4.14 Visual/Aesthetic Resources

This section presents an analysis of potential impacts on visual/aesthetic resources that would result from implementation of the Los Vaqueros Reservoir Expansion Project. The analysis includes a description of visual/aesthetic resources in the project area, the associated regulatory framework, the significance criteria used to evaluate impacts on identified resources as a consequence of implementing the alternatives, the methods used in evaluating these impacts, and the results of the impact assessment based on the applied significance criteria.

4.14.1 Affected Environment

Regulatory Setting

State

California Scenic Highway Program

In 1963, the California legislature created the Scenic Highway Program to protect scenic highway corridors from changes that would diminish the aesthetic value of lands next to the highways. The state regulations and guidelines governing the Scenic Highway Program are found in the Streets and Highways Code, Section 260 et seq. A highway may be designated as "scenic" depending on how much of the natural landscape can be seen by travelers, the scenic quality of the landscape, and the extent to which development intrudes upon the travelers' enjoyment of the view.

No state-designated scenic routes are in the project area. Contra Costa County contains two state-designated scenic highways (Interstate 680 and State Route [SR] 24) and Alameda County has Interstate 580. None of these three highways is near or within views of the project components. While Caltrans considers SR 4 within the Contra Costa County as eligible for state scenic highway designation, it has not been so designated (Caltrans, 2005).

Local

Contra Costa County General Plan

The Contra Costa County General Plan (Contra Costa County, 2005) presents goals and policies that are applicable to management and protection of scenic resources. These goals and policies include the following:

- Preservation and enhancement of identified scenic routes (Goal 5-R)
- Preservation of scenic qualities of the San Francisco Bay/Delta estuary system and the Sacramento-San Joaquin River/Delta shoreline (Goal 9-12)
- Conservation and protection of scenic views from scenic routes (Policy 5-37)
- Protection of natural topographic features (Policy 5-43)
- New power lines shall be parallel to existing lines (Policy 9-20) (Contra Costa County, 2005)

The specific goals and policies related to visual/aesthetic resources are presented in Appendix E-2.

No designated (local, state, or federal) scenic vistas occur within the project area. However, as defined by the Contra Costa County General Plan, Section 9.6 Scenic Resources, "Contra Costa County is perceived by many as a desirable place to live and work. A major component in that is the scenic vistas that are available throughout the County…two main resources…are…(1) scenic ridges, hillsides and rock outcroppings; and (2) the San Francisco Bay Delta estuary system." Contra Costa County has designated SR 4 and Vasco Road as scenic highways and expressways; Camino Diablo Road, Walnut Boulevard (to the North entrance of the Los Vaqueros Watershed) and Byron Highway as scenic routes: Old River and Clifton Court Forebay as scenic waterways; and the Black Hills ridgeline southwest of the Los Vaqueros Reservoir as a scenic feature. Additionally, Contra Costa County has many smaller, localized scenic resources such as isolated hilltops, rock outcroppings, mature stands of trees, lakes, reservoirs, and other natural features that, although not designated as scenic resources, should be treated as providing aesthetic opportunities, according to the General Plan.

East County Area Plan – A Portion of the Alameda County General Plan

Alameda County's East County Area Plan (Alameda County, 2002) includes visual/aesthetic resource related policies that include the following:

- Minimizing the alteration of natural topography and vegetation (Policy 116)
- Protecting both individual and large stands of mature, healthy trees (Policy 110)
- Landscaping in both rural and urban areas to enhance the scenic quality of the area to screen undesirable views (Policy 114)
- Where grading is necessary, preserving the natural contours to blend with undisturbed slopes (Policy 117) (East County Area Plan, 2005)

Specific policies are listed in Appendix E-1. Alameda County has not identified or designated any scenic vistas or visually-sensitive ridgelines that are within the project area.

Environmental Setting

The project area for visual/aesthetic resources encompasses the landscapes directly affected by facilities proposed under each of the project alternatives and the surrounding areas that would be within view of the project actions. The visual/aesthetic analysis focuses on travel route views, views within parks, and recreational views.

Definitions Related to Visual/Aesthetic Resources

Visual/aesthetic resources consist of the landforms, vegetation, rock and water features, and cultural modifications that create the visual character and sensitivity of a landscape. A number of factors are documented for the existing visual/aesthetic resources of the project area to help determine the manner in which those resources or characteristic landscapes may be modified by the project. The primary existing visual/aesthetic condition factors considered in this EIS/EIR are defined below and include: Visual Quality, Viewer Types and Volumes, Viewer Exposure, and Visual Sensitivity.

Visual Quality is defined as the overall visual impression or attractiveness of an area as determined by the particular landscape characteristics, including landforms, rock forms, water features, and vegetation patterns. The attributes of variety, vividness, coherence, uniqueness, harmony and pattern contribute to the overall visual quality of an area. For the purposes of this EIS/EIR, visual quality is defined according to three levels:

- Indistinctive, or industrial — defined as generally lacking in natural or cultural visual resource amenities typical of the region
- Representative — defined as visual resources typical or characteristic of the region's natural and/or cultural visual amenities
- Distinctive — defined as visual resources that are unique or exemplary of the region's natural or cultural scenic amenities

Viewer Types and Volumes of use pertain to the types (i.e., public viewers including recreationalist and motorist) and amounts of use (i.e., number of recreational users or motorists) that various land uses receive. Land uses that derive value from the quality of their settings are considered potentially sensitive to changes in visual setting conditions. Land uses within the project area that may be sensitive to change in visual conditions include major transportation systems such as designated scenic highways, designated scenic roads, and designated park, recreation and natural areas.

Viewer Exposure addresses the variables that affect viewing conditions from potentially sensitive areas. Viewer exposure considers the following factors:

- Landscape visibility (the ability to see the landscape)
- Viewing distance (i.e., the proximity of viewers to the project)
- Viewing angle — whether the project would be viewed from above (superior), below (inferior) or from a level (normal) line of sight
- Extent of visibility — whether the line of sight is open and panoramic to the project area or restricted by terrain, vegetation and/or structures
- Duration of view

Visual Sensitivity is the overall measure of an existing landscape's susceptibility to adverse visual changes. This analysis of visual sensitivity is based on the combined factors of visual quality, viewer types and volumes, and visual exposure to the project. Visual sensitivity is reflected according to high, moderate, and low visual sensitivity ranges.

Existing Visual Quality of the Region

The visual character of Eastern Contra Costa County is typified by the undulating hills of grassland typical of the northern San Joaquin Valley, agricultural and rural landscapes, and the Delta. The hills provide a backdrop to the agricultural landscape and the Delta, where open views

of distant horizons appear, generally unobstructed by local topography or tall vegetation. The agricultural landscape is dominated by crops (i.e., hay, oats, cherries, walnuts, tomatoes, corn, alfalfa, vineyards, and palm nurseries) and other ancillary facilities including outbuildings, tractors, irrigation, and drainage works.

The Delta, which is near the center of the valley at 25 feet mean sea level (msl), is composed of a network of about 700 miles of waterways and 1,100 miles of levees that protect the islands and tracts, most of which have ground surface elevations near or below sea level. Topography in the valley and Delta is uniformly flat; as a result, human-made features (including poles and lines for electricity and phones, blow-off and air valves for underground water pipelines, residential and agricultural structures, fencing, elevated roadway, bridges, levees, canals, highway and local road signage, and other commercial signage) are visible in both near-field and far-field distances. A distinct part of the area landscape is the wind farms, which include numerous wind turbines, outbuildings, and access roads within the Altamont Hills area.

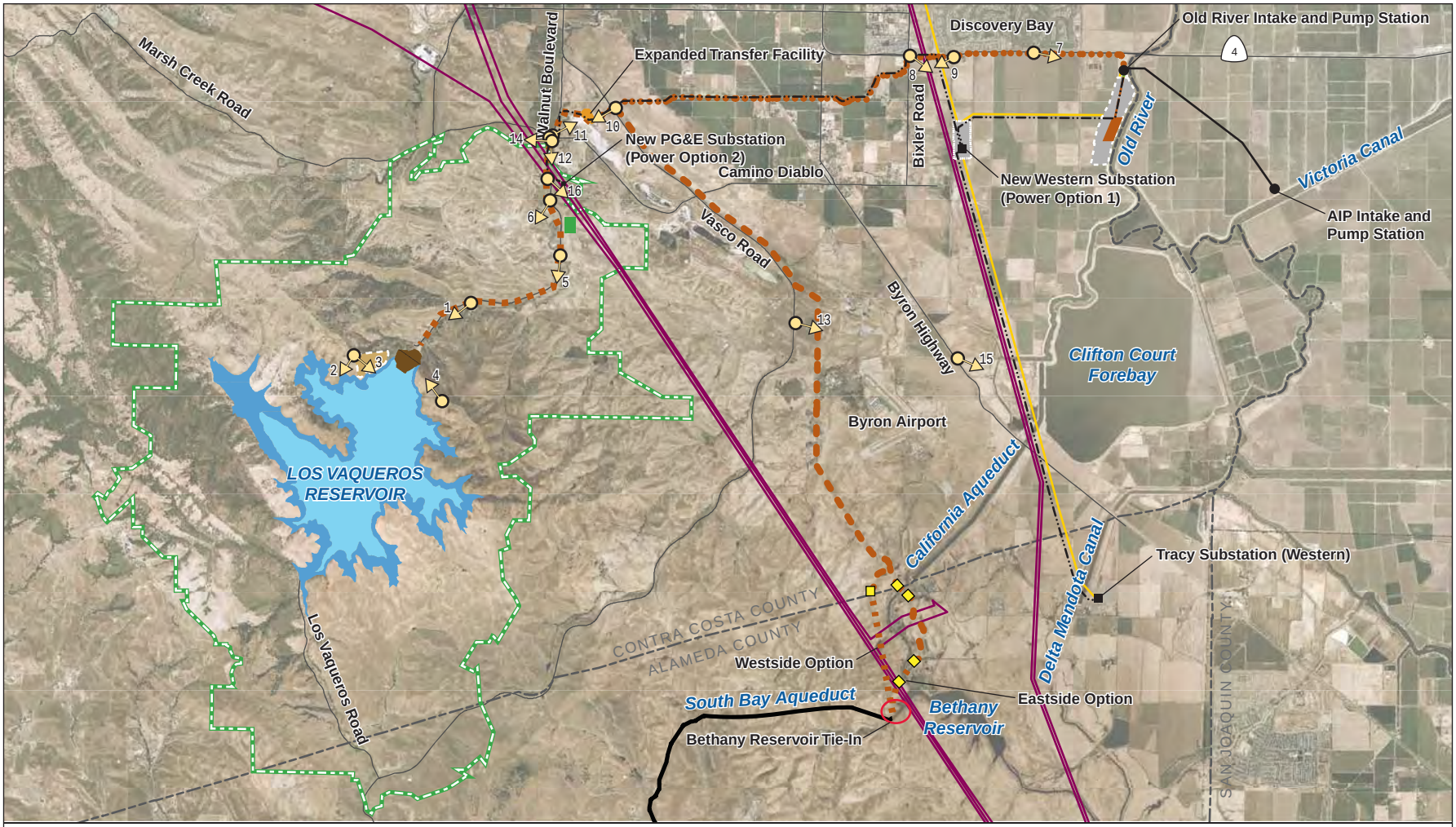
Figure 4.14-1 is a viewpoint map that depicts photograph numbers and provides the location and direction from which photographs were taken. The photographs, presented together as a single group in **Figures 4.14-2** through **4.14-9**, were assigned numbers by order of mention in the following subsections which describe the existing visual character of the project area by component.

Los Vaqueros Reservoir Expansion Area and Recreational Facilities

The Los Vaqueros Reservoir was created by establishing a dam on upper Kellogg Creek (Figure 4.14-2, Photograph 1); the majority of the reservoir is sited within two broad valleys that are about 0.5 mile wide each. The mountainous areas north of the reservoir are predominately grasslands interspersed with oak trees.

The landscape of the Los Vaqueros Watershed (i.e., those lands within the CCWD Los Vaqueros Watershed property line) is characterized by moderate-to-low elevation and northwest-southeast trending ridgelines, and separated by valleys of varying steepness and width. Ridgelines surrounding the reservoir rise to 2,550 feet msl, while the reservoir's high water level is at 472 feet msl.

Views from the Los Vaqueros Reservoir and the areas downstream of the dam are obstructed by ridgelines, which focus views on the natural character of the reservoir and hills. The visual character of the landscape downstream of the dam is a mixture of open grasslands, rolling hills with sparse oak savannah, and scrub habitat. The scenic Black Hills area to the west of the reservoir (Figure 4.14-2, Photograph 2) is characterized by woodland and scrub habitat. To the southeast of the reservoir, the grassland ridges, interspersed with oak woodlands and rock outcroppings, decline in elevation and steepness as they progress toward the San Joaquin Valley (Figure 4.14-3, Photograph 3). To the north, the ridges are grassland ridges interspersed with oak trees; the borrow area for the existing dam has re-vegetated with upland scrub habitat (Figure 4.14-3, Photograph 4).



SOURCE: USGS, 1993 (base map); ESRI, 2006; CCC, 2007; CCWD, 2007; MWH, 2007; and ESA, 2008

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Figure 4.14-1
Viewpoint Map

PHOTOGRAPH 1. View from Walnut Boulevard looking southwest at downstream face of the dam. (October 2008)

PHOTOGRAPH 2. View from Vista Grande Trail looking southwest toward the Black Hills (October 2008)

SOURCE: ESA, 2006

Figure 4.14-2
Site Photographs

PHOTOGRAPH 3. View from Vista Grande Trail looking southeast toward San Joaquin County (October 2008)

PHOTOGRAPH 4. View from Eastside Trail looking northwest toward the dam and borrow area (July 2008)

SOURCE: ESA, 2006

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Figure 4.14-3
Site Photographs

PHOTOGRAPH 5. View from Walnut Boulevard looking south toward the Watershed Office (October 2008)

PHOTOGRAPH 6. View from Walnut Boulevard looking southwest toward 160 TAF Borrow Area (October 2008)

SOURCE: ESA, 2006

Figure 4.14-4
Site Photographs

PHOTOGRAPH 7. View from Highway 4 looking east toward Old River Intake and Pump Station (October 2008)

PHOTOGRAPH 8. View from Highway 4 looking southeast along Delta Transfer pipeline alignment (October 2008)

SOURCE: ESA, 2006

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Figure 4.14-5
Site Photographs

PHOTOGRAPH 9. View from Highway 4 looking southwest along Delta Transfer pipeline alignment (October 2008)

PHOTOGRAPH 10. View from Vasco Road looking southwest along Delta Transfer pipeline alignment to Transfer Facility (October 2008)

SOURCE: ESA, 2006

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Figure 4.14-6
Site Photographs

PHOTOGRAPH 11. View from Camino Diablo Road looking northeast to backside of Transfer Facility (October 2008)

PHOTOGRAPH 12. View from Camino Diablo Road looking south toward Transfer-LV pipeline alignment (October 2008)

SOURCE: ESA, 2006

Figure 4.14-7
Site Photographs

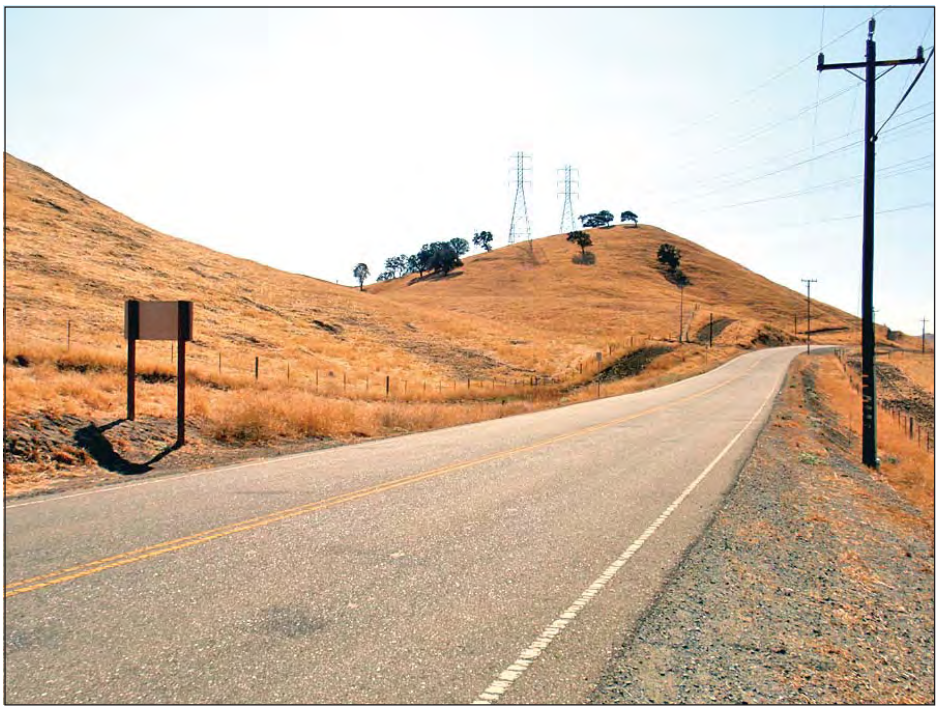
PHOTOGRAPH 13. View from Vasco Road looking southeast toward Transfer-Bethany pipeline alignment (October 2008)

PHOTOGRAPH 14. View from Walnut Boulevard looking west at valve structure of Los Vaqueros pipeline (October 2008)

SOURCE: ESA, 2006

Figure 4.14-8
Site Photographs

PHOTOGRAPH 15. View from Byron Highway looking southeast toward Western potion of Power Option 2: PG&E & Western (October 2008)



PHOTOGRAPH 16. View from Walnut Boulevard looking southeast toward PG&E 69 kV distribution line and substation site associated with Power Option 2: PG&E & Western (October 2008)

SOURCE: ESA, 2006

Figure 4.14-9
Site Photographs

Viewers of the Los Vaqueros Reservoir from the dam looking southward or upstream, including recreational facilities and borrow area, are limited to recreational users of the watershed such as hikers, boaters, and anglers. Views of the reservoir and associated recreation facilities (marina, fishing piers, and adjacent roads / trails) by recreational users on the trail network provided by the Morgan Territory and Round Valley Regional Preserves are generally obstructed by vegetation and topography.

The visual setting downstream of the dam is characterized by grassland hills interspersed with oak trees and the meandering Kellogg Creek and its associated riparian habitat (Figure 4.14-4, Photograph 5). Near the dam, a number of mitigation ponds are interspersed with Kellogg Creek. Utilitarian features dotting the landscape include Walnut Boulevard, power poles and lines, blow-off and air valves associated with the Los Vaqueros Pipeline, lattice transmission structures, wind generation facilities, fences, recreational trails, parking, picnic areas, the Interpretive Center, and other District facilities (i.e., Watershed Office and other support buildings). Additionally, as some of the lands surrounding the reservoir are used for livestock grazing, sheep, cows, and goats are often part of the visual landscape.

Viewers of the dam from downstream are generally limited to recreational users traveling via Walnut Boulevard to the Interpretive Center and to the area adjacent to the top of the dam. Views of the dam core borrow area for the 160-thousand acre feet (TAF) reservoir (160-TAF borrow zone) would generally be screened by the Kellogg Creek riparian vegetation (Figure 4.14-4, Photograph 6) but would be visible from hikers on portions of the Alkali Meadow Trail.

In summary, the visual quality of the watershed is considered distinctive because the natural foothills landscape has been largely preserved and unaltered.

Delta Intake Facilities

The visual character of the landscape surrounding the Old River Intake and Pump Station as well as the new Delta Intake and Pump Station is predominately agricultural. Views of Old River from the west are generally obstructed by the levee systems, and views from the east are generally limited to the SR 4 bridge across Old River.

Two “industrial-type” facilities already exist within the area: (1) CCWD’s Old River Intake and Pump Station (see Figure 4.14-5, Photograph 7) is characterized as industrial in nature featuring buildings, fencing, power poles and lines, pipelines and intake facilities; and (2) the Town of Discovery Bay’s Community Services District Wastewater Treatment Plant, consisting of buildings, fencing and three lagoons.

Viewers of the Old River Intake and Pump Station as well as the new Delta Intake and Pump Station would generally be limited to motorists on SR4, recreational users of Old River (generally used as a travel corridor to and from the south Delta), and one residence on the southeast side of Old River on Victoria Island. The visual quality of the area is representative of the largely agricultural areas next to the Delta.

Delta-Transfer Pipeline Area

The visual character of the landscape surrounding the Delta-Transfer pipeline area is agricultural, composed of crops (i.e., hay, oats, cherries, walnuts, tomatoes, corn, alfalfa, vineyards and palm nurseries), homes/farms and associated out buildings and infrastructure including farm roads (Figure 4.14-5 Photograph 8), three transmission lines with large steel lattice towers (Figure 4.14-6 Photograph 9), power poles and lines, and aboveground blow-off and air valves associated with the Old River Pipeline. Public viewers of the Delta-Transfer Pipeline area would generally be limited to motorist on SR 4 between Discovery Bay and Byron Highway, and Vasco Road near the Transfer Facility. Other local roads which would afford views of the area would be Bixler Road, Kellogg Creek Road, and Hoffman Lane. The visual quality of the area is representative of the agricultural area next to the Delta and throughout the southeastern county area.

Transfer Facility Expansion

The visual character of the landscape surrounding the existing Transfer Facility is generally open space characterized by rolling grassland hills (Figure 4.14-6 Photograph 10). To the west, the landscape is scarred, characterized by the surface mining activities taking place at Unimin's Byron Sand Plant Quarry (Figure 4.14-7 Photograph 11). Views of the Transfer Facility are available from Vasco Road, Walnut Boulevard, and Camino Diablo Road. However, views from Vasco Road are generally limited because the surrounding topography provides screening. The visual quality of the area from Walnut Boulevard and Camino Diablo Road is indistinct due to the mining operations. From Vasco Road, the visual quality is representative of the rolling grassland hills in the valley.

Transfer-LV Pipeline

The visual character of the landscape of the Transfer-LV Pipeline alignment near the Transfer Facility is scarred due to surface mining activities taking place at Unimin's Byron Sand Plant Quarry. As the pipeline alignment enters the watershed, the landscape is characterized by rolling grassland hills dotted with trees and evidence of mining activities (Figure 4.14-7 Photograph 12). Views within the watershed specific to the area downstream of the dam are described above under Los Vaqueros Reservoir Expansion Area and Recreational Facilities. Generally, the visual quality of the area is distinctive because the natural foothills landscape has been largely preserved and unaltered.

Inlet/Outlet Pipelines

These pipelines are associated with the dam and would extend from the dam downstream to connect with the Transfer-LV Pipeline. Descriptions of the visual character and likely viewers of the inlet/outlet pipelines area are provided above under the discussion Los Vaqueros Reservoir Expansion Area and Recreational Facilities. The visual quality of the area is distinctive because the natural foothills landscape has been largely preserved and unaltered.

Transfer-Bethany Pipeline

The visual character of the landscape around this pipeline alignment from the Transfer Facility along Vasco Road to Armstrong Road is generally rolling grassland hills (Figure 4.14-8 Photograph 13). The area along Armstrong Road is rural residential, and is characterized by

small ranches, the Brushy Creek riparian corridor, utility poles/wires and the Byron Municipal Airport. South of Armstrong Road the area is again characterized by rolling grassland hills with occasional riparian zones along the local drainages. As the alignment approaches the California Aqueduct, the visual landscape contains more man-made features including wind generation facilities and associated buildings accessed via Byron Hot Springs Road, transmission lines and lattice towers, the California Aqueduct, Bethany Reservoir, and the South Bay Aqueduct and Pump Station.

Viewers of the Transfer-Bethany pipeline area would generally be limited to motorists traveling on Vasco Road, Armstrong Road, and Byron Hot Springs Road. Views south of Byron Hot Springs Road would not be accessible to the public as the area is secure and requires a key. There would be no public views of the project area from within the Bethany Reservoir State Recreation Area, because the southwestern area of the Bethany Reservoir is not open to the public. The visual quality of the area is representative of the rolling grassland hills in the valley interspersed with ranches and associated farming facilities.

Blow-off and Air Valves

Blow-off and air valves would be associated with the Delta-Transfer, Transfer-LV, and Transfer Bethany pipeline alignments. Blow-off and air valves are already elements of the visual landscape for the Delta-Transfer, and Transfer-LV pipeline areas. Figure 4.14-8 Photograph 14 shows a valve structure near the intersection of Walnut Boulevard and Camino Diablo Road.

Power Option 1: Western Only

The visual character of the landscape around the facilities to be constructed under Power Option 1 is generally the same as described in the preceding Delta intake facilities and Delta-Transfer Pipeline subsections. The area is dominated by agricultural lands crisscrossed with large lattice towers and transmission lines. Therefore, views generally encompass a rural, agricultural landscape characterized by crops (i.e., hay, oats, cherries, walnuts, tomatoes, corn, alfalfa, vineyards, and palm nurseries), homes/farms and associated out buildings and infrastructure including farm roads and distribution and transmission lines. Views of the proposed substation and distribution line would generally be limited to the stretch of SR 4 from Discovery Bay to Bixler Road. Local roads affording views include Kellogg Creek Road, Camino Diablo Road and Hoffman Lane; as well as at the crossing of Vasco Road. The visual quality of the area is representative of the agricultural areas next to the Delta and throughout the southeastern county area.

Power Option 2: Western & PG&E

The visual character of the landscape around the Western portion of the facilities to be constructed under Power Option 2 is generally agricultural. The view generally encompasses a rural, agricultural landscape characterized by crops, homes/farms and associated out buildings. The visual landscape is also interspersed with man-made features including two 500-Kilovolt (kV) and one 230-kV transmission lines that parallel the proposed transmission line alignment south to north (Figure 4.14-9 Photograph 15), Tracy Substation, the Delta Mendota Canal, California Aqueduct, Old River Intake and Pump Station, farm roads and other utility lines.

Views of the proposed transmission line would generally be limited to local roadways generally north of Kelso Road, east of Byron Highway, west of Clifton Court and Old River and south of SR 4 including: Kelso Road, Mountain House Road, Bethany Lane, Herdlyn Road, Bruns Road, Byron Highway, Clifton Court Road, and Western Farms Ranch Road. Views of the transmission line may be available to recreational users of Italian Slough (i.e., anglers); however, due to the levees in the vicinity of the Old River Intake and Pump Station, views from Old River would be obscured. The visual quality of the area is representative of the agricultural area next to the Delta and throughout the southeastern county area.

The visual character of the landscape around the Pacific Gas and Electric (PG&E) portion of Power Option 2 near the Transfer Facility is scarred due to surface mining activities taking place at Unimin's Byron Sand Plant Quarry (See Figure 4.14-7 Photograph 12). Additionally, there are homes along Longwell Road where the alignment traverses before entering the watershed. Within the watershed, the landscape is characterized by rolling grassland hills dotted with trees and intermittent views of Kellogg Creek. Utility lines extend along the roadways and a 500kv PG&E transmission line on lattice towers crosses the area. The proposed substation would be in an area surrounded by steeper topography, limiting views from Walnut Boulevard and one residence on the western hilltop (Figure 4.14-9 Photograph 16). Although evidence of surface mining is apparent, in general, the visual quality of the area is representative.

Contra Costa County has designated SR 4 and Vasco Road as scenic highways and expressways; Camino Diablo Road, Walnut Boulevard (to the entrance of the watershed) and Byron Highway as scenic routes, Old River and Clifton Court Forebay as scenic waterways; and the Black Hills ridgeline southwest of the Los Vaqueros Reservoir as a scenic feature.

Viewer Types and Exposures

Viewer types and exposure conditions vary substantially in the project area. Public viewer groups evaluated include: motorists along SR 4 (a state eligible scenic highway and county-designated scenic highway/expressway); Vasco Road (county-designated scenic highway/expressway); Camino Diablo Road, Walnut Boulevard (to the entrance of the watershed), Byron Highway (county-designated scenic routes) and Los Vaqueros Road; and visitors to recreational areas including the watershed and Old River (county-designated scenic waterway).

For each of the viewer groups identified in the project area, viewer exposure conditions were determined based on knowledge of the project areas and a site visit conducted on October 10, 2008. Variables considered include the viewing distance, angle of view, the extent to which views are screened or open, and duration of view. Viewing distances are described according to whether the project activities would be viewed within a foreground (within 0.5 mile or 2,640 feet), middleground (0.5 to 2.0 miles), or background (beyond 2.0 miles) zone. Viewing angle and extent of visibility considers the relative location of the project facility to the viewer and whether visibility conditions are open or panoramic, or limited by intervening vegetation, structures or terrain.

Duration of view pertains to the amount of time the project facilities or area would typically be seen from a sensitive viewpoint. In general, duration of view would be less in instances where the project facility would be seen for short or intermittent periods (such as from major travel routes and

recreation destination roads) and greater in instances where the project facility would be seen regularly and repeatedly (such as from public use areas).

Motorists on Major or Scenic Travel Routes

Scenic highways and routes within the project area include SR 4, Byron Highway, Vasco Road, Camino Diablo, and Walnut Boulevard. In addition, Los Vaqueros Road is considered to be a major travel route to and from the southern portion of the reservoir. Views along SR 4, Byron Highway and Los Vaqueros Road (near the reservoir) are generally panoramic and open, while views along Vasco Road, Camino Diablo Road, and Walnut Boulevard are generally limited by the surrounding hilly terrain.

The Old River Intake and Pump Station and about 2.5 miles of the Delta-Transfer Pipeline alignment would be within the foreground view from SR4. The new Delta Intake and Pump Station as well as the Western facilities associated with Power Option 1 and Power Option 2 would be in the middleground. Traffic volumes on SR4 are high and views are generally panoramic and open but of short duration.

The Western facilities associated with Power Option 1 and Power Option 2 would generally be within background views along Byron Highway, with the exception of two areas where the transmission line would cross the highway. Traffic volumes are relatively high and views are generally panoramic and open but of short duration.

Portions of the Delta-Transfer Pipeline and Transfer-Bethany Pipeline would be within the foreground views along Vasco Road. Views of the Transfer Facility Expansion would be obscured due to the topography of the area. Traffic volumes are relatively high, and views are generally limited by the hilly terrain and of short duration.

The Transfer-Bethany Pipeline and Transfer-LV Pipeline would be within the foreground view of Camino Diablo Road at two locations where these pipeline alignments would cross the road. Traffic volumes are moderate and views are generally limited by the hilly terrain and of short duration. Views of the Transfer Facility from this road are obscured by the hilly terrain.

The Transfer-LV Pipeline, Power Option 2 PG&E transmission line, inlet/outlet pipelines, and dam modification would be within the foreground view from Walnut Boulevard. Traffic volumes are moderate and views are generally limited by the hilly terrain and of short duration.

The expanded Los Vaqueros Reservoir, dam modification, shell borrow area, and recreational facilities on the southern shore would be within the foreground view of Los Vaqueros Road. Traffic volumes are low and views are generally panoramic and open at the reservoir.

Park and Recreation Areas

Parks and recreational areas in the project area include the Los Vaqueros Watershed, Round Valley Regional Preserve, Morgan Territory Regional Preserve, and Old River.

The expanded Los Vaqueros Reservoir, dam modification, shell borrow area and recreational facilities would be visible to recreation users in the watershed. Recreational use is relatively low within the watershed. Boaters and anglers generally enjoy panoramic and open views of the reservoir and associated recreational facilities. Hikers' views can range from open and panoramic to obstructed by vegetation and terrain, depending where the recreational users are in the watershed. Viewer exposure is considered moderate due to the low number of views, high view duration and open visibility.

The expanded Los Vaqueros Reservoir would not be visible to hikers using trails that traverse the Round Valley Regional Preserve and Morgan Territory Regional Preserve and connect to the watershed. Recreational use is relatively low where these trails connect with the Los Vaqueros trail system. Views of the reservoir area are limited by the vegetation and hilly terrain.

The intake structure associated with the new Delta Intake and Pump Station would be visible to recreational users on Old River. Recreational use within the vicinity of the Delta intake facilities is relatively low, as this area of the river is used primarily to traverse from Discovery Bay to other parts of the southern Delta; no marina or other recreation facilities exist along this stretch of Old River. However, views of the other facilities at the proposed intake and pump station would generally be obstructed by the levees. Viewer exposure is considered low due to the low number of views, low view duration, and limited visibility.

Visual Sensitivity

Visual sensitivity is a composite measurement of the overall susceptibility of an area or viewer group to adverse visual or aesthetic impacts, given the combined factors of landscape visual quality, viewer types, and exposure conditions. **Table 4.14-1** summarizes the visual sensitivity of the major viewer types that would be affected by the project facilities.

4.14.2 Environmental Consequences

Significance Criteria

The thresholds for determining the significance of impacts for this analysis are based on the environmental checklist in Appendix G of the California Environmental Quality Act (CEQA) Guidelines. These thresholds also encompass the factors taken into account under the National Environmental Policy Act (NEPA) to determine the significance of an action in terms of its context and the intensity of its effects. An alternative was determined to result in a significant effect on visual/aesthetic resources if it would do any of the following:

- Have a substantial, demonstrable negative aesthetic effect on a scenic vista
- Substantially damage scenic resources including, but not limited to, scenic waterways, trees, rock outcroppings, and historic buildings within a state scenic highway
- Substantially degrade the existing visual character or quality of the site and its surroundings
- Create a new source of substantial light or glare that would adversely affect day or nighttime views in the area

TABLE 4.14-1
SUMMARY OF VISUAL SENSITIVITY FINDINGS
VIEWER TYPES, VISUAL EXPOSURES, AND VISUAL QUALITY

Viewer Type	Visual Quality	Viewer Exposure and Volumes	Visual Sensitivity	Project Component
Travel Routes				
SR 4	Representative	Foreground Distance Unobstructed Views High Number of Viewers Low View Duration	Moderate	Delta Intake Facilities Delta-Transfer Pipeline Western Power Facilities
Byron Highway	Representative	Background Distance (except two crossings) Unobstructed Views High Number of Viewers Low View Duration	Low	Western Power Facilities
Vasco Road	Representative	Foreground Distance Unobstructed Views High Number of Viewers Low View Duration	Low	Delta-Transfer Pipeline Transfer-Bethany Pipeline
Camino Diablo	Representative	Foreground Distance Obstructed Views Moderate Number of Viewers Low View Duration	Low	Transfer-LV Pipeline Transfer-Bethany Pipeline
Walnut Boulevard	Distinct	Foreground Distance Obstructed Views Low Number of Viewers Low View Duration	Low	Dam Modification Transfer-LV Pipeline Inlet/Outlet Pipelines PG&E Transmission Line 160 TAF Borrow Area
Los Vaqueros Road	Distinct	Foreground Distance Unobstructed Views Low Number of Viewers High View Duration	Moderate	Los Vaqueros Reservoir Expansion Dam Modification Shell Borrow Area Recreational Facilities
Park/Recreation				
Los Vaqueros Watershed	Distinct	Fore, Middle and Background Distances Obstructed/unobstructed Views Low Number of Viewers High View Duration	Moderate to High	Los Vaqueros Reservoir Expansion Dam Modification Shell Borrow Area Recreational Facilities
Old River	Representative	Foreground Distance Partially obstructed Views Low Number of Viewers Low View Duration	Low	New Delta Intake and Pump Station

Because no state-designated scenic highways run near or through the project area, no potential exists for project impacts related to substantially damaging scenic resources within a state scenic highway. As such, impacts to scenic resources within a state scenic highway are not discussed below.

Definition and Use of Significance Criteria

An adverse impact to visual/aesthetic resources may occur when: (1) an action perceptibly changes the existing physical features of the landscape that are characteristic of the region or locale; (2) an action introduces new features to the physical landscape that are perceptibly uncharacteristic of the region or locale, or become visually dominant in the viewshed; or (3) an action blocks or totally obscures aesthetic features of the landscape. The degree of visual impact depends on how noticeable the adverse change is. The noticeability of a visual impact is a function of the project features, context, and viewing conditions (angle of view, distance, and primary viewing directions). The key factors in determining the degree of visual change are visual contrast, project dominance, and view blockage.

Visual Contrast

Visual contrast is a measure of the degree of change in line, form, color, and texture that the project will create, when compared to the existing landscape. Visual contrast ranges from none to strong, and is defined as:

- *None* – The element contrast is not visible or perceived
- *Weak* – The element contrast can be seen but does not attract attention
- *Moderate* – The element contrast begins to attract attention and begins to dominate the characteristic landscape
- *Strong* – The element contrast demands the viewer's attention and cannot be overlooked

Project Dominance

Visual dominance is a measure of a project feature's apparent size relative to other visible landscape features in the viewshed, or seen area. A feature's dominance is affected by its relative location in the viewshed and the distance between the viewer and feature. The level of dominance can range from subordinate to dominant.

View Blockage or Impairment

View blockage or impairment is a measure of the degree to which project features would obstruct or block views to aesthetic features due to the project's position and/or scale. Blockage of aesthetic landscape features or views can cause adverse impacts, particularly in instances where scenic or view orientations are important to the use, value or function of the land use.

Overall Adverse Visual Impact

Overall adverse impacts to visual/aesthetic resources reflect the composite visual changes to both the directly affected landscape and from sensitive viewing locations. The visual impact levels referenced in this EIS/EIR indicate the relative degree of overall change to the visual environment that the project alternatives would create, considering visual sensitivity, visual contrast, view blockage, and project dominance.

In general, the determination of impact significance is based on combined factors of Visual Sensitivity and the Degree of Visual Change that the project would cause. The inter-relationship of these two overall factors in determining whether adverse visual impacts are significant is shown in **Table 4.14-2**.

TABLE 4.14-2
GUIDELINES FOR DETERMINING ADVERSE VISUAL IMPACT SIGNIFICANCE

	Overall Visual Change				
Overall Visual Sensitivity	**Low**	**Low to Moderate**	**Moderate**	**Moderate to High**	**High**
Low	Not Significant	Not Significant	Adverse, but Not Significant	Adverse, but Not Significant	Adverse, but Not Significant
Low to Moderate	Not Significant	Adverse, but Not Significant	Adverse, but Not Significant	Adverse, but Not Significant	Adverse, but Not Significant
Moderate	Adverse, but Not Significant	Adverse, but Not Significant	Adverse, but Not Significant	Adverse and Potentially Significant	Adverse and Potentially Significant
Moderate to High	Adverse, but Not Significant	Adverse, but Not Significant	Adverse and Potentially Significant	Adverse and Potentially Significant	Significant
High	Adverse, but Not Significant	Adverse and Potentially Significant	Adverse and Potentially Significant	Significant	Significant

Not Significant impacts may or may not be perceptible but are considered minor in the context of existing landscape characteristics and view opportunity.

Adverse, but Not Significant Impacts are perceived as negative but do not exceed environmental thresholds.

Adverse and Potentially Significant Impacts are perceived as negative and may exceed environmental thresholds depending on project- and site-specific circumstances.

Significant impacts with feasible mitigation may be reduced to less-than-significant levels or avoided all together. Without mitigation or avoidance measures, significant impacts would exceed environmental thresholds.

Impact Summary

Table 4.14-3 provides a summary of the impact analysis for issues related to visual/aesthetic resources.

TABLE 4.14-3
SUMMARY OF IMPACTS – VISUAL/AESTHETIC RESOURCES

Impact	Project Alternatives			
	Alternative 1	Alternative 2	Alternative 3	Alternative 4
4.14.1: The project alternatives would not have a substantial, demonstrable negative aesthetic effect on a scenic vista or from a county-designated scenic highway or route.	LS	LS	LS	LS
4.14.2: The project alternatives would not substantially degrade the existing visual character or quality of the site and its surroundings, except Alternative 4 due to the borrow area in Kellogg Valley.	LS	LS	LS	LSM
4.14.3: The project alternatives would not create a new source of substantial light but Alternatives 1, 2, and 3 could create a new source of substantial glare that could adversely affect views in the area.	LSM	LSM	LSM	LS
4.14.4: The project alternatives would not make a cumulatively considerable contribution to adverse effects on visual/aesthetic resources in the project area or broader region.	LS	LS	LS	LS

NOTES:

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

Impact Analysis

No Project/No Action Alternative

Under the No Project/No Action Alternative, no new facilities would be constructed, and existing facilities would not be altered, expanded, or demolished. Implementation of this alternative would not affect scenic vistas, scenic resources, or the existing visual character of the surrounding area, and would not create any additional source of light or glare.

Impact 4.14.1: The project alternatives would not have a substantial, demonstrable negative aesthetic effect on a scenic vista or from a county-designated scenic highway or route. (Less than Significant)

Contra Costa General Plan states that a major component to the perception that Contra Costa County is a desirable place to live and work is the scenic vistas that are available through out the County. Noting that the County has many localized features, the General Plan, 9.6 Scenic Resources focuses on two main resources (1) scenic ridges, hillsides, and rock outcroppings; and (2) the San Francisco Bay/Delta estuary system. Therefore, for purposes of this CEQA analysis, “scenic vista” encompasses scenic resources as designated by the Contra Costa County General Plan.

Within the project area, Contra Costa County has designated the Black Hills ridgeline southwest of the Los Vaqueros Reservoir as a scenic ridgeline; SR 4 and Vasco Road as scenic highways and

expressways; Camino Diablo Road, Walnut Boulevard (to the entrance of the watershed) and Byron Highway as scenic routes; and Old River and Clifton Court Forebay as scenic waterways. In addition to evaluating effects on scenic vistas and views of scenic resources, this section evaluates views from scenic highways and routes.

Alternative 1

Los Vaqueros Reservoir Expansion

Reservoir expansion would result in an increase in the inundation area of the reservoir and some recreational facilities (i.e., marina, boats, and docks) that are currently on the southern shore would be moved to the northern shore near the dam. Currently, the reservoir high-water level is about 472 feet msl and with inundation it would rise to a height of 560 feet msl. Although this increase in inundation would be perceptible to anglers, boaters and hikers on trails within the watershed, it would result in a weak visual contrast. Further, this change would not dominate the views of the Black Hills Ridgeline, a county designated scenic ridgeline about 1 to 5 miles southwest of the Los Vaqueros Reservoir, and would not obstruct views of the Black Hills Ridgeline.

Moreover, removal of some recreational facilities on the south end would decrease the number of man-made features within the view of the Black Hills Ridgeline. Therefore, the relative change in the views of the Black Hills Ridgeline as viewed by recreational users of the Los Vaqueros Reservoir would be low.

New Delta Intake and Pump Station

The views from SR 4, a county designated scenic highway, of the new Delta Intake and Pump Station are generally agricultural and industrial in the foreground. Middle and background views are obscured by the levee systems along Old River, a county designated scenic waterway. For instance, when driving west on Highway 4, views of Old River are within the foreground, but views of the Old River Intake and Pump Station and the new Delta Intake and Pump Station site would be obstructed by the natural bend in Old River and the levees. When driving east on Highway 4, views of Old River are completely obscured by the levee system. Views of the new intake would be within the foreground of recreational users of Old River as they travel from Discovery Bay to the south Delta.

Views from Old River are also generally obscured by levees. However, similar to the existing Old River Intake and Pump Station, many new structures associated with the new Delta Intake and Pump Station would be placed inside a ring levee, which surrounds the site and creates a visual barrier of the site.

Since the new structures would be similar to those already existing at the Old River Intake and Pump Station, the visual contrast would be weak, would not cause a substantial visual contrast to existing views, and would not dominate nor obstruct the view. Therefore, the relative change in the views from SR4 would be low.

Delta-Transfer Pipeline

Permanent structures associated with the Delta-Transfer Pipeline would include blow-off valves and air valves that extend about 2 feet above the ground (See Figure 4.14-8, Photograph 14). Blow-off and air valves associated with the Old River Pipeline already appear along SR4. Blow-off and air valves associated with the Delta-Transfer Pipeline would be installed about every 2,000 and 1,000 feet, respectively.

Although drivers along SR4 could see these structures in the foreground views, because the blow-off valves and air valves structures would be similar to existing structures, the visual contrast would be weak. Additionally, as some blow-off valve structures would be in low-lying areas and some would be screened by intermittent vegetation along SR4, the introduction of these new structures would not cause a substantial visual contrast to existing views and would not dominate or obstruct the views from SR4. Therefore, the relative change in the views from SR4, a county designated scenic route, would be low.

Transfer Facility Expansion

Views of permanent structures associated with the Transfer Facility Expansion would be obstructed from viewers traveling along Vasco Road, a county-designated scenic highway, by the existing topography around the site. Thus, there would no change in view from this road and no scenic vista would be obstructed.

Transfer-LV Pipeline

Permanent structures associated with the Transfer-LV Pipeline would include blow-off valves and air valves. Blow-off and air valves associated with the Los Vaqueros Pipeline already appear along Walnut Boulevard. Although drivers along Walnut Boulevard would see these structures in foreground views, because these structures would be similar to existing structures, the visual contrast would be weak. Moreover, as some blow-off valve structures would be in low-lying areas and some would be screened by the intermittent vegetation and topography along Walnut Boulevard, the introduction of these new structures would not cause a substantial visual contrast to existing views and would not dominate or obstruct the views from Walnut Boulevard. Therefore, the relative change in the views from Walnut Boulevard, a county designated scenic route, would be low.

Inlet/Outlet Pipelines

Permanent structures associated with the inlet/outlet pipelines would not obstruct views of any scenic vistas.

Transfer-Bethany Pipeline

Like the Delta-Transfer Pipeline, the only aboveground structures associated with the Transfer-Bethany Pipeline would include blow-off valves and air valves that stand about 2 feet aboveground. Drivers from Vasco Road, a county-designated scenic highway/expressway, could see these valves in the foreground. However, some of these blow-off valves would be placed in low-lying areas along the pipeline alignment and would generally be obscured by the natural

topography. Regarding air valves that may be placed at a higher elevation, these structures are generally small and would blend in with other structures in the viewshed including, but not limited to wire and wood post fencing, small lattice wind mills and associated ranching equipment. Therefore, the introduction of these new structures would not cause a substantial visual contrast to existing views and would not dominate or obstruct the views from Vasco Road. Accordingly, the relative change in the views from Vasco Road would be low.

Power Infrastructure

Power Option 1: Western Only. A new substation, access road to the facility and 69 kV transmission line to the new Delta Intake and Pump Station would be constructed about 2,500 feet south of SR4 and 1 to 1.5 miles east of Byron Highway. The substation and access road would be constructed next to three large existing transmission lines installed on lattice towers.

Views of the substation site are generally obstructed by existing vegetation and development from SR4 and Byron Highway, respectively. Moreover, the substation would be fenced and a landscaping plan to add visual screening would be implemented. Therefore, the new substation and access road would not cause a substantial visual contrast to existing views and would not dominate or obstruct the views from SR4 or Byron Highway. Accordingly, the relative change in the views from SR4 or Byron Highway would be low.

For the portion of the transmission line from the substation east to the new Delta Intake and Pump Station and west to the Transfer Facility wooden poles and conductors already exist within most of the proposed alignment. Therefore, installation of a new transmission line or replacement of the existing transmission line would not result in a substantial visual contrast since the new poles and conductors would be similar to those that currently exist. Moreover, the transmission facilities would not dominate or obstruct views from SR4 or at the Byron Highway and Vasco Road crossings. Accordingly, the relative change in the views from SR4, Byron Highway, and Vasco Road would be low.

Power Option 2: PG&E and Western. Western's new wooden power poles and transmission line from the Tracy Substation to the new Delta Intake and Pump Station would be visible from Byron Highway. Views from SR 4 for the portion of the transmission line that would be in the same alignment as proposed under Power Option 1 were discussed previously.

In general, the views of the alignment vary from foreground to background views depending on one's location on Byron Highway. However, these new, approximately 50-foot poles would be within an existing transmission line corridor that contains three transmission lines: two 500 kV lines and one 230 kV line on lattice towers. Therefore, installation of a new transmission line would not result in a substantial visual contrast because the new poles and conductors would be substantially smaller than the existing facilities. Moreover, views of the facilities would be intermittently obstructed by topography and man-made features including farm buildings and houses.

The new transmission line would not dominate or obstruct views from Byron Highway. Therefore, the relative change in the views from SR 4 and Byron Highway would be low.

A portion of the PG&E transmission line would be visible in foreground views from Walnut Boulevard and at the crossing of Camino Diablo Road. Because existing wooden poles and conductors already line these local roadways, installation of a new transmission line would not result in a substantial visual contrast because the new poles and conductors would be similar to what currently exist. The proposed substation would be in an area surrounded by steeper topography, limiting views from Walnut Boulevard. Therefore, the transmission facilities would not dominate or obstruct views from Walnut Boulevard or Camino Diablo Road. Accordingly, the relative change in the views from Walnut Boulevard and Camino Diablo Road would be low.

Summary

In all cases, construction of proposed facilities under Alternative 1 would not dominate or obstruct views of scenic vistas from any of the county-designated scenic resources including highways, expressways, routes, or waterways. Therefore, the project effect on scenic vistas would be less than significant.

Alternative 2

Impacts related to scenic vistas resulting from implementation of 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 scenic vistas would be less than significant.

Alternative 3

Impacts related to scenic vistas from implementation of Alternative 3 would be less than Alternative 1 because the Transfer-Bethany Pipeline would not be constructed, thereby reducing visual impacts to viewers along Vasco Road, a county designated scenic highway. Moreover, Alternative 3 would not include construction of the new Delta Intake and Pump Station.

Construction activities at the existing Old River Intake and Pump Station would take place inside the fenced property and ring levee, which surrounds the site and creates a visual barrier of the site, therefore limiting impacts to viewers along SR4 and recreational users of Old River. Installation of a new fish screen within an existing bay, next to an existing screen, would not result in a substantial visual contrast to existing views from Old River. Moreover, the new screen would not dominate or obstruct views from Old River. Accordingly, the relative change in the views from SR4 and Old River would be low, and overall impacts to scenic vistas would be less than significant.

Alternative 4

Impacts to scenic vistas resulting from implementation of Alternative 4 would be less than Alternative 1 because this alternative involves a smaller reservoir expansion (160 TAF) and most of the project components associated with Alternative 1 would not be implemented under this alternative. The following components would not be constructed: Delta Intake and Pump Station, Delta-Transfer Pipeline, Transfer Facility Expansion, Transfer-LV Pipeline, Transfer-Bethany Pipeline, Power Supply Option 1 or 2, or the Marina Complex on the northern shoreline.

Recreation facilities would be relocated or constructed in different locations compared to Alternative 1; for example, the Westside Access Road would be lower in elevation than proposed under Alternative 1 and recreational facilities including the Marina would generally be constructed upslope of the existing facilities under Alternative 4 rather than in new locations as under Alternative 1. No impacts to scenic vistas would result from the 160-TAF borrow area as it is not within the viewshed of any scenic vistas. The following paragraphs discuss impacts resulting from the expansion of Los Vaqueros Reservoir, Westside Access Road and relocated recreational facilities associated with Alternative 4.

Reservoir expansion to 160 TAF would result in an increase in the inundation area of the reservoir and some recreational facilities (i.e., marina, boats, docks, and western hiking trail/access road) that are currently on the southern shore would be moved upslope. Currently, the reservoir high water level is about 472 feet msl and with inundation it would rise to a height of 510 feet msl.

Although this increase in inundation and relocated recreational facilities (i.e., marina, boat docks, picnic area, Westside Access Road, etc.) would be perceptible to anglers, boaters and hikers within the watershed, the changes would result in a weak visual contrast. These changes would not dominate the views of the Black Hills Ridgeline, a county-designated scenic ridgeline about 1 to 5 miles southwest of the Los Vaqueros Reservoir, and would not obstruct views of the Black Hills Ridgeline. Therefore, the relative change in the views of the Black Hills Ridgeline as viewed by recreational users of the Los Vaqueros Reservoir would be low.

Therefore, the effect on scenic vistas under Alternative 4 would be less than significant.

Mitigation: None required.

Impact 4.14.2: The project alternatives would not substantially degrade the existing visual character or quality of the site and its surroundings, except Alternative 4 due to the borrow area in Kellogg Valley. (Less than Significant for Alternatives 1, 2, and 3; Less than Significant with mitigation for Alternative 4)

Alternative 1

Construction

During the 3-year construction period associated with construction of the 275-TAF reservoir, the Los Vaqueros Watershed would be closed to public access[1]. However, during the 1-year period before the start of construction activities when the reservoir would be drawn down, the public would have access. Because the reservoir area is not visible from trails associated with Morgan Territory and Round Valley Regional Preserves, construction-related impacts that could degrade the existing visual character or quality of the site and its surroundings would not be visible to the

[1] The Miwok Trail, to maintain connectivity between Round Valley and Morgan Territory Regional Preserves, would remain open; however, this trail offers no views of the Los Vaqueros Reservoir. See Figure 4.15-2.

public or recreational users. Moreover, increased visibility of the lands beneath the water as the reservoir is drawn down would be temporary in nature.

Outside the watershed, construction equipment, excavated stockpiled soils, sections of pipe, and other materials along pipeline corridors and at project sites could degrade the existing visual character or quality of the site and its surroundings. However, as discussed below, many construction activities would not be visible to the public and recreational users because project sites would be screened by topography, vegetation, and existing man-made features. Moreover, this impact would be temporary.

Los Vaqueros Reservoir Expansion

As discussed above, reservoir expansion would result in an increase in the inundation area of the reservoir. After construction, the reservoir would be filled over an estimated 1-year period. Therefore, the inverse would be experienced as decreased visibility of the lands beneath the water would occur as the reservoir is filled. Although this increase in inundation would be perceptible to anglers, boaters, and hikers within the watershed, it would result in a weak visual contrast, and would not dominate nor obstruct the views of the reservoir and its surroundings from boats and existing/proposed trails.

The maximum water level associated with Alternative 1 would be 560 feet, and the minimum water level would be 460 feet. This fluctuation in water level would occur at certain times of year and leave an exposed strip around the water's edge up to 100 feet thick. This anticipated level of fluctuation is equivalent to fluctuations of the existing reservoir and would be visible to recreational users of the reservoir. Therefore, it would result in a weak visual contrast, and would not dominate nor obstruct the views of the reservoir and its surroundings from boats and existing/proposed trails.

As part of the dam construction, a site of about 36 acres, just upstream of the left abutment of the dam, would be excavated to harvest materials for construction of the dam. This borrow area would be an extension of the borrow area (i.e., roughly triangular-shaped area of the hillside near the dam face) developed for construction of the existing dam (see Figure 4.14-3, Photograph 4). After excavation, grading and contouring of the borrow area to blend with existing and planned topography, a portion of the hillside from an elevation of 600 feet to 1,060 feet msl would remain a flat, rocky surface. A marina complex and its associated parking and other facilities would be built on this flat, rocky surface and to the west. Therefore, the marina complex would generally shield views of the borrow area from boaters, anglers, and hikers. However, views of the marina complex itself would be new to recreational users and would result in a moderate visual contrast.

Because the marina complex would be similar to other watershed buildings in appearance, situated near the water level and tucked into the borrow area and surrounding hills, it would not dominate nor obstruct the views of the reservoir and its surroundings from boats and existing/proposed trails. Moreover, removal of some recreational facilities on the south end would decrease the number of man-made features visible from the eastside trail to the west, improving the visual quality of the south end of the reservoir.

Additionally, installation of connections (i.e., approximately 12-foot-wide dirt/gravel trails) between existing maintenance roads to create the eastside trail would result in a weak visual contrast and would not dominate nor obstruct the views of the reservoir and its surroundings from boats and existing/proposed trails.

New Delta Intake and Pump Station

As previously discussed, views of the new Delta Intake and Pump Station from westbound lanes on SR 4 would be obscured. Views from eastbound lanes on SR 4 would be within the foreground. However, in similar fashion to the existing Old River Intake and Pump Station, many new structures associated with the new Delta Intake and Pump Station would be placed inside a ring levee, which surrounds and creates a visual barrier of the site. Moreover, since the new structures would be similar to those already existing at the Old River Intake and Pump Station, the visual contrast would be weak.

In addition, although views of the new intakes would be within the foreground for recreational users of Old River, intakes already exist next to the site, and views are short in duration as recreational users travel Old River from Discovery Bay to the south Delta. Therefore, the relative change in the views of the new Delta Intake and Pump Station from SR 4, and associated intakes from Old River, would result in a weak visual contrast that would neither dominate nor obstruct the views of Old River and its surroundings from SR4.

Transfer Facility Expansion

As previously discussed, the existing topography around the Transfer Facility Expansion site would obstruct views of its permanent structures from surrounding roadways. Therefore, there would be no changes in the existing visual character or quality of the site and its surroundings.

Pipelines

After installation of the pipelines, the sites would be restored to preconstruction conditions (i.e., reestablishing existing topography and reseeding with a native seed mix typical of the immediately surrounding area). The proposed pipelines (i.e., Delta-Transfer, Transfer-LV, and Transfer-Bethany) would be belowground; blow-off and air valves extend about 2 feet above the ground (See Figure 4.14-8, Photograph 14). Currently blow-off and air valves appear along portions of SR4 and Walnut Boulevard from the Transfer Facility to the dam. New blow-off and air valves would be installed about every 2,000 and 1,000 feet, respectively.

Although drivers along SR4 and Walnut Boulevard as well as recreational users of the Walnut Trail in the watershed could see these structures in foreground views, since these structures would be similar to existing structures, the visual contrast would be weak. Furthermore, as some would be in low-lying areas and vegetation provides intermittent screening along SR4 and Walnut Boulevard, the introduction of these new structures would result in a weak visual contrast and would not dominate nor obstruct views from local roadways or trails.

The valves associated with the Transfer-Bethany Pipeline would be within the foreground view of the public traveling on Vasco Road. However, some of these valves would be placed in low-lying

areas along the pipeline alignment and would generally be obscured by the natural topography. Therefore, the introduction of these new structures would result in a weak visual contrast and would not dominate nor obstruct the views from Vasco Road.

Lastly, the inlet/outlet pipelines would not have associated blow-off and air valves. Therefore, since the pipelines would be underground, there would be no changes in the existing visual character or quality of the site and its surroundings.

Power Supply

Power Option 1: Western Only. A new substation, access road to the facility and 69 kV transmission line to the new Delta Intake and Pump Station would be constructed about 2,500 feet south of SR4 and 1 to 1.5 miles east of Byron Highway. The substation and access road would be constructed next to three large existing transmission lines installed on lattice towers. Views of the site are generally obstructed by existing vegetation and development from SR4 and Byron Highway, respectively. Moreover, the substation would be fenced and a landscaping plan to add visual screening would be implemented.

For the portion of the transmission line from the substation east to the new Delta Intake and Pump Station and Old River Intake and Pump Station, existing wooden poles and conductors appear within the alignment. For the portion west to the Transfer Facility, numerous existing electrical facilities including lattice towers, tubular steel poles, wooden poles and conductors appear within a portion of the alignment and within the entire viewshed. Therefore, installation of a new substation, access road, and a new/replacement transmission line would result in a weak visual contrast and would not dominate nor obstruct the views from SR 4 or Byron Highway.

Power Option 2: PG&E and Western. Western's new wooden power poles and transmission line from the Tracy Substation to the new Delta Intake and Pump Station would be visible from Byron Highway. Views from SR 4 for the portion of the transmission line that would be in the same alignment as proposed under Power Option 1 are discussed above. In general, the views of the alignment vary from foreground to background views depending on one's location on Byron Highway. However, these new, approximately 50-foot poles and associated conductors would be within an existing transmission line corridor that contains three transmission lines: two 500 kV lines and one 230 kV line on large lattice towers.

Views of the facilities are intermittently obstructed by topography and man-made features, including farm buildings and houses. Therefore, installation of a new transmission line would result in a weak visual contrast and would not dominate nor obstruct views from SR 4 or Byron Highway.

A portion of the PG&E transmission line would be visible in foreground views from Walnut Boulevard and at the crossing of Camino Diablo Road. Because wooden poles and conductors already exist along these local roadways, installation of a new transmission line would not result in a substantial visual contrast because the new poles and conductors would be similar to what currently exists. Moreover, the proposed substation would be in an area surrounded by steeper topography, limiting views from Walnut Boulevard. Therefore, installation of a new substation

and transmission line would result in a weak visual contrast and would not dominate nor obstruct views from Camino Diablo Road or Walnut Boulevard.

Summary

Under Alternative 1, project construction activities and facility siting would result in a weak visual contrast and would not dominate nor obstruct the views of the public or recreational users; therefore, Alternative 1 would not substantially degrade the existing visual character or quality of the site and its surroundings. This would be a less-than-significant impact.

Alternative 2

Under Alternative 2, construction activities and facility siting impacts would be the same as analyzed under Alternative 1 because Alternative 2 includes construction of the same facilities as Alternative 1 does. Therefore, Alternative 2 would not substantially degrade the existing visual character or quality of the site and its surroundings. This would be a less-than-significant impact.

Alternative 3

Under Alternative 3, construction activities and facility siting impacts would be less than Alternative 1 because neither the new Delta Intake and Pump Station nor the Transfer-Bethany Pipeline would be constructed, thereby reducing changes to the existing visual character or quality of the site and its surroundings. Construction activities at the existing Old River Intake and Pump Station would generally take place inside the fenced property and ring levee, which surrounds and creates a visual barrier of the site from SR4.

Installation of a new fish screen within an existing bay, next to an existing screen, would not result in a substantial visual contrast to existing views from Old River. Therefore, construction-related activities and a new fish screen at the Old River Intake and Pump Station would result in a weak visual contrast and would not substantially degrade the existing visual character or quality of the site and its surroundings. This would be a less-than-significant impact.

Alternative 4

Impacts to the existing visual character or quality of the site and its surroundings resulting from implementation of Alternative 4 would be less than from Alternative 1 because this alternative involves a smaller reservoir expansion (160 TAF only) and most of the project components associated with Alternative 1 would not be implemented under this alternative. The following components would not be constructed: 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 recreation facilities would be relocated or constructed in different locations compared to Alternative 1; for example, the Westside Access Road would be 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 as under Alternative 1. The following paragraphs discuss impacts resulting from the shell borrow area west of the dam,

160-TAF borrow area, Westside Access Road and relocated recreational facilities associated with Alternative 4.

Reservoir expansion to 160 TAF would result in an increase in the inundation area of the reservoir and some recreational facilities (i.e., marina, boats, docks, and western hiking trail/access road) that are currently on the southern shore would be moved upslope. Currently, the reservoir high water level is about 472 feet msl and with inundation it would rise to a height of 510 feet msl. Although this increase in inundation and relocated recreational facilities would be perceptible to anglers, boaters, and hikers within the watershed, it would result in a weak visual contrast and would not dominate nor obstruct the views of the reservoir or its surroundings from the dam, boats and existing/proposed trails.

Under Alternative 4, the shell borrow area just upstream of the left abutment of the dam would be about 14 acres smaller than under Alternative 1. Moreover, the Marina Complex would not be sited within the borrow area. After excavation, the borrow area site would be graded and contoured to blend with existing and planned topography.

In addition, it is likely that, as occurred with the existing Los Vaqueros Reservoir, the borrow area would naturally revegetate with upland scrub habitat. Therefore, the roughly triangular-shaped area of the hillside near the dam face would become larger, and would result in a weak visual contrast. Moreover, it would not dominate nor obstruct the views of the reservoir or its surroundings from the dam, boats, and existing/proposed trails.

About 270,000 cubic feet of naturally occurring alluvial clay deposits would be excavated from the 160-TAF borrow area in Kellogg Valley. Views from Walnut Boulevard of the 160-TAF borrow area generally would be screened by the Kellogg Creek riparian vegetation; however, it would be visible to hikers on portions of the Alkali Meadow Trail. This would result in a moderate visual contrast and dominate the viewshed of the recreational trail users; however, as the area is in a low-lying valley, it would not block middleground and background views of the valley and surrounding hills.

Generally, under Alternative 4, construction and operations would result in a weak visual contrast and would neither dominate nor obstruct the views of the public or recreationalists. However, impacts associated with excavating the 160-TAF borrow area would substantially degrade the existing visual character and quality of the site and its surroundings and therefore represent a significant impact.

Mitigation Measures

Measure 4.14.2a: CCWD shall develop and implement a site restoration plan specifically for the 160-TAF borrow area that shall provide for finished topography that, while not restored to prior condition, shall blend in with the surrounding landscape, minimizing the visual contrast. The plan shall include a revegetation plan that includes a native seed mix typical of the surrounding area. While these site restoration steps are similar to those that will be required at all project sites, this specific project area requires its own restoration plan because of the extent of ground disturbance that will occur here.

Impact Significance after Mitigation: Less than Significant.

Impact 4.14.3: The project alternatives would not create a new source of substantial light but Alternatives 1, 2, and 3 could create a new source of substantial glare that could adversely affect views in the area. (Less than Significant with Mitigation for Alternatives 1, 2, and 3; Less than Significant for Alternative 4)

Alternative 1

Construction

During the 3-year period associated with construction of the 275-TAF reservoir, the Los Vaqueros Watershed would be closed to public access[2]. Moreover, because the reservoir area is not visible from trails in and around Morgan Territory and Round Valley Regional Preserves, creation of a new source of substantial light or glare from lighting and equipment used during nighttime construction would not be visible to the public or recreational users, and would therefore not result in construction-related impacts.

The watershed would be open to the public during the 1-year reservoir draw down and approximately 1-year reservoir filling period. No new equipment or lighting would be required to drawdown or fill the reservoir; therefore no new source of substantial light or glare would result from drawdown or refilling of the reservoir.

Outside the watershed, site lighting and construction equipment could result in creation of a new source of substantial light or glare. However, as discussed below, many construction activities would not be visible to the public and recreational users due to screening of project sites by topography, vegetation, and existing man-made features. Moreover, this impact would be temporary.

For information on potential impacts to wildlife from the use of lighting during project construction and operation, see Section 4.6, Biological Resources.

Los Vaqueros Reservoir Expansion

When construction is completed, the expanded reservoir, dam, and recreational facilities would have nighttime lighting for safety and security. This lighting would not vary substantially from what is currently used at existing facilities, which is generally shielded light or lamps installed such that the light is directed downwards. Moreover, the Los Vaqueros Watershed is a day-use facility which closes at sunset or earlier and, as discussed previously, is obscured from public views from other recreational facilities. Therefore, operational impacts that could result from creation of a new source of substantial light or glare from the use of lighting for safety and security in the watershed would not be visible to the public or recreational users.

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2 The Miwok Trail would remain open during construction to maintain connectivity between Round Valley and Morgan Territory Regional Preserves; however, this trail offers no views of the Los Vaqueros Reservoir to recreational users. See Figure 4.15-2.

New Delta Intake and Pump Station

During construction, site lighting and construction equipment could be required at night for safety and security. As discussed in Impact 4.14-1, views of the new Delta Intake and Pump Station when driving west on SR 4 would be obscured. Views from SR 4 when driving east would be within the foreground. However, after construction of the ring levee, the majority of the construction activities would be taking place inside the ring levee, which would surround the site and create a visual barrier. Therefore, construction activities associated with the new Delta Intake and Pump Station would not result in a new source of substantial light or glare that would be visible to the public or recreational users.

The permanent structures associated with the new Delta Intake and Pump Station would be similar to the structures currently at the Old River Intake and Pump Station, which are generally painted in light earth tones and are non-reflective. For safety and security, lighting similar to that currently used at the Old River Intake and Pump Station would be installed. Current lighting is generally shielded or installed such that the light is directed downwards. Therefore, the structures and lighting would generally be obscured from view, and operation of the new Delta Intake and Pump Station would not result in a new source of substantial light or glare that would be visible to the public.

Transfer Facility Expansion

During construction, site lighting and construction equipment could be required at night for safety and security. When construction is completed, the Transfer Facility Expansion would have nighttime lighting for safety and security. This lighting would not vary substantially from what is currently used at this site, which is generally shielded, or lamps installed such that the light is directed downwards. Moreover, as discussed previously, public views of the Transfer Facility Expansion would be obstructed from surrounding roadways by the existing topography around the site. Therefore, construction and operation of the Transfer Facility would not result in a new source of substantial light or glare that would be visible to the public or recreational users.

Pipelines

During construction of the Delta-Transfer, Transfer-LV, and Transfer-Bethany Pipelines, site lighting and construction equipment could be required at night for safety and security for the duration of construction. However, because the pipeline construction area moves continuously along the alignment, lighting at any one location would be of limited duration. After completion of construction, no lighting would be required because the pipelines would be underground. Therefore, construction and operation of the pipelines would not result in a new source of substantial light or glare that would be visible to the public or recreational users.

Power Supply

During construction of the transmission lines associated with either Power Option 1: Western Only or Power Option 2: Western and PG&E, lighting could be required at night for safety and security for the duration of project construction. However, because the construction area would move continuously along the transmission line alignment, lighting at any one location would be

limited in duration. After completion of construction, no lighting would be required along the transmission lines. Therefore, construction of the transmission line would not result in a new source of substantial light or glare that would be visible to the public or recreational users.

However, installation of new conductor specifically associated with Power Option 1, within an area where no transmission lines currently exist (i.e., along the Delta-Transfer Pipeline corridor) could result in a noticeable visual change during the daytime. The new conductor could be reflective and could cause glare. This effect could result in the new conductor appearing visible or prominent and would therefore result in a potentially significant impact.

Power Option 1: Western Only. A lighting plan to provide security and exterior lighting would be developed for a new substation that would be constructed west of the new Delta Intake and Pump Station. Additionally, structures associated with the new substation could introduce potentially reflective, metal surfaces that could create glare effects. However, views of the site are generally obstructed by existing vegetation and development from SR4 and Byron Highway, respectively. Moreover, the substation would be fenced and a landscaping plan to provide additional visual screening would be implemented. Therefore, operations of the new substation would not result in a new source of substantial light or glare that would be visible to the public or recreational users.

Power Option 2: PG&E and Western. For the proposed substation within the Los Vaqueros Watershed, a lighting plan to provide security and exterior lighting would be developed. Additionally, structures associated with the new substation could introduce potentially reflective, metal surfaces that could create glare effects. However, the substation would be in an area surrounded by steeper topography, limiting views from Walnut Boulevard. Moreover, at night, the substation would not be visible to the public or recreational users as it would be within the watershed, which closes at sunset or earlier. Therefore, construction and operation of a new substation would not result in creation of a new source of substantial light or glare that would be visible to the public or recreational users.

Summary

Under Alternative 1, project construction and operations would not result in creation of a new source of substantial light or glare that would be visible to the public or recreational users. However, a conductor within an area where no transmission lines currently exist could result in a noticeable visual change during the daytime. Therefore, operation of Power Option 1 could result in a new source of substantial glare that would be visible to the public from SR 4. This would be a significant impact.

Alternative 2

Under Alternative 2, construction and operational impacts would be the same as analyzed under Alternative 1 because Alternative 2 includes implementation of the same facilities as does Alternative 1. Therefore, Alternative 2 could result in a new source of substantial glare that would be visible to the public. This would be a significant impact.

Alternative 3

Under Alternative 3, construction and operational impacts would be less than Alternative 1 because neither the new Delta Intake and Pump Station nor the Transfer-Bethany Pipeline would be constructed, thereby eliminating the need for construction and safety/security lighting at either location. Construction activities at the existing Old River Intake and Pump Station would take place inside the fenced property and ring levee, which surrounds the site and creates a visual barrier of the site. Because safety and security lighting are already in place; additional lighting would not likely be required and there would be no additional light impacts. However, as described for Alternative 1, the new conductor associated with Power Option 1 could be a substantial source of glare, representing a significant impact.

Alternative 4

Impacts from implementation of Alternative 4 would be less than from Alternative 1 because this alternative involves a smaller reservoir expansion (160 TAF only) and most of the project components associated with Alternative 1 would not be implemented under this alternative. The following components would not be constructed: Delta Intake and Pump Station, Delta-Transfer Pipeline, Transfer Facility Expansion, Transfer-LV Pipeline, Transfer-Bethany Pipeline, Power Supply Option 1 or 2, or the Marina Complex on the northern shoreline.

Impacts resulting from the construction and operations of the shell borrow area west of the dam, 160 TAF borrow area, Westside Access Road, and relocated recreational facilities associated with Alternative 4 would be the same as those discussed under Alternative 1. All construction and operations would require site and safety lighting as described for Alternative 1, and all the facilities would be within the Los Vaqueros Reservoir area. Therefore, Alternative 4 would not result in creation of a new source of substantial light or glare that would be visible to the public or recreational users.

Mitigation Measures

Measure 4.14.3: Non-specular conductors shall be installed to reduce the potential glare effects and the level of visual contrast between the transmission line and its landscape setting.

Impact Significance after Mitigation: Less than Significant.

Impact 4.14.4: The project alternatives would not make a cumulatively considerable contribution to adverse effects on visual/aesthetic resources in the project area or broader region. (Less than Significant)

The geographic scope considered for potential cumulative impacts to visual/aesthetic resources is the viewshed of the public and recreational users common to the project alternatives. Within the viewshed of the project alternatives, the Vasco Road and Camino Diablo Intersection Improvements Project, in combination with the proposed project, could contribute to cumulative impacts to the visual/aesthetic resources. Specifically, construction activities and equipment

could obstruct views from Vasco Road, a county-designated scenic highway/expressway, and Camino Diablo Road, a scenic route. Impacts from construction would be limited in duration and therefore would not result in significant impacts.

After construction, the road widening would be visible within foreground views; however, it would not obstruct or dominate the views of the public. Moreover, as discussed above, within this viewshed, permanent impacts from Alternatives 1 and 2 would be limited to air valves and blow-off valves that would generally not be visible to the public. Some air valves and blow-off valves may be visible; however, as discussed above, due to the existing character of the viewsheds, installation of air valves and blow-off valves would result in a weak visual contrast to the existing viewsheds. Therefore, the project's contribution to cumulative impacts to visual/aesthetic resources would not be cumulatively considerable. This would be a less-than-significant cumulative impact.

Mitigation: None required.

4.15 Recreation

This section provides an analysis of potential impacts on recreational facilities that would result from implementation of the Los Vaqueros Reservoir Expansion Project. The analysis includes a description of the environmental setting, the associated regulatory framework (including all applicable recreational policies), the methodology, and the impact assessment. Mitigation measures are identified, where appropriate, to avoid or reduce potential impacts.

4.15.1 Affected Environment

Regulatory Setting

Federal and State

No federal or state regulations specifically apply to recreational activity in the Los Vaqueros Watershed, with the exception of state limits on body contact recreation in domestic water supply reservoirs (see California Health and Safety Code section 115825(b)). The U.S. Environmental Protection Agency and the California Department of Health Services prescribe regulations that limit the contaminants in water provided by public water systems.

Local

Contra Costa County General Plan

Goals and policies in the Contra Costa County General Plan (Contra Costa County, 2005) pertaining to recreation are provided in Appendix E-2. These goals and policies include the following:

- Retention of important creeks and streams in order to maintain recreation opportunities (8-79)
- Preservation and protection of the County's recreational resource lands (Goal 9-A)
- Development of properly designed park and recreational facilities for the County's residents (9-36)
- Promotion of recreational enjoyment of the County's amenities for the health, safety, and welfare of its residents (9-38)
- Protection and provision of public access to scenic areas on waterfronts, including water-recreation such as fishing, boating, and picnicking (9-43)

Alameda County East County Area Plan – A Portion of the Alameda County General Plan

Goals and policies in Alameda County's East County Area Plan (Alameda County, 2002) pertaining to recreation are provided in Appendix E-1. These goals and policies are as follows:

- Preservation and protection of recreational resource lands of East County (9-A)
- Consideration of recreational benefits when determining cost and benefits of alternative drainage system improvements (Policy 7-41)

Contra Costa Water District

The Contra Costa Water District (CCWD) Board of Directors adopted a set of principles by which it would participate in the planning and development of the Los Vaqueros Reservoir Expansion Project, as presented in Chapter 2, Project Background. One of the CCWD Board Principles states that CCWD will not support an expansion of Los Vaqueros Reservoir unless the project preserves and increases the recreational opportunities of the original Los Vaqueros Reservoir. CCWD is responsible for implementing the Watershed Management Program and the Resource Management Plan described below.

Ordinance 01-01

CCWD has adopted a specific ordinance for managing resources in the Los Vaqueros Watershed. CCWD Ordinance 01-01 states:

> "The rules and regulations included herein are necessary or convenient for the control, operation, and protection of the reservoir and surrounding land Contra Costa Water District owns, operates, or controls; for the control, operation, and protection of structures and facilities, and equipment used in connection with the reservoirs; for the protection of property, watersheds, and watercourses; for the due operation, management, or control of the property; to prevent water pollution; and to protect the health and safety of its customers and other members of the public."

Article 3 of CCWD Ordinance 01-01 further defines specific restrictions on activities that could occur in the watershed including prohibition of body or clothing contact in any District water body and operating any vessel without a permit. The full list of restrictions is included in Appendix E-4.

Watershed Management Program

The Watershed Management Program (Brady and Associates, 1997) provides programs for the management of the watershed but does not include management programs for public access or recreation. One major program goal pertinent to the project includes provision of recreational facilities and programs and public access at a reasonable cost for users. The program also consists of several objectives such as the following: to provide opportunities for both passive and active recreational uses, to protect the watershed's natural and cultural resources, and to provide recreational activities and programs that are consistent with water quality and reliability goals. A complete list of the Watershed Management Program's objectives is contained in Appendix E-4.

Resource Management Plan

Recreation policies for the watershed were originally outlined in the Los Vaqueros Resource Management Plan (Brady/LSA, 1999) and subsequently formulated into broad guiding policies based on enactment of Ordinance No. 01-01 by the CCWD Board of Directors in September 2001. The Resource Management Plan includes recreation and public access goals such as: **"**Provide recreational facilities and programs and public access at reasonable costs that are distributed equitably among users." Other policies prevent access to watershed areas between Los Vaqueros Road and Vasco Road due to property ownership, protection of water quality, steep terrain, and protection of biological and cultural resources (R-7) and prevention of

road access from the west through East Bay Regional Park District (EBRPD) lands (R-8). Policies relevant to trail development and maintenance within the watershed call for minimizing erosion and other impacts to water quality in the watershed, observing a minimum 100-foot setback from the reservoir to minimize sediment transport, and only permitting equestrian and bicycle use when they would not contribute to erosion and trail degradation as determined by CCWD watershed staff (T-7 and T-8). These policies and restrictions are listed in Appendix E-4.

Regional Recreational Opportunities

The project is located in southeastern Contra Costa County and northeastern Alameda County. The region offers a variety of recreational opportunities in both urban and outdoor settings, which are illustrated in **Figure 4.15-1**. Mount Diablo State Park serves as the northwestern anchor of a series of outdoor recreational areas that extend through the Diablo Range. The EBRPD Morgan Territory Regional Preserve links Mount Diablo State Park to the Los Vaqueros Watershed, which forms the southeastern anchor of this extensive open space and recreation system.

Several smaller EBRPD lands border the state park on the west and the southeast. These include: Vasco Caves Regional Preserve (owned jointly by EBRPD and CCWD), Round Valley Regional Preserve, Brushy Peak Regional Preserve (partially owned by the Livermore Area Park District), the San Francisco Bay to San Joaquin Delta Trail, and the Diablo Trail. To the north of the watershed is the Cowell Ranch Open Space, currently being collaboratively planned for state park use by California State Parks and the City of Brentwood. This open space is not yet open to the public and currently has no recreational facilities. Other accessible public lands lie to the north and east, where San Francisco Bay and Delta waterways provide recreational boating, fishing, and camping opportunities. To the south, Lake Del Valle (also operated by EBRPD) provides additional boating, fishing and camping facilities.

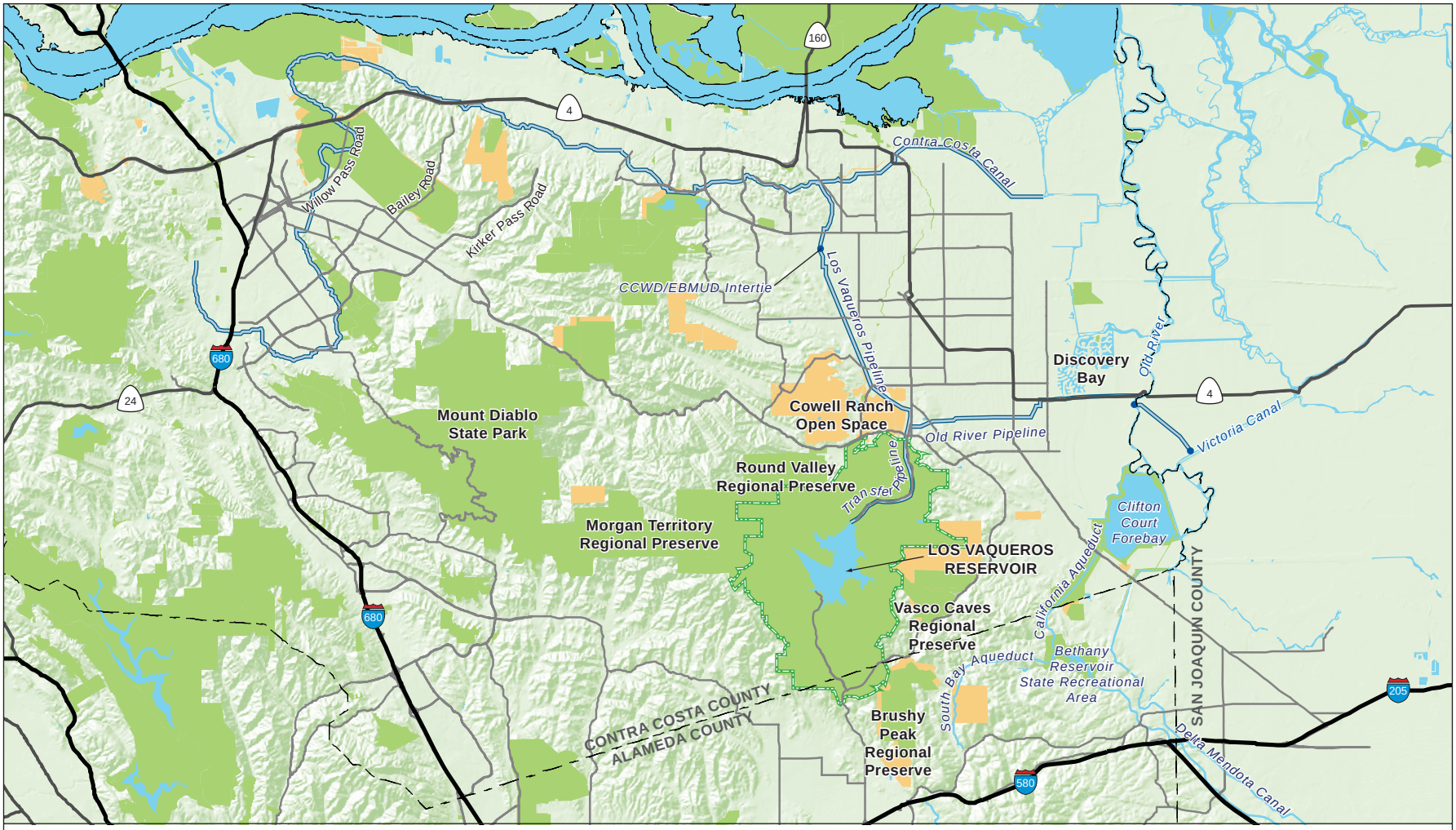
Additional recreational facilities include the Bethany Reservoir State Recreation Area which surrounds Bethany Reservoir at the southeast end of the project area. This recreation area, managed by California State Parks, is used primarily for day-use activities, water-oriented recreation, and biking along the California Aqueduct.

Local Recreational Opportunities

Los Vaqueros Watershed

The Los Vaqueros Watershed provides day-use opportunities for hiking, biking, boating, fishing, and horseback riding. Recreational facilities and trails within the watershed are illustrated in **Figure 4.15-2**. **Table 4.15-1** provides additional detail on the existing facilities.

Public vehicle access to the watershed is limited to (1) the Marina, concession, and picnic area on the southern shore of the reservoir, and (2) the Interpretive Center, Watershed Office, and day-use facilities near the existing Los Vaqueros Dam on the north end of the watershed. The Interpretive Center, Watershed Office, and day-use facilities near the dam are accessed via Walnut Boulevard, which connects to Camino Diablo near the intersection with Vasco

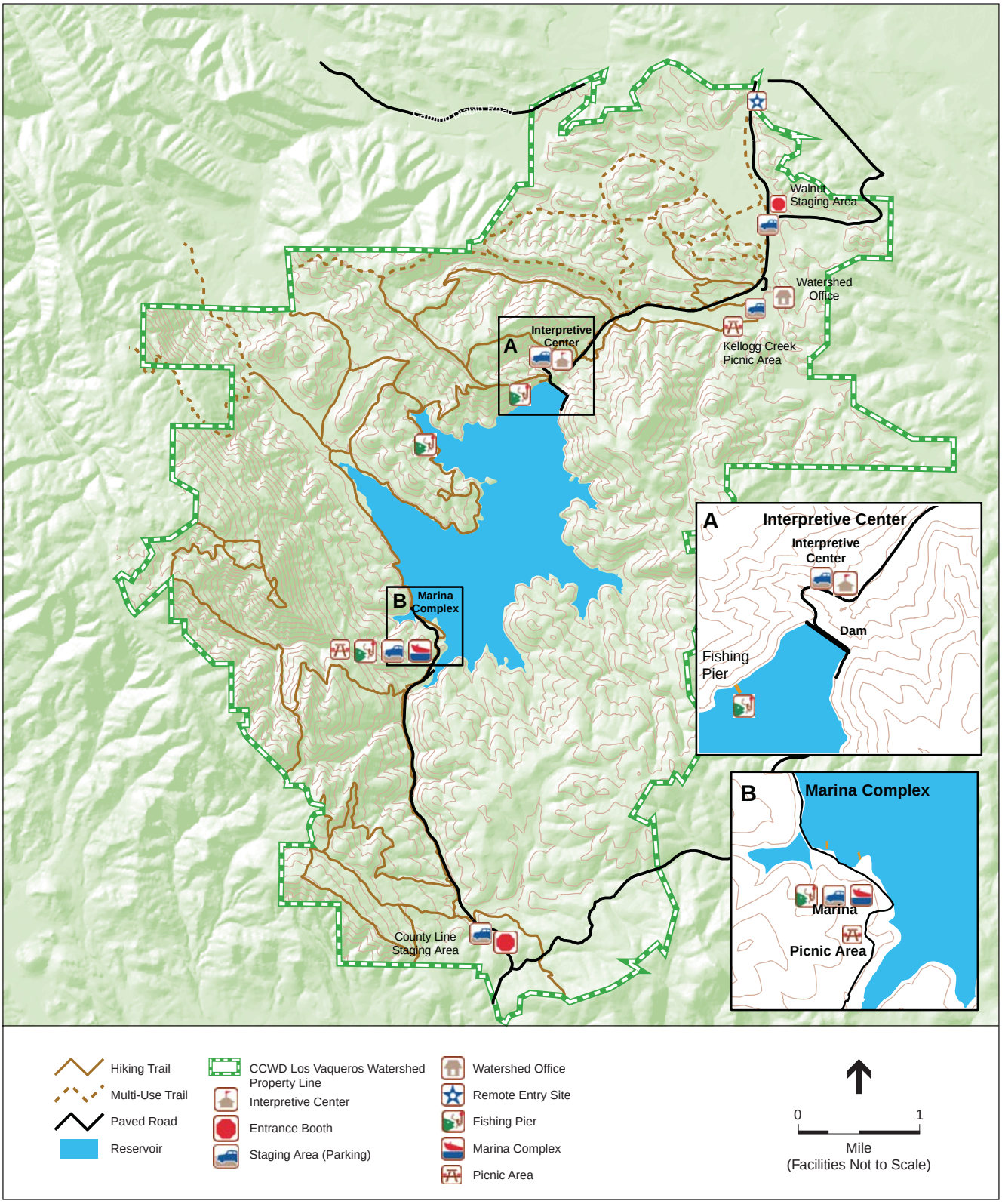


SOURCE: USGS, 1993 (base map); Contra Costa County, 2005; and ESA, 2007

Los Vaqueros Reservoir Expansion Project EIS/EIR . 201110

Figure 4.15-1

Recreation and Open Space Areas



SOURCE: USGS, 1993 (base map); and Contra Costa Water District, 2005

Los Vaqueros Reservoir Expansion Project EIS/EIR . 201110

Figure 4.15-2

Existing Los Vaqueros Watershed Facilities

TABLE 4.15-1
LOS VAQUEROS RESERVOIR EXISTING DAY-USE FACILITIES

	Parking	Equestrian/ Bus Parking	Toilets	Display Panel	Picnic Tables	Barbeque Units	Fishing Piers	Miscellaneous Facilities
Areas Below Dam								
Walnut Staging Area (North Entry)	32	13	1	1	2	–	–	–
Kellogg Creek Picnic Area	40	–	4	1	11	11	–	Three metal-roof shade shelters covering seven picnic tables
Interpretive Center/ Dam Staging Area	85	2	2	1	10	4		Outdoor amphitheater at the Interpretive Center
Top of Dam			1	1				Visitor-use toilet
Areas Above Dam								
Southwest of Dam							1	Fishing pier
County Line Staging Area (South Entry)	29	–	1	1	1	–	–	
Los Vaqueros Staging Area	61	–	2	1	–	–	1	Americans with Disabilities Act ramp to fishing pier
Oak Point Picnic Area	–	–	–	–	7	3	1	Visitor-use toilets at Marina or Los Vaqueros Staging Area
Marina	59	–	6	–	6	–	–	Marina building, fish-cleaning station, outdoor amphitheater, pay phone, drinking fountain, Marina Manager's residence
Knoll Picnic Area	21	–	1	-	18	9	–	Picnic tables
Northwest Cove	–	–	1	–	–	–	1	Fishing pier
Trails								
Hiking-Only Trails								39.2 miles*
Multi-use Trails (for hiking, bicycling, and horseback riding)								15.8 miles* – almost all multi-use trails are outside the reservoir drainage area
Total	**327**	**15**	**18**	**6**	**55**	**27**	**4**	**55 miles of trails***

* Note: trail length calculated using GIS coverage.

SOURCE: ESA, 2008.

Road. Marina access is provided via a 3.75-mile-long public road that connects to North Vasco Road. Aside from the Marina, facilities at the southern end of the reservoir include a concession building, trailheads, picnic area, and fish-cleaning stations. The public can rent electric boats at the Marina near the concession building; private boats are prohibited on the reservoir. To protect the public water supply, activities involving body or clothing contact with the water also are not allowed at the reservoir. Two fishing piers at points along the west side of the reservoir and a fishing platform on the western edge of the dam allow visitors to fish along the western shoreline.

As shown in Table 4.15-1, the watershed has more than 39.2 miles of hiking-only trails, and about another 15.8 miles of multi-use trails. Hiking-only trails align the west side of the reservoir and extend north and south of the reservoir through the watershed (see Figure 4.15-2). No public access is provided along the east side of the reservoir. Of the 15.8 miles of multi-use trails provided for hiking, biking, and horseback riding, all but about 1 mile are outside the reservoir watershed drainage area to the north. The short segment of the Miwok Trail within the reservoir watershed drainage area connects Round Valley Regional Preserve to the Morgan Territory Regional Preserve via the Adobe Trail (see Figure 4.15-2).

4.15.2 Environmental Consequences

Methodology

This impact assessment focuses on the effects that the project could have on local recreational opportunities and park resources. The analysis assumes that public demand for recreational opportunities and use of recreational facilities is likely to increase at a rate commensurate with additional population growth contemplated by current growth projections. Expansion of Los Vaqueros Reservoir would not induce population growth or cause increased demand for recreational facilities.

Significance Criteria

The thresholds for determining the significance of impacts for this analysis are based on the environmental checklist in Appendix G of the State CEQA Guidelines. These thresholds and the following impact analysis also encompass the factors taken into account under NEPA to assess environmental impact of an action in terms of the context and the intensity of its effects. Accordingly, the project and alternatives would result in a significant impact on recreation resources if it would do any of the following:

- Substantially reduce recreational opportunities or substantially degrade recreational experiences
- Increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated
- Include recreational facilities or require the construction or expansion of recreational facilities that might have a significant adverse physical effect on the environment

With respect to the third impact significance criterion listed above, as described in Section 3.5.5, Recreational Facilities, recreational facilities are part of the project alternatives. Recreational facilities inundated by reservoir expansion or otherwise affected by project construction would either be relocated or replaced within the watershed. Additional recreation facilities would also be constructed within the watershed. Accordingly, impacts associated with the construction of recreation facilities included as part of the project alternatives are assessed throughout the EIS/EIR and therefore are not further evaluated in this section.

Impact Summary

Table 4.15-2 provides a summary of the impact analysis for issues related to recreation based on actions outlined in Chapter 3.

TABLE 4.15-2
SUMMARY OF IMPACTS – RECREATION

Impact	Project Alternatives			
	Alternative 1	**Alternative 2**	**Alternative 3**	**Alternative 4**
4.15.1: Construction of the project alternatives would result in a short-term reduction of recreational opportunities in the project area due to construction activities outside the watershed and closure of the watershed to the public during the construction period, but would enhance recreational opportunities in the long-term.	LSM	LSM	LSM	LSM
4.15.2: The project alternatives would not increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated.	LS	LS	LS	LS
4.15.3: No other reasonably foreseeable future projects would also reduce recreational opportunities in the project area, similar to those opportunities affected by the project alternatives, or increase the use of existing neighborhood and regional parks or other recreational facilities; therefore, there does not appear to be the potential for the project alternatives to contribute to a cumulative effect on recreation facilities, opportunities or experience.	LS	LS	LS	LS

NOTES:

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

Impact Analysis

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. Implementation of this alternative would neither temporarily nor permanently affect existing recreational resources, opportunities, or experiences.

Impact 4.15.1: Construction of the project alternatives would result in a short-term reduction of recreational opportunities in the project area due to construction activities outside the watershed and the closure of the watershed to the public during the construction period, but would enhance recreational opportunities in the long-term. (Less than Significant with Mitigation)

Alternative 1

Effects to Los Vaqueros Reservoir Recreation Facilities

The Los Vaqueros Watershed would be closed to all public access during the estimated 3-year project construction period with the exception of a short segment of the Miwok Trail to maintain connectivity between Round Valley and Morgan Territory Regional Preserves. This restriction of public access and use is necessary for public safety during the construction period due to the substantial amount of construction activity that would be occurring within the watershed along with the substantial construction traffic, including movement of heavy equipment and materials. Consequently, during the construction period there would be no recreational use of Los Vaqueros Reservoir (i.e., Marina, fishing piers and shoreline areas), the day-use area, the Interpretive Center, or the 55 miles of trails. Moreover, during the 1-year period prior to the start of construction activities when the reservoir would be drawn down as well as during the 1 year after project completion when the reservoir would be filled, water-related activities (i.e., boating and fishing) would be restricted.

With completion of the project, replacement and new facilities would be available for public use once more. The CCWD Board Principles established for this project (see Section 2.2.2) call for improving and increasing recreational opportunities at Los Vaqueros Reservoir. To implement these principles, the project includes construction of new recreational facilities at the expanded reservoir capable of meeting current user needs, provides opportunities similar to those present in the watershed, and adds new facilities that would enhance the public's recreational opportunities. Recreational facilities for the proposed action and alternatives are discussed in Section 3.5.5 and summarized here.

Reservoir expansion from 100 thousand acre feet (TAF) to 275 TAF would result in inundation of several existing recreation facilities including the Marina and concession stand/bait shop, fishing piers, shoreline access along the west side of the reservoir, and some picnic and parking areas and trails near the reservoir. All existing recreation facilities that would be affected by the project would either be relocated or replaced with a new facility in the watershed. In addition, as part of the project, some recreational facilities and opportunities would be expanded.

The existing Marina on the south end of the reservoir would be replaced with a new Marina Complex at the north end of the reservoir near the dam. This new complex would be next to the proposed dam borrow area. A flat area of about 11 acres (about 280 feet wide by 2,100 feet long) would be created on the borrow area site near the dam. Once borrow materials have been excavated from this site it would be graded to accommodate a new, second interpretive center, amphitheater, parking, staging and picnic areas. Due west, an additional 5-acre flat area would be graded to

accommodate the Marina Manager's residence, Marina building, docks, fishing piers, picnic area, and parking.

The Marina Complex would provide the same facilities as the existing Marina and would be compliant with the Americans with Disabilities Act. It would include a concessioners' stand/bait shop, new fishing piers, a new fish cleaning station, boat dock parking, and picnic areas. The boat dock would provide for an increased number of electric powered boats for rent (50 instead of the existing 30), and the two existing 18-foot pontoon boats, along with covered berths for three boats for rescue and water quality sampling. Movable floating docks would be constructed to allow boat access under a range of reservoir surface elevations.

At the southern end of the reservoir, four piers would be relocated, one additional fishing pier would be built, and fishing facilities such as a new fish cleaning station would be constructed uphill of the existing Marina area (see Figure 3-28). Day-use facilities would also be relocated. One picnic area would be relocated uphill of the existing southern Marina, one would be moved to the new Marina Complex, and a third picnic area would be established at the new parking area at the south end of the reservoir. Hiking trail access would be provided at this new parking area (see Figure 3-28).

About 8 miles of hiking-only trails would be replaced with 15.5 miles of hiking-only trails that would provide access to the same areas and recreational experiences as were available before the reservoir expansion. Both service road and recreational access roads would also be replaced. An optional 14.5-mile Eastside Service Access Road/Hiking Only Trail is proposed as well as the 11-mile Westside Service Access Road/Hiking Only Trail. The replacement trails would maintain comparable reservoir and landscape views. Trail connectivity with regional trails in the EBRPD's Morgan Territory and Round Valley Regional Preserves would be preserved.

Southern access to the Westside Trail would be available from Los Vaqueros Road. The new optional 14.5-mile Eastside Service Access Road/Hiking Only Trail would be constructed along the southeastern portion of the reservoir, connecting existing access roads in the south and eastern portion of the watershed. A park bench is proposed for a peninsula in the southern portion of the watershed for viewing. A parking lot would be near the upper reservoir inundation limit and would provide direct access to the trailhead. The site would have picnic tables, toilet facilities, and a water station. Overall, there would be a net increase in the trails available for public use.

Upon completion of the project, existing, replacement and additional new facilities would be available for public use again, thus improving recreational opportunities and enhancing recreational experiences.

Effects on Recreational Facilities Outside Los Vaqueros Reservoir

Construction of facilities outside the watershed including the new Delta Intake and Pump Station, Delta-Transfer Pipeline, a portion of the Transfer-Los Vaqueros (LV) Pipeline, Transfer Facility Expansion, Transfer –Bethany Pipeline, Power Option 1: Western Area Power Administration (Western) Only and the Western Portion of the Power Option 2: Western & Pacific Gas and

Electric (PG&E) would not substantially reduce or degrade existing recreational opportunities. These facilities would not intersect or impede the use of any existing recreational facilities.

The new Delta Intake and Pump Station would be constructed on the west side of Old River just south of Highway 4. Old River provides recreational access to boaters and anglers from Discovery Bay to the southern Delta. Construction of the new Delta Intake and Pump Station would require the use of a cofferdam within the waterway; however, the channel at this location is about 100 feet wide and boat access would not be impeded.

The Delta-Transfer and Transfer-LV Pipelines would be installed along the east side of Walnut Road across the road from the southeastern-most edge of the Cowell Ranch Open Space (Figure 4.15-1). This approximately 3,500-acre property, currently being collaboratively planned for state park use by California State Parks and the City of Brentwood, is not yet open to the public and has no recreational facilities. If visitor use is initiated before construction of the project begins, then project construction might temporarily affect visitor vehicle access to this area (e.g., causing access delays, but not closure) but it would not reduce the recreational opportunities that might be provided at the ranch.

Construction related to the Transfer Facility Expansion would occur within the fence line of the existing facility where no recreational facilities or uses exist; therefore, there would be no recreational impact.

The Transfer-Bethany Pipeline would terminate at the southwestern-most corner of Bethany Reservoir. The pipeline trench associated with the Eastside Option would traverse about 0.3 mile of the Bethany Reservoir State Recreation Area. This recreation area is primarily used for water-oriented recreation, especially fishing and windsurfing. Recreational users do not have access to the southwestern part of this recreation area where project construction activities would occur and no developed recreational facilities, such as the California Aqueduct Bikeway, would be crossed by the project pipeline or tunnel alignments. Therefore, there would not be a reduction of recreational opportunities at the Bethany Reservoir State Recreation Area.

Regarding the additional power facilities, Power Option 1 would include use of an existing 230-kilovolt (kV) transmission line, installation of a new Western substation at the eastern terminus of Camino Diablo Road, upgrade of an existing single-circuit power line to Old River Intake and Pump Station, and installation of a new distribution line which would be within the Delta-Transfer Pipeline alignment. The new substation would not displace any existing recreational facilities nor would it be near any recreational facilities. Likewise, the proposed distribution line and power line upgrade would occur within existing utility alignments; therefore, there would be no recreational impacts.

The portion of Power Option 2 outside the watershed would include construction of a new 69-kV power line from the Tracy Substation south of the Harvey O. Banks Pumping Plant to the intersection of an existing 69-kV power line to the Old River Intake and Pump Station. There are no recreational facilities or uses along any portion of Power Option 1 and Power Option 2 outside the watershed.

Therefore, construction of facilities outside the watershed would have no impact on recreational facilities or opportunities since the proposed construction areas would not displace, intersect or impede the use of any recreational facilities.

Impacts to Planned Recreational Facilities

EBRPD has identified development of two trails in the vicinity of project facilities in its recently published 2007 Master Plan Map. The plan shows a proposed Delta Trail Extension along Old River and the South Pacific Rail Road Trail near Clifton Court Forebay. According to EBRPD, the Delta Trail Extension could be developed in the next 3 to 5 years, dependent on funding and acquisition of property rights and an encroachment permit from Reclamation District 108 (Townsend, 2008). This trail is identified to extend along Old River through the area proposed for the new Delta Intake and Pump Station.

The new Delta Intake and Pump Station would require construction of a new levee and breaching of the existing levee in order to build the facility. If this trail were to be constructed and opened for public use before construction begins on the project, then it would need to be closed during the 2-year construction period of the new Delta Intake and Pump Station, which would temporarily reduce this recreational hiking opportunity.

The South Pacific Railroad Trail (Trail 44 on Master Plan Map), also identified on the 2007 Master Plan Map, is projected by EBRPD to be constructed and open in the 2013 to 2018 timeframe. The trail is proposed to run next to and within the railroad right of way. A small portion of this planned trail would cross the proposed 69-kV, double-circuit power line associated with Power Option 2: Western & PG&E. It is standard industry practice for power lines to be constructed to span railroad rights of way; therefore, recreational access would not be impeded. Furthermore, due to existing power facilities and other industrial features within the vicinity of the proposed trail, the 69-kV, double-circuit power line would not substantially degrade the recreational experience.

Summary

Alternative 1 has the potential to impact recreational opportunities and experiences in the short-term due to the 3-year closure of the watershed, additional 2-year restriction on water-related activities (i.e., water recreation would be closed a total of 5 years to allow for reservoir draining, dam modification construction and expanded reservoir refill), and a potential 2-year interruption of the EBRPD's Delta Trail Extension if this trail is completed during a time frame that conflicts with project construction activity. This would be a significant impact.

However, there would not be substantial long-term adverse effects on recreational opportunities and experiences. Following completion of project construction, the watershed would reopen to public access and all previous recreational uses. Recreational opportunities and recreational experiences would be enhanced because there would be a net increase in recreational facilities within the watershed (i.e., an expanded Marina, additional fishing piers and support facilities, additional miles of trails, and a second Interpretive Center).

Alternative 2

Impacts related to recreational opportunities and experiences resulting from construction of the project under Alternative 2 would be the same as analyzed under Alternative 1 because Alternative 2 includes construction of the same facilities as does Alternative 1.

Alternative 3

Construction related impacts to recreational opportunities and experiences resulting from construction activities in the watershed would be the same under Alternative 3 as analyzed under Alternative 1 because Alternative 3 also includes construction of a 275-TAF reservoir and all of the same associated activities and facilities in the watershed.

Outside the watershed, Alternative 3 differs from Alternative 1 in that it includes expansion of the Old River Intake and Pump Station, rather than construction of the new Delta Intake and Pump Station, and it does not include construction of the Transfer-Bethany Pipeline. However, because construction of facilities outside of the watershed would not disrupt or degrade use of an existing recreational facility, these differences in Alternative 3 compared to Alternative 1 do not alter the project impacts. Similar to Alternative 1, construction of facilities outside the watershed under Alternative 3 would have no impact on recreational facilities, opportunities or experience.

Regarding potential impacts to the planned Delta Trail Extension identified by EBRPD to extend along Old River, construction at the Old River Intake and Pump Station would not require closure of this trail if it is in place by that time. The Old River Intake and Pump Station is an existing facility on the river bank. Any trail extended along Old River past this existing facility would have to be developed inland of this facility since public access is not permitted through the facility site. Although trail use would not be impeded, noise, dust, and vibration from construction activities could result in short-term degradation of the user experience in the immediate vicinity of the project construction site. Because the project effects on this planned recreational trail would be short-term and localized they would be less than significant. Impacts related to the South Pacific Railroad would be the same for Alternative 3 as described under Alternative 1.

Summary

Impacts related to recreational opportunities and experiences from implementation of Alternative 3 would be less than Alternative 1 because the new Delta Intake and Pump Station would not be constructed; therefore a potential 2-year interruption of the EBRPD's Delta Trail Extension use would not be required. However, there could be short-term localized impacts due to construction activities at the Old River Intake and Pump Station. In summary, although impacts are reduced, Alternative 3 would still result in significant impacts to recreational opportunities and experiences due to the closure of the watershed and restricted water-related activities.

Alternative 4

Similar to Alternative 1, the watershed would be closed to the public and no recreational activities would be available during the project construction period. The construction period for this alternative is 2 years, rather than the 3-year period required for Alternatives 1, 2, and 3. However,

unlike Alternatives 1, 2 and 3, it is anticipated that not all water-related activities would be restricted during the one-year draw down and subsequent one-year refilling of the reservoir. It is likely that shoreline fishing opportunities would be available and boating may be available depending on the water level retained after draw down. After completion of construction, enhanced and expanded recreation facilities and opportunities at the Los Vaqueros Reservoir would be re-opened for public use.

Under Alternative 4, the same recreational facilities in the watershed would be inundated as described under Alternative 1. Because the reservoir would be expanded to 160 TAF rather than 275 TAF under this alternative, an opportunity would arise to relocate existing recreational facilities differently than proposed for Alternatives 1, 2, and 3. Specifically, the existing Marina, concession stand/bait shop and Marina parking area would be relocated upslope of its existing location on the south end of the reservoir, rather than being relocated to the north end of the reservoir as proposed for Alternatives 1, 2, and 3. About 6 miles of trails and 4.6 miles of the unpaved west side access road would be inundated and would be relocated along the perimeter of the expanded reservoir. This would result in an additional 9.5 miles of trails and 5.4 miles associated with the west side access road. Moreover, a new east side trail could be installed. Additionally, four fishing piers and the picnic areas and restrooms associated with the Marina would also be generally relocated upslope of their existing locations. Therefore, recreational opportunities and experiences would be greater with implementation of the project due to the increased mileage of hiking trials, west side access road, and potentially an east side trail. (See Figure 3-29.)

Unlike Alternative 1, there would be no construction of facilities outside the watershed under Alternative 4; therefore there would be no impacts on existing recreational facilities or uses as well as no potential for impact to the planned EBRPD Delta Trail Extension.

Summary

Impacts related to recreational opportunities and experiences from implementation of Alternative 4 would be less than Alternative 1 because no facilities outside the watershed would be constructed, the reservoir would be smaller, access to recreation would be limited for a shorter duration, and recreational facilities would generally be moved upslope. However, impacts of Alternative 4 would still be significant due to the closure of the watershed during construction and restricted access for water-related activities during drawdown and filling of the reservoir. Like Alternative 1, following completion of project construction, the watershed would reopen to public access and all previous recreational uses. Recreational opportunities and recreational experiences would be enhanced because there would be a net increase in recreational facilities within the watershed (i.e., additional miles of trails).

Mitigation Measures

> **Measure 4.15.1a:** Before any recreational facilities are closed in the watershed, CCWD shall prepare and implement a public outreach program and promote the program via the web, billing inserts, and other methods to inform current and potential recreational users of the temporary closure of the Los Vaqueros Reservoir day-use facilities and inform customers of other recreational opportunities in the area.

Measure 4.15.1b: If EBRPD's proposed Delta Trail Extension is developed and open to the public before or during construction of the new Delta Intake and Pump Station, CCWD shall provide EBRPD with an anticipated closure schedule; prepare and implement a public outreach program and promote the program via the web, billing inserts, and other methods to inform current and potential recreational trail users of the temporary closure of the Delta Trail Extension and inform customers of other recreational trail opportunities in the area; and place signage to the north and south of the new Delta Intake and Pump Station site along the trail to inform recreational users of the trail closure, alternative trail options, and anticipated timing for the reopening.

Impact Significance after Mitigation: Less than Significant.

Impact 4.15.2: The project alternatives would not increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated. (Less than Significant)

Alternative 1

The project would not include residential development nor would it induce population growth that would increase the demand for local or regional recreational facilities. Likewise, the project would not directly increase the number of day-use visitors using existing recreational facilities or necessitate the construction of new recreational facilities. However, as described above, during the estimated 3-year project construction period, there would be full closure of the recreational facilities at the watershed. Consequently, there would be no recreational use of Los Vaqueros Reservoir, its day-use areas, or the 55 miles of trails during the 3-year construction period (with the exception of the short segment of the Miwok Trail). Moreover, during the one year period prior to the start of construction activities when the reservoir would be drawn down as well as during the one year after project completion when the reservoir would be filled, water-related activities (i.e., boating and fishing) would be restricted.

It is possible that closure of the watershed would create more demand for other recreation facilities. Information on use of the watershed for recreational purposes gives an indication if demand at other facilities might increase and the extent of increased demand during the 3-year construction period and additional 2-year restriction for water-related activities.

CCWD employs a concessionaire, the Los Vaqueros Recreation Company, to provide recreational services and facility maintenance at Los Vaqueros Reservoir as well as to collect data regarding visitor use. Data gathered between September 2001 and June 2002 show 15,292 cars entering at both the north and the south entries and show that 74 percent of the visitors to the reservoir use the south entry. Visitor data, documenting attendance by month over a 7-year period (July 2001 through June 2008), indicates that annual attendance ranges by year from 28,966 (year ending June 30, 2002) to 23,717 (year ending June 30, 2008) with most visitors to the watershed during the spring (March to May) and autumn (September and October). Recent visitor data

indicates that the large majority of visitors continue to enter the watershed lands from the south to use fishing facilities in the Marina area.

The Los Vaqueros Watershed offers a number of recreational and educational opportunities. According to CCWD staff, in 2002, about 90 percent of Los Vaqueros visitor use was for fishing (Nuzum, 2002). More recently, during the 2007-2008 fiscal year, 20,237, or 85 percent of the visitors to the reservoir, purchased daily fishing access pass permits. CCWD watershed staff note that fishing increases substantially whenever the reservoir is stocked (Mueller, 2008). Besides fishing, the watershed offers general hiking opportunities as well as several annual athletic events that attract hundreds of runners and bicyclists for single-day visits.

Additionally a number of education and outreach programs are hosted by CCWD. Specifically, the Watershed Connections Field Trip is held about 92 times per year at the Interpretive Center. The program was attended by about 3,400 school children and about 550 adults during the July 1, 2007 to June 30, 2008 timeframe (Hook, 2008). CCWD also sponsors a variety of weekend programs, generally held every other weekend, covering a variety of topics, as well as Public Outreach Tours four times a year where visitors spend time at the Interpretive Center and in the Marina area.

The existing annual visitors, primarily fishing enthusiasts, would likely find other recreational locations to temporarily replace reservoir use in the numerous local and regional facilities. There would be some increased use of the most popular locations as Los Vaqueros anglers sought alternative locations; however, this use would be dispersed over a wide geographic area. Representative recreation and open space areas are depicted in Figure 4.15-1 and described the in Regional Recreation Opportunities section above. Other regional options for anglers that would be available during the 5-year restriction of water-related activities in the watershed include: numerous locations in the adjacent Delta region, Contra Loma Regional Park, Del Valle Reservoir, Bethany Reservoir State Recreation Area, San Francisco Bay, and along the San Joaquin River. Since the number of anglers that use the watershed is relatively small and displaced anglers would be dispersed over a wide geographic area, temporary closure of the watershed is not anticipated to cause or accelerate substantial physical deterioration of other local fishing areas.

The recreational visitors to the watershed who do not come to fish would also be displaced during the 3-year project construction period. Due to the steep topography and hot, windy climate associated with the watershed, the existing 55 miles of hiking trails within the watershed are only lightly used during most of the year. Reservoir construction would close trails, restroom and picnic facilities to visitors, and annual athletic events would not be held in the watershed. The displaced recreational visitors would likely use the numerous EBRPD parks, Mount Diablo State Park, and other local parks in the region. Because relatively few recreationalists use Los Vaqueros trails, restroom, and picnic facilities, the temporary and dispersed increase in use of trails and other recreational facilities during project construction is not anticipated to cause or accelerate substantial physical deterioration of other recreational facility.

Additionally, due to the closure of the reservoir during the 3-year construction period, the educational programs would not be offered by CCWD. However, since the number of visitors to

the watershed to participate in the educational programs is relatively small and there are a number of other opportunities within the county, including programs offered by state and local agencies, temporary closure of the watershed is not anticipated to cause a substantial physical deterioration of facilities offering educational programs.

Construction of facilities outside the watershed including the new Delta Intake and Pump Station, Delta-Transfer Pipeline, Transfer Facility Expansion, a portion of the Transfer-LV Pipeline, Transfer-Bethany Pipeline, Power Option 1: Western Only and the Western Portion of the Power Option 2: Western & PG&E would not likely increase use of existing regional parks or recreational facilities. Specifically, construction activities associated with the Bethany Reservoir Tie-In would not likely increase use of existing regional parks or recreational facilities as the project area is already restricted from recreational use. Therefore, these facilities would not displace recreational users, causing an increased use of other facilities, nor would they draw additional visitors to nearby recreational facilities.

Summary

Closure of the Los Vaqueros Watershed and of the existing recreational and educational activities within watershed for the 3-year project construction period and additional 2-year restriction for water-related activities would prompt some existing visitors to the watershed to visit other recreation areas in the region while the recreational/educational activities are restricted. Many other recreation areas are available in the project region composed of Contra Costa, Alameda, and San Joaquin Counties that would be able to serve recreation visitors during the short-term displacement from the Los Vaqueros Reservoir.

Alternative fishing opportunities are provided at numerous locations in the adjacent Delta region, Contra Loma Regional Park, Del Valle Reservoir, Bethany Reservoir State Recreation Area, San Francisco Bay, and along the San Joaquin River. Hiking, biking, and picnicking opportunities are provided at numerous parks in the region, including several managed by EBRPD, Mount Diablo State Park and other local and regional parks.

The visitors displaced from the watershed are low in number and would be dispersed in terms of their use of other recreation areas in the region; therefore, implementation of the project under Alternative 1 would not result in a substantial increase in the use of other recreational facilities that would cause or accelerate substantial physical deterioration of facilities. Construction of project facilities outside of the watershed would not displace recreation visitors from existing recreational areas or uses and thus would not cause any increase in recreational use at other facilities. The project effect on other recreational facilities in the project region under Alternative 1 is less than significant.

Alternative 2

Impacts related to the use of existing neighborhood and regional parks and other recreational facilities resulting from construction of the project under Alternative 2 would be the same as analyzed under Alternative 1 because Alternative 2 includes construction of the same facilities as does Alternative 1. Therefore, impacts under Alternative 2 would be less than significant.

Alternative 3

Impacts related to the use of existing neighborhood and regional parks and other recreational facilities resulting from construction of the project discussed under Alternative 3 would generally be the same as analyzed under Alternative 1, since this alternative also includes construction of a 275-TAF reservoir expansion, requiring closure of the watershed for 3 years and an additional 2-year restriction for water-related activities. The Transfer-Bethany Pipeline and the new Delta Intake and Pump Station would not be constructed under this alternative. Alternative 3 does include expansion of the Old River Intake and Pump Station. However, these differences in the facilities to be constructed outside the watershed do not change the overall impact of this alternative on other recreation facilities since none of these facilities would disrupt existing recreation areas or displace recreation users. Impacts under Alternative 3 would be less than significant.

Alternative 4

Impacts related to the use of existing neighborhood and regional parks and other recreational facilities resulting from construction of the project discussed under Alternative 4 would be less than those analyzed under Alternative 1 because the proposed reservoir expansion is 160 TAF rather than 275 TAF and as a result the construction period would be 2 years rather than 3. The watershed and associated recreational opportunities would still need to be closed during the construction period. However, unlike Alternative 1, it is anticipated that not all water-related activities would be restricted during reservoir draw down and subsequent refilling. It is likely that shoreline fishing opportunities would be available and boating may be available depending on the water level retained after draw down. However, as discussed for Alternative 1 this short-term closure of recreational activities and displacement of recreation users from the watershed would not result in a substantial increase in use at other recreational facilities or cause or accelerate facilities deterioration. The following facilities would not be constructed under this alternative: Delta Intake and Pump Station, Delta-Transfer Pipeline, Transfer Facility Expansion, Transfer-LV Pipeline, Transfer-Bethany Pipeline and either power option. Impacts under Alternative 4 would be less than significant.

Summary

Construction of Alternative 4 would not increase the use of other recreational facilities, neighboring parks, or regional parks such that substantial physical deterioration of the facility would occur or be accelerated. Impact to other recreational facilities due to short-term closure of the Los Vaqueros Watershed and its associated recreation activities during the 2-year construction period would be less than significant. Following project construction, the watershed would be re-opened for visitor use of expanded recreation facilities.

Mitigation: None required.

Impact 4.15.3: No other reasonably foreseeable future projects would also reduce recreational opportunities in the project area, similar to those opportunities affected by the project alternatives, or increase the use of existing neighborhood and regional parks or other recreational facilities; therefore, there does not appear to be the potential for the project alternatives to contribute to a cumulative effect on recreation facilities, opportunities or experience. (Less than Significant)

As described under Impact 4.15.1, the project under Alternatives 1, 2, and 3 would result in a short-term reduction of recreational opportunities during the reservoir drawdown, construction and subsequent refilling due to the need to close the Los Vaqueros Watershed and all recreational activities to public use. Alternative 4 would likely not require restriction of all water-related activities during reservoir draw down and refilling. Following completion of project construction, replacement and new recreational facilities would be available in the watershed for public use once more, thus improving recreational opportunities and enhancing recreational experiences. Therefore, potential cumulative effects could only occur if another project would be constructed at the same time as the Los Vaqueros Reservoir Expansion Project and would also reduce fishing, hiking, or picnicking recreational opportunities in the region.

As discussed in Appendix I, Projects Considered for Cumulative Analysis of Land-side Resources and Issue Areas, no other identified development or public works projects are proposed for construction during the same timeframe or in proximity to proposed facility sites. As a result, there does not appear to be the potential for the Los Vaqueros Reservoir Expansion Project construction activities to contribute to cumulative recreational effects. Project construction is anticipated to be completed in about 3 years for Alternatives 1, 2, and 3 and 2 years for Alternative 4, after which there would be no further potential for the project to contribute to cumulative recreational effects associated with construction activities.

Additionally, as described under Impact 4.15.2, due to the closure of the reservoir, some existing visitors to the watershed would be prompted to visit other recreation areas in the region. Therefore, potential cumulative effects could occur if another project would increase the demand for local or regional recreational facilities during the reservoir closure.

As discussed in Appendix I, other identified housing development projects (Pantages Bay at Discovery Bay, Bixler Road Residential Project, Mountain House Specific Plan) would increase the local population and likely the use and potential physical deterioration of local recreational areas during the time the reservoir cannot be used by the public. The Pantages Bay at Discovery Bay and Bixler Road Residential Projects have proposed approximately 290 units and 68 single family residences, respectively. The Mountain House Specific Plan proposes an ultimate population of 39,000 people with anticipated build out occurring around 2024 in a strong economy and around 2044 in a weak economy (Martin, 2008).

Between 2005 and 2008, two and a half neighborhoods were constructed, totaling about 2,500 homes and 5,000 to 7,000 persons. Due to the current economic situation, construction has ceased. Assuming the economy strengthens in the next year, it is reasonably foreseeable that another 2.5 neighborhoods could be completed before the reservoir closure increasing demand for

other local or regional recreational facilities. However, as part of the Specific Plan, about 750 acres are proposed for open space and recreation. Therefore, as the population growth from these projects that would overlap with the displacement of recreational uses at the watershed during project construction would be small, the projects would not result in a substantial cumulative increase in the use of other recreational facilities that would cause or accelerate substantial physical deterioration of facilities. Therefore, the projects would not result in a cumulatively considerable contribution to a significant cumulative impact to regional recreational resources.

Mitigation: None required.

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.

***Historic Property Treatment Plans* (Sonoma State University Academic Foundation, Inc. (SSUAF), 1993a, 1994, 1995, 1998, 1999, 2001)**

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 properties[1] and one sensitive location[2] 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.

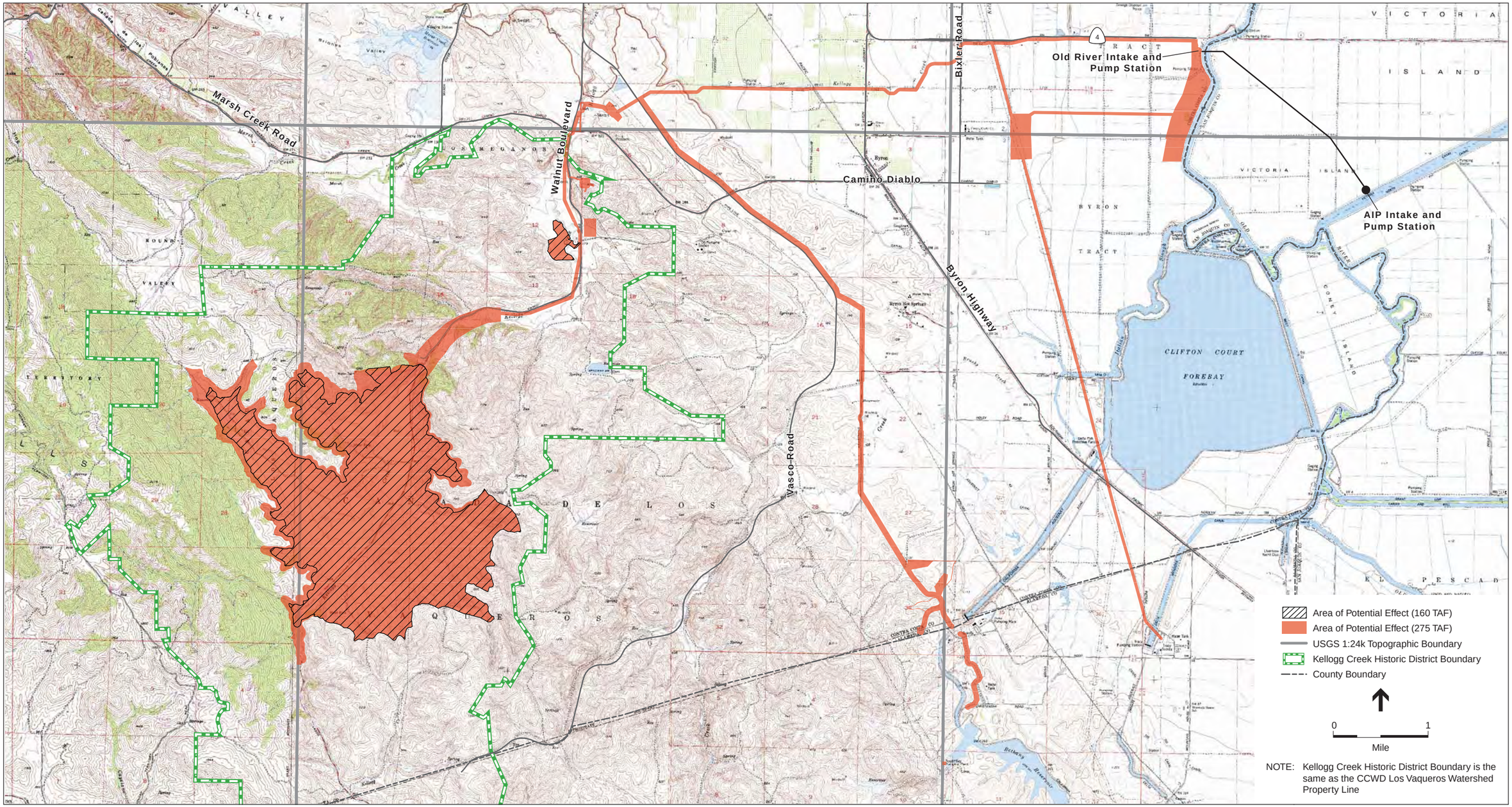
public access (**Figure 4.16-1**). The expansion of the existing dam would also entail the mass excavation of a new foundation upstream of the existing dam foundation to depths of as much as 50 feet below the original ground surface (see Figure 3-2). The APE for the Alternatives 1, 2, and 3 also includes 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[3] includes 41 historic properties and one sensitive location. The Cultural Resources Technical Report (Appendix G[4]) 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.



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

Figure 4.16-1
Area of Potential Effect

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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 millingslabs. 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 triblet 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, phylogenic, 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

Rock Formation	Age/Type	Geologic Maps[a]	UCMP Records[b]	Published Literature	Sensitivity Rating
Basin, Natural Levee and Peat Deposits	Holocene/ Stream & Estuarine	No Information	Unknown		Low
Alluvial Fan and Fluvial Deposits	Quaternary/ Non-Marine	Possible fresh-water mollusks/ vertebrates	Unknown		Moderate
Tulare Formation	Pliocene/ Non-Marine	No Information	3		High
Neroly Formation	Miocene/ Non-Marine	No Information	80		Very High
Markley Formation	Eocene/Marine & Non-Marine	No Information	134	Barron et. al., 1984	Very High
Dominigene Formation	Eocene/ Marine & Non-Marine	No Information	92	Barron et. al., 1984	Very High
Meganos Formation	Paleocene/ Marine & Non-Marine	Plant Debris	60	Graham, J.J., 1950	Very High
Great Valley Sequence	Cretaceous/ Marine & Non-Marine	Formaninfera[c]	Unknown		High

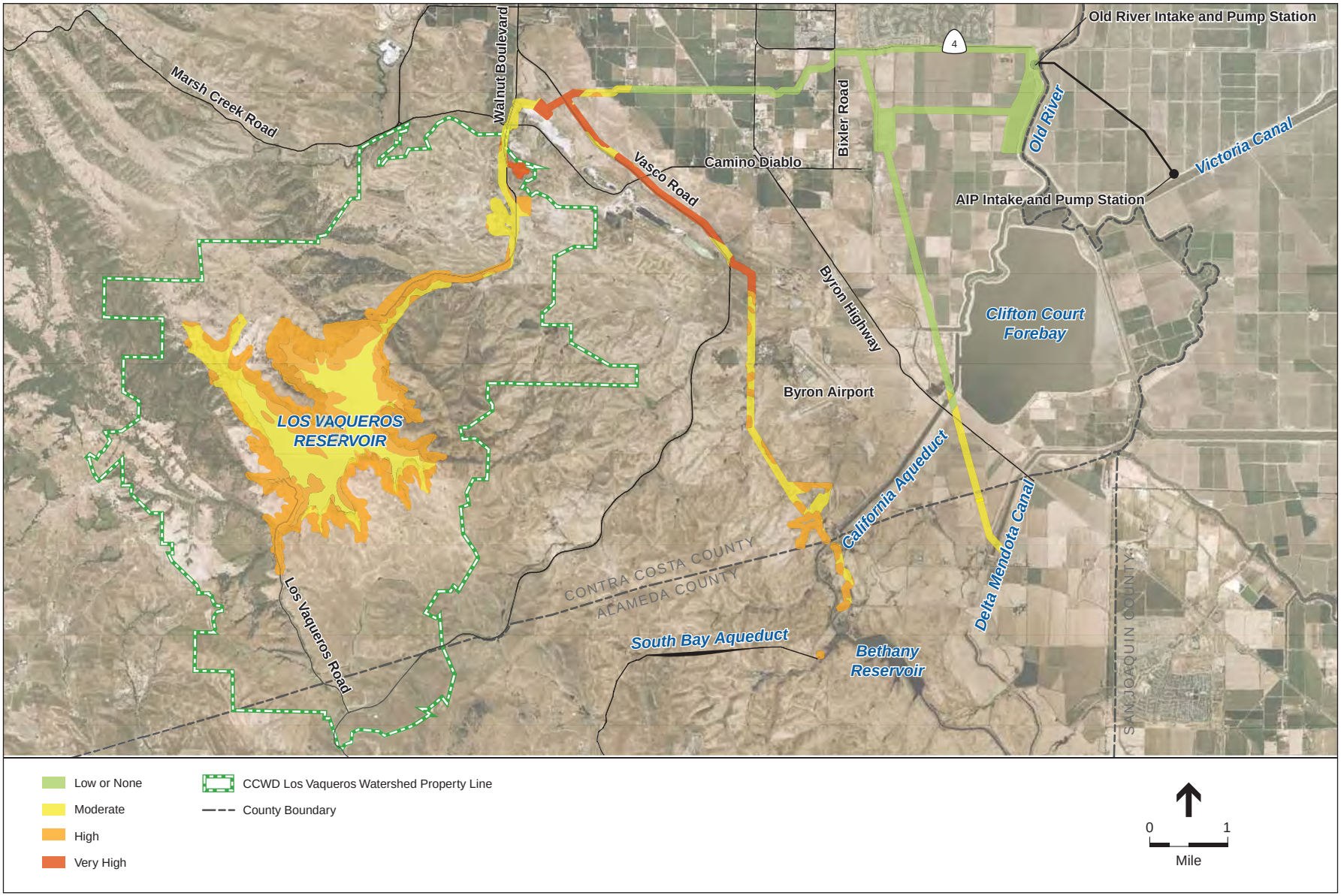
[a] "No Information" means that geologic unit descriptions did not specifically mention the presence of fossils in the rock formation.
[b] The UCMP database was queried for rock formations within Contra Costa and Alameda Counties. "Unknown" indicates that fossils of the same age were found, but there was no information to relate the fossil find to the specific deposit or formation.
[c] Formanifera 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 Formaniferia 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.

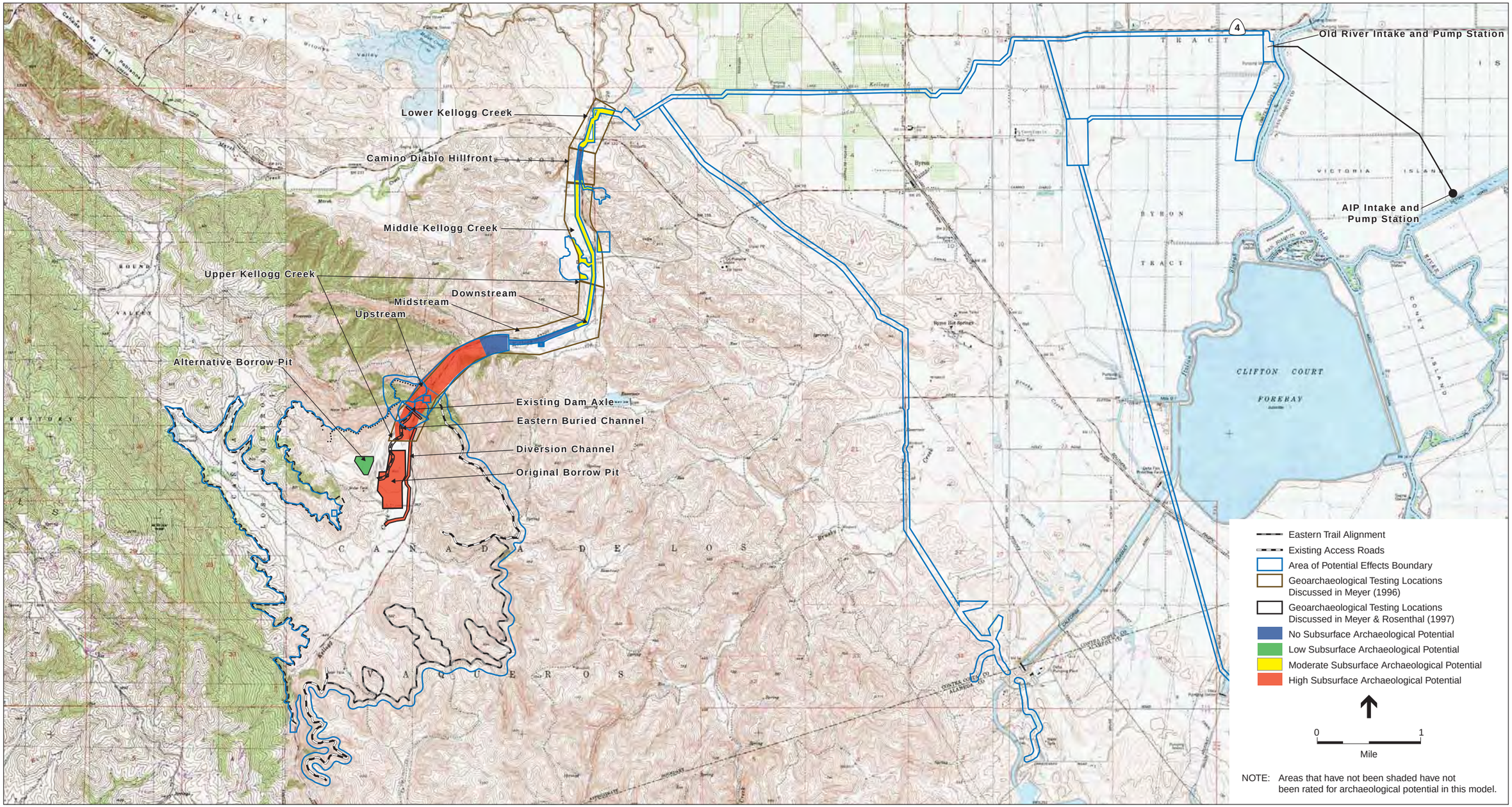
Paleontological Information Sources

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.



SOURCE: USGS Topographical Quandrangles (Clifton Court Forebay, 1978; Brentwood, 1978; Byron Hot Springs, 1968; Woodward Island, 1978; and Tassajara, 1996); and ESA, 2008

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Figure 4.16-3

Geoarchaeological Testing Areas and Areas of Archaeological Sensitivity

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- *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 a high potential for undiscovered buried cultural resources (including human burials) within the valley bottom 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 Pipeline[5]) 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 4.16-2
SUMMARY OF IMPACTS – CULTURAL AND PALEONTOLOGICAL RESOURCES

	Project Alternatives			
Impact	**Alternative 1**	**Alternative 2**	**Alternative 3**	**Alternative 4**
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	LSM	LSM	LSM	LSM
4.16.2: Ground-disturbing activities could encounter and destroy paleontological resources in certain geologic formations underlying the project area	LSM	LSM	LSM	LSM
4.16.3: Construction and management of project components could disturb human remains, including those interred outside of formal cemeteries	LSM	LSM	LSM	LSM
4.16.4: Construction and management of project components would contribute to adverse cumulative impacts to cultural and/or paleontological resources	LSM	LSM	LSM	LSM

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

		Construction	Operation and Maintenance		
Site Number	**Property Type**	**Drawdown**	**Inundation**	**Water Level Fluctuation**	**Access**
CA-CCO-9	Milling Station		x	x	x
CA-CCO-427H	Ranch Headquarters	x	x	x	x
CA-CCO-445H	Ranch Headquarters	x	x		
CA-CCO-450/H	Ranch Headquarters Occupation Site	x	x	x	x
CA-CCO-452	Milling Station		x	x	x
CA-CCO-458/H	Occupation Site	x	x		
CA-CCO-459	Milling Station; Burial	x	x	x	x
CA-CCO-462	Milling Station		x	x	x
CA-CCO-463	Occupation Site		x	x	x
CA-CCO-464	Milling Station		x	x	x
CA-CCO-467/H	Milling Station; Water Management Feature		x	x	x
CA-CCO-468	Milling Station; Occupation Site		x	x	x
CA-CCO-469	Milling Station	x	x		
CA-CCO-470H	Ranch Headquarters	x	x		
CA-CCO-636	Occupation Site	x	x		
CA-CCO-696	Buried Site	x	x		
CA-CCO-725[a]	Rock Feature		x	x	x
P-07-000532	Reburial Site	x	x		
P-07-000791	"Spring Box Site" Water Management Feature		x	x	x

[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.

- 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 4.16-4
KNOWN HISTORICAL RESOURCES AND
POTENTIAL IMPACTS OF CONSTRUCTION OF THE NEW DAM

Site Number Property Type	Construction			Operation and Maintenance		
	Drawdown	Excavation	Crushing	Inundation	Water Level Fluctuation	Access
CA-CCO-696 Buried Site; Burials	x	x	x	x		
CA-CCO-458/H Occupation Site; Burials	x	x	x	x		
CA-CCO-637 Buried Site; Burials		x				

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 4.16-5
KNOWN HISTORICAL RESOURCES POTENTIALLY IMPACTED BY THE BORROW AREA

Site Number Property Type	Construction Access
CA-CCO-696 Buried Site; Burials	x
CA-CCO-458/H Occupation Site; Burials	x

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 4.16-6
HISTORICAL RESOURCES AND POTENTIAL IMPACTS FROM CONSTRUCTION, OPERATION, AND MAINTENANCE OF THE RESERVOIR INLET AND OUTLET PIPELINES

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

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 4.16-7
HISTORICAL RESOURCES AND POTENTIAL IMPACTS FROM CONSTRUCTION, OPERATION, AND MAINTENANCE OF THE WESTERN HIKING TRAIL AND ACCESS ROAD

	Road Construction		Road Operation and Maintenance
Site Number Property Type	**Excavation**	**Staging and Access**	**Access**
CA-CCO-450/H Ranch Headquarters; Occupation Site	x	x	x
CA-CCO-462 Milling Station	x	x	x
CA-CCO-463 Occupation Site	x	x	x
CA-CCO-464 Milling Station	x	x	x
CA-CCO-467/H Milling Station; Water Management Feature	x	x	x

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

	Road Construction		Road Operation and Maintenance
Site Number Property Type	**Excavation**	**Staging and Access**	**Access**
CA-CCO-455 Milling Station			x
CA-CCO-456 Rockshelter			x

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) and 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

	Construction	Operation and Maintenance		
Site Number Property Type	**Drawdown[b]**	**Inundation**	**Water Level Fluctuation**	**Access**
CA-CCO-9 Milling Station		x	x	x
CA-CCO-427H Ranch Headquarters	x	x	x	x
CA-CCO-450/H Ranch Headquarters Occupation Site	x	x	x	x
CA-CCO-459 Milling Station; Burial	x	x	x	x
CA-CCO-462 Milling Station		x	x	x
CA-CCO-463 Occupation Site		x	x	x
CA-CCO-468 Milling Station; Occupation Site		x	x	x
CA-CCO-725[a] Rock Feature		x	x	x
P-07-000532 Reburial Site	x	x		
P-07-000791 "Spring Box Site" Water Management Feature		x	x	x

[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 4.16-10
HISTORICAL RESOURCES AND POTENTIAL IMPACTS FROM CONSTRUCTION, OPERATION, AND MAINTENANCE OF THE WESTERN HIKING TRAIL AND ACCESS ROAD FOR THE 160 TAF RESERVOIR

	Road Construction		Road Operation and Maintenance
Site Number Property Type	**Excavation**	**Staging and Access**	**Access**
CA-CCO-450/H Ranch Headquarters; Occupation Site	x	x	x
CA-CCO-459 Milling Station; Burial	x	x	x
CA-CCO-462 Milling Station	x	x	x
CA-CCO-463 Occupation Site	x	x	x
CA-CCO-468 Milling Station	x	x	x
CA-CCO-725 Rock Feature	x	x	x

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 that 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

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

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 site 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 Descendent (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 projects 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 projects 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.

4.17 Socioeconomic Effects

This section provides an analysis of the potential socioeconomic impacts that would result from implementation of the Los Vaqueros Reservoir Expansion Project. The section includes a description of the existing conditions, the associated regulatory framework (including all applicable socioeconomic policies), impact assessment methodology, and an assessment of impacts.

4.17.1 Affected Environment

Regulatory Setting

Federal

National Environmental Policy Act

According to the provisions of the National Environmental Policy Act (Title 40, Code of Federal Regulations, Section 1508.14):

> "…economic or social effects are not intended by themselves to require preparation of an environmental impact statement. When an environmental impact statement is prepared and economic or social and natural or physical environmental effects are interrelated, then the environmental impact statement will discuss all of these effects on the human environment."

State

California Environmental Quality Act

Under the California Environmental Quality Act (CEQA) Guidelines (Section 15358[b]), the impacts analyzed in an Environmental Impact Report (EIR) must be "related to physical changes" in the environment. The CEQA Guidelines (Section 15131[a]) states, "Economic or social effects of a project shall not be treated as significant effects on the environment." In some cases, however, economic effects can result in physical effects. Therefore guidelines also state:

> An EIR may trace a chain of cause and effect from a proposed decision on a project through anticipated economic or social changes resulting from the project to physical changes caused in turn by the economic or social changes. The intermediate economic or social changes caused need not be analyzed in any detail greater than necessary to trace the chain of cause and effect. The focus of the analysis shall be on the physical changes.

Local

Contra Costa County General Plan

The Contra Costa County General Plan does not identify goals, policies, and implementation measures related to the social or economic effects of the project alternatives.

Alameda County General Plan

The Alameda County General Plan does not identify goals, policies, and implementation measures related to the social or economic effects of the project alternatives.

Socioeconomic Conditions

The proposed project facility sites are located in eastern Contra Costa County and adjoining Alameda County. Because the majority of facilities would be located in the eastern part of Contra Costa County, this county represents the primary affected environment for the socioeconomic impact analysis. In addition, Contra Costa County also encompasses the Contra Costa Water District (CCWD) service area boundaries and is the location of several communities that would contribute goods and services to the construction activities. Furthermore, focusing the impact analysis on this affected environment will ensure an assessment that is more conservative than would be obtained using a broader regional approach in which any effects would be dispersed over a greater area. For the purpose of this analysis, it is expected that about 40 percent of the construction employees would be county residents; the remaining 60 percent would travel to the area, depending on the contractor selected and range of construction capabilities they would bring to the project.

Table 4.17-1 presents the existing (baseline) economic conditions for each of the major industrial sectors within Contra Costa County. The services sector is by far the county's primary employment sector, providing over 43 percent of the jobs—more than three times the size of the next largest sector (Financial, Investment, and Real Estate). However, in terms of output, manufacturing industries produce more than twice the contribution to the county's economy, despite having only a ninth of the employees.

TABLE 4.17-1
ANNUAL JOBS AND OUTPUT BY SECTOR – CONTRA COSTA COUNTY (2004)

Industry Sector	Jobs	Output (in millions of 2008 dollars terms)
Agriculture	2,796	$1,340
Construction	46,518	$7,481
Manufacturing	24,398	$44,782
Transportation, Communications, and Public Utilities	32,695	$12,319
Trade	63,121	$7,091
Financial, Investment, and Real Estate	67,310	$16,574
Services	217,361	$19,684
Government	45,719	$8,837
TOTAL	**499,918**	**$118,108**

SOURCES: MIG, 2007.

The western and northern area shorelines of Contra Costa County are highly industrialized, while the interior sections of the western part of the county are predominantly residential, commercial, and light industrial. Most of the county's employment and residential population is located in the western parts of the county, while the eastern areas in the project vicinity are relatively rural. Agriculture, service, and some construction employment provide most of the job opportunities for residents in the eastern part of the county. However, in recent years, considerable growth in residential development along the northern and northeastern county areas has occurred.

Table 4.17-2 presents Contra Costa County's population and unemployment figures. While the county has a relatively high rate of employment among its residents, there were an estimated 24,900 unemployed residents in 2007.

TABLE 4.17-2
CURRENT POPULATION AND UNEMPLOYMENT IN CONTRA COSTA COUNTY (2007)

Industry Sector	Contra Costa County	California
Total Population	1,042,321	37,662,518
Total Labor Force	526,100	18,188,100
Total Employment	501,200	17,208,900
Unemployment Rate	4.7%	5.4%

SOURCES: DOF, 2007; EDD, 2007.

4.17.2 Environmental Consequences

Methodology

The socioeconomic analysis of the proposed Los Vaqueros Reservoir Expansion Project evaluates potential economic changes resulting from project construction activities using an economic model, IMPLAN, which is described below. The analysis focuses on the potential construction related socioeconomic effects since this aspect of the project involves the greatest opportunity for mobilization and re-allocation of money, such that construction is expected to financially affect individuals and businesses within the local economy. This section also provides a quantitative assessment of potential project-related land use changes (i.e., temporary and long-term impacts on agriculture) and other local revenue-generation activities (i.e., recreation). Economic assessment of changes to agriculture and recreation involve a limited time period (approximately 3 year construction period) and relatively small amounts of money when compared with construction costs, and therefore spending related to these activities was not modeled in the same manner as construction costs.

Construction cost estimates for Alternative 1 were used to evaluate economic impacts for project construction. Because the facilities to be constructed are the same, Alternative 2 is expected to cost the same as Alternative 1. Cost estimates for Alternative 3 and Alternative 4 were not available at the time of EIS/EIR preparation, however since Alternative 1 has the

largest cost and also the largest potential for impacts, impacts resulting from Alternatives 3 and 4 would not be greater than those determined for Alternative 1.

The economic analysis of construction-related impacts involved: (1) determining the direct construction-related employment and income changes; and (2) estimating the secondary economic impacts (i.e., indirect and induced impacts) on associated businesses (such as local material and equipment suppliers). Analysis of the future construction cost estimates was performed to estimate future project-related job employment impacts, since construction is not expected to begin until early 2012. As for post-construction spending, economic effects related to project operation were not included in this analysis due to the relatively small amount of money to be generated per year when compared with about $465 million of spending for construction materials and labor.

IMPLAN Input-Output Model

IMPLAN input-output modeling is used to estimate the direct and secondary multiplier effects for any spending change upon an area's economy, such as those resulting from a major construction project. The IMPLAN model represents the structure of a local economy and economic interrelationships among firms and industry sectors. The model can predict both the direct and secondary impacts of spending changes on local employment and income for each industry sector. For the Los Vaqueros Reservoir Expansion project, IMPLAN modeling was conducted for construction spending, however was not used to measure any indirect effects related to agriculture or recreation since their direct spending impacts are so minor in magnitude.

Direct project-related employment includes not only construction laborers but also pre- and post-construction management and engineering staff (i.e., for project design, permitting, operation, and administration). Secondary impacts refer to the combined indirect and induced effects resulting from the procurement of construction-related supplies and services, materials, and equipment; future spending by construction workers; and indirect project-related employment. The magnitude of secondary impacts is estimated using IMPLAN multipliers that represent the typical flow of indirect and induced spending within the county economy.

Key construction cost components were evaluated to determine their potential effect on the local economy. This analysis also identifies the major materials, services, or other cost items that would be purchased from outside Contra Costa County and estimates their proportion of the construction cost. This adjustment ensures impacts are not overestimated by attributing job and income benefits for spending that would occur outside the county's economy. For the remaining construction items, the applicable IMPLAN data sector for each cost item was identified.[1] These direct costs were then used to model the expected indirect project-related economic effects.

[1] IMPLAN data sectors correspond to North American Industry Classification System and the Bureau of Economic Analysis commodity classifications, which are used to match spending with appropriate multipliers.

Assumptions

The following section identifies the key project-related assumptions used in the socioeconomic impact analysis.

Proportion of Construction Workers Residing in Contra Costa County

A central factor determining the magnitude of the project's future employment impacts is the proportion of jobs performed by county residents. The local job impacts are a function of the match between the project's labor needs and the availability of qualified local workers. The greater the number of county residents hired by the project, the greater the economic benefits to the county's economy. While there would also be benefits to the county economy from non-county residents employed by the project (e.g., from food and fuel sales), more of their earnings would be spent outside the county.

Because the project is predominately located in Contra Costa County, it is likely that a large proportion of construction workers would be local residents. According to 2000 U.S. Census data on local commuting patterns, 75.3 percent of all workers employed in Contra Costa County are also county residents. In addition, the size and duration of the Los Vaqueros Reservoir Expansion Project are expected to make employment very attractive to local construction workers. The project location in eastern Contra Costa County is also relatively accessible for workers living in San Joaquin County and eastern Alameda County.

The economic analysis also considered the possibility that an insufficient number of local workers would be available to meet the labor needs if the expansion were to coincide with any other major construction projects in the area. Section 4.1.3 Cumulative Impacts Analysis, and Appendix I, Projects Considered for Cumulative Analysis of Land-side Resources and Issue Areas, provide a list of projects that have the potential to occur during part or all of the 3-year Los Vaqueros Reservoir Expansion project construction period. Large public works projects, such as construction of the Altamont Water Treatment Plant in Alameda County and Vasco Road Improvements in Contra Costa County have the most potential to compete for workers who are skilled in electrical, concrete and other work on large-scale structures. Construction of other major land use projects including Mountain House (San Joaquin County), Cecchini Ranch and other Discovery Bay residential developments would likely also employ area construction workers. However these projects would not necessarily compete for the same type of workers who build larger scale facilities.

In 2007, Contra Costa County had an estimated combined unemployment rate of 4.7 percent compared to a state average of 5.4 percent (EDD, 2008). Furthermore, future regional employment growth has been estimated to continue at about 0.7 percent annually between 2002 and 2012.[2] Statewide new job growth is projected at approximately a rate of 1.5 percent annually between 2004 and 2014 (EDD, 2007). During this 10-year period, employment in the region's construction sector as a whole has been projected to increase by 9.3 percent, while heavy construction employment was projected to increase from 9,100 to 9,400 jobs (3.3 percent growth) (EDD, 2007).

[2] The California Employment Development Department (EDD) provides future employment projections for the Oakland Metropolitan Statistical Area, which consists of both Alameda and Contra Costa Counties.

Although the trends indicated above suggest there may be a reduced availability of local workers, the high desirability of reservoir expansion jobs (due to the size and duration of such work) would nonetheless encourage local employment by county residents. Based on the current national downturn in construction, it is not anticipated that there will be an insufficient number of local workers. Also, the expansion project could offer employment opportunities to a wider workforce than other large construction projects in the region (such as the on-going Bay Bridge replacement project) that have a greater need for specialized construction skills. Based on this information, and to provide a conservative estimate of the potential job benefits to Contra Costa County, an assumption that 40 percent of the project's employment would come from county residents is used in this analysis.

Procurement of Construction Material and Equipment

The magnitude of the construction spending impacts and related indirect economic effects would depend on the proportion of local procurement and on local value-added for construction materials and services. For example, if there is a greater availability of cranes and other construction equipment within the county, then there could be a greater amount of indirect local construction spending.

Key material costs for the project consist of pipe materials as well as concrete and other rock materials. Because of the size, type, and quantity of pipeline materials required by the project, virtually all the pipeline-related materials would be manufactured outside of Contra Costa County. Consequently, project expenditures on these items are expected to have a negligible economic impact on the local economy.

Similarly, major proportions of the sand, gravel, and other rock materials for the reservoir expansion project are expected to be imported to the site from quarries outside Contra Costa County. Embankment fill materials for the shell and core zone of the reservoir would be obtained mostly on site. However, extensive quantities of roller-compacted concrete and other import material (e.g. filter, drain, rip-rap, and bedding rock) needed for the dam enlargement and pipeline placement would have to be imported.

While rip-rap bedding for the original Los Vaqueros Reservoir construction was obtained within Contra Costa County from the Cemex Aggregate (formerly RMC Lonestar), most of the other rock materials for the project are expected to be acquired from quarries outside the county. During construction of the original Los Vaqueros Reservoir most of the drain rock was obtained from Granite Construction's Tracy Quarry (in San Joaquin County). Besides its Tracy location, Granite's Vernalis Quarry (also in San Joaquin County) is also considered a likely candidate source for the project's filter sand, drain gravel, and roller-compacted concrete aggregate supplies. Quarry run rock for the abutment may also be obtained from the Jackson Valley Quarry located in Amador County (URS, 2008).

The site's location and access routes also favor transportation of these materials and other project supplies from the region east of Contra Costa County, accessed by interstate highways 5, 580, and 205. Consequently project expenditures on the majority of the concrete and other rock materials for the dam expansion can be expected to have a negligible economic impact on the local economy.

Therefore, for the purposes of the economic analysis it is estimated that only 10 percent of the dam material expenditures would be for materials procured from within Contra Costa County.

A major proportion of the equipment required for the project would be relatively specialized excavation, crane, and other hauling equipment likely obtained from outside Contra Costa County. The other major equipment cost would be fuel expenditures, which also have a near negligible "value added" component to Contra Costa's economy. As a result, it is expected that project-related equipment expenditures would have a very minor economic impact on the Contra Costa County economy. For the purposes of the economic analysis it is conservatively estimated that only 5 percent of the project equipment expenditures ($145M x 0.05 percent or approximately $10M) would be for materials procured from within Contra Costa County (see Table 4.17-5).

Contingency Cost

Contingency costs were included in the projected construction spending estimates, which include future employment projections. Contingency spending was applied proportionately to the base cost item projections. If future construction does not require use of the contingency funds, then both the future direct impacts (employment and income effects) and secondary economic impacts on the county would be reduced correspondingly.

Construction Spending

The majority of the construction spending was assumed to match IMPLAN's "Sector 40 – Water, Sewer, and Pipeline" category. Since the release of the 2001 IMPLAN data sets, the sectoring scheme for IMPLAN has been based on the North American Industry Classification System and has 509 sectors. This sectoring scheme very closely follows the 1997 BEA Benchmark Study for the United States sectoring. The sectoring scheme provides a systematic identification of businesses, which enables a community's economy and economic interrelationships to be represented and modeled. Accordingly, IMPLAN multipliers for that category were used to estimate the direct and indirect employment and income impacts.

The full cost estimate for an expanded Los Vaqueros Reservoir would include mitigation and land acquisition costs. However, because land acquisitions can, in many cases, represent transfer in capital between owners both within and outside the county, such transactions might not result in any new spending in the economy. In such cases, it would be inappropriate to estimate economic impacts from the land exchange. The costs for future mitigation measures are currently insufficiently specified to estimate the nature and proportion of this spending that may be expected to benefit the Contra Costa County economy. To be conservative in the estimate of economic benefits associated with the expansion project, spending for mitigation and land acquisition was not included in the economic impact analysis. In any case, the magnitude of the potential mitigation spending is far less than the contingency expenditures included in the impact analysis. Consequently, the omission of the mitigation spending is not expected to substantially alter the project's estimated economic impact to Contra Costa County.

Any remaining "other costs" are expected to consist predominantly of additional technical services for project design, construction management, and implementation. These costs were assumed to

correspond to IMPLAN's "Sector 506 – Engineering, Architectural Services" category. However, because these costs have not been determined and are by their nature unknown, these spending items were not included to be conservative in the economic impact analysis. Similarly, given the unknown nature and magnitude of the project's expenditures for "general conditions and unlisted items allowances," spending on these items was also excluded in the economic impact analysis for Contra Costa County.

Significance Criteria

For this analysis, the significance of impacts related to employment and income was determined based on the expected proportional changes in the corresponding economic sector. County economies are inherently dynamic and so are subject to fluctuation due to seasonal effects, population changes, and other natural economic cycles of growth and contraction. Therefore, for purposes of this analysis, an alternative was determined to result in a significant adverse socioeconomic effect if it would result in a substantial, discernible adverse change in Contra Costa County's existing economy (i.e., over 0.5 percent) as a result of one or more of the following:

- Local construction related income or employment changes
- Loss of agricultural production and value that would have a substantial adverse economic effect in the local or regional area in which the facilities are located such that substantial quantities of agricultural land would be taken out of production in addition to those directly affected by the project
- Loss of recreation-related visitor spending that would have a substantial adverse economic effect to the local or regional area's economy in which the facilities are located

Based on the total economic output for Contra Costa County (see Table 4.17-1) 0.5 percent of $118,108M (output is provided in millions of dollars) is equal to nearly $6 billion dollars.

Impact Summary

Table 4.17-3 provides a summary of the impact analysis for issues related to socioeconomics based on the project description including construction activities outlined in Chapter 3, Project Description.

Impact Analysis

No Project/No Action Alternative

Under the No Project/No Action Alternative, no new facilities would be constructed, and no agricultural lands would be temporarily or permanently removed from production or experience production decreases as a result of facility siting. Agricultural and recreational facility operations in the project area would continue in manners similar to current conditions. Therefore, the ongoing economic and fiscal benefits of agricultural production and recreation-related income in the project area would be expected to continue at existing levels. There would be no adverse socioeconomic impact under the No Project/No Impact Alternative.

TABLE 4.17-3
SUMMARY OF IMPACTS – SOCIOECONOMICS

Impact	Project Alternatives			
	Alternative 1	Alternative 2	Alternative 3	Alternative 4
4.17.1: Project construction could temporarily generate new income and local employment that could benefit Contra Costa County's economy.	B	B	B	B
4.17.2: Loss of agricultural land use associated with project construction and development could affect Contra Costa County and Alameda County's economy.	LS	LS	LS	LS
4.17.3: Short-term loss of recreation income associated with project construction could affect Contra Costa County's economy.	LS	LS	LS	LS
4.17.4 Construction of the project alternatives, when combined with construction of other future projects, could have a potentially beneficial effect on income and local employment.	B	B	B	B
4.17.5: Construction of the project alternatives, when combined with construction of other future projects, could have a potential cumulative effect on Contra Costa County's economy as a result of temporary loss of agricultural land uses.	SU	SU	LS	LS
4.17.6 Construction of the project alternatives, when combined with construction of other future projects, could have a potential cumulative effect on Contra Costa County's economy as a result of temporary recreational impacts.	LS	LS	LS	LS

NOTES:

SU = Significant Unavoidable Impact
LSM = Less-than-Significant Impact with Mitigation
LS = Less-than-Significant Impact
NI = No Impact
B = Beneficial Impact

Impact 4.17.1: Project construction could temporarily generate new income and local employment that could benefit Contra Costa County's economy. (Beneficial Impact)

Alternative 1

Table 4.17-4 shows the estimated total construction costs for the Los Vaqueros Reservoir Expansion Project, assuming a 275,000-acre-foot (275 TAF) reservoir, conveyance pipelines, and other facilities fully described in Chapter 3, Project Description for Alternative 1. The project cost figures are escalated to a future anticipated "mid-point" of construction in order to avoid over or under-estimating future construction costs.

The estimated cost for Alternative 1 facility construction is about $465 million in "above the line" spending. The "above the line" costs are the most assured spending components directly related to the physical construction of the new facility. Other more variable project costs include design

TABLE 4.17-4
ESTIMATED CONSTRUCTION COST FOR EXPANDED LOS VAQUEROS RESERVOIR – ALTERNATIVE 1

Item Description	Cost (in millions of mid-term dollars)
Reservoir Expansion	$110
Transfer Facility Reservoir / Pump Station Expansion	$40
Delta Pump Station	$20
Raw Water Conveyance	$225
Power Supply	$40
Subtotal	**$465**
Design & Construction Management	$170
Other (Land Acquisition / Mitigation)	$25
General Conditions & Unlisted Items Allowance[a]	$210
Contingency	$145
Total construction cost	**$985**

[a] Includes future cost escalation to project's mid-term. All costs approximate and may not total exactly due to rounding.

SOURCE: URS, 2008.

and construction management costs of about $170 million, potential contingency spending of up to $145 million, and other possible cost increases from the estimated future cost escalation and design changes ("General Conditions and Unlisted Items Allowance") that could add as much as $210 million. Overall, the total construction cost for the proposed Alternative 1 is conservatively estimated to be $985 million (URS, 2008).

Table 4.17-5 shows the estimated total project construction cost by cost type and the proportion of that spending expected to occur from Contra Cost County workers and businesses to evaluate the economic impacts of the future construction spending specifically within Contra Costa County. A relatively minor proportion of the project's equipment and materials spending is expected to occur within Contra Costa because many of these items are highly specialized (e.g. pipeline materials) and therefore are expected to be obtained from manufacturers, distributors, or quarries located outside Contra Costa County (URS, 2008). The estimated spending column for Contra Costa County shows the estimated maximum in-county spending after major imported materials (such as pipelines), imported equipment, and out-of-county labor costs were removed. These adjusted county spending estimates were then used in the IMPLAN model to determine the local direct and indirect economic impacts of the project.[3]

As shown in Table 4.17-5, it is estimated that about $115 million of the project's total construction cost would be spent within Contra Costa County for labor, technical services, equipment, or materials. Construction labor and technical services are expected to be the primary

[3] Only major cost items were removed from the construction spending. The IMPLAN model also adjusts its secondary impact estimates based on past patterns of county economic leakage for the industry.

TABLE 4.17-5
ESTIMATED CONSTRUCTION SPENDING – ALTERNATIVE 1

Cost Type	Estimated Cost (in millions of 2008 dollars)	Estimated Contra Costa Spending[b] (in millions of 2008 dollars)	Estimated Other Regional Spending[c] (in millions of 2008 dollars)
Construction Labor / Technical Services[a]	$70	$30	$40
Equipment[a]	$145	$10	$135
Materials[a]	$220	$10	$210
Design & Construction Management	$170	$15	$155
Other (Land Acquisition / Mitigation)	$25	-	$25
General Conditions & Unlisted Items[d]	$210	$30	$180
Contingency[d]	$145	$20	$125
Total construction cost	**$985**	**$115**	**$870**

[a] Mid-points of construction values have been used for the estimated allocation by cost type.
[b] The spending estimates have been adjusted to remove major expense items that would not have a direct economic effect on the county's economy, either because materials and equipment must be imported (e.g., pipelines) or because the spending would make little direct economic contribution (e.g., land sales), or it insufficiently specified to allocate (e.g. mitigation).
[c] For the purposes of the analysis the greater Bay Area Region consists of the Bay Area Counties of Alameda, Contra Costa, Marin, Napa, San Francisco, San Mateo, Santa Clara, Solano, Sonoma, and San Joaquin.
[d] The contingency and general conditions spending in Contra Costa is based on the estimated construction spending in Contra Costa.

SOURCE: MWH 2007; URS 2008.

component of the project-related spending within Contra Costa since most of the materials and equipment would most likely be obtained from businesses elsewhere in the greater Bay Area region. Approximately 40 percent of the project's direct labor and technical services are expected to be provided by Contra Costa County businesses and residents which is equivalent to approximately $30 million in direct spending. For the project's equipment expenditures, approximately 95 percent ($135 million of the project's total $145 million) of the estimated equipment cost is expected to consist of fuel, services, and specialized construction equipment that would be imported from outside the Contra Costa County. A similar proportion of the project's estimated materials cost ($220 million of the project's total $230 million) is expected to consist of sand, gravel, pipelines and other specific materials that must be imported from outside the county. Although such "other regional spending" will not benefit Contra Costa's economy, the expenditures will directly benefit both the region's economies and the state as a whole.

The proportion of estimated project spending for project design, general conditions and contingency cost items (i.e. expenses not related to "direct" construction labor, material or equipment) within Contra Costa County are based on the estimated distribution for the above direct construction spending within the Contra Costa. Since most labor and technical services are non-taxable, the estimated project-related sales tax benefits to Contra Costa County would be up to $0.85 million. Actual sales tax benefits could be further reduced depending on the proportion of the design, contingency and other non-labor "below the line costs" are in fact incurred by the project. These estimates of the Contra Costa County and other regional spending are approximate but reflect both the character of the local and regional economies and the project location which favors importation of materials, equipment, and workers from San Joaquin and Alameda Counties.

In addition to the income and related employment benefits that Contra Costa County would gain from construction expenditures paid to its local businesses and residents, Contra Costa County would also receive significant project-related sales and/or use tax[4] benefits on expenses related to construction materials. Under California tax regulations, Contra Costa County could receive sales and use tax revenues equal to 1 percent of total taxable sales spending for the entire project.[5] Material and equipment purchases would be taxable while most labor and services spending would not be taxable. Consequently, based on the estimated sales distribution in Table 4.17-5, assuming that up to $825 million of the total construction costs could be for taxable materials and equipment items, Contra Costa County could receive up to $8.25 million in future sales and use tax revenues from the project (this would include the local sales tax benefits from the expected $85 million in construction spending within Contra Costa described in the previous paragraph).[6] The magnitude of the tax benefit to Contra Costa will vary depending on the both the extent actual construction spending and the proportion of the purchased materials and services whose providers have already collected the applicable sales taxes.

Future project-related employment has been determined based on the expected crew staffing levels over the length of the project's approximately 3-year-long projected construction period. During construction, about 400 employees would be working at full mobilization. Correspondingly, it is conservatively estimated that the total project employment would be about 1,200 full-time equivalents (FTEs). Employment figures are expressed as full-time equivalent employment, a computed statistic representing the number of full-time employees or workers that would be employed if the number of hours worked by part-time employees is calculated as if worked by full-time employees.

Applying a conservative full-burdened average labor expense of $145,000 per employee (MWH, 2007), it is estimated that employment of 1,200 FTEs would correspond to $174 million in project labor costs. This would be consistent with the approximate estimate of $70 million for the direct construction spending and $170 million in design and construction management spending shown in Table 4.17-5.

Of the project's total employment, it is estimated that about 40 percent of these workers might reasonably be expected to represent Contra Costa residents during their period of project employment. Jobs created are calculated as full-time equivalents for the entire construction period. The actual number of construction workers onsite during peak construction periods would vary, as some workers could be employed for shorter periods of time than others and some workers may work part-time. It is expected that a considerable proportion of the "white collar" and more senior

4 Purchasers (such as the Contra Costa Water District or the construction contractor) are required to pay "use" taxes to the California Board of Equalization on their taxable goods or services purchases if applicable sales taxes have not been collected by the seller. California State Board of Equalization regulations allow for the direct distribution of the local taxes to the local jurisdiction of the construction site for certain qualifying contracts. Construction contractors who enter into a construction contract equal to or greater than $5 million may elect to direct allocation of tax to the jurisdiction in which the jobsite is located.

5 Under the 2004 "triple flip" tax legislation (Code Section 97.68) the State of California retained ¼ percent of the sales tax returns to cities and counties to repay economic recovery bonds. However, the local governments receive ad valorem property tax revenues in lieu of the withheld revenues to make up the difference.

6 Construction cost estimates include applicable sales taxes.

jobs could likely be filled by non-Contra Costa County residents, since these jobs are not as location dependant and have skill requirements that may need to be obtained from a more regional area.

Table 4.17-6 shows both the direct construction jobs and secondary jobs that could be generated by the project. The majority of the secondary jobs would be service or trade industry jobs, including new jobs in support industries (providing services and materials required by project construction) as well as other service and trade jobs resulting from the increased spending within the county by construction workers making purchases with their earnings.

TABLE 4.17-6
EMPLOYMENT IMPACTS IN CONTRA COSTA COUNTY BY SECTOR

	Projected Employment (Full-Time Equivalent)				
	Direct	**Secondary[a]**	**Annual Total[b]**	**Current (2004)**	**% Change**
Agriculture				2,796	-
Construction	480	4	161	46,518	< 0.1%
Manufacturing		8	3	24,398	< 0.1%
Transportation, Communications, and Public Utilities		29	10	32,695	< 0.1%
Trade		96	32	63,121	< 0.1%
Financial, Investment, and Real Estate		42	14	67,310	< 0.1%
Services		316	105	217,361	< 0.1%
Government		2	1	45,719	< 0.1%
Total	**480**	**497**	**326**	**499,917**	**< 0.1%**

[a] Includes both indirect and induced impacts.
[b] Based on a 3-year estimated construction period.
Totals may not add exactly due to rounding.

SOURCES: MIG 2007; ESA.

Based on the assumption that 40 percent of construction workers reside in Contra Costa County, it is estimated that about 480 jobs (FTEs) would be filled by Contra Costa residents while the remaining 720 FTE jobs would predominantly staffed by Alameda or San Joaquin residents. As a result of project-related local income and employment growth, nearly an additional 500 indirect or secondary jobs would generated by the expected $115 million of spending on wages and materials within the county. These jobs would be created in businesses providing project-related goods and services, or alternatively in other businesses catering to project employees (e.g. retail, food etc.). Of these jobs, the majority would likely be lower skilled positions. Because these jobs would primarily be associated with services needed to support project construction, these jobs would constitute indirect employment and, as such, would represent secondary project-related economic benefits.

The projected employment impacts were also estimated on an annual basis over the main construction period to determine the expected annual project-related employment. The annualized employment effects were then compared to existing conditions to evaluate the magnitude of the projected economic impacts.

In addition to employment benefits, the project would also have direct and secondary benefits on Contra Costa County's level of economic output. **Table 4.17-7** presents the project's expected impacts on the county's output for the major industrial sectors.

TABLE 4.17-7
OUTPUT IMPACTS IN CONTRA COSTA COUNTY BY SECTOR

	Projected Output (in millions of 2008 dollars)			Current (2004)	% Change
	Direct	Secondary[a]	Annual Total[b]		
Agriculture				$1,340	–
Construction	$115		$38	$7,481	0.5%
Manufacturing		$8	$3	$44,782	< 0.1%
Transportation, Communications, and Public Utilities		$5	$2	$12,319	< 0.1%
Trade		$10	$3	$7,091	0.1%
Financial, Investment, and Real Estate		$12	$4	$16,574	< 0.1%
Services		$28	$9	$19,684	0.1%
Government		$8	$3	$8,837	< 0.1%
Total	**$115**	**$71**	**$62**	**$118,108**	**< 0.1%**

[a] Includes both indirect and induced impacts.
[b] Based on a 3-year construction period and to the nearest million dollars. Totals may not add exactly due to rounding.

SOURCES: MIG 2007; ESA.

Table 4.17-7 shows both the direct construction-related and secondary economic output generated by the project. Output represents the value added to the economy by the economic activity. The majority of the secondary output associated with the project would be in the service, trade, and financial-related industry sectors. Overall, about a $71 million beneficial output impact is projected for the secondary impacts to the Contra Costa County economy, which would result in beneficial effects. Because the amount of spending is less than 0.5 percent of the Countywide economy, however, the project effect represents a less than significant beneficial economic impact upon the Contra Costa County economy.

Alternative 2

Because Alternative 2 facilities and construction would be the same as for Alternative 1, the benefits from construction spending and employment associated with Alternative 2 would be the same as Alternative 1. Because the amount of spending is less than 0.5 percent of the Countywide economy, however, the project effect represents a less than significant beneficial economic impact upon the Contra Costa County economy.

Alternative 3

The benefits from construction spending and employment associated with Alternative 3 would be similar to but less than Alternative 1, because this alternative would not include construction of either the new Delta Intake and Pump Station or the Transfer-Bethany Pipeline. Modifications to the Old River Intake and Pump Station would be constructed under Alternative 3 however costs and associated socioeconomic benefits would be less than the cost of a completely new intake. Full cost estimates are not available for Alternative 3, but like Alternative 1, this alternative would result in beneficial economic effects. Because the amount of spending is less than 0.5 percent of the Countywide economy, however, the project effect represents a less than significant beneficial economic impact upon the Contra Costa County economy.

Alternative 4

The benefits from construction spending and employment associated with Alternative 4 would be similar in nature to but much less in magnitude than Alternative 1 because this alternative would involve a smaller reservoir expansion (160 TAF rather than 275 TAF) and fewer facility improvements. Full cost estimates are not available for Alternative 4, but like Alternative 1, this alternative would result in beneficial economic effects. Because the amount of spending is less than 0.5 percent of the Countywide economy, however, the project effect represents a less than significant beneficial economic impact upon the Contra Costa County economy.

Mitigation: None required.

Impact 4.17.2: Loss of agricultural land use associated with project construction and development could affect Contra Costa County and Alameda County's economy. (Less than Significant)

Introduction

Temporary or long-term reduction in agricultural resources has the potential to affect Contra Costa County's economy. As indicated in Table 4.17-1, the County has an estimated 2,796 agricultural jobs and $1,340,000,000 in agricultural output, measured in 2008 dollars. The Contra Costa County Department of Agriculture 2007 Crop Report indicates that of the County's 482,000 total acres, the Land in Farms is 126,228 acres (2002 Census) and Harvested Cropland is 26,018 Acres (2002 Census) (Contra Costa County, 2007).

As discussed in Section 4.8, Agriculture, there are six classifications of agricultural land found in the project vicinity; however, only the Prime Farmland, Farmland of Statewide Importance, and Unique Farmland classifications are considered for purposes of determining impact significance. Although impacts to Farmland of Local Importance, Grazing Land and Other Land are not considered significant, they are assessed in Section 4.8 for disclosure purposes (see Figure 4.8-1).

Reservoir Expansion and Recreation Facilities. The CCWD Watershed property includes land designated under the FMMP as Farmland of Local Importance, Grazing Land or Other Land.

Intake Facilities. The new Delta Intake and Pump Station would be sited on land designated Farmland of Statewide Importance. The existing Old River Intake and Pump Station is also located on land designated Farmland of Statewide Importance, however no property beyond the existing facility boundaries is proposed for use.

Conveyance Facilities. The eastern portion of the Delta-Transfer Pipeline extends through areas of Prime Farmland, Farmland of Statewide Importance, and Unique Farmland. The western portion of the Delta-Transfer Pipeline and the Transfer-LV Pipeline would occur primarily on Grazing Land and Farmland of Local Importance. The Transfer Facility Expansion would occur on land designated as Farmland of Local Importance. The Transfer-Bethany Pipeline would primarily pass through lands designated Farmland of Local Importance and, to a lesser degree, through areas designated as Grazing Land.

Power Supply Facilities. Under Power Option 1 (Western Only), the proposed Western substation and its access road would occur on lands designated as Grazing Land. Proposed transmission lines would connect with one or both intakes near Old River, passing through lands designated as Prime Farmland, Farmland of Statewide Importance, and Unique Farmland. To the west, near the existing Transfer Station, existing and proposed transmission lines pass through lands designated as Prime Farmland, Farmland of Local Importance, and Other Lands.

Under Power Option 2 (Western & PG&E), the proposed PG&E substation and its access road would occur on lands designated as Grazing Land. Proposed transmission lines would connect with one or both intakes along Old River, passing through lands designated as Prime Farmland, Farmland of Statewide Importance, and Unique Farmland. To the west, near the existing Transfer Station, existing and proposed transmission lines pass through lands designated as Prime Farmland, Farmland of Local Importance, and Other Land.

Alternative 1

As analyzed in Section 4.8, Agriculture, and shown in Table 4.8-5, temporary construction activities associated with Alternative 1 (under Power Option 1) would affect as much as 91 acres of Prime Farmland, 39 acres of Unique Farmland, and 41 acres of Farmland of Statewide Importance for total impacts to Important Farmland of 170 acres. The project construction, including pipeline and transmission line construction, would occur over a period of up to 3 years, so only a portion of the acreage that would be temporarily affected would be out of agricultural production in any one year. The affected acreage represents a small proportion of Contra Costa County's total active agricultural land base: in 2006 there were over 262,000 total acres, of which 41,619 acres were determined to be Important Farmland, as shown in Table 4.8-1 (DLRP, 2008).

Although much of the CCWD Watershed property is used for grazing, the purpose of the grazing is for habitat management. As mitigation for construction of the existing Los Vaqueros Reservoir, the

CCWD Watershed Lands are managed to provide premium kit fox habitat as defined by the Biological Opinion for the original reservoir project. Land management activities include grazing cattle and sheep on large portions of the District property (approximately 10,000 acres) in order to provide 800 to 1200 pounds of forage per acre as specified by the Biological Opinion.

Construction of the project components for Alternatives 1 would require the permanent conversion of 21.7 acres of Farmland of Statewide Importance. The additional agricultural acreages that would be converted are listed by project component in Table 4.8-6.

Overall, the loss of 21.7 acres of Important Farmland attributed to the proposed project would be small in comparison to the more than 41,619 acres of farmland in Contra Costa County, an estimated 0.001 percent. The relatively small proportion of affected agriculture lands indicates that Alternative 1 would not result in any substantial displacement of agricultural workers, associated loss in employment income and tax revenues, or other loss of revenues. The economic and associated socioeconomic effects upon Important Farmland are less than significant.

Alternative 2

Because the facilities construction would be the same, Alternative 2 would have the same impacts as Alternative 1. The economic and socioeconomic effects of Alternative 2 upon Important Farmlands are less than significant.

Alternative 3

Impacts to agriculture under Alternative 3 would be less than Alternatives 1 and 2 because this alternative does not include construction of a new Delta Intake or Transfer-Bethany Pipeline. Although this Alternative would include expansion of the Old River Intake and Pump Station, construction would not extend beyond the existing facility site and there would be no farmland permanently converted under Alternative 3. Alternative 3 (under Power Option 1) would temporarily affect as much as 91 acres of Prime Farmland, 39 acres of Unique Farmland, and 19 acres of Farmland of Statewide Importance for total impacts to Important Farmland of 149 acres. As with Alternative 1, the project's construction would occur over a period of up to 3 years, so only a portion of the acreage that would be temporarily affected would be out of agricultural production in any one year. Based on the relatively small proportion of affected agriculture lands, Alternative 3 is not expected to result in any substantial displacement of agricultural workers, associated loss in employment income and tax revenues, or other loss of revenues. The economic and socioeconomic effects of Alternative 3 upon Important Farmlands are less than significant.

Alternative 4

Alternative 4 would result in less impact than under Alternative 1 because it would involve a smaller reservoir expansion and construction of fewer facilities including no pipeline construction. There would be no Important Farmland temporarily affected or permanently converted under Alternative 4. Based on no impacts to Important Farmland, Alternative 4 is not expected to result in displacement of agricultural workers, associated loss in employment income and

tax revenues, or other loss of revenues. The economic and socioeconomic effects of Alternative 4 upon Important Farmland are less than significant.

Mitigation: None required.

Impact 4.17.3: Short-term loss of recreation income associated with project construction could affect Contra Costa County's economy. (Less than Significant)

Alternative 1

Under Alternative 1, recreational use of Los Vaqueros Reservoir and its watershed would be precluded for a 6 to 12 month period to drain the reservoir and then about 4 years to allow for construction of the dam expansion and refilling the expanded reservoir. The most recent visitor data, attendance by month over a 6-year period (July 2001 through June 2008), indicates that annual attendance ranges by year from 28,966 (during the 12-month period ending June 30th 2002) to 18,129 (ending June 30th 2006) with most visitors to the watershed during the spring (March to May) and autumn (September and October). During a recent 12-month period (ending June 30th, 2008), total visitation at Los Vaqueros was 23,717.

Based on the daily fishing access pass permits sold during 2007-08 financial year, the total number of user days by anglers fishing at the reservoir were estimated to be 20,237 (85% of visitors). With approximately 85 percent of current visitor use for fishing or boating, annual hiking and other non-reservoir uses (e.g. picnicking) lake would be an estimated 15 percent or about 3,480 visitors (Mueller, 2008).

According to the analysis in Section 4.15, Recreation, most fishing use at the reservoir is expected to be temporarily displaced from the county to other locations such as Lake Del Valle, San Francisco Bay, the Bay-Delta, the San Joaquin River, and other water bodies. Hiking would be displaced to the numerous East Bay Regional Park District parks (many located within Contra Costa County), Mt. Diablo State Park, and other local parks. Given that the proportion of non-resident users is high, and that comparable alternative water recreation locations within the county are limited, it is conservatively assumed that up to 90 percent of the spending by the displaced recreational visitors could occur outside of Contra Costa County's economy during project construction.

There are few recreational analyses estimating the average daily spending locally by recreational users. However, spending by hikers is generally recognized to be very limited. The most comparable analysis of the recreational user spending in the region was performed as part of a comprehensive economic impact study performed by Economic Planning Systems for the neighboring East Bay Regional Park District in 2000. The economic analysis estimated that typical local spending by park users was about $6 per visit (in 2008 dollars) (EPS, 2000). This would suggest that the approximately 3,480 non-fishing visitors (primarily hikers) at Los Vaqueros would generate about $20,880 in local spending.

The past permit sales and boat rental revenues indicate recreational boating activity and spending at the reservoir since all anglers must purchase permits and only electric watercraft rented from the Los Vaqueros Reservoir's marina operations are permitted to be used on the reservoir. In 2008, an estimated total of 20,237 anglers spent nearly $75,900 on fishing access fees at Los Vaqueros (Mueller, 2008). In addition, the 1,808 boat rentals at the reservoir generated $77,400 in sales during the 2007-08 financial year. Total sales revenues at the reservoir (including nearly $138,000 in additional revenues from parking and retail sales) were about $291,000. Combined with the estimated local spending by non-fishing visitors to Los Vaqueros, the total local spending directly associated with Los Vaqueros recreationists can be estimated to be up to $311,900[7].

Using the conservative assumption that up to 90 percent of the reservoir's current recreational use could be displaced out of the county economy temporarily during project construction, then about $280,700 of annual recreational spending would be lost by the Contra Costa economy. However, as a proportion of the county's total annual income of about $26,775 million by its Trade and Services sectors (and given the concurrent benefits of the construction-related income), the loss of $280,700 in recreation-related spending (approximately a 0.001 percent decrease) would represent a less-than-significant impact on the county's economy. Therefore, the impact on the economy from the temporary lost recreation use under Alternative 1 would be less than significant.

Alternative 2

Because the facilities construction would be the same under Alternative 2 as Alternative 1, Alternative 2 impacts are the same impacts as Alternative 1. Therefore, the impact on the economy from the temporary lost recreation use under Alternative 2 would be less than significant.

Alternative 3

Recreation-related socioeconomic impacts under Alternative 3 would be the same as under Alternative 1 because Alternative 3 would involve the same level of reservoir expansion to 275 TAF and would include the same level of replacement and enhancement of recreation facilities within the Los Vaqueros Watershed as Alternative 1, and for the same duration. Therefore, the impact on the economy from the temporary lost recreation use under Alternative 3 would be less than significant.

Alternative 4

Recreation-related socioeconomic impacts under Alternative 4 would be less than under Alternative 1 because Alternative 4 would involve reservoir expansion to only 160 TAF, resulting in shorter construction duration of about 2 years. Alternative 4 would not include a marina complex or interpretive center, however it would include replacement of existing recreation facilities within the Los Vaqueros Watershed, with an overall smaller effect on recreation and the

[7] The EPS estimates presumably represent conservative visitor spending projections. Consequently, for estimating total local spending by Los Vaqueros visitors, the EPS spending estimate has been added to the actual total Los Vaqueros sales (even though some hiker's sales will have likely been made at the Reservoir).

county's economy than Alternative 1. Therefore, the impact on the economy from the temporary lost recreation use under Alternative 4 would be less than significant.

Mitigation: None required.

Impact 4.17.4: Construction of the project alternatives, when combined with construction of other future projects, could have a potentially beneficial effect on income and local employment. (Beneficial Impact)

All Alternatives

Impact 4.17.1 identifies a temporary increase in income and local employment resulting from the location of the project facilities and construction of the project alternatives. This represents an incremental cumulative contribution to local and regional incomes and employment. Public works and land development projects identified in Section 4.1.3 Cumulative Impacts Analysis, and Appendix I, Projects Considered for Cumulative Analysis of Land-side Resources and Issue Areas, indicate that there could be other construction underway during part or all of the 3-year Los Vaqueros Reservoir Expansion project construction period. Large public works projects, such as construction of the Altamont Water Treatment Plant in Alameda County and Vasco Road Improvements in Contra Costa County plus land development projects such as Mountain House (San Joaquin County), Cecchini Ranch and other Discovery Bay residential developments could result in construction expenditure effects to local or regional residents and businesses, which would then similarly affect local and regional employment and income conditions. The location of the project facilities and construction of the project alternatives, in combination with construction of other future development, would be considered a cumulative beneficial impact. While this effect is relatively minor within the context of County income and employment, it is considered to be beneficial.

Mitigation: None required.

Impact 4.17.5: Construction of the project alternatives, when combined with construction of other future projects, could have a potential cumulative effect on Contra Costa County's economy as a result of temporary loss of agricultural land uses. (Less than Significant for Alternatives 3 or 4; Significant and Unavoidable for Alternatives 1 or 2)

Alternative 1

Impact 4.17.2 indicates that the socioeconomic impacts associated with temporary loss of agricultural land use resulting from construction activities would be less than significant. Due to the small area affected by these impacts and the temporary nature of the construction activities, these impacts were determined to be negligible in relation to the overall regional economy. However, in Section 4.8, the agricultural analysis determined that the project would have significant

cumulative impact on the region's agricultural resources because the project would result in the permanent reduction of Important Farmland (Impact 4.8.4).

With or without the project, the trend of land conversion from agricultural uses to urban and other non-agricultural uses (e.g., wildlife habitat enhancement) in the Central Valley would continue. It is likely that other future projects, such as expansion of Discovery Bay into the Cecchini Ranch property that would require large tracts of land, would convert agricultural lands to non-agricultural uses; these lands may or may not be designated Prime Farmland, Unique Farmland, and Farmland of Statewide Importance and may or may not be under Williamson Act contracts.

As a number of the proposed projects listed in Appendix I, "Local Development Projects Considered in Cumulative Impact Analyses," are not yet in the environmental planning stage, the acreage of Prime Farmland, Unique Farmland, and Farmland of Statewide Importance that could be converted by these projects is not known. However, in general, the acreage of Prime Farmland, Unique Farmland, and Farmland of Statewide Importance in Contra Costa County and, to a lesser degree, in Alameda County, is expected to decline. The proposed project would contribute incrementally to this decline. Therefore, the incremental contribution of farmland conversion associated with the proposed project would be a cumulatively considerable contribution to an existing significant cumulative impact. This impact would therefore be significant and unavoidable.

Alternative 2

Under Alternative 2, which would construct the same facilities as Alternative 1, the project would result in a significant and unavoidable cumulative impact with respect to the cumulative conversion of Farmland of Statewide Importance to non-agricultural use, even with implementation of mitigation Measure 4.8.2a and 4.8.2b. The incremental contribution of farmland conversion associated with the proposed project would be a cumulatively considerable contribution to an existing significant cumulative impact. Under Alternative 2, this impact would therefore be significant and unavoidable.

Alternative 3

Under Alternative 3, no Important Farmland would be permanently impacted because this Alternative does not involve construction of the new Delta Intake and Pump Station or the Transfer-Bethany Pipeline. Impacts under Alternative 3 would not be cumulatively considerable, and therefore the level of significance would be less than significant.

Alternative 4

Under Alternative 4, no Important Farmland would be permanently impacted because this Alternative does not involve construction of the new Delta Intake and Pump Station or new water conveyance pipelines through agricultural areas. Furthermore, Alternative 4 would not involve construction of Power Supply facilities. Impacts under Alternative 4 would not be cumulatively considerable, and therefore the level of significance related to cumulative impacts would be less than significant.

Mitigation Measure

Implementation of Agricultural Resources Mitigation Measures 4.8.1 and 4.8.2 (a and b) would minimize potential impacts under Alternatives 1 and 2; however, those measures would not reduce cumulative impacts to less than significant levels. The level of significance after mitigation would be a significant and avoidable cumulative impact.

Impact Significance after Mitigation: Significant and Unavoidable for Alternatives 1 or 2; Less than Significant for Alternatives 3 and 4.

Impact 4.17.6: Construction of the project alternatives, when combined with construction of other future projects, could have a potential cumulative effect on Contra Costa County's economy as a result of temporary recreational impacts. (Less than Significant)

All Alternatives

As described in Section 4.15, "Recreation," the project-related temporary loss of recreational opportunities and subsequent relocation of Los Vaqueros recreational facilities would result in a less than significant cumulative impact on recreational facilities and use. The project's recreational impacts are also projected to be temporary with no long term change to the area's recreational facilities and uses. Given the less than significant cumulative impact on recreation resources, there would correspondingly be a less than significant related cumulative impact on the region's economy from the project. The recreational-related economic sector is only a minor component of the area's economy, so a very large change in that sector would need to occur to be sufficient in magnitude to result in a significant economic impact on the economy as a whole. The recreational analysis concludes that no other development projects that would affect recreation at Los Vaqueros or other state and regional parks in the area. Therefore, no corresponding economic changes would be expected associated with the recreational use at these other parks.

As a result, the cumulative economic impacts from project-related construction and relocation of the recreation facilities are determined to be less than significant.

Mitigation: None required.

4.18 Environmental Justice

This section provides an analysis of the potential environmental justice impacts that would result from implementation of the Los Vaqueros Reservoir Expansion Project. The analysis includes a description of the existing conditions, the associated regulatory framework (including all applicable environmental justice policies), the methodology, and assessment of the expected project-related impacts.

4.18.1 Affected Environment

Regulatory Setting

This section provides the federal, regional, and local regulations concerning environmental justice that would apply to the Los Vaqueros Reservoir Expansion Project.

Federal

Executive Order 12898

On February 11, 1994, President Clinton issued "Executive Order 12898 on Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations." The order was designed to focus attention on environmental and human health conditions in areas of high minority populations and low-income communities, and to promote nondiscrimination in programs and projects substantially affecting human health and the environment (Federal Register, 1994). The order requires the U.S. Environmental Protection Agency (U.S. EPA) and all other federal agencies (as well as state agencies receiving federal funds) to develop strategies to address this issue. The agencies are required to identify and address any disproportionately high and adverse human health or environmental effects of their programs, policies, and activities on minority and/or low-income populations.

Environmental Justice Implementation Plan

In 1997, the U.S. EPA's Office of Environmental Justice released the *Environmental Justice Implementation Plan,* supplementing the U.S. EPA's environmental justice strategy and providing a framework for developing specific plans and guidance for implementing Executive Order 12898. In 1998, federal agencies received a framework for the assessment of environmental justice in the U.S. EPA's *Guidance for Incorporating Environmental Justice Concerns in the EPA's National Environmental Policy Act Compliance Analysis*. This framework emphasizes the importance of selecting an analytical process appropriate to the unique circumstances of the potentially affected community.

State

While several California state agencies have used the U.S. EPA's *Environmental Justice Implementation Plan* as a basis for the development of their own environmental justice strategies and policies, the majority of these agencies do not yet have guidance for incorporating environmental

justice impact assessment into the California Environmental Quality Act (CEQA) process. However, the State of California has a number of legislative and agency actions associated with environmental justice, as described below.

California Government Code

Section 65040.12 of the California Government Code states that:

> "[E]nvironmental justice" means the fair treatment of people of all races, cultures, and incomes with respect to the development, adoption, implementation, and enforcement of environmental laws, regulations, and policies.

Under Assembly Bill 1553, signed into law in October 2001, the Governor's Office of Planning and Research (OPR) is required to adopt guidelines for addressing environmental justice issues in local agencies' general plans. California Code Section 65040.12 also established the OPR as the "coordinating agency in state government for environmental justice programs;" it also directs the agency to coordinate its efforts and to share information regarding environmental justice programs with federal agencies, and to review and evaluate any information obtained as a result of their respective regulatory activities. To this end, the OPR prepared the *Environmental Justice in California State Government*; this policy report gives a brief history of environmental justice, reports on the status of the OPR's efforts, and provides for future environmental justice efforts within state government. OPR also provides general environmental justice guidelines in its most recent *2003 General Plan Guidelines.* OPR is currently in the process of updating these Guidelines (Litchney, 2008).

Although the OPR policy report, the California State Lands Commission (CSLC) Environmental Justice Policy (discussed below), and state legislation provide useful background information and guidance on the equitable treatment of environmental justice populations, no specific guidelines have been adopted at the state level to guide environmental justice in CEQA environmental documents. As such, most state agencies have been using federal guidance to assess the environmental justice impacts of the projects under their review.

California State Lands Commission Environmental Justice Policy

The CSLC developed an Environmental Justice Policy to ensure equity and fairness in its own processes and procedures, and in October 2002 adopted an amended policy. The policy ensures that "environmental justice is an essential consideration in its processes, decisions and programs and that all people who live in California have a meaningful way to participate in these activities" (CSLC, 2008). The CSLC implements the policy, in part, by identifying and communicating with relevant populations that could be adversely and disproportionately affected by CSLC projects or programs, and by ensuring that a range of reasonable alternatives is identified to minimize or eliminate environmental impacts affecting such populations. This discussion is provided in this EIS/EIR consistent with and in furtherance of the CSLC's Environmental Justice Policy. Under the agency's adopted environmental justice policy, CSLC's staff is required to report back to the Commission on how environmental justice is integrated into its programs, processes, and activities (CSLC, 2002).

Local

Contra Costa County Policy

In response to Executive Order 12898, metropolitan transportation agencies and councils of governments in some parts of California have developed environmental justice policies. The Contra Costa County Board of Supervisors established an Environmental Justice Policy in 2003, affirming its concurrence with California Government Code Section 65040.12. The Board of Supervisors also indicated that "Contra Costa County will conduct its programs, policies and activities that substantially affect human health or the environment, and promote enforcement of all health and environmental statutes under County jurisdiction in a manner that ensures fair treatment of people of all races, cultures, and income levels, including minority populations and low-income populations of the County." The Board of Supervisors directed the future development of agency guidelines—a process that is ongoing.

Alameda County Policy

Alameda County does not have an adopted Environmental Justice Policy related to implementing Executive Order 12898 (Bonekempber, 2008).

Metropolitan Transportation Commission

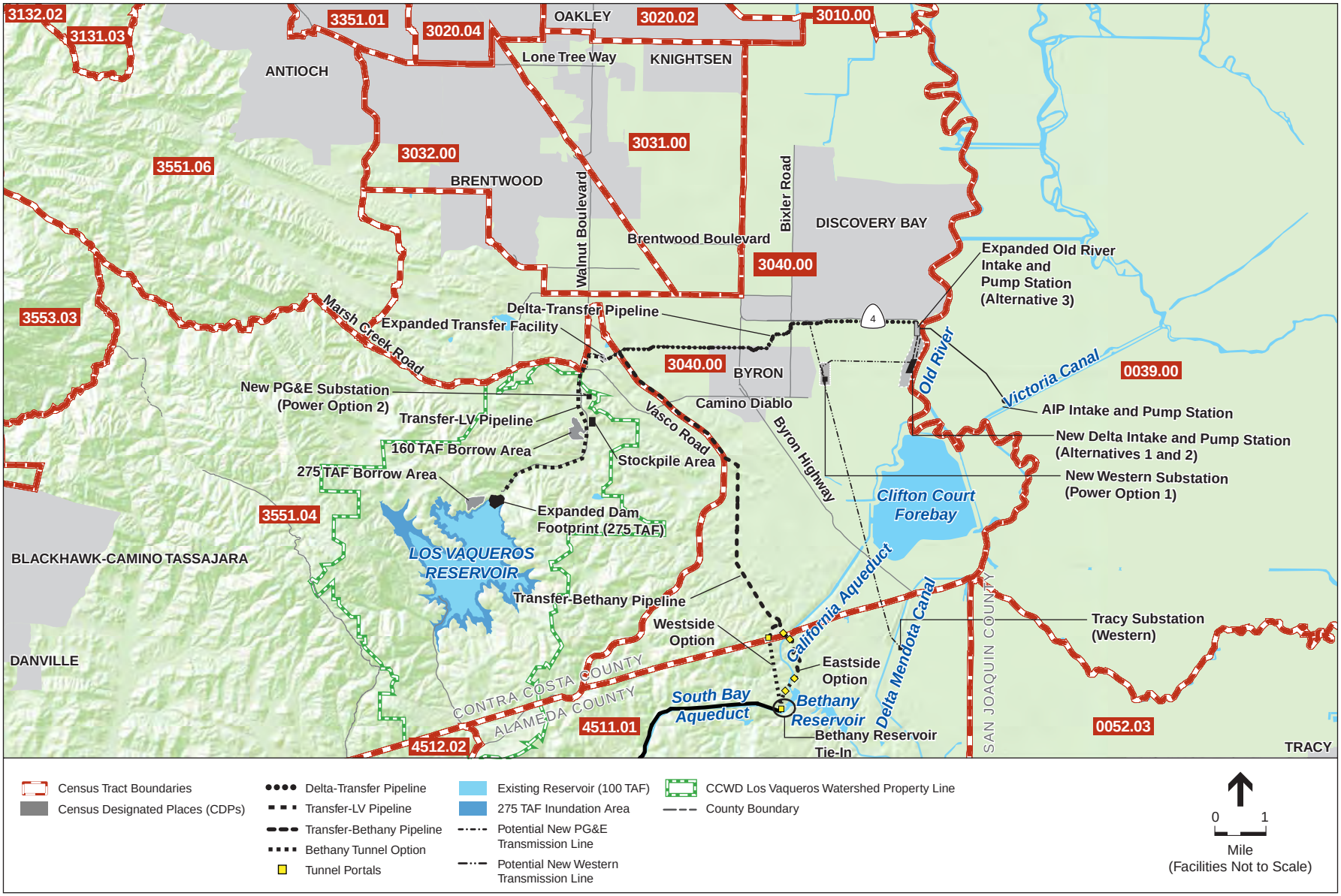
The Metropolitan Transportation Commission's (MTC's) *2001 Regional Transportation Plan Equity Analysis and Environmental Justice Report* provides one of the most substantial recent environmental justice analyses and is used by several other Bay Area agencies as a model for their approach and analysis of environmental justice issues.

Environmental Setting

For the purpose of this analysis, the potentially affected environmental justice population was determined to be the communities located within a two-mile radius of the project alternatives. This impact area encompasses the communities that could be subject to construction or operation-related impacts associated with the project. The five corresponding census blocks for these communities are shown in **Figure 4.18-1**, as is the geographic area of the Byron Census-Designated Place (CDP). A CDP is a location that is identified by the United States Census Bureau for statistical purposes. CDPs are delineated to provide data for settled concentrations of population that are identifiable by name but, like the town of Byron, are not legally incorporated.

Census Tract 0039.01 is not included in the analysis, as there is only a very small residential population in close proximity to the Old River Intake and Pump Station or the New Delta Intake and Pump Station.[1]

[1] The vast majority of the 1,549 residents in Census Tract 0039.01 live in western Stockton, which is more than 8 miles from the eastern-most area where construction-related effects might be expected to occur.



SOURCE: USGS, 1993 (base map); and ESA, 2008

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Figure 4.18-1
Census Tracts and CDPs within the Project Vicinity

Minority Populations

According to the federal Council on Environmental Quality (CEQ) guidelines for environmental justice analyses:

> Minority populations should be identified where either (a) the minority population of the affected area exceeds 50 percent or (b) the minority population percentage of the affected area is meaningfully greater than the majority population percentage in the general population or other appropriate unit of geographic analysis. A minority population also exists if there is more than one minority group present and the minority percentage, as calculated by aggregating all minority persons, meets one of the above-stated thresholds (CEQ, 1997).

Information regarding racial diversity in the project area was derived from the 2000 U.S. Census. The racial composition for Contra Costa County and the census tracts within two miles of the project area are presented in **Table 4.18-1**. The non-white population of Census Tract 3031.00 (located approximately a mile north of Byron) was 55.5 percent of the tract's entire population; as a result, in accordance with the CEQ guidelines, this census tract qualifies as minority community of concern.

TABLE 4.18-1
RACIAL COMPOSITION (PERCENT) FOR CONTRA COSTA COUNTY AND THE SURROUNDING AFFECTED ENVIRONMENT

	White	Hispanic / Latino[2]	Black	American Indian / Alaska Native	Asian	Native Hawaiian / Pacific Islander	Other
Contra Costa County	57.9%	17.7%	9.2%	0.4%	10.8%	0.3%	3.7%
City of Brentwood	63.1%	28.2%	2.4%	0.4%	2.7%	0.2%	3.1%
Byron CDP	64.3%	25.9%	4.4%	1.1%	2.2%	0.2%	2.0%
Tract 3031.00	44.5%	49.3%	1.6%	0.3%	1.5%	0.1%	2.5%
Tract 3032.00	67.5%	19.0%	1.9%	0.4%	4.4%	0.3%	3.7%
Tract 3040.00	79.6%	13.3%	1.9%	0.7%	1.7%	0.1%	2.7%
Tract 3551.04	72.8%	4.5%	2.5%	0.2%	17.4%	0.1%	2.5%
Tract 4511.01	75.8%	10.5%	2.0%	0.2%	7.3%	0.1%	4.1%

Minority community of concern.

SOURCE: U.S. Census Bureau, 2000a.

Low-Income Populations

The CEQ's environmental justice guidance does not clearly define low-income populations as those meeting the census poverty thresholds, but states that "Low-income populations in an affected area should be identified with the annual statistical poverty thresholds from the Bureau of the Census' Current Population Reports, Series P-60 on Income and Poverty."

[2] The federal statistical system and the U.S. Census Bureau classify race and Hispanic/Latino origin as two separate concepts. In other words, each person has two attributes, their race (or races) and whether or not they are Hispanic/Latino, to account for the fact that people of Hispanic/Latino origin may be of any race. For more information on the definition of the term "Hispanic and Latino," see U.S. Census Bureau, 2004, at http://www.census.gov/population/www/socdemo/compraceho.html. This EIS/EIR specifically identifies "Hispanic/Latino" residents as a potential minority population of concern for the environmental justice analysis.

Poverty thresholds vary according to a household's size and composition. The most current poverty thresholds (2007) are $21,027 for a two-parent household with two children (U.S. Census, 2007). These thresholds provide one national measurement of income that is not adjusted for regional costs of living. Among its poverty statistical data, the U.S. Census Bureau also reports population data income ratios from 50 percent to 200 percent of the poverty threshold (U.S. Census Bureau, 2000b) at a census tract population level.[3] For many federal and state programs, eligibility levels are significantly higher than the poverty level (e.g., the eligibility criterion is 185 percent of the poverty level to qualify for food stamp assistance in California under the Women, Infants, and Children program).[4] The MTC's *2001 Regional Transportation Plan Equity Analysis and Environmental Justice Report* definition of low-income community states:

> Low-income is defined as the household income that is at or below the U.S. Department of Health and Human Services Poverty Guidelines. For the purposes of this exercise (i.e., the 2001 Regional Transportation Plan Equity Analysis) the definition of low-income to households was established as households at or below 200 percent of poverty. This level was used to reflect the relatively high cost of living in the Bay Area. Zones, where the low-income population was 30 percent of the total population or greater, were included in the Equity Analysis (MTC, 2001).

Table 4.18-2 presents poverty level data for the project area communities.[5]

TABLE 4.18-2
INCOME OF CONTRA COSTA COUNTY AND THE SURROUNDING AFFECTED ENVIRONMENT

	Total Population (2000)	Population with Incomes Below Poverty Level	Population with Incomes Below 200 Percent of Poverty Level	Population with Incomes More than 200 Percent of Poverty Level
Contra Costa County	938,310	7.6%	18.7%	81.3%
City of Brentwood	23,211	5.8%	15.6%	84.4%
Byron CDP	826	14.9%	40.6%	59.4 %
Tract 3031.00	8,304	10.4%	30.5%	69.5%
Tract 3032.00	21,533	4.2%	9.9%	90.1%
Tract 3040.00	10,824	5.4%	11.6%	88.4%
Tract 3510.04	15,997	1.4%	3.6%	96.4%
Tract 4511.01	4,579	2.8%	5.9%	94.1%

Low-income community of concern.

SOURCE: U.S. Census Bureau, 2000b.

3 The most current census level demographic information available is from the 2000 Census. The proportion of individuals below the poverty level are based on 2000 population, income and poverty level threshold data.

4 The Women, Infants, and Children program is a California Department of Health Services nutrition program that helps pregnant women, new mothers, and young children eat well and stay healthy.

5 Census Track 0039.01 is not included in the analysis, as there is a negligible residential population in close proximity to the Old River Pump Station or the New Delta Intake and Pump Station since the vast majority of the 1,549 residents in Census Tract 0039.01 live in western Stockton, which is more than 8 miles from the eastern-most area where construction-related effects might be expected to occur.

As shown in the table, Byron has nearly twice the Contra Costa County average of residents living below the poverty level. In addition, under the MTC's more inclusive low-income community definition, Census Tract 3031.00 (located about a mile north of Byron)—with almost a third of its population living below 200 percent of the poverty level compared to the countywide average of 18.7 percent—would also be recognized as a low-income community. Therefore in assessment of the project alternatives, both Census Tract 3031.00 and the community of Byron (Byron CDP) are considered low-income communities.

As indicated in the Environmental Setting discussion, above, the communities of concern for the project environmental justice analysis is the larger minority and low-income populations within Census Tract 3031.00 as well as the low-income Byron CDP area.

4.18.2 Environmental Consequences

Methodology

This section analyzes the distributional patterns of high-minority and low-income populations on a regional basis and characterizes the distribution of such populations adjacent to the project area. This analysis focuses mainly on whether the project has the potential to disproportionately affect area(s) of high-minority population(s) and low-income communities and thus create an adverse environmental justice impact. According to Executive Order 12898, an environmental justice impact would be considered significant and would require mitigation if the construction or operation of the project would cause any minority or low-income population to bear a disproportionate share of an adverse impact.

According to CEQ and EPA guidelines established to assist Federal and State agencies, the first step in conducting an environmental justice analysis is to define minority and low-income populations. Based on these guidelines, a minority population is present in a project area if: (1) the minority population of the affected area exceeds 50%, or (2) the minority population percentage of the affected area is meaningfully greater than the minority population percentage in the general population or other appropriate unit of geographic analysis. By the same rule, a low-income population exists if the project area consists of 50% or more people living below the poverty threshold, as defined by the U.S. Census Bureau, or is significantly greater than the poverty percentage of the general population or other appropriate unit of geographic analysis. The second step of an environmental justice analysis requires a finding of a high and adverse impact. The CEQ guidance indicates that when determining whether the effects are high and adverse, agencies are to consider whether the risks or rates of impact "are significant (as employed by NEPA) or above generally accepted norms." The final step requires a finding that the impact on the minority or low-income population be disproportionately high and adverse. While none of the published guidelines define the term "disproportionately high and adverse," the CEQ includes a non-quantitative definition stating that an effect is disproportionate if it appreciably exceeds the risk or rate to the general population.

Significance Criteria

The following thresholds use factors taken into account under NEPA to determine the significance of an action in terms of its context and the intensity of its effects. To make a finding that disproportionately high and adverse effects would likely fall on the minority or low-income population, three conditions must be met simultaneously: (1) there must be a minority or low-income population in the impact zone; (2) a high and adverse impact must exist; and (3) the impact must be disproportionately high and adverse on the minority or low-income population.

The project alternatives would result in a significant environmental justice impact if it would result in both the following:

- A significant environmental effect that would result in a high and adverse impact on an identified minority or low-income population that is disproportionately high and adverse, exceeding the impact on the general population or other appropriate comparison group. Potential adverse environmental impacts associated with this type of major infrastructure project and therefore analyzed in this EIS/EIR include (1) construction or operation related nuisance effects (e.g. – traffic, noise, dust and/or hazards); and (2) construction or operation effects on local employment opportunities; and

- The identified minority or low-income population would be disproportionately affected by cumulative or multiple adverse exposures impacts.

Impact Summary

Table 4.18-3 provides a summary of the impact analysis for issues related to environmental justice based on actions outlined in Chapter 3.

Impact Analysis

No Project/No Action Alternative

Under the No Project/No Action Alternative, no physical changes to the environment would occur. The project alternative facilities would not be constructed, and existing Contra Costa Water District (CCWD) facilities would continue to be operated as under current conditions. Because no physical activities would occur, there would be no potential for harm or disproportionate disturbance to minority and low-income communities.

Impact 4.18.1: Construction and operation of the project alternatives would result in air quality, noise, and/or other environmental impacts related to traffic and other construction activities that would not disproportionately affect nearby minority and/or low-income communities. (Less than Significant)

Alternative 1

The project area extends throughout southeastern Contra Costa County and northeastern Alameda County. As indicated above, the City of Brentwood (in Contra Costa County) is located about

TABLE 4.18-3
SUMMARY OF IMPACTS – ENVIRONMENTAL JUSTICE

Impact	Project Alternatives			
	Alternative 1	Alternative 2	Alternative 3	Alternative 4
4.18.1: Construction and operation of the project alternatives would result in air quality, noise, and/or other environmental impacts related to traffic and other construction activities that would not disproportionately affect nearby minority and/or low-income communities.	LS	LS	LS	LS
4.18.2: Construction and operation of the project alternatives would not disproportionately affect local employment opportunities for minority and/or low-income communities in the vicinity of the project.	NI	NI	NI	NI
4.18.3: Construction and operation of the project alternatives when combined with construction of other past, present, and probable future projects, would result in air quality, noise, and/or other environmental impacts related to traffic and other construction activities that would not disproportionately affect nearby minority and/or low-income communities.	LS	LS	LS	LS
4.18.4: Construction and operation of the project alternatives, when combined with construction of other past, present, and probable future projects, would not disproportionately affect local employment opportunities for minority and/or low-income communities in the vicinity of the project.	NI	NI	NI	NI

NOTES:

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

four miles north of the project area, and the City of Livermore in Alameda County is located seven miles south of the project area. Two unincorporated towns are located in the project area - Byron and Discovery Bay (see Figure 4.18-1).

Two communities of concern have been identified for analysis within the Los Vaqueros Reservoir Expansion project area. The population living within Census Tract 3031.00, located south of the Knightsen area and east of the City of Brentwood, is recognized as a minority and low-income population; the population living within the Byron CDP is recognized as a low-income population. Together the residents of these areas compose the project area communities of concern.

Proximity of Project Facilities to Communities of Concern

The proximity of project facilities to the identified minority and low-income areas, and the relative effect upon those communities, is discussed below.

Reservoir Expansion and Recreational Facilities. Alternative 1 involves a 275 TAF Reservoir Expansion/Dam Modification project with borrow areas, PG&E substation (under Power Option 2) and recreation facilities constructed within the CCWD Watershed property. Project facilities

located in the CCWD Watershed property are over two miles from Census Tract 3031.00 and the Byron CDP.

New Delta Intake and Pump Station. The new Delta Intake and Pump Station site is located in an agricultural area about 3.4 miles from Census Tract 3031.00 and about 1.6 miles from the Byron CDP.

Conveyance Facilities. Alternative 1 includes construction of three water conveyance pipelines and expansion of the existing Transfer Facility. Under Alternative 1, approximately 18.7 miles of water pipelines would be constructed; only 6 percent of the total miles of pipeline would border on the Byron CDP. Of the 16 rural residences and the numerous residences in Discovery Bay that are located along the Delta-Transfer Pipeline, only 3 are located within the Byron low-income area.

- The Delta-Transfer Pipeline would be located within the existing road rights-of-way that pass approximately one mile south of Census Tract 3031.00 and adjoin the Byron CDP for about 1.1 miles of the pipeline's 6.5 mile alignment. Approximately 3 rural homesteads are located within the Byron CDP near this portion of the pipeline, while an additional 13 residences adjacent to this pipeline alignment would be located in non low-income communities.

- The Transfer Facility Expansion would occur on CCWD land next to the existing Transfer Facility, approximately 1.7 miles southwest of Census Tract 3031.00 and approximately 2.0 miles east of the Byron CDP.

- The Transfer-LV Pipeline alignment would pass in close proximity to numerous individual residences, however the facility would be approximately 1.7 miles southwest of Census Tract 3031.00 and approximately 2.0 miles east of the Byron CDP.

- The Transfer-Bethany Pipeline would pass south along Vasco Road, near but not through the Byron CDP approximately 3,000 feet to the east.

Power Supply. To accommodate a New Delta Intake and Pump Station as well as the expansion of the Transfer Facility, additional overhead electrical power lines and a substation would be required. Two options for electrical facilities are under consideration: Power Option 1 (Western Only) and Power Option 2 (Western and PG&E).

- Construction of Power Option 1 includes a new power line from Western's Tracy Substation to the New Delta Intake facilities, with a new Western substation at the eastern terminus of Camino Diablo Road. The new powerline, which would largely be located within an existing transmission corridor, would be located approximately 2.0 miles southeast of Census Tract 3031.00 and could be as close as 100 feet east of the Byron CDP. A new Western substation along this alignment could be located approximately 1.5 miles south of Census Tract 3031.00 and as close as 100 feet east of the Byron CDP. Review of aerials photographs shown in Chapter 3 indicates that there is agricultural land and no residences located along this eastern border of the Byron CDP or in the substation siting zone for Power Supply Option 1.

- Power Option 2 would entail a new PG&E substation within the CCWD Watershed property in an area to the north of the staging area, plus a new distribution line connecting the new PG&E substation to the expanded Transfer Facility. Most of the power facilities would occur

within an existing right-of-way or on Watershed land, a minimum 1.7 miles southwest of Census Tract 3031.00 and approximately 2.0 miles east of the Byron CDP. Power Option 2 would also involve powerlines on the eastern side of the project area, a minimum of 1.9 miles southeast of Census Tract 3031.00 and approximately 500 feet east of the Byron CDP.

As shown on Figure 4.18-1 and discussed above, about 1.1 mile of the Delta-Transfer Pipeline (portion along Kellogg Creek Road) would be located on the border of the Byron CDP. It is also possible that a Power Supply Option 1 (Western Only) substation and power lines would be constructed directly east of the Byron CDP. It should be noted that the eastern end of the Byron CDP contains few residences and the substation siting zone is located in an agricultural area with no residences. No project construction and operation activities would occur in Census Tract 3031.00. In effect, a low proportion of the Alternative 1 facilities would be in close proximity (within 1 mile) of low-income populations of concern, and the majority of the project pipelines, power supply and other facilities would be located in non-minority and non-low-income areas.

Construction Impacts

The type of construction activities that would occur under Alternative 1, and the relative effect on the identified minority and low-income population, is discussed below.

Construction Traffic. Earthmoving activities such as excavation, grading, soil stockpiling, and filling would occur during construction. Pipelines would be installed through trenching and jack-and-bore tunneling. These activities would result in some short-term increases in vehicle trips by construction workers and construction vehicles and may require use of some alternative travel routes by local residents. Based on information found in Section 4.9 Transportation and Circulation, the roadways that would be most affected by construction activities during the project's 3-year duration include SR4, Vasco Road, Byron Highway, Walnut Boulevard and Camino Diablo. These roads, and in particular Byron Highway, pass through or near the communities of concern. However, due to both the nature of the construction activities and the road network, the construction activities (and its related traffic impacts) will vary in both their location and occurrence. Consequently, the construction traffic is expected to have some temporary, localized impacts to the area residents. However, the duration and magnitude of these and the other indirect traffic impacts are projected to be less than significant with implementation of Mitigation Measure 4.9.1. Since no significant traffic impact is expected to affect the broader project area (see Section 4.9, Transportation and Circulation), and only a small proportion of the construction would occur within areas with low-income populations, no disproportionate adverse impacts on minority or low-income communities would occur.

Construction Air Quality and Noise. Project-related construction activities could cause short-term increases in fugitive dust, equipment exhaust emissions, and sound levels. Although construction would cause temporary air quality and noise impacts, these short-term impacts would be localized to a smaller construction area. Such impacts are typical of construction projects, are temporary, and would be less than significant with mitigation (see Section 4.10, Air Quality; and Section 4.11, Noise). Further, only a small proportion of the construction would occur within the Byron CDP (and none within Census Tract 3031.00), therefore no disproportionate adverse air quality or noise impacts to minority or low-income communities would occur.

Electric and Magnetic Fields Health Impacts. As described in Section 3.5.5, Power Supply Infrastructure, the project would involve construction of new power supply facilities to support operation of the expanded Los Vaqueros system. New electrical transmission lines would be extended to the new Delta Intake and Pump Station and the Expanded Transfer Facility and one or two new electrical substations would be required in the project area. Since there would be new transmission lines and other power facilities constructed as part of the Los Vaqueros Reservoir Expansion Project, EMF levels would increase, and there would be some potential for increased exposure by people and the environment to EMF. However, as indicated in Section 4.13.1, Affected Environment, there are no federal or state regulations governing EMF except near schools. None of the project components would be located within one-quarter mile of an existing or proposed school so this criterion would be met and impacts related to EMF would be less than significant. Since the potential for electric and magnetic fields impacts are less than significant, no disproportionate electric and magnetic fields impacts to minority or low-income communities would occur.

Summary

All of the project construction planned for Alternative 1 would be located in non-minority communities since all project construction would occur a minimum of 1 mile from Census Tract 3031.00. Approximately 6 percent of the total pipeline construction for the project (1.1 mile of the Delta Transfer Pipeline) construction would directly border the Byron CDP. It is also possible that under Power Option 1 (Western Only) powerlines and a substation would be located as close as 100 feet from the eastern border of the Bryon CDP. However, based on a review of a current aerial photograph for Power Supply Option 1, there are no residences along the eastern border of the Byron CDP or in the substation siting zone. Furthermore, none of the project components would be located within one-quarter mile of an existing or proposed school and therefore the potential for electric and magnetic field impacts are less than significant. Because relatively little construction would occur near the Byron CDP and none in Census Tract 3031.00, construction impacts to areas with minority or low-income populations would not cause a disproportionate impact to the minority and low-income community in the area. Construction of the project would involve activities and use equipment typical for any construction project; temporary traffic, air quality and noise effects would be mitigated to less than significant levels. Alternative 1 would not cause a disproportionate impact to the minority and low-income community in the area, and environmental justice impacts would be less than significant.

Alternative 2

The facilities included in Alternative 2 would be the same as those under Alternative 1. Therefore, like Alternative 1, construction and operation of the Project under Alternative 2 would not disproportionately affect the identified populations of concern, and environmental justice impacts would be less than significant.

Alternative 3

Construction of Alternative 3 would largely include the same components as discussed above for Alternative 1 with three relevant differences. First, expansion of the Old River Intake and Pump

Station would occur within the facility's existing site area. The Old River facility is located approximately 3.3 miles southeast of Census Tract 3031.00 and approximately 1.9 miles east of the Byron CDP and therefore is not considered close enough to affect those communities of concern.

Also, Alternative 3 would exclude construction of a New Delta Intake and Pump Station and Transfer-Bethany Pipeline, reducing the amount of construction in eastern Contra Costa County and northeastern Alameda County. Without this new construction, there would be no potential to effect communities of concern.

In summary, as with Alternative 1, Alternative 3 would not cause a disproportionate impact to the minority and low-income community in the area, and environmental justice impacts would be less than significant.

Alternative 4

Alternative 4 would involve a 160 TAF Reservoir Expansion/Dam Modification project with a borrow area and recreational facilities to be constructed within CCWD Watershed property lines. Under this alternative, the existing Transfer Station capacity would be expanded, but there would be no change in the facility structure or footprint. Alternative 4 would not include construction of any Delta Intake, Conveyance or Power Supply facilities, and would avoid areas with identified populations of concern.

Alternative 4 would not implement any project activities within 2 miles of Census Tract 3031.00 or the Byron CDP, whereas under Alternative 1 construction of some facilities would occur within 2 miles of these communities. Construction and operation of Alternative 4 would not cause a disproportionate impact to the minority and low-income communities in the area, and environmental justice impacts would be less than significant.

Mitigation: None required.

Impact 4.18.2: Construction and operation of the project alternatives would not disproportionately affect local employment opportunities for minority and/or low-income communities in the vicinity of the project. (No Impact)

Alternative 1

The project would generate approximately 1,200 full-time-equivalent (FTE) positions during the estimated three-year construction period (400 FTEs per year). The expansion of the reservoir and associated facilities would offer a range of labor opportunities for area workers of low to high skill levels. Construction of the Los Vaqueros Reservoir Expansion and associated facilities could offer employment opportunities to a wider workforce than other large construction projects in the region (such as the Bay Bridge replacement project) that have a greater need for specialized construction skills. Based on this information, and to provide a conservative estimate of the potential job benefits to Contra Costa County, an assumption that 40 percent of the project's employment would come

from county residents is used in this analysis. These project-related jobs would include a high proportion of low-skilled labor positions and apprenticeships that would be open to vicinity residents, including minority and low-income residents in the communities of concern. Of the estimated 1,200 projected employment opportunities, up to a third of the positions (400 positions) could be relatively low-skilled employment. These jobs would be accessible to minorities living in the area based upon their proximity to the open positions, and their relatively low cost of commuting to project job sites. Furthermore, since construction would not occur in the sensitive communities, construction would not interfere with businesses in minority communities. Instead, construction workers would be likely to bring some new business to local restaurants, retail outlets, and lodging.

While completion of Alternative 1 would end the short term construction employment opportunities, there would be no long-term local job reductions associated with the new expanded Los Vaqueros Facility. Future operation of the expanded Los Vaqueros reservoir and associated facilities would require a very minor increase in the staffing levels for its future operations and maintenance. As a result there would be no future adverse impacts on the local job opportunities available to the local low-income and minority community members.

Upon completion, the expanded reservoir would also increase low-cost recreation options and access to fishing at the reservoir. These are beneficial impacts that would improve the quality of life for all CCWD customers and citizens of the county, and particularly populations that reside in close proximity and chose to take advantage of low cost recreation and fishing opportunities.

Summary

The construction of Alternative 1 would temporarily increase the employment opportunities available locally to minority or low-income populations. The future operation of the expanded Los Vaqueros reservoir and associated facilities would require a very minor increase in the staffing levels for its future operations and maintenance. The increased local recreation opportunities at the future expanded Los Vaqueros Reservoir would also be beneficial to local residents.

These effects would generally be beneficial to local residents and none would cause a disproportionate impact to the minority and low-income community in the area. Therefore construction and operation of Alternative 1 would not disproportionately affect local employment opportunities for minority and/or low-income communities in the vicinity of the project; there would be “No Impact”.

Alternative 2

The facilities included in Alternative 2 would be the same as those under Alternative 1. Therefore construction and operation of Alternative 2 would not disproportionately affect local employment opportunities for minority and/or low-income communities in the vicinity of the project; there would be “No Impact”.

Alternative 3

Construction of Alternative 3 would largely include the same components as discussed above for Alternative 1 with three modifications: expansion of the Old River Intake and Pump Station would occur within the facility's existing site area. However, Alternative 3 would exclude the New Delta Intake and Pump Station and Transfer-Bethany Pipeline, reducing the amount of construction in eastern Contra Costa County and northeastern Alameda County. Opportunities for local employment would still be available for local residents although they would be correspondingly reduced given the somewhat smaller amount of project construction under Alternative 3.

In summary, as with Alternative 1, construction and operation of Alternative 3 would not disproportionately affect local employment opportunities for minority and/or low-income communities in the vicinity of the project; there would be "No Impact".

Alternative 4

Alternative 4 would involve a 160 TAF Reservoir Expansion and Dam Modification with a borrow area and recreational facilities to be constructed within the watershed. Under this alternative, the existing Transfer facility would be upgraded, however this facility would not expand its footprint as would occur for other alternatives. Alternative 4 would exclude construction of any Delta Intake, Conveyance or Power Supply facilities, and would avoid areas with identified populations of concern.

Unlike Alternative 1, Alternative 4 would not implement any project activities within 2 miles of Census Tract 3031.00 or the Byron CDP. As a result, construction and operation of Alternative 4 would not cause a disproportionate impact to the minority and low-income community in the area; there would be "No Impact".

Mitigation: None required.

Impact 4.18.3: Construction and operation of the project alternatives when combined with construction of other past, present, and probable future projects, would result in air quality, noise, and/or other environmental impacts related to traffic and other construction activities that would not disproportionately affect nearby minority and/or low-income communities. (Less than Significant)

All Alternatives

Impact 4.18.1 evaluates the potential for environmental justice impacts associated with temporary traffic, air quality, noise and other environmental impacts resulting from project construction activities. As discussed above, because relatively little construction would occur near the Byron CDP and none in Census Tract 3031.00, construction impacts to areas with minority or low-income populations would not cause a disproportionate impact to the minority and low-income community in the area. As also discussed above, construction of the project would involve activities and use equipment typical for any construction project; temporary traffic, air quality and noise effects would be mitigated to less than significant levels with mitigation. None of the alternatives would

cause a disproportionate impact to the minority and low-income communities in the area, and project-related environmental justice impacts would be less than significant.

Cumulative Construction Projects. There is the potential for cumulative impacts associated with select other projects to be built in the same 3-year timeframe as the Los Vaqueros Expansion project (approximately 2012 to 2015) and within the same geographic area. As discussed in Section 4.1 – Approach to Analysis (see subsection 4.1.3 Approach to Cumulative Analysis), a review of local and regional development, infrastructure and transportation projects was conducted to provide a list of relevant projects (see Table 4.1.2). Construction-related impacts, including traffic, dust and noise result in localized effects; therefore, only other projects or activities in relatively close proximity (within one mile of Census Tract 3031.00 and the Byron CDP) would have the potential to add to anticipated project-generated construction impacts and create cumulative construction-related effects.

Of the projects listed, development or public works projects proposed for construction during the same timeframe as the Los Vaqueros Reservoir Expansion Project include the Cecchini Ranch development and the Brentwood Solid Waste Transfer Facility Expansion (located in Brentwood). However, these construction projects would not be located within 1 mile of Census Tract 3031.00 or the Byron CDP, and are therefore not considered relevant to a discussion of cumulative environmental justice impacts.

There are also various Road Safety Improvement and Widening Projects (SR 4, Vasco Road, Walnut Boulevard Widening and the Byron Highway) which, although scheduled for completion prior to the Los Vaqueros Reservoir Expansion, do have the potential to overlap in time and geographic area with the project alternatives. As such, they could impact minority and low-income communities where construction occurs within 1 mile of these populations. However, the improvements would not disproportionally affect Census Tract 3031.00 or the Byron CDP, since they are located throughout the region and would impact other communities at the same time. Based on this review of probable future projects, Los Vaqueros Reservoir Expansion Project construction activities would not contribute considerably to any significant cumulative effects.

Cumulative Operations. With respect to cumulative, short-term operational impacts resulting from project-related traffic and air quality sources combined with other projects and their effects, there does appear to be the potential to make a cumulatively considerable contribution to traffic and air quality effects. As discussed in their respective section (Transportation Impact 4.9.6; Air Quality Impact 4.10.2), operation of the Los Vaqueros Reservoir Expansion project under all alternatives would result in less than significant effects. But, when operation of the Los Vaqueros Reservoir Expansion project is considered in combination with operation of relevant cumulative projects, traffic and air quality, there is the potential for significant cumulative impacts for traffic and air quality to occur. However, these operational impacts to traffic and air quality would not disproportionally affect Census Tract 3031.00 or the Byron CDP, since impacts would be spread throughout the region and would impact other (non-minority and higher income) communities at the same time.

Noise levels, by comparison, are more localized than traffic and air quality, and are not anticipated to increase above ambient levels enough to result in cumulative noise impacts (see Section 4.11.2). As such, cumulative noise impacts are not anticipated.

Based on this review of probable future projects, Los Vaqueros Reservoir Expansion Project operation would not result in significant cumulative operational impacts to identified populations.

In summary for all alternatives, the cumulative impact to the County's minority and low-income populations from area construction is not cumulatively considerable and disproportionate to minority or low-income populations. Cumulative, operational impacts related to traffic and air quality may result in cumulatively considerable impacts, however these impacts would not disproportionally affect minority and low-income communities. Therefore, cumulative environmental justice impacts are considered to be less than significant.

Mitigation: None required.

Impact 4.18.4: Construction and operation of the project alternatives, when combined with construction of other past, present, and probable future projects, would not disproportionately affect local employment opportunities for minority and/or low-income communities in the vicinity of the project. (No Impact)

All Alternatives

The geographic area for employment opportunities is broader than the local (i.e.- two-mile) range for potential construction impacts. Therefore, the following discussion of cumulative impacts will focus upon countywide employment opportunities and their potential cumulative effects upon minority and low-income populations.

Cumulative Construction Projects. In Section 4.17 Socioeconomic Effects, discussion under Impact 4.17.2 identified temporary beneficial countywide impacts related to new income and local employment during project construction. Discussion under Impact 4.17.4 identified beneficial cumulative impacts related to new income and local employment during project construction (also Countywide). These beneficial countywide effects could also be available to identified minority and low-income populations during the construction period.

In this Environmental Justice section, discussion under Impact 4.18.2 finds that construction of the project would not disproportionately affect local employment opportunities for minority and/or low-income communities in the vicinity of the project. Instead, there would be work opportunities associated with the project that could increase income and local employment associated with construction of one of the project alternatives. Therefore, there would be no project related adverse contribution to the any significant cumulative impacts on local employment opportunities that would disproportionately affect minority and/or low-income communities in the project's vicinity.

Cumulative Operations. With respect to cumulative, long-term operational impacts resulting from project-related employment opportunities combined with other projects and their effects, there does not appear to be the potential to make a cumulatively considerable contribution. This is because there are anticipated to be only about 3 new employment positions filled after project construction is completed. Whether all the new positions were filled by minority and/or low-income residents or not, there would be no impact related to operational employment. Therefore, there would be no opportunity for a contribution to local employment and no opportunity to impact cumulative operational effects.

In summary for all alternatives, the cumulative impact to the County's minority and low-income populations from county-wide construction and operational employment opportunities is not cumulatively considerable and disproportionate to minority or low-income populations. Cumulative, construction and operational impacts related to employment opportunities may result in cumulatively considerable impacts, however these impacts would not disproportionally affect minority and low-income communities. Therefore, cumulative environmental justice impacts are considered to be less than significant.

Mitigation: None required.

4.19 Indian Trust Assets

Indian Trust Assets (ITAs) are legal interests in property held in trust by the United States (U.S.) for federally-recognized Indian tribes or individual Indians. An Indian trust has three components: (1) the trustee, (2) the beneficiary, and (3) the trust asset. ITAs can include land, minerals, federally-reserved hunting and fishing rights, federally-reserved water rights, and in-stream flows associated with trust land. Beneficiaries of the Indian trust relationship are federally-recognized Indian tribes with trust land; the U.S. is the trustee. By definition, ITAs cannot be sold, leased, or otherwise encumbered without approval of the U.S. The characterization and application of the U.S. trust relationship have been defined by case law that interprets Congressional acts, executive orders, and historic treaty provisions.

Consistent with President William J. Clinton's 1994 memorandum, "Government-to-Government Relations with Native American Tribal Governments," U.S. Department of the Interior (DOI), Bureau of Reclamation, Mid-Pacific Region (Reclamation), assesses the effect of its programs on tribal trust resources and federally-recognized tribal governments. Reclamation is tasked to actively engage federally-recognized tribal governments and consult with such tribes on government-to-government level (Federal Register, 1994) when its actions affect ITAs. The U.S. DOI Departmental Manual Part 512.2 ascribes the responsibility for ensuring protection of ITAs to the heads of bureaus and offices (DOI, 1995). DOI is required to "protect and preserve Indian trust assets from loss, damage, unlawful alienation, waste, and depletion" (DOI, 2000). Reclamation is responsible for assessing whether the proposed project has the potential to affect ITAs.

It is the general policy of the DOI to perform its activities and programs in such a way as to protect ITAs and avoid adverse effects whenever possible (Reclamation, 2000). The project alternatives would expand the existing Delta intake facilities at Old River to accommodate higher flows and expand Los Vaqueros Reservoir capacity to 275 TAF under Alternatives 1, 2, 3 and 160 TAF under Alternative 4. Reclamation will comply with procedures contained in Departmental Manual Part 512.2, guidelines, which protect ITAs.

The nearest ITA to the project location is the Lytton Rancheria, located approximately 33 miles west/northwest of the project area. The nearest construction activity to the Lytton Rancheria would be over 30 miles distance. The proposed action does not affect ITAs.

The potential for the project to affect significant Native American sites is addressed in Section 4.16, Cultural and Paleontological Resources.

4.20 Growth-Inducing Effects

4.20.1 Introduction

Both the National Environmental Policy Act (NEPA) and the California Environmental Quality Act (CEQA) require consideration of a project's growth inducement potential as a possible way in which a project might result in indirect environmental effects.

NEPA Definition of Growth Inducement

The Council on Environmental Quality NEPA Regulations require federal agencies to address the potential indirect impacts of a proposed action in preparing environmental assessments. Indirect effects are reasonably foreseeable effects that may occur beyond the immediate timeframe of a proposed action or outside the immediate vicinity of the action area. These effects "may include growth-inducing effects and other effects related to induced changes in the pattern of land use, population density, or growth rate" (CFR Section 40 1508.8 [b]).

CEQA Definition of Growth Inducement

The CEQA *Guidelines* state that an environmental impact report (EIR) should discuss the ways in which a proposed project may induce growth (Section 15126.2[d]). Growth inducement is defined by the CEQA *Guidelines* as:

> *[T]he ways in which the proposed project could foster economic or population growth, or the construction of additional housing, either directly or indirectly, in the surrounding environment. Included in this are projects which would remove obstacles to population growth ... It must not be assumed that growth in any area is necessarily beneficial, detrimental, or of little significance to the environment.*

A project can have a direct effect on population growth if it involves construction of substantial new housing. A project can have indirect growth-inducement potential if it would (1) establish substantial new permanent employment opportunities (e.g., commercial, industrial, or governmental enterprises) or otherwise stimulate economic activity; or (2) remove an obstacle to additional growth and development, such as removing a constraint to or increasing the capacity of a required public service. For example, an increase in the capacity of utility or road infrastructure could allow either new or additional development in the surrounding area.

Approach

The following section reviews the potential for the project, under each of the four project alternatives, to induce growth. The focus of the discussion is the extent to which an alternative could provide additional water supply to one or more Bay Area water agencies that might support additional growth.

4.20.2 Growth-Inducement Potential

Overview

None of the project alternatives involves the construction of new housing; therefore none would be directly growth inducing. Furthermore, the project, under any of the four project alternatives, would not indirectly induce growth related to establishment of substantial new permanent employment opportunities such as those created by development of commercial, industrial, or governmental enterprises; expansion of the Los Vaqueros Reservoir system would create only a few additional, permanent jobs (less than 10).

However, under some project alternatives, the project might remove an obstacle to growth by improving the reliability of water supply to one or more of the three South Bay water agencies: Alameda County Water District (ACWD), Alameda County Flood Control and Water Conservation District – Zone 7 (Zone 7), and Santa Clara Valley Water District (SCVWD); and to the Contra Costa Water District (CCWD). This section evaluates the extent to which the project alternatives could remove water supply reliability as an obstacle to growth and therefore have indirect growth-inducement potential.

Improving Supply Reliability

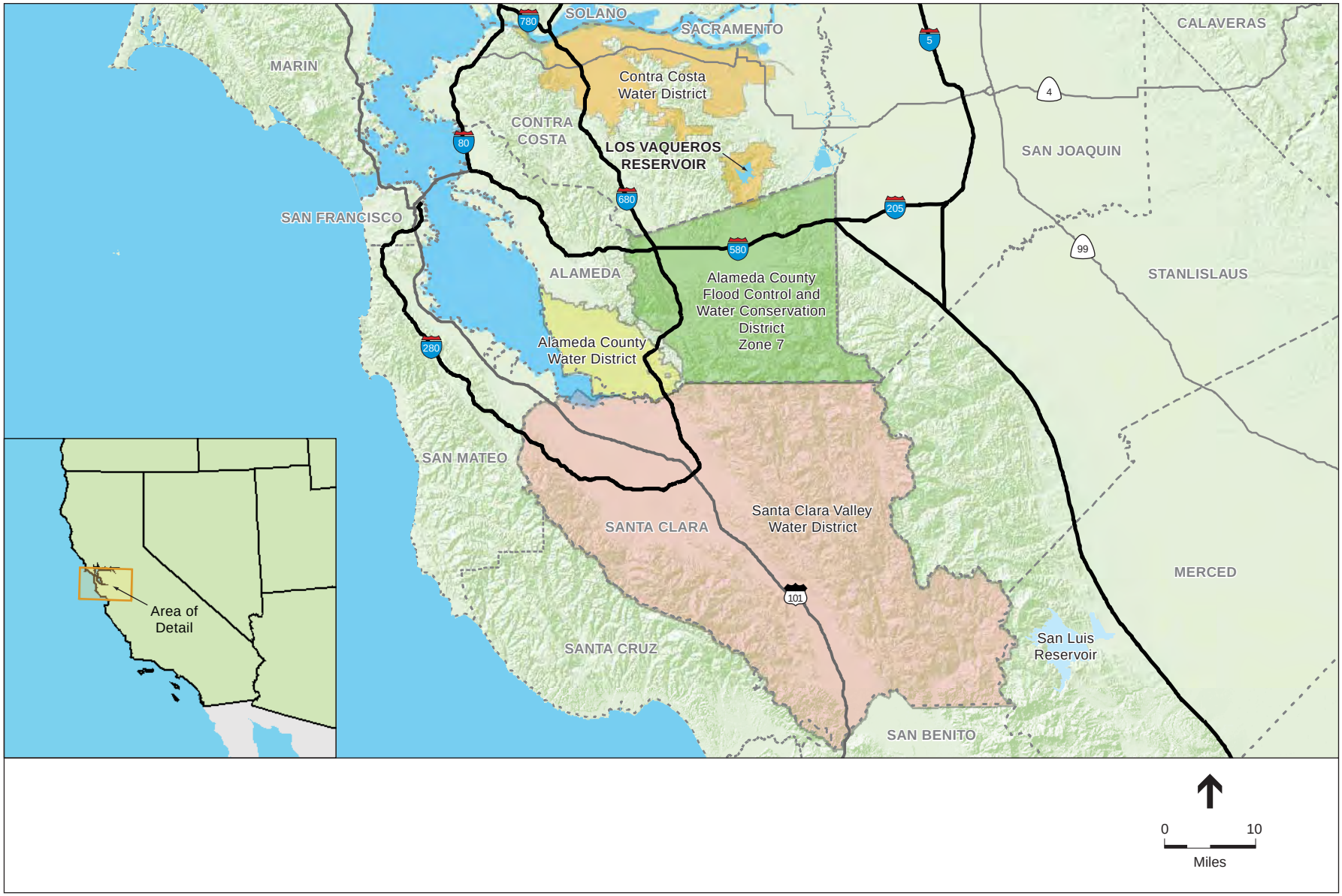
As described in Chapter 1, Purpose and Need/Project Objectives, two primary objectives pertain to all of the project alternatives: to use an expanded Los Vaqueros Reservoir to develop water supplies for environmental water management (Environmental Water Management) and to increase water supply reliability for Bay Area water providers (Water Supply Reliability). Water supplies for Environmental Water Management would not induce growth. However, increasing water supply reliability for Bay Area water providers does have the potential to remove an obstacle to growth.

Under each alternative, project operations are designed to provide some level of improvement in water supply reliability to the three South Bay water agencies or CCWD (see **Figure 4.20-1**).

By design, Alternative 1 would provide for the greatest improvement of water supply reliability. The water supply reliability improvements provided by the proposed project are categorized as follows:

- *Delta Supply Restoration* – The new and enlarged Los Vaqueros Reservoir system would be used to partially restore delivery reductions to the South Bay water agencies that have occurred and are expected to continue to occur due to regulatory restrictions at the State Water Project (SWP) and Central Valley Project (CVP) Delta export pumps.

- *Dry-Year Storage* – Additional storage in the expanded Los Vaqueros Reservoir would be used to meet dry-year needs for CCWD and the South Bay water agencies. Subsequently, the need to purchase supplemental dry-year supplies, activate dry-year exchange programs, or institute drought management measures would also be reduced. This would allow storage of water in wet periods for use in dry periods.



SOURCE: USGS, 1993 (base map); and ESA, 2008

Los Vaqueros Reservoir Expansion Project EIS/EIR . 201110

Figure 4.20-1

CCWD and Water Districts Served by SWP's South Bay Aqueduct

- *Emergency Storage* – Additional storage in the expanded Los Vaqueros Reservoir would be available for delivery to Bay Area water agencies through the South Bay Connection or existing interties in the event of a levee failure, chemical spill, or other emergency.

Alternative 1

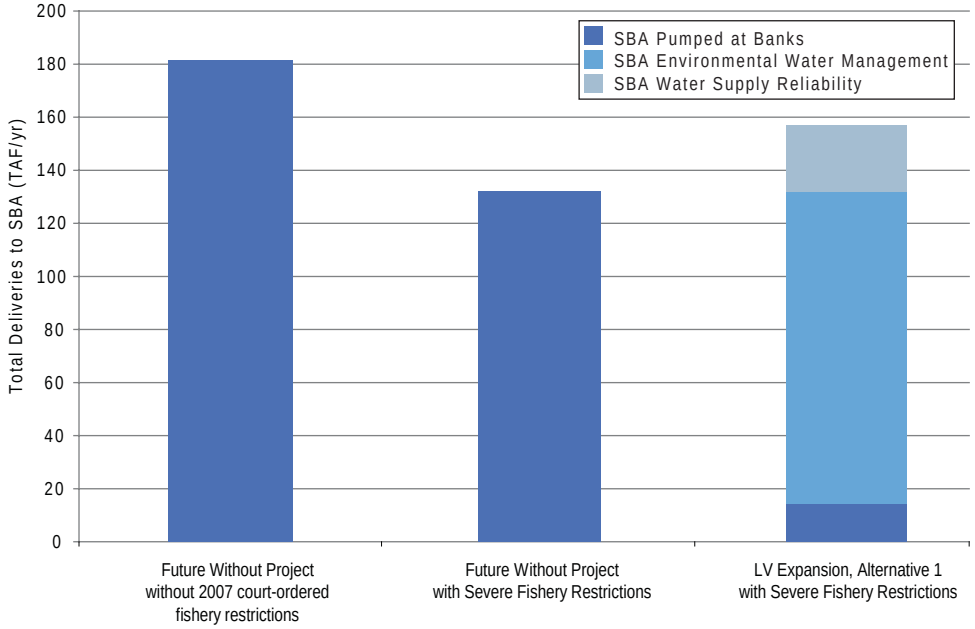
Water Supply Reliability Improvements Provided by the Project

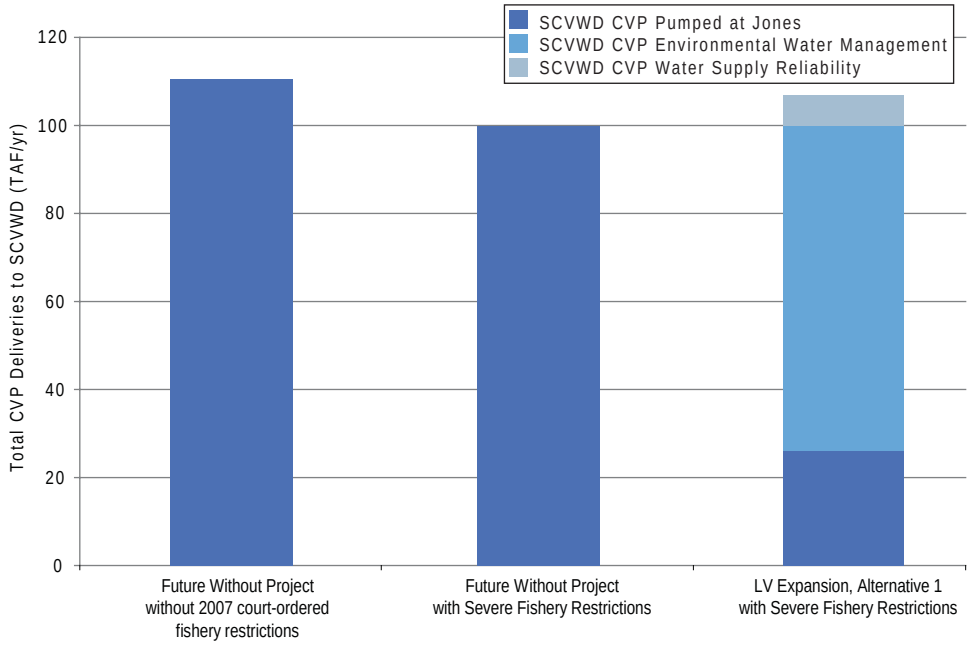
Under Alternative 1, as described in Section 3.4, Action Alternatives, operations to increase water supply reliability would include a combination of Delta Supply Restoration, Dry-Year Storage and Emergency Storage. The water supply reliability and other benefits of Alternative 1 are summarized in Table 4.2-4 in Section 4.2, Delta Hydrology and Water Quality.

Anticipated Future Water Deliveries

With Delta Supply Restoration and Dry-Year Storage operations, direct diversions and stored water supplies would be used to partially offset delivery reductions to the South Bay water agencies that have occurred and are expected to continue to occur due to regulatory restrictions at the SWP and CVP Delta export pumps. As discussed in Section 4.2, two scenarios for future pumping restrictions are evaluated in this EIS/EIR: a moderate fishery restrictions scenario and a severe fishery restrictions scenario. Model studies were also performed without assuming either of these increased levels of restrictions on Delta exports, to estimate Delta export pumping in the future without assuming the 2007 court-ordered fishery restrictions to be in effect. **Figure 4.20-2** illustrates the relationship between modeled Delta exports for South Bay water agencies with and without the Delta fishery restrictions. The severe restrictions scenario is considered in this analysis of growth inducement potential because under this scenario, Alternative 1 has the potential to restore more of the Delta supply deliveries to the South Bay water agencies than under the moderate restrictions scenario.

As shown in Figure 4.20-2, modeling of future conditions without assuming the moderate or severe fishery restrictions on Delta exports shows water contractors on both the SWP and CVP systems would have received more supply from these two water systems in the future (on a long-term average annual basis) than they can now expect with such restrictions in place. Estimated future long-term annual average SWP deliveries to the South Bay water agencies, without the fishery restrictions imposed in 2007 and without the Los Vaqueros Reservoir Expansion Project, would be about 180 thousand acre-feet (TAF). Assuming severe fishery restrictions, future projected long-term annual average SWP deliveries to the South Bay water agencies could be about 130 TAF. As shown in the graph, under Alternative 1, long-term average annual SWP deliveries to the South Bay water agencies would be restored to about 155 TAF. This delivery amount is less than deliveries estimated for the future without the 2007 fishery restrictions. Similarly, projected future long-term annual average CVP deliveries to SCVWD, without the fishery restrictions imposed in 2007 and without the Los Vaqueros Reservoir Expansion Project, were estimated to be about 110 TAF per year, on average, and the assumed severe fishery restrictions reduce the estimated future CVP deliveries to SCVWD to about 100 TAF per year, on average. As shown in Figure 4.20-2, the average annual CVP deliveries to SCVWD would be restored to about 107 TAF in Alternative 1, again less than the deliveries projected for the future without the 2007 fishery restrictions.





SOURCE: CCWD, 2008

Figure 4.20-2
Water Supply Reliability
(2030 Level of Development)

Assuming severe fishery restrictions, Delta Supply Restoration and Dry-Year Storage operations together could provide a long-term annual average benefit of about 30 TAF for the South Bay water agencies and about 25 TAF annually in a 6-year drought. Dry-year storage would also be available to CCWD under this alternative. CCWD's dry-year supply benefit would be up to 20 TAF of stored water at the beginning of a drought. Refer to Section 4.2 for more information on the deliveries made under Alternative 1.

The maximum amount of Emergency Storage that could be available to the Bay Area region under Alternative 1 would be about 210 TAF (under the severe fishery restrictions scenario). This stored water would be available during shortages caused by natural disasters or other emergencies. Emergency water supplies would be delivered through either the South Bay Connection or existing interties between water agencies.

Historical Water Deliveries

Table 4.20-1 presents historical total deliveries of Delta water by the SWP to the South Bay water agencies over a 12-year period from 1995 through 2006 (prior to the fishery restrictions imposed in 2007). As shown, total deliveries from the Delta through the South Bay Aqueduct (SBA) to these three agencies over this period ranged from 76.6 TAF to 220.4 TAF, and averaged about 152 TAF. In dry and below-normal years (2001, 2002, and 2004), deliveries averaged about 138 TAF.

TABLE 4.20-1
HISTORICAL SWP DELIVERIES TO THE SOUTH BAY WATER AGENCIES (acre-feet)

Year	Water Year Type[1]	Table A[2]	Total SWP Deliveries by Agency[3]			Total Deliveries
		Contract	ACWD	SCVWD	Zone 7	
1995	Wet	184,000	17,793	30,091	28,756	76,640
1996	Wet	186,000	19,662	18,903	89,850	128,415
1997	Wet	188,000	24,063	27,522	95,601	147,186
1998	Wet	188,000	19,075	17,941	63,410	100,426
1999	Wet	188,000	37,952	48,910	82,945	169,807
2000	Above Normal	210,000	35,978	58,617	101,988	196,583
2001	Dry	220,000	18,004	34,409	77,922	130,335
2002	Dry	220,000	27,811	53,261	62,186	143,258
2003	Above Normal	220,000	36,590	45,450	108,981	191,021
2004	Below Normal	222,619	27,884	52,364	59,458	139,706
2005	Above Normal	222,619	44,599	47,512	128,249	220,360
2006	Wet	222,619	43,079	61,403	74,637	179,119

1 Water year type shown is for the Sacramento Valley.
2 This is the amount of Table A water under contract to the South Bay water agencies; the amount available in a given year varies based on water year type and other factors.
3 Deliveries by Agency show the total amount of water delivered by the SWP to the South Bay water agencies. Deliveries include SWP Contract Table A supplies, Article 21 deliveries, Article 56 deliveries, and other deliveries including transfers, exchanges, and other non-SWP water delivered through SWP facilities.

SOURCE: Compiled by DWR, C. Spencer, 2008.

As shown in Figure 4.20-2, long-term average annual SWP deliveries to the South Bay water agencies under Alternative 1, would be restored to about 155 TAF under the future conditions modeled. This estimated delivery amount is slightly higher than the historical long-term average annual deliveries of 152 TAF of water delivered from the Delta to the South Bay water agencies through the SWP.

Table 4.20-2 presents historical total deliveries by the CVP to SCVWD over the same 12-year period from 1995 through 2006. Deliveries to SCVWD have ranged from about 64.2 TAF to 150.5 TAF, averaging 105 TAF over this period. SCVWD's CVP contract is for 152,500 acre feet and is used to meet both urban and agricultural demand. As for the SWP deliveries described above, estimated deliveries of Delta water to SCVWD through the CVP under Alternative 1 would be slightly higher (107 TAF) than the historical long-term average annual deliveries (105 TAF).

TABLE 4.20-2
HISTORICAL CVP DELIVERIES TO SCVWD (acre-feet)

Year	Water Year Type[1]	Deliveries to SCVWD[2]
1995	Wet	108,603
1996	Wet	100,783
1997	Wet	91,346
1998	Wet	78,679
1999	Wet	116,933
2000	Above Normal	91,372
2001	Dry	150,516
2002	Dry	134,346
2003	Above Normal	106,409
2004	Below Normal	126,631
2005	Above Normal	89,149
2006	Wet	64,230

1 Water year type shown is for the Sacramento Valley.
2 Deliveries to SCVWD show the total amount of water delivered by the CVP to SCVWD and could include transfers, exchanges or other water in addition to contract supply.

SOURCE: USBR Central Valley Operations Office, Reports of Operations, 2008.

Table 4.20-3 presents historical total Delta diversions for CCWD over the 12-year period from 1995 through 2006. CCWD's total Delta diversions have ranged from about 108.4 TAF to 206.5 TAF, averaging about 131.6 TAF over this period. Alternative 1 would provide CCWD with 20 TAF of additional storage for use in drought periods.

Discussion

As summarized in the previous section, Alternative 1 could restore some but not all of the future Delta water deliveries from the SWP and CVP previously expected by the South Bay Water agencies. At this time, the South Bay water agencies have not committed to participating in the project alternatives and have not specified an amount of water to be provided to them. However, for purposes of this impact analysis, it is acknowledged that if one or more of these agencies were to

TABLE 4.20-3
HISTORICAL CVP DELIVERIES TO CCWD (acre-feet)

Year	Water Year Type[1]	CVP Deliveries	Total CCWD Delta Diversions[2]
1995	Wet	93,889	108,805
1996	Wet	105,184	116,841
1997	Wet	113,747	121,555
1998	Wet	88,456	206,461
1999	Wet	83,541	108,421
2000	Above Normal	94,530	128,655
2001	Dry	92,005	114,716
2002	Dry	82,357	127,980
2003	Above Normal	81,579	149,406
2004	Below Normal	93,634	129,820
2005	Above Normal	82,682	136,548
2006	Wet	91,826	129,819

1 Water year type shown is for the Sacramento Valley.
2 Total CCWD Delta Diversions includes the total amount of water delivered by the CVP to CCWD, water transfers, local water rights and diversions of surplus water under CCWD's water rights for the existing Los Vaqueros Reservoir.

SOURCE: CCWD, 2008

participate in Alternative 1, they would receive some improved supply reliability compared to existing and future conditions without the project.

It is not possible to determine exactly how each agency might make use of the water supply reliability benefit provided under Alternative 1. Each of the three South Bay water agencies has multiple sources of supply that they manage to meet the needs of the customers within their service areas. Generally, each agency manages a combination of local surface water and groundwater resources along with surface water supply imported from the Delta. They also each use a combination of surface water and groundwater storage to reserve water supply for drought periods and other times of potential supply shortage.

A review of the Urban Water Management Plans (UWMP) for these three agencies (ACWD, 2005; SCVWD, 2005; Zone 7, 2005) showed that the total projected 2030 water demand in their service areas is: ACWD – 79,100 acre feet (AF); Zone 7 – 69,370 AF; and SCVWD – 448,200 AF, for a total of 596,670 AF. **Table 4.20-4** shows the "normal year" supply from SWP and CVP sources identified in each agency's 2005 UWMP. A "normal year" is defined as "a year in the historical sequence that most closely represents median runoff levels and patterns. This is the average supply available over the period from 1967 forward, given currently existing facilities and institutional arrangements" (SCVWD, 2005). Review of Table 4.20-4 indicates that the South Bay water agencies anticipate obtaining between 41 percent (ACWD) and 65 percent (Zone 7) of their annual water supply from the Delta in 2030.

TABLE 4.20-4
NORMAL YEAR WATER SUPPLY ANTICIPATED FROM DELTA SOURCES BY WATER DISTRICT

	Normal Year 2010 (acre-feet)	Percentage of Respective Agency Supply	Normal Year 2030 (acre-feet)	Percentage of Respective Agency Supply
Alameda County Water District	32,700	40%	36,000	41%
Zone 7	63,900	70%	60,900	65%
Santa Clara Valley Water District	197,400	52%	197,400	44%
Total Anticipated Future Delta Supply for South Bay water agencies	**294,000**		**294,300**	
Contra Costa Water District	211,500	89%	213,000	89%

SOURCE: Contra Costa Water District 2005 UWMP; Alameda County Water District 2005 UWMP; Zone 7 2005 UWMP; SCVWD 2005 UWMP; ESA 2008.

As shown in Table 4.20-4 the South Bay water agencies anticipate receiving about 294 TAF of Delta water in 2030. The estimate of Delta deliveries to South Bay water agencies shown in Figure 4.20-2 without assuming moderate or severe Delta fishery restrictions is about 290 TAF at the 2030 level of development (about 180 TAF through the SBA system, plus 110 TAF through the CVP system). The modeling estimate of future deliveries of 290 TAF per year for Delta water supply among the South Bay water agencies is slightly lower than that projected in the UWMP for these agencies, but is approximately comparable.

Alternative 1 could restore, on average, about 30 TAF of Delta supply to the three South Bay water agencies. This represents about 10 percent of the total Delta supply these agencies had been expecting from Delta supply sources (294.3 TAF), as reflected in their current UWMPs, and about 5 percent of their total water demands (596.7 TAF). Alternative 1 would not provide these agencies with a new source of water or an amount beyond that which they had previously planned to receive. However, on average, this alternative would provide slightly more water than the average annual amount these agencies historically had received.

During a drought, this additional water could reduce the amount of supplemental water or the level of demand reduction necessary. The supply restoration provided under Alternative 1 would not be substantial and is well within the range of demands and supplies for which there are current approved plans.

Alternative 1 would provide 20 TAF of additional storage to CCWD at the beginning of a drought. With this additional dry-year supply, CCWD could reduce its purchase of supplemental supplies and could reduce the severity of drought management (rationing) measures imposed on its customers. In 1996, the CCWD Board of Directors adopted the Future Water Supply Study (described in Chapter 2), including a preferred alternative to provide their customers a high-quality, reliable supply of water through 2040. The preferred alternative included continued reliance on the CVP, conservation, recycling, and water transfers. In 2002, the Future Water Supply Study was updated and extended through 2050. A key goal of the Future Water Supply Study

implementation plan is to meet 100 percent of demand in all but the driest years, and to meet at least 85 percent of normal year demands in a drought. The remaining 15 percent of demand would be met through demand management, including mandatory rationing, transfers, and spot market water purchases. The additional 20 TAF from Alternative 1 would enable CCWD to reduce rationing requirements, transfers, and/or spot market water purchases during a drought.

CCWD certified a programmatic EIR on its Future Water Supply Implementation in 1999 and received a biological opinion from USFWS in 2000 covering the secondary effects of growth related to implementation of the Future Water Supply Study. The dry-year water supplied to CCWD from Alternative 1 is consistent with the Future Water Supply Study, the Future Water Supply Implementation EIR and the related USFWS Biological Opinion.

Emergency storage does not have a growth-inducing potential because it would not be used to meet the demands of any particular agency or area, but rather would be made available in the event of a natural disaster or other emergency based on needs and conditions specific to the emergency.

Alternative 2

Under Alternative 2, operations to increase Water Supply Reliability would include Dry-Year Storage and Emergency Storage. It does not include a specific increment of water for Delta Supply Restoration as under Alternative 1. Operating Alternative 2 for Dry-Year Storage would increase the amount of water available to CCWD in dry years by up to 20 TAF at the start of a drought. About 200 TAF of emergency storage would be available to the Bay Area region under Alternative 2, assuming severe fishery restrictions. This water would be available during shortages caused by natural disasters or other emergencies. Emergency water supplies would be delivered through either the South Bay Connection or existing interties between water agencies.

Alternative 2 does not include the Delta Supply Restoration operation and does not have the potential to induce growth in the South Bay water agencies' service areas. The analysis and conclusions regarding the potential for the Dry-Year Storage operation to affect growth in the CCWD service area are the same as presented for Alternative 1.

Emergency storage does not have a growth-inducing potential because it would not be used to meet the demands of any particular agency or area, but rather would be made available in the event of a natural disaster or other emergency based on needs and conditions specific to the emergency.

Alternative 3

Under Alternative 3, operations to increase Water Supply Reliability would include only Dry-Year Storage and Emergency Storage operations with no increment of water from Delta Supply Restoration operations as provided under Alternative 1. Operating for Dry-Year Storage would increase the amount of water available to CCWD in dry years by up to 20 TAF at the start of a drought. About 220 TAF of emergency storage would be available to the Bay Area region under Alternative 3, assuming severe fishery restrictions. This water would be available

during shortages caused by natural disasters or other emergencies. Emergency water supplies would be delivered through existing interties between water agencies.

Alternative 3 does not have the South Bay Connection and does not have the potential to induce growth in the South Bay water agencies' service areas. The analysis and conclusions regarding the potential for the Dry Year Storage operation to affect growth in the CCWD service area are the same as presented for Alternative 1.

Emergency storage does not have a growth-inducing potential because it would not be used to meet the demands of any particular agency or area, but rather would be made available in the event of a natural disaster or other emergency based on needs and conditions specific to the emergency.

Alternative 4

Under Alternative 4, operations to increase Water Supply Reliability would include Dry-Year Storage and Emergency Storage. Operating for Dry-Year Storage would increase the amount of water available to CCWD and other participating Bay Area water agencies to which CCWD can deliver water directly through interties or indirectly by exchange. The increase in available water would be as much as 60 TAF at the start of a drought. About 115 TAF of emergency storage would be available to the Bay Area region under Alternative 4, assuming severe fishery restrictions. This water would be available during shortages caused by natural disasters or other emergencies. Emergency water supplies would be delivered through existing interties between water agencies.

As described above for Alternative 1, CCWD is implementing its Future Water Supply Study, relying on CVP supplies, conservation, recycling, and water transfers to meet future demand. CCWD's goal, according to the Future Water Supply Study, is to meet 100 percent of demand in all but the driest years and to provide at least 85 percent of demand in a drought. The 60 TAF of dry-year supply storage provided to CCWD under Alternative 4 would reduce the extent to which CCWD would need to acquire water transfers to meet future demand in both normal and drought conditions, and would reduce the need for rationing and spot market purchases during droughts. The dry-year water supplied to CCWD from Alternative 4 is consistent with the Future Water Supply Study, the Future Water Supply Implementation EIR, and the related USFWS Biological Opinion.

Emergency storage does not have a growth-inducing potential because it would not be used to meet the demands of any particular agency or area, but rather would be made available in the event of a natural disaster or other emergency based on needs and conditions specific to the emergency.

4.20.3 Secondary Effects of Growth

The water supply reliability provided by Alternative 1 would restore some amount of the water the South Bay water agencies had previously expected and planned to receive from the Delta in the future under their existing contracts with the state and federal water agencies. In addition, all project alternatives would provide additional water reliability to CCWD. Each of these agencies has prepared a long-term future water supply plan; Delta water supply is a central component in each. These long-term water supply plans have been designed to provide adequate water supply to meet the needs of both existing customers and the growth that has been planned in each service area by the respective city and county land use agencies. These plans identify water supplies needed in the future to provide for both normal-year water demands as well for drought periods and include the following:

- ACWD, Integrated Resource Plan and 1996-2001 Capital Improvements Program, 1998.
- ACWD, Urban Water Management Plan, 2005.
- CCWD, Future Water Supply Implementation, 1999.
- CCWD, Urban Water Management Plan, 2005.
- SCVWD, Integrated Water Resources Planning Study 2003, Adopted December 2005.
- SCVWD, Urban Water Management Plan, December 2005.
- SCVWD Water Utility Enterprise Report – Annual Report on the Protection and Augmentation of the Water Supplies of the District, October 2007.
- Zone 7 Water Agency, 2008/09 Capitol Improvement Program, Ten-Year Water System Plan, Five-Year Flood Control System Plan, Adopted October 17, 2007.
- Zone 7 Water Agency, Urban Water Management Plan, 2005.

Water that could be provided to these agencies is reflected in the adopted land use plans for the areas to be served. The potential environmental effects of this future planned growth have been evaluated and fully disclosed previously in the CEQA environmental documents prepared on the long-term water supply plans for the South Bay water agencies and CCWD.

- ACWD, Integrated Resources Plan and 1996-2001 Capital Improvement Program, May 15, 1998, State Clearinghouse # 97122003.
- CCWD, Future Water Supply Implementation Final EIR, January 22, 1999, State Clearinghouse # 97072064.
- Zone 7 Water Agency, Water Supply Planning Program Draft EIR, January 1999.