed scatter of domestic refuse and farm machinery. In 1998 the barns were removed, and two maps of the complex and a brief historical sketch were prepared. The ranch buildings included a house, tankhouse, well, windmill, pump house, horse barn (probably built in the 1870s), a sheep barn (1945), fuel and tool shed, turkey shed, tractor equipment...
and harvester shed, bunkhouse, granary/garage, blacksmith shop, and smokehouse (SSUAF 1999:28). A brief summary of land ownership and land use follows.

1872 Eastons, Scottish immigrants, patented a quarter section including this property.

1880 Easton son, George, occupied and ran the farm with his family. He raised livestock (horses, hogs, and chickens) and conducted hay farming.

1900 Morchio family, Italian immigrants, leased, occupied, and raised grain on the property.

c. 1910 Documents list the substantial Easton house (two bedrooms upstairs, 5 bedrooms downstairs), two barns, granary/garage, chicken houses, bunkhouse, tankhouse, blacksmith shop and smokehouse (Hattersly-Drayton 1993:20).

1919 Grueninger (parents were German immigrants in the 1880s) bought parcel from Easton and conducted dry farming.

1927 Replaced Easton house with Craftsman-style bungalow; discarded many old possessions into Kellogg Creek.

1935 Grueninger gradually built his operation into a large ranch by purchasing neighboring properties to make a full section (640 acres). He deeded the property to his nephew, Pyron Crosslin.

No date Crosslin sold to Kaiser Construction Company, but remained on the property as a resident with a life estate.

1971 Craftsman style house burned and the Crosslins moved, giving up life estate.

In the 1990s, prior to initiation of the Los Vaqueros 100 TAF Reservoir construction and mitigation, there were three extant barns (granary, shed and garage, shelter for harvester) and a horse arena, which was probably the oldest extant structure on the Vasco (Praetzellis et al. 1997:160).

In 1998, data recovery investigations were undertaken at CA-CCO-535H as part of the mitigation measures developed for the demolition and clean-up activities being undertaken at the site (Meyer and Stewart 1998). The site was photographed, mapped and recorded in detail. In addition, a steel probe was used to determine if stone paving existed buried beneath the barn floors (Meyer and Stewart 1998:5-7). The proposed mitigation involved the demolition and removal of all above-ground debris and structures (SSUAF 1998:3). However, the building that had been previously identified as the ranch bunkhouse was later discovered to have originally served as one of the county’s earliest Tax Assessor’s offices. The building, which had already been relocated once, was relocated off-site to allow site
clearance to continue (Meyer and Stewart 1998:7). The building was considered ineligible for the NRHP and no further consideration was required (Meyer and Stewart 1998:8).

**CA-CCO-650H, Historic Artifact Scatter**

This site is an historic artifacts scatter, which mostly originates from within the fill dirt used to build up the levee road forming the western bank of a small irrigation canal. No structural debris was noted. Fifteen uncontrolled shovel probes were dug, but only one yielded any subsurface deposits. Due to the extremely disturbed condition and poor integrity of this site, no further management is recommended. There is no available information on the history of owners or tenants for this site.

**CA-CCO-726/H, Powerline Site, Historic Artifact Scatter**

The historic component of the Powerline Site consists of an extensive artifact scatter (Meyer and Meyer 2000:50). Archaeological monitoring of this site was undertaken in 1998 during the excavation of a waterline trench. No subsurface historic materials were located at this time. Monitoring of the construction of two detection points was also undertaken. Historic artifactual material within this area was found to cover a 120-x-60-ft. area at 6 to 8 inches below surface. These artifacts were related to household domestic use, and included ceramic ware, glass bottles and other drinking ware, canning jars, a portion of a griddle or stove burner, cow, sheep and deer bone (some saw-cut), sheet metal, a chain and hook, and nails. Diagnostic artifacts ranged in date from 1875 to 1920, with most artifacts falling into the 1880 to 1910 date bracket. Meyer and Meyer (2000:56) suggested that the artifact scatter may have been associated with a household site, and that the lack of any features or patterning to the historic material indicates that the site has likely been disturbed by cultivation (Meyer and Meyer 2000:50, 55-56). Based on the pattern of household trash disposal from the same occupation period at other sites in the vicinity, it is likely that there was a household nearby, however any such household escaped detection during the extensive archival research conducted by SSUAF for the Los Vaqueros Reservoir project (e.g., Praetzellis et al. 1995).

**Discussion and Significance of Previous Historic-Era Research**

The archaeological investigations summarized above were complemented by equally intensive collection of oral testimonies and archival research. As a result, the occupations of most of the ranch headquarters have been associated with specific individuals through time. This has allowed for the historical and interpretive connection of material culture remains with individuals of different ethnicities, genders, ages, life histories, and social affiliations. The historic-period occupation of the study area has yielded archaeological evidence primarily from the later 1800s when tenant ranchers of different ethnicities dry-farmed the
land. Of the two remaining adobe ruins from the earliest occupations of the area, the Suñol Adobe has been carefully excavated. A more detailed consideration of the results of Historic-period research is presented within the research framework in section 5.1 Previous Research Questions.

3.5 Native American Consultation

The Native American Heritage Commission (NAHC) was contacted by letter on July 10, 2008, requesting information on sacred lands and a contact list of local tribal representatives and most likely descendents (MLD). A response was received from the NAHC on August 1, 2008, noting, "A record search of the sacred land file has failed to indicate the presence of Native American cultural resources in the immediate project area." The letter also provided a list of Native American contacts in Contra Costa and Alameda counties.

4.0 Survey

4.1 Survey Method

The majority of the study area has been previously surveyed for cultural resources (Figure 5). Additional surveys were conducted for the Los Vaqueros Expansion Area Studies. Consultants conducted a mixed strategy pedestrian survey of the reservoir expansion area and portions of the proposed pipeline corridors as well as the proposed eastside hiking trail. In the reservoir expansion area, surveyors targeted known historic properties between the existing 100 TAF reservoir and the proposed 275 TAF expansion area with an additional search area, or buffer, extending 200 ft. beyond the anticipated 275 TAF high water mark (560 ft. amsl). All previously recorded and evaluated sites were relocated and examined for new evidence of disturbance that might have affected their NRHP-eligibility status. Any new cultural resources were mapped and recorded.

Segments of each of the proposed pipeline corridors (Delta-Transfer, Transfer-LV, and Transfer-Bethany), the powerlines (Options 1 and 2), and associated facilities including the Transfer Facility Expansion area, power substation, and the Staging Area north of the dam, that had not been previously surveyed, or that had been surveyed more than 10 years ago, were examined on foot using 4-m transect intervals. Archaeologists searched for evidence of past cultural activities older than 45 years such as concentrations of flaked stone, groundstone, charcoal, fire-affected rock, locally dark soil, shell and/or bone fragments, shards of ceramic or glass, brick, nails, wire, foundations, fencerows, corrals, and irrigation ditches.
4.2 Survey Results

Cultural resource surveys were undertaken in April 2004, May, June, and November 2007, and February and April 2008. The April 2004 survey was undertaken by WSA as part of an earlier phase for the planning of this project. Table 4 presents a summary of the cultural resources within the study area and proposed APE. Sixteen historic properties were relocated and assessed for evidence of recent damage and these are discussed below. Nine historic properties were not accessible due to inundation or their removal as part of the mitigation for the 100 TAF Los Vaqueros Reservoir (CA-CCO-445H, 458/H, 469, 470H, 636, 637, 696, 725, 726/H, and 755). Nine cultural resources were recorded and have been assumed eligible for listing on the NRHP and the CRHR for the purposes of this assessment report.

CA-CCO-9, Milling Station

This site was revisited on June 11, 2007. BRMs were relocated in two main clusters. The 1953 site map depicts the northern cluster, while the southern cluster is depicted on the 1980 site map, across a newly built wooden footbridge. Site appears undisturbed with lichen and leaf litter covering most boulders.

Mitigation recommendation: thorough recordation with focus on mapping (combining the 1953 and 1980 site maps to form a complete site map of both clusters.)

CA-CCO-143 and 144, Lithic Scatters

On April 22, 2008, WSA staff revisited these site locations. There was no evidence of the site on the surface. Visibility was very poor (less than 5%), and the area has been heavily disturbed by agricultural activity over the decades.

CA-CCO-397, Milling Station

On February 29, 2008, WSA staff revisited this site. The condition of the site appears to be unchanged since it was last recorded, except for a few things. A barbed-wire fence has been erected which bisects the western 1/3 of the site, just to the west of the 1986 datum. There were no previously recorded BRMs on any boulders to the west of this fence, although this was not verified during the 2008 revisit. The land is currently being used for cattle grazing; there were cattle on the western side of the fence at the time of the revisit and evidence of cattle tramping within the site boundaries. A total of seven BRMs were relocated, corresponding to the locations on the 1999 sketch map, which was based on the 1986 sketch map. The condition of the site seems to be good, with some loss of integrity due to erosional activity and grazing.
Table 4. Summary of Results of Cultural Resources Survey

<table>
<thead>
<tr>
<th>Resource</th>
<th>Site Type</th>
<th>Last Assessed</th>
<th>Condition</th>
<th>Previous Mitigation</th>
</tr>
</thead>
<tbody>
<tr>
<td>CA-CCO-9</td>
<td>Milling Station</td>
<td>June 2007; No obvious disturbance</td>
<td>Excellent; subsurface unknown</td>
<td>Avoided; long term monitoring</td>
</tr>
<tr>
<td>CA-CCO-143</td>
<td>Lithic Scatter</td>
<td>April 2008; could not relocate</td>
<td>Unknown</td>
<td>No known mitigation</td>
</tr>
<tr>
<td>CA-CCO-144</td>
<td>Lithic Scatter</td>
<td>April 2008; could not relocate</td>
<td>Unknown</td>
<td>No known mitigation</td>
</tr>
<tr>
<td>CA-CCO-397</td>
<td>Open Site</td>
<td>November 2007; Disturbance from active animal burrows and cattle trail</td>
<td>Poor to good; subsurface unknown</td>
<td>No mitigation</td>
</tr>
<tr>
<td>CA-CCO-427H</td>
<td>Ranch Headquarters</td>
<td>June 2007; No obvious disturbance; unrecorded grooved boulders in creek bed</td>
<td>Subsurface excellent in locations not previously excavated</td>
<td>Level 2 Data Recovery; Partial Inundation</td>
</tr>
<tr>
<td>CA-CCO-445H*</td>
<td>Ranch Headquarters</td>
<td>No access; inundated</td>
<td>Unknown</td>
<td>Level 1 and 2 Data Recovery; Inundation</td>
</tr>
<tr>
<td>CA-CCO-446H</td>
<td>Ranch Headquarters</td>
<td>November 2007; No obvious new disturbance</td>
<td>No remaining structures; subsurface unknown</td>
<td>Avoided; Screened</td>
</tr>
<tr>
<td>CA-CCO-447/H</td>
<td>Livestock Feature; Open Site with burials</td>
<td>November 2007; No obvious new disturbance</td>
<td>Good; subsurface good in locations not previously excavated</td>
<td>Historic: Level 1 Data Recovery; Screened; construction monitoring Prehistoric: Level 1 Data Recovery; construction monitoring</td>
</tr>
<tr>
<td>CA-CCO-450/H</td>
<td>Ranch Headquarters; Open Site (includes &quot;High Water Site&quot;)</td>
<td>June 2007; Corrals and barn in use; no obvious new disturbance of prehistoric</td>
<td>Structures good; subsurface unknown</td>
<td>Stone Fence recorded; Historic Architectural Survey Report (2000); Partial screening of cabin; Barrier placement</td>
</tr>
<tr>
<td>CA-CCO-452</td>
<td>Milling Station</td>
<td>June 2007; Some surface disturbance</td>
<td>Excellent; subsurface unknown</td>
<td>Avoided</td>
</tr>
<tr>
<td>CA-CCO-458/H*</td>
<td>Historic Artifact Scatter; Open Site with burials</td>
<td>No access; inundated</td>
<td>Unknown</td>
<td>Level 2 Data Recovery; Inundation</td>
</tr>
<tr>
<td>CA-CCO-459</td>
<td>Milling Station with human remains</td>
<td>April 2004, June 2007; Partial exposure and erosion due to fluctuating water level; additional bedrock mortars observed</td>
<td>Good to Excellent; previous testing</td>
<td>Level 2 Data Recovery; Partial inundation; Long term monitoring</td>
</tr>
<tr>
<td>CA-CCO-462</td>
<td>Milling Station</td>
<td>June 2007; No obvious disturbance</td>
<td>Excellent; subsurface unknown</td>
<td>Avoided</td>
</tr>
<tr>
<td>Resource</td>
<td>Site Type</td>
<td>Last Assessed</td>
<td>Condition</td>
<td>Previous Mitigation</td>
</tr>
<tr>
<td>------------</td>
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<td>----------------------------------</td>
<td>-----------------------------------------------</td>
</tr>
<tr>
<td>CA-CCO-463</td>
<td>Open Site with Milling Station</td>
<td>June 2007; No obvious disturbance</td>
<td>Excellent; subsurface unknown</td>
<td>Avoided; long term monitoring</td>
</tr>
<tr>
<td>CA-CCO-464</td>
<td>Milling Station</td>
<td>June 2007; No obvious disturbance; site larger and more complex than recorded</td>
<td>Excellent; subsurface unknown</td>
<td>Avoided</td>
</tr>
<tr>
<td>CA-CCO-467/H</td>
<td>Water Management Feature; Milling Station</td>
<td>April 2004; No obvious disturbance</td>
<td>Good; subsurface unknown</td>
<td>Avoided</td>
</tr>
<tr>
<td>CA-CCO-468</td>
<td>Milling Station and Open Site</td>
<td>June 2007; No obvious new disturbance; broken mortar scattered on surface</td>
<td>Fair to good</td>
<td>Level 1 Test; Partial Inundation</td>
</tr>
<tr>
<td>CA-CCO-469*</td>
<td>Milling Station</td>
<td>No access; inundated</td>
<td>Unknown</td>
<td>Level 1 Test; Inundation</td>
</tr>
<tr>
<td>CA-CCO-470H*</td>
<td>Ranch Complex</td>
<td>No access; inundated</td>
<td>Unknown</td>
<td>Level 2 Data Recovery; Inundation</td>
</tr>
<tr>
<td>CA-CCO-533H</td>
<td>Ranch Headquarters</td>
<td>April 2008</td>
<td>Poor to fair; subsurface unknown</td>
<td>Avoided</td>
</tr>
<tr>
<td>CA-CCO-534H</td>
<td>Ranch Headquarters</td>
<td>April 2008</td>
<td>Poor to fair; subsurface unknown</td>
<td>Avoided</td>
</tr>
<tr>
<td>CA-CCO-535H</td>
<td>Ranch Headquarters</td>
<td>April 2008; No surface elements of the site remain</td>
<td>Poor to fair; subsurface unknown</td>
<td>Buildings demolished; Care taken to maintain subsurface integrity</td>
</tr>
<tr>
<td>CA-CCO-596H</td>
<td>Ranch Headquarters</td>
<td>April 2008</td>
<td>Fair to Good Subsurface unknown</td>
<td>No known mitigation; not in 100 TAF reservoir APE</td>
</tr>
<tr>
<td>CA-CCO-597</td>
<td>Petroglyph Boulder</td>
<td>April 2008; Petroglyph not visible</td>
<td>Poor to Fair; subsurface unknown</td>
<td>Graffiti noted; not in 100 TAF reservoir APE</td>
</tr>
<tr>
<td>CA-CCO-621/H</td>
<td>Ranch Headquarters; Lithic Scatter</td>
<td>April 2008</td>
<td>Poor</td>
<td>Phased Data Recovery</td>
</tr>
<tr>
<td>CA-CCO-636*</td>
<td>Milling Station</td>
<td>No access; inundated</td>
<td>Unknown</td>
<td>Level 1 Test; Inundation</td>
</tr>
<tr>
<td>CA-CCO-637*</td>
<td>Lithic Scatter (surface); Open Site with burials (buried)</td>
<td>No access; under dam</td>
<td>Unknown</td>
<td>Level 2 Data Recovery; Covered by Dam</td>
</tr>
<tr>
<td>CA-CCO-650H</td>
<td>Historic Artifact Scatter</td>
<td>April 2008; could not relocate</td>
<td>Unknown</td>
<td>15 uncontrolled shovel probes; no further management recommended</td>
</tr>
</tbody>
</table>
Table 4. Summary of Results of Cultural Resources Survey (continued)

<table>
<thead>
<tr>
<th>Resource</th>
<th>Site Type</th>
<th>Last Assessed</th>
<th>Condition</th>
<th>Previous Mitigation</th>
</tr>
</thead>
<tbody>
<tr>
<td>CA-CCO-653</td>
<td>Open site with single burial</td>
<td>April 2008; could not relocate</td>
<td>Unknown</td>
<td>Phase 1 inventory</td>
</tr>
<tr>
<td>CA-CCO-696*</td>
<td>Open Site with burials (deeply buried)</td>
<td>No access; under dam, inundated</td>
<td>Unknown</td>
<td>Construction Monitoring; Level 2 Data Recovery; Inundation</td>
</tr>
<tr>
<td>CA-CCO-725*</td>
<td>Open Site</td>
<td>No access; paved under road</td>
<td>Unknown</td>
<td>Level 2 Data Recovery; Paved over</td>
</tr>
<tr>
<td>CA-CCO-726/H</td>
<td>Historic Artifact Scatter; Open Site</td>
<td>November 2007; No obvious new disturbance</td>
<td>Good to Excellent</td>
<td>Construction monitoring</td>
</tr>
<tr>
<td>CA-CCO-755*</td>
<td>Buried Open Site</td>
<td>April 2008; no surface evidence</td>
<td>Unknown</td>
<td>Construction monitoring</td>
</tr>
<tr>
<td>P-07-000791</td>
<td>Water Management Feature</td>
<td>April 2004; could not relocate</td>
<td>Good</td>
<td>Covered by silt</td>
</tr>
<tr>
<td>P-07-002640</td>
<td>Isolated pestle</td>
<td>February 2008; could not relocate</td>
<td>Poor</td>
<td>No known mitigation</td>
</tr>
<tr>
<td>Kellogg Creek Dam</td>
<td>Water Management Feature</td>
<td>June, November 2007; Parts of original dam dismantled, some removed</td>
<td>Fair</td>
<td>Original function of structure destroyed; No known previous mitigation</td>
</tr>
<tr>
<td>Kellogg Creek Irrigation Ditch</td>
<td>Water Management Feature</td>
<td>First recorded Nov 2007</td>
<td>Good</td>
<td>No known mitigation</td>
</tr>
<tr>
<td>Irrigation Ditch 1</td>
<td>Water Management Feature</td>
<td>First recorded Nov 2007</td>
<td>Good</td>
<td>Avoided by original installation of Delta-Transfer pipeline 1998</td>
</tr>
<tr>
<td>Irrigation Ditch 2</td>
<td>Water Management Feature</td>
<td>First recorded Nov 2007</td>
<td>Good</td>
<td>Avoided by original installation of Delta-Transfer pipeline 1998</td>
</tr>
<tr>
<td>Irrigation Ditch 3</td>
<td>Water Management Feature</td>
<td>First recorded Nov 2007</td>
<td>Good</td>
<td>Avoided by original installation of Delta-Transfer pipeline 1998</td>
</tr>
<tr>
<td>Byron-Bethany Irrigation Canal</td>
<td>Water Management Feature</td>
<td>First recorded Nov 2007</td>
<td>Good</td>
<td>Avoided by original installation of Delta-Transfer pipeline 1998</td>
</tr>
<tr>
<td>Concrete Culvert</td>
<td>Water Management Feature</td>
<td>First recorded Nov 2007</td>
<td>Excellent</td>
<td>Avoided by original installation of Delta-Transfer pipeline 1998</td>
</tr>
<tr>
<td>SPRR grade</td>
<td>Linear Feature</td>
<td>First recorded Nov 2007</td>
<td>Good</td>
<td>Avoided by original installation of Delta-Transfer pipeline 1998</td>
</tr>
<tr>
<td>Transmission Line</td>
<td>Linear Feature</td>
<td>First recorded Nov 2007</td>
<td>Good</td>
<td>Avoided by original installation of Delta-Transfer pipeline 1998</td>
</tr>
</tbody>
</table>

* Resources were not accessible at the time of the survey.
CA-CCO-427H, Perata/Bonfante Site, Ranch Headquarters

This site was revisited on June 11, 2007, by WSA staff. The site is a Ranch Headquarters, and has been previously mitigated with data recovery including excavation of at least 5 different features. The site no longer has standing structures. Most fences have been removed. We discovered two grooved boulders in the creek adjacent to the historic site. The site is partially inundated.

CA-CCO-446H, Ranch Headquarters

This site was revisited in 2007. The site may be adversely affected by construction of inlet and outlet pipelines for the Los Vaqueros Reservoir Expansion Project.

CA-CCO-447/H, Livestock Feature; Open Site with Burials

This site was revisited in 2007. The site may be adversely affected by construction of inlet and outlet pipelines for the Los Vaqueros Reservoir Expansion Project.

CA-CCO-450/H, Ranch Headquarters

The site was visited by WSA on June 12, 2007. Marshy land bordering the 100 TAF Reservoir lies nearby but the reservoir does not currently cover the site. The Cowboy House has been surrounded by a high cyclone fence to discourage entry and windows have been boarded over with plywood. There appears to be continued animal usage of the pens located adjacent to the cabin. The barn also appears to be used for storage of large machinery. The site appears to be in a good stable condition.

CA-CCO-452, Milling Station

This is another BRM site located east of Los Vaqueros Rd along Kellogg Creek below the reservoir. The ground is gently sloping and overgrown. There is some disturbance that has churned up the dirt around the boulders. We relocated some of the boulders with BRMs mapped in 1982, including the datum on split boulder, located other possible BRMS, but did not relocate the boulder with 2 BRMs on the 1982 map.

CA-CCO-459, Milling Station with Human Remains

The site was revisited on June 12, 2007. More BRMs were located than were previously recorded. The lone BRM, on the shore of the reservoir, is now visible; wave erosion has damaged it. No artifacts were noted.
CA-CCO-462, Milling Station

Site was relocated and appeared to be in a good, stable undisturbed condition. Lichen and leaf litter concealed many of the BRMs. The site is located further north west up the seasonal drainage, and is heavily overgrown by poison oak in the drainage where the BRMs are mapped, and by leaf litter and grass above on the terrace where the barbed wire fence is. Cattle have heavily disturbed the steep slope above the stream bed, primarily affecting the prehistoric portion of the site. They do not appear to have disturbed the terrace.

CA-CCO-463, Open Site with Milling Station

This site was visited by WSA on June 11, 2007. It appeared that the site has been undisturbed, except for some surface disturbance from cattle. Lichen and dried grasses obscure many of the BRMs on this site. CCO-463 is located west of Los Vaqueros Rd. across from CCO-9. The site is on a steeper slope setting higher above a tributary creek than CCO-9 which is on a very gentle slope down near Kellogg Creek. We did not relocate all BRMs mapped in 1982, namely those near and along the seasonal creek.

CA-CCO-464, Milling Station

Site CA-CCO-464 was visited by WSA on June 11, 2007. There was no obvious disturbance and the site appears larger and more complex than previously recorded. BRMs are located above a seasonal drainage on the west side of Los Vaqueros rd across from CCO-452. These BRMs are on a fairly steep slope. We were unable to relocate the exact configuration of boulders and BRMs recorded on the 1982 map, but located other examples. The site is overgrown with brush in some areas, and covered by leaf litter in others, but otherwise appears to be undisturbed.

CA-CCO-467/H, Milling Station, Water Management Features

This site was revisited in 2004. The site is located among trees lining a narrow seasonal stream and the bedrock mortars are thickly covered with leaf fall and other debris. No obvious disturbance was observed. A portion of this site will be inundated by the expansion of the reservoir.

CA-CCO-468, Milling Station and Open Site

The site was visited by WSA in June 2007. This site is currently located at the edge of and partially inundated by the 100 TAF reservoir pool adjacent to a tributary of Kellogg Creek.
The elements of the site include 5 previously recorded BRMs, a small earthen dam, and possible rock shelters upstream. The rock shelters are on the south sloped side of the seasonal creek and are formed by very large sandstone boulders with a very low gap. The shelter is heavily used by small animals and the dirt is churned up and covered with leaf litter. The soil is light brown silty loam. No obvious new disturbance was noted. At the time of inspection, the water level of the creek was low, allowing for documentation of the effects of draw down, such as increased visibility of the site and possible erosion. As a result of the draw-down, another grouping of BRMs was found in the creek bed. A partial portable mortar was found, but not collected.

CA-CCO-533H, Ranch Headquarters

In February of 2008, WSA staff revisited this site. The site appears much the same as described by the 1986 site record, except for a few minor modifications. The area is currently being used for cattle grazing, so there is some disturbance from that activity. Feature 1, a possible fieldstone building foundation corner seemed to have been disturbed, as some of the rocks were loose. Another circular metal trough had been placed close to the SW portion of the site boundary, near Feature 3. Thick-gauge wire and fan blades were also found near Feature 1 and the wood enclosure. The heavy metal pipe was relocated. The artifact concentration discovered by Meyer in 2003 could not be relocated.

CA-CCO-534H, Ranch Headquarters

In February of 2008, WSA staff revisited this site. The site has changed significantly since it was last recorded in 1999; all standing structures have been removed leaving only the wooden remains of a windmill. Two cement troughs were situated at the base of a hill, near the windmill remnants. The (levee) arroyo still remains, but no exotic trees remain. To the south, the previously recorded resources appear to have been removed.

CA-CCO-535H, Ranch Headquarters

An inspection of the site on November 21, 2007 revealed several indications of a former ranch and domestic occupation of the small knoll. These include a cement foundation and walkway, a cluster of pepper trees, a broken cement bird bath, various rusted metal pipes, fittings, and a tank, and shaped sandstone paving stones and wood posts eroding out of a roughly rectangular mound of dirt, stone, and debris. Domestic refuse was found scattered over the surface of the northeastern slope of the knoll. The above-ground, architectural elements of the resource were determined to be ineligible for listing on the NRHP and have been demolished and removed. There does not appear to have been significant ground disturbance subsequent to the demolition in 1998.
CA-CCO-596H, Farm Headquarters

On February 13, 2008, WSA staff revisited this site. The site has remained much the same as it appeared when it was recorded in 1986. All ten of the features were relocated, and appeared as described on the 1986 site record, with the exception of an unrecorded rock wall originating at the house and running parallel to the recorded wall for approximately 25 ft. WSA staff updated the site record sketch map.

CA-CCO-597, Petroglyph Boulder

In April of 2008, WSA staff revisited this site. A single boulder was located in an open field matching the description and location of site CA-CCO-597. However WSA staff could not make out the previously reported petroglyphs. There was modern graffiti, as well as recent and older scrapes from heavy machinery, indicating that there have been attempts to move the boulder.

CA-CCO-621/H, Secondary Lithic Scatter and Farm Headquarters

This site was originally recorded in 1990 as containing both prehistoric and historic elements. However testing revealed that the prehistoric component consisting of several obsidian flakes and bifaces, was in secondary context. The historic component consists of a sheet scatter of historic and modern ceramic shards, brick, and concrete. The buildings were torn down in 1990. Two large palm trees and several fruit trees were also recorded. Only one palm tree remains and the fruit trees have been removed as of February 2008. Brick, glass, and other domestic debris were observed. A fenced-in area was found at the south edge of the site. No prehistoric artifacts were found.

CA-CCO-650H, Historic Artifact Scatter

In April of 2008, WSA was unable to relocate any evidence of the reported historic debris in the levee roads and the levee banks

CA-CCO-653, Open Site with Burial

In April of 2008, WSA staff revisited this site but were unable to relocate any evidence of the site, due to poor visibility (less than 5 percent) and evidence of heavy agricultural disturbance including plowing and harvesting.
CA-CCO-726/H

The site location was revisited in November 2007. There is no obvious evidence of the site, and no evidence of significant disturbance subsequent to installation of the 100 TAF dam.

CA-CCO-755, Open Site

In April of 2008, WSA staff revisited the site location and noted the absence of any obvious site disturbance subsequent to the utility work in 2002 that uncovered prehistoric debris. No evidence was expected as it was reported as buried.

P-07-00791, Water Management Feature

The Spring Box Site has been silted over and two successive surveys by WSA staff in 2004 and 2007 have been unable to relocate the small wooden feature.

Kellogg Creek Dam

This newly-recorded feature is a board-form concrete irrigation structure with associated floodgates and irrigation drain-pipes used to redirect water to associated agricultural fields, located at the point where the flow of Kellogg Creek shifts from east to northwest. It is crossed northeast-southwest by a bridge on Kellogg Creek Road, and blocked by a gate 15’ northwest of the bridge. The structure appears to be the remains of a stoplog (or handstop) dam, which raises the water level in a culvert beneath the Kellogg Creek Road Bridge and allows it to be redirected for purposes of irrigation. The dam itself is no longer intact and the creek flow is now uninterrupted. At the northwest corner of the bridge, bolted to the concrete retaining wall there is vertical wood planking which was likely used to attach the wood structure of the dam itself. A number of fragments of broken wood planking are visible beneath the bridge and just downstream (northeast) from the bridge. Broken concrete and drain-pipe fragments are also located along the creek bed downstream. The bridge itself uses modern bolts that have little corrosion and what appears to be pressure treated wood.

Kellogg Creek Irrigation Ditch

This segment of an irrigation ditch, now referred to as Kellogg Creek, is located within Contra Costa County. An associated dam feature has been recorded separately. This segment of the irrigation ditch is partially overgrown and suffering from erosion.
Irrigation Ditch 1

This 200-ft. segment of an unnamed irrigation ditch is located within Contra Costa County. The irrigation ditch is depicted on the 1916 USGS Byron Quadrangle Topographic Map (surveyed in 1911). It emanated from a pumping plant at Indian Slough and extended south to its intersection with another irrigation ditch that emanated from Italian Slough. The alignment of the ditch has not been changed. This segment of the ditch is unlined. A concrete culvert (recorded separately), which is marked with the date 1940, allows flow of water beneath SR4.

Irrigation Ditch 2

This 200-ft. segment of an unnamed irrigation ditch is located within Contra Costa County. The irrigation ditch is depicted on the 1943 War Department Byron Quadrangle Topographic Map. It extended north and south of SR4. A portion of the irrigation ditch north of SR4 has been altered and the southern portion has been extended (USGS 1978 Woodward Island topographic map). This segment is unlined and is heavily overgrown with vegetation.

Irrigation Ditch 3

This 200-ft. segment of an unnamed irrigation ditch is located within Contra Costa County. The irrigation ditch is depicted on the 1916 USGS Byron Quadrangle Topographic Map (surveyed in 1911). It emanated from Indian Slough, extended southwesterly, turned to the southeast and then continued due south. It is depicted on the 1943 War Department Byron Quadrangle Topographic Map as maintaining the same alignment but having been extended further to the south to connect with another irrigation ditch emanating from Italian Slough. By the time the 1978 USGS Woodward Island Quadrangle Topographic Map was produced, the southern portion of the irrigation ditch, south of Camino Diablo, had been realigned. The northern portion of the irrigation ditch has been reconfigured to conform to the Discovery Bay residential development along SR4. The southern portion of the irrigation ditch appears to maintain the same alignment as in 1978.

Byron-Bethany Irrigation Canal

This 200-ft. segment of the Byron-Bethany Irrigation Canal is located within Contra Costa County. The Byron-Bethany Irrigation Canal connects to Kellogg Creek in the north, continues in a north-south direction past Camino Diablo, then extends in a jagged alignment in a roughly southeast direction, intersecting with the California Aqueduct to the south. The canal was constructed pre-1943, as it first appears on the War Department Byron Quadrangle Topographic Map for that year, though at that time it extended only as far as approximately one-third of the way between the township of Byron and Byron Hot Springs. By the time the
1978 USGS Brentwood Quadrangle Topographic Map was produced, the alignment had been extended to meet the California Aqueduct. Based on Google Earth (2007), an approximately 0.65 mile section of the canal approximately 0.7 miles northwest of its intersection with the California Aqueduct has been removed or possibly relocated underground.

**Concrete Culvert**

The culvert is located within Contra Costa County. The box culvert is constructed of board-form concrete and stamped with the date 1940. The culvert allows water to flow beneath SR4 along an unnamed irrigation ditch (recorded separately as Irrigation Ditch 1). The base level of the culvert is higher than the irrigation ditch into which the water flows. Therefore, this culvert may also have been designed to function as a drop, which is used to slow the flow of water (see Etcheverry 1916:278; Davis and Wilson 1919:282).

**Southern Pacific Railroad Grade**

This 200-ft. segment of the Southern Pacific Railroad (SPRR) is located within Contra Costa County. A segment of the same railway line further to the southeast has been recorded by PAR Environmental Services in 2001 with the trinomials CA-CCO-744H/CA-ALA-601H (P-07-02553/P-01-010452). PAR observed that the railroad track had remained essentially unchanged since its construction, retaining the original grade, alignment and rail gauge width. The replacement of tracks and ties with similar materials was noted as part of regular maintenance and operation. Likewise, this segment of the railroad appears to also retain its original grade, alignment and rail gauge width. Pieces of the track have been replaced as per regular maintenance requires. The most easily dateable replacement is that of the tie plates which likely occurred in the 1940s. The replacement tie plates are stamped with the date 1944 and a C within a diamond. The railroad is currently in use.

**Transmission Line**

This 200-ft. segment of the transmission line is located within Contra Costa County. The transmission line parallels the Southern Pacific Railroad (SPRR) on the western side at this segment. Two more modern transmission lines also follow the same alignment in this area, with one located on either side of the railroad. The poles and crossbars are constructed of wood. Aqua and clear glass insulators were observed on the wooden crossbars. No insulators or fragments of insulators were located on the ground surrounding the line. However, based on viewing from below, the aqua glass insulators, which appear to have an inner skirt, sharp drip points and are internally threaded, appear to be of the Hemingray 42 type (see Tibbits 1972:76). These were produced between the 1920s and 1950s (Willis 2007). Production of Hemingray’s glass insulators ceased in 1967 (Whitten n.d.).
5.0 Research Questions

The Evaluation prepared by SSUAF (1992) as part of the cultural resources compliance for the Los Vaqueros Reservoir project established a set of research questions to guide cultural resources investigations for prehistoric, ethnohistoric, and historic-era site components within the project area. These research questions are presented below. They have been used to guide the evaluation of cultural resources as part of this report. The questions are followed by an assessment of how the research, conducted as part of the mitigation during the 1990s, has succeeded in addressing the questions. Section 5.2 presents suggestions for updating the research questions to guide future mitigation programs undertaken as part of Section 106 and CEQA compliance for the Los Vaqueros Reservoir Expansion. A more complete research design will be developed in the Cultural Resources Management Plan that will be prepared after the Programmatic Agreement is signed, and prior to preparing any Historic Property Treatment Plans.

5.1 Previous Research Questions and Findings

The lists of research questions and potentially contributing data sets developed by SSUAF (1992) for the Los Vaqueros Project have been reproduced below. Research questions have been underlined. The research questions are organized by Prehistoric, Ethnohistoric, and Historic periods.

Prehistoric Archaeology

Prehistoric archaeology includes the archaeology of Native Americans prior to the time of contact. Three major research topics were investigated by SSUAF and further divided into the following series of subtopics.

REGIONAL CHRONOLOGY

Does the project area conform to Fredrickson’s chronology? SSUAF was able to refine the Fredrickson chronology based on their findings in the Los Vaqueros project area, as discussed previously in section 2.3, and depicted in Figure 4.

Do sites in the project area date to before 1,500 B.P.? Yes. The oldest intact deposits date to at least 9000 B.P. from the site CCO-696 (Meyer and Rosenthal 1997).

Are older sites present in the project area that have been buried by alluvial deposits? Yes, Meyer and Rosenthal (1997) identified a series of buried paleosols within the Kellogg Creek valley, the oldest dating to the Pleistocene. Cultural deposits were found in association with the paleosols buried beneath alluvial deposits, some as deep as 4 m below the surface.
**If multi-component sites are present in the project area, do settlement patterns change over time?** Two prehistoric sites investigated during previous mitigation had more than one temporally and spatially discrete component. Components from CA-CCO-458/H include the East Locus (Upper Archaic through first part of the Lower Emergent periods), and the West Locus (Emergent period). Overall the site has been interpreted as a small residential site with very short-term occupations. The East Locus was occupied earlier leaving behind a sparse assemblage with no features. The West Locus was occupied subsequently and exhibits 10 features, 3 burials, and a richer and more diverse assemblage. This difference may simply reflect a longer period of time over which the intermittent short-term use continued, or it may represent a shift in site use to more extended stays, possibly by larger groups of people.

CA-CCO-696 yielded a component older than 9,000 B.P. and associated with the Lower Archaic that has been interpreted as a short-term camp by Meyer and Rosenthal (1997). The second, more recent component associated with the Upper Archaic through the Lower Emergent periods, represents a shift to long-term occupation, as evidenced in part by the over 169 burials.

Based on only these two sites, settlement pattern change in the Los Vaqueros study area may have involved a shift towards a more intensive and extended use of lowland sites over time, resulting in a large number of burials and other features and an enrichment of the associated assemblages both in artifact variety and density. However, settlement pattern analysis does require a much broader scope than can be gained from the study of two sites, both in terms of sampling from different environmental zones, but also in terms of the number of sites for decoding changing patterns of settlement.

**Subsistence-Settlement**

**Was the project area occupied seasonally, year round, or only for short-term, resource-specific procurement?** Recent archaeological research has shown that these questions can be addressed by some of the well-preserved and datable deposits in the Los Vaqueros lowlands. The question can be more fully addressed once additional research has included sites from uplands to complement existing research from sites in the lowlands. Floral and faunal analyses indicate some seasonal use of various sites, and a preponderance of short-term use (e.g., Meyer and Rosenthal 1997). Investigating a fuller range of zones including the uplands to update the comprehensive prehistory should be a goal of future research.

**Is there variability in site types within the project area over time that would indicate shifting adaptive strategies?** Variability in site types over time is very generally expressed as the appearance of multiple bedrock milling stations in both the uplands and the lowlands, with the transition from the Archaic to the Emergent period. There is no evidence to date that the uplands were occupied prior to the appearance of bedrock milling stations. Within the
lowland archaeological sites of the study area, archaeological research has shown variation in preferences in game animals, and in plant resources over time. Implements have changed from millingslabs to mortars and bedrock milling stations. Larger spear and dart points were replaced by the bow and arrow. These changes in material culture and food preferences indicate changes in adaptive strategies.

*Will archaeological sites contain low diversity of materials and tool types reflective primarily of the procurement and processing of plant materials and secondarily of activities, such as tool maintenance, related to hunting? Some sites have been interpreted as primarily processing sites (e.g., 459). To date, no statistically meaningful measures of diversity have been employed by SSUAF archaeologists to interpret their findings.*

*Will Archaic Period sites (if found) be task specific with low constituent diversity?* Archaeological sites investigated to date have revealed occupations from the Lower Archaic (CCO-696), from the Middle Archaic (447/H, 637) and from the Upper Archaic (450/H, 636, 459, 458/H, 696, and 725). Most of these occupations appear to be focused on food processing (e.g., 459), while others show intriguing evidence for diversity of activities including more substantial evidence for residence and burials (e.g., 696, 637). The Upper Archaic shows an increased range of exploited habitats, and occupation over a wider range of seasons. CCO-696 yielded 160 burials from this period and evidence for house construction, suggesting the site was residential and subject to long-term use.

*Will upland Archaic Period sites occur less frequently than Emergent Period sites (lowland areas are excluded from the test because it is believed that lowland Archaic Period sites will be underrepresented because of soil deposition processes)?* Upland sites were mitigated by avoidance and were therefore not investigated. Bedrock milling stations, located in both the lowlands and uplands, were first used towards the very end of this period. Contrary to expectations, lowland Archaic period sites were recovered at great depths and in good to excellent condition. They occur with similar frequency as those of the Emergent period.

*Will Lower Emergent Period sites be predominantly task specific with low artifact diversity and fewer small, possibly seasonal campsites?* Many sites showed occupation during the Upper Archaic/Lower Emergent period transition (450/H, 458/H, 637, 696, 725, 726/H), although the evidence at each site was sparse. They appear to represent short-term, periodic use over a relatively long time span. No clear evidence of a residential base has been identified.

*Is there more intensive use of the Los Vaqueros area during the Upper Emergent Period?* The sites represent a wide range of site types, from extensive residential occupations to bedrock milling stations with very sparse deposits. CCO-458/H appears to have been a major
central habitation site with burials and a house floor, while bedrock milling stations appear more focused on food-processing activities. A wider variety of species, including fish, were utilized.

*For any given period, how does subsistence and settlement in the project area compare with the San Ramon Creek and Alamo Creek watersheds?* In the summary mitigation report, Meyer and Rosenthal (1997:V.10) conclude that the data recovered during the Los Vaqueros Project parallels the patterns observed in other nearby valleys including the Walnut Creek, San Ramon, and Livermore drainages. With the exception that the Lower Archaic deposits in the Los Vaqueros area are older than any evidence of occupation in the interior Diablo Range, they argue that the Middle and Upper Archaic assemblages are quite similar to other nearby watersheds. Sites are located in riparian habitats and often contain human burials and residential features. Mortars and pestles are found in Middle Archaic through Emergent-period deposits. Throughout the Archaic, small, medium, and large species of mammals were exploited, and tool stone from local sources (e.g., cherts) predominate. Obsidian occurs in low frequencies, and was obtained from both Eastern Sierra and North Coast Ranges sources. With the Emergent period, there is an increase in exchange items such as obsidian from the North Coast Ranges. There is an intensified use of floral resources and an increase in marine fish and shellfish. Changes in subsistence and settlement patterns are not linear and do not show an increase in sedentism and intensified land use over time. The picture is more variable and complex.

**INTERACTION AND EXCHANGE**

In central California, changes in prehistoric interaction and exchange are marked by variation in obsidian use. SSUAF sought to test the hypothesis for a shift to a regularized exchange system with the Lower Emergent period by looking for changes in the exploitation of obsidian in the archaeological record over time (Meyer and Rosenthal 1997:V.10).

*What is the temporal, geographic and source variability of obsidian in the Los Vaqueros area? Subsets of this question include the following: Is obsidian rare to absent in Archaic Period sites? If obsidian occurs in the Archaic Period, will it be limited to formal artifacts, broken artifacts, and flakes indicative of maintenance and repair? Given sufficient sample size, will the obsidian in Archaic Period sites have relatively high source variability?*

The earliest occupations yielded non-local obsidian, indicating that forays for collection and/or networks for exchange may have been far-reaching. The low frequency of flaking debris to tools indicates that obsidian was acquired in the form of finished tools throughout the Archaic period. Obsidian use increased with the Upper Archaic/Emergent transition, and by the Emergent period, obsidian was imported exclusively from the Napa Valley source, in the form of cobbles and minimally modified flake blanks (Meyer and Rosenthal 1997:V.11).
How does obsidian use in the project area compare with obsidian use in the San Ramon Creek and Alamo Creek watersheds? Is obsidian use in the Los Vaqueros Project area indicative of regularized exchange during the Emergent Period and ad hoc exchange during the Archaic Period, as observed elsewhere in Contra Costa County? Meyer and Rosenthal (1997:V.12) report that the patterns of exchange of obsidian generally agree with patterns observed in other nearby valleys. Increased frequencies of obsidian during the Emergent period is interpreted to represent the development and elaboration of a regional exchange system, which may have been associated with the acquisition of food items such as marine fish and shellfish.

What is the temporal, geographic and source variability of other exotic materials in the Los Vaqueros area? Other items of exchange include marine-shell beads and ornaments. The oldest evidence dates to 4770 B.P. at CCO-637 and a burial containing more than 1,000 Olivella shell beads. Frequency of shell beads peaked during the Upper Archaic. By the Upper Emergent period, Los Vaqueros appears to have participated in the clam-shell disk bead system of currency.

The lack of synchronicity between the changing frequencies of obsidian and marine-shell beads suggests that more than one exchange system was operating.

Ethnohistoric Archaeology

As discussed above, Ethnohistoric archaeology addresses the history of Native Americans from around the time of contact onwards. SSUAF developed a series of research questions organized under three major research topics for Ethnohistoric archaeology.

SETTLEMENT AND SUBSISTENCE IN THE MISSION AND POST-MISSION PERIODS

Did Native Americans use the mountainous portion of the project area as a refuge during the Mission Period? This question has not been successfully addressed by archaeological work conducted for the Los Vaqueros Reservoir studies because the focus of research has been on the lowland sites. Upland sites have not been dated. Oral testimonies and archival research reveal an oral tradition of moving to the foothills to escape periodic floods, and some speculate that foothills were also seen as a refuge from severe epidemics associated with the coming of the Whites (Lobo 1997:180). However, the foothills referred to by informants are located in the Ione area east of the central valley, rather than in the project area, on the west side of the central valley.

Praetzellis et al. (1997:14-15) point out that by 1805, all the inhabitants of the Los Vaqueros area had been moved to the missions (Milliken 1994:44), and the Los Vaqueros watershed
remained unoccupied until the 1840s when Francisco Alviso, Antonino Higuera and Manuel Miranda were granted the Los Vaqueros rancho as tenants-in-common.

Did Native Americans work on ranchos during the Mexican and early American periods? Archival research has suggested that Native Americans worked on ranchos. To date, the only Ranch Headquarters with the potential to verify this, CCO-450/H, remains to be systematically investigated.

Did Native Americans use traditional resources while working on the ranchos? This question has not yet been adequately addressed. The lower adobe, 470H, yielded details on the Basque inhabitants but no evidence of associated Native Americans (Ziesing 1997b). Neither interviews nor archival research have yielded any information on the rancheria complex at 450/H. Future archaeological work may be the only means by which information can be gathered on 19th-century Indian lifeways at Los Vaqueros (Davis et al. 1997:150).

TRIBELET GROUP BOUNDARIES AND RELATIONS

Were the boundaries between the Julpun to the north, the Volvon to the west, and the Ssaoam to the south fluid? Did tribelet boundaries change during the ethnohistoric period? This question has not been addressed by archaeological or other studies to date.

Can individuals who belonged to specific tribelets be identified as workers on ranchos in the project area? The identity of the rancheria residents at CCO-450/H may never be learned (Davis et al. 1997:150). Documentary evidence suggests the possibility that two part-Ssaoam men referred to only by first names, worked in the Livermore Valley area and may have worked for one of the landholders in the Los Vaqueros area (Milliken 1997d:143). This argument has not been substantiated with archaeological investigation.

Where did Native Americans go when they ceased working on the ranchos in the project area? This is another question that was not answered by archaeological mitigation work. Ethnographic research has yielded stories of relatives of present-day informants working their way from one job to another, from the Livermore and Pleasanton areas east towards Ione, where the informants now live (e.g., Lobo 1997). The 1860 U.S. Census shows only a few Native American individuals and families in the Livermore Valley area and none in the Los Vaqueros (Davis et al. 1997:149). The descendants of the Miwok with ties to the Los Vaqueros area now inhabit Ione in the Sierra foothills (Lobo 1997).

ACCCULTURATION

How did subsistence and settlement practices change during the ethnohistoric period? To what extent were traditional lifeways and cultural practices retained (or abandoned) during the ethnohistoric period? The volume ‘Native American History Studies for the Los
Historical Archaeology

Historical Archaeology addresses the archaeology from the time of contact through the recent past. SSUAF was able to address three major research topics with their archaeological investigations in the Los Vaqueros area (e.g., Ziesing 1996). They also made use of oral histories and archival research, as reported in *The Los Vaqueros Watershed: A Working History* (Praetzellis et al. 1997). The research topics and individual questions that guided the SSUAF research for mitigation of the 100 TAF Reservoir are presented first, followed by a summary of some of the results based primarily on archaeological work.

Ranching Adaptations Relative to Environmental Conditions

*How did area ranchers adapt to their changing economic and environmental milieu?* Subsets of this question include the following: What were the effects on ranching operations of the change from the hide-and-tallow trade to the new demand for beef cattle? How did the droughts of the 1860s, 1890s, and 1930s affect the local adaptations? How was this related to the greater water requirements of beef cattle? To what degree did subsistence agriculture increase during periods of economic decline for cattle ranchers? To what extent were patterns of land use, development, and tenure associated with family developmental cycles? What was the effect on the natural environment of the managed ecosystem created by the ranchers? How did the economic strategies of owners differ from tenants? Which of the two groups fared better?

Social Relations

*How were social relations managed within and between ranching units?* Subsets of this question include the following: What evidence exists for competition for resources in the study area? To what degree was this based on ethnicity versus other factors? How were physical and social boundaries given material form?

Application of the Modernization Model in the Los Vaqueros Uplands

*To what degree is the modernization model of social and cultural change relevant to the Los Vaqueros uplands?* Subsets of this question include the following: What evidence is there for continuity/change in Native American culture during the Mexican/American period? To
what degree was the opening up of trade in Alta California following the Gold Rush reflected on a household level? Is there evidence that elements of traditional culture operated simultaneously with modern Victorian values? Successful, urban Californios tended to embrace Americanization. Was this also true of less successful rural people? Did the decline of the fortunes of the Mexican rancheros influence the intensity of their participation in Victorian values? To what degree did Victorian values come to dominate in the Los Vaqueros uplands, and among what groups? How did rural patterns of ethnicity vary from urban patterns? How did this vary between households of differing economic, social, ethnic, and geographic characteristics?

Historic Period Research Results

Six phases of historic land use were identified as a result of extensive archival research conducted for the Los Vaqueros area (Ziesing 1996:204-205). These phases include:

- **1820-1862** Los Vaqueros land grant considered public; open range for cattle
- **1863-1871** Peres fences grant so that only landowners can graze cattle
- **1872-1881** gradual transition from grazing to dry-land farming
- **1882-1910** grant split into tenant holdings; wheat cultivation dominant
- **1911-1935** tenant holdings continue; wheat cultivation transitions to sheepraising
- **1935-1990** sharp decline in tenant farming; Crocker estate subdivides and sells to individual landowners

The archaeological evidence at Vasco Adobe, CCO-470H, is associated primarily with the first three phases of land use in the Vasco (Ziesing 1997b:203). Occupation continued into the fourth phase but toward the end of the period the Adobe was abandoned when a wood-frame farmhouse was constructed nearby. Although the Vasco Adobe was built in the middle of the 1850s by Basque cattle ranchers, archaeological evidence from the architecture, site patterning, and deposits of household refuse reflect use of the site in the late 1860s and early 1870s (Ziesing1997b:iii). Most of the other excavated historic-era sites, including 427H, 445H, and 447/H, fall within the fourth phase, Tenants/Dominant Wheat, 1881 to ca. 1910 (Ziesing 1996:205).

The main research issues addressed by SSUAF for historic period sites include ranching adaptations and the environment, modernization, and social relations involving tenancy and ethnicity. Ziesing tackled the first two issues with archaeological findings at 427H, 445H, 447/H, and 470H. Social relations are more fully explored using historical research and oral history (e.g., Hattersly-Drayton 1993; Praetzellis et al. 1995).
RANCHING ADAPTATIONS AND THE ENVIRONMENT

*Water management* is a fundamental adaptation to the semi-arid environment of the Vasco. The residential sites had hand-dug or bored wells. A few sites had windmills. Many sites show modifications of creek banks and ditches dug to provide water to livestock. The Vasco was never irrigated, which restricted tenants to dry-land mixed farming even when neighboring areas turned towards the more profitable use of land-intensive cultivation of specialty crops, once irrigation was made available (Ziesing 1996:207).

*Construction techniques* Common to all excavated sites was the extensive use of local materials, especially sandstone, in construction. The stone was minimally shaped, if at all, and was either dry-laid or held together by a mud-based mortar. The stonework incorporated both the foundations and flooring of structures in many cases. Stone-lined cellars were usually situated away from the house and used for cool storage. In one case the cellar was located directly beneath the house. Although not much remained of house structures in the 1990s, historic photographs and oral testimony show that they were constructed of wood rather than stone, as might be expected given the prevalence of this building material.

In the Vasco, the land was rarely owned by the family that farmed it. This may have had a large influence on the relative lack of investment in buildings, both houses and barns. Historical analysts of barns in the Vasco have little comparative material to draw from as barns in California have not been systematically studied. Ziesing makes some attempt at tracing the origins of the barn styles in the Vasco (e.g., New England vs. Midwest). There are no significant conclusions from this analysis of the two barns CCO-427H and CCO-445, except that they are generally larger than similar barns in other regions, and that they were most likely provided by the landowner and for this reason may not have reflected any of the ethnicity-specific construction styles of the tenants.

The Vasco Adobe served as a bunkhouse for vaqueros with an industrial-sized kitchen. It also housed landowners and their families on occasion (Ziesing 1996:206). The design of the adobe appears to adapt the traditional Spanish adobe to the local environment. Local materials, such as sandstone and clay, were used in the construction. The kitchen was attached and there was an interior fireplace. The Vascos (*Bascos*) originated from Basque country in Spain. Basque cultural traditions and design differ from those of Spain, though they share some similarities. The Basques spent some time in Argentina on their way to California and were familiar with Spanish architectural style. The Spanish style adobe contrasts with the subsequent wood-frame structures in the Vasco.
MODERNIZATION

The material culture associated with the occupation of the Vasco Adobe during the 1860s and 1870s reflects participation in a mass market, cosmopolitan trade network. Ziesing notes a remarkable similarity in artifact types among contemporary sites, regardless of their economic, ethnic, geographic, or functional association (Ziesing 1997b:209). Ziesing proposes a mix of tradition and modernization, with the architecture, butchery techniques and meat preparation reflecting traditional Basque elements, while the ceramics, bottled condiments, canned foods, all reflected participation in the modern economy of California. Subsequent occupants (e.g., Peres) focused on modernizing the building, removing many of the more unique elements of the adobe, such as the bread oven and the open hearth in the kitchen.

The five sites excavated and reported in Ziesing (1996) were occupied from ca. 1880 to ca. 1930, a time of modernization. Modernization has been measured by Victorianization, or the adoption of Victorian values. Immigrant families arrived in the Vasco steeped in their own particular ethnic culture and values. Victorianism describes a set of cultural values, practices and aesthetics that came to predominate among the Euroamerican cultural and political establishment of the 19th-century America acting as a homogenizing force that smoothed over ethnic differences (Hardesty 1980). Identification of a trend toward Victorianism has been particularly successful in interpretations of early urban California (e.g., the archaeological studies conducted for replacement of the Cypress Structure in West Oakland).

Built Environment Building construction and site layout was remarkably similar from site to site, leading Ziesing to postulate that the land owners may have been largely responsible for providing and maintaining the built environment for their tenants (Ziesing 1996:212). Small differences between CCO-427H and CCO-445H, both 300-acre tenant farms, suggest that one tenant may have been more demanding of the landowner to provide more (e.g., a second barn, or a state-of-the-art windmill), a demand supported by a more productive tenancy, for example.

Refuse Disposal Patterns Residential yards were littered with extensive debris scatters regardless of the ethnic origin of the tenant families. Small filled pits suggest that refuse was sometimes placed in pits and burned, but the majority of trash appears to have been informally distributed about the residence (Ziesing 1996:214). Trash deposits were also found in streambeds or gullies. This pattern appears to be independent of ethnic preferences or traditions, and may have more to do with poor rural tenant farmer practicality or aesthetic.

Technological Innovation Over the course of the period of tenant occupation and farming, ca. 1880 to ca. 1930 on the Vasco, tenant farmers continued to use horse-drawn machinery and to farm wheat, even when other California farmers were making the transition to mechanized
equipment, agribusiness, and specialty-crop cultivation (Ziesing 1996:215-216). The majority of land on the Vasco was hilly, and the tractors could not perform as well as horses. Irrigation districts did not reach into the Kellogg Creek watershed and as a result specialty-crop cultivation was not practicable. For these reasons tenant farmers remained conservative and did not take advantage of technological innovations, for the most part.

**Mass Consumption** The Vasco tenants on a whole were relatively poor and prided themselves at being self-sufficient (Ziesing 1996:220). Deposits from different sub-periods within the period of ca. 1880 to ca. 1930 show an increase in presence, and variation, in decorated ceramics through time. This is interpreted as an increase in participation in the world market. In order to better gauge the extent to which residents of the Vasco kept up with fashions in material culture, future excavations of contemporary rural and urban sites are needed for comparison. At the very least, the presence and gradual increase of more fashionable ceramics, and increase in food cans, suggest the increased influence and "the pervasiveness of a poverty-defying mass market in household goods" over time (Ziesing 1996:221).

**Social Relations: Tenancy and Ethnicity**

Early occupation of the Vasco is represented by the Vasco Adobe, originally built and occupied by a family of Basque origins. The material culture they left behind conveys adaptation and incorporation of elements from different ethnicities. The adobe building was styled after Spanish adobes, but with unique elements, such as an interior kitchen and fireplace, that may have been related to Basque building traditions (Ziesing 1997b:208). Ceramic tablewares were English and typically found in most Anglo-American middle class households of the time. Ziesing proposes that imported foodstuffs, such as olive oil, wine, and spices reflect Basque preferences, as do the butchery patterns and practices, although she does not provide evidence to support her claims. A preference for olive oil and wine was not unique to Basques, but rather included most Mediterranean cultures at the time.

During the years in which the historic-era sites were occupied, ca. 1880 to ca. 1930, there were two distinct land-use periods as defined by Praetzellis et al. (1995). Recent European immigrants lived in small family groups and farmed or ranched as tenants. Even though at least four different ethnic groups were present, including Portuguese, French, Italian and Irish, there was an overall shared conservatism in most aspects of farm and family life, including consumption patterns, building construction, technological innovation, and refuse disposal (Ziesing 1996:221). These recent immigrants did not succumb to the Victorianism prevalent in other contexts at the time, and yet they followed a seemingly common and conservative way of doing things. For example, they used horse-drawn machinery, used wells and windmills for water, disposed of garbage in their front yards or in nearby creeks, and used plain or mismatched kitchen and dining wares. Farm or ranch complexes were laid out in very similar plans with similar architecture and construction materials and techniques.
Ziesing suggests that the relative homogeneity of the architecture and physical layout of the ranch complexes was due to the fact that land owners, of which there were very few, were responsible for providing and maintaining these structural aspects of ranch life, while tenants probably felt little desire to invest their own resources and energy in something that they did not own, as tenancy was considered to be a temporary condition. Most tenants expected to be able to buy their own land eventually, and those that did not eventually moved into town.

Despite the relative homogeneity of the material culture and archaeological evidence, oral testimonies reveal that the tenant residents of the Vasco maintained social networks largely defined by ethnic ties (Hattersly-Drayton 1993; Ziesing 1996).

5.2 Modified Research Questions

The research questions developed for the 100 TAF Los Vaqueros Reservoir (SSUAF 1992) are sufficient for updating the cultural resources identification, assessment of integrity, and evaluations, in the study area for the 275 TAF reservoir expansion. This set of research questions will be revised in the Cultural Resources Management Plan (CRMP) that will be modified once the PA has been updated, and prior to the development and implementation of any HPTPs. Some suggestions for future research are presented here.

Suggestions for Future Prehistoric-Period Research

Future prehistoric-period research questions should focus on two main goals: compiling and improving what is known about the lowland occupations of the Kellogg Creek Watershed, and learning more about the upland occupations, and how they complement lowland occupations through time. The 275 TAF reservoir expansion will have a cumulative adverse effect on the Kellogg Creek Historic District when combined with the previous effects of the 100 TAF reservoir. The prehistoric research that resulted from the 100 TAF mitigation has never been compiled in a scholarly study or in a document prepared for the public. These results should be combined with results from any mitigation resulting from the 275 TAF reservoir and combined in a scholarly study of the Historic District, as well as in a document accessible to members of the interested public.

To this end, future HPTPs that address known or potential prehistoric archaeological sites should revise the prehistoric research design to reflect findings to date. Work should focus on sites in upland contexts. All of these are milling stations. Did prehistoric exploitation of the uplands predate the bedrock milling stations? How does the variability in size and location reveal the nature of the bedrock milling sites? Were they simply resource-procurement and short-term processing sites or were some associated with a fuller range of activities? Findings should be integrated with the results of the intensive lowland studies and synthesized to present a more complete story of the prehistoric occupation of the Los Vaqueros area.
Suggestions for Future Historic-Period Research

As mentioned above for prehistoric research questions, the 275 TAF reservoir will have a cumulative adverse effect on the Historic District unless it is mitigated. A great deal of historic era research was conducted as part of the mitigation for the 100 TAF reservoir. This should be complemented by two main avenues of research including an investigation into the known location of the earliest documented historic-era residence, and a comprehensive analysis of water management within the Historic District.

Historical research in the Vasco focused on five sites that represent the Tenant/Dominant Wheat land-use phase at Los Vaqueros (Praetzellis et al. 1995). Ziesing concludes that her results are preliminary and require further support from additional excavations at sites with occupants of known ethnicity. She suggests that the work at the Suñol Adobe, CCO-450/H, should provide information from an earlier time period that can be the basis of a diachronic comparative study (Ziesing 1996:223).

The Suñol Adobe represents an "ingenious and sensitive adaptation of experience and tradition to a new environment and economy" (Ziesing 1997b:211). Excavation of the Suñol Adobe at CCO-450/H would provide a comparative study to test whether this mix of tradition and innovation was common to early Vasco inhabitants. Ziesing (1997b:214) suggests that a comparative study might be able to address:

- The role of women on Los Vaqueros ranches in the 1850s and 1860s;
- The impact of the climatic disasters of the early 1860s on the lifestyle of the Vasco inhabitants;
- Evaluation of the structural uniqueness of the Vasco adobe compared to the Suñol adobe; the changing relationship between the Bascos and the Suñols by looking at whether or not they shared building technology;
- The role of Native American labor in the 1850s Vasco (since the village site is there);
- Early ranch diet, butchering techniques, and consumer goods for comparison with Vasco Adobe. The study would be more effective when compared with contemporary collections outside the Los Vaqueros area, and when compared with Basque food habits.

Water management is a crucial feature of the history of land use and occupation of the Historic District. Tenant ranchers functioned in the semi-arid environment with no irrigation; by contrast, there were major modifications for water management, such as irrigation, in adjacent delta area, resulting in a very different history of land use. The various water management features that have been identified in the Los Vaqueros area through archaeological research should be presented in a comprehensive study that details the range
of variation in construction methods and materials, locations, and functions of these features and how they relate to the success of the tenant farmers throughout their occupation of the Vasco.

6.0 Impacts and Mitigation

6.1 Impact Evaluation Criteria

Assessment of potential impacts on historic properties from a Los Vaqueros Reservoir expansion requires determining how the undertaking could affect those attributes of cultural resources that make them NRHP eligible. Only properties within the APE must be considered. Most of the properties that have been determined eligible within the APE are contained within a National Register Historic District, and as such are interrelated insofar as eligibility is concerned.

The National Register of Historic Places (NRHP), created under the NHPA, is the federal list of cultural resources worthy of preservation. An historic property is a cultural resource that has been listed in or is determined eligible for listing in the NRHP. Resources listed in the NRHP include districts, sites, buildings, structures, and objects that are significant in American history, prehistory, architecture, archaeology, engineering, and culture. The NRHP is maintained and expanded by the National Park Service on behalf of the Secretary of the Interior. The Office of Historic Preservation in Sacramento, California, administers the local NRHP program under the direction of the State Historic Preservation Officer (SHPO). To guide the selection of properties included in the NRHP, the National Park Service has developed the NRHP Criteria for Evaluation. The criteria are standards by which every property that is nominated to the NRHP is judged. The quality of significance in American history, architecture, archaeology, and culture is possible in districts, sites, buildings, structures, and objects that possess integrity of location, design, setting, material, workmanship, feeling, and association, and meet one of the following criteria:

Criterion A: a property is associated with events that have made significant contributions to the broad patterns of the history of the United States; or

Criterion B: a property is associated with the lives of people significant in United States history; or

Criterion C: a property embodies the distinctive characteristics of a type, period, or method of construction; represents the work of a master; possesses high artistic value; or represents a significant and distinguishable entity whose components may lack individual distinction; or
Criterion D: a property has yielded, or may be likely to yield, information important in prehistory or history (36 CFR Part 60.4).

The CEQA defines significant historical resources as "resources listed or eligible for listing in the California Register of Historical Resources (CRHR)" (Public Resources Code Section 5024.1). A resource may be considered historically significant if it meets the following criteria for listing on the CRHR:

A. It is associated with events that have made a significant contribution to the broad patterns of California’s history and cultural heritage; or
B. It is associated with the lives of persons important to California’s past; or
C. It embodies the distinctive characteristics of a type, period, region, or method of construction, or represents the work of an important creative individual, or possesses high artistic values; or
D. It has yielded or is likely to yield information important in prehistory or history (Public Resources Code Section 5024.1).

In order to meet one or more of the four specific criteria listed above, a cultural resource must possess integrity to qualify for listing in either the CRHR or the NRHP. Integrity is generally evaluated with reference to qualities including location, design, materials, workmanship, setting, feeling, and association. A potentially eligible site must retain the integrity of the values that would make it significant. Typically, integrity is indicated by evidence of the preservation of the contextual association of artifacts, ecofacts, and features within the archaeological matrix (Criterion D) or the retention of the features that maintain contextual association with historical developments or personages that render them significant (Criteria A, B, or C). Evidence of the preservation of this context is typically determined by stratigraphic analysis and analysis of diagnostic artifacts and other temporal data (e.g., obsidian hydration, radiocarbon assay) to ascertain depositional integrity or by the level of preservation of historic and architectural features that associate a property with significant events, personages, or styles.

Integrity refers both to the authenticity of a property’s historic identity, as shown by the survival of physical characteristics that existed during its historic period and to the ability of the property to convey its significance. This is often not an all-or-nothing scenario (determinations can be subjective); however, the final judgment must be based on the relationship between a property’s features and its significance.

In cases such as the Los Vaqueros Reservoir Expansion Project where both the CRHR and NRHP evaluation criteria apply, federal standards prevail. Historic properties assessed as
NRHP-eligible are also considered "important", and procedures for managing these properties under 36 CFR 800 satisfy the State CEQA Guidelines as well.

Once a project has been defined and recognized as a federal undertaking, an Evaluation and Request for Determination of Eligibility and Effect will be submitted by the Reclamation archaeologist to the SHPO, and one of three possible Findings of Effect can be made: No Effect, No Adverse Effect, or Adverse Effect. Advisory Council regulations (36 CFR 800.9) define an undertaking as having an effect on a historic property when the undertaking may alter the characteristics of the property that qualify the property for inclusion in the NRHP, including alteration of the property’s location, setting, or use.

An undertaking may have an adverse effect when the effect on an historic property may diminish the integrity of the property’s location, design, setting, materials, workmanship, feeling, or association. Adverse effects on historic properties include, but are not limited to:

- Physical destruction or alteration of all or part of the property;
- Isolation of the property from or alteration of the property’s setting when that character contributes to the property’s qualification for the NRHP;
- Introduction of visual, audible, or atmospheric elements that are out of character with the property or alter its setting;
- Neglect of a property resulting in its deterioration or destruction; and
- Transfer, lease, or sale of the property.

Section 15064.5 of the CEQA Guidelines indicate a project may have a significant environmental effect if it causes "substantial adverse change" in the significance of an "historical resource" or a "unique archaeological resource" as defined or referenced in CEQA Guidelines Section 15064.5[b, c] (revised October 26, 1998). Such changes include "physical demolition, destruction, relocation, or alteration of the resource or its immediate surroundings such that the significance of an historical resource would be materially impaired" (CEQA Guidelines 1998 Section 15064.5 [b]).

6.2 Site Evaluation

Forty-four cultural resources and one sensitive location are located within the APE. Of these, 41 are listed or eligible for listing on the NRHP and are referred to as historic properties. For each of the historic properties, all site records are presented with summaries of any previous evaluations in Appendix A (bound separately). Updates to these evaluations are suggested based on recent site visits; however there was no archaeological testing in the assessment phase of this
project. These evaluations are summarized in Table 5. Those resources that have not been evaluated will be treated as potentially eligible for listing on the NRHP for the purposes of this report.

**Table 5. Summary of Evaluations of Cultural Resources in the APE**

<table>
<thead>
<tr>
<th>Resource</th>
<th>Integrity/Previous Mitigation</th>
<th>Last Assessed</th>
<th>1992 NRHP Status</th>
<th>Update</th>
</tr>
</thead>
<tbody>
<tr>
<td>CA-CCO-9 Milling Station</td>
<td>Excellent/ Avoided; long term monitoring</td>
<td>June 2007</td>
<td>Eligible</td>
<td>Eligible</td>
</tr>
<tr>
<td>CA-CCO-310 Rock Shelter</td>
<td>Excellent/ Level 1 Data Recovery (Stewart 1995)</td>
<td>April 1996</td>
<td>Eligible</td>
<td>Eligible</td>
</tr>
<tr>
<td>CA-CCO-397 Open Site</td>
<td>Good/ No mitigation</td>
<td>November 2007</td>
<td>Eligible</td>
<td>Eligible</td>
</tr>
<tr>
<td>CA-CCO-417 Rock Shelter</td>
<td>Excellent/ Avoided</td>
<td>October 1995</td>
<td>Eligible</td>
<td>Eligible</td>
</tr>
<tr>
<td>CA-CCO-427H Ranch Headquarters</td>
<td>Excellent/ Level 2 Data Recovery; Partial Inundation</td>
<td>June 2007</td>
<td>Eligible</td>
<td>Eligible</td>
</tr>
<tr>
<td>CA-CCO-445H Ranch Headquarters</td>
<td>Excellent/ Level 1 and 2 Data Recovery; Inundation</td>
<td>No access: inundated</td>
<td>Eligible</td>
<td>Eligible</td>
</tr>
<tr>
<td>CA-CCO-446H Ranch Headquarters</td>
<td>Good/ Avoided; Screened</td>
<td>November 2007</td>
<td>Eligible</td>
<td>Eligible</td>
</tr>
<tr>
<td>CA-CCO-447/H Livestock Feature; Open Site with burials</td>
<td>Historic: Good Prehistoric: Excellent/ Historic: Level 1 Data Recovery; Prehistoric: Level 1 Data Recovery;</td>
<td>November 2007</td>
<td>Eligible</td>
<td>Eligible</td>
</tr>
<tr>
<td>CA-CCO-448H Ranch Headquarters</td>
<td>Lacking/ 1997 Investigations reveal presence of excavated features (Praetzellis 1997). Avoidance is recommended.</td>
<td>March 1997</td>
<td>Ineligible</td>
<td>Treat as Eligible</td>
</tr>
<tr>
<td>CA-CCO-450/H Ranch Headquarters; Open Site</td>
<td>Historic: Good to Excellent Prehistoric: Fair/ Stone Fence recorded; Historic Architectural Survey Report (2000); Partial screening of cabin; Barrier placement</td>
<td>June 2007</td>
<td>Eligible; buildings, structures not eligible)</td>
<td>Eligible; Buildings, structures not eligible)</td>
</tr>
<tr>
<td>Resource</td>
<td>Integrity/Previous Mitigation</td>
<td>Last Assessed</td>
<td>1992 NRHP Status</td>
<td>Update</td>
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<td>--------------------------------------------</td>
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</tr>
<tr>
<td>CA-CCO-452 Milling Station</td>
<td>Excellent/Avoided</td>
<td>June 2007</td>
<td>Eligible</td>
<td>Eligible</td>
</tr>
<tr>
<td>CA-CCO-454H Ranch Headquarters</td>
<td>Good to Excellent/Level 1 Data Recovery conducted (Stewart (1995))</td>
<td>April 1996</td>
<td>Eligible</td>
<td>Eligible</td>
</tr>
<tr>
<td>CA-CCO-455 Rock Shelter</td>
<td>Excellent/Avoided</td>
<td>April 1996</td>
<td>Eligible</td>
<td>Eligible</td>
</tr>
<tr>
<td>CA-CCO-456 Rock Shelter</td>
<td>Excellent/Avoided</td>
<td>April 1996</td>
<td>Eligible</td>
<td>Eligible</td>
</tr>
<tr>
<td>CA-CCO-458/H Open Site with burials</td>
<td>Excellent/Level 2 Data Recovery; Inundation</td>
<td>No access: inundated</td>
<td>Eligible</td>
<td>Eligible</td>
</tr>
<tr>
<td>CA-CCO-459 Milling Station with human remains</td>
<td>Good to Excellent/Level 2 Data Recovery; Partial inundation</td>
<td>April 2004, June 2007 Partial exposure and erosion due to fluctuating water level; additional bedrock mortars observed</td>
<td>Eligible</td>
<td>Eligible</td>
</tr>
<tr>
<td>CA-CCO-462 Milling Station</td>
<td>Excellent/Avoided</td>
<td>June 2007</td>
<td>Eligible</td>
<td>Eligible</td>
</tr>
<tr>
<td>CA-CCO-463 Open Site with Milling Station</td>
<td>Excellent/Avoided</td>
<td>June 2007</td>
<td>Eligible</td>
<td>Eligible</td>
</tr>
<tr>
<td>CA-CCO-464 Milling Station</td>
<td>Excellent/Avoided</td>
<td>June 2007</td>
<td>Eligible</td>
<td>Eligible</td>
</tr>
<tr>
<td>CA-CCO-467/H Water Management Artifact Scatter; Milling Station</td>
<td>Historic: Fair to Good; Prehistoric: Excellent/Avoided</td>
<td>April 2004</td>
<td>No obvious disturbance</td>
<td>Eligible</td>
</tr>
<tr>
<td>CA-CCO-468 Milling Station and Open Site</td>
<td>Fair to Good/Level 1 Test; Partial Inundation</td>
<td>June 2007 No obvious new disturbance; broken mortar scattered on surface</td>
<td>Eligible</td>
<td>Eligible</td>
</tr>
<tr>
<td>CA-CCO-469 Milling Station</td>
<td>Fair to Good/Level 1 Test; Inundation</td>
<td>No access: inundated</td>
<td>Eligible</td>
<td>Eligible</td>
</tr>
<tr>
<td>CA-CCO-470H Ranch Complex</td>
<td>Excellent/Level 2 Data Recovery; Inundation</td>
<td>No access; inundated</td>
<td>Eligible</td>
<td>Eligible</td>
</tr>
<tr>
<td>CA-CCO-535H Ranch Headquarters</td>
<td>Excellent (subsurface)/Care taken to maintain subsurface integrity</td>
<td>November 2007 No obvious new disturbance</td>
<td>Eligible</td>
<td>Eligible</td>
</tr>
<tr>
<td>CA-CCO-596H Ranch Headquarters</td>
<td>Fair to good</td>
<td>April 2008 Not in 1992 APE</td>
<td>Treat as eligible</td>
<td>1992 APE</td>
</tr>
</tbody>
</table>
### Table 5. Summary of Evaluations of Cultural Resources in the APE (continued)

<table>
<thead>
<tr>
<th>Resource</th>
<th>Integrity/Previous Mitigation</th>
<th>Last Assessed</th>
<th>1992 NRHP Status</th>
<th>Update</th>
</tr>
</thead>
<tbody>
<tr>
<td>CA-CCO-597 Petroglyph Boulder</td>
<td>Poor to fair/ Graffiti noted heavy machinery damage</td>
<td>April 2008</td>
<td>Not in 1992 APE</td>
<td>Treat as eligible</td>
</tr>
<tr>
<td>CA-CCO-621/H Ranch Headquarters; Lithic Scatter</td>
<td>Poor/ Phased Data Recovery</td>
<td>April 2008; one of two palm trees has been removed</td>
<td>Not in 1992 APE</td>
<td>Ineligible</td>
</tr>
<tr>
<td>CA-CCO-636 Milling Station</td>
<td>Good/ Level 1 Test; Inundation</td>
<td>No access: inundated</td>
<td>Eligible</td>
<td>Eligible</td>
</tr>
<tr>
<td>CA-CCO-637 Open Site with burials</td>
<td>Excellent (subsurface)/ Level 2 Data Recovery; Covered by Dam</td>
<td>No access; under dam</td>
<td>Eligible</td>
<td>Eligible</td>
</tr>
<tr>
<td>CA-CCO-650H Historic Artifact Scatter</td>
<td>Poor/ Phase 1 Shovel Probe</td>
<td>April 2008; Could not relocate</td>
<td>Not in 1992 APE</td>
<td>Ineligible</td>
</tr>
<tr>
<td>CA-CCO-696 Open Site with burials</td>
<td>Excellent/ Level 2 Data Recovery; Inundation</td>
<td>No access; under dam, inundated</td>
<td>Treated as eligible when discovered</td>
<td>Treat as eligible</td>
</tr>
<tr>
<td>CA-CCO-725 Hearth Feature</td>
<td>Good/ Level 2 Data Recovery; Paved over</td>
<td>No access; paved under road</td>
<td>Treated as eligible when discovered</td>
<td>Treat as eligible</td>
</tr>
<tr>
<td>CA-CCO-726/H Historic Artifact Scatter; Hearth Feature</td>
<td>Good to Excellent/ Construction monitoring</td>
<td>November 2007 No obvious new disturbance</td>
<td>Treated as eligible when discovered</td>
<td>Treat as eligible</td>
</tr>
<tr>
<td>CA-CCO-755 Buried Open Site</td>
<td>Poor/Construction monitoring</td>
<td>April 2008; could not relocate</td>
<td>Not in 1992 APE</td>
<td>Treat as eligible</td>
</tr>
<tr>
<td>P-07-000532 Reburial Site (Sensitive Site)</td>
<td>Excellent/ No previous mitigation; Inundation</td>
<td>No access: inundated</td>
<td>Not part of 1992 study</td>
<td>Treat as eligible</td>
</tr>
<tr>
<td>P-07-000791 Water Management Feature</td>
<td>Good/ covered by silt</td>
<td>April 2004; could not relocate</td>
<td>Treated as eligible when discovered</td>
<td>Treat as eligible</td>
</tr>
<tr>
<td>Kellogg Creek Dam Water Management Feature</td>
<td>Fair/ function of structure destroyed; no known mitigation</td>
<td>June, November 2007 Parts of original dam dismantled, some removed</td>
<td>Not discovered in 1992 study</td>
<td>Treat as eligible</td>
</tr>
<tr>
<td>Kellogg Creek Irrigation Ditch Water Management Feature</td>
<td>Good/ no known mitigation</td>
<td>First recorded Nov 2007</td>
<td>Not discovered in 1992 study</td>
<td>Treat as eligible</td>
</tr>
</tbody>
</table>
Table 5. Summary of Evaluations of Cultural Resources in the APE (continued)

<table>
<thead>
<tr>
<th>Resource</th>
<th>Integrity/Previous Mitigation</th>
<th>Last Assessed</th>
<th>1992 NRHP Status</th>
<th>Update</th>
</tr>
</thead>
<tbody>
<tr>
<td>Irrigation Ditch 1 Water Management Feature</td>
<td>Good/ avoided by original installation of Delta-Transfer pipeline 1998</td>
<td>First recorded Nov 2007</td>
<td>Not discovered in 1992 study</td>
<td>Treat as eligible</td>
</tr>
<tr>
<td>Irrigation Ditch 2 Water Management Feature</td>
<td>Good/ avoided by original installation of Delta-Transfer pipeline 1998</td>
<td>First recorded Nov 2007</td>
<td>Not discovered in 1992 study</td>
<td>Treat as eligible</td>
</tr>
<tr>
<td>Irrigation Ditch 3 Water Management Feature</td>
<td>Good/ avoided by original installation of Delta-Transfer pipeline 1998</td>
<td>First recorded Nov 2007</td>
<td>Not discovered in 1992 study</td>
<td>Treat as eligible</td>
</tr>
<tr>
<td>Byron-Bethany Irrigation Canal Water Management Feature</td>
<td>Good/ avoided by original installation of Delta-Transfer pipeline 1998</td>
<td>First recorded Nov 2007</td>
<td>Not discovered in 1992 study</td>
<td>Treat as eligible</td>
</tr>
<tr>
<td>Concrete Culvert Water Management Feature</td>
<td>Excellent/ avoided by original installation of Delta-Transfer pipeline 1998</td>
<td>First recorded Nov 2007</td>
<td>Not discovered in 1992 study</td>
<td>Treat as eligible</td>
</tr>
<tr>
<td>SPRR Grade Linear Feature</td>
<td>Good/ avoided by original installation of Delta-Transfer pipeline 1998</td>
<td>First recorded Nov 2007</td>
<td>Not discovered in 1992 study</td>
<td>Treat as eligible</td>
</tr>
<tr>
<td>Transmission Line Linear Feature</td>
<td>Good/ avoided by original installation of Delta-Transfer pipeline 1998</td>
<td>First recorded Nov 2007</td>
<td>Not discovered in 1992 study</td>
<td>Treat as eligible</td>
</tr>
</tbody>
</table>

6.3 Potential Project Impacts

The following analysis considers only the potential impacts on the 41 historic properties (NEPA) and the Reburial Site within the APE (all of the resources listed in Table 5 except for CA-CCO-448H, CA-CCO-621/H, and CA-CCO-650H). These can all be considered historical resources as well, as they are all also listed, or eligible for listing on the CRHR (CEQA). There are no unique archaeological resources (CEQA). There is no further need to consider the effects of the project on those resources that not eligible for listing on the NRHP (NEPA) or the CRHR (CEQA).

The construction and management of project components could impact historic properties either directly or indirectly. Direct impacts may occur when impacts on historic properties cannot be avoided through project redesign or other methods. Demolition or inundation of historic buildings and excavating an archaeological site are examples of direct impacts.
Historic properties could also be affected indirectly as a result of increased access to the project area that leads to vandalism and unauthorized excavation and collection. Potential project impacts are presented by project component and the historic properties that would be impacted.

**Los Vaqueros Reservoir Expansion**

Eighteen known historic properties and the Reburial site (a sensitive site) would be affected by expansion of the Los Vaqueros Reservoir to 275 TAF. The potential impacts on each of these resources are summarized in Table 6. The construction schedule includes drawdown of the existing 100 TAF reservoir, a two-year period in which it would be empty (during dam construction), and inundation to the 275 TAF level. After the reservoir has been filled, the reservoir would be subject to periodic water level fluctuations. The impacts associated with this construction schedule include the following:

- During construction period drawdown, exposure of currently inundated sites to increased erosion and access could lead to vandalism and illegal collecting.
- During periods when the water levels are highest, some sites could be inundated. Inundation is typically considered by SHPO to be an adverse effect.
- As a result of periodic water level fluctuations during normal operation of the reservoir, sites within the fluctuation zone would be exposed to increased erosion.
- During operation of the reservoir, increased access to sites in both the fluctuation zone and just beyond the water’s edge could lead to an increased potential for vandalism and illegal collecting.

The drawdown for construction would expose ten currently partially or fully inundated sites (CA-CCO-427H, 445/H, 450/H, 458/H, 459, 469, 470H, 636, 696, and the reburial site) to erosion and the effects of increased access, which could include vandalism and illegal collecting. Inundation of the expanded reservoir to the new 275 TAF level would subject nine sites (CA-CCO-9, 452, 462, 463, 464, 467/H, 468, 725, and P-07-000791) to inundation for the first time and re-submerge or more fully submerge those ten sites that are currently inundated (CA-CCO-427H, 445/H, 450/H, 458/H, 459, 469, 470H, 636, 696, and the reburial site P-07-000532). The buildings at CCO-450/H would be demolished prior to inundation.

Twelve of the known historic properties listed in Table 6 would be within the area exposed by periodic lowering of the reservoir level due to seasonal variation in the availability of water (CA-CCO-9, 427H, 450/H, 452, 459, 462, 463, 464, 467/H, 468, and 725, P-07-000791). The 275 TAF Reservoir could periodically be drawn down as low as the level of the high water level of the original 100 TAF reservoir pool. During drawdown, the area between the 100 TAF and the 275 TAF high water marks would be subjected to increased erosion and increased access, which could lead to vandalism and illegal collecting of historic properties.
Table 6. Potential Impacts to Historic Properties from the Reservoir Expansion

<table>
<thead>
<tr>
<th>Site Number Property Type</th>
<th>Construction</th>
<th>Operation and Maintenance</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Drawdown</td>
<td>Inundation</td>
</tr>
<tr>
<td>CA-CCO-9 Milling Station</td>
<td></td>
<td>x</td>
</tr>
<tr>
<td>CA-CCO-427H Ranch Headquarters</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>CA-CCO-445H Ranch Headquarters</td>
<td></td>
<td>x</td>
</tr>
<tr>
<td>CA-CCO-450/H Ranch Headquarters Occupation Site</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>CA-CCO-452 Milling Station</td>
<td></td>
<td>x</td>
</tr>
<tr>
<td>CA-CCO-458/H Occupation Site</td>
<td></td>
<td>x</td>
</tr>
<tr>
<td>CA-CCO-459 Milling Station; Burial</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>CA-CCO-462 Milling Station</td>
<td></td>
<td>x</td>
</tr>
<tr>
<td>CA-CCO-463 Occupation Site</td>
<td></td>
<td>x</td>
</tr>
<tr>
<td>CA-CCO-464 Milling Station</td>
<td></td>
<td>x</td>
</tr>
<tr>
<td>CA-CCO-467/H Milling Station; Tenant Ranch</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>CA-CCO-468 Milling Station; Occupation Site</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>CA-CCO-469 Milling Station</td>
<td></td>
<td>x</td>
</tr>
<tr>
<td>CA-CCO-470H Ranch Headquarters</td>
<td></td>
<td>x</td>
</tr>
<tr>
<td>CA-CCO-636 Occupation Site</td>
<td></td>
<td>x</td>
</tr>
<tr>
<td>CA-CCO-696 Buried Site</td>
<td></td>
<td>x</td>
</tr>
<tr>
<td>CA-CCO-725* Rock Feature</td>
<td></td>
<td>x</td>
</tr>
<tr>
<td>P-07-000532 Reburial Site</td>
<td></td>
<td>x</td>
</tr>
<tr>
<td>P-07-000791 &quot;Spring Box Site&quot; Water Management Feature</td>
<td>x</td>
<td>x</td>
</tr>
</tbody>
</table>

* The rock feature (CA-CCO-725) was removed and the area was paved over to construct Road 3A during installation of the 100 TAF reservoir. The feature itself no longer exists; however, there is a high potential for additional features and deposits historically associated with the feature in the immediate vicinity.
Mitigation Measures that would reduce the impacts on historic properties to a less-than-significant level are discussed in section 7.4.

Los Vaqueros Dam

Construction of a new dam could potentially impact three known historic properties within or close to the proposed footprint of the main structure (Table 7). Although these sites (CA-C CO-458/H, -637, and -696) have already been subject to mitigation, there is a high potential that previously undisturbed, significant archaeological deposits remain at each site and in the vicinity, which has been identified as an area of high potential for buried cultural deposits (Meyer and Rosenthal 1997). Expansion of the dam footprint upstream would require an extended period of drawdown and the mass excavation for a new foundation to a depth of more than 50 ft. The extended drawdown would expose any near-surface remains to erosion, vandalism, and illegal collecting. The mass excavation would remove and destroy any cultural deposits or human remains. The movement of heavy equipment and materials could crush, mix, and expose any intact deposits remaining at site CCO-458/H upstream of the existing dam structure, and -637 downstream of the existing dam structure, that are not directly removed by mass excavation.

### TABLE 7. Potential Impacts of the New Dam on Historic Properties

<table>
<thead>
<tr>
<th>Site Number</th>
<th>Property Type</th>
<th>Construction</th>
<th>Operation and Maintenance</th>
</tr>
</thead>
<tbody>
<tr>
<td>CA-C CO-696</td>
<td>Buried Site; Burials</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>CA-C CO-458/H</td>
<td>Occupation Site; Burials</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>CA-C CO-637</td>
<td>Buried Site; Burials</td>
<td>x</td>
<td>x</td>
</tr>
</tbody>
</table>

Borrow Area

The preferred borrow area for a dam construction material is located west of the existing dam. No known historic properties fall within the borrow area; however, heavy vehicle traffic between the borrow area and the dam could potentially impact two historic properties, CA-C CO-696 and -458/H. Heavy equipment access and transportation of borrow materials would affect the site by crushing, mixing, and exposing any sub-surface deposits.
Old River Intake and Pump Station

There are no historic properties within the proposed APE for this facility. As such, no adverse effects to recorded historic properties are expected.

Reservoir Inlet and Outlet Pipelines

The approximately 1,000-ft.-wide reservoir inlet and outlet pipelines study area contains four historic properties (CA-CCO-446H, -447/H, -726/H, and -755). The potential impacts on resources are summarized in Table 8. The alignment of the inlet and outlet pipelines has not yet been chosen within the 1,000-ft.-wide study corridor, and it could be possible to avoid excavation impacts on these resources through choice of alignment.

<table>
<thead>
<tr>
<th>Site Number Property Type</th>
<th>Pipeline Construction</th>
<th>Operation and Maintenance</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Excavation</td>
<td>Staging and Access</td>
</tr>
<tr>
<td>CA-CCO-446H Ranch Headquarters</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>CA-CCO-447/H Occupation; Livestock Shelter; Burials</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>CA-CCO-726/H Rock Feature; Historic Artifact Scatter</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>CA-CCO-755 Buried Open Site</td>
<td>x</td>
<td>x</td>
</tr>
</tbody>
</table>

The proposed recreational facilities include a new marina facility, interpretive center, fishing access, day-use facilities, user parking, and hiking trails. The only proposed recreational facility that has the potential to impact historic properties is the hiking trail/access road that would follow the western edge of the Expanded Los Vaqueros Reservoir.

Western Hiking Trail/Access Road

A combined new hiking trail and service road following the western perimeter of the expanded reservoir could affect a series of five historic properties (summarized in Table 9) that are at or within 200 ft. of the proposed maximum water line. Each of these historic properties could also be impacted by road building and maintenance as well as increased access resulting from the new trail and road.
### Table 9. Potential Impacts of the Western Hiking Trail/Access Road on Historic Properties

<table>
<thead>
<tr>
<th>Site Number Property Type</th>
<th>Road Construction</th>
<th>Road Operation and Maintenance</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Excavation</td>
<td>Staging and Access</td>
</tr>
<tr>
<td>CA-CCO-450/H Ranch Headquarters; Occupation Site</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>CA-CCO-462 Milling Station</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>CA-CCO-463 Occupation Site</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>CA-CCO-464 Milling Station</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>CA-CCO-467/H Milling Station; Tenant Ranch</td>
<td>x</td>
<td>x</td>
</tr>
</tbody>
</table>

#### Eastside Hiking Trail

A new hiking trail that would link existing service roads following the eastern perimeter of the expanded reservoir could affect two historic properties (summarized in Table 10) that are visible and accessible from the proposed trail. Each of these historic properties could also be impacted by increased access resulting from the new trail.

### Table 10. Potential Impacts of the Eastside Hiking Trail on Historic Properties

<table>
<thead>
<tr>
<th>Site Number Property Type</th>
<th>Road Construction</th>
<th>Road Operation and Maintenance</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Excavation</td>
<td>Staging and Access</td>
</tr>
<tr>
<td>CA-CCO-455 Rockshelter</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>CA-CCO-456 Rockshelter</td>
<td>x</td>
<td>x</td>
</tr>
</tbody>
</table>

#### Delta-Transfer Pipeline

The APE for the conveyance pipeline from the supply source at Old River to the Transfer Facility has been proposed as a 200-ft.-wide corridor centered on the existing pipeline. Pipeline installation taking place along this corridor will include a combination of open trenching and jack-and-bore technique. The jack and bore is used to avoid by going beneath existing features such as railroad grades, road crossings, and irrigation canal or flood control.
channels. The nine newly recorded historic properties include a railroad grade, transmission line, irrigation canals and associated flood-control facilities. There are low potential impacts to these historic properties.

Expanded Transfer Facility

There are no known historic properties within the proposed APE for expansion of the Transfer Facility; therefore, impacts to historic properties are expected to be low.

Transfer-LV Pipeline

The APE for the conveyance pipeline from the Transfer Facility to the Los Vaqueros Reservoir has been proposed as a 200-ft.-wide corridor centered on the existing pipeline. This corridor meets the 1,000-ft.-wide corridor study area of the reservoir inlet and outlet pipelines, considered separately below. There are two historic properties within the Transfer-LV Pipeline APE (CA-CCO-397 and -535H). These resources are highly visible and accessible within the 200-ft. corridor and will be vulnerable to every potential impact from the project, including trenching construction methods, use of the area for staging and travel during construction and access to the pipeline once it is installed.

Transfer-Bethany Pipeline

The APE for the conveyance pipeline from the Expanded Transfer Facility to the Bethany Reservoir has been proposed as a 300-ft.-wide corridor. Pipeline trenching, staging, and heavy equipment access along this corridor could potentially impact two historic properties, CA-CCO-596H and 597. There are no known historical resources along either of the conveyance options (tunnel, or trench and tunnel). There is a low potential for undiscovered resources.

New Transmission Lines and Substations

Impacts from the transmission line from the Old River Pump Station and the Delta Pump Station to the Expanded Transfer Facility have been analyzed under the Delta-Transfer Pipeline (see above) as the two facilities would be co-aligned. There are nine cultural resources that have been assumed to be eligible for listing on the NRHP and the CRHR for the purposes of this analysis. They are discussed below under Delta-Transfer Pipeline because these facilities would be located within the same alignment.

There are no historical resources within the APE for the remaining elements of the electrical power options, including transmission and distribution lines and substations, therefore, no significant impacts to recorded historical resources are expected.
6.4 Mitigation Measures

As details of the plans for the project components are refined, and their potential impacts on historic properties are more clearly understood, each historic property will be assessed to determine the appropriate method of mitigation. Site-specific mitigation measures will be spelled out in HPTPs that follow from the PA. The preferred approach to mitigation is site avoidance. If avoidance is not prudent or feasible or could not ensure the adequate protection of sensitive historic properties, then evaluation, testing, and data recovery, if appropriate, could be necessary. Involvement of appropriate Native American groups will be solicited during the mitigation decision-making process.

The mitigation measures presented below describe in general terms the types of mitigation appropriate for the Los Vaqueros Reservoir Expansion.

The proposed Mitigation Measures fall into five categories:

- Site avoidance;
- Site preservation and protection;
- Preconstruction testing in areas of high potential for buried resources and human remains;
- Construction monitoring in areas of moderate potential for buried resources and human remains;
- Site evaluation and data recovery;
- Un-surveyed lands
- Unanticipated discoveries
- Scholarly and non-technical syntheses of mitigation results from data recovery in order to offset the cumulative effects on the Historic District and individual historic properties

Although specific mitigation measures will be detailed in HPTPs stemming from the renegotiated PA, and these will occur once the project design has been finalized, it is possible that some mitigation measures can be undertaken prior to initiation of the construction phase of the project.

Mitigation Measure 1: Avoid Cultural Resource Sites

The preferred method of avoiding impacts is to relocate construction-related activities to avoid historic properties. Fencing and monitoring to ensure that sites are protected might also be necessary and these are discussed in Mitigation Measure 2. Adequate avoidance requires that the qualities that might make properties eligible for the NRHP be considered. For example, prehistoric or historic archaeological sites can be avoided by restricting ground-
disturbing activities in the vicinity of the site. In the process of project planning, project components have been designed to avoid, where possible, known historic properties. The historic properties that fall within pipeline APEs may be avoided by minor changes in the alignment in the immediate vicinity of each historic property. For example, if feasible from an engineering perspective, the final location of the trench to install the Transfer-Bethany pipeline could be adjusted within the 200-ft.-wide APE corridor to avoid damage to the petroglyph boulder, CA-CCO-597. As another example, the proposed Delta-Transfer Pipeline will parallel the existing Delta-Transfer Pipeline. Historic properties that could be avoided by judicial placement of the construction trenching, staging areas, and access roads within the APE corridor include CA-CCO-726/H, -446/H, -447/H, -397, and -535H. If the engineers are successful in placing the construction trenching, staging and access areas away from these resources, they must also be protected by Mitigation Measure 1b, with temporary fences set up during pipeline installation.

Once the locations of access points, staging areas, and other construction-related activities are determined, specific measures to protect sites in the vicinity of each activity will be established and implemented through HPTPs, prior to construction.

**Mitigation Measure 2: Prevent Access to Historic Properties**

To prevent construction-related adverse impacts to historic properties within the APE, fencing or other barriers will be placed around sites that could be impacted. A cultural resource construction monitoring plan will be prepared and implemented to ensure that monitoring and/or physical barriers adequately protect sites from incidental construction activities. As an example, the petroglyph boulder, CA-CCO-597 falls within the APE for the Transfer-Bethany Pipeline and will be fenced during construction allowing for a 20-ft buffer to ensure that heavy equipment traffic and staging- and storage-related activities do not cause inadvertent damage to the property.

**Mitigation Measure 3: Conduct Construction Crew Training**

All construction crews that work on the project should undergo a training session to inform them of the presence and nature of NRHP-eligible cultural resources and human remains within the project area; of the laws protecting these resources and associated penalties; and of the procedures to follow should they discover cultural resources during project-related work.

**Mitigation Measure 4: Preconstruction Testing and Data Recovery for NRHP-Eligible Properties**

The significant impacts posed by the original project were mitigated for many resources to what was then a less-than-significant level. The proposed project may pose additional
significant impacts to NRHP-eligible properties that would need to be mitigated to a less-than-significant level. Portions of sites that had not been previously exposed or studied may be damaged by new construction activities, and new sites may be discovered. Both CA-CCO-458/H and 696 are located just upstream of the 100 TAF dam and both yielded buried prehistoric cultural deposits and human remains and have a high potential to contain additional deposits and human remains that have not yet been disturbed (Meyer and Rosenthal 1997). The intensive geoarchaeological studies conducted in association with the 100 TAF Reservoir project concluded that there are areas of high potential to contain buried cultural deposits and human remains in the immediate vicinity of the dam (Meyer and Rosenthal 1997). Mass excavation for the new dam foundation will damage and remove any remaining deposits, including human remains. In this case, previous mitigation does not preclude the need for further mitigation with the initiation of a new project.

A Memorandum of Understanding (MOU) was developed between CCWD and interested Native Americans that outlined the process for the respectful treatment of Native American graves and human remains discovered during preconstruction and construction of the Los Vaqueros Project. This MOU should be reviewed and renewed for the current project. The updated MOU should outline the process for the respectful treatment of Native American graves and human remains when it is known ahead of time that construction has a high potential for damaging Native American graves and human remains. One approach that has been used in Contra Costa County is the controlled, monitored preconstruction excavation of the location suspected to have buried human remains that allows for the careful and respectful removal of Native American graves and human remains as they are uncovered (Price et al. 2005; 2006). A similar approach was used for the 100 TAF Reservoir construction (e.g., Meyer and Rosenthal 1997:III.52-53). This preconstruction controlled excavation is conducted at a much slower pace, with modified equipment (e.g., scraper with rubber tires rather than metal treads, or a backhoe with straight-edged rather than toothed bucket) and in smaller increments (e.g., 3-inch lifts) with both archaeologists and Native American monitors present. If human remains are observed, the mechanical excavation is halted in the area to allow archaeologists to carefully remove the remains and any associated grave goods in the presence of a Native American monitor. Once the maximum depth of cultural deposits has been reached, preconstruction excavation is complete, and the remaining mass excavation can proceed without the limitations imposed by the mitigation for cultural resources and human remains. The details of mitigation measures for specific sites and impacts will be worked out and presented in HPTPs once the Evaluation, PA and MOU are in place. A preliminary assessment of the sites that cannot be avoided and may be directly impacted by the project either by ground disturbance associated with construction and/or inundation, include CA-CCO-9, 450/H, 452, 462, 463, 464, 468, 637, 696, and 725. Sites that may be exposed during the drawdown and may require additional data recovery include CA-CCO-427H, 445H, 458/H, 459, 469, 470H, and 636. If sites within the pipeline corridors cannot be avoided and protected by temporary fencing (Mitigation Measures 1a and 1b) then
the adverse effects on these sites should be mitigated through testing and data recovery. These sites include CA-CCO-726/H, 446H, 447/H, 397, 597, and 535H.

**Mitigation Measure 5: Monitor Areas with Moderate and High Potential for Buried Resources and Human Burials during Ground-Disturbing Activities**

Where the undertaking must disturb areas with either high or moderate potential for buried cultural deposits and human remains, the minimal mitigation recommended is to have a qualified archaeologist present during any ground-disturbing activities. A Cultural Resources Construction Monitoring Plan (CRCMP) should be prepared outlining the areas along Kellogg Creek and water conveyance alignments that should be monitored during construction. If buried sites are found, they will need to be evaluated for eligibility to the NRHP, and appropriate treatment will need to be developed in accordance with the Section 106 consultation process as outlined in the PA and the CRCMP.

**Mitigation Measure 6: Design Project Facilities to be Unobtrusive**

Where preserved historic properties are within the proposed APE of an aboveground facility, the facility should be designed to be architecturally compatible with historic properties and should be designed to blend visually with the surrounding area. Where appropriate, landscaping should be used to screen facilities from historic properties and to avoid or reduce visual impacts. The design of such facilities and landscaping should be undertaken in consultation with the SHPO.

**Mitigation Measure 7: Review, Update, and Implement Existing Cultural Resources Management Plan for the Kellogg Creek Watershed**

Impacts on some sites from increased access and vandalism can be prevented by implementing the existing Cultural Resources Management Plan. The plan was developed for the original Los Vaqueros Project; it remains relevant for the current project, but should be reviewed and updated, with specific attention to the Research Questions. In some cases, preserving historic properties in place may be possible. To ensure the long-term protection of these sites, the plan provides guidelines to prevent impacts on historic properties, such as restrictions for use in areas of sensitivity, and a long-term monitoring program to ensure that NRHP-eligible properties are protected in the future.

**Mitigation Measure 8: Conduct Surveys for Unsurveyed Portions of the Project Area**

Any new land bought as compensatory mitigation for replacement of listed species habitat lost due to project expansion under the Endangered Species Act and any other compensatory mitigation required by USEPA and USFWS under the Fish and Wildlife Coordination Act
must be surveyed. Any cultural resources discovered as a result of this survey must be inventoried and evaluated for eligibility for listing in the NRHP and for any project effects. Any modifications to the project, such as pipeline reroutes, no matter how minor, must also be surveyed, and any discovered cultural resources inventoried and evaluated for eligibility for listing in the NRHP in accordance with the Section 106 compliance process.

**Mitigation Measure 9: Prepare an Inadvertent Discovery Plan**

A plan should be prepared to deal with unanticipated discovery of cultural resources and human remains. An Inadvertent Discovery Plan shall be prepared to detail the procedure to follow when cultural resources are discovered during construction. Inadvertent Discovery Plans describe the laws, procedures and contact information needed for handling situations when a project inadvertently discovers archaeological resources.

**Mitigation Measure 10: Prepare a Comprehensive Prehistory of Kellogg Creek Historic District**

Results from the recordation, testing, and data recovery of the prehistoric-era resources shall be synthesized into a comprehensive scholarly study of the prehistory of the Kellogg Creek Historic District guided by the research questions presented within the Cultural Resources Technical Report with particular attention paid to the change in use through time of the lower elevations of the Kellogg Creek Watershed and resources therein within the context of the greater watershed.

**Mitigation Measure 11: Prepare a Public-Access Prehistory of Kellogg Creek Historic District**

Results from the recordation, testing, and data recovery of the prehistoric-era resources within the Kellogg Creek Historic District shall be synthesized into a document that can be easily accessed and understood by members of the public including children of grade-school age.

**Mitigation Measure 12: Prepare a Synthesis of the History of the Kellogg Creek Historic District**

Results from the recordation, testing and data recovery of the historic-era resources within the Kellogg Creek Historic District shall be synthesized with existing analysis and reporting generated as a result of the installation of the 100 TAF reservoir and shall be presented in a new scholarly report with particular emphasis placed on analysis of the use of watershed lands with regard to elevation, resources, setting, and changing needs over time.

Compliance with these mitigation measures will mean that the project will have no adverse effects (or less than significant impact) on significant cultural resources or on the Historic District.
Table 11 presents in summary form the historic properties within the APE, the potential impacts posed by the project, and recommended mitigation measures to reduce these impacts to less than significant level. Mitigation measures 3 and 6 though 12 apply to all historic properties within the APE and are not included in the summary in Table 11.

**Table 11. Summary of Management Recommendations for Cultural Resources within the APE**

<table>
<thead>
<tr>
<th>Resource</th>
<th>Status</th>
<th>Potential Effects</th>
<th>Management Recommendations</th>
</tr>
</thead>
<tbody>
<tr>
<td>CA-CCO-9 Milling Station</td>
<td>Eligible, I and D</td>
<td>I, E, A</td>
<td>4</td>
</tr>
<tr>
<td>CA-CCO-310 Rockshelter</td>
<td>Eligible, I and D</td>
<td>A</td>
<td>2, 5</td>
</tr>
<tr>
<td>CA-CCO-397 Open Site</td>
<td>Eligible, I and D</td>
<td>EX, SA</td>
<td>1, 2, 4, 5</td>
</tr>
<tr>
<td>CA-CCO-417 Rockshelter</td>
<td>Eligible, I and D</td>
<td>A</td>
<td>2, 5</td>
</tr>
<tr>
<td>CA-CCO-427H Ranch Headquarters</td>
<td>Eligible, D</td>
<td>DD, I, E, A</td>
<td>4</td>
</tr>
<tr>
<td>CA-CCO-445H Ranch Headquarters</td>
<td>Eligible, D</td>
<td>DD, I</td>
<td>4</td>
</tr>
<tr>
<td>CA-CCO-446H Ranch Headquarters</td>
<td>Eligible, D</td>
<td>EX, SA, A</td>
<td>1, 2, 4, 5</td>
</tr>
<tr>
<td>CA-CCO-447/H Livestock Feature; Open Site with burials</td>
<td>Eligible, D</td>
<td>EX, SA</td>
<td>1, 2, 4, 5</td>
</tr>
<tr>
<td>CA-CCO-448H Ranch Headquarters</td>
<td>Treat as eligible, D</td>
<td>None</td>
<td>No further consideration</td>
</tr>
<tr>
<td>CA-CCO-450/H Ranch Headquarters; Open Site</td>
<td>Eligible, I and D</td>
<td>DD, I, E, A, EX, SA</td>
<td>4</td>
</tr>
<tr>
<td>CA-CCO-452 Milling Station</td>
<td>Eligible, D</td>
<td>I, E, A</td>
<td>4</td>
</tr>
<tr>
<td>CA-CCO-454H Ancillary Ranch Complex</td>
<td>Eligible, D</td>
<td>A, possibly EX</td>
<td>1, 2, 5</td>
</tr>
<tr>
<td>CA-CCO-455 Rockshelter</td>
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<td>A</td>
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<td>CA-CCO-456 Rockshelter</td>
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<td>CA-CCO-458 Open Site with burials</td>
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<td>DD, I, EX, CR, CA</td>
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<td>CA-CCO-459 Milling Station with human remains</td>
<td>Eligible, D</td>
<td>DD, I, E, A, EX, SA</td>
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<td>CA-CCO-462 Milling Station</td>
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<td>CA-CCO-463 Open Site with Milling Station</td>
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<td>Resource</td>
<td>Status</td>
<td>Potential Effects</td>
<td>Management Recommendations</td>
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<tr>
<td>CA-CCO-467/H Water Management Artifact Scatter; Milling Station</td>
<td>Eligible, I and D</td>
<td>I, E, A, EX, SA</td>
<td>2, 4, 5</td>
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<tr>
<td>CA-CCO-468 Milling Station and Open Site</td>
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<td>I, E, A, EX, SA</td>
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<td>CA-CCO-469 Milling Station</td>
<td>Eligible, D</td>
<td>DD, I</td>
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<td>CA-CCO-470H Ranch Complex</td>
<td>Eligible, I and D</td>
<td>DD, I</td>
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<tr>
<td>CA-CCO-535H Ranch Headquarters</td>
<td>Eligible, D</td>
<td>EX, SA</td>
<td>1, 2, 4, 5</td>
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<tr>
<td>CA-CCO-596H Ranch Headquarters</td>
<td>Treat as Eligible, I</td>
<td>EX, SA</td>
<td>1, 2, 4, 5</td>
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<td>CA-CCO-597 Petroglyph Boulder</td>
<td>Treat as Eligible, I</td>
<td>EX, SA</td>
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<td>CA-CCO-621/H Ranch Headquarters; Lithic Scatter</td>
<td>Ineligible after testing</td>
<td>EX, SA</td>
<td>No further consideration</td>
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<td>CA-CCO-636 Milling Station</td>
<td>Eligible, I and D</td>
<td>DD, I</td>
<td>4</td>
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<tr>
<td>CA-CCO-637 Open Site with burials</td>
<td>Eligible, I and D</td>
<td>EX</td>
<td>4</td>
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<tr>
<td>CA-CCO-650H Historic Artifact Scatter</td>
<td>Ineligible after testing</td>
<td>EX, SA</td>
<td>No further consideration</td>
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<tr>
<td>CA-CCO-696 Open Site with burials</td>
<td>Treat as Eligible, I</td>
<td>DD, I, EX, CR, CA</td>
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<td>CA-CCO-725 Hearth Feature</td>
<td>Treat as Eligible, D</td>
<td>I, E, A, EX, SA</td>
<td>4</td>
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<tr>
<td>CA-CCO-726/H Historic Artifact Scatter; Hearth Feature</td>
<td>Treat as Eligible, D</td>
<td>EX, SA, A</td>
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<tr>
<td>CA-CCO-755 Buried Open Site (possible burial)</td>
<td>Treat as Eligible, D</td>
<td>EX, SA, A</td>
<td>4</td>
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<tr>
<td>P-07-000532 Reburial - Sensitive Site</td>
<td>Treat as eligible</td>
<td>DD, I</td>
<td>1, 2</td>
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<tr>
<td>P-07-000791 Water Management Feature</td>
<td>Treat as eligible</td>
<td>I, E, A</td>
<td>4</td>
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<td>Kellogg Creek Dam Water Management Feature</td>
<td>Treat as eligible</td>
<td>EX, SA</td>
<td>1, 2</td>
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<td>Kellogg Creek Irrigation Ditch Water Management Feature</td>
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<td>EX, SA</td>
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<td>Irrigation Ditch 1 Water Management Feature</td>
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<td>EX, SA</td>
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<tr>
<td>Irrigation Ditch 2 Water Management Feature</td>
<td>Treat as eligible</td>
<td>EX, SA</td>
<td>1, 2</td>
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<tr>
<td>Irrigation Ditch 3 Water Management Feature</td>
<td>Treat as eligible</td>
<td>EX, SA</td>
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Table 11. Summary of Management Recommendations for Cultural Resources within the APE (continued)

<table>
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<th>Resource</th>
<th>Status</th>
<th>Potential Effects</th>
<th>Management Recommendations</th>
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<td>Byron-Bethany Irrigation Canal</td>
<td>Treat as eligible</td>
<td>EX, SA</td>
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<td>Water Management Feature</td>
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<td>Concrete Culvert</td>
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<td>SPRR Grade</td>
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<tr>
<td>Transmission Line</td>
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<td>Linear Feature</td>
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</table>

**STATUS KEY:**
I: eligible as an individual property
D: eligible as a contributor to the Historic District
I and D: eligible as both an individual property and as a contributor to the Historic District

**POTENTIAL EFFECTS KEY:**
DD: Drawdown
A: Access
I: Inundation
E: Erosion
R: Recreation
EX: Excavation
CR: Crushing
CA: Construction Access
SA: Staging and Access
7.0 References

Albee, A. D.
1979 Archaeological Survey of Vasco Road Bridge No. 7711 B-7.60, Proposed Reconstruction Project. On file at the Northwest Information Center, Sonoma State University, Rohnert Park, CA (S-002621).

Baldrica, Mike and Billie Davis
1982 Archaeological Site Record for CA-CCO-397. On file at the Northwest Information Center, Sonoma State University, Rohnert Park, CA.

Beardsley, Richard K.

Bennyhoff, James A., and Richard E. Hughes

Brady and Associates, Inc. and LSA

Brady and Associates, Inc. and Sonoma State University Anthropological Studies

Bramlette, Allan G.
1987 An Archaeological Study for Potential Landfill Locations in Southeastern Contra Costa County, California. On file at the Northwest Information Center, Sonoma State University, Rohnert Park, CA (S-008969).

Bramlette, Allan, Mary Praetzellis, Adrian Praetzellis and David A. Fredrickson
1988 Archaeological and Historical Resources within the Los Vaqueros/Kellogg Study Area, Contra Costa and Alameda Counties, California (letter report). On file at the Northwest Information Center, Sonoma State University, Rohnert Park, CA (S-010040).
Bramlette, Allan G., Mary Praetzellis, Adrian Praetzellis, Katherine M. Dowdall, Patrick Brunmeier and David A. Fredrickson
1991 Archaeological Resources Inventory for Los Vaqueros Water Conveyance Alignments, Contra Costa County, California. On file at the Northwest Information Center, Sonoma State University, Rohnert Park, CA (S-013256).

Bramlette, Allan, Mary Praetzellis, Adrian Praetzellis, Margaret Purser and David A. Fredrickson
1990 Archaeological and Historical Resources Inventory for the Vasco Road and Utility Relocation Project, Contra Costa and Alameda Counties. On file at the Northwest Information Center, Sonoma State University, Rohnert Park, CA (S-012800).

Bramlette, Allan and Albert J. Villemaire
1987 Archaeological Monitoring of Woodward-Clyde Consultants Geotechnical Excavations within the Los Vaqueros Project Area (letter report). On file at the Northwest Information Center, Sonoma State University, Rohnert Park, CA (S-009385).

Brown, Kyle, Adam Marlow, Thomas Young, James Allan and William Self
2004 Cultural Resource Assessment of the South Bay Aqueduct Improvement and Enlargement Project, Alameda County, California. On file at the Northwest Information Center, Sonoma State University, Rohnert Park, CA (S-029590).

Bureau of Reclamation

CEQA Guidelines
Chavez, David and Jan M. Hupman
2003 Cultural Resources Investigations for the Vasco Road and Camino Diablo Intersection Improvements Project, Contra Costa County, California. On file at the Northwest Information Center, Sonoma State University, Rohnert Park, CA (S-026870).

Clark, Matthew R.
1983 An Archaeological Field Reconnaissance of Portions of the Stewart and Souza Ranches, Contra Costa and Alameda Counties, California (letter report). On file at the Northwest Information Center, Sonoma State University, Rohnert Park, CA (S-005869).
1984 Archaeological Reconnaissance of the Gomes North Parcel, Alameda County, California. On file at the Northwest Information Center, Sonoma State University, Rohnert Park, CA (S-006489).

Coles, George R.
1966 An Archaeological Reconnaissance of the Kellogg Project on the Rancho Canada de Los Vaqueros, Contra Costs County, California (letter report). On file at the Northwest Information Center, Sonoma State University, Rohnert Park, CA (S-002329).

Contra Costa Water District
1993a Memorandum of Understanding Regarding the Respectful Treatment of Native American Graves and Human Remains Discovered During Pre-construction and Construction of the Los Vaqueros Project.

Cook, S.F. and A.B. Elsasser

Davis, Lee, Richard Hitchcock and Lisa Mertz
Davis, Lee, Suzanne B. Stewart and Richard Hitchcock

Eidsness, Janet P. and Randall A. Milliken
1986 Archaeological Survey of the Kellogg Reservoir, Contra Costa County, California. On file at the Northwest Information Center, Sonoma State University, Rohnert Park, CA (S-008108).

Eidsness, Janet, Scotty Thompson, Mark Hylkema, Martha Jackson
1986 DPR Archaeological Site Record for P-07-000197 (CA-CCO-397). On file at the Northwest Information Center, Sonoma State University, Rohnert Park, CA.

Emanuels, George
1993 California's Contra Costa County, an Illustrated History. 5th edition, Diablo Books, Walnut Creek, CA.

Farris, Glen and Phil Hines
1987 Archaeological Site Record for Site CA-CCo-548 (1/27/87). Site record filed at the Northwest Information Center of the California Historical Resources Information System, Sonoma State University, Rohnert Park, CA.

Fong, Michael R. and Donna M. Garaventa, Stuart A. Guedon, Steven J. Rossa and David G. Brittin
1991 Cultural Resources Assessment of the 230kV Bethany Compressor Station Tap Project, Alameda County, California. On file at the Northwest Information Center, Sonoma State University, Rohnert Park, CA (S-014597).

Frederickson, David A.
1973 Early Cultures of the North Coast Ranges, California. Doctoral dissertation, Department of Anthropology, University of California, Davis.
1983 Archaeological Survey of the Wind Energy Company Project Area near Altamont Pass, Alameda County, California. On file at the Northwest Information Center, Sonoma State University, Rohnert Park, CA (S-006007).
1986 A Review of the Cultural Resources Evaluation of Sections 25 and 30, Howden Wind Parks, Inc., Vasco Road Area, Contra Costa County, California (County File #2025-85). On file at the Northwest Information Center, Sonoma State University, Rohnert Park, CA (S-008757).


Fredrickson, David A. (editor)

1982 Los Vaqueros: A Cultural Resource Study. On file at the Northwest Information Center, Sonoma State University, Rohnert Park, CA (S-005763).

Fredrickson, David A., Suzanne B. Stewart and Grace H. Ziesing (editors)


Gerow, Bert A., with Roland W. Force

1968 An Analysis of the University Village Complex with a Reappraisal of Central California Archaeology. The Board of Trustees of the Leland Stanford Junior University, Palo Alto, CA.

Giliberti, Joseph


Government Land Office

1862 Government Land Office Plat Maps T1N R2E, T1N R3E, T1S R2E, and T1S R3E. On file at the Northwest Information Center, Sonoma State University, Rohnert Park, CA.

1871 Government Land Office Plat Map T2S R2E. On file at the Northwest Information Center, Sonoma State University, Rohnert Park, CA.

1872 Government Land Office Plat Map T1N R4E. On file at the Northwest Information Center, Sonoma State University, Rohnert Park, CA.
Groza, R.G.

Hardesty, Donald L.

Hattersley-Drayton, Karana

Hattersley-Drayton, Karana and Mary Praetzellis
2000 Historic Architectural Survey Report for Cowboy House and Barn (CA-CCO-450/H), Contra Costa County, California. On file at the Northwest Information Center, Sonoma State University, Rohnert Park, CA (S-022707).

Hattersley-Drayton, Karana and Mary Praetzellis
2000 Historic Architectural Survey Report for Cowboy House and Barn (CA-CCO-450H), Contra Costa County, California. On file at the Northwest Information Center, Sonoma State University, Rohnert Park, CA (S-023523).

Historic Record Company
1926 *History of Contra Costa County California*. Historic Record Company, Los Angeles. CA.

Hittell, Theodore H.
Hohlmayer, Earl

1991a Balfour-Guthrie was Important to Early Brentwood. *Daily Ledger-Post Dispatch*, 17 November. Antioch, CA.

1991b Irrigation System was First Step to Building a Thriving Brentwood. *Daily Ledger-Post Dispatch*, 24 November. Antioch, CA.

Holman, Miley Paul

1983 An Archaeological Survey of the Proposed Walker/Jackson Windfarm Expansion Area, Contra Costa County, California. On file at the Northwest Information Center, Sonoma State University, Rohnert Park, CA (S-006123).

1984a Archaeological Reconnaissance of Proposed 90 Unit Windfarm, Souza Ranch (letter report). On file at the Northwest Information Center, Sonoma State University, Rohnert Park, CA (S-006699).

1984b Archaeological Survey of Souza/Vaquero Farms Property (letter report). On file at the Northwest Information Center, Sonoma State University, Rohnert Park, CA (S-006710).

1984c Archaeological Reconnaissance of Sections 19, 21 Portions Thereof (letter report). On file at the Northwest Information Center, Sonoma State University, Rohnert Park, CA (S-007090).

1985 A Report of Findings from an Archaeological Reconnaissance of Sections 19, 20, 21, and 24, Lands of Souza and Vaquero Farms, Altamont Pass, Contra Costa County. On file at the Northwest Information Center, Sonoma State University, Rohnert Park, CA (S-007679).

1986a Archaeological Reconnaissance of Section 27, Southern Half, and Northeast Quarter of Section 34 in the Altamont Pass, Contra Costa County. On file at the Northwest Information Center, Sonoma State University, Rohnert Park, CA (S-008912).


1988 Archaeological Field Reconnaissance of the Rooney Property, Permit Number Z-5454, Alameda County, California (letter report). On file at the Northwest Information Center, Sonoma State University, Rohnert Park, CA (S-010461).

1992 Archaeological Field Inspection of the Two Additional Quarry Areas for the Unimin Quarry near Byron Hot Springs, Contra Costa County, California (letter report). On file at the Northwest Information Center, Sonoma State University, Rohnert Park, CA (S-013839).
Huddleson, Julia

Jackson, Thomas L., Michael J. Moratto, Richard M. Pettigrew, C. Kristina Roper and Randall F. Schalk (editors)

Jensen & Associates
1986 Class III Intensive Archaeological Field Reconnaissance of the Kellogg Reformulation Unit, Highline Canal Alternative, Contra Costa and Alameda Counties, California. On file at the Northwest Information Center, Sonoma State University, Rohnert Park, CA (S-010509).

Keswick, Janet A., Allan G. Bramlette and David A. Fredrickson
1987 An Archaeological Study for Potential Landfill Location VI-8 in Southeastern Contra Costa County, California. On file at the Northwest Information Center, Sonoma State University, Rohnert Park, CA (S-009400).

Kyle, D.E. (revised by)

Levy, R.
Lobo, Susan

Meyer, Jack
1994  An Archaeological Study of the Western Area Power Administration Electric Transmission Line Right-of-Way, near Byron, Contra Costa County, California. On file at the Northwest Information Center, Sonoma State University, Rohnert Park, CA (S-016654).
1995  An Archaeological Study of the Proposed Sprint Fiber Cable Realignment Route near Byron, Contra Costa County, California. On file at the Northwest Information Center, Sonoma State University, Rohnert Park, CA (S-017546).
1996  Geoarchaeological Implications of Holocene Landscape Evolution in the Los Vaqueros Area of Eastern Contra Costa County, California. On file at the Northwest Information Center, Sonoma State University, Rohnert Park, CA (S-018641).
1998  An Archaeological Study of the "High Water Site" in the Los Vaqueros Reservoir Area, Contra Costa County, California. On file at the Northwest Information Center, Sonoma State University, Rohnert Park, CA (S-020398).

Meyer, Jack and David A. Fredrickson
1996  Results of a Subsurface Archaeological Survey of the Proposed Los Vaqueros and Transfer Pipeline Routes, Los Vaqueros Project, Contra Costa County, California. On file at the Northwest Information Center, Sonoma State University, Rohnert Park, CA (S-018187).

Meyer, Jack, Lori Hager, Thomas Martin and Annita Waghorn
2000  An Archaeological Evaluation of CA-CCO-320H, with Updates for CA-CCO-397 and CA-CCO-544, Los Vaqueros Area, Contra Costa County, California. On file at the Northwest Information Center, Sonoma State University, Rohnert Park, CA (S-023280).

Meyer, Jack and Michael D. Meyer
2002  DPR Site Records for P-07-002592 (CA-CCO-775). On file at the Northwest Information Center, Sonoma State University, Rohnert Park, CA.
2000  Archaeological Monitoring and Investigations for the Road 3A and Habitat Mitigation Construction Projects, Los Vaqueros Area, Contra Costa County,
California. On file at the Northwest Information Center, Sonoma State University, Rohnert Park, CA (S-022919).

Meyer, Jack and Jeffrey S. Rosenthal

1997 Archaeological and Geoarchaeological Investigations at Eight Prehistoric Sites in the Los Vaqueros Reservoir Area, Contra Costa County, California. Anthropological Studies Center, Sonoma State University Academic Foundation, Rohnert Park, California. Submitted to the Contra Costa Water District, Concord, California. On file at the Northwest Information Center, Sonoma State University, Rohnert Park, CA (S-020072).

1998 An Archaeological Investigation of Artifacts and Human Remains from CA-CCO-637, Los Vaqueros Project Area, Contra Costa County, California. Anthropological Studies Center, Sonoma State University Academic Foundation, Rohnert Park, California. Submitted to the Contra Costa Water District, Concord, California. On file at the Northwest Information Center, Sonoma State University, Rohnert Park, CA (S-020396).

Meyer, Michael D. and Jack Meyer

2000 Site Recording at CA-CCO-453H and CA-CCO-534H, Phase 1 Recreation Program, Los Vaqueros Project, Alameda and Contra Costa Counties, California. On file at the Northwest Information Center, Sonoma State University, Rohnert Park, CA (S-023208).

Meyer, Michael D. and Suzanne B. Stewart

1998 Data-Recovery Investigations of the McKenzie Barns at CA-CCO-535H (The Easton/Morchio/Grueninger Farmstead), Los Vaqueros Project, Contra Costa County, California. On file at the Northwest Information Center, Sonoma State University, Rohnert Park, CA (S-021113).

Milliken, Randall


Orlins, Robert I.
1987 A Cultural Resource Record Search for a Proposed Landfill Site near Byron Hot Springs, Contra Costa County, California. On file at the Northwest Information Center, Sonoma State University, Rohnert Park, CA (S-009466).

Ortiz, Beverly R.

Plat Maps
1861 Rancho Cañada de los Baqueros Plat Map. On file at the Northwest Information Center, Sonoma State University, Rohnert Park, CA.
1861 Rancho Los Meganos Plat Map. On file at the Northwest Information Center, Sonoma State University, Rohnert Park, CA.

Porter, Cris D., Jennie Goodrich and Michael Baldrica
1980 A Cultural Resources Survey of the Bankhead Ranch Property, Subdivision 5808, Contra Costa County, California. On file at the Northwest Information Center, Sonoma State University, Rohnert Park, CA (S-002310).

Praetzellis, Adrian, Grace H. Ziesing and Mary Praetzellis
1994 Tales of the Vasco. On file at the Northwest Information Center, Sonoma State University, Rohnert Park, CA (S-019524).

Praetzellis, Mary (editor)
Praetzellis, Mary, Jack Meyer and Suzanne Stewart  
1999  Historic Property Treatment Plan for the Phase I Recreation Program and for Late Discoveries, Los Vaqueros Project, Alameda and Contra Costa Counties, California. On file at the Northwest Information Center, Sonoma State University, Rohnert Park, CA (S-021899).

Praetzellis, Mary, Suzanne B. Stewart, and Grace H. Ziesing  

Praetzellis, Mary, Grace Ziesing, Jack McIlroy and Adrian Praetzellis  
1995  Investigations at Three Historic Archaeological Sites, Summer 1993, for the Los Vaqueros Project, Alameda and Contra Costa Counties, California. On file at the Northwest Information Center, Sonoma State University, Rohnert Park, CA (S-017646).

Price, Heather, Aimee Arrigoni, Eric Strother, Kyle Brown, Thomas Young and Jennifer Price with Contributions from Allen Estes, Kyle Kearney, James Allan and William Self  

Price, Heather, Aimee Arrigoni, Jenni Price, Eric Strother, and Jim Allan with contributions by Kenneth Gobalet, Jack Meyer and Eric Wohlgemuth  
2006  Archaeological Investigations at CA-CCO-309, Rossmoor Basin, Contra Costa County, California. Prepared for the County of Contra Costa Department of Public Works, Martinez, CA.

Rawls, James J., and Walton Bean  

Romano, Melinda  
1990  Archaeological Survey and Cultural Resources Inventory, Brentwood Alternative, California, PGT-PG&E Pipeline Expansion Project. On file at the Northwest Information Center, Sonoma State University, Rohnert Park, CA (S-012275).
Rosenthal, Jeffrey S., and Jack Meyer

Smith & Elliott
1879 Smith & Elliott (publishers) Map of Contra Costa County and Part of Alameda County. On file at the Northwest Information Center, Sonoma State University, Rohnert Park, CA.

Solari, Elaine-Maryse and Dell Upton
1996 Architectural Property at the Starr Ranch (CA-CCO-470H), Los Vaqueros Project, Alameda and Contra Costa Counties, California. On file at the Northwest Information Center, Sonoma State University, Rohnert Park, CA (S-018202).

Sonoma State University Academic Foundation, Inc. (SSUAF), the Anthropological Studies Center
1993a *Agreement for Curation of Archaeological Collections from the Los Vaqueros Project Area* between the Anthropological Studies Center and the Contra Costa Water District. Report prepared for Contra Costa Water District, Concord, CA.
1998  Historic Property Treatment Plan for Proposed Demolition and Clean-up Activities at CA-CCO-535H (McKenzie Ranch), Los Vaqueros Project, Contra Costa County, CA.


State of California, Department of Water Resources

Stewart, Suzanne B.

Stoyka, Michael and Brian Gassner
2000  DPR 523 Continuation Sheet for P-07-000197 (CA-CCO-397). On file at the Northwest Information Center, Sonoma State University, Rohnert Park, CA.

Stoyka, Michael and Michael Meyer
2001  Cultural Resources Survey of the Los Vaqueros Reservoir Draw-Down Zone, December 2000: Los Vaqueros Project, Contra Costa and Alameda Counties, California. On file at the Northwest Information Center, Sonoma State University, Rohnert Park, CA (S-023758).

Taite, Krislyn K.
Treganza, Adan E.
1964 Archaeological Observations in the Kellogg Reservoir Area, Contra Costa, California. On file at the Northwest Information Center, Sonoma State University, Rohnert Park, CA (S-002330).

United States Geological Survey (USGS)
1898 (reprinted 1947) Mt. Diablo Quadrangle Topographic Map. On file at the Northwest Information Center, Sonoma State University, Rohnert Park, CA.
1978 Clifton Court Forebay Quadrangle Topographic Map. Maptech, Terrain Navigator Pro. Amesbury, MA.

West, G. James
1982 Class II Archaeological Survey, Kellogg Unit Reformulation, Contra Costa County, California. On file at the Northwest Information Center, Sonoma State University, Rohnert Park, CA (S-010508).

Wiberg, Randy S.
1984 An Archaeological Reconnaissance of the Souza Ranch/Phase 2 Property, near Byron, Contra Costa County, California. On file at the Northwest Information Center, Sonoma State University, Rohnert Park, CA (S-006701).

William Self Associates
Wohlgemuth, Eric

2004 The Course of Plant Food Intensification in Native Central California. Doctoral dissertation, Department of Anthropology, University of California, Davis.

Ziesing, Grace H.

1997b Archaeological Investigations for the Vasco Adobe Site, CA-CCO-470H, for the Los Vaqueros Project, Alameda and Contra Costa Counties, California. On file at the Northwest Information Center, Sonoma State University, Rohnert Park, CA (S-019319).

Ziesing, Grace H. (ed.)