4.16 Cultural and Paleontological Resources

This section presents an analysis of potential impacts on cultural resources that would result from implementation of the Los Vaqueros Reservoir Expansion Project pursuant to the requirements of Section 106 of the National Historic Preservation Act (NHPA) of 1966 as amended (August 2004), the National Environmental Policy Act (NEPA), and the California Environmental Quality Act (CEQA). Additionally, analysis of potential impacts on paleontological resources (i.e., fossils), as required under NEPA is included. The analysis includes a description of the existing conditions, the associated regulatory framework (including all applicable land use policies), the methodology, the significance criteria, the impact assessment, and the mitigation measures for the project alternatives.

Cultural resources are the material remains of past human life or activities. The term encompasses archaeological, traditional, and built environmental resources, including but not necessarily limited to buildings, structures, objects, and sites. Those cultural resources that possess historical significance and therefore require consideration under federal and state laws and regulations are referred to as historical resources (under CEQA) and historic properties (under NEPA and Section 106 of NHPA). Cultural resources is the preferred term that will be used throughout this document except in the contexts in which it is important to indicate that specific cultural resources are significant and have been listed, or are eligible for listing, on the California Register of Historical Resources (CRHR) and/or the National Register of Historic Places (NRHP).

4.16.1 Affected Environment

Regulatory Setting

The project is subject to both state and federal regulations. CCWD is the lead state agency for the project and Reclamation is the lead federal agency. Cultural resource studies have been conducted in compliance with Section 106 of NHPA, NEPA and CEQA.

Federal, State, and Local

National Historic Preservation Act

Section 106 of NHPA and its implementing regulations (36 CFR 800, as amended in August 2004) require federal agencies to consider the effects of their undertakings, or those they fund or permit on historic properties, cultural resources that may be eligible for listing, or that are listed in the NRHP. The 36 CFR Part 60.4 regulations describe the criteria to evaluate cultural resources for inclusion in the NRHP. Such resources are required to retain integrity and must exhibit an association with broad patterns of our history, be associated with an important person, embody a distinctive characteristic, or yield information important to prehistory or history.

The 36 CFR Part 800 regulations, implementing Section 106 of the NHPA, call for considerable consultation with the State Historic Preservation Officer (SHPO), Indian tribes, and
interested members of the public throughout the process. If it is determined that the proposed action is the type that has the potential to affect historic resources, the four principal steps are:

- Determine what the area of potential effects (APE) is for the proposed action
- Identify historic properties within the APE
- Assess the affects of the undertaking to historic properties within the APE
- Resolve adverse effects to historic properties adversely affected by the proposed action

Adverse effects to historic properties may be resolved through preparation of a memorandum of agreement (MOA) developed in consultation between interested parties; in the case of the Los Vaqueros Reservoir Expansion Project, this would be Reclamation, SHPO, Indian tribes, and interested members of the public. The Advisory Council on Historic Preservation (ACHP) is also invited to participate. The MOA describes stipulations that treat historic properties to mitigate adverse effects.

**National Register of Historic Places**

The NRHP, created under NHPA, is the federal list of cultural resources worthy of preservation. 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 by the keeper of the National Register with the National Park Service (NPS). To guide the selection of properties included in the NRHP, the NPS developed the National Register Criteria for Evaluation located at 36 CFR Part 60.4. The criteria are standards by which every property that is nominated to the NRHP is judged. The quality of significance in American history, prehistory, 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
- **Criterion B**: A property is associated with the lives of people significant in United States history
- **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
- **Criterion D**: A property has yielded, or may be likely to yield, information important in prehistory or history (36 CFR Part 60.4)

When a project has been defined and recognized as a federal undertaking, an Evaluation and Request for Determination of Eligibility and Effect shall be submitted by Reclamation to SHPO, and one of three possible Findings of Effect can be made: No Historic Property Affected, No Adverse Effect, or Adverse Effect. ACHP 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 a historic property may diminish the integrity of the property’s location, design, setting, materials, workmanship, feeling, or association.

**American Indian Religious Freedom Act**

The American Indian Religious Freedom Act (AIRFA) of 1978 established “the policy of the United States to protect and preserve for American Indians their inherent right of freedom to believe, express, and exercise the traditional religions…including but not limited to access to sites, use and possession of sacred objects, and the freedom to worship through ceremonials and traditional rites (P.L. 95-431).”

**The Native American Graves Protection and Repatriation Act**

The Native American Graves Protection and Repatriation Act (NAGPRA) of 1990 and the regulations (43 CFR Part 10) that allow for its implementation address the rights of lineal descendants, Indian tribes, and Native Hawaiian organizations (parties with standing) to Native American human remains, funerary objects, sacred objects, and objects of cultural patrimony, (cultural items). The statute requires federal agencies and museums to provide information about Native American cultural items to parties with standing and, upon presentation of a valid claim, ensure the item(s) undergo disposition or repatriation.

**Native American Heritage Commission**

The Native American Heritage Commission (NAHC) identifies and catalogs places of special religious or social significance to Native Americans and known graves and cemeteries of Native Americans on private lands, and performs other duties regarding the preservation and accessibility of sacred sites and burials and the disposition of Native American human remains and burial items.

**Paleontological Resources Preservation Act**

The federal Paleontological Resources Preservation Act (PRPA) of 2002 was enacted to codify the generally accepted practice of limiting the collection of vertebrate fossils and other rare and scientifically significant fossils to qualified researchers; these researchers must obtain a permit from the appropriate state or federal agency and agree to donate any materials recovered to recognized public institutions, where they will remain accessible to the public and to other researchers (PRPA, 2007). The act also establishes penalties for illegal salvage of paleontological resources on public lands. This act incorporates key findings of a report, *Fossils on Federal Land and Indian Lands*, issued by the Secretary of Interior in 2000 which included input from staff of the Smithsonian Institution, United States Geological Society (USGS), various federal land management agencies, paleontological experts, and the public.

**California Environmental Quality Act**

Under CEQA, public agencies must consider the effects of their actions on both “historical resources” and “unique archaeological resources.” As stated in the Public Resources Code (PRC), Section 21084.1, a “project that may cause substantial adverse change in the significance of a historical resource is a project that may have a significant effect on the environment.”
“Historical resource” is a term with a defined statutory meaning (see PRC, Section 21084.1 and CEQA Guidelines Section 15064.5 (a) and (b)). The term embraces any cultural resource listed in or determined eligible for listing in the CRHR. The CRHR includes resources listed in or formally determined eligible for listing in the NRHP, as well as some California State Landmarks and Points of Historical Interest.

In addition to assessing whether cultural resources potentially affected by a proposed project are listed or have been identified in a survey process, lead agencies have a responsibility to evaluate them against the CRHR criteria prior to making a finding as to a proposed project’s impacts on historical resources (PRC, Section 21084.1; CEQA Guidelines, Section 15064.5(a)(3)). In general, a historical resource, under this approach, is defined as any object, building, structure, site, area, place, record, or manuscript that:

a) Is historically or archaeological significant; or is significant in the architectural, engineering, scientific, economic, agricultural, educational, social, political or cultural annals of California; and

b) Meets any of the following criteria:

1. Is associated with events that have made a significant contribution to the broad patterns of California’s history and cultural heritage;
2. Is associated with the lives of persons important in our past;
3. 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
4. Has yielded, or may be likely to yield, information important in prehistory or history.

Potential eligibility also rests upon the integrity of the resource. Integrity is defined as the retention of the resource’s physical identity that existed during its period of significance. Integrity is determined through considering the setting, design, workmanship, materials, location, feeling, and association of the resource.

As noted above, CEQA also requires lead agencies to consider whether projects will affect “unique archaeological resources.” PRC, Section 21083.2(g) states that “unique archaeological resource” means an archaeological artifact, object, or site about which it can be clearly demonstrated that, without merely adding to the current body of knowledge, there is a high probability that it meets any of the following criteria:

- Contains information needed to answer important scientific research questions and that there is a demonstrable public interest in that information.
- Has a special and particular quality such as being the oldest of its type or the best available example of its type.
- Is directly associated with a scientifically recognized important prehistoric or historic event or person (PRC, Section 21083.2(g)).
Treatment options under Section 21083.2 of the PRC include activities that preserve such resources in place in an undisturbed state. Other acceptable methods of mitigation under Section 21083.2 include excavation and curation, or study in place without excavation and curation.

**California Health and Safety Code**

California law protects Native American burials, skeletal remains, and associated grave goods regardless of their antiquity and provides for the sensitive treatment and disposition of those remains. Section 7050.5(b) of the California Health and Safety Code specifies protocol when human remains are discovered. The code states:

In the event of discovery or recognition of any human remains in any location other than a dedicated cemetery, there shall be no further excavation or disturbance of the site or any nearby area reasonably suspected to overlie adjacent remains until the coroner of the county in which the human remains are discovered has determined, in accordance with Chapter 10 (commencing with Section 27460) of Part 3 of Division 2 of Title 3 of the Government Code, that the remains are not subject to the provisions of Section 27492 of the Government Code or any other related provisions of law concerning investigation of the circumstances, manner and cause of death, and the recommendations concerning treatment and disposition of the human remains have been made to the person responsible for the excavation, or to his or her authorized representative, in the manner provided in Section 5097.98 of the Public Resources Code.

CEQA Guidelines Section 15064.5(e) requires that excavation activities be stopped whenever human remains are uncovered and that the county coroner be called in to assess the remains. If the county coroner determines that the remains are those of Native Americans, the NAHC must be contacted within 24 hours. At that time, the lead agency is required to consult with the appropriate Native Americans as identified by the NAHC, who then directs the lead agency (or applicant), under certain circumstances, to develop an agreement with the Native Americans for the treatment and disposition of the remains.

Section 7052 of the California Health and Safety Code states that it is a felony to willfully mutilate, disinter, or remove from a place of interment, any remains known to be human.

**California Public Resources Code**

Several sections of the California PRC protect paleontological resources. Section 5097.5 prohibits “knowing and willful” excavation, removal, destruction, injury, and defacement of any paleontologic feature on public lands (lands under state, county, city, district, or public authority jurisdiction, or the jurisdiction of a public corporation), except where the agency with jurisdiction has granted permission. Section 30244 requires reasonable mitigation for impacts on paleontological resources that occur as a result of development on public lands. The sections of the California Administrative Code pertaining to the State Division of Beaches and Parks afford protection to geological features and “paleontological materials,” but grant the director of the state park system authority to issue permits for specific activities that may result in damage to such resources, if the activities are in the interest of the state park system and for state park purposes (California Administrative Code Sections 4307–4309; as cited in PRPA, 2007).
If an archaeological resource is neither a unique archaeological nor a historical resource, the effects of the project on that resource shall not be considered a significant effect on the environment. It is sufficient that the resource and the effects on it be noted in the EIR, but the resource need not be considered further in the CEQA process.

Additional sections of the PRC that are applicable to the proposed project are as follows:

- **Section 5097.5.** Provides that any unauthorized removal or destruction of archaeological or paleontological resources on sites located on public lands is a misdemeanor. As used in this section, “public lands” means lands owned by, or under the jurisdiction of, the state, or any city, county, district, authority, or public corporation, or any agency thereof.

- **Section 5097.98.** Prohibits obtaining or possessing Native American artifacts or human remains taken from a grave or cairn, and sets penalties for such acts.

**Contra Costa County General Plan**

The Contra Costa County General Plan includes several goals and policies related to the protection and preservation of cultural resources. Specific policies include the protection of historic buildings or structures (Policy 9-33) and compatibility of development in surrounding areas of historical significance (9-34). These policies are listed in Appendix E-2.

**Alameda County East County General Plan**

The East County Area Plan also identifies goals and polices pertinent to the preservation of cultural resources. These policies and programs encourage the County to identify and preserve significant archaeological and historical resources (Policy 136), require development to be designed to avoid cultural resources or require appropriate mitigation measures to offset impacts (137); and require a background and records check of a project area if a project is located within a sensitive archaeological zone as determined by the County (Program 59). These policies are described in Appendix E-1.

**Contra Costa County Historic Resources Inventory**

The Historic Resources Inventory of Contra Costa County, created in 1976 and updated in 1989, was prepared by the Contra Costa County Community Development Department with the assistance of 17 historical societies located within the County. A copy is on file at the California Historical Resources System Northwest Information Center in Rohnert Park, California. This inventory was reviewed for cultural resources within the study area as part of the records search conducted for the proposed project.

**Alameda County Register of Historic Resources**

Alameda County does not maintain a register for the entire county. Individual cities maintain registers, and the County is developing the Alameda County Register that will list historical resources within the unincorporated areas of the County. To this end the Historical and Cultural Resource Survey of East Alameda County was prepared in 2005 and is available from the County. This survey was reviewed for cultural resources within the study area as part of the records search conducted for the proposed project.
Existing Los Vaqueros Compliance Agreements and Previous Planning Documents

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

Programmatic Agreement among Reclamation, CCWD, California State Historic Preservation Officer, and the Advisory Council on Historic Preservation Regarding the Implementation of the Los Vaqueros Project (Reclamation, 1992)

The Programmatic Agreement (PA) is the basis for the protection of historic properties (significant cultural resources) within the APE for the Los Vaqueros Reservoir. The PA stipulates that the project be defined, and that historic properties that would be affected by the project 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 Reservoir and was responsible for establishing the PA. CCWD, the lead state agency, is responsible for implementing the PA, which 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 United States Army Corps of Engineers (USACE) and the State Water Resources Control Board (SWRCB) were the cooperating federal and state agencies, respectively. The SHPO and the ACHP were parties to the agreement. All of the subsequent management documents follow from the PA. Although the existing PA is still in effect, it may be renegotiated among the cooperating agencies, with Reclamation as the lead agency, for the Los Vaqueros Reservoir Expansion Project. If this occurs, Western Power Authority would be included as a signatory.


A series of phased HPTPs were created for the Los Vaqueros Reservoir to avoid or minimize project effects on historic properties (SSUAF, 1993a, 1994, 1995, 1998, 1999, 2001). HPTPs are required in accordance with the PA when project plans affect NRHP-eligible cultural resources. 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 SHPO. CCWD is responsible for carrying out the HPTPs. In consultation with SHPO, Reclamation would prepare new HPTPs appropriate for the new project effects associated with the proposed project.

Evaluation, Request for Determination of Eligibility, and Effect for the Los Vaqueros Project, Alameda and Contra Costa Counties, California (SSUAF, 1992)

The Los Vaqueros Reservoir Watershed (watershed), located within the upper Kellogg Creek 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). This effort provided an inventory and evaluation of all cultural resources within the project area known at that time. This effort also served as the basis for consultation by Reclamation with 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 cultural resources within the watershed as required by the PA. SHPO’s comments or concerns were addressed by Reclamation.

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

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. Mitigation measures identified for cultural resources in the 1993 EIR/EIS are consistent with those included in this EIS/EIR.

**Los Vaqueros Cultural Resources Management Plan (Brady/LSA, 1999)**

The Cultural Resources Management Plan incorporates and updates the Evaluation (Brady/LSA, 1999) and is presented by CCWD as part of the Resource Management Plan. The Cultural Resources Management Plan summarizes the cultural resources that are eligible for listing on NRHP and details plans for their management. A new Cultural Resources Management Plan may be prepared by CCWD in association with the Los Vaqueros Reservoir Expansion Project.

**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)**

The 1993 MOU between CCWD and interested tribal entities of Contra Costa and San Joaquin Counties lays out the roles and responsibilities of all parties during construction and watershed management, and the treatment and disposition of Native American burial sites, 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 1993 MOU was established by CCWD with no Reclamation involvement. Although the existing MOU remains in effect, CCWD may negotiate a new MOU for the proposed project. This new MOU would continue to include interested tribal entities of Contra Costa County. The project has no components in San Joaquin County, so tribal entities in San Joaquin County would not be included. However, if Alternatives 1 and 2 is to be built (which includes the Transfer-Bethany Pipeline and appurtenant facilities), then the agreement would be extended to include interested tribal entities of Alameda County as there is the potential to discover remains within the proposed pipeline corridor within that county.

**Agreement for Curation of Archaeological Collections from the Los Vaqueros Project Area between the Anthropological Studies Center and CCWD (SSUAF, 1993b)**

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 Reservoir. CCWD is responsible for establishing and following the Curation Agreement and may update the agreement for the Los Vaqueros Reservoir Expansion Project.
Application of Existing Compliance Agreements to the Proposed Project

As the federal lead agency, Reclamation defined the APE and established the PA with SHPO, ACHP, and CCWD as signatories for the Los Vaqueros Reservoir. Reclamation also presented the Evaluation to SHPO for review and addressed any concerns raised by SHPO. That document established how cultural resources would be handled and how they would be affected by the project. CCWD used information from the Evaluation to prepare the 1993 EIR/EIS to comply with CEQA and NEPA, established an MOU and a Curation Agreement, and developed a Cultural Resources Management Plan 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 SHPO for review. To implement the Los Vaqueros Reservoir Expansion Project, Reclamation would prepare a new Evaluation and may negotiate an updated PA, and prepare new HPTPs. CCWD would likely negotiate an updated MOU and Curation Agreement, and develop a new Cultural Resources Management Plan.

Environmental Setting

Cultural resources studies related to the installation and maintenance of the existing Los Vaqueros Reservoir resulted in the documentation of 75 historic properties¹ and one sensitive location² within the surrounding watershed. The sensitive location is the reburial site for human remains that were removed from Native American burial sites during construction of the original Los Vaqueros Reservoir. In 1992, the watershed, which comprises the Kellogg Creek Historic District (District), was found to be eligible for listing in the NRHP as a Historic District (SSUAF, 1992). Some of the historic properties are eligible for listing, or are listed on the NRHP as individual properties and as contributors to the District, while others are eligible for listing, or listed, solely as contributors to the District. Properties that are listed individually have significance independent of the District, while those that are listed as contributors to the District derive their significance from their historic role within the District. It is possible for a single property to have both individual significance and significance as a contributor to the District. This EIS/EIR section considers the impact to individual historic properties as well as to the District as a whole.

Area of Potential Effect

An APE is defined in the Code of Federal Regulations (CFR), Title 36, Part 800.16(d) as: “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 APE for the Alternatives 1, 2 and 3 includes the 275 TAF reservoir inundation area plus an additional buffer that encompasses proposed hiking trails, access roads, recreation facilities, and areas subject to indirect effects such as erosion due to fluctuations in the reservoir water level and increased

---

¹ Any prehistoric or historic district, site, building, structure, or object included in or eligible for inclusion in the NRHP. The term eligible for inclusion in the NRHP pertains to both properties that the Secretary of the Interior has formally determined to be eligible and to all properties that meet NRHP listing criteria.

² Though not a historic property, this reburial site contains Native American human remains and is subject to legislation guiding the treatment of Native American graves and human remains.
public access (Figure 4.16-1). The expansion of the existing dam would also entail the mass excavation of a new foundation upstream of the existing dam foundation to depths of as much as 50 feet below the original ground surface (see Figure 3-2). The APE for the Alternatives 1, 2, and 3 also includes all of the pipeline and electrical power corridors and associated facilities, with the exception of the Transfer-Bethany Pipeline which is not included in Alternative 3. The trench width for the conveyance pipeline installation would range from 35 to 70 feet; trench depth would range from 15 to 55 feet, depending on the size of the pipeline being installed, but would typically be 20 feet. The active work area along the open trench would generally extend about 25 to 50 feet to both sides of the trench. The construction easement analyzed for the proposed pipelines is 200 feet wide, except for the Transfer-Bethany Pipeline for which a construction easement of up to 300 feet wide was analyzed. The actual construction area used would be narrower in some places due to environmental constraints (e.g., to avoid wetlands), physical conditions, or landowner issues. The pipeline construction easement would include temporary access roads, staging areas, and stockpiles (Figure 4.16-1). The corridor width for installation or modification of existing electrical power lines would be 50 feet.

The APE for Alternative 4 includes the 160 TAF reservoir inundation area plus an additional buffer that encompasses proposed hiking trails, access roads, recreation facilities, and areas subject to indirect effects such as erosion due to fluctuations in the reservoir water level and increased public access (Figure 4.16-1). This APE for the 160 TAF reservoir also includes a borrow area northeast of the reservoir and west of Walnut Boulevard. Since Alternative 4 does not include any of the new or expanded facilities outside of the watershed that are included in any of the other three alternatives, therefore the APE for Alternative 4 does not extend outside the CCWD watershed (see Figure 14.16-1). The APE for Alternative 4 is encompassed within the APE for Alternatives 1, 2, and 3.

The APE for Alternative 1, 2, and 3 includes 41 historic properties and one sensitive location. The Cultural Resources Technical Report (Appendix G) identifies and evaluates the cultural resources that could be affected by the project alternatives. The maps associated with this document, “Cultural Resource Assessment of the Los Vaqueros Reservoir Expansion Project, Contra Costa County, California” are confidential, and are located, along with the full report, on file at the Northwest Information Center at Sonoma State University. The inundation area of the 275 TAF reservoir, the dam, and the recreation facilities contain 24 of these historic properties and the sensitive location. In addition, geoarchaeological studies have identified areas with a high potential to yield subsurface cultural resources within the District (Meyer, 1996; Meyer and Rosenthal, 1997). These areas are likely to yield prehistoric cultural resources and human burials that have been buried beneath alluvium and are not visible on the modern ground surface. The potential for buried cultural resources in these areas must be considered when evaluating plans for reservoir expansion. Supplemental records searches and pedestrian surveys conducted between 2001 and 2008 indicate that there are 17 historic properties in the proposed pipeline and electrical power corridors and associated facilities. There are no known historic properties in the area proposed

---

3 There are no historic properties associated with the Transfer-Bethany Pipeline.
4 The full report is only available to federal and State agencies with jurisdiction over cultural resources; a redacted version is included in Appendix G.
Los Vaqueros Reservoir Expansion Project EIR, 2011
Figure 4.16-1
Area of Potential Effect

SOURCE: USGS Topographic Quadrangles (Antioch South, Brentwood, Tassajara, Byron Hot Springs, Clifton Court Forebay), 1968-1980; Contra Costa County, 2008; MWH, 2008; and ESA, 2008

NOTE: Kellogg Creek Historic District Boundary is the same as the CCWD Los Vaqueros Watershed Property Line.
for expansion or construction of the new Delta Intake and Pump Station facilities adjacent to Old River. These historic properties are discussed in the impact section.

The APE for Alternative 4 includes 15 historic properties and one sensitive location. These are located within the inundation area of the 160 TAF reservoir, the dam, and the recreation facilities. In addition, geoarchaeological studies have identified areas with a high potential to yield subsurface cultural resources within the District (Meyer, 1996; Meyer and Rosenthal, 1997). These areas are likely to yield prehistoric cultural resources and human burials that have been buried beneath alluvium and are not visible on the modern ground surface. The potential for buried cultural resources in these areas must be considered when evaluating plans for reservoir expansion.

**Archaeological and Historical Setting**

This section provides background information pertinent to the evaluation of cultural resources found in the project area. Los Vaqueros Reservoir is situated in the northern Diablo Ranges along the western edge of the Central Valley and the Sacramento–San Joaquin Delta. The area is composed of a series of low-lying foothills, ranging from 100 feet to 1,100 feet above mean sea level (msl), and northeast-trending valleys that drain into the Central Valley and Delta. Grasslands dominate the lower eastern hills; native grasses were largely supplanted by European varieties with the introduction of cattle and herding into these areas. Oak woodland-savanna with patches of chaparral covers the higher western slopes. Higher-order stream channels host a variety of riparian plant communities (SSUAF, 1992).

The historical Delta region of the Old and Middle Rivers comprises numerous small leveed (reclaimed) islands of tule marshes surrounded by a network of rivers, tributary channels that carry water away from the main river channel, and sloughs (side channels, often dead ends). As a result of farming, levee construction, and canal building, the Delta portion of the study area has been continually disturbed for over 100 years. Elevation ranges from 10 to 14 feet above msl along the elevated levees to below msl in the majority of the Delta region. Today, the area is a mix of nontidal freshwater marsh, seasonal wetlands, upland grassland, and riparian woodland.

The stream channels and associated valley bottoms often harbor prehistoric sites buried beneath sterile alluvium. Because they are not visible on the surface and escape pedestrian survey efforts, these sites—which could contain human burials and be thousands of years old—are most often found by accident during the course of construction projects. In an effort to predict the potential for buried cultural resources, Meyer (1996) conducted a geoarchaeological study of the conveyance corridors associated with Los Vaqueros Reservoir. Meyer analyzed a series of excavated trenches and stream cut banks and identified three successively older buried ancient land surfaces, or paleosols. These paleosols have a high potential of preserving any cultural resources that might have been present when the ancient land surface was exposed and stable. Based on his observations, Meyer developed a predictive model of the relative potential for buried prehistoric cultural resources along the water conveyance system for the original Los Vaqueros Reservoir. His criteria for determining the potential for subsurface cultural resources include the presence or absence of a paleosol buried at some time during the Holocene (the geological period during which humans were present in the area); the degree of preservation or erosion of the
surface of a buried paleosol; the time interval of landform stability represented by a paleosol; the presence or absence of a watercourse; and the relative proximity of a buried paleosol to a present or former watercourse (Meyer, 1996). He ranked the potential for buried cultural resources from lacking potential to having low, moderate, or high potential. The predictive model has been substantiated by subsequent archaeological finds (e.g., Meyer and Rosenthal, 1997) and has been used for planning purposes in Section 4.16.2 to develop mitigation measures including avoidance, and pre-construction testing for the purposes of identifying and recording buried cultural resources.

Evidence gathered from recent archaeological investigations conducted by CCWD indicates that the District, defined by the watershed boundaries, experienced one of the longest sequences of human occupation yet identified in a single locality in the broader San Francisco-Bay-Delta region (Meyer and Rosenthal, 1997). The District prehistory includes occupations from the Lower Archaic (10,000 to 6,000 Before Present [BP]), the Middle Archaic (6,000 to 2,500 BP), the Upper Archaic (2,500 to 1,500 BP), the Upper Archaic/Emergent Period transition (1,500 to 700 BP), and the Emergent Period (1,000 to 200 BP).

The earliest occupation of the area during the Lower Archaic is characterized by high residential mobility as evidenced by short-term occupation sites. Grassland-savanna resources such as seeds and nuts were processed using handstones and milling slabs. Obsidian from the North Coast Ranges was imported or obtained in exchange for the production of hunting and processing tools such as knives and spear points. Burials were interred in tightly flexed positions.

During the Middle Archaic, residential mobility had decreased and base camps were established in the valley. Plant resources from the nearby uplands were preferred over the grassland-savanna resources, and mortars and pestles replaced handstones and milling slabs. Burials were placed in flexed and extended positions, sometimes with shell ornaments and beads. Valley occupants continued to obtain obsidian from distant sources.

During the Upper Archaic, fixed villages were established. Plant resources from both the uplands and grassland-savanna were emphasized, with an increased use of small seeds. Numerous uniformly made shell beads and ornaments are often found with flexed burials, indicating both differences in status and the continuing presence of trade and exchange.

During the Upper Archaic/Emergent Period transition, there was a shift in burial practices and land use patterns. Bedrock milling stations were established at least 1,300 years ago, and more locations in the valley were occupied. In contrast to the preceding period, occupations were brief and were probably associated with resource acquisition and processing. Obsidian use increased from earlier periods, but other exchange items were absent. Burials were interred in extended positions.

By the Emergent Period, fixed villages were established, and bedrock-milling stations continued to be used for bulk processing of grassland-savanna small-seed resources in preference over upland nut and berry crops. Obsidian use increased and was associated with the importation of obsidian cobbles and minimally modified flake blanks exclusively from Napa Valley sources.
Extensive research on the probable Emergent Period occupants and their territories within the Los Vaqueros Reservoir area has concluded that precise tribal boundaries cannot be determined (Milliken, as cited in Fredrickson et al., 1997). Mission records indicate that, at the time of the Spanish settlement in California, 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). The Volvons may have held the peak of Mt. Diablo and the rugged lands to the east of the peak. Their villages were located along the Marsh Creek drainage, and perhaps also at Clayton on the north side of Mt. Diablo or to the southeast in the Kellogg Creek drainage. The Ssaoams lived in the dry hills and tiny valleys around Brushy Peak and Altamont Pass—hilly lands that separated the Livermore Valley from the San Joaquin Valley. They probably held the high lands south and east of Kellogg Creek, including the Vasco Caves. The Ssaoams may have also held the valley of Kellogg Creek itself.

The arrival of the Spanish explorers in 1775 threatened the cultural and political organization of these native groups. The Franciscan priests were intent on changing the native people of California into Catholic agriculturists, which led to a rapid and major reduction in native California populations. The native people living in the Mt. Diablo region (including the present-day Los Vaqueros area) suffered a complete Spanish takeover of their lands by the end of the 18th 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. Although some native people were drawn to the mission life by their interest in Spanish technology and religion, many were opposed to the Spanish settlement, and most were eventually forced to join the missions or were killed. By 1806, almost all native people were living at the missions, and the surviving Ohlone, along with groups of Esselen, Yokuts, and Miwok, were transformed from hunters and gatherers into agricultural laborers (Levy, 1978; Shoup and Milliken with Brown, 1995). Eventually, increased mortality from new diseases, social stress from disrupted tribal trading networks, and environmental stress caused by growing herds of Spanish livestock served to largely eradicate the aboriginal lifestyle (Fredrickson et al., 1997).

The native population continued to decrease in number following the initial Spanish missionization of the San Francisco Bay Area. 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. Mission baptismal records indicate “the last Costanoan tribal groups living an aboriginal existence had disappeared by 1810” (Milliken, 1983). By 1832, the population had decreased to less than 20 percent of its size at the time of initial contact with the Spanish (Levy, 1978). Many of the surviving “converted” natives worked as vaqueros (cowboys) for the missions and spent much time grazing cattle. At that time, the Los Vaqueros area remained unclaimed and was therefore one of the areas the missions used for cattle ranching.

With the secularization of the missions in the mid-1830s, more than 800 patents of land (comprising more than 12 million acres) were issued to individuals by the Mexican government in what is now California (Ziesing, 1997). Many of the mission lands, including those once used for cattle grazing, were quickly divided up among elite Mexican families, leaving the remaining Indian populations of the former missions with nothing. As a result, many native people migrated back to their homelands and often began working as vaqueros or servants for the new owners of the land.
In the early 1840s, the 17,000-acre Rancho Cañada de los Vaqueros was granted to three brothers-in-law, who used the area only sporadically during their short tenure. Only three surviving Ssaoam descendents and two surviving Volvon siblings were identified in the 1840s mission records, and one or more of these individuals may have been working on the Rancho Cañada de los Vaqueros at that time (Fredrickson et al., 1997). Another suggestion of post-mission Native American settlement was found in an observation made in the 1930s regarding the Suñol Adobe (designated as CA-CCO-45O/H), which lies along the edge of the proposed inundation area. In addition, in 1940 an Indian rancheria was located 1,000 feet up the hill but no other information was identified (Hendry and Bowman, 1940). The settlement referenced by Hendry and Bowman may refer to Native American workers living near the Suñols in the 1850s, or simply to prehistoric archaeological site remains (Meyer and Rosenthal, 1997).

During this period, stock raising was the main economic pursuit at Rancho Cañada de los Vaqueros. The land itself was used only for subsistence-level farming to provide fruits and vegetables for the stockraisers’ households (Bramlette et al., 1991). Some domestic structures and corral features were built at this time, but the Rancho Cañada de los Vaqueros area remained sparsely populated.

Deteriorating relations between the United States and Mexico resulted in the Mexican War, which ended with Mexico relinquishing California to the United States under the Treaty of Guadalupe Hidalgo of 1848. The discovery of gold in the Sierra Nevada in 1848 produced a major population increase in Northern California and, although Mexican livestock grants still covered most of the land, immigrants and squatters eventually appeared throughout the area. Land use changes resulted as livestock grazed most native grasses to extinction; woodlands were cut for lumber, railroad ties, and mine timbers; and agricultural development occurred on nearly all arable land.

By the late 1850s, settlers and speculators began investing in the Rancho Cañada de los Vaqueros property (Meyer and Rosenthal, 1997). The validity of various land claims was not resolved by the courts for more than 30 years, and as a result, the Rancho Cañada de los Vaqueros property remained primarily under single ownership. The vast property, which was used for grain farming and ranching, was eventually operated by up to a dozen tenant farmers on parcels of approximately 300 acres each. The land use of this historical period resulted in relatively minimal impacts on cultural resources within the lower watershed, thus preserving much of the material evidence of the past settlement system (Meyer and Rosenthal, 1997).

By the 1870s, the public land on the northern and western edges of the Rancho Cañada de los Vaqueros land grant had been settled by homesteaders. This land was known as the Vasco area (named after a group of Basque cattle ranchers) and was used by the inhabitants for large-scale stockraising and farming. Most of the homesteaders, however, lost their land by the beginning of the 20th century, and small parcels were bought and consolidated for stockraising. The land of the current watershed and surrounding areas remained mostly undeveloped and in the hands of relatively few landowners until plans for a reservoir on this site began taking shape in the 1960s and 1970s (Ziesing, 2000).
Kellogg Creek Historic District

Most significant cultural resources within the watershed now constitute the District. The NRHP 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, 2005).

This district encompasses both archaeological and architectural historic properties from the prehistoric, ethnohistoric, and historic periods. The SSUAF, Inc., 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). In addition to discussing continuous occupation, the SSUAF based its assessment on physiographic features, historic land-holding boundaries, and establishment of a district as a management tool (SSUAF, 1992), and recommended the inclusion of 68 historic properties comprising 69 cultural components within this district. The prehistoric period is represented by 12 open sites, 16 milling stations, 8 rock shelters, and 1 rock art site. A ranch site represents the ethnohistoric period, and the historic period includes 1 ancillary farm or ranch complex, 1 water management feature, 5 stone fences and corrals, 23 farm or ranch headquarters, and 1 site of unknown characteristics (SSUAF, 1992). In addition to these, 2 prehistoric milling stations and 5 water management features recorded by Ziesing in 2000 are considered eligible for NRHP district status, bringing the total of historic properties within this district to 75.

Expected Property Types

Prehistoric property types typically found in the District and in the lands to the east (west of the Delta) include but are not limited to the following generalized types:

- **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 other features such as burials and/or milling stations. The deposits include concentrations of debitage (sharp-edged waste material left over from the creation of stone tools), fire-affected rock, burned and unburned animal bone, and/or shell; this combination of materials is associated with domestic activities. Open sites may also be called occupation sites. Open sites with less diverse materials may represent special-purpose stations.

- **Human Burial Sites** are marked predominantly by the presence of human remains. Other features and associated buried deposits may also be present in the area because human burials are often associated with occupation sites.

- **Milling Stations** are marked predominantly by the presence of bedrock mortars (bedrock milling stations). Such sites may also contain prehistoric cultural materials, such as concentrations of debitage, fire-affected rock, burned and unburned animal bone, and/or shell, or other rock features, but they may also lack associated deposits.
• **Rockshelters** are often found in large rock outcrops and may contain other associated features such as prehistoric cultural materials including concentrations of debitage, fire-affected rock, burned and unburned animal bone, and/or shell, bedrock milling stations, or rock art.

• **Lithic Scatters** are concentrations of materials such as obsidian or chert that represent the remains of stone tool production. This property type typically lacks other cultural materials or features.

• **Rock Art**, painting, pecking, or engraving on rock faces are sometimes found in association with other elements such as bedrock mortars, midden (refuse heap), rockshelters, and subsurface deposits. The rock faces may be 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.

Historic property types commonly encountered in the District but also found in the lands to the east (west of the Delta) 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, privies, cisterns, barns, corrals, other structural remains, non-native vegetation, roads, and fences.

• **Ancillary Ranch or Farm Complex** includes the presence of one or more ranching or farming structures as well as domestic features. These may include living quarters, privies, cisterns, barns, corrals, other structural remains, non-native vegetation, roads, and fences suggesting temporary domestic occupation associated with some animal management feature, such as a corral.

• **Livestock Features** are built elements used for the maintenance of livestock. They include stone and wood corrals and fences.

• **Water Management Features** are built elements used for the storage of water or the manipulation of water sources. They include dams, reservoirs, spring improvements, ditches, creek improvements, and troughs.

• **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, or insulators), ceramics (e.g., table ware or storage containers), metal (e.g., wire, nails, or farm equipment), brick, and/or wood. They are represented solely by the presence of such deposits and do not include any structural remains, standing or collapsed.

**Paleontological Setting**

Paleontological resources within the study area consist of the fossilized remains of plants and animals, including vertebrates (animals with backbones), invertebrates (e.g., starfish, clams, ammonites, and coral marine), and fossils of microscopic plants and animals (microfossils). The age and abundance of fossils depend on the location, topographic setting, and particular geologic formation in which they are found. Fossil discoveries not only provide a historic record of past plant and animal life, but may assist geologists in dating rock formations. Often, fossil discoveries constrain the time period and the geographic range of flora or fauna. The Society of Vertebrate Paleontology (1995) has determined that vertebrate fossils and fossiliferous
deposits are considered significant nonrenewable paleontological resources while invertebrate fossils are not significant paleontological resources, unless they provide undiscovered taphonomic, taxonomic, phylogenetic, ecologic or stratigraphic information. Moreover, certain plant or invertebrate fossils may be designated as significant by a project paleontologist, special interest group, lead agency or local government.

On a regional scale, fossilized plants, animals and microorganisms occur primarily in marine and non-marine (fluvial) sedimentary rock. The potential to preserve fossils in a particular rock formation depends on the depositional environment in which it was formed. For example, fast moving currents that form deposits of gravel and cobbles are less likely to preserve the remains of organisms than gently flowing currents that deposit mud and silt. Thus, the most fossil-bearing geologic units in the APE occur in rocks that formed in relic marine environments such as inland embayments, coastal areas, and extensive inland bays. Over time, these deposits were uplifted and folded, forming the backbone of what is now the Diablo Range. The oldest fossils found in the APE are approximately 100 to 65 million years old (late Cretaceous period), and the youngest are less than 10,000 years old (Holocene period).

Paleontological Sensitivity

To evaluate the paleontological sensitivity of the areas underlying the APE, geologic materials underlying the APE were identified and classified based on the level of evidence indicating the presence of fossils. In order to classify each of the formations for paleontological sensitivity, each source of information was queried for evidence of fossil resources, and sensitivity ratings were assigned based on the results (Table 4.16-1).

Overall, the University of California, Museum of Paleontology (UCMP) database lists 2,395 fossil localities in Contra Costa County, of which 270 are vertebrates. In Alameda County, there are 394 fossil localities, of which 96 are vertebrates. Several fossil localities occur along Byron-Kellogg Road, Vasco Road, Marsh Creek, Byron Creek and numerous other unnamed localities (UCMP, 2008). Chevron’s database lists approximately 904 microfossils, and Exxon Mobil lists approximately 244 microfossils within the USGS 7.5-minute quadrangles where the project area is located (Woodward Island, Brentwood, Clifton Court Forebay, Byron Hot Springs, Tassajara, and South Antioch). This indicates that the area as a whole is rich in fossil resources.

The majority of fossil discoveries in the UCMP database were invertebrates or microfossils. However, several vertebrate fossils were discovered that may occur in or around the APE, namely within the Tulare, Neroly, and Markley Formations, and the Great Valley Sequence (UCMP, 2008). The database contained vague locality names such as “Delta Pumping Plant,” “Byron West 1,” and “California Aqueduct 3,” so exact locations of these finds could not be determined. The criteria used to assign the various paleontological sensitivities are as follows:

- **Low**: Rock formations that are not identified as fossiliferous in published geologic maps, have no records of fossil discoveries, or are otherwise unlikely to contain fossils due to the age or depositional environment of the formation.


TABLE 4.16-1
PALEONTOLOGIC POTENTIAL OF GEOLOGIC FORMATIONS UNDERLYING THE APE

<table>
<thead>
<tr>
<th>Rock Formation</th>
<th>Age/Type</th>
<th>Geologic Maps&lt;sup&gt;a&lt;/sup&gt;</th>
<th>UCMP Records&lt;sup&gt;b&lt;/sup&gt;</th>
<th>Published Literature</th>
<th>Sensitivity Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>Basin, Natural Levee and Peat Deposits</td>
<td>Holocene/Stream &amp; Estuarine</td>
<td>No Information</td>
<td>Unknown</td>
<td></td>
<td>Low</td>
</tr>
<tr>
<td>Alluvial Fan and Fluvial Deposits</td>
<td>Quaternary/Non-Marine</td>
<td>Possible freshwater mollusks/vertebrates</td>
<td>Unknown</td>
<td></td>
<td>Moderate</td>
</tr>
<tr>
<td>Tulare Formation</td>
<td>Pliocene/Non-Marine</td>
<td>No Information</td>
<td>3</td>
<td></td>
<td>High</td>
</tr>
<tr>
<td>Neroly Formation</td>
<td>Miocene/Non-Marine</td>
<td>No Information</td>
<td>80</td>
<td></td>
<td>Very High</td>
</tr>
<tr>
<td>Markley Formation</td>
<td>Eocene/Marine &amp; Non-Marine</td>
<td>No Information</td>
<td>134</td>
<td>Barron et. al., 1984</td>
<td>Very High</td>
</tr>
<tr>
<td>Dominigene Formation</td>
<td>Eocene/ Marine &amp; Non-Marine</td>
<td>No Information</td>
<td>92</td>
<td>Barron et. al., 1984</td>
<td>Very High</td>
</tr>
<tr>
<td>Great Valley Sequence</td>
<td>Cretaceous/ Marine &amp; Non-Marine</td>
<td>Formaninera&lt;sup&gt;c&lt;/sup&gt;</td>
<td>Unknown</td>
<td></td>
<td>High</td>
</tr>
</tbody>
</table>

<sup>a</sup> “No Information” means that geologic unit descriptions did not specifically mention the presence of fossils in the rock formation.

<sup>b</sup> The UCMP database was queried for rock formations within Contra Costa and Alameda Counties. “Unknown” indicates that fossils of the same age were found, but there was no information to relate the fossil find to the specific deposit or formation.

<sup>c</sup> Formaninera are small, one-celled, mostly marine animals which secrete shells of calcium carbonate ranging in size from microscopic to a few centimeters across.

SOURCES: Helley and Graymer (1997); Graymer et. al. (1994); UCMP (2008); Barron et. al. (1984); Graham J.J. (1950).

- **Moderate**: Rock formations that are identified as containing fossils in published geologic maps, but where there are no records of fossil finds in the rock formations in the project area.
- **High**: Rock formations that contain numerous records of fossil finds, or few records of vertebrate fossils.
- **Very High**: Rock formations that contain numerous records of vertebrate fossils, or where published literature provides specific information on the significance of fossil finds.

In summary, only the low lying, eastern parts of the APE underlain by peat and basin deposits have a low potential to uncover paleontological resources. The remaining portions of the APE have geologic materials with a moderate to very high potential to uncover paleontological resources (Figure 4.16-2). The Neroly, Markley, Dominigene and Meganos Formations were assigned very high sensitivities (Table 4.16-1, above) because of the numerous fossil records found in a search of the UCMP database. In determining the rocks that underlie the APE, an additional 50 meters buffer was added to the APE in order to account for uncertainty in the contacts between rock formations that is inherent in geologic mapping.

Several publications have discussed the presence of fossil resources in the formations that underlie parts of the APE. Graham (1950) describes a scientifically significant discovery of two...
SOURCE: Graymer, Jones and Brabb, 1994; Helley and Graymer, 1997; USDA, 2006; UCMP, 2008; and ESA, 2008

Figure 4.16-2
Paleontological Sensitivity of the APE
Foraminifera microfossils in the uppermost silt member of the Meganos Formation. The Foraminifera species, *Elphidium clarki* and *Operculina campi*, were discovered in augered holes east of Kellogg Creek (SE ¼ SW ¼, Section 6, Township 1 South, Range 3 East on the USGS Byron Hot Springs quadrangle). The discovery of these fossils allowed paleontologists to further describe the geographic range of the species, and the Elphidium fossils may be the oldest of that type in North America (Graham, 1950). Additionally, the Sidney Flat Shale and the Kellogg Shale, both of which occur in the area, are known to contain a wide variety of invertebrate fossils, including foraminifers, coccoliths, silicoflagellates, and diatoms (Barron et. al., 1984). The Sidney Flat Shale is a layer within the Markley Sandstone, and the Kellogg Shale occurs west of Byron. The fossil assemblages have aided geologists in dating the rocks and correlating them with other units in California. The applicability of these discoveries to further understand the geologic record makes this a significant paleontological resource.

**Soils**

Surface soils lack a burial mechanism to preserve organisms and therefore do not contain paleontological resources. However, a description of their location and depth is important in assessing the potential impact that proposed project components may have on the underlying bedrock. Additional discussion on soils and their occurrence is provided in Section 4.4, Geology, Soils, and Seismicity.

Six soil associations (e.g. different types of soils associated with a common landform such as valleys, ridges, basins, etc.) are found in the project area, all of which are moderately deep to very deep. The Brentwood-Rincon-Zamora association, Capay-Sycamore-Brentwood association, and Sacramento-Omni association occur on valley floors and floodplains. The Marcuse-Solano-Pescadero association forms on the rims of basins. The Rindge-Kingile association occurs on drained mucks in the Delta and is more than 60 inches deep. The Altamont-Diablo-Fontana association, which forms on upland terrain, is classified as moderately deep to deep (Natural Resources Conservation Service (NRCS), 2008). The Sacramento Series is the deepest of these soils, with a depth of 77 inches to bedrock. Generally, the depths to bedrock beneath soils decrease as slopes increase away from valley floors.

**Existing Conditions**

Existing conditions include historic properties and areas with a high potential to contain as yet undiscovered, buried cultural resources and human remains within the proposed APE. The Cultural Resources Technical Report (Appendix G) contains a detailed and technical exposition of the methods, identification, and evaluation of the cultural resources within the proposed APE, and provides a list of historic properties: those cultural resources evaluated to have historical significance. Methods used to determine the existing conditions for the project include records searches of archaeological, historical, and paleontological resources, application of the geoarchaeological predictive model, and pedestrian surveys. Each of these methods is summarized below.
Records Searches
The cultural resources of the District were studied extensively by CCWD starting in the mid-1980s. The EIR/EIS for the Los Vaqueros Reservoir was certified in 1993, and the reservoir was initially filled with water in 1998. Since then, the cultural resources of the District have been managed and monitored by CCWD staff. In early 2002, CCWD and the consultant team for the project began to thoroughly review all documentation regarding cultural resources in the reservoir expansion area and to verify the locations of selected sites in areas that would be directly affected by reservoir expansion. This environmental evaluation effort was concentrated within the District, although data were also collected for the potential conveyance corridor options 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); March 20, 2007 (NWIC File No. 06-1316) and April 16, 2008 (NWIC File No. 07-1482). Staff transferred locations of known cultural resources and previous cultural resources studies within the study area and adjoining 0.25-mile area from their base maps onto 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 (OHP) 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 Vaqueros plat map; 1861 Rancho Los Meganos plat map; 1862 General Land Office (GLO) plat maps T1N R2E, T1N R3E, T1S R2E, and T1S R3E; 1871 GLO plat map T2S R2E; Smith & Elliott (publishers) map of Contra Costa County and part of Alameda County (1879); 1898 (reprinted 1947) USGS Mt. Diablo quadrangle; and the 1916 (reprinted 1948) USGS Byron Hot Springs quadrangle.

Geoarchaeological Predictive Model
Meyer (1996) and Meyer and Rosenthal (1997) developed a predictive model using a geoarchaeological study and construction monitoring and excavation results from the original 100 TAF reservoir within the Kellogg Creek Historic District. The map and table provided by Meyer (1996) summarizing the results of the geoarchaeological study identifies the relative potential for buried cultural deposits within the original pipeline corridors for the 100 TAF reservoir. The application of these results to the proposed project APE shows that there is a moderate to high potential for significant, ancient, and deeply buried cultural resources and human remains in the vicinity of the existing dam as well as downstream of the dam in the Kellogg Creek valley parallel to Walnut Boulevard (corresponding to the mid-section of the Transfer-LV Pipeline). The model only applies to the valley floor of the watershed and does not predict the potential for discovery of cultural resources or human remains in the upper elevations of the watershed, in pipeline or power right-of-ways (ROW) outside of the watershed, or at the Delta intake facilities (i.e., Old River and/or new Delta) sites. See Figure 4.16-3.
Pedestrian Survey of the Reservoir, Pipeline Corridor, and Associated Facilities

The majority of the APE has been previously surveyed for cultural resources. Additional surveys were conducted for the reservoir expansion area. In April 2004, a selection of cultural resources around the perimeter of the existing reservoir were relocated in the field using a global positioning system (GPS) receiver and mapped using a geographic information system (GIS). The sites were assessed for any unreported disturbance that might have affected their NRHP-eligibility status.

In May, June, and November 2007, and February and April 2008, consultants 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 feet. 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-meter 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.

Paleontological Information Sources

In order to describe the paleontological sensitivity of the geologic materials underlying the APE, information was derived from several sources that describe the locations of fossil discoveries and the general nature of geologic deposits.

- **Soil Maps** (NRCS, 2008): Surface soils do not contain paleontological resources due to the lack of a burial mechanism to preserve organisms. However, an evaluation of their location and depth is important in assessing the potential impact that project elements may have on the underlying bedrock. For example, particularly deep soils may protect the underlying geology from disturbance in construction activities.

- **Geologic Maps** (Graymer et. al., 1994; Helley and Graymer, 1997): Geologic maps of bedrock and surficial deposits provide information on the rock formations underlying the APE. The depositional environment of the rock formations underlying a site provides a general idea of whether fossils would be preserved (eg. gentle marine deposits versus a landslide mass). Often, the geologic description of the units identifies those that are fossil bearing.

- **The University of California Museum of Paleontology** (UCMP, 2008): UCMP has the largest paleontological collection of any university museum in the world. Researchers have compiled fossil information from a large number of sources and catalogued them by species, location, age, and the rock formation in which they were discovered. Searching the database by rock formation can give a general idea of how fossiliferous it is. However, detailed locality information is usually unavailable and it can be difficult to find the exact location of a fossil record.
• **Exxon Mobil Corporation and Chevron Corporation Fossil Databases** (Brabb, E.E. and Parker J.M. 2003; Brabb, E.E. 2005): In recent years, Exxon-Mobil and Chevron have released paleontological data on microfossils previously kept confidential. Since the 1930s, petroleum companies have collected microfossils to aid their efforts to determine the age and depositional environments of the formations where these fossils are found. The ability to obtain geographic coordinates or the USGS 7.5 minute quadrangles where the fossils are located provides more detailed location information than the UCMP collections records.

• **Published Literature** (Graham, 1950; Barron et. al., 1984): A literature search was performed using the geologic formations as key words. Several publications were found that discuss the presence of microfossils in formations that underlie the APE. These publications are listed in references for this section.

**Summary of Findings**

The historic properties and areas of high potential to contain undiscovered cultural resources, as well as paleontological resources, that fall within the proposed APE of the reservoir expansion and associated facilities are summarized in this section and presented by project component. It should be noted, that prior to development of this EIS/EIR, a Facilities Siting exercise was conducted to develop and evaluate potential facility alternatives. Specific siting criteria were developed for cultural resources to determine high, medium, or low constraint based on a defined rating scale resulting in the avoidance of various cultural resources through rerouting or elimination of an alternative route or facility location.

**Los Vaqueros Reservoir Expansion**

Eighteen known historic properties and one sensitive location (P-07-000532 the Reburial Site) lie within the 275 TAF reservoir portion of the APE. These consist of CA-CCO-9, -427H, -445H, -450/H, -452, -458/H, -459, -462, -463, -464, -467/H, -468, -469, -470H, -636, -696, -725, and P-07-000791. The area has high potential for undiscovered buried cultural resources (including human burials) within the valley floor occupied by the reservoir, and moderate potential in the hillslopes above the valley bottom.

Fifteen known historic properties and one sensitive location (P-07-000532 the Reburial Site) lie within the 160 TAF reservoir portion of the APE. These consist of CA-CCO-9, -427H, -445H, -450/H, -458/H, -459, -462, -463, -468, -469, -470H, -636, -696, -725, and P-07-000791. The area has high potential for undiscovered buried cultural resources (including human burials) within the valley floor occupied by the reservoir, and moderate potential in the hillslopes above the valley bottom.

Both the 275 TAF and 160 TAF reservoir APE have a high to moderate potential for paleontological resources.

**Dam Modification**

Three known historic properties lie within the immediate vicinity of the proposed expanded dam structure for the 275 TAF reservoir expansion: CA-CCO-458/H, -637, and -696. A single historic property, CA-CCO-637, lies within the footprint of the proposed expanded dam structure for the
160 TAF reservoir. There is also a high potential for undiscovered buried cultural resources (including human burials), and high to moderate potential for paleontological resources, in the vicinity of the existing dam.

**Borrow Areas**
No known historic properties are within the proposed shell borrow areas for the 160 TAF and 275 TAF reservoir alternatives west of the dam. There is a low potential for undiscovered buried cultural resources (including human burials) primarily at the foot of the hills where the borrow area would be placed. However, there is high potential for paleontological resources. There are no known historic properties within the proposed core borrow area for the 160 TAF reservoir alternative west of Walnut Boulevard north of the dam; however, there are two historical properties adjacent to the borrow area, and there is a moderate potential for undiscovered buried cultural resources (including human burials) and paleontological resources. Although testing for the geoarchaeological predictive model did not extend all the way into the proposed borrow area, it is located within the same alluvial valley that was partially tested and yielded a finding of moderate subsurface archaeological potential (Figure 4.16-3).

**Staging Area**
No known historic properties are within the 15 acre staging area in the northern end of the watershed. The area has low potential for undiscovered buried cultural resources (including human burials), and high to moderate potential for paleontological resources.

**Delta Intake Facilities**
No known historic properties are within either the Old River Intake and Pump Station Expansion or the new Delta Intake and Pump Station APE. The areas have low potential for undiscovered buried cultural resources (including human burials) and paleontological resources.

**Delta-Transfer Pipeline**
Nine newly recorded cultural resources were discovered within the Delta-Transfer APE as a result of the records search and field survey. These include four flood control channels (also called irrigation ditches), one irrigation canal, one concrete culvert, one railroad grade, one transmission line, and one water management feature. Because the resources have not been evaluated for their NRHP eligibility, they are assumed to be potentially eligible for listing on the NRHP for the purposes of this analysis, and any impacts to them would be considered significant. All of these resources date from the historic period. However, construction of the Delta-Transfer Pipeline would employ bore and jack technique near these utility crossings, railroad crossings, canal crossings, and would therefore avoid impacts to these known cultural resources. The area has low potential for undiscovered buried cultural resources (including human burials). Regarding paleontological resources, the majority of the alignment has low potential; however, approximately 1 mile of the alignment due east of the Transfer Facility has moderate and very high potential for paleontological resources.
Transfer Facility Expansion
No known historic properties are within the Transfer Facility Expansion APE. The area has low potential for undiscovered buried cultural resources (including human burials) but very high potential for paleontological resources.

Transfer-LV Pipeline
Two historic properties are within the Transfer-LV Pipeline APE, between the Transfer Facility and the Inlet/Outlet Pipeline corridor. These include CA-CCO-397 and -535H. The corridor passes through an area of high potential for encountering as yet undiscovered buried prehistoric resources (Meyer, 1996). There is also high to moderate potential for paleontological resources.

Inlet/Outlet Pipelines
Four known historic properties fall within the Inlet/Outlet Pipeline APE (CA-CCO-446H, -447/H, -726/H, and -755). In the vicinity of the dam, this alignment passes through an area of high potential for encountering as yet undiscovered buried prehistoric resources, including human burials (Meyer, 1996). There is also high to moderate potential for paleontological resources.

Transfer-Bethany Pipeline
Two known historic properties (CA-CCO-596H and -597) are within the Transfer-Bethany Pipeline APE. The area has low potential for undiscovered buried cultural resources (including human burials). There is very high potential, interspersed with areas of moderate potential, for paleontological resources in the northern half of the alignment (i.e., north of where the pipeline begins to traverse along Armstrong Road). Continuing south, there is generally moderate potential, interspersed with high potential until the vicinity of the spoils disposal area, where the potential for paleontological resources generally becomes high, interspersed with moderate potential, until the terminus of the alignment at Bethany Reservoir.

Power Supply
Four known historic properties lie within the portion of the APE for Power Option 1 that is co-located with the Delta-Transfer Pipeline. No known historic properties are within the remainder of the Power Option 1 APE and the entirety of the Power Option 2 APE. Both Power Options have low potential for undiscovered buried cultural resources (including human burials). For Power Option 1, the majority of the project area would have low potential for paleontological resources, except for about 1 mile of the alignment due east of the Transfer Facility which has moderate and very high potential for paleontological resources. For Power Option 2, the Western component from the Tracy Substation to just north of the South Bay Aqueduct would have moderate potential for paleontological resources, while the remainder of the alignment to the intake facilities would have low potential. For the PG&E component, the substation site within the watershed would have very high potential while the alignment to the Transfer Facility would have moderate potential for paleontological resources.
Recreational Facilities

**Marina Complex.** No known historic properties are within the Marina Complex at the northern end of the reservoir (Alternative 1, 2, and 3), and none on the proposed site on the southern shore of the reservoir (Alternative 4). The facility would be placed within the borrow area west of the dam after removal of the borrow materials and preparation of the remaining ground surface. The area has no potential for undiscovered buried cultural resources (including human burials) because the underlying sediments would be excavated during dam construction (as discussed above for the proposed dam modification), and because the marina construction would not involve additional disturbance of underlying sediments. However, there is high potential for paleontological resources.

**Interpretive Center.** No known historic properties are within the site proposed for the Interpretive Center (Meyer, 1996). The area has low potential for undiscovered buried cultural resources (including human burials) and high potential for paleontological resources.

**Hiking Trails and New Access Roads.** The Westside Access Road/Trail associated with Alternatives 1, 2, and 3 would pass through or nearby five known historic properties, including CA-CCO-450/H, -462, -463, -464, and -467/H. The Westside Access Road/Trail associated with Alternative 4 would pass through or nearby six known historic properties including CA-CCO-450/H, -462, -463, -468, -725, and P-07-000791. There is a moderate potential for undiscovered buried cultural resources (including human burials) and a high potential for paleontological resources.

The Eastside Trail would pass nearby two historic properties, including CA-CCO-455 and -456, which would be visible from the trail. There is a low potential for undiscovered buried cultural resources (including human burials) and generally high potential for paleontological resources.

**Other Facilities.** No known historic properties are associated with other facilities within the Marina Complex for Alternatives 1, 2, and 3, which includes the Fishing Piers, Picnic Areas, Restrooms, Parking and Access Road from Walnut Boulevard. The Alternative 4 potential fishing pier locations at the north end of the reservoir have no known historic properties. The areas associated with these other facilities have low potential for undiscovered buried cultural resources (including human burials) and high potential for paleontological resources.

**Relocated Recreational Facilities – Alternative 4 Only.** Alternative 1 provides for all recreational facilities to be relocated up slope of their existing locations. The proposed area for relocation of facilities at the southern end of the reservoir have no known historic properties, low potential for undiscovered buried cultural resources, and high potential for paleontological resources.

**Impact Mechanisms**

The following section considers the potential impact mechanisms on the known historic properties of each component of the project alternatives. All impacts identified for historic properties also apply to the District as a whole, because all historic properties are contributors to the District. The category “district” implicitly recognizes that the importance of the whole is
greater than the sum of its contributing parts; the research values of contributing elements in the
district can be fully understood only in relation to each other. Thus, invoking the district
designation has implications for the treatment of historic properties. By definition, the loss of a
single contributing element within an NRHP district has a deleterious impact on the integrity and
research potential of the remaining contributing elements and on the district as a whole. Thus,
if a project component affects one contributing element of the district, it affects the entire
district. Areas of high potential to yield buried cultural deposits are also noted.

The construction and operation of project components could affect 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 excavation of 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.

Los Vaqueros Reservoir Expansion / Dam Modification

The construction schedule for the 275 TAF reservoir and dam, described in more detail in
Chapter 3, Project Description, includes drawdown of the existing 100 TAF reservoir, a three-
year period of construction in which the reservoir will be empty, and subsequent inundation to the
275 TAF level. The impact mechanisms associated with this construction schedule include:

- **Construction period drawdown**: Exposure of currently inundated sites to increased erosion
  and access could lead to vandalism and illegal collecting.

- **Movement of borrow area materials**: The movement of heavy equipment between the
  western borrow area and the dam site may cause mixing and crushing of near-surface
  archaeological deposits.

- **Dam construction**: Mass excavation of a new foundation for the dam expansion would
  remove materials to the level of bedrock, a depth of greater than 50 feet in some areas. Any
  archaeological sites would be removed and destroyed. In addition, any additional
  excavation associated with the new dam would cause ground disturbance and have the
  potential to directly affect historic properties.

- **Staging**: The use of the staging area downstream of the dam would be limited to the
  movement and storage of materials, use of contractor trailers and storage bins, and parking.
  There is a potential for compaction, mixing, and crushing of near-surface cultural resources,
  if any are present.

- **Inundation**: Prior to inundation, any buildings and structures within the reservoir pool would
  be demolished; archaeological sites with surface and near surface components would be
  covered with sediment and water and could be exposed to mixing and crushing. SHPO
  typically considers inundation to be an adverse effect.

When filled, the reservoir would be subject to periodic fluctuations in water level. The potential
impact mechanisms associated with operation and maintenance of the reservoir include:

- **Cultural resources** within the fluctuation zone would be exposed to increased erosion.
• **Access** to historic properties in both the fluctuation zone and sites within a few hundred feet of the water’s edge would be increased with maintenance and recreational use, possibly leading to adverse effects from vandalism and illegal collecting.

**Old River Intake and Pump Station Expansion**

Expansion of this facility, as proposed under Alternative 3 only, would not require any physical site modification. There would be no ground disturbance, changes in site layout or changes to structures required. As a result there would be no physical disruption of the site. The expansion effort involves replacing existing pumps with higher horsepower pumps, replacing steel plates in existing unused bays with state-of-the-art positive-barrier fish screens, and installing a second surge tank in the spot reserved for it next to the existing tank.

**New Delta Intake and Pump Station**

Construction activities for the new Delta Intake and Pump Station are described in Chapter 3 and in summary would involve the following impact mechanisms:

- **Clearing** and grubbing of the ground.
- **Excavating** and/or pile driving for foundations and utilities trenches.
- **Increased** access and the potential for adverse impacts on historic properties through vandalism and illegal collecting.

**Pipelines**

Installation of the pipelines is described in detail in Chapter 3 and involves the following potential impact mechanisms:

- **Trenching**: Pipeline installation would remove and destroy any historic properties within the path of the trench to depths of up to 55 feet.
- **Tunneling**: Pipeline installation would remove and destroy any historic properties within the boring pits and the path of the tunnel.
- **Soil Disposal**: Disposal of soils from tunneling would result in the crushing, mixing, and/or compaction of near-surface cultural remains.
- **Temporary access roads, staging, and stockpiling**: Heavy equipment travel, storage, and movement of heavy materials adjacent to the trench and within the 200-foot-wide construction easement (or 300-foot-wide for Transfer-Bethany Pipeline⁵) would result in the crushing, mixing, and/or compaction of near-surface cultural resources and human remains. Any aboveground features, such as petroglyph boulders or bedrock milling stations lying outside of the trench but within the ROW, could be damaged by heavy equipment.
- **Operation and maintenance**: When in place, access roads to the pipelines would increase the potential for adverse impacts on historic properties through vandalism and illegal collecting.

---

⁵ The actual construction area used would be narrower in some places due to environmental constraints (e.g., to avoid wetlands), physical conditions, or landowner issues.
Transfer Facility Expansion
Construction activities for the Transfer Facility Expansion are described in Chapter 3 and in summary would involve the following impact mechanisms:

- **Clearing** and grubbing of the ground.
- **Excavating** for foundations and utilities trenches.
- **Increased** access and the potential for adverse impacts on historic properties through vandalism and illegal collecting.

Power Supply
Electrical power facilities could include installation of new power lines, upgrading of existing powerlines, and construction of new substations. Installation of new power/distribution lines would likely involve:

- **Augering** holes for the 50-foot tall poles at up to 300-foot spans.
- **Temporary** 6,250 square feet pull and tension sites within the ROW. Temporary impacts could include crushing, mixing, and/or compaction of near-surface cultural resources and human remains due to use of heavy equipment at the sites.
- **Temporary** access road along the length of the powerline. The temporary access road impacts including clearing and grubbing of the ground, heavy equipment travel along the roadbed, and storage of heavy materials adjacent to the roadbed would result in the crushing, mixing, and/or compaction of near-surface cultural resources and human remains.

Upgrading existing powerlines would involve one of the following:

- **Placing** new insulator arms and additional conductors on existing poles.
- **Pole** for pole replacement of the existing powerline with more powerful transmission line. It would include removal of existing poles, backfill and/or auger of holes, installation of new poles, and removal and replacement of new conductor.
- **Augering** holes for a new set of pole and conductors installed parallel to the existing powerline.

Construction of substations would require approximately 2 acres of land for a permanent fenced facility and a permanent access road. Construction activities would most likely involve:

- **Clearing** and grubbing of the ground.
- **Excavating** for poles and access road.
- **Increased** access and the potential for adverse impacts on historic properties through vandalism and illegal collecting.

Recreation Facilities
Construction, operation, and maintenance of the recreational facilities (e.g., marina, day-use facilities, and parking) would most likely involve:
Clearing and grubbing of the ground.

Excavating and/or pile driving for foundations and utilities trenches.

Increased access and the potential for adverse impacts on historic properties through vandalism and illegal collecting.

Construction of the western access road and hiking trail, and the eastside trail would involve:

- **Clearing**, grubbing, and excavation for the road bed.
- **Temporary** access road construction, staging, and stockpiling. Heavy equipment travel, storage, and movement of heavy materials adjacent to the roadbed would result in the crushing, mixing, and/or compaction of near-surface cultural resources or human remains. Any aboveground features, such as petroglyph boulders or bedrock milling stations lying outside of the trench but within the right-of-way, could be damaged by heavy equipment.

Maintenance and use of the western access road and hiking trail, and the eastside trail would lead to:

- **Increased** access and the potential for adverse impacts on historic properties through vandalism and illegal collecting.

## 4.16.2 Environmental Consequences

### Methodology

The proposed project description was analyzed with reference to the locations and nature of each historic property within the APE. Each anticipated impact (e.g., trenching, earth disturbing activities, etc.) was evaluated with respect to whether it could cause any of the adverse effects listed on any of the historic properties in the previous section, and by extension, on the District as a whole, as all historic properties are contributors to the District. Therefore, if the project alternative impacts one historic property within the District, then impacts to the District as a whole would occur. In addition to historic properties, areas of high potential for buried cultural resources, human remains and paleontological resources are also considered with respect to potential adverse effects. When the following discussion of impacts and significance criteria refers to CEQA, the term historical resource is used to indicate a historically significant cultural resource. When the discussion refers to Section 106 of NHPA, or NEPA, the term historic property is used to indicate a historically significant cultural resource. In the Los Vaqueros Reservoir Expansion Project, all cultural resources that have been determined to be significant under Section 106 of the NHPA are also significant under CEQA (Guidelines Section 15064.5).

### Significance Criteria

The project would cause a significant cultural or paleontological resources impact if it would:

- Cause a substantial adverse change in the significance of a historical resource as defined in CEQA Guidelines Section 15064.5
• Cause a substantial adverse change in the significance of an archaeological resource pursuant to CEQA Guidelines Section 15064.5

• Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature

• Disturb any human remains, including those interred outside of formal cemeteries

Under CEQA Guidelines Section 15064.5 and PRC Section 5024.1, all cultural resources that have been listed in or determined eligible for listing in the NRHP (such as the District) are also significant historical resources under California law. A resource that is not federally eligible or listed is still a significant resource under CEQA if it is:

• Determined by the State Historical Resources Commission to be eligible for listing, or listed, in the California Register of Historical Resources;

• Included in a local register of historical resources, as defined in PRC Section 5020.1(k), unless the preponderance of the evidence demonstrates that it is not historically or culturally significant; or

• Determined by the lead agency, on the basis of substantial evidence in light of the whole record, to be historically significant or significant in the architectural, engineering, scientific, economic, agricultural, educational, social, political, military, or cultural annals of California.

Under CEQA, an archaeological resource may be a: 1) historical resource; 2) unique archaeological resource; or 3) non-unique archaeological resource, in descending order of mitigation requirements. All of the historic properties listed or eligible for listing on the NRHP are also listed or eligible for listing on the CRHR. Archaeological resources listed or eligible for listing on the NRHP and the CRHR are historical resources. There are no properties within the APE that are listed in the CRHR but not listed in the NRHP, and no known unique archaeological resources (recognized by CEQA, but not by NHPA) in the project area. Section 15064.5 of the CEQA Guidelines states that a project may have a significant environmental effect if it causes “substantial adverse change” in the significance of a “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 a historical resource would be materially impaired” (CEQA Guidelines 1998 Section 15064.5[b]).

Under the NHPA Section 106, and for compliance with NEPA, an undertaking may have an adverse effect when the effect on a 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 damage to all or part of the property;

• Alteration of a property that is not consistent with the Secretary of Interior’s standards for the treatment of historic properties and applicable guidelines;
• Removal of the property from its historic location;
• Change of the character of the property’s use or of physical features within the property’s setting that contribute to its historic significance;
• Introduction of visual, atmospheric or audible elements that diminish the integrity of the property’s significant historic features; and
• Neglect of a property resulting in its deterioration, except where such neglect and deterioration are recognized qualities of a property of religious and cultural significance to an Indian tribe.

Generally, a project that follows the Secretary of Interior’s standards and guidelines for treatment of historic properties shall be considered as mitigated to a level of less than a significant impact on a historical resource for the purposes of CEQA.

Impact Summary

Table 4.16-2 provides a summary of the impact analysis for issues related to cultural and paleontological resources.

<table>
<thead>
<tr>
<th>Impact</th>
<th>Project Alternatives</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Alternative 1</td>
</tr>
<tr>
<td>4.16.1: Construction and management of project components would cause a substantial adverse change in the significance of a historical and/or unique archaeological resource as defined in Section 15064.5 or historic property or historic district, as defined in Section 106 of the NHPA (36 CFR 800), or in a previously undiscovered cultural resource</td>
<td>LSM</td>
</tr>
<tr>
<td>4.16.2: Ground-disturbing activities could encounter and destroy paleontological resources in certain geologic formations underlying the project area</td>
<td>LSM</td>
</tr>
<tr>
<td>4.16.3: Construction and management of project components could disturb human remains, including those interred outside of formal cemeteries</td>
<td>LSM</td>
</tr>
<tr>
<td>4.16.4: Construction and management of project components would contribute to adverse cumulative impacts to cultural and/or paleontological resources</td>
<td>LSM</td>
</tr>
</tbody>
</table>

NOTES:

SU = Significant and Unavoidable
LSM = Less-than-Significant Impact with Mitigation
LS = Less-than-Significant Impact
NI = No Impact
Impact Analysis

CEQA terminology is used for consistency and simplification in this section, except where Section 106 of the NHPA is explicitly referenced. The impacts analysis is based on the Cultural Resources Assessment of the Los Vaqueros Reservoir Expansion Project, Alameda and Contra Costa Counties, California (see Appendix G).

No Project/No Action Alternative

Under the No Project/No Action Alternative, no new facilities would be constructed and no existing facilities would be altered, expanded, or demolished; therefore no ground-disturbing activities would occur. Consequently, no indirect or direct impacts on cultural or paleontological resources would occur.

Impact 4.16.1: Construction and management of project components would cause a substantial adverse change in the significance of a historical and/or unique archaeological resource as defined in Section 15064.5 or historic property or historic district, as defined in Section 106 of the NHPA (36 CFR 800), or in a previously undiscovered cultural resource. (Less than Significant with Mitigation).

Alternative 1

Los Vaqueros Reservoir Expansion

Eighteen known historical resources and the reburial site (a sensitive site) would be affected by the Los Vaqueros Reservoir Expansion 275 TAF. The potential impacts on each of these resources are summarized in Table 4.16-3. The reservoir expansion is located within the watershed, which is listed as a Historic District on the NRHP. All of the historical resources in the watershed that would be impacted by Alternative 1 are contributing elements to this Historic District.

Historical resources that would be significantly impacted include both prehistoric sites and historic sites. The prehistoric occupation and use of the watershed was organized around the location and availability of resources, such as acorns, fresh water, bedrock outcrops, and marshes, among other factors. Many of these resources are located at the lower elevations of the watershed. Expansion of the reservoir would significantly affect an entire class of prehistoric occupation sites. Similarly, the historic occupation of the watershed was in part governed by resource location and setting, and expansion of the reservoir would continue the process begun with the original reservoir that permanently and significantly impacted those historic sites in lower elevations.

The construction schedule includes drawdown of the existing 100 TAF reservoir, a 3-year period in which it would be empty (during dam construction), and inundation to the 275 TAF level. After the reservoir is re-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 historical resources to increased erosion and access which could lead to vandalism and illegal collecting.
### TABLE 4.16-3
HISTORICAL RESOURCES AND POTENTIAL IMPACTS FROM CONSTRUCTION, OPERATION, AND MAINTENANCE OF THE LOS VAQUEROS RESERVOIR EXPANSION IN THE RESERVOIR ZONE

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

- During periods when the water levels are highest, some sites could be inundated. Inundation is typically considered an adverse effect.
- As a result of periodic water level fluctuations during normal operation of the reservoir, historical resources 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 nine currently inundated historical resources (CA-CCO-427H, 445/H, 450/H, -458/H, -459, -469, -470H, -636, -696) and the reburial site P-07-000532 to erosion and the effects of increased access, which could include vandalism and illegal collecting. Some of these sites are extensive and only partially inundated by the 100 TAF reservoir. Inundation of the expanded reservoir to the new 275 TAF level would more fully inundate these (including CA-CCO-427H, 450/H, and -459) and subject three historical resources (CA-CCO-9, -468, and P-01-000791) to inundation for the first time. This inundation would re-submerge those
six historical resources that are currently fully inundated (CA-CCO-445/H, -458/H, -469, -470H, -636, -696,) and the reburial site P-07-000532). The drawdown and inundation could also affect undiscovered cultural resources. The archaeological components of CCO-450/H are eligible for listing on the NRHP and CRHR and would be inundated. The buildings at CCO-450/H have been determined to be ineligible for listing on the NRHP or the CRHR and would be demolished prior to inundation. An additional six historical resources (CA-CCO-452, -462, -463, -464, 467/H, and -725) that fall within the 200-foot buffer zone beyond the 275 TAF high water mark (560 feet above msl) along the western side of the reservoir could suffer increased erosion and the effects of increased public access. The 275 TAF reservoir could be drawn down to the same level as the existing conditions. 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 historical resources. Twelve of the known historical resources listed in Table 4.16-3 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, -725, and P-07-000791).

**Dam Modification**

Construction of a new dam could potentially impact three known historical resources within or close to the proposed footprint of the main structure (see Table 4.16-4). Although these historical resources (CA-CCO-458/H, -637, and -696) have already been subject to mitigation, there is a high potential that previously undisturbed, significant cultural resources remain at each site and in the vicinity, which has been identified as an area of high potential for buried cultural resources (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 feet. The extended drawdown would expose any near-surface remains to erosion, vandalism, and illegal collecting. The mass excavation could remove and destroy any cultural resources or human remains. The movement of heavy equipment and materials could crush, mix, and expose any intact cultural resources remaining at site CA-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>
<thead>
<tr>
<th>Site Number</th>
<th>Property Type</th>
<th>Construction</th>
<th>Operation and Maintenance</th>
</tr>
</thead>
<tbody>
<tr>
<td>CA-CCO-696</td>
<td>Buried Site; Burials</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>CA-CCO-458/H</td>
<td>Occupation Site; Burials</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>CA-CCO-637</td>
<td>Buried Site; Burials</td>
<td>x</td>
<td>x</td>
</tr>
</tbody>
</table>
Borrow Area

The borrow area for the 275 TAF dam expansion is located west of the existing dam. No known historical resources fall within the borrow area and there is a low potential for undiscovered cultural resources; however, heavy vehicle traffic between the borrow area and the dam could potentially impact two historical resources (CA-CCO-696 and -458/H) by crushing, mixing and exposing any near-surface cultural resources. This impact is summarized in Table 4.16-5.

<table>
<thead>
<tr>
<th>Site Number</th>
<th>Property Type</th>
<th>Construction Access</th>
</tr>
</thead>
<tbody>
<tr>
<td>CA-CCO-696</td>
<td>Buried Site; Burials</td>
<td>x</td>
</tr>
<tr>
<td>CA-CCO-458/H</td>
<td>Occupation Site; Burials</td>
<td>x</td>
</tr>
</tbody>
</table>

New Delta Intake and Pump Station

No historical resources and a low potential for undiscovered buried cultural resources are within the APE for the new Delta Intake and Pump Station.

Conveyance Facilities

Construction activities associated with each of the conveyance facilities would generally impact historical resources in the same manner. Earth disturbing activities including trenching to install the pipelines and grading for site preparation could destroy and remove cultural resources. Use of temporary access roads and stockpiles within and adjacent to the construction areas could result in the crushing, mixing, and/or compaction of near-surface cultural resources. Any aboveground features, such as petroglyph boulders or bedrock milling stations within the areas used for temporary access, staging, or storage, could also be damaged by heavy equipment.

Delta-Transfer Pipeline. There are nine newly recorded historical resources within the APE for the Delta-Transfer Pipeline. The pipeline would parallel the existing Old River Pipeline, which was installed by boring under these resources, thereby avoiding impacts. The construction of the Delta-Transfer Pipeline would employ these bore and jack technique near utility crossings, railroad crossings, canal crossings, and would therefore avoid impacts to these known historical resources. There is a low potential for undiscovered buried cultural resources.

Transfer Facility Expansion. No historical resources and low potential for undiscovered buried cultural resources are within the Transfer Facility Expansion APE.

Transfer-LV Pipeline. Two historical resources are within the Transfer-LV Pipeline APE (CA-CCO-397 and -535H) that could be impacted by the installation of the pipeline. This APE meets the APE of the Inlet/Outlet Pipelines which are analyzed separately below. This pipeline
passes through areas of no archaeological potential, and through other areas of moderate potential for undiscovered buried cultural resources.

Transfer-Bethany Pipeline. Construction or improvements taking place within the Transfer-Bethany Pipeline APE could potentially impact two historical resources, CA-CCO-596H and -597. There is a low potential for undiscovered buried cultural resources.

Inlet/Outlet Pipelines. The Inlet/Outlet Pipelines APE contains four known historical resources (CA-CCO-446H, -447/H, -726/H, and -755) that could be impacted. The potential impacts on known historical resources are summarized in Table 4.16-6. According to the predictive model, there is a high potential for undiscovered cultural resources, including human remains.

<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></td>
<td>Excavation</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>

Power Supply

Power Option 1: Western Only. Impacts from the portion of the Power Option 1: Western Only transmission line that would be co-aligned with the Delta-Transfer Pipeline are discussed above. Within the APE for the portion of the transmission line that is not co-located with the Delta-Transfer Pipeline alignment, there are no known historical resources and a low potential for undiscovered cultural resources.

Power Option 2: Western & PG&E. Within the APE for Power Option 2, there are no known historical resources and a low potential for undiscovered cultural resources.

Recreational Facilities

Marina Complex. There are no known historical resources and there is low potential for undiscovered buried resources within the APE of the Marina Complex.
Interpretive Center. There are no known historical resources and there is low potential for undiscovered buried cultural resources within the APE of the Interpretive Center.

Hiking Trails.

Westside Hiking Trail/Access Road. Construction of a combined new hiking trail and service road following the western perimeter of the expanded reservoir could impact five historical resources (summarized in Table 4.16-7) that are within or immediately adjacent to the construction zone for the trail and service road. Impacts associated with these historical resources would include ground disturbing activities such as clearing and grubbing as well as travel by truck and heavy machinery to and from staging areas during road construction. Each of these historical resources could also be impacted by road operation and maintenance as well as increased access leading to vandalism resulting from the new trail and road. There is a low to moderate potential for undiscovered buried cultural resources.

<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; Water Management Feature</td>
<td>x</td>
<td>x</td>
</tr>
</tbody>
</table>

Eastside Hiking Trail. A new hiking trail following the eastern perimeter of the expanded reservoir could significantly impact two historical resources, CA-CCO-445 and 456 (summarized in Table 4.16-8) that would be visible and accessible from the proposed trail location. Because they would be visible from the new trail, each of these historical resources could be impacted by increased access and vandalism resulting from the new trail. There is a low potential for undiscovered buried cultural resources.

Other Facilities. There are no known historical resources and there is low potential for undiscovered buried cultural resources within the APE of the Fishing Piers, Picnic Areas, Restrooms, Parking, and associated access.
TABLE 4.16-8
HISTORICAL RESOURCES AND POTENTIAL IMPACTS FROM CONSTRUCTION, OPERATION, AND MAINTENANCE OF THE EASTSIDE HIKING TRAIL

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

Summary of Alternative 1

Alternative 1 has the potential to impact 41 known historical resources, the reburial site, and the District due to construction and/or operation of the following components: Los Vaqueros Reservoir Expansion/Dam Modification (including borrow area), Transfer-LV Pipeline, Inlet/Outlet Pipelines, Transfer-Bethany Pipeline, Power Option 1 or Power Option 2, and both the Westside Access Road/Trail and Eastside Trail. Additionally, there are areas of moderate to high potential for undiscovered cultural resources as well as human remains within the APE for Alternative 1. Therefore, impacts to cultural resources would be significant under Alternative 1.

Alternative 2

Impacts related to historical resources, the reburial site, the District, and previously undiscovered cultural resources resulting from implementation of the project discussed under Alternative 2 would be the same as analyzed under Alternative 1 because Alternative 2 includes implementation of the same facilities as does Alternative 1. Therefore, impacts to cultural resources would be significant.

Alternative 3

Impacts related to historical resources and previously undiscovered cultural resources resulting from implementation of Alternative 3 would be less than Alternative 1 because the Transfer-Bethany Pipeline would not be constructed, thereby reducing the total number of historical resources affected from 41 to 39. However, the impacts to the Kellogg Creek Historic District and historical resources within the District would remain the same as those described for Alternative 1 as a result of expanding the reservoir to 275 TAF. Since the area of ground disturbing activities would be less than under Alternative 1, impacts to previously unidentified cultural resources would be reduced. However, significant areas of moderate to high potential for undiscovered cultural resources within the APE for Alternative 3 remain. In summary, although impacts are reduced, Alternative 3 would still result in significant impacts to cultural resources.
Alternative 4

Impacts related to historical resources and previously undiscovered cultural resources resulting from implementation of Alternative 4 would be less than Alternative 1 because this alternative involves a smaller reservoir expansion (160 TAF only) and several of the project components associated with Alternative 1 would not be implemented under this alternative. The following components would not be constructed: new Delta Intake and Pump Station, Delta-Transfer Pipeline, Transfer Facility Expansion, Transfer-LV Pipeline, Transfer-Bethany Pipeline, Power Supply Options 1 or 2, or the Marina Complex on the northern shoreline. Other project components would be constructed in different locations; for example, the Westside Access Road would be located lower in elevation than proposed under Alternative 1 and recreational facilities would generally be constructed upslope of the existing facilities under Alternative 4 rather than in new locations. Impacts resulting from the Los Vaqueros Reservoir Expansion, Dam Modification, Westside Access Road and relocated recreational facilities associated with Alternative 4 are discussed below:

Los Vaqueros Reservoir Expansion under Alternative 4

The Los Vaqueros Reservoir Expansion to 160 TAF under Alternative 4 would avoid impacts to nine of 18 historical resources potentially impacted under Alternative 1. The nine historical resources which would be impacted under Alternative 4 are summarized in Table 4.16-9. Impacts to the reburial site and the District would remain. The construction schedule associated with Alternative 4 would avoid complete drawdown of the existing 100 TAF reservoir, and construction activities would be limited to the downstream side of the dam. After the reservoir is re-filled, the reservoir would be subject to periodic water level fluctuations. The impacts associated with this alternative include the following:

- 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.

Inundation of the expanded reservoir under Alternative 4 would subject six known historical resources (CA-CCO-9, -427H, -450/H, -459, -468, and P-01-000791) to inundation for the first time, or more completely. The archaeological components of CA-CCO-450/H constitute a historical resource, but the building and structures at CCO-450/H have been determined to be ineligible for listing on the NRHP and the CRHR and would be demolished prior to inundation.

An additional three historical resources (CA-CCO-462, -463, and -725) that fall within the 200-foot buffer zone beyond the 160 TAF high water mark (508 feet above msl) could suffer increased erosion and the effects of increased public access. Seven of the known historical resources listed in Table 4.16-9 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, -459, -463, -468, and -725). The 160 TAF reservoir could periodically be drawn down as low as the high water
### TABLE 4.16-9

HISTORICAL RESOURCES AND POTENTIAL IMPACTS FROM CONSTRUCTION, OPERATION, AND MAINTENANCE OF THE LOS VAQUEROS RESERVOIR EXPANSION TO 160 TAF IN THE RESERVOIR ZONE

<table>
<thead>
<tr>
<th>Site Number</th>
<th>Property Type</th>
<th>Construction</th>
<th>Operation and Maintenance</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Drawdown</td>
<td>Inundation</td>
</tr>
<tr>
<td>CA-CCO-9</td>
<td>Milling Station</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>CA-CCO-427H</td>
<td>Ranch Headquarters</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>CA-CCO-450/H</td>
<td>Ranch Headquarters</td>
<td>Occupation Site</td>
<td>x</td>
</tr>
<tr>
<td>CA-CCO-459</td>
<td>Milling Station; Burial</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>CA-CCO-462</td>
<td>Milling Station</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>CA-CCO-463</td>
<td>Occupation Site</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>CA-CCO-468</td>
<td>Milling Station; Occupation Site</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>CA-CCO-725a</td>
<td>Rock Feature</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>P-07-000532</td>
<td>Reburial Site</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>P-07-000791</td>
<td>“Spring Box Site”</td>
<td>Water Management Feature</td>
<td>x</td>
</tr>
</tbody>
</table>

---

*a* 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.

*b* Drawdown is the period when water would be released from the Los Vaqueros Reservoir prior to start of construction.

---

level of the original 100 TAF reservoir pool. During drawdown, the area between the 100 TAF and the 160 TAF high water marks would be subject to increased erosion and increased access, which could lead to vandalism and illegal collecting of historical resources.

### Dam Modification

The Dam Modification under Alternative 4 would avoid impacts to two of the three historical resources associated with Alterative 1. Alternative 4 would require mass excavation for a new foundation to a depth of more than 50 feet upstream of the dam which would remove and destroy any cultural resources or human remains, including those associated with a known historical resource (CA-CCO-637), and any other previously undiscovered cultural resources.
160 TAF Borrow Area

The boundaries of the additional 160 TAF borrow area located near the northern entrance booth has been designed to avoid known historical resources in the vicinity. There is a moderate potential for undiscovered buried cultural resources.

Western Hiking Trail/Access Road

Construction, operation, and maintenance of the Westside Hiking Trail/Access Road under Alternative 4 could impact one more historical resource than would be impacted under Alternative 1. There is a series of six historical resources (summarized in Table 4.16-10) that are within or immediately adjacent to the construction zone for the trail/access road. The portions of these sites, some quite extensive, not impacted by construction and road use would be visible and accessible from the trail and road once these are installed and could be impacted by increased visitation and vandalism. Each of these historical resources could be impacted by road building and maintenance as well as increased access resulting from the new trail and road. There is a moderate to high potential for previously undiscovered cultural resources.

<table>
<thead>
<tr>
<th>Site Number</th>
<th>Property Type</th>
<th>Road Construction</th>
<th>Road Operation and Maintenance</th>
</tr>
</thead>
<tbody>
<tr>
<td>CA-CCO-450/H</td>
<td>Ranch Headquarters; Occupation Site</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>CA-CCO-459</td>
<td>Milling Station; Burial</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>CA-CCO-462</td>
<td>Milling Station</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>CA-CCO-463</td>
<td>Occupation Site</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>CA-CCO-468</td>
<td>Milling Station</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>CA-CCO-725</td>
<td>Rock Feature</td>
<td>x</td>
<td>x</td>
</tr>
</tbody>
</table>

Relocated Recreational Facilities

No known historical resources, low potential for undiscovered buried cultural resources, and high potential for paleontological resources within the APE for relocated recreational facilities.
Summary

Overall, impacts related to Alternative 4 would be less than Alternative 1. Alternative 4 would potentially affect 15 historical resources, 26 fewer than Alternative 1, as well as the Reburial site and the Kellogg Creek District. Since the area of ground disturbing activities would be less than under Alternative 1, impacts to previously unidentified cultural resources would be reduced. However, there remain significant areas of moderate to high potential for undiscovered cultural resources within the APE for Alternative 4. Therefore, impact to cultural resources would be significant.

Mitigation Measures

Under both federal and state law, the first mitigation measure to be considered for a significant impact to a cultural resource is relocation of project elements so that the impact is avoided. For all project alternatives, some project elements could not be relocated to avoid impacts on cultural resources.

Measure 4.16.1a: Los Vaqueros Reservoir Expansion; Dam Modification; and Other Sites Where Cultural Resources Can Be Avoided. The preferred mitigation measure under CEQA is site avoidance. If feasible, avoid impacts to known cultural resources through project design modification. Using GIS mapping techniques, overlay project design plans on boundary maps of known cultural resources and redesign project components to avoid significant cultural resources by ensuring they fall into areas designated as open space or otherwise undeveloped areas. This is the least costly mitigation measure and is favored by archaeologists, local historical societies, and Native American groups.

Measure 4.16.1b: Los Vaqueros Reservoir Expansion; Dam Modification; and Other Sites Where Cultural Resources Cannot Be Avoided. If feasible, protect cultural resources in place. If resources cannot be protected in place, implement data recovery consistent with 14 CCR § 15126.4(b)(3)(c) and with the guidelines set forth in the Secretary of Interior’s standards and guidelines (Standards I through IV). CCR § 15126.4(b)(3)(c) states a data recovery plan shall be prepared and adopted prior to any excavation being undertaken. Because the historical significance of most archaeological sites lies in their potential to contribute to scientific research, the data recovery plan shall make provision for adequately recovering the scientifically consequential data from and about the historical resource. Similarly geared toward scientific inquiry, the Secretary of Interior’s standards include following an explicit statement of objectives and employing methods that respond to needs identified in the planning process; using methods and techniques of archaeological documentation (data recovery) selected to obtain the information required by the statement of objectives; assessing the results of the archaeological documentation against the statement of objectives and integrating them into the planning process; and reporting and making public the results of the archaeological documentation. To this end, data recovery findings shall be documented in a data recovery report, which shall follow guidelines set forth by SHPO for such reports.

Measure 4.16.1c: Los Vaqueros Reservoir Expansion; Dam Modification; Marina Access Road; Inlet/Outlet Pipelines; Western Hiking Trail/Access Road; Delta-Transfer Pipeline; Transfer-LV Pipeline; and Transfer-Bethany Pipeline. Prior to ground disturbing activities, conduct subsurface investigations (i.e., archeological testing) for undiscovered cultural resources in the portions of the APEs for the project elements that are identified as having
moderate to high potential for undiscovered subsurface cultural resources. Conduct data recovery as described in Mitigation Measure 4.16.1b.

**Measure 4.16.1d: All project elements near known cultural resources or in areas with high potential for undiscovered cultural resources.** During construction, restrict ground-disturbing activities to the minimum area feasible and fence off known cultural resources and high-potential areas that are outside but near the construction area. To prevent construction-related adverse impacts on historic properties within the APE, CCWD shall instruct its contractors to place fencing or other barriers around sites that could be affected. CCWD shall prepare and implement a cultural resource construction monitoring plan to ensure that monitoring and/or physical barriers adequately protect sites from incidental construction activities. For example, the petroglyph boulder (CA-CCO-597) that is within the APE for the Transfer-Bethany Pipeline shall be fenced during construction, thereby creating a 20-foot-wide buffer to ensure that heavy equipment traffic and staging- and storage-related activities do not cause inadvertent damage to the property.

**Measure 4.16.1e: All project elements.** All construction personnel who work on the project shall undergo a training session to inform them of the presence and nature of cultural resources and human remains within the project area; of the laws protecting these resources and associated penalties; and of the procedures to follow if they discover cultural resources during project-related work.

**Measure 4.16.1f: All project elements.** If previously undiscovered cultural resources (e.g., unusual amounts of shell, animal bone, bottle glass, ceramics, structure/building remains, etc.) are discovered during ground-disturbing activities, CCWD shall authorize the construction contractor to stop work in that area and within 100 feet of the find until a qualified archaeologist can assess the significance of the find according to NRHP and CEQA (including CRHR) criteria, and, if necessary, develop appropriate treatment measures in consultation with CCWD. Potential treatment measures for significant and potentially significant resources may include, but would not be limited to, no action (i.e., resources determined not to be significant), avoidance of the resource through changes in construction methods or project design, and implementation of a program of testing and data recovery, in accordance with PRC § 21083.2. Implementation of this mitigation measure would ensure proper identification and treatment of any significant cultural resources uncovered as a result of project-related ground disturbance and would reduce the potential impact resulting from inadvertent damage or destruction of unknown cultural resources during construction to a less-than-significant level.

**Measure 4.16.1g:** Impacts on some sites from increased access and vandalism can be minimized by updating the existing Cultural Resources Management Plan. The plan was developed for the original Los Vaqueros Project and it should be updated for the proposed project. To ensure the long-term protection of these sites, the existing 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 cultural resources are protected in the future. The plan states that should vandalism be detected during the long-term monitoring program, a plan should be in place to organize the documentation and investigation of the endangered resource. Such an HPTP would entail elements including complete photographic and mapping documentation of the resource, as well as a phased archaeological testing and data recovery program. Such an HPTP shall be developed for each historic property that is
determined to be visible from trails, exposure due to erosion, and vulnerable to vandalism for the proposed project.

**Measure 4.16.1h:** Results from the recordation, testing, and data recovery of the prehistoric and historic-era resources within the District shall be synthesized into a comprehensive scholarly study of the prehistory and history of the District. Particular attention shall be paid to the change in use through time of the lower elevations of the watershed and resources therein within the context of the greater watershed. Additionally, the same information shall be synthesized into a document for public education that can be easily accessed and understood by members of the public including children of grade-school age.

**Impact Significance after Mitigation:** Less than Significant.

---

**Impact 4.16.2:** Ground-disturbing activities could encounter and destroy paleontological resources in certain geologic formations underlying the project area. (Less than Significant with Mitigation)

**All Alternatives**

Earth disturbing activities, common to all project alternatives, such as trenching, grading, and excavation would disturb the ground below the surface soil horizon and underlying bedrock and could intersect and destroy fossil resources within certain sedimentary formations. As discussed in the paleontological setting section of this chapter, the deepest soils underlying the APE are at approximately 77 inches while hill slope soils are generally significantly shallower. Therefore, since the depth to bedrock associated with the majority of the APE would be less than 6 feet, impacts from any earth disturbing activities could potentially impact paleontological resources. **Table 4.16-11** provides a summary, by project component for each alternative, of the likelihood of impacting paleontological resources.

Because all the project alternatives have the potential to impact paleontological resources; this would be a significant impact.

**Mitigation Measures**

**Measure 4.16.2a:** A trained paleontologist shall monitor the earth disturbing activities in areas of high and very high sensitivity. If a paleontological resource is encountered during excavation monitoring, the onsite monitor shall halt or divert excavations within 50 feet of the find until the discovery is examined by the monitor in accordance with Society of Vertebrate Paleontology standards. If the resource is determined not to be significant, construction shall resume. If the resource is determined to be significant, construction shall remain halted and the paleontologist shall prepare and implement a salvage plan in accordance with Society of Vertebrate Paleontology standards to recover, remove and/or mold exposed paleontological resources and conduct sampling where necessary to recover microfossil remains (Society of Vertebrate Paleontology, 1995). The paleontologist shall notify CCWD and Reclamation if the find is determined to be significant.
**TABLE 4.16-11**  
**PALEONTOLOGICAL RESOURCES AND POTENTIAL FOR IMPACTS FROM EARTH-DISTURBING ACTIVITIES**

<table>
<thead>
<tr>
<th>Project Component</th>
<th>Alternative 1</th>
<th>Alternative 2</th>
<th>Alternative 3</th>
<th>Alternative 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Los Vaqueros Reservoir Expansion / Dam Modification</td>
<td>Moderate - High</td>
<td>Moderate - High</td>
<td>Moderate - High</td>
<td>Moderate - High</td>
</tr>
<tr>
<td>Delta Intake Facilities</td>
<td>Low - None</td>
<td>Low - None</td>
<td>Low - None</td>
<td>-</td>
</tr>
<tr>
<td>Delta-Transfer Pipeline</td>
<td>Low - Very High</td>
<td>Low - Very High</td>
<td>Low - Very High</td>
<td>-</td>
</tr>
<tr>
<td>Transfer Facility Expansion</td>
<td>Very High</td>
<td>Very High</td>
<td>Very High</td>
<td>-</td>
</tr>
<tr>
<td>Transfer-LV Pipeline</td>
<td>Moderate - Very High</td>
<td>Moderate - Very High</td>
<td>Moderate - Very High</td>
<td>-</td>
</tr>
<tr>
<td>Inlet/Outlet Pipelines</td>
<td>Moderate - High</td>
<td>Moderate - High</td>
<td>Moderate - High</td>
<td>Moderate - High</td>
</tr>
<tr>
<td>Transfer –Bethany Pipeline</td>
<td>Moderate - Very High</td>
<td>Moderate - Very High</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Power Option 1: Western Only</td>
<td>Low - Very High</td>
<td>Low - Very High</td>
<td>Low - Very High</td>
<td>-</td>
</tr>
<tr>
<td>Power Option 2: Western &amp; PG&amp;E</td>
<td>Low - High</td>
<td>Low - High</td>
<td>Low - High</td>
<td>-</td>
</tr>
<tr>
<td>Recreation Facilities</td>
<td>Moderate - High</td>
<td>Moderate - High</td>
<td>Moderate - High</td>
<td>Moderate - High</td>
</tr>
</tbody>
</table>

**Measure 4.16.2b:** Prior to the start of construction on project elements that would require earth disturbing activities in areas of low or moderate paleontological sensitivities, construction personnel involved with earth-moving activities shall be trained regarding the appearance of fossils and proper notification procedures. This worker training shall be prepared and presented by a qualified paleontologist. If workers discover paleontological resources during ground-disturbing activities, work shall stop within 50 feet of the find until a qualified paleontologist can assess the significance of the find and determine the appropriate next steps, depending on the significance of the find as described in Measure 4.16.2a.

**Impact Significance after Mitigation:** Less than Significant.

**Impact 4.16.3:** Construction and management of project components could disturb human remains, including those interred outside of formal cemeteries. (Less than Significant with Mitigation)

**Alternative 1**

Alternative 1 could disturb human remains, including those interred outside of formal cemeteries. The combination of components proposed for this alternative has the potential to impact five known burial sites (CA-CCO-447/H, -458/H, -459, -637, and -696). In addition, the alternative could impact the reburial site (P-07-000532), which houses the human remains previously recovered during the mitigation action for the 100 TAF reservoir. Disturbance of undiscovered human remains could also occur.
Los Vaqueros Reservoir Expansion

Three known burial sites would be potentially impacted by expanding the Los Vaqueros Reservoir to 275 TAF. The potential impacts on each of these properties are summarized in Table 4.16-3. The construction schedule includes drawdown of the existing 100 TAF reservoir, a 3-year period during which the reservoir would be empty (during dam construction), and inundation to the 275 TAF level. After the reservoir is re-filled, it would be subject to periodic water level fluctuations.

The drawdown for construction would expose two formerly inundated known sites with human remains (CA-CCO-696 and -458/H) to erosion and the effects of increased access, including potential vandalism and illegal collecting. Inundation to the 275 TAF level would subject one historical resource with human remains (CA-CCO-459) to complete inundation (the resource is currently partially inundated by the 100 TAF reservoir). This resource is also within an area that would be exposed by periodic lowering of the reservoir level due to seasonal variation in the availability of water. The Los Vaqueros Reservoir Expansion could periodically be drawn down as low as the level of the high water level of the original 100 TAF reservoir. 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 in turn lead to exposure, vandalism, and illegal collecting of any as-yet undiscovered human remains. The reservoir floor is an area of high potential for previously undiscovered sites with human remains.

Dam Modification

Construction activities associated with the Dam Modification would potentially affect three known burial sites (CA-CCO-696, -637 and -458/H) within or close to the proposed footprint of the main structure (see Table 4.16-4). The potential impacts on each of these properties are summarized in Table 4.16-4. Although all three of these sites within the area of the modified dam (CA-CCO-458/H, -637, and -696) have already been subject to mitigation, there is a high potential that construction activities would impact previously undisturbed human remains as the dam is located in an area that has been identified as having high potential for buried cultural deposits (Meyer and Rosenthal, 1997). Expansion of the dam footprint upstream would require an extended drawdown period and the mass excavation for a new foundation to a depth of more than 50 feet.

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 with human remains. Absent mitigation, the movement of heavy equipment and materials could crush, mix, and expose any intact deposits that are not directly removed by mass excavation at site CA-CCO-458/H upstream of the existing dam structure and at CA-CCO-637 downstream of the existing dam structure.

Based on the geoarchaeological study (Meyer, 1996) and the nature of the known sites (Meyer and Rosenthal, 1997), there is a high potential that previously unknown cultural deposits, including human burials, could be disturbed in the area of the proposed new dam (both upstream and downstream) that were not discovered during the previous construction activities.
Borrow Area
No known sites with human remains fall within the borrow area; however, heavy vehicle traffic between the borrow area and the dam could potentially affect two burial sites (CA-CCO-458/H and -696, see Table 4.16-5). The movement of heavy equipment and borrow materials could crush, mix, or expose any near-surface deposits at these two sites. Impacts related to construction access between the borrow area and the dam site is analyzed above under Los Vaqueros Reservoir Expansion and Dam Modification.

Staging Area
The downstream staging area is in an area that has no known burial sites. The anticipated impacts of the staging area would result from the movement and storage of materials, including contractor trailers and parking. Near-surface cultural deposits, if present, could potentially be compacted, mixed, and crushed. Based on the results of the geoarchaeological predictive testing and modeling, however, the area is considered to have moderate potential for undiscovered human remains. During a pedestrian survey, an inspection of the abundant spoils resulting from activities of burrowing animals across the area failed to reveal the presence of any near-surface cultural materials. If present, human remains are likely to be deeply buried and would not be affected by use of the area for construction staging.

New Delta Intake and Pump Station
No known burial sites are within the APE for the new Delta Intake and Pump Station. Therefore, no potential impacts on known sites with human remains are expected. Additionally, there is a low potential for undiscovered human remains.

Conveyance Facilities
Each of the pipeline corridors would affect historical resources with human remains in the same general manner. Trenching to install the pipe would destroy and remove any cultural deposits with burials within the path of the trench. Use of temporary access roads and stockpiles adjacent to the trench would result in the crushing, mixing, and/or compaction of near-surface human remains.

Delta-Transfer Pipeline. No known burial sites are within the APE for the Delta-Transfer Pipeline; therefore, no potential impacts on known sites with human remains are expected. There is a low potential for undiscovered human remains.

Expanded Transfer Facility. No known burial sites are within the APE for the Expanded Transfer Facility; therefore, no potential impacts on known sites with human remains are expected. There is a low potential for undiscovered human remains.

Transfer-LV Pipeline. No known burial sites are within the APE for the Transfer-LV Pipeline; therefore, no potential impacts on known sites with human remains are expected. Portions of this proposed pipeline route have a low potential while other portions have a moderate potential for undiscovered human remains (see Figure 4.16-2).
Inlet/Outlet Pipeline. Two known burial sites are (CA-CCO-447/H and CA-CCO-637) within the Inlet/Outlet Pipeline APE. The potential impacts on each of these properties are summarized in Table 4.16-6. Additionally, this is an area of high potential to yield human remains.

Transfer-Bethany Pipeline. No known burial sites are within the APE for the Transfer-Bethany Pipeline; therefore, no potential impacts on known sites with human remains are expected. There is a low potential for undiscovered human remains for the majority of the Transfer-Bethany Pipeline, except where the pipeline approaches within 100 feet of creeks: the potential increases to moderate.

Power Supply
No known burial sites are within the APE for Power Options 1 or 2; therefore, no potential impacts on known sites with human remains are expected. There is a low potential for undiscovered human remains.

Recreational Facilities
No known burial sites are within the APE for the Recreational Facilities; therefore, no potential impacts on known sites with human remains are expected. There is low potential for undiscovered human remains.

Summary
Implementation of Alternative 1 would impact five known burial sites as well as the Reburial site which houses the human remains previously recovered during the mitigation action for the existing Los Vaqueros Reservoir. Furthermore, Alternative 1 proposes ground disturbing activities in some areas with moderate to high potential for previously unrecorded human remains. Therefore, impacts to known and previously unrecorded human remains under Alternative 1 would be significant.

Alternative 2
Alternative 2 would result in the same impacts on known human remains and undiscovered human remains as those described for Alternative 1 because Alternative 2 includes implementation of the same facilities as does Alternative 1. Therefore, impacts to known and previously unrecorded human remains would be significant.

Alternative 3
Alternative 3 would result in the same impacts as Alternative 1 on known human remains and the reburial site because the impacts are caused by construction of facilities common to both alternatives (i.e., Los Vaqueros Reservoir Expansion/Dam Modification and Inlet/Outlet Pipelines). Furthermore, Alternative 3 also proposes ground disturbing activities in some areas with moderate to high potential for previously unrecorded human remains. Although Alternative 3 would include the Old River Intake and Pump Station Expansion, there are no known burial sites within the APE; therefore, no potential impacts on known sites with human remains are expected. Additionally, there is a low potential for undiscovered human remains. However, overall, impacts to known and previously unrecorded human remains would be significant.
**Alternative 4**

Alternative 4 would result in no impacts to the reburial site and fewer impacts to known human remains when compared to Alternative 1. Specifically, because Alternative 4 would not require drawdown for construction, two formerly inundated known sites with human remains (CA-CCO-696 and -458/H) would not be exposed. There are no known sites with human remains within the proposed boundaries of the 160 TAF core borrow area to the west of the dam. However, like Alternative 1, CA-CCO-459, a known burial site (historic resource with human remains) would be impacted by expanding the Los Vaqueros Reservoir to 160 TAF. Furthermore, Alternative 4 proposes ground disturbing activities in some areas with moderate to high potential for previously unrecorded human remains. While the nature of the impacts on human remains would be equivalent to those from Alternative 1, the extent of impact would be less because there is less earth disturbing activities proposed under Alternative 4. However, impacts to known and previously unrecorded human remains under Alternative 4 would still be significant.

**Mitigation Measure**

**Measure 4.16.3: Stop Potentially Damaging Work if Human Remains Are Uncovered During Construction, as a Result of Erosion, or of Vandalism, Assess the Significance of the Find, and Pursue Appropriate Management.** California law recognizes the need to protect interred human remains, particularly Native American burials and associated items of patrimony, from vandalism and inadvertent destruction. The procedures for the treatment of discovered human remains are contained in California Health and Safety Code §7050.5 and §7052 and California PRC §5097.

In accordance with the California Health and Safety Code, if human remains are uncovered during ground-disturbing activities, including construction, erosion, or vandalism, all such activities within a 100-foot radius of the find shall be halted immediately and CCWD’s designated representative shall be notified. CCWD shall immediately notify the county coroner and a qualified professional archaeologist. The coroner is required to examine all discoveries of human remains within 48 hours of receiving notice of a discovery on private or state lands (Health and Safety Code Section 7050.5[b]). If death appears to have resulted from homicide, suicide, poisoning, accident, violence, or certain contagious diseases and hazards, the coroner is required to investigate as specified in Government Code Section 27491. If the coroner determines that the remains are those of a Native American, he or she must contact the Native American Heritage Commission by phone within 24 hours of making that determination (Health and Safety Code Section 7050[c]). CCWD’s responsibilities for acting upon notification of a discovery of Native American human remains are identified in detail in the California PRC Section 5097.98. CCWD or its appointed representative and the professional archaeologist shall contact the Most Likely Descendant (MLD), as determined by the NAHC, regarding the remains. The MLD, in cooperation with the property owner and the lead agencies, shall determine the ultimate disposition of the remains in accord with the provisions of Section 5097.98. If NAHC cannot identify any MLDs, if the MLD fails to make a recommendation, or CCWD disagrees with the MLDs recommendation and mediation fails to resolve the issue, then CCWD must reinter the human remains with appropriate dignity on a part of the property not subject to further subsurface disturbance, as is specified in Section 5097.98(b) and 14 Cal. Code Regs § 1064.5(e)(2).

**Impact Significance after Mitigation:** Less than Significant.
Impact 4.16.4: Construction and management of project components would contribute to adverse cumulative impacts to cultural and/or paleontological resources. (Less than Significant with Mitigation)

**Cultural Resources**

The geographic scope considered for potential cumulative impacts to cultural resources is the District and portions of the project area that would be subject to ground disturbing activities. Outside the watershed, and therefore outside of the District, there are no projects that have the potential to result in similar impacts within the APE of the project alternatives.

Within the watershed, and hence within the District, the proposed Vasco Wind Energy Repowering Project (Wind Project) could contribute to cumulative cultural resource impacts in combination with the proposed project. Approximately one half of the project area associated with the Wind Project would be located within the District. Construction and maintenance activities associated with the Wind Project could impact known historical resources (CCO-448H) and undiscovered cultural resources and/or human remains as a result of activities including installation of wind generation facilities as well as access road construction and maintenance. As previously stated, a District is considered to represent more than the sum of its parts; therefore, any action that significantly impacts one element of the District has the potential to impact the entire District. Therefore, these impacts in combination with the impacts associated with the proposed project would result in a significant cumulative impact to the District. The project’s contribution would be cumulatively considerable; however, Measures 14.16.1a-h identified for the Los Vaqueros Reservoir Expansion Project would reduce the project’s contribution to a less than cumulatively considerable level.

Impacts to human remains are site specific; therefore, since there are no past, present and reasonably foreseeable actions that would result in the same impact as the project alternatives; no cumulative impact would occur.

**Paleontological Resources**

The geographic scope considered for paleontological resources consist of areas within the vicinity of the project alternatives that are geologically similar and are likely to contain similar fossil resources. Construction related impacts that would result in ground disturbing activities would have the potential to add to anticipated project impacts, thus causing a cumulatively considerable impact to paleontological resources.

Due to the nature of the fossil record (i.e., buried bedrock), paleontologists cannot know either the quality or quantity of fossils prior to exposure. As a result, even in the absence of surface fossils, it is necessary to assess the sensitivity of rock units based on the known potential to produce significant fossils elsewhere within the same geologic unit, a similar geologic unit, or based on whether the unit in question is deposited in a type of environment that is known to be favorable for fossil preservation.
The Wind Project could also contribute to cumulative paleontological resource impacts in combination with the proposed project. As mapped by Graymer, et al. (1994), the bedrock that underlies the Wind Project area is underlain by Unit B and C of the Great Valley Sequence, common to the proposed project. The sequence is comprised of mostly marine sandstone and shale that is Cretaceous in age (65 to 145 million years old). Construction and maintenance activities associated with the Wind Project could impact these paleontological resources as a result of activities including installation of wind generation facilities, underground cable lines, substation, and access roads. Additionally, the following projects would overlap with geologic units that may contain paleontological resources that would be affected by the proposed project: Vasco Caves to Brushy Peak Trail (Unit C of the Great Valley Sequence), DWR South Bay Aqueduct (SBA) Enlargement (Unit D of the Great Valley Sequence), Vasco Road Safety Improvements (A and B) (Unit B and C of the Great Valley Sequence), Vasco Road and Camino Diablo Intersection Improvements Project (Undivided Flatland), and Marsh Creek Road Shoulder Widening Project sites (Unit D of the Great Valley Sequence). These projects are in areas where there could be a high to very high paleontological sensitivity.

Therefore, these impacts in combination with the impacts associated with the proposed project would result in a significant cumulative impact to paleontological resource. However, cumulative impacts on paleontological resources result when rock units become unavailable for study and observation by scientists. The destruction of fossils has a significant cumulative impact as it makes biological records of ancient life unavailable for study by scientists. The project's contribution would be cumulatively considerable; however Mitigation Measures 4.16.2a and 4.16.2b, which requires preparation and implement of a salvage plan in accordance with Society of Vertebrate Paleontology standards for paleontological resources that are exposed during ground disturbing activities and are determined to be significant, identified for the Los Vaqueros Reservoir Expansion Project would reduce the project's contribution to a less than cumulatively considerable level.

**Mitigation Measure**

*Measures 4.16.2a and 4.16.2b, as previously stated.*

**Impact Significance after Mitigation:** Less than Significant.