CHAPTER 2
Project Description

The March 2010 Final EIS/EIR, as modified by the August 2013 EIR Addendum #1 (together the "Final EIS/EIR") analyzed, among other alternatives, a Timing Variant under which Los Vaqueros Reservoir would be expanded first to 160 TAF and later to 275 TAF. Los Vaqueros Reservoir has now been expanded to 160 TAF, and the project partners are considering a second phase of expansion. Since certification of the Final EIS/EIR, refinements have been made to elements of the previously analyzed facilities, and operational assumptions have been updated, primarily to reflect more detailed water demand and operational preference information from the Local Agency Partners and Refuges, as well as updated regulatory and environmental conditions in which the project would be constructed and operated. (These updated regulatory and environmental conditions are described in detail in Chapter 1.) Section 2.1 discusses the currently proposed Phase 2 Expansion alternatives. Section 2.2 describes the changes to the proposed project facilities from those described in the Final EIS/EIR. Section 2.3 discusses the greater detail now available about individual Local Agency Partner and Refuge operational preferences and the more specific project operational scenarios that have been formulated to reflect that information.

2.1 Phase 2 Expansion Alternatives

The action alternatives considered in this Supplement are options for the second phase of the Los Vaqueros Reservoir Expansion Project (Phase 2 Expansion). The numbering of the action alternatives for the Phase 2 Expansion correlates, in terms of operational priorities and major features, with Alternatives 1, 2 and 4 analyzed in the Final EIS/EIR. The action alternatives are formulated to capture the full range of potential project operations to best meet the needs of the various Local Agency Partners as well as the south-of-Delta wildlife refuges (Refuges) identified in the Central Valley Project Improvement Act (CVPIA). All action alternatives would continue to provide CCWD with the benefits of the original Los Vaqueros Project and already-completed expansion of Los Vaqueros Reservoir to 160 TAF storage capacity and also provide benefits of improved water supply reliability to the Local Agency Partners and Refuges. The potential benefits of the Phase 2 Expansion are described in Chapter 3.

2.1.1 No Project/No Action Alternatives

The Final EIS/EIR evaluated alternatives under which the then-existing Los Vaqueros Reservoir would be expanded to 275 TAF or 160 TAF. The CCWD Board of Directors selected the 160-TAF reservoir expansion project for construction, which did not preclude future consideration of a second phase of expansion to 275 TAF under the Timing Variant. Expansion of

Los Vaqueros Reservoir to 160-TAF storage capacity was completed in 2012 as described in the Final EIS/EIR, except that CCWD did not upgrade the pumps at the Transfer Facility.

This Supplement employs two No Project/No Action Alternatives. Each of the updated action alternatives will be compared to the updated 160-TAF No Project/No Action Alternative, to quantify the incremental impact/benefit of the Phase 2 Expansion. In addition, the updated action alternatives will be compared to the original Final EIS/EIR No Project/No Action Alternative (hereinafter referred to as the 100-TAF No Project/No Action Alternative), to enable the reader to compare the combined impacts of both the already-completed expansion of Los Vaqueros Reservoir to 160 TAF storage capacity and the proposed Phase 2 Expansion (hereinafter referred to as the Total Project) to the impacts of the Timing Variant previously presented in the Final EIS/EIR.

Under the 100-TAF No Project/No Action Alternative, Los Vaqueros Reservoir is assumed to have a 100 TAF storage capacity behind the original dam with the associated inundation footprint, with CCWD operating the facilities to meet its customer demands subject to current regulatory and physical constraints.

Under the 160-TAF No Project/No Action Alternative, no new facilities would be constructed, and CCWD would continue operating the existing Los Vaqueros Reservoir and other CCWD facilities to deliver water to meet its customer demands and delivered water quality goal subject to current regulatory and physical constraints. This alternative would not change operations of the Los Vaqueros Reservoir system. The Local Agency Partners and Refuges operations would likewise be unchanged, and their water supply reliability would not be improved through use of the existing Los Vaqueros Reservoir system, except through separate partnership agreements that could be developed in the future but are not contemplated in this analysis.

2.1.2 Alternative 1A

Alternatives 1A, 1B, and 2A would expand Los Vaqueros Reservoir storage from 160 TAF to 275 TAF, build a new Delta-Transfer Pipeline, and relocate the existing Marina Complex and Los Vaqueros Watershed trails and access roads that would be inundated by the reservoir expansion. All of the action alternatives would upgrade the existing Transfer Facility, build a new Transfer-Bethany Pipeline, and add facilities to deliver water to the Transfer Facility from the Rock Slough Intake, which entails building a new Neroly High-Lift Pump Station and replacing Pumping Plant #1. All of the action alternatives would include a new EBMUD-CCWD Intertie Pump Station to facilitate deliveries from the Los Vaqueros Pipeline to the EBMUD system and also include variable frequency drives at EBMUD's Walnut Creek Pumping Plant to facilitate deliveries from EBMUD's Mokelumne Aqueduct #2 to the Los Vaqueros system. All of the action alternatives would also build new pipelines to deliver water to the City of Brentwood Water Treatment Plant and to ECCID's Bixler Intake, as well as improve Los Vaqueros Watershed facilities, which would include upgrading the existing Los Vaqueros Interpretive Center, upgrading the existing old barn near the Los Vaqueros Watershed Office, and adding a new trail surrounding the Mortero Wetland Complex. A list of the major components for all the alternatives is provided in **Table 2-1** below. Alternatives 1A, 1B, and 2A differ from one another only in the proposed operations of the facilities. **Figure 2-1** shows the facilities associated with these alternatives.

TABLE 2-1
MAJOR COMPONENTS OF PHASE 2 EXPANSION ALTERNATIVES

	160-TAF No Project / No Action Alternative	Alternative 1A	Alternative 1B	Alternative 2A	Alternative 4A
Operational Priority					
		Water Supply Reliability	Environmental Water Management & Water Supply Reliability	Environmental Water Management	Environmental Water Management & Water Supply Reliability
Proposed Modifications to Existing Facilities					
Los Vaqueros Reservoir Capacity	160 TAF	275 TAF	275 TAF	275 TAF	160 TAF
Los Vaqueros Reservoir Maximum Water Surface Elevation	507 feet	560 feet	560 feet	560 feet	507 feet
Pumping Plant #1 Capacity	200 cfs	350 cfs	350 cfs	350 cfs	350 cfs
Transfer Pump Station Capacity	150 cfs	200 cfs	200 cfs	200 cfs	200 cfs
EBMUD Walnut Creek Pumping Plant Variable Frequency Drives	None	Included	Included	Included	Included
Los Vaqueros Interpretive Center	No change	Improved	Improved	Improved	Improved
Los Vaqueros Watershed Office Barn	No change	Seismically upgraded and improved	Seismically upgraded and improved	Seismically upgraded and improved	Seismically upgraded and improved
Proposed New Facilities					
Transfer-Bethany Pipeline Capacity	None	300 cfs	300 cfs	300 cfs	300 cfs
Delta-Transfer Pipeline Capacity	None	180 cfs	180 cfs	180 cfs	None
Expanded Transfer Facility Pump Station Capacity	None	300 cfs	300 cfs	300 cfs	300 cfs
Expanded Transfer Facility Storage Reservoir Capacity	None	5 MG	5 MG	5 MG	5 MG
Neroly High-Lift Pump Station Capacity	None	350 cfs	350 cfs	350 cfs	350 cfs
EBMUD-CCWD Intertie Pump Station	None	155 cfs	155 cfs	155 cfs	155 cfs
Los Vaqueros Marina Complex	No change	Relocated upslope	Relocated upslope	Relocated upslope	No change
Los Vaqueros Watershed Trails	None	As described in Final EIS/EIR, and new trail at Mortero Wetland Complex	As described in Final EIS/EIR, and new trail at Mortero Wetland Complex	As described in Final EIS/EIR, and new trail at Mortero Wetland Complex	New trail at Mortero Wetland Complex
Brentwood Pipeline	None	Included	Included	Included	Included
ECCID Intertie	None	80 cfs	80 cfs	80 cfs	80 cfs

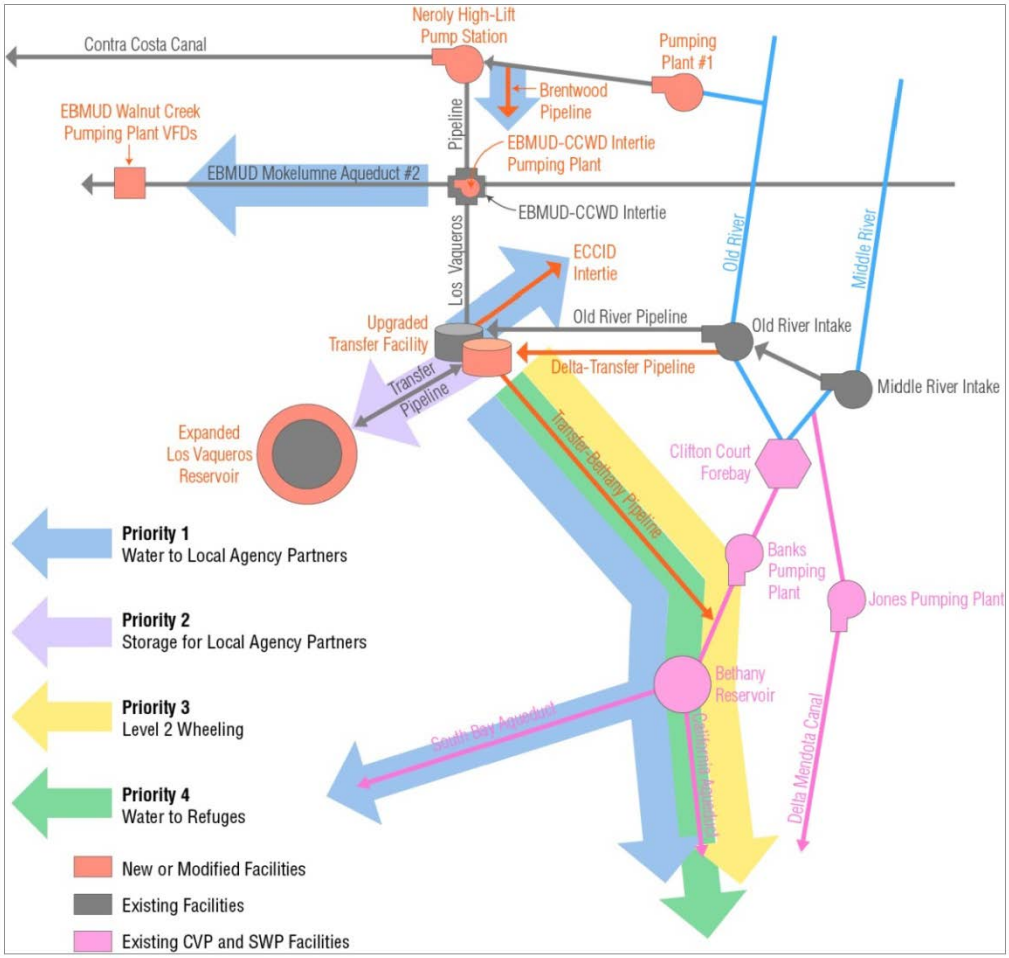


Figure 2-1
Schematic of Alternative 1A

Alternative 1A is formulated to maximize deliveries for water supply reliability, including drought and emergency supply reliability, to the Local Agency Partners. As shown in **Figure 2-1**, the first priority in Alternative 1A would be to deliver available water to meet Local Agency Partner demand, if any, and otherwise to divert that water to storage in Los Vaqueros Reservoir, if possible, for later use by the Local Agency Partners. If additional CCWD system capacity were available and if Central Valley Project (CVP) north-of-Delta storage withdrawals were available to be made during high storage conditions, the next priority would be to wheel, in coordination with the Refuge Water Supply Program, CVPIA Level 2 water through CCWD facilities through the Transfer-Bethany Pipeline for the Refuges, in order to free up capacity at Jones Pumping Plant (or Banks Pumping Plant through a wheeling agreement with DWR), to move additional water to CVP south-of-Delta contractors. Wheeling consists of pumping water through different facilities (in this case, CCWD's) than the water otherwise would have been pumped through (in this case, Jones Pumping Plant), and therefore would not provide a new water supply to the Refuges. The additional water that could be moved using the freed-up Jones Pumping Plant or Banks Pumping Plant capacity could include CVP allocations or water transfers. If water and system capacity were still available after these other three operations, additional deliveries would be made to provide ecosystem benefits by meeting Refuge demand.

2.1.3 Alternative 1B

Alternative 1B includes the same facilities as Alternative 1A. (See **Figure 2-2**.) Alternative 1B is formulated to maximize potential project deliveries to both Local Agency Partners and Refuges and is considered the Proposed Project under CEQA. Like Final EIS/EIR Alternative 1, Alternative 1B balances the priorities of water supply reliability to the Local Agency Partners and environmental water management for the Refuges. Water available to be moved by this alternative would go first to provide water supply reliability by meeting Local Agency Partner demand, if any, and then to provide ecosystem benefits by meeting Refuge demands. If water and system capacity were still available, water would then be stored in Los Vaqueros Reservoir for later use by the Local Agency Partners or Refuges. If system capacity were available after these other three operations, Level 2 Refuge water would be wheeled to the Refuge Water Supply Program for delivery to the Refuges in order to free up capacity at Jones Pumping Plant or Banks Pumping Plant to move additional water to other CVP south-of-Delta contractors.

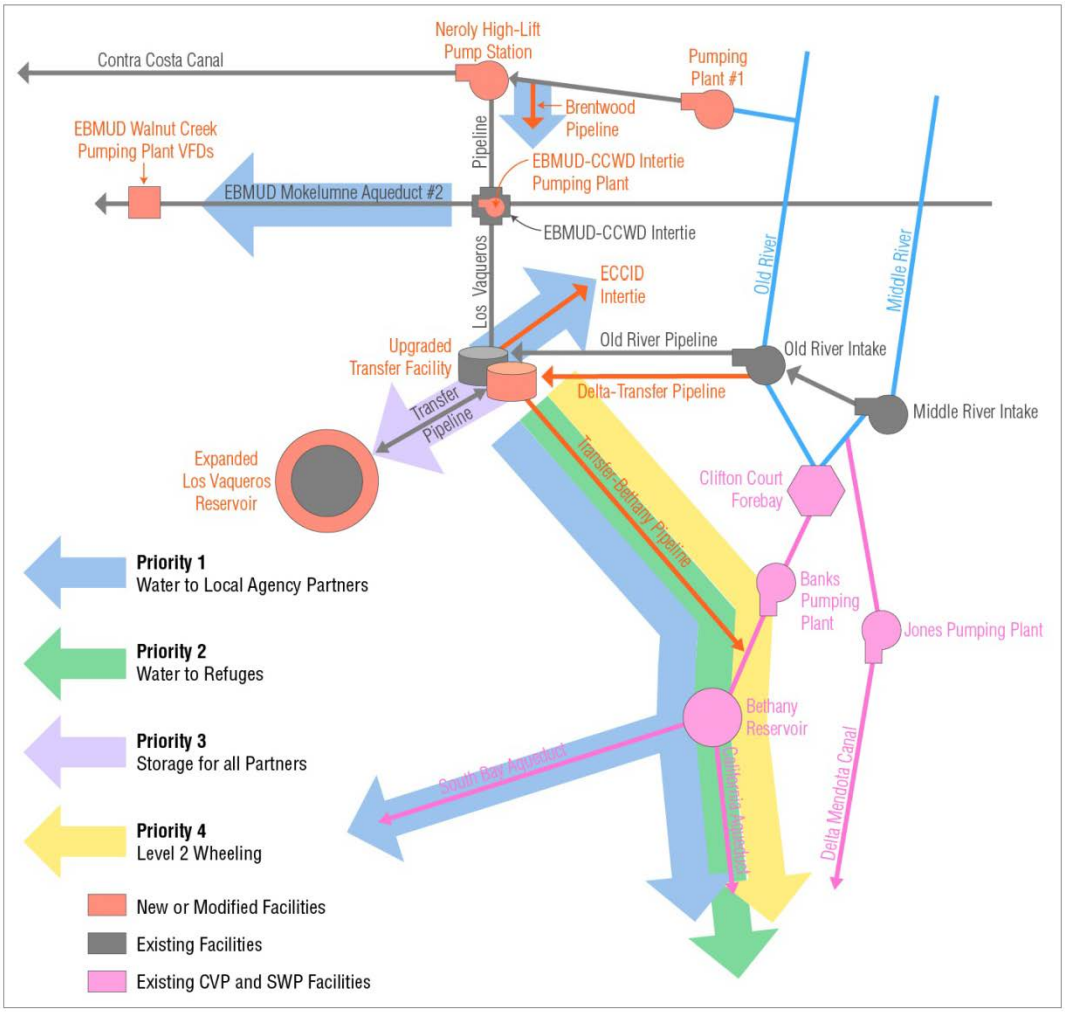


Figure 2-2
Schematic for Alternative 1B

2.1.4 Alternative 2A

Alternative 2A includes the same facilities as Alternatives 1A and 1B. (See **Figure 2-3**.) Alternative 2A is formulated to maximize potential project deliveries to the Refuges. Like Final EIS/EIR Alternative 2, Alternative 2A prioritizes environmental water management for the Refuges. Water available to be moved by this alternative would go first to the Refuge Water Supply Program to provide ecosystem benefits by meeting Refuge demands and would otherwise be stored in Los Vaqueros Reservoir for later use by the Refuges. If water and system capacity were still available after these other two operations, deliveries would be made to meet any Local Agency Partner water supply needs.

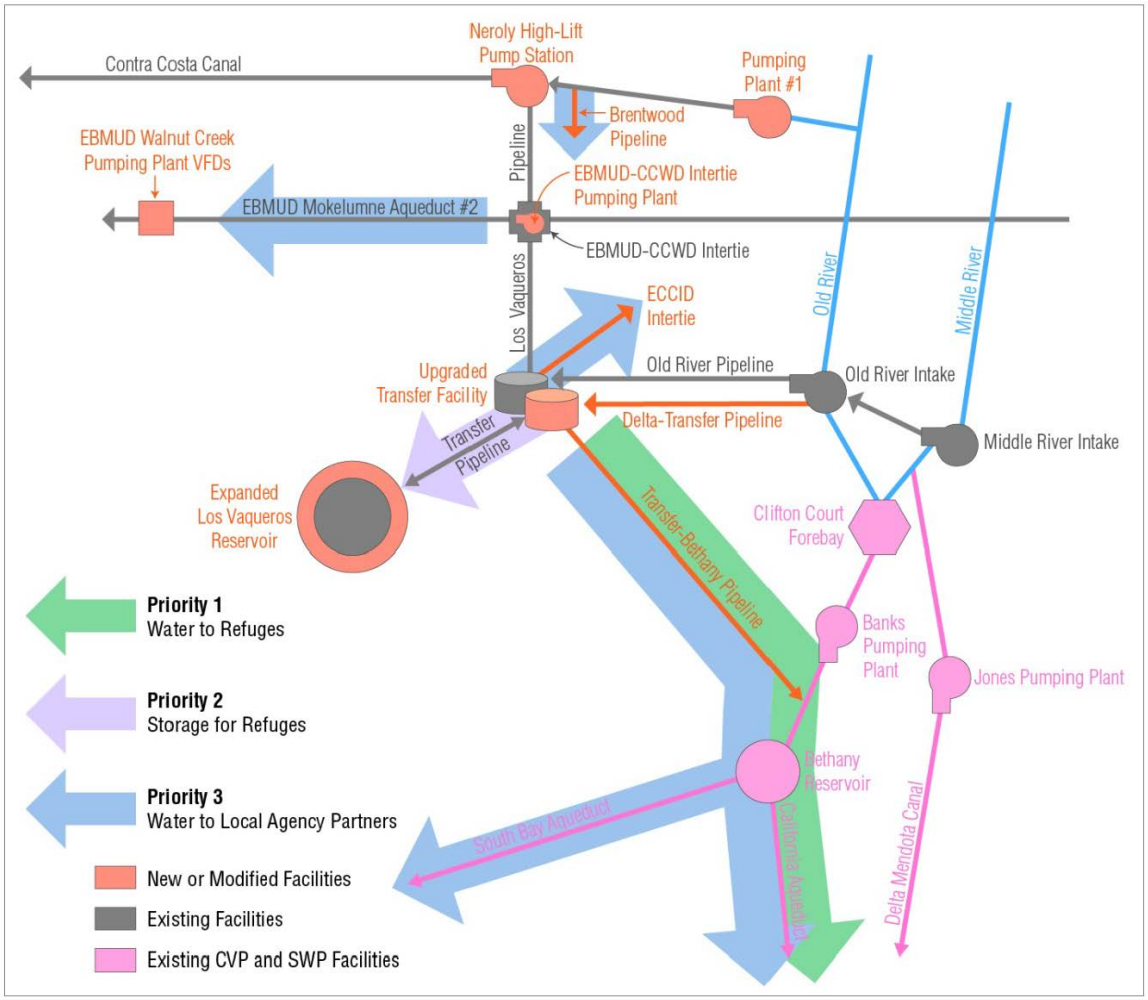


Figure 2-3
Schematic for Alternative 2A

2.1.5 Alternative 4A

Alternative 4A would not expand the existing 160-TAF Los Vaqueros Reservoir storage capacity or build a new Delta-Transfer Pipeline but would make all of the other major physical improvements identified for Alternatives 1A, 1B, and 2A. (See **Figure 2-4**.) Alternative 4A would include upgrade of the Transfer Facility, a new Transfer-Bethany Pipeline, and facilities to deliver water to the Transfer Facility from the Rock Slough Intake. Like Final EIS/EIR Alternative 4, Alternative 4A has a Los Vaqueros Reservoir storage capacity of 160 TAF. Alternative 4A uses the same operational priorities as Alternative 1B and is formulated to maximize potential project deliveries to both the Local Agency Partners and Refuges.

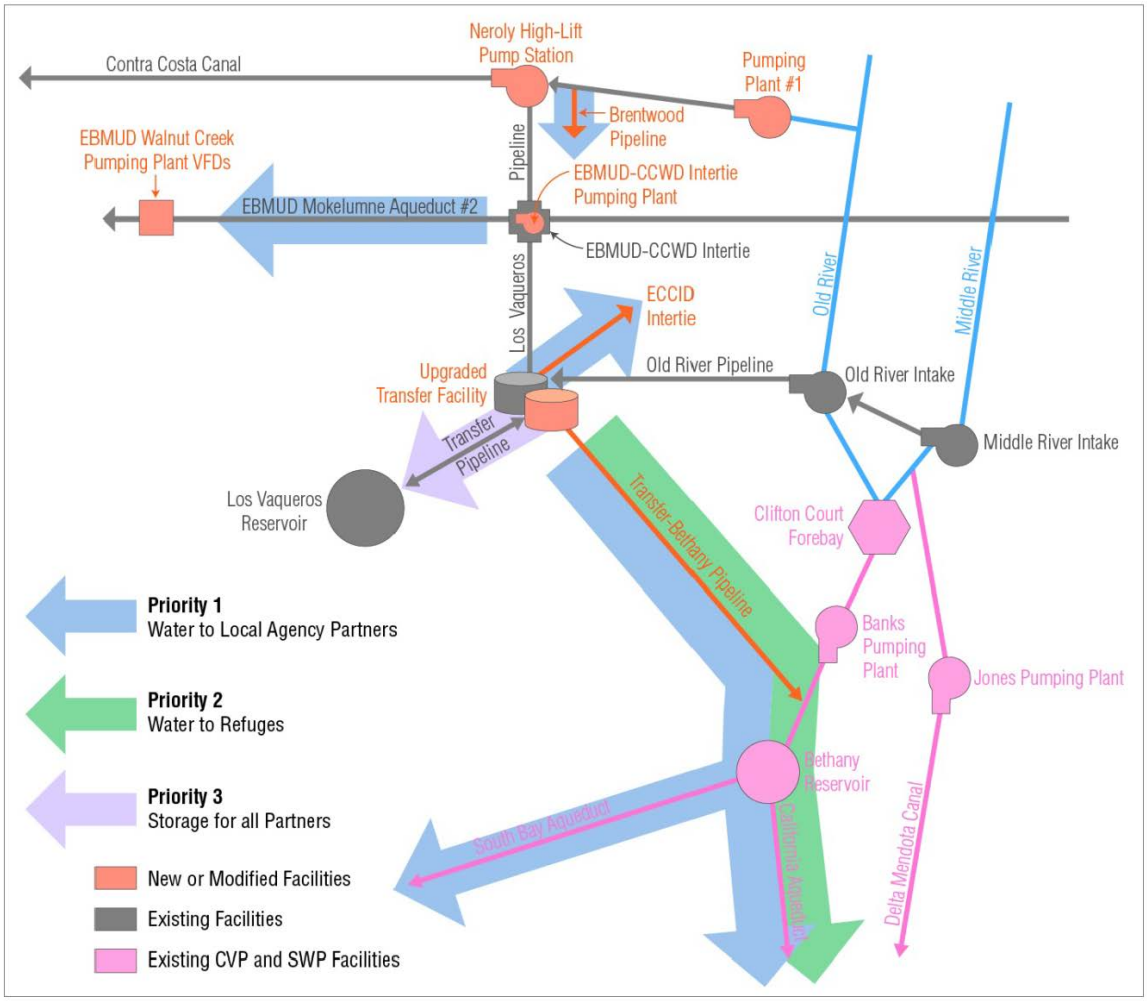


Figure 2-4
Schematic for Alternative 4

2.2 Project Facility Refinements

Refinements to the proposed facilities have been made since the publication of the Final EIS/EIR. Several project facilities proposed in the Final EIS/EIR have been eliminated, several others have been reduced in size or otherwise modified, and some new project facility elements have been added. These refinements are summarized in **Table 2-2** and described in greater detail below. The refinements apply to all the action alternatives unless otherwise noted.

2.2.1 Facilities Completed

The following facilities described in the Final EIS/EIR have been constructed and are in operation:

1. Expansion of Los Vaqueros Reservoir from 100-TAF to 160-TAF storage capacity.
2. Relocation of the Marina Complex upslope of the original Marina location.
3. Relocation of trails and access roads that were inundated by the expansion of Los Vaqueros Reservoir to 160 TAF.
4. Acquisition and management of over 5,000 acres of habitat lands as compensatory mitigation, including almost 15 acres of wetland preservation and enhancement, 4,700 acres of grasslands, 90 acres of oak woodlands, 6 acres of scrub habitat, and over 118, 500 linear feet of drainages preserved or enhanced (CCWD, 2015).

2.2.2 Facilities Eliminated

2.2.2.1 Delta Intake and Pump Station

The previously proposed new Delta Intake and Pump Station, with a capacity of 170 cfs, to be constructed on Old River south of the existing Old River intake, have been eliminated. The associated new electrical power facilities and upgrades to existing Western and PG&E power facilities have also been eliminated. (See **Figure 2-5**.) No new Delta Intake is now proposed; however, as explained below, the action alternatives now include facilities to enable diversion of water from the existing Rock Slough Intake to the Transfer Facility. The previously proposed diversion capacity from Old River was determined not to be necessary to meet the demands of the Local Agency Partners and Refuges when considered in combination with: 1) the flexibility provided by the new proposed facilities enabling the use of the existing Rock Slough Intake capacity to convey water to the Transfer Facility; and 2) the increased limitations on pumping from Old River due to the changes to the Delta regulatory environment, as discussed in greater detail in Section 2.3.2.1.

2.2.2.2 Transfer-Los Vaqueros Pipeline

The previously proposed new Transfer-Los Vaqueros Pipeline, with a capacity of 670 cfs, from the Transfer Facility to Los Vaqueros Reservoir, has been eliminated. This component was included in the previously proposed 275-TAF reservoir expansion alternatives to increase Los Vaqueros Reservoir filling capacity. (See **Figure 2-5**.) There now is no proposed increase to the currently permitted Los Vaqueros Reservoir filling capacity of 200 cfs. Increasing the filling capacity as previously proposed would not improve the ability to meet Local Agency Partner and Refuge demands.

TABLE 2-2
FACILITIES CHANGES COMPARED TO THE FINAL EIS/EIR

	Final EIS/EIR Timing Variant	Phase 2 Expansion Alternatives
Los Vaqueros Reservoir Capacity	275 TAF	275 TAF in Alternatives 1A, 1B, 2A 160 TAF in Alternative 4A
Pumping Plant #1 Capacity	350 cfs (2010 capacity of existing pump station, before Contra Costa Canal Replacement Project)	350 cfs (new pump station)
Neroly High-Lift Pump Station Capacity	Not included	350 cfs
New Delta Intake and Pump Station Capacity	170 cfs	None (Project component has been eliminated)
Delta-Transfer Pipeline Capacity	350 cfs	180 cfs in Alternatives 1A, 1B, 2A None (project component eliminated) in Alternative 4A
Existing Transfer Pump Station Capacity	200 cfs (2010 capacity, before 160-TAF Los Vaqueros Reservoir Expansion)	200 cfs (upgraded capacity)
New Transfer Pump Station Capacity	670 cfs	300 cfs
New Transfer-Los Vaqueros Pipeline Capacity	670 cfs	None (Project component has been eliminated)
Transfer-Bethany Pipeline Capacity	470 cfs	300 cfs
Transfer-Bethany Pipeline Alignment	Westside Option – above-ground pipeline with tunnel section to Bethany Reservoir Eastside Option – above-ground pipeline to Bethany Reservoir	Westside Option unchanged Eastside Option – shortened pipeline to California Aqueduct just south of Banks Pumping Plant
EBMUD Walnut Creek Pumping Plant Variable Frequency Drives	Not included	Included
EBMUD-CCWD Intertie Pump Station Capacity	Not included	155 cfs
Los Vaqueros Marina Complex	Relocated to northern end of Los Vaqueros Reservoir	Relocated upslope of existing Marina Complex at southern end of Los Vaqueros Reservoir in Alternatives 1A, 1B, 2A Existing Marina Complex unchanged in Alternative 4A
Los Vaqueros Interpretive Center	Second interpretive center added as part of Northern Marina Complex	Existing Interpretive Center upgraded; second interpretive center eliminated
Los Vaqueros Watershed Office Barn	Not included	Seismically upgraded and improved
Los Vaqueros Watershed trails	Trails and access roads inundated by reservoir expansion relocated	Trails and access roads inundated by reservoir expansion relocated in Alternatives 1A, 1B, 2A New trail at Mortero Wetland Complex in all action alternatives
Brentwood Pipeline	Not included	Included
ECCID Intertie Capacity	Not included	80 cfs

2.2.2.3 Northern Marina Complex

The previously proposed Northern Marina Complex included site amenities in three separate areas on the northern side of the reservoir:

1. A new Marina building, fishing piers, and marina manager's house;
2. A new interpretive center with picnic area and parking facilities; and
3. A relocated fishing pier.

The previously proposed locations for the new Marina building and new interpretive center were determined to be unsuitable because of access and cost issues. These site amenities have been eliminated, as indicated in **Figure 2-5**. The fishing pier facility at the northern end of Peninsula Cove has been retained from the Final EIS/EIR; it would be in the same location and be exactly the same size as shown in the Final EIS/EIR and would include a single pier, fish cleaning stations, picnic tables/shelters and pit toilets.

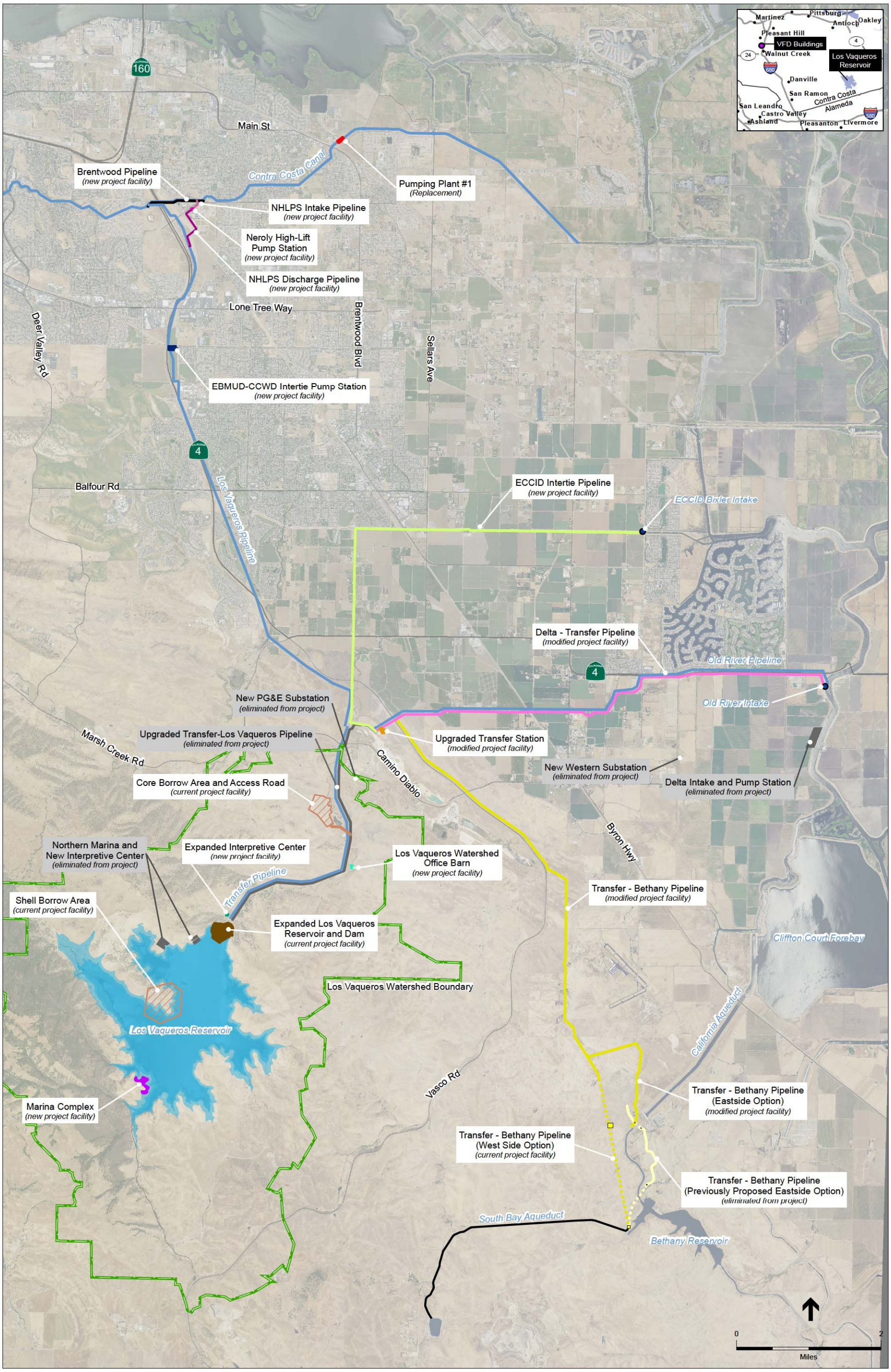
As described below, under Alternatives 1A, 1B and 2A, a new Marina Complex, which would include an interpretive center, would be constructed at the southern end of the reservoir rather than relocating the complex to the northern end. Also, the existing Los Vaqueros Interpretive Center adjacent to the dam on the northern side of the reservoir would be upgraded in all action alternatives.

2.2.3 Facilities Modified

2.2.3.1 Los Vaqueros Reservoir Dam Modification

The dam required to expand Los Vaqueros Reservoir to 275-TAF storage capacity would be the same as previously proposed in the Final EIS/EIR. The general arrangement of the dam embankment and appurtenant facilities, dam slopes, crest elevation, freeboard, and internal zoning of the dam (i.e., the zones of different materials with specific properties that form the dam embankment) have all been retained. The design and construction sequencing however would take into account that the raise would be accomplished from the now-constructed 160-TAF dam rather than the original 100-TAF dam (see **Figure 2-6**). The expanded Los Vaqueros Reservoir dam would be included in Alternatives 1A, 1B, and 2A, but not in Alternative 4A.

Most of the 4.3 million cubic yards of earthfill for the 275-TAF dam raise would be used for the upstream and downstream shells. The proposed source for the shell materials would be within the 143-acre shell borrow area located on the southeast end of the prominent ridge separating the north and south arms of the existing reservoir, as shown in **Figure 2-7**. Most of the shell borrow area would be within the 275-TAF Los Vaqueros Reservoir boundary and would be inundated after construction. Part of the shell borrow area would result in a cut slope approximately 100 feet above the water line after inundation of the 275-TAF reservoir, which would be revegetated. The Panoche formation claystones and sandstones from both areas are anticipated to have excavation, compaction and strength characteristics similar to the materials used for both the original dam and the 160-TAF dam raise.



SOURCE: USDA, 2016; USGS, 2016; CCWD, 2017; ESA, 2017

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Figure 2-5

Previously Proposed Facilities and Phase 2 Expansion Facilities

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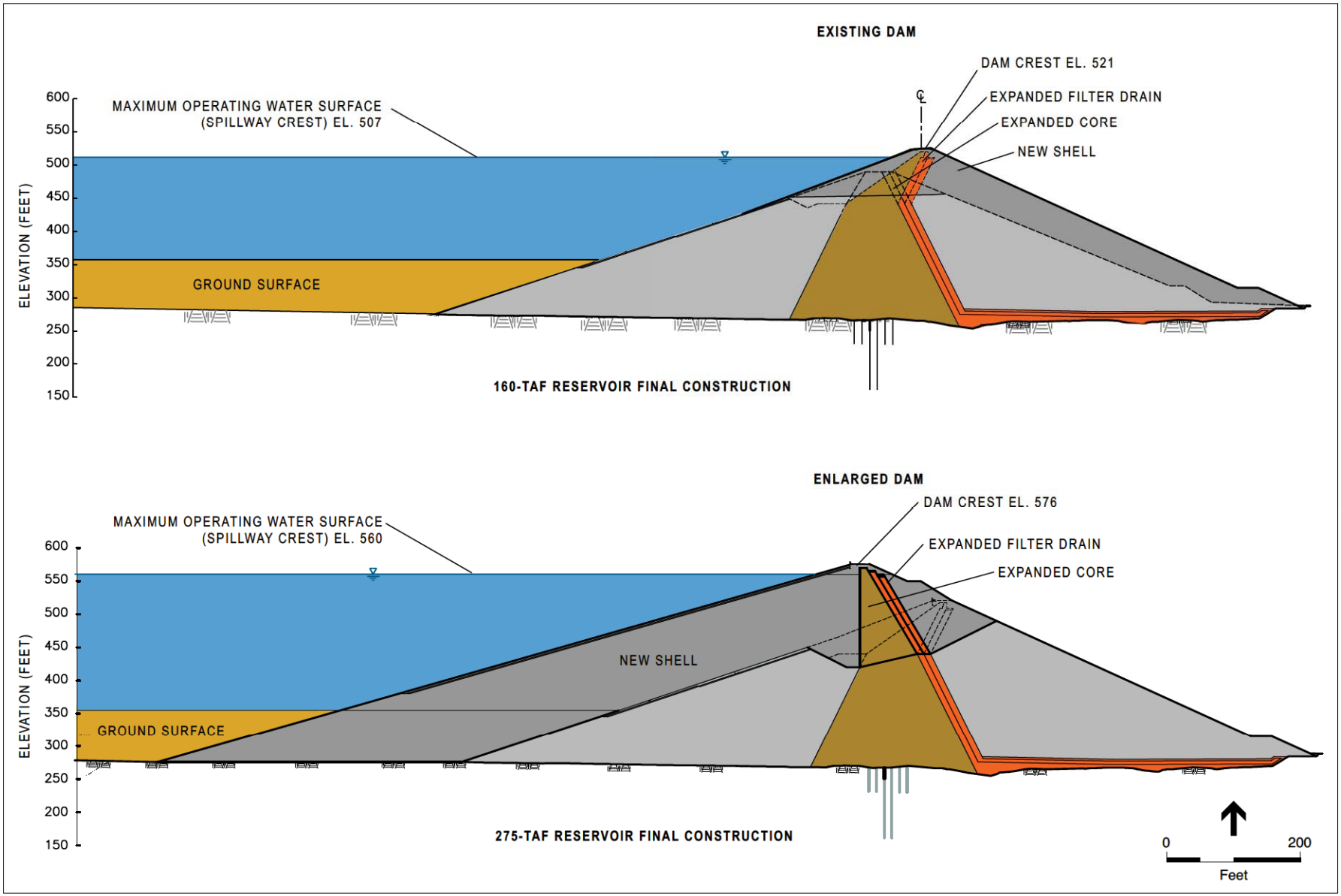

SOURCE: CCWD, 2010; ESA, 2017

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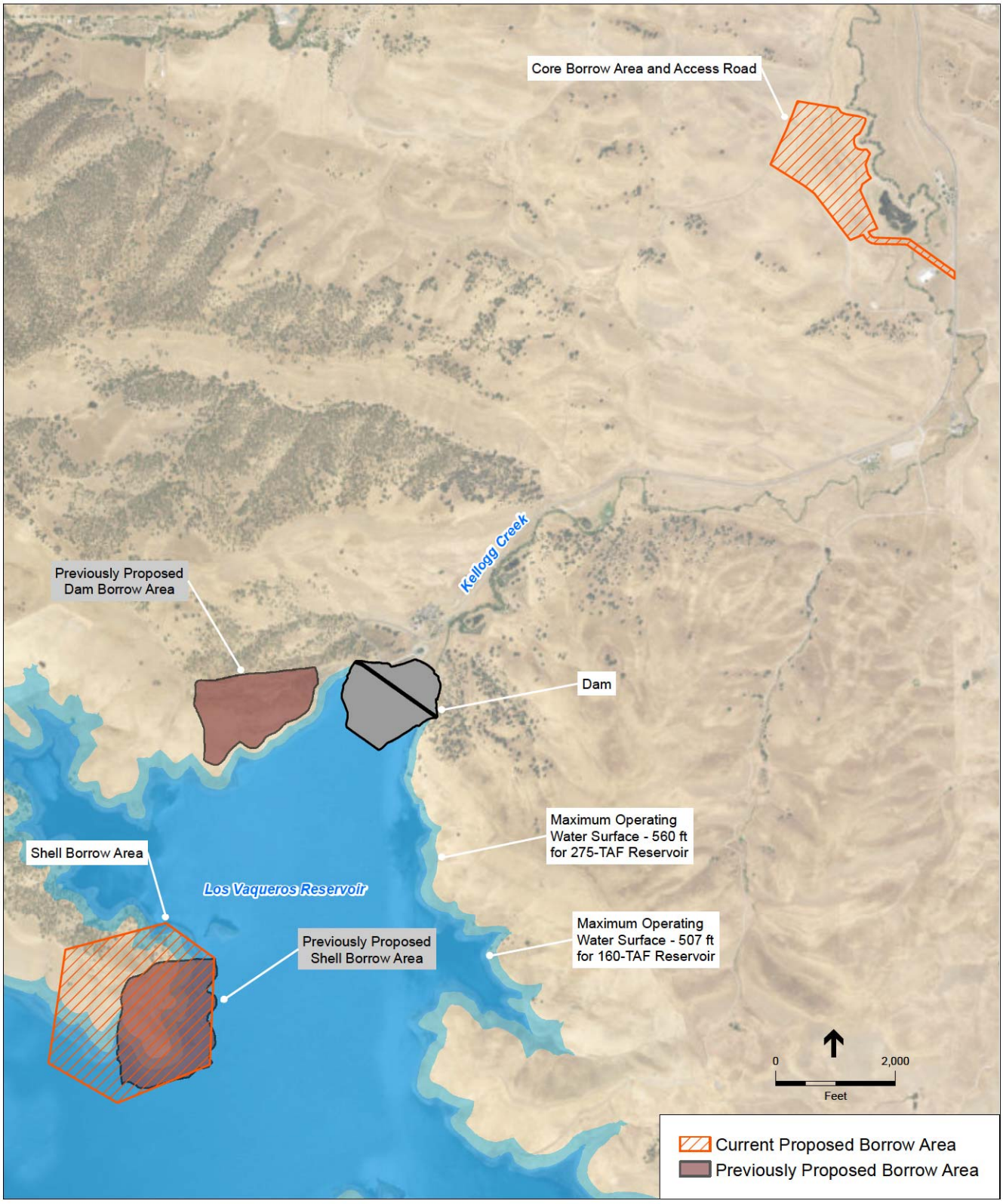
Figure 2-6

Profile View of Los Vaqueros Dam Raise



SOURCE: USDA, 2016; USGS, 2016; CCWD, 2017; ESA, 2017

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Figure 2-7

Plan View of Los Vaqueros Dam Raise and Shell/Core Borrow Areas

The previously proposed shell borrow area described in the Final EIR/EIS was the east-west trending ridge above the dam's left abutment, as indicated in **Figure 2-7**. It is an extension of the shell borrow source used for construction of both the original dam and the 160-TAF dam raise. However, construction experience gained during the 160-TAF raise showed that the extension of this borrow source would not yield sufficient higher quality target materials to compensate for the higher production costs associated with excavation on the ridge. Thus, this area would not be used as the shell borrow source for the Phase 2 Expansion.

Clay for the core would be obtained from the same borrow source used for the 160-TAF construction, the naturally occurring alluvial deposits in the valley floor approximately 2.5 miles downstream of the dam. The borrow area would occur within the 58-acre area defined in **Figure 2-7**. The area defined by the limits includes the access haul road from Walnut Boulevard. The previously proposed core borrow described the Final EIR/EIS was upstream of the dam in the area currently inundated by the 160-TAF Los Vaqueros Reservoir. The proposed downstream borrow area was successfully used in the previous expansion of the Los Vaqueros Dam and produced very cost effective, high quality core materials.

All other construction materials for the dam raise are as described the Final EIR/EIS.

2.2.3.2 Delta-Transfer Pipeline

The proposed capacity of the new Delta-Transfer Pipeline has been decreased from 350 cfs to 180 cfs. With the elimination of the new Delta Intake and Pump Station and given the capacity of the existing Old River Pipeline of 320 cfs, an additional 180 cfs of pipeline capacity would be sufficient to match the 500-cfs total combined physical capacity of the existing Old River Intake (250 cfs) and Middle River Intake at Victoria Canal (250 cfs). The new Delta-Transfer Pipeline is included in Alternatives 1A, 1B, and 2A, but is not included in Alternative 4A (see **Figure 2-5**).

The Delta-Transfer Pipeline would be constructed between the existing Old River Intake and Pump Station and the Transfer Facility, generally parallel to the existing Old River Pipeline. The Old River Pipeline is located 50 feet into the 85-foot wide permanent easement owned by CCWD and generally traverses agricultural fields and orchards as it extends first in a westerly direction from the Old River Intake and Pump Station parallel to State Route 4 to the intersection of Bixler Road, then in a southwesterly direction for about 1 mile before continuing west to the Transfer Facility outside of Byron off Vasco Road. The new Delta-Transfer Pipeline would be about 34,700 feet long (about 6.5 miles) and approximately 66 inches in diameter. Except for the smaller pipeline diameter, the details about construction of the proposed new Delta-Transfer Pipeline described in the Final EIS/EIR (pages 3-68 – 3-72) are unchanged.

2.2.3.3 Transfer Facility Upgrade

The proposed Transfer Facility Upgrade, which previously consisted of a new 670-cfs capacity pump station and 12-MG storage tank to accommodate both the previously proposed higher Los Vaqueros Reservoir filling capacity and the delivery of water into the Transfer-Bethany Pipeline, has been reduced in size. The smaller size of the proposed Transfer Facility Upgrade matches the sizes of the other facilities now proposed. The previously proposed energy recovery

system to be installed at the Transfer Facility to capture the hydraulic energy generated by the water delivered by gravity from Los Vaqueros Reservoir to the Transfer-Bethany Pipeline has also been eliminated.

The existing Transfer Pump Station pumps would be upgraded to retain the current permitted pumping capacity of 200 cfs under the higher head of the expanded Los Vaqueros Reservoir. The upgrades to the existing pumps would consist primarily of changing out electric pump motors and modifying the pumps. All work would be done within the existing paved footprint of the existing Transfer Facility. The existing 24.3-acre Transfer Facility site is owned by CCWD and is located about 2.75 miles west of Byron on Vasco Road between Camino Diablo and Walnut Boulevard.

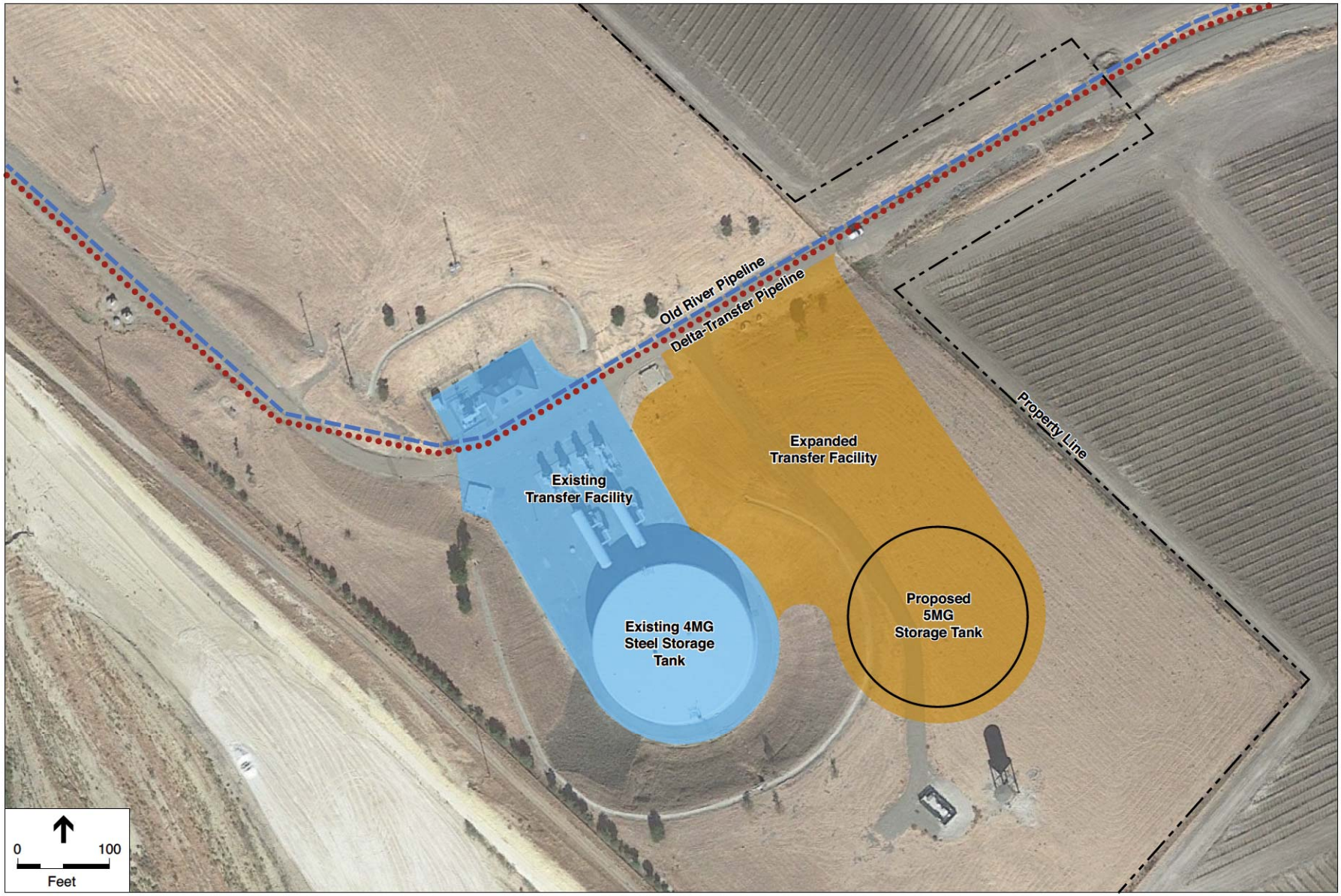
A new 300-cfs capacity pump station and an additional 5-MG storage tank would be constructed within the footprint of the existing Transfer Facility site, northeast of the existing Transfer Pump Station, as shown in **Figure 2-8**, to deliver water into the Transfer-Bethany Pipeline. Previously, a larger new pump station and storage tank were proposed to be located northwest of the existing pump station and tank (see Figure 3-22 of Volume I of the Final EIS/EIR), which would also have been on the existing Transfer Facility site but would have required more excavation. The new proposed site for the new pump station immediately adjacent to the existing Transfer Pump Station also minimizes the length of piping to the Transfer-Bethany Pipeline tie-in and intertie piping between the Old River Pipeline and Delta-Transfer Pipeline compared to other siting options. The new proposed location also minimizes operation and maintenance staff travel time.

The primary building materials would include structural steel, concrete, and masonry. Concrete pouring and steel working activities would occur simultaneously with general construction activities for each component of the new pump station. The new 5-MG tank would have a 91-foot radius and be approximately 30 feet tall. The tank would be built on a reinforced concrete ring footing foundation with a layer of asphaltic cement pavement laid beneath the tank. Power would be provided to the six new 50-cfs pumps from a new substation and new electrical motor control center building. Pacific Gas and Electric (PG&E) power, of 21 kilovolts (kV) delivered to the new pump station and reservoir, would follow the same overhead route and come from the same PG&E substation as are used to deliver power to the existing Transfer Facility. The new substation to power the new pumps would match the existing Transfer Pump Station substation.

2.2.3.4 Transfer-Bethany Pipeline

The proposed capacity of the new Transfer-Bethany Pipeline to deliver water from the Transfer Facility to the vicinity of Bethany Reservoir for south-of-Delta partners has been decreased from 470 cfs to 300 cfs, with a corresponding decrease in proposed pipeline diameter from 132 inches to 84 inches. The smaller capacity would be sufficient to deliver water to meet the revised Local Agency Partner and Refuge demands.

The location of the new Transfer-Bethany Pipeline is the same as described in the Final EIS/EIR except that the proposed Eastside Option for the alignment of the Transfer-Bethany Pipeline in the Final EIS/EIR has been shortened by about 1.8 miles to tie into the California Aqueduct just north of Bethany Reservoir in the Bethany Recreation Area, rather than into Bethany Reservoir near the



SOURCE: CCWD

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Figure 2-8
Upgraded Transfer Facility

South Bay Aqueduct. (See **Figure 2-9**.) The Transfer-Bethany Pipeline would start at the same place and travel along the same alignment as proposed for the Eastside Option in the Final EIS/EIR for the first 7.1 miles. Except for the smaller pipeline diameter, the details about construction of the proposed Transfer-Bethany pipeline described in the Final EIS/EIR (pages 3-68 – 3-72) are unchanged.

Both the previously proposed and the revised Eastside Option alignment would avoid the tunneling that would be needed for the Westside Option alignment proposed in the Final EIS/EIR. The revised Eastside Option alignment, identified in the Reclamation 2016 Value Planning Study, would provide the same water supply benefit with a shorter pipeline as the originally proposed Eastside Option, but would not preserve the option for the South Bay Aqueduct water agency partners to receive a water quality benefit, since this alignment would blend any water delivered from the Los Vaqueros Reservoir with the much larger volume of water in the California Aqueduct pumped directly from the Delta.

2.2.3.5 Los Vaqueros Watershed Trails

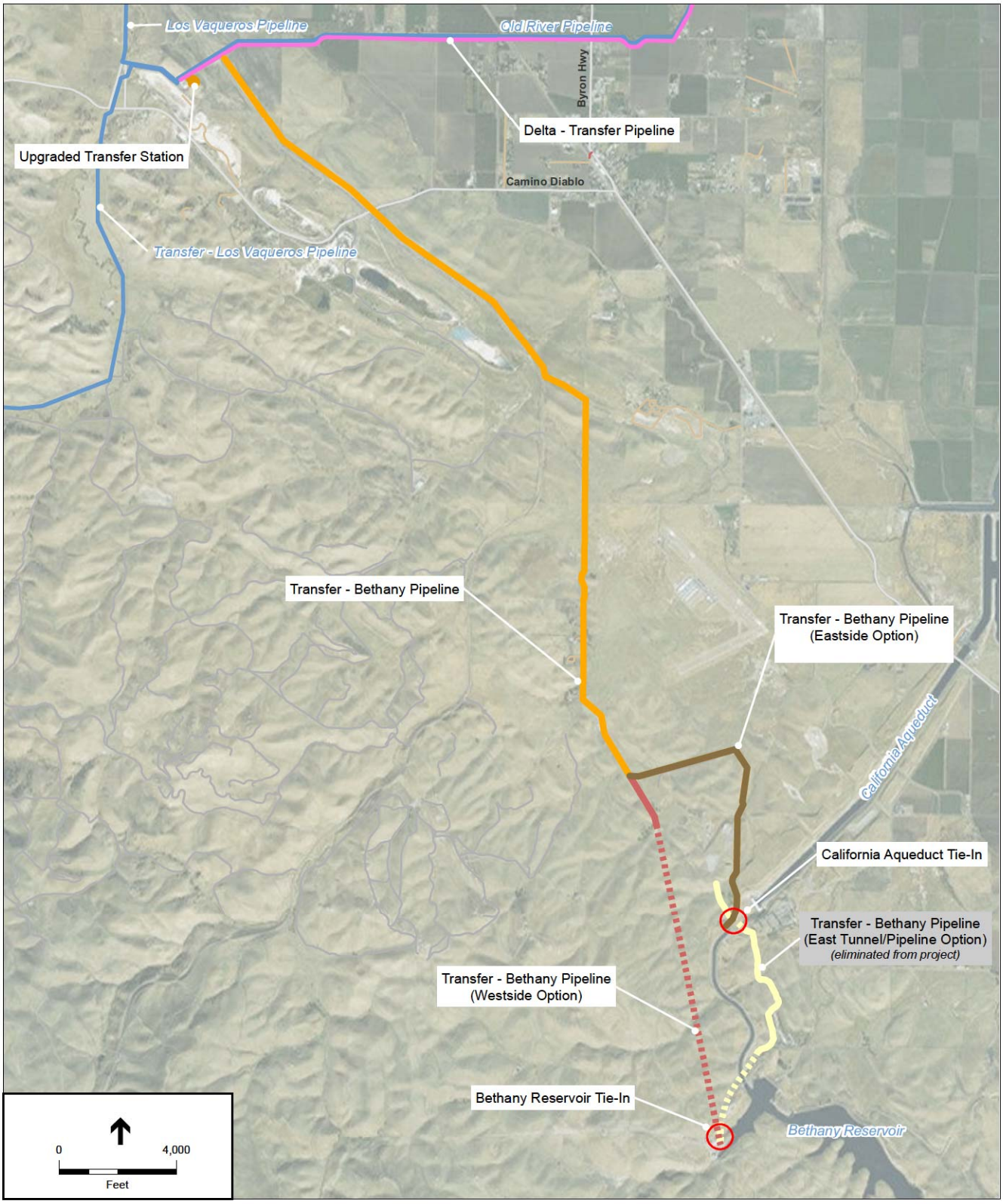
Los Vaqueros Watershed has an extensive trail network open to equestrians, hikers and cyclists. Some of these trails have been slightly modified from what was described in the Final EIS/EIR, after the expansion of Los Vaqueros Reservoir to 160 TAF. (See **Figure 2-10**.) Trails adjacent to the water at the 100 TAF storage level (elevation 487 feet) were moved to higher ground (water would rise to 521 feet at 160 TAF storage) to accommodate the rising water as part of the implementation of the Timing Variant. These modifications were on-the-ground refinements and were all done in areas, gradients or habitats previously analyzed in the Final EIS/EIR.

In Alternatives 1A, 1B, and 2A, a few of these existing trails and access roads would be inundated or otherwise lost due to the Phase 2 Expansion. These trails would be relocated within the watershed on higher ground as described in the Final EIS/EIR. (See **Figure 2-10**.) Relocating these trails would maintain existing recreational benefits. All of these trail relocations would be implemented in areas, gradients and within habitats previously analyzed in the Final EIS/EIR. The previously proposed interconnecting trails on the east side of Los Vaqueros Reservoir have been eliminated from the Phase 2 Expansion due to sensitive biological and cultural resources that are in that area. Because of these sensitive resources, no current access is allowed, and none is proposed.

2.2.4 Facilities or Facility Improvements Added

2.2.4.1 Pumping Plant #1 Replacement

Replacement of Pumping Plant #1 on the Contra Costa Canal would be needed to match the designed and permitted Rock Slough Intake diversion capacity of 350 cfs in all the action alternatives. The separately-approved Contra Costa Canal Replacement Project, which is replacing the open channel portion of the Contra Costa Canal with a buried pipe, will lower the operating water surface levels at Pumping Plant #1 due to the friction losses added by the pipeline. Pumping would be limited to approximately 200 cfs using the existing Pumping Plant #1 pumps after the completion of the Canal Replacement Project, which is assumed for the



SOURCE: USDA, 2016; USGS, 2016; CCWD, 2017; ESA, 2017

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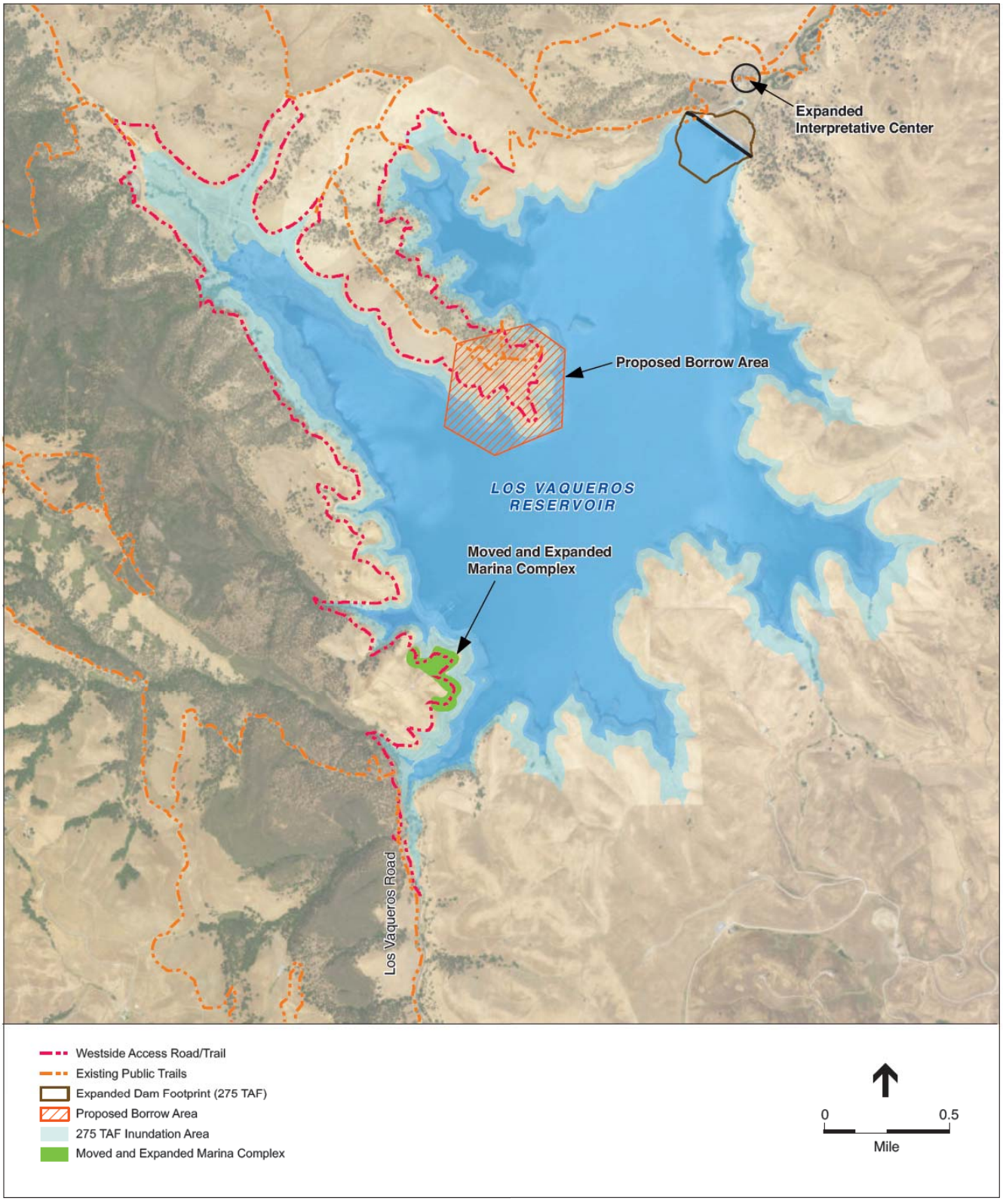
Figure 2-9

Transfer-Bethany Pipeline Alignment Detail



SOURCE: GlobeXplorer, 2007; and ESA, 2017

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Figure 2-10

Los Vaqueros Watershed Trails

160-TAF No Project/No Action Alternative. Larger horsepower pumps set at a lower elevation (than existing) at Pumping Plant #1 would be needed to move the same amount of water (350 cfs) as previously has been moved through this system.

A larger new building and upgraded electrical facilities are also included in the proposed upgrade of Pumping Plant #1 and would be built in the vicinity of the existing Pumping Plant #1 structure in the existing Contra Costa Canal right-of-way owned by Reclamation. (See **Figure 2-11**.) The proposed Pumping Plant #1 upgrade would involve demolition of the existing Pumping Plant #1 building and construction of a new building to house the upgraded pumps and appurtenances. The building would be constructed of concrete and would be similar in height to the existing Pumping Plant #1, approximately 35 feet tall. The square footage of the building would increase to approximately 4,000 square feet. The new pump station would have a total of six new pumps, three pumps in each of two parallel wet wells. A dedicated force main would carry flow from each pump. The below-grade valves would be housed within a valve box. The pump motors would be centered above the pumps and mounted on a floor slab with bottom elevation at approximately +16 feet.

New power lines and substations would be required for the new Pumping Plant #1. Currently, incoming power is stepped down to 2300 volt, three phase, 60 hertz at a single existing Western Area Power Administration transformer with a capacity at 1500 kVA. The new pump station would require a maximum of 2,100 horse power and would require two new 2000-kVA transformers.

To construct the new Pumping Plant #1, the encased portion of the Contra Costa Canal would be isolated and dewatered. Sheet piling is already installed around much of the forebay of Pumping Plant #1, and additional sheet piling would be installed to isolate the construction site from the Contra Costa Canal. The site would be excavated to construct the foundation for the building and the wet wells, and to tie into the encased portion of the Contra Costa Canal. The existing pipeline is buried approximately 15 feet below the grade line and excavation may need to occur down to 25 feet below the grade line. During the construction of the foundation, wet wells, and pipeline tie-in, groundwater dewatering would be required to keep the site dry.

2.2.4.2 Neroly High-Lift Pump Station

A proposed new high-lift pump station on the Contra Costa Canal near CCWD's Neroly Blending Facility (Neroly High-Lift Pump Station) has been added to all of the proposed action alternatives to pump water from the existing Contra Costa Canal to the existing Transfer Facility, which would enable filling of Los Vaqueros Reservoir and deliveries to the Transfer-Bethany Pipeline from the existing Rock Slough Intake. The proposed capacity of the Neroly High-Lift Pump Station is 350 cfs, to match the existing permitted diversion capacity at Rock Slough Intake. The Neroly High-Lift Pump Station, including electrical, hydraulic, and mechanical systems, would be constructed on the existing CCWD property at the Randall-Bold Water Treatment Plant site (see **Figure 2-12**), which is already-developed land. The primary building materials would include structural steel, concrete, and masonry. Concrete pouring and steel working activities would occur simultaneously with general construction activities for each component of the new pump station.

SOURCE: USDA, 2016; USGS, 2016; CCWD, 2017; ESA, 2017

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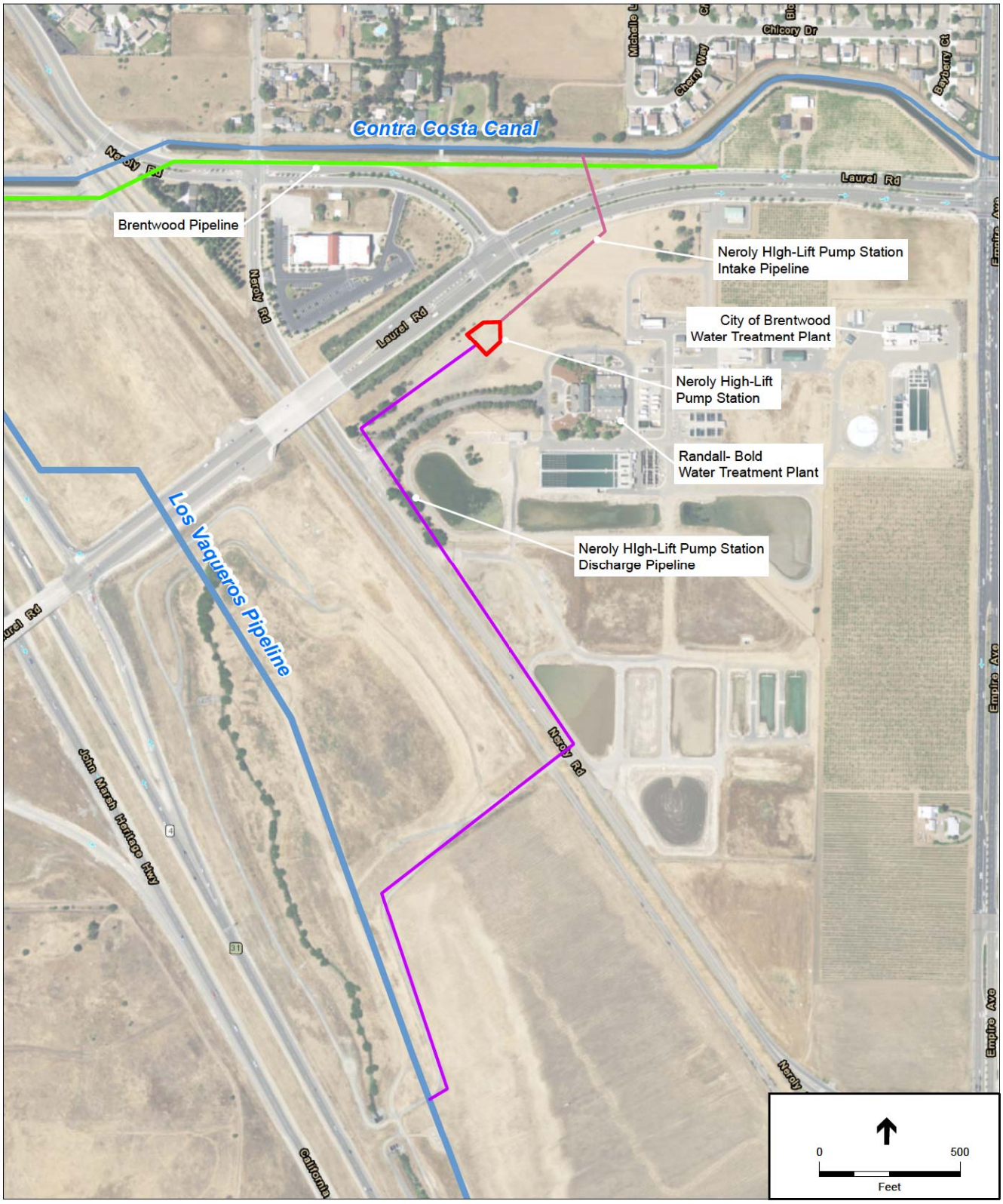
Figure 2-11

Pumping Plant #1 Replacement



SOURCE: USDA, 2016; USGS, 2016; CCWD, 2017; ESA, 2017

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Figure 2-12

Neroly High-Lift Pump Station and Brentwood Pipeline

The intake to the Neroly High-Lift Pump Station would be two 72-inch pipelines that would deliver water under gravity to a wet-well that would be constructed under the pump station location, as shown in **Figure 2-12**. The tap-in to Contra Costa Canal would require a gate structure on the canal to maintain water levels over the pump intake. Crossing of Laurel Road would be required for the twin 72-inch pipelines; tunneling under the road could be required, if open trench construction (which would require traffic detours) could not be accommodated. The pump station would include 6 pumps, each with 50-cfs capacity, requiring about 12,000 kVA of new additional connected power load from the existing Western Area Power Administration transmission network that supplies CCWD facilities including the Multipurpose Pipeline pump station at the Randall-Bold Water Treatment Plant.

The discharge from the Neroly High-Lift Pump Station would be a single 84-inch pipeline connecting to Los Vaqueros Pipeline as shown in **Figure 2-12**. The discharge pipeline is proposed to extend southwesterly from the Neroly High-Lift Pump Station discharge header, passing through a flow meter (located inside a vault) and crossing perpendicular to the two-lane Neroly Road and the adjacent railroad tracks to a location approximately 200 ft. southwest of the railroad crossing. The alignment then turns west a short distance to a point near the top of the slope at the Lindsey Stormwater Detention Basin. From there the pipeline turns slightly to run southwesterly again and cross down the slope of the basin and run parallel to the slope, crossing under the existing box culvert at Antioch Creek to a connection point with the existing Los Vaqueros Pipeline. The total length of the discharge pipeline is approximately 1,155 feet. At the connection location, isolation valves would be required at Los Vaqueros Pipeline and the pipeline from the Neroly High-Lift Pump Station.

2.2.4.3 Brentwood Pipeline

A new pipeline to move blended water from CCWD's Neroly Blending Facility to the City of Brentwood Water Treatment Plant would be constructed in all the action alternatives. Water from the Los Vaqueros Pipeline is blended with water in the Contra Costa Canal from the Rock Slough Intake at the Neroly Blending Facility. The up-to 48-inch diameter pipeline would be sized for flows up to 46.5 cfs (30 million gallons per day). The new pipeline would divert water from the Contra Costa Canal downstream of Flow Control Station #2 of the Los Vaqueros Pipeline to provide blended water from the Los Vaqueros Pipeline and the Contra Costa Canal. The pipeline would extend approximately 4,500 feet to the east, parallel to the south side of the Contra Costa Canal, and connect to the existing City of Brentwood Water Treatment Plant Inlet Pipeline, as shown in **Figure 2-12**. The new pipeline would cross beneath the Highway 4 overpass, be constructed using standard open-trench construction techniques, and would cross beneath the Union Pacific railroad tracks likely using trenchless techniques, such as directional drilling, jack and bore or microtunnel. Construction could result in limited temporary impacts to the East Bay Regional Park District trail, which is located on the north side of the Contra Costa Canal. Segments of the pipeline may be constructed within existing roadways, which would require traffic control and short-duration closures. An easement or license from Union Pacific Railroad would be required, along with encroachment permits from the City of Brentwood and City of Oakley and licenses from Reclamation for segments of the pipeline within the Reclamation right-of-way along the Contra Costa Canal.

2.2.4.4 EBMUD-CCWD Intertie Pump Station

A new high-lift pump station would be constructed at the EBMUD-CCWD Intertie in all the action alternatives to provide the 300 feet of head needed to lift water from Los Vaqueros Pipeline to EBMUD's Mokelumne Aqueduct #2, allowing water to be delivered at sufficient pressure and rates for EBMUD's use. The pump station would be approximately 9,675 square feet in size; note that this does not include any land that would be needed for an electrical substation or other similar facility, if needed. It would consist of four 2,000 hp pumps (three running to provide 85 mgd plus one standby pump). This pumping plant could cause very high surge pressures on the Los Vaqueros Pipeline, so significant surge controls would be needed. **Figure 2-13** shows the proposed location for the new pump station. EBMUD would need to purchase land for the pump station.

2.2.4.5 EBMUD Walnut Creek Pumping Plant Variable Frequency Drives

The installation of variable frequency drives at EBMUD's Walnut Creek Pumping Plant has been added to all of the proposed action alternatives to facilitate deliveries through the EBMUD-CCWD Intertie from EBMUD's Mokelumne Aqueduct #2 to the Los Vaqueros Pipeline. Currently, EBMUD meets its customer demand by managing flow rates on the three separate Mokelumne Aqueducts using a combination of pumping and gravity flows. The ability to throttle pumping on these aqueducts is limited. When flow is being conveyed through the EBMUD-CCWD Intertie from Mokelumne Aqueduct #2 to or from Los Vaqueros Pipeline, it is very challenging operationally to balance the flows entering EBMUD's Walnut Creek Pumping Plant with the demands on the other side. Variable frequency drives on all three aqueducts to would allow adjustments of supply to meet EBMUD service area demand while managing deliveries to the Los Vaqueros system.

The installation of variable frequency drives at EBMUD's Walnut Creek Pumping Plant would require the construction of two new buildings to house the variable frequency drives, as shown in **Figure 2-14**. A new structure approximately 200 feet by 25 feet and 20 feet tall would be located adjacent to the building housing Walnut Creek Raw Water Pumping Plants 1 and 2. A second structure, 180 feet by 25 feet and 15 feet tall, would be located next to Pumping Plant #3. Both of these structures would be located on EBMUD property.

2.2.4.6 ECCID Intertie Pipeline

A new intertie pipeline of up to 80-cfs capacity between the existing Transfer Facility and East Contra Costa Irrigation District's existing Bixler Intake (ECCID Intertie) would be constructed to deliver water from CCWD facilities to ECCID. The proposed alignment of the approximately 7-mile long ECCID intertie pipeline would run north along Walnut Boulevard in Brentwood and east parallel to ECCID's main distribution canal, as shown in **Figure 2-15**. Encroachment permits from the City of Brentwood would be required for the portion of the intertie pipeline constructed along Walnut Boulevard. ECCID maintains a cleared dirt right-of-way approximately 100 feet wide on the north side of the canal and an asphalt road of the canal road on their 100-foot wide right-of-way on the south side of the canal. Construction of the east-west portion of the

SOURCE: USDA, 2016; USGS, 2016; CCWD, 2017; ESA, 2017

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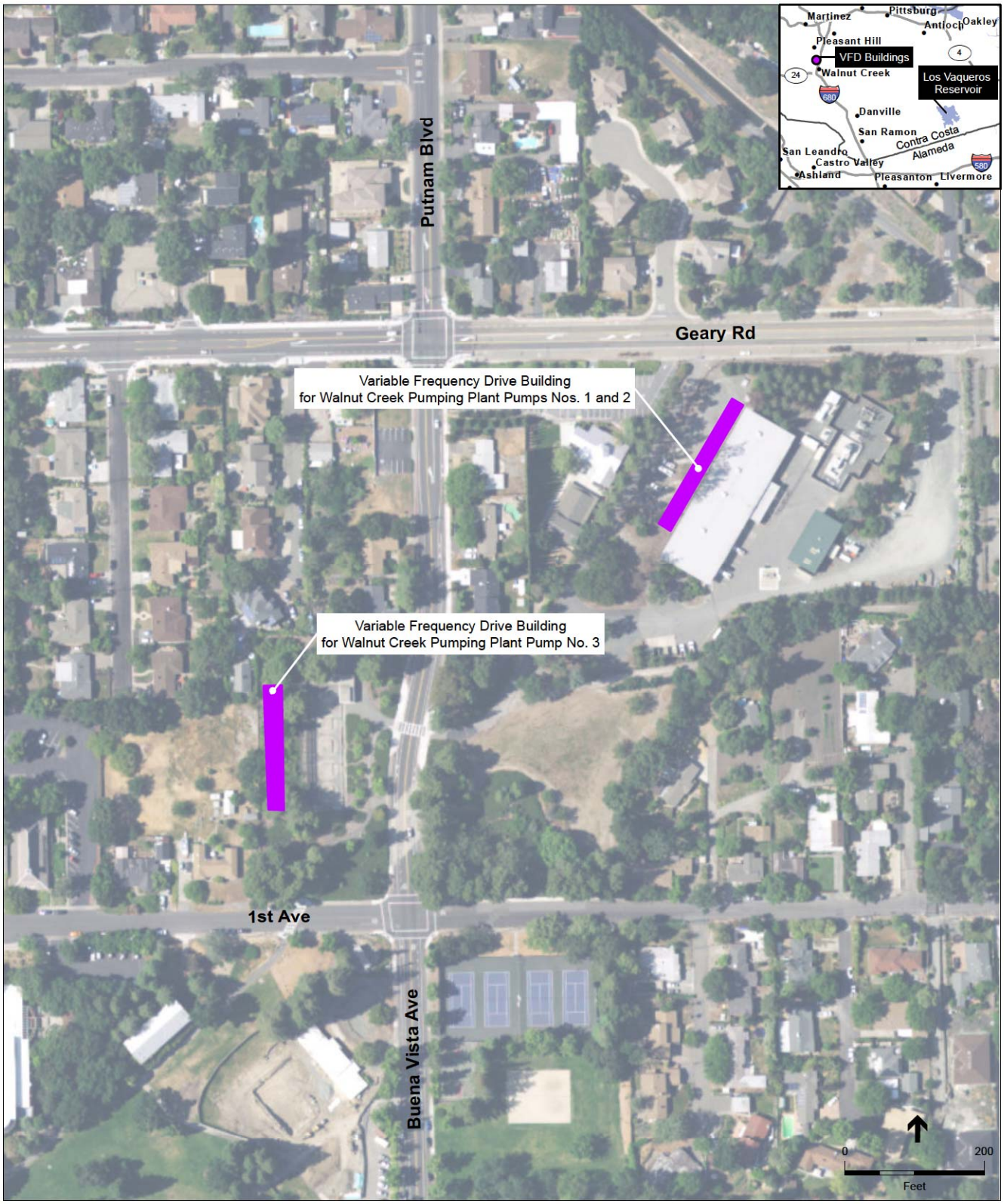
Figure 2-13

EBMUD-CCWD Intertie Pump Station



SOURCE: USDA, 2016; USGS, 2016; CCWD, 2017; ESA, 2017

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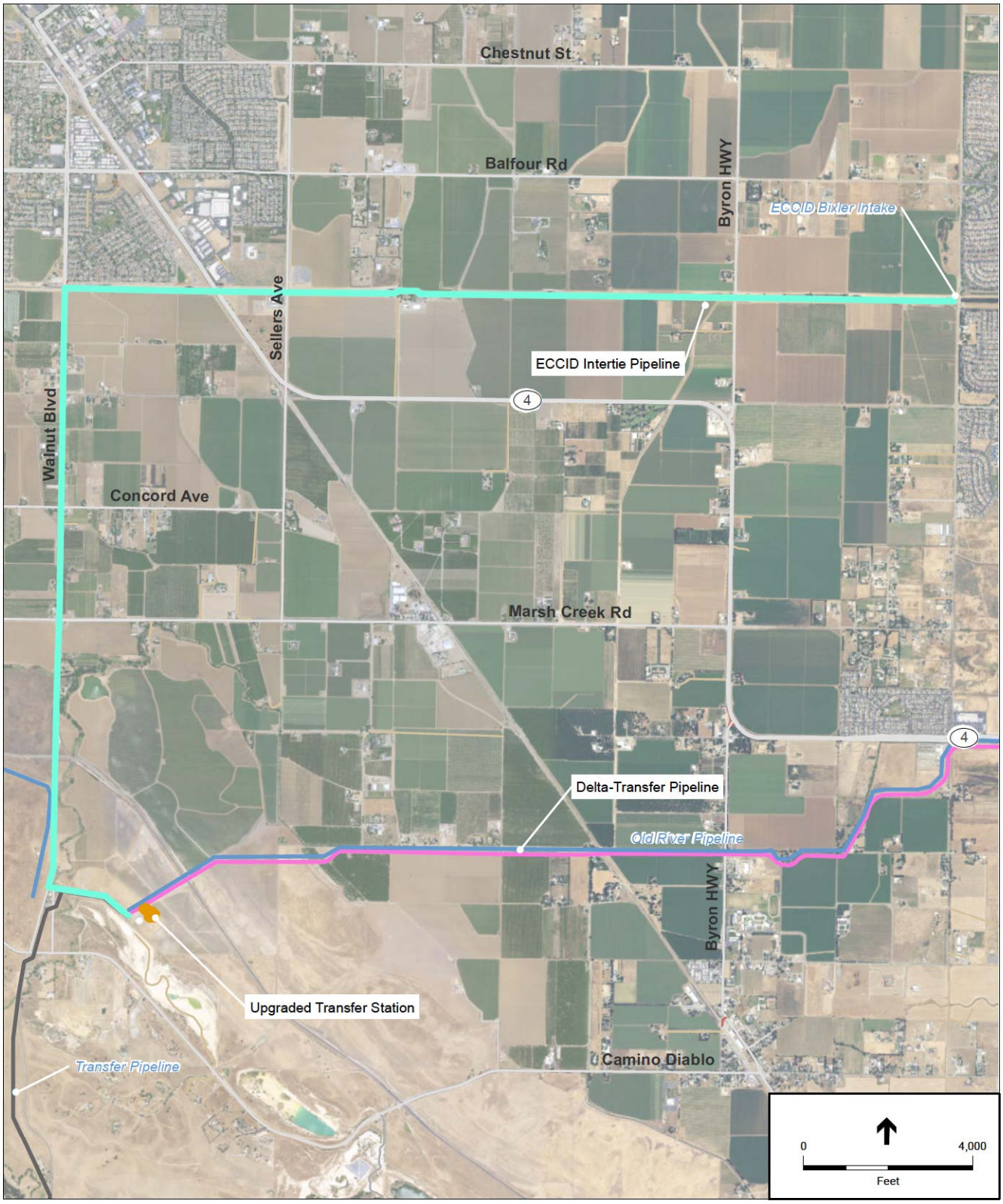
Figure 2-14
EBMUD Walnut Creek Pumping Plant Variable Frequency Drives



SOURCE: USDA, 2016; USGS, 2016; CCWD, 2017; ESA, 2017

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Figure 2-15
ECCID Intertie Pipeline

proposed ECCID intertie pipeline would occur entirely within the existing right-of-way along the canal. The new pipeline would be constructed using standard open-trench construction techniques. Construction within existing roadways would require traffic control and short-duration closures.

2.2.4.7 Los Vaqueros Watershed Recreation Facilities

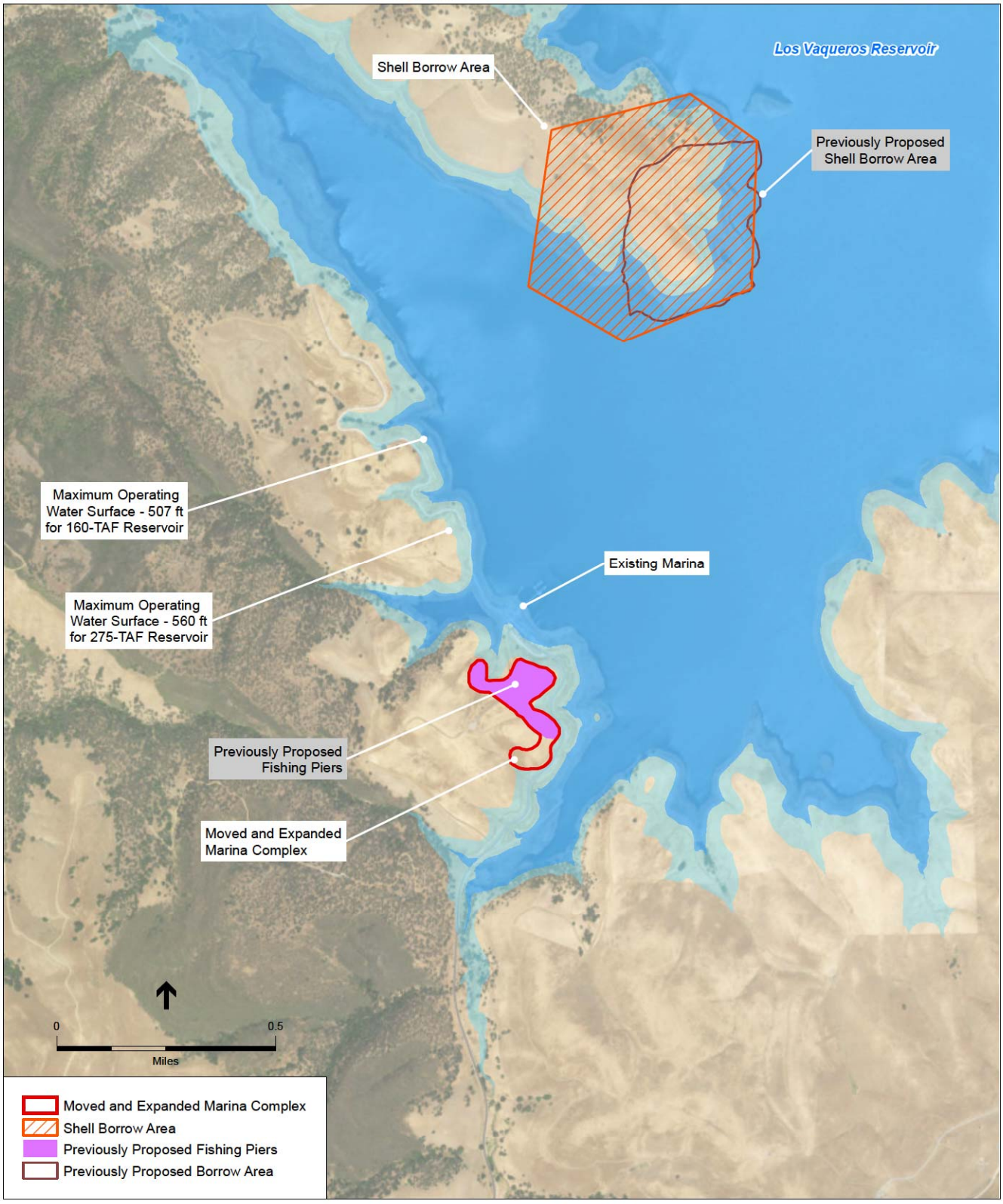
Marina Complex

For Alternatives 1A, 1B, and 2A, the existing Marina Complex, including the facilities at the south cove and the end of Los Vaqueros Road, would be inundated to make way for an expanded 275 TAF reservoir. Since Los Vaqueros Reservoir would not be expanded in Alternative 4A, the existing Marina Complex would not need to be relocated in that alternative.

In Alternatives 1A, 1B, and 2A, a new Marina Complex would replace the existing Marina Complex upslope of the existing facilities at the southern end of Los Vaqueros Reservoir (see **Figure 2-16**). The new Marina Complex would have a footprint of up to 12 acres. This new Marina Complex replaces the previously proposed marina facilities on the northern end of the Reservoir described in the Final EIS/EIR, as well as the previously proposed fishing facilities at the southern end of the Reservoir that included approximately 8 acres of fishing piers, fish cleaning stations, parking, etc. The new Marina Complex would be compliant with the Americans with Disabilities Act (ADA) and would include:

1. Parking, including ADA-accessible stalls and turnouts as close and as level as possible to the reservoir;
2. A boat launch ramp for servicing the rental fleet and for contractor's boats;
3. Covered picnic areas with concrete tables/benches, a play area, shade structures, remote restrooms, and other visitor amenities;
4. An outdoor amphitheater;
5. A Marina building, with room for a building lobby, interpretive displays, offices to accommodate up to 15 employees, requisite bathrooms and septic system, retail area, and food service area with sinks;
6. Outbuildings for storage, workshop space, water treatment and electrical equipment, and a large enclosed yard for larger items and other storage;
7. Fishing piers, fish cleaning stations, and a fish plant tube; and
8. Docks, which would include a dock surface smoother, two covered berths for patrol boats, berths for 50 electric-powered rental boats and three pontoon boats, davits (small cranes) to lift rental boats out of the water for cleaning, and a large boat house with room to hang life jacket/personal floatation devices and gear.

The connections to the trails near the new Marina Complex would be slightly modified from what was shown in the Final EIS/EIR, but the footprint area would remain the same as was previously analyzed.



SOURCE: USDA, 2016; USGS, 2016; CCWD, 2017; ESA, 2017

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Figure 2-16
Marina Complex

Los Vaqueros Interpretive Center

The previously proposed second interpretive center that was to be part of the Northern Marina Complex has been eliminated. Instead, the existing Los Vaqueros Interpretive Center would be upgraded and enlarged within the existing developed location just north of the dam along Kellogg Creek, as shown in **Figure 2-17**. This site has an educational pond, which would remain unchanged.

Los Vaqueros Watershed Office Barn

The existing old barn near the Los Vaqueros Watershed Office would be seismically and structurally upgraded (without expanding the existing footprint) and would contain an interpretive exhibit about ranching history in the area and an area for demonstrations to complement the existing outdoor education program. A new conservation and native plant demonstration garden of up to approximately 100 feet by 130 feet in area, 10 new parking stalls, and an expanded parking area of up to approximately 60 feet by 80 feet to accommodate school buses would be located in the vicinity of the old barn. Up to five new small picnic areas would be located adjacent to the new parking stalls, and a new vault toilet building would be added to the area. The vault toilet building would be self-contained, requiring water filling of the internal water supply tanks and pumping of the sewage containment vault approximately 3 to 4 times a year. All of these new facilities would be located within the existing footprint of disturbed area adjacent to the existing Watershed Office and Barn (see **Figure 2-18**).

New Los Vaqueros Watershed Trail

A new 0.5-mile ADA accessible interpretive trail would be built surrounding the Mortero Wetland Complex, which is located adjacent to the Walnut Staging Area at the northern end of the Los Vaqueros Watershed (see **Figure 2-19**). The new trail would include interpretive displays, viewing facilities, and shade structures and would generally follow the existing gravel road/trail with loops, turnouts, and rest areas. Approximately 0.5 acres of open space areas would be disturbed.

2.3 Project Operations Update

The details of the operations proposed in the Final EIS/EIR have been updated to reflect changed conditions since the publication of the Final EIS/EIR, including changes in the conditions surrounding the project (as described in Chapter 1) as well as updated and more detailed information about Local Agency Partners, Refuges, and operations (described in this section below).

2.3.1 Updates to All Alternatives

The following two background conditions have changed since the publication of the Final EIS/EIR and are included in all of the modeling scenarios for the No Project/No Action Alternatives and the action alternatives.

1. CCWD's demands have been updated to reflect more recent customer usage, as documented in CCWD's 2015 Urban Water Management Plan (CCWD, 2016). These demand projections are compliant with California State Law (SBX7-7, colloquially known as 20% x 2020) as described in Chapter 1.

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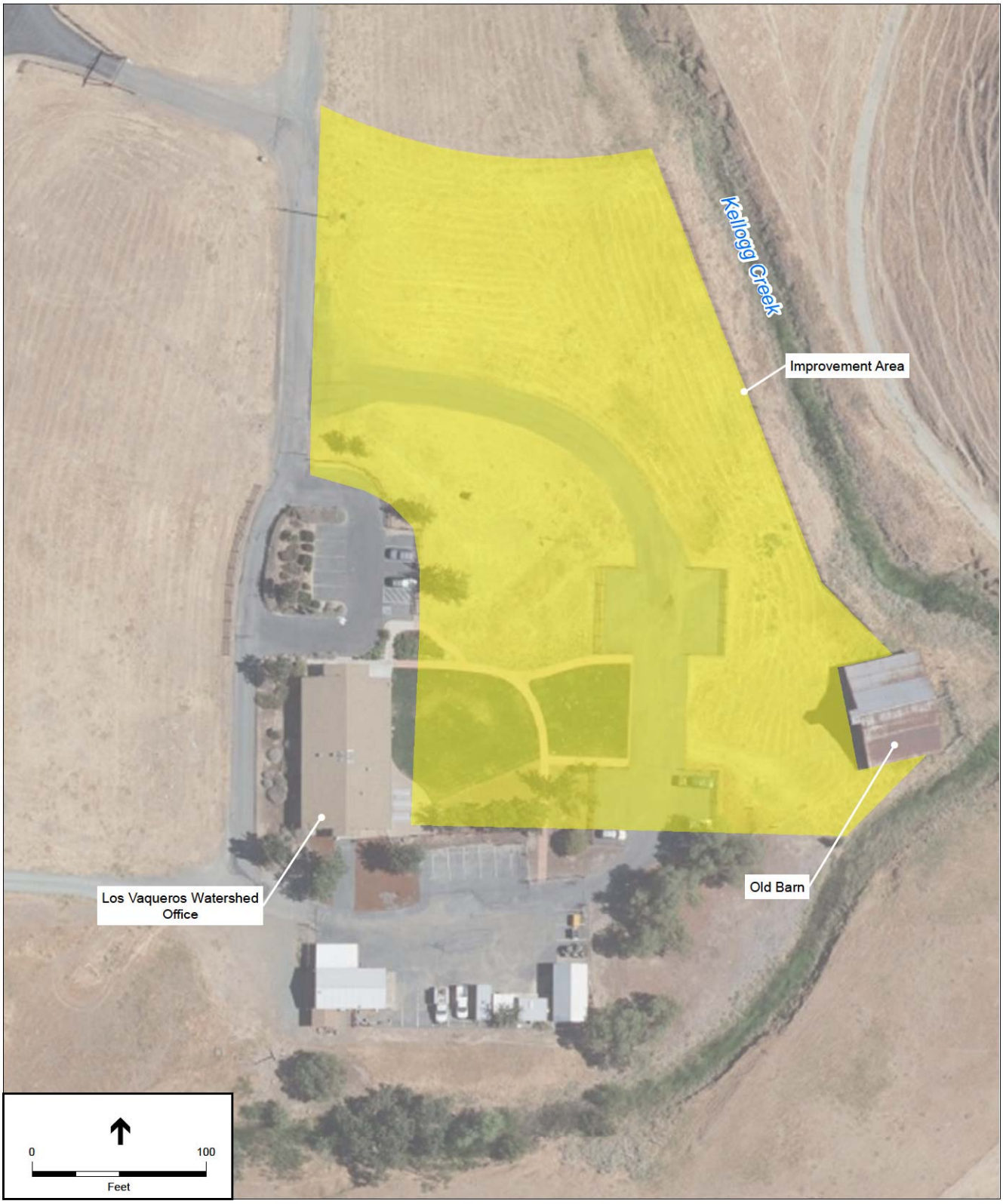
SOURCE: USDA, 2016; USGS, 2016; CCWD, 2017; ESA, 2017

Figure 2-17
Los Vaqueros Interpretive Center



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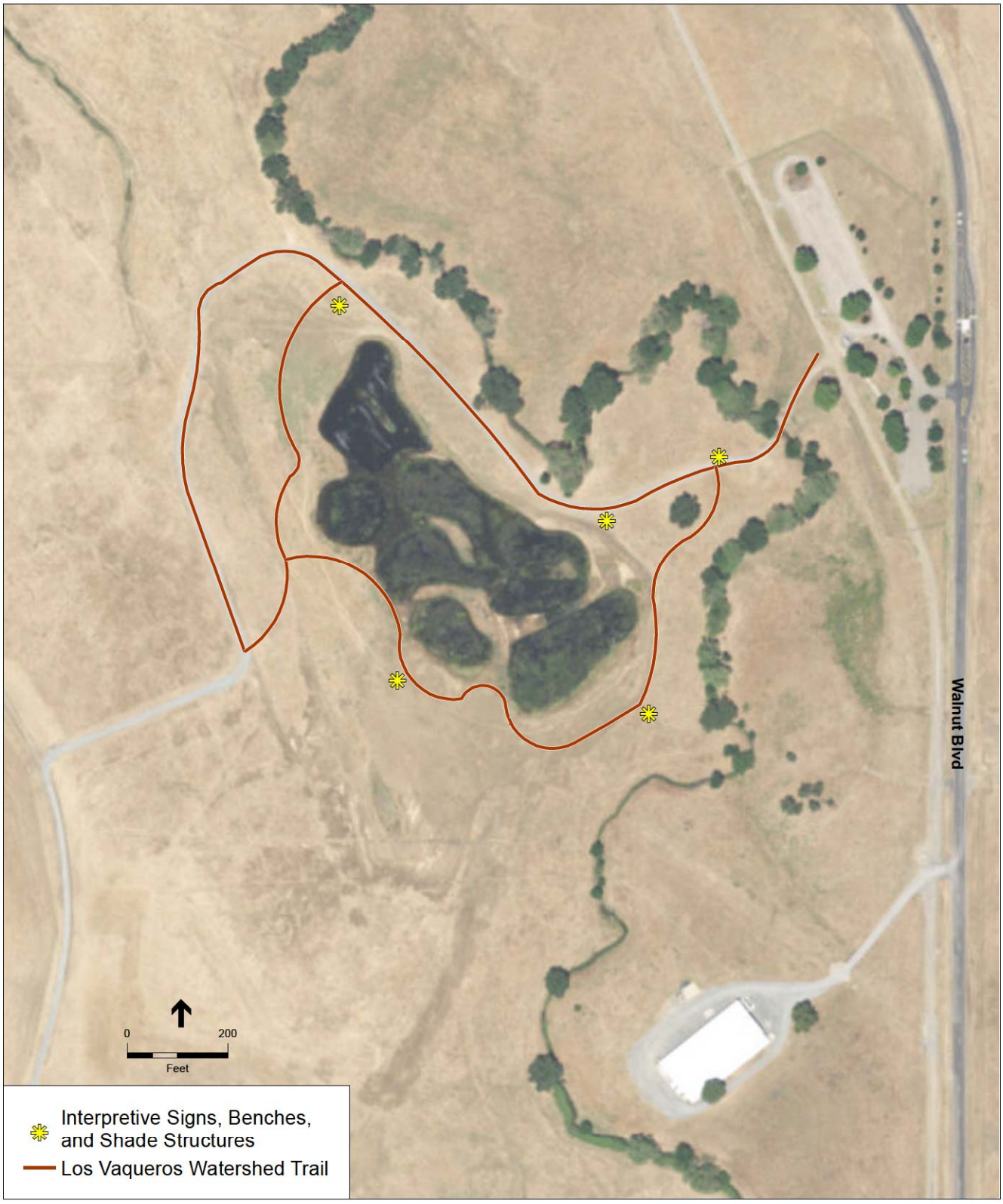
SOURCE: USDA, 2016; USGS, 2016; CCWD, 2017; ESA, 2017

Figure 2-18
Los Vaqueros Watershed Office Barn



SOURCE: USDA, 2016; USGS, 2016; CCWD, 2017; ESA, 2017

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Figure 2-19

Los Vaqueros Watershed Trail

2. Diversions to Los Vaqueros Reservoir storage from the Old River Intake and Middle River Intake at Victoria Canal do not take place when Old and Middle River (OMR) flow restrictions are controlling CVP and SWP south Delta export operations under the 2008 U.S. Fish and Wildlife Service (USFWS) Operations Criteria and Plan (OCAP) Biological Opinion (USFWS, 2008) and 2009 National Marine Fisheries Service (NMFS) OCAP Biological Opinion (NMFS, 2009). This fisheries-related restriction is in addition to the no-fill/no-diversion period requirements specified in the existing biological opinions for Los Vaqueros Reservoir operations in the No Project/No Action Alternatives. In the Final EIS/EIR, diversions for partners were not made when OMR flow restrictions controlled export operations, but it was assumed that diversions for CCWD filling of Los Vaqueros Reservoir could take place using CCWD's CVP contract allocation. In the Final EIS/EIR action alternatives and in the No Project/No Action Alternatives for the Phase 2 Expansion, the default timing specified in the Los Vaqueros biological opinions and incidental take permit (USFWS, 1993; NMFS, 1993; CDFG, 2009) of March 15 through May 31 for the no-fill period, with a concurrent no-diversion period in April, was assumed to be shifted to the first half of February and all of March and June for the no-fill period, with a concurrent no-diversion period in March. This shifted timing better coordinates Los Vaqueros Reservoir filling operations with CVP and SWP operations under the OCAP biological opinions, since the limit on the ratio of San Joaquin River inflow to exports often controls CVP and SWP exports in April and May, rather than OMR flow restrictions, and CCWD diversions are considered to be in-Delta diversions and therefore not included in total exports.

2.3.2 Updates to Action Alternatives

Several additions or improvements to the operations of the action alternatives have been developed since the publication of the Final EIS/EIR to better meet Local Agency Partner and Refuge water supply needs while accommodating operational constraints. Greater detail has been provided about the Local Agency Partners and Refuges, including their operational preferences and available water supply.

2.3.2.1 Rock Slough Filling

The ability to deliver water to the existing Transfer Facility from the existing Rock Slough Intake has been added, so that CCWD would be able to fill Los Vaqueros Reservoir and deliver water to the proposed Transfer Bethany Pipeline from the existing Rock Slough, Old River, and Middle River Intakes, as well as from the existing EBMUD-CCWD Intertie. Rock Slough Intake is, like the Freeport Intake, north of the locations where Old and Middle River flows are measured for the purposes of monitoring CVP and SWP compliance with the 2008 USFWS and 2009 NMFS OCAP Biological Opinions. Los Vaqueros Reservoir filling from Rock Slough Intake and deliveries to partners south of the Delta would not be constrained when Old and Middle River flow restrictions control CVP and SWP south Delta export operations. The proposed new Neroly High-Lift Pump Station and replacement of Rock Slough Pumping Plant #1, described in Section 2.2, would be needed to enable this operation.

2.3.2.2 CCWD No-Fill/No-Diversion Period

The 75- to 90-day no-fill period and concurrent 30-day no-diversion period required by the 1993 USFWS Biological Opinion for the Los Vaqueros Project, the 1993 NMFS Biological Opinion

for the Los Vaqueros Project, and the 2009 California Department of Fish and Game (now CDFW) Incidental Take Permit for the Maintenance and Operation of the Los Vaqueros Project and Alternative Intake Project would be eliminated in the proposed action alternatives for the Phase 2 Expansion, and instead CCWD's Los Vaqueros Reservoir filling operations would be constrained by the Old and Middle River flow restrictions for the benefit of listed species. CCWD and Reclamation would work with the fisheries agencies to modify the permits for operations at CCWD's intakes accordingly.

2.3.2.3 Use of Freeport Intake

Operational rules for the use of the Freeport Intake and the EBMUD-CCWD Intertie have been revised. CCWD, Local Agency Partners, and the Refuge Water Supply Program could (subject to obtaining the appropriate water rights modifications and other permits, agreements, and approvals, and the availability of water) receive water diverted from the Freeport Intake through the EBMUD-CCWD Intertie when EBMUD determines that the EBMUD system operations can accommodate such diversions. This water could be delivered directly to Local Agency Partners or Refuge Water Supply Program, stored in Los Vaqueros Reservoir for later use, or delivered to CCWD in exchange for a reassignment of water previously stored in Los Vaqueros Reservoir from CCWD storage to partner storage. This use would be in addition to the Freeport Intake operations previously included in the Final EIS/EIR, in which CCWD was the only partner to receive water through the EBMUD-CCWD Intertie from the Freeport Intake, with diversion of up to 3.2 TAF per year of CCWD's CVP contract water as specified under the 2004 Settlement and General Release Agreement between CCWD and the Freeport Regional Water Authority, EBMUD, and the Sacramento County Water Agency (CCWD et al., 2004) and covered in the 2004 Freeport Regional Water Project Final EIR/EIS (Reclamation and FRWA, 2004; FRWA, 2004).

2.3.2.4 Additional Partners

All of the action alternatives propose to facilitate storage and delivery of water to a variety of regional partners, in addition to the South Bay water agencies and Refuge Water Supply Program for the Refuges identified in the Final EIS/EIR. As discussed in Chapter 1, the potential partners now would include ten Local Agency Partners and the Refuge Water Supply Program on behalf of the Refuges. The mechanisms for water delivery would vary by partner and would be more varied than deliveries through the Transfer-Bethany Pipeline discussed in the Final EIS/EIR. These mechanisms are described in Sections 2.3.3 and 2.3.4. Following the analysis of potential benefits of the proposed project and an evaluation of other factors, such as environmental impacts, alternatives, and mitigation measures, funding availability, demand, and other individual agency water supply options, each Local Agency Partner will decide individually whether to continue to participate in the Phase 2 Expansion. The partners would then work together to secure necessary modifications to water rights permits, local agreements, and other regulatory approvals for the Phase 2 Expansion.

2.3.2.5 Sources of Water

All of the action alternatives would divert Delta Surplus Water under CCWD's Los Vaqueros water right, under Reclamation's water rights pursuant to CCWD's or other partners' CVP

contracts, under other Local Agency Partner water rights, or under DWR's water rights pursuant to partners' State Water Project contracts. State Water Resources Control Board Decision 1641, which sets forth water quality objectives associated with CVP and SWP south Delta export operations, defines the Delta to be in balanced conditions when SWP and CVP releases from upstream reservoirs plus unregulated river flows approximately equal the water supply needed to meet Sacramento Valley in-basin uses plus CVP and SWP exports. Conversely, Delta excess, or surplus, conditions occur when upstream releases plus unregulated flow exceed in-basin uses plus exports. In-basin uses include flows to meet the water quality and flow objectives required by the State Water Resources Control Board Decision 1641. "Delta Surplus Water" is used in this analysis to mean the volume of water in excess of the amount of water needed for the Delta to be in balanced conditions. It is water not currently diverted by any other user and does not include water released from upstream storage to meet regulatory requirements or contractual obligations.

The timing and quantity of Delta Surplus Water varies depending on hydrology and the regulatory requirements of the SWP and CVP. Delta Surplus Water is usually available for some time every year (typically after storm events in the winter or spring), even in critically dry water years. **Figure 2-20** shows the average annual volume of Delta Surplus Water available by water year type, according to the 82-year historical hydrology used in CalSim II to simulate the Existing Condition. (See Section 4.2.2.1 for additional details about CalSim II.) As shown in **Figure 2-20**, there is about 10 million acre-feet annually of Delta Surplus Water available on average, with over 22 million acre-feet of Delta Surplus Water available in wet years, over 11 million acre-feet in above normal years, just under 5 million acre-feet in below normal years, 2.5 million acre-feet in dry years, and about 1 million acre-feet in critical years.

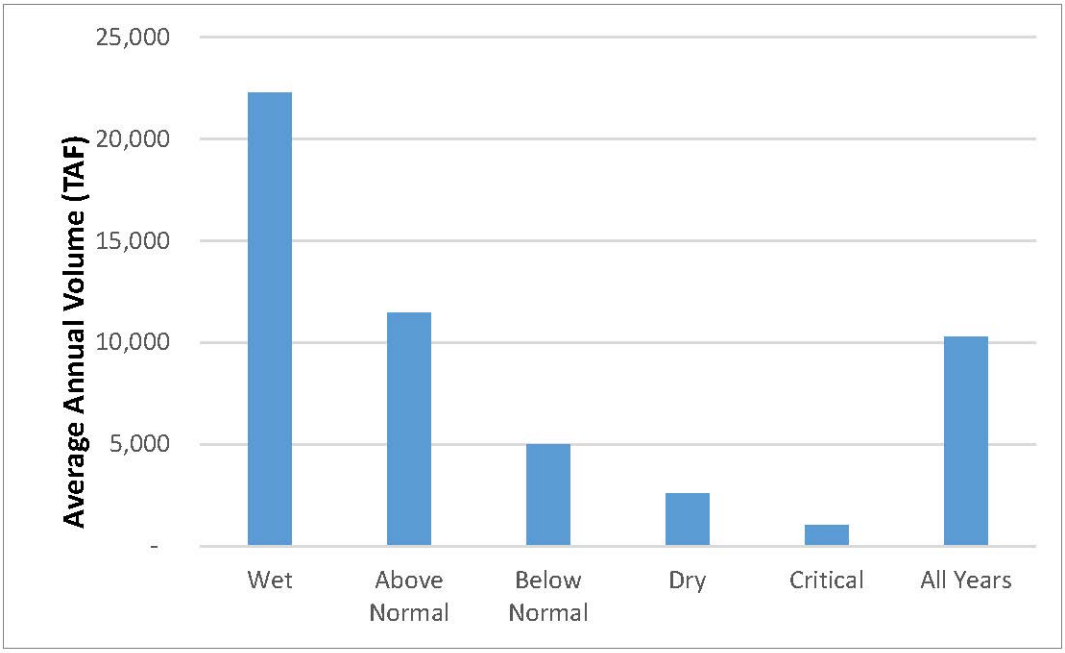

Figure 2-20
Volume of Delta Surplus Water Available
(CalSim II Modeling, Existing Condition)

In addition to Delta Surplus Water diverted under the water rights described above, water diverted for delivery and/or storage for the Local Agency Partners and Refuges would also include the water supplies of some individual partners which could be diverted during Delta balanced conditions as well as Delta excess conditions. Two Local Agency Partners, EBMUD and SCVWD, would be willing to share their water with the other partners, as described in Table 2-5 and Sections 2.3.4.4 and 2.3.4.6.

2.3.2.6 Water Rights Permits

The partners would work together to secure any necessary modifications to relevant water rights permits, agreements, and/or contracts in order to use the sources of water described in the previous section and in Table 2-5. **Table 2-3** lists the water rights that could be used in the Phase 2 Expansion. Changes such as modifications to the place of use and point of diversion under these permits could be required. Long-term transfer or exchange agreements would be needed for the water to be diverted, stored, and delivered for use by the Phase 2 Expansion.

2.3.2.7 Changes to Wheeling Operations

The previously proposed wheeling of south Delta exports through CCWD screened intakes to provide a Delta fisheries benefit has been eliminated. The explicit use of Los Vaqueros Reservoir storage for Delta fish protection by using storage to support wheeling of south Delta exports through CCWD screened intakes, a no-diversion period for the South Bay water agencies, or augmentation of fish flows has also been eliminated. Both of these activities have been determined not to be critical at this time.

The option to wheel a portion of Refuge Level 2 water deliveries that would otherwise be exported at the Jones Pumping Plant or Banks Pumping Plant through CCWD facilities, in order to create capacity at the south Delta export facilities for other south-of-Delta CVP contractors to use, has been added.

2.3.3 Updates to Operations for Refuges

The project objective of enhancing environmental water supply would be met by making deliveries via the Refuge Water Supply Program to meet Refuge water needs, which is considered to be an ecosystem benefit in this analysis. The Refuges described in Chapter 1 would receive water delivered through the Transfer-Bethany Pipeline to the California Aqueduct and then to San Luis Reservoir, with limitations as described below. The delivered water would be either direct diversions or rediversions from the Delta or releases from Los Vaqueros Reservoir storage. The water would be Delta Surplus Water or water made available from a Local Agency Partner, as discussed in Section 2.3.2.5. The Phase 2 Expansion would not change the manner in which water is conveyed by the Refuge Water Supply Program to the various Refuges, which is described next.

TABLE 2-3
WATER RIGHTS FOR POTENTIAL USE IN PHASE 2 EXPANSION

Agency	Permit/License Number	Application Number	Source of Water
CCWD	Permit 20749	20245	Old River, Victoria Canal
CCWD	Permit 20750	25516	Kellogg Creek
DWR	Permit 16478	5630	Feather River, Italian Slough, Sacramento Delta Channels
DWR	Permit 16479	14443	Feather River, Sacramento-San Joaquin Delta Channels
DWR	Permit 16481	14445A	Italian Slough, Sacramento-San Joaquin Delta Channels
DWR	Permit 16482	17512	Italian Slough, Sacramento-San Joaquin Delta Channels, San Luis Creek
EBMUD	License 11109	4228	Mokelumne River
EBMUD	Permit 10478	13156	Mokelumne River
ECCID	None (pre-1914)	S000404	Indian Slough
Reclamation	Permit 12721	5626	Sacramento River
Reclamation	Permit 11967	5628	Trinity River
Reclamation	Permit 12722	9363	Sacramento River & Delta
Reclamation	Permit 12723	9364	Sacramento River & Delta
Reclamation	Permit 12725	9366	Rock Slough
Reclamation	Permit 12726	9367	Rock Slough
Reclamation	Permit 11315	13370	American River
Reclamation	Permit 11316	13371	American River
Reclamation	Permit 16597	14858	Stanislaus River
Reclamation	Permit 11968	15374	Trinity River
Reclamation	Permit 11969	15375	Trinity River
Reclamation	Permit 11971	16767	Trinity River
Reclamation	Permit 11973	17374	Trinity River
Reclamation	Permit 12364	17376	Clear Creek
Reclamation	Permit 13776	18115	Stony Creek
Reclamation	Permit 16600	19304	Stanislaus River
Reclamation	Permit 15735	22316	Rock Slough

The Refuge Water Supply Program conveys water from San Luis Reservoir or directly from Jones Pumping Plant, bypassing San Luis Reservoir, to most of the Refuges via the Delta-Mendota Canal. Jones Pumping Plant and the Delta-Mendota Canal are operated by the San Luis & Delta-Mendota Water Authority; the operations and maintenance agreement between Reclamation and the San Luis & Delta-Mendota Water Authority identifies water deliveries to Refuges. The majority of Refuges receive water deliveries either diverted directly from the Delta-Mendota Canal or taken from the Mendota Pool through conveyance agreements between

Reclamation and three local water and irrigation districts: Central California Irrigation District, Grassland Water District, and Henry Miller Reclamation District. East Bear Creek National Wildlife Refuge could receive water via the Mendota Pool and the Eastside Bypass. Water is delivered to the boundaries of Kern National Wildlife Refuge from San Luis Reservoir through the San Luis Canal and then through the California Aqueduct, utilizing conveyance agreements between Reclamation and the California Department of Water Resources and Buena Vista Water Storage District. Two of the 14 Refuges do not have access to conveyance facilities that would be necessary to receive water from San Luis Reservoir: Pixley National Wildlife Refuge and Merced National Wildlife Refuge. These two refuges rely on groundwater and other local sources of supply, including surface water deliveries from local water and irrigation districts.

The CVPIA specifies two refuge water types, Level 2 and Level 4, for delivery to the Refuges. Section 3406(d)(1) of the CVPIA directs Reclamation to provide water supplies to the Refuges in accordance with Level 2 of the Dependable Water Supply Needs table (which represents the average annual historical water supplies received over a 10-year period prior to 1989) for the Refuges listed in the Report on Refuge Water Supply Investigations (Reclamation, 1989) and two-thirds of the water supply needed for full habitat development for the Refuges identified in the San Joaquin Basin Action Plan/Kesterson Mitigation Plan (Reclamation et al., 1989). Level 2 water is provided primarily from CVP supplies. Section 3406(d)(2) directs Reclamation to supplement Level 2 water supplies to the full Level 4 quantities of the Dependable Water Supply Needs table for the Refuges listed in the Refuge Water Supply Report and the full water supply needed for full habitat development for the Refuges listed in the San Joaquin Basin Action Plan/Kesterson Mitigation Plan. Incremental Level 4 water is the difference between Level 4 and Level 2 volumes and must be acquired through voluntary measures, including water conservation, purchase from willing sellers, and conjunctive use, which do not require involuntary reallocations of CVP yield. CVPIA authorizes CVP water transfers and exchanges to provide Incremental Level 4 supplies. A full Level 4 water supply (Level 2 plus Incremental Level 4 volumes) would provide optimum habitat to support a broad range of species including targeted threatened and endangered species.

Each Refuge has a different proportion of Level 2 and Incremental Level 4 water required to meet its full Level 4 annual water allocation. For example, the San Luis Unit of the San Luis National Wildlife Refuge's annual allocation identifies zero Incremental Level 4 water under the CVPIA and only receives Level 2 supplies provided by Reclamation, while the Kern National Wildlife Refuge's annual allocation identifies more than half of its supply in the form of Incremental Level 4 water. Also, conveyance losses associated with delivering refuge water supplies vary among the Refuges. The Refuge contract allocation for Incremental Level 4 water is quantified in **Table 2-4**. For the purposes of simulating the maximum potential benefits and operational impacts of the Phase 2 Expansion, the total annual volume of water identified as Incremental Level 4 contract allocation is used as the Refuges' demand in this analysis. This total volume would be the upper limit of the actual amount of water needed by the Refuges in any particular year from the Phase 2 Expansion, since the Refuge Water Supply Program has secured and is in the process of securing other sources of Incremental Level 4 water. Table 2-4 does not include the Refuges that do not have an Incremental Level 4 allocation. This analysis identifies the amount and timing of additional water deliveries that could be made from the Phase 2 Expansion through

the Transfer-Bethany Pipeline to the Refuge Water Supply Program for the Refuges in each of the action alternatives, but the manner in which this water would be distributed among the Refuges and the specific habitat uses to which it would be put are left to be determined by the Refuge Water Supply Program and the Refuge agencies.

TABLE 2-4
INCREMENTAL LEVEL 4 WATER NEEDS OF CVPIA SOUTH-OF-DELTA REFUGES (IN ACRE-FEET PER YEAR)

Refuge	Incremental Level 4 Volume[a]	Conveyance Losses[b]	Total Water Need
Grassland Resource Conservation District	55,000	6,325 (11.5%)	61,325
Volta Wildlife Area	3,000	0 (0%)	3,000
Los Banos Wildlife Area	8,330	2,791 (33.5%)	11,121
Salt Slough Unit (North Grassland WA)	3,340	1,119 (33.5%)	4,459
China Island Unit (North Grassland WA)	3,483	401 (11.5%)	3,884
Mendota Wildlife Area	2,056	0 (0%)	2,056
West Bear Creek Unit (San Luis NWR)	3,603	901 (25%)	4,504
Kern National Wildlife Refuge	15,050	2,258 (15%)	17,308
Pixley National Wildlife Refuge[c]	4,720	1,180 (25%)	5,900
Merced National Wildlife Refuge[c]	2,500	625 (25%)	3,125
East Bear Creek Unit (San Luis NWR)[c]	4,432	1,551 (35%)	5,983
TOTAL	105,514	17,151	122,665

NOTES:

a Reclamation et al., 2010

b Estimated conveyance losses are for local water district facilities, and do not include conveyance losses through CVP and SWP facilities operated by the San Luis & Delta-Mendota Water Authority and the California Department of Water Resources (Reclamation and CDFG, 2003).

c Refuge lacks direct conveyance from CCWD facilities, but could receive benefits through a water exchange. Conveyance losses are based on best estimates, and are subject to future exchange agreements.

2.3.4 Updates to Local Agency Partner Operations

Specific Local Agency Partners and their operational preferences and requirements have been identified since the publication of the Final EIS/EIR. The potential partners are described in Chapter 1. The facilities modifications and operational requirements needed for participation in the Phase 2 Expansion are described in the previous sections of this chapter, and more details about potential partners' operational preferences are described here. This greater level of detail has allowed refinements to be made to the proposed project operations. These proposed operations are subject to obtaining the necessary amendments to water rights permits and licenses, agreements, and contracts, as well as all necessary regulatory approvals.

The project objective of enhancing water supply reliability, including drought and emergency supply reliability, would be met by providing water to Local Agency Partners. The Local Agency Partners' demands are based on individual partner water supply needs identified in their 2015

Urban Water Management Plans and other planning studies[1]. Water delivered to meet the project objective of enhancing water supply reliability would no longer be limited to the Final EIS/EIR goal of restoring South Bay water agencies' water supply to the levels that they received before the implementation of the 2008 USFWS and the 2009 NMFS OCAP Biological Opinions.

The magnitude and timing of the individual partners' demands from the Phase 2 Expansion are described in this section below and summarized in **Table 2-5**. Many of the partners have identified a need for water in drought years; each agency has different criteria for when additional dry year water supply is needed, depending on considerations such as their water supply portfolios, operational and regulatory constraints, and internal policies. For the purpose of simulating the maximum potential operational impacts of the Phase 2 Expansion, relatively conservatively large planning demands are used in this analysis; strict drought conservation is not assumed in the analysis, even though the Local Agency Partners have all adopted water shortage contingency plans.

Phase 2 Expansion would maximize deliveries to meet the demands specified by the Local Partner Agencies using available water supply, subject to operational prioritization rules for each action alternative (as described above in Section 2.1), physical system limitations, and regulatory restrictions. The delivered water would be either diversions from the Delta or releases from Los Vaqueros Reservoir storage.

In addition to having a portion of Los Vaqueros Reservoir dedicated to general partner storage that would be filled with water which all partners could draw upon, some individual partners would have identified a need for dedicated storage (including reserved drought and/or non-drought emergency storage), as described in **Table 2-5**. The Local Agency Partners that have identified a need for dedicated storage would be allocated a share of the expanded Los Vaqueros Reservoir storage in Alternatives 1A, 1B, and 4A, but not in Alternative 2A, in which priority is given to environmental water supply. An individual partner's dedicated storage would be reserved for use only by that partner according to its own operational preferences; for many of the Local Agency Partners, the operational preference would be to use their stored water in droughts.

[1] List of Urban Water Management Plans and other planning documents of urban Local Agency Partners

ACWD	Urban Water Management Plan 2015-2020 (ACWD, 2016)
BAWSCA	Long Term Reliable Water Supply Strategy Phase II Final Report (BAWSCA, 2015) Annual Survey Fiscal Year 2014-15 (BAWSCA, 2016)
BBID	Mountain House: 2015 Urban Water Management Plan (MHCSD, 2016) City of Tracy: 2015 Urban Water Management Plan (Tracy, 2016)
Brentwood	2015 Urban Water Management Plan (Brentwood, 2016)
EBMUD	Urban Water Management Plan 2015 (EBMUD, 2016) Water Supply Management Program 2040 Plan (EBMUD, 2012)
SCVWD	2015 Urban Water Management Plan (SCVWD, 2016) 2012 Water Supply and Infrastructure Master Plan (SCVWD, 2012)
SFPUC	2015 Urban Water Management Plan for the City and County of San Francisco (SFPUC, 2016)
Zone 7	2015 Urban Water Management Plan (Zone 7, 2016a) Water Supply Evaluation Update (Zone 7, 2016b)

Some Local Agency Partners have identified a further need for reserved drought/emergency storage, to be reserved for use only in that partner's defined extreme drought or other non-drought emergency; the reserved emergency storage would be in addition to any dedicated operational storage assigned to that partner.

TABLE 2-5
LOCAL AGENCY PARTNER PHASE 2 EXPANSION WATER SOURCES AND DEMANDS

Local Agency Partner	Additional Source of Water Available for Phase 2 Expansion Diversions	Demand from Phase 2 Expansion	Dedicated Storage in Los Vaqueros Reservoir
ACWD	Extra SWP Table A Allocation Third-party water transfers from willing sellers[a]	Up to 24 TAF/year in certain drier years	Yes, including reserved storage of 10 TAF in Alternatives 1A & 1B
BAWSCA	None	10 TAF/year in certain drier years	Yes, including reserved storage of 10 TAF in Alternatives 1A & 1B and 5 TAF in Alternative 4A
BBID	None	20 TAF/year in critically dry years; additional fall demand in low precipitation months	Yes, including reserved storage of 30 TAF in Alternatives 1A & 1B and 5 TAF in Alternative 4A.
Brentwood	ECCID Contract	For water quality blending	Yes, including reserved storage of 2 TAF under Existing Conditions and 5 TAF under Future Conditions
EBMUD	Water available under EBMUD's Mokelumne River water right in certain wetter years (available for other partners' use)	Up to 30 TAF/year in certain drier years	None; option to call on stored water based on other partners' use of Mokelumne River water
ECCID	ECCID pre-1914 water right	For water quality blending	Yes, including reserved storage of 3 TAF under Existing Conditions and 6 TAF under Future Conditions
SCVWD	Extra CVP allocation (may be available for other partners' use) Extra SWP Table A Allocation	At least 10 TAF/year in certain drier years and for groundwater recharge	Yes, including reserved storage of at least 20 TAF in Alternatives 1A & 1B and 4 TAF in Alternative 4A
SFPUC	None	16.7 TAF/year in all years + up to 57 TAF/year in drier years	None
SLDMWA	Third-party water transfers from willing sellers[a] CVP water made available by wheeling of Level 2 Refuge supplies Member agency extra CVP allocation	Limited by Phase 2 Expansion operational constraints	None
Zone 7	Extra SWP Table A Allocation	Up to 19 TAF/year in drier years	Yes, including preferential storage of up to 5 TAF/year of Delta Surplus Water in all years

NOTES:

[a] Third-party transfers are not included in the Phase 2 Expansion analysis, but are discussed in the sensitivity study in Appendix C.

2.3.4.1 Alameda County Water District (ACWD)

ACWD would receive water from the project through the new Transfer-Bethany Pipeline, delivered to the existing California Aqueduct and then to the existing South Bay Aqueduct. ACWD has identified a need for up to 24 TAF/year of water in certain drier years. In addition, ACWD has identified a need for dedicated emergency storage of 10 TAF to be used only during extreme droughts or disruptions in SWP deliveries. In years with higher SWP Table A allocations, ACWD has SWP contract allocation available to store in Los Vaqueros Reservoir; this is water that would otherwise have been pumped at the Banks Pumping Plant for storage south of the Delta. This storage can only be drawn upon by ACWD.

2.3.4.2 Byron-Bethany Irrigation District (BBID)

BBID would receive water from the project through the new Transfer-Bethany Pipeline, delivered to the existing California Aqueduct and then to the Delta-Mendota Canal to the Mountain House community within BBID's service area. BBID has identified a need for 20 TAF/year of water in critically dry water years, as well as additional water in months in the fall with low precipitation.

2.3.4.3 City of Brentwood (Brentwood)

Brentwood would receive water through existing CCWD facilities and through a new pipeline from CCWD's Neroly Blending Facility to the City of Brentwood Water Treatment Plant. In the 160-TAF No Project/No Action Alternative, Brentwood would continue to receive ECCID water diverted from Rock Slough and/or Old River Intake by CCWD and delivered for treatment at CCWD's Randall-Bold Water Treatment Plant and/or the City of Brentwood Water Treatment Plant. In all of the action alternatives, Brentwood would also be able to receive water diverted from Middle River Intake or from Los Vaqueros Reservoir storage.

Brentwood has identified a need for a water quality blending source, in order to help to continue to meet its National Pollutant Discharge Elimination System (NPDES) permit requirements for salinity in its treated wastewater effluent. Up to 3 TAF of storage under Existing Conditions and 10 TAF under Future Conditions would be dedicated in Los Vaqueros Reservoir for Brentwood's water quality blending use. Brentwood would receive the same delivered water quality as CCWD's service area. Brentwood would store some of their ECCID water in Los Vaqueros Reservoir. Brentwood has also identified a need for dedicated emergency storage of 2 TAF under existing conditions and 5 TAF in the future.

2.3.4.4 East Bay Municipal Utility District (EBMUD)

EBMUD would receive water through the existing 155 cfs EBMUD-CCWD Intertie that connects CCWD's Los Vaqueros Pipeline and EBMUD's Mokelumne Aqueduct #2. EBMUD could also receive water by exchange, where CCWD uses water from Los Vaqueros Reservoir in lieu of diverting CCWD's CVP Contract water from the Delta and EBMUD diverts CCWD's CVP Contract water at Freeport Intake. EBMUD could also receive water through existing potable water interties between EBMUD and CCWD's treated water systems, which have a total capacity of 15.5 cfs.

In certain wetter years, EBMUD has identified that extra water under its Mokelumne River water right would be available to store in Los Vaqueros Reservoir for use by other partners. Implementation of Mokelumne River water transfers would be subject to EBMUD's discretion, based on consideration of EBMUD's long-term operational needs, in addition to necessary modifications of relevant water rights, permits, contracts, and other agreements. EBMUD's position in the hierarchy of Mokelumne River water right users is determined by a variety of agreements between Mokelumne River water right holders, the appropriative rights, permits, and licenses issued by the State Water Resources Control Board, pre-1914 rights, and riparian rights. EBMUD operates Pardee and Camanche Reservoirs in a coordinated manner to meet its water supply needs while concurrently making releases from Camanche Reservoir to satisfy downstream senior rights and regulatory and environmental obligations. For more details on EBMUD's water supply, hydrological setting, water rights, and operational and regulatory requirements, see Appendix A.

EBMUD has identified a need for up to 30 TAF/year of water in drier years. The Mokelumne River water transferred to other partners would create an option for EBMUD to purchase water supplies from Phase 2 Expansion in the years that EBMUD is seeking additional water supplies.

As described in Sections 1.2.1.6 and 2.3.2.3, existing EBMUD facilities including the Freeport Regional Water Project, Folsom South Canal Connection, Mokelumne Aqueduct #2, and EBMUD-CCWD Intertie would be used to divert water as part of the Phase 2 Expansion project. This water could include both CVP and non-CVP supplies. At its sole discretion, EBMUD will determine when sufficient unused capacity is available in its facilities to wheel water supplies for Phase 2 Expansion operations.

2.3.4.5 East Contra Costa Irrigation District (ECCID)

ECCID would receive water through a new ECCID Intertie between the CCWD and ECCID systems. Due to concerns about declining Delta water quality, ECCID has identified a need for a water quality blending source. Storage would be dedicated in Los Vaqueros Reservoir for ECCID's water quality blending use. ECCID would store water in Los Vaqueros Reservoir, subject to obtaining any appropriate permits and agreements. ECCID would use water stored in Los Vaqueros Reservoir to blend with Delta diversions from its Bixler Intake as needed.

2.3.4.6 Santa Clara Valley Water District (SCVWD)

SCVWD would receive water from the project through the new Transfer-Bethany Pipeline, delivered to the existing California Aqueduct and then to the existing South Bay Aqueduct. SCVWD could also receive water delivered through the Transfer-Bethany Pipeline to the California Aqueduct to San Luis Reservoir and through the San Felipe Division. For the Phase 2 Expansion, SCVWD has identified a need for at least 10 TAF/year of water in drier years and for groundwater recharge. In addition, SCVWD has identified a need for dedicated emergency storage of at least 20 TAF in the Phase 2 Expansion to be used only in extreme drought emergencies.

In wetter years, SCVWD has a portion of its CVP and SWP contract allocations available to store in Los Vaqueros Reservoir, through exchange with its purified water supply. SCVWD is planning on expanding its existing Silicon Valley Advanced Water Purification Center to produce up to

24,000 AF/year of purified water for groundwater recharge or direct potable reuse. When groundwater storage is high and/or surface water supplies are abundant, SCVWD would have excess purified water capacity and/or extra CVP and/or SWP contract supply. Additional storage capacity would help SCVWD conjunctively manage its supplies. Additional connections between regional water systems would also help facilitate water exchanges and transfers as a means of managing supplies through different types of hydrologic periods. SCVWD is willing to consider transfer to or exchange of its water with other partners if SCVWD's dedicated storage in Los Vaqueros Reservoir is sufficiently high.

2.3.4.7 San Francisco Public Utilities Commission (SFPUC) and Bay Area Water Supply and Conservation Agency (BAWSCA)

SFPUC and BAWSCA could receive water through exchange or direct deliveries conveyed through existing facilities and interties. CCWD would deliver water as described above to SCVWD, which has customer agencies that are also members of BAWSCA, and then into SFPUC's Hetch Hetchy system through the existing Milpitas intertie. Water delivered through the Milpitas intertie would augment the Hetch Hetchy water supplies being delivered to the BAWSCA agencies through that portion of the San Francisco Regional Water System.

Alternatively, if South Bay Aqueduct capacity was limited or other Local Agency Partners were making use of the Transfer-Bethany Pipeline capacity, water could be delivered to EBMUD and then through the Hayward Intertie to the City of Hayward (Hayward). Any amount excess to the City of Hayward's needs would be delivered through Hayward's transmission facilities to the SFPUC Regional Water System. The Hayward Intertie is a group of facilities that connect the EBMUD and SFPUC water systems through Hayward, which is a wholesale water customer of SFPUC and a BAWSCA member agency. The Hayward Intertie is jointly owned by SFPUC and EBMUD and operated by Hayward. Hayward's sole water supplier, per Hayward's water contract, is SFPUC. Water delivered from EBMUD through the Hayward Intertie would be directly used by Hayward customers instead of water from SFPUC's Regional Water System. In turn, the SFPUC water supply that would have been delivered to Hayward would be delivered to other SFPUC customers.

The Hayward Intertie was designed to deliver up to 30 MGD of water between the SFPUC and EBMUD systems in the event of non-drought emergencies or planned critical maintenance. Hayward receives 100% of its water supply from SFPUC via gravity from two turnouts off the SFPUC Regional Water System on the southern end of Hayward. When the Hayward Intertie is being operated to deliver water from EBMUD through the Hayward Intertie, water is pumped directly from EBMUD's water system into Hayward's water system, resulting in reversed hydraulic flows, lower system pressures, and changed water quality.

Wheeling water from Los Vaqueros through EBMUD's system to reach the Hayward intertie would affect EBMUD's system operations as well. In particular, blending water from Los Vaqueros with EBMUD's water – which is predominately from the Mokelumne River – could result in water quality changes and increased EBMUD customer taste and odor complaints. Blended water could also necessitate changes in EBMUD's standard water treatment process may be required.

Existing agreements and environmental coverage for the Hayward Intertie currently limit the use of the Hayward Intertie to emergencies or planned critical maintenance. Drought conditions do not constitute an emergency under the Hayward Intertie's existing Joint Exercise of Powers Agreement. Any expanded or long-term use of the Hayward Intertie for Phase 2 Expansion operations would be subject to institutional agreements that would need to be negotiated and approved by the City of Hayward, EBMUD, and SFPUC. The details of any proposed use of the Hayward Intertie have not been sufficiently developed to allow for meaningful analysis of potential impacts to Hayward and EBMUD. In the event that use of the Hayward Intertie for Phase 2 Expansion operations is pursued in the future, all potential operational and environmental impacts would need to be identified, analyzed and mitigated, including hydraulic pressure, fire flow and water quality considerations for the City of Hayward and EBMUD.

In addition to using these two physical interties, Phase 2 Expansion water could also be delivered to ACWD, which is a member of BAWSCA, allowing ACWD to reduce its use of Hetch Hetchy water in exchange, thus freeing up Hetch Hetchy water to be delivered to other BAWSCA member agencies; this method of exchange would also be subject to institutional agreements that would need to be negotiated. Use of the South Bay Aqueduct to move water to SFPUC and BAWSCA or other agencies would be require a new conveyance agreement with DWR and approval by the agencies already contracted to use the South Bay Aqueduct (ACWD, SCVWD, and Zone 7).

SFPUC has identified a need for water in all water year types of up to 16.7 TAF/year, as well as an additional need for water in drier years of up to 57 TAF/year. In addition to SFPUC's identified demands, BAWSCA has identified a further need for water of 10 TAF/year in certain drier years. BAWSCA has identified a need for dedicated emergency storage of 5-10 TAF to meet its drier year demands.

2.3.4.8 San Luis & Delta-Mendota Water Authority (SLDMWA)

SLDMWA member agencies would receive water from the project through the new Transfer-Bethany Pipeline. SCVWD, which is a member of SLDMWA, could receive water delivered through the Transfer-Bethany Pipeline to the California Aqueduct and then either to the South Bay Aqueduct or to San Luis Reservoir. Grassland Water District is also a member of SLDMWA. The Refuge Water Supply Program has a conveyance agreement with SLDMWA to wheel CVPIA water supplies to the Refuges, including to Grassland Water District for private wetlands within the Grassland Resource Conservation District. SLDMWA and the south-of-Delta CVP contractors could also receive water exported at Jones Pumping Plant (or Banks Pumping Plant through a wheeling agreement with DWR) using capacity made available by wheeling Level 2 Refuge water supplies through CCWD facilities.

In addition to the water needs identified by the SLDMWA member agencies that are also Local Agency Partners in the Phase 2 Expansion, SLDMWA is interested in any additional water supply for south-of-Delta CVP contractors that could be made available by Phase 2 Expansion operations. South-of-Delta CVP contractors often are not allocated their full CVP contract amounts, even in wetter years. A specific amount of water needed by SLDMWA member agencies from the Phase 2 Expansion has not been included, because Phase 2 Expansion

operational constraints (both facility sizes and priority of usage) would limit the amount of water delivered to be less than the total amount of water needed to satisfy SLDMWA demands.

2.3.4.9 Alameda County Flood Control and Water Conservation District, Zone 7 (Zone 7)

Zone 7 would receive water from the project through the new Transfer-Bethany Pipeline, delivered to the existing California Aqueduct and then to the existing South Bay Aqueduct. Water could also be delivered via exchange in the Delta via the South Bay Aqueduct. Zone 7 has identified a need for water delivery in drier years of up to 19 TAF/year. This dry year need could be met with storage of up to 5 TAF/year of Delta Surplus Water for Zone 7 in all year types. Zone 7 is also requesting 5 TAF/year of supplemental supply from the Phase 2 Expansion, in addition to SWP water that Zone 7 would place into storage. In years with higher SWP Table A allocations, Zone 7 has SWP contract allocation available to store in Los Vaqueros Reservoir. This storage can only be drawn upon by Zone 7.

2.4 Updates to Overall Construction Program

Construction is expected to take about six years for Alternatives 1A, 1B, and 2A. As described in Chapter 1, Section 1.3, the Value Planning Report prepared by Reclamation in 2016 included the recommendation to sequence construction activities such that the construction of the Transfer-Bethany Pipeline would be completed first before beginning construction of the dam enlargement and other facilities. This sequence would allow for acceleration of the reservoir drawdown by delivering water released from the reservoir through the Transfer Pipeline and then through the Transfer-Bethany Pipeline to other Project Partners as well as through the Los Vaqueros Pipeline to CCWD.

For Alternative 4A the dam enlargement will not occur and reservoir drawdown is not required. Construction for facility improvements included in Alternative 4A could occur concurrently and is expected to take about two years.

Initiation of construction is anticipated in 2021 for all alternatives. The other details of the overall construction program remain the same as described in the Final EIS/EIR.

2.5 Updates to Permits and Approvals

See Section 1.5, CEQA and NEPA Processes for the Los Vaqueros Reservoir Expansion, for a description of the CCWD and federal decision making processes applicable to the Supplement to the Final EIS/EIR. In addition, the section below addresses changes to the permits, approvals, and other processes described in the Final EIS/EIR.

2.5.1 Federal Decision Processes

As a result of the 2016 Water Infrastructure for Improvements to the Nation Act (WIIN Act), the Secretary of the Interior may authorize construction of a State-led storage project if: 1) the

participation has been requested by the Governor of the State; 2) the Secretary concurs that the project is technically and financially feasible and provides a Federal benefit; 3) sufficient non-Federal funding is available to complete the project; and 4) the State-led storage project sponsors are financially solvent. (The WIIN Act definition of a "State-led storage project" includes a water storage facility constructed, operated, and maintained by a public agency organized pursuant to State law.) The WIIN Act also states that at least a proportional share of the project benefits must be Federal benefits, including water supplies dedicated to specific purposes such as environmental enhancement and wildlife refuges; and the Secretary must submit a written notification of these determinations to Congress within 30 days of making the determinations. The Phase 2 Expansion project includes incremental Level 4 water supplies to CVPIA south-of-Delta wildlife refuges and as such would be eligible for funding under the WIIN Act.

2.5.2 State Decision Processes

The California Water Commission has been authorized by Proposition 1 to make the final decision on state funding for the Phase 2 Expansion. If Proposition 1 funding is awarded by CWC, CCWD would enter into agreements with CDFW, DWR, and the SWRCB for oversight of the state public benefits provided by Phase 2 Expansion.

A determination of consistency with the Delta Plan would need to be filed with the Delta Stewardship Council. The SWRCB would need to approve necessary water rights actions. Construction of the proposed Transfer-Bethany Pipeline would require execution of an agreement with DWR to physically connect the Transfer-Bethany Pipeline to the California Aqueduct and also to convey water through state facilities, including the California Aqueduct, Bethany Reservoir, and the South Bay Aqueduct. The regulatory decisions by CDFW, SWRCB, and other state agencies for permitting would be unchanged from what was described in the Final EIS/EIR.

2.5.3 Local Decision Processes

CCWD, as the CEQA lead agency, would also have the same decision process. The Local Agency Partners would each make an independent decision on whether to participate in the Phase 2 Expansion based on their individual agency needs and interests. If these agencies decided to participate, they would rely on the Final EIS/EIR and this Supplement for CEQA compliance.

2.5.4 Regulatory Permits and Approvals

The permits and approvals that are no longer potentially needed for implementation the action alternatives of the Phase 2 Expansion, due to elimination of the previously proposed new Delta Intake and Pump Station are listed in **Table 2-6**. The other permits and approvals described in the Final EIS/EIR that are potentially needed for implementation of the Phase 2 Expansion alternatives are unchanged. The agencies responsible for issuing these approvals would consider the information presented in the Final EIS/EIR and this Supplement during their deliberations.

TABLE 2-6
PERMITS AND APPROVALS NO LONGER NEEDED FOR IMPLEMENTATION OF PHASE 2 EXPANSION ACTION ALTERNATIVES

Permit	Permitting Authority
Federal Permits/Approvals	
Clean Water Act Section 404/Rivers and Harbor Act Section 10 Dredge and Fill Permit	U.S. Army Corps of Engineers
Private Aids to Navigation Permit	U.S. Coast Guard
Transmission Service Request Permit and Open Access Transmission Service Tariff Process	Western Area Power Administration
State Permits/Approvals	
Clean Water Act Section 401 Water Quality Certification	Central Valley Regional Water Quality Control Board
Section 1601 et seq. Streambed Alteration Agreement	California Department of Fish and Wildlife
General Permit	State Lands Commission
Local Permits/Approvals	
Levee Construction/Maintenance agreement	Reclamation District 800

CHAPTER 3
Project Benefits

This chapter provides an overview of the Phase 2 Expansion benefits. Information in this chapter is presented two ways, first as a summary of each type of benefit across all action alternatives followed by a summary of the benefits for each action alternative. The categories of benefits presented are intended to be consistent with those defined by the California Water Commission (CWC) in the Water Storage Investment Program. On behalf of the Local Agency Partners and the Refuges, CCWD intends to seek funding from the CWC for a portion of the capital cost for the Phase 2 Expansion.

The CWC is authorized to invest $2.7 billion for public benefits associated with the capital cost of new and existing water storage projects that improve the operation of the state water system, are cost effective, and provide a net improvement in ecosystem and water quality conditions, in accordance with the Water Storage Investment Program and Water Code section 79750 (b). Applicants seeking funding must demonstrate that ecosystem improvement benefits make up at least 50 percent of the requested amount of funding for public benefits. The remainder may be made up of other public benefits including water quality improvement, flood control, emergency response, and recreation. To be eligible to receive funding, a project must provide measurable improvements to the Delta's ecosystem or its tributaries but not all ecosystem benefits need to occur within the Delta. The Water Storage Investment Program requires that applicants evaluate their storage projects under two specific climate change scenarios for the years 2030 and 2070 and that the CalSim II model developed by the CWC be used to quantify public benefits located in the Delta.

The Phase 2 Expansion would improve regional water supply reliability by increasing water deliveries to Local Agency Partners, provide ecosystem improvements by delivering additional water supply to the Refuge Water Supply Program to meet Refuge water needs, improve delivered water quality for Local Agency Partners, improve regional water operations by integrating with other water systems, and enhance recreation. The public benefits of the Phase 2 Expansion include: water delivered to Local Agency Partners during emergencies, water delivered via the Refuge Water Supply Program to meet Refuge water needs, and recreation enhancement. The action alternatives are intended to provide all of these benefits to varying degrees depending on the facilities and operations specific to each alternative, as described in Chapter 2. The benefits shown in this chapter are calculated for the Phase 2 Expansion using the CalSim II model provided by the CWC for the 2030 climate change scenario. See Section 4.2 for additional information about the modeling assumptions and Chapter 5 for additional information about the climate change projections, including the 2070 climate change scenario.

3.1 Water Supply Reliability

3.1.1 Non-Drought Emergency Reliability (CWC Public Benefit)

The Water Storage Investment Program defines emergency response as a public benefit which includes water for human health and safety during declared emergencies (Water Code Section 79753(a)(4)). The Phase 2 Expansion would deliver high quality water after or during an emergency. Water supply could be reduced or interrupted after an emergency such as a flood or earthquake. Conveyance of water supply through the Delta could be interrupted or reduced in the event of Delta levee failures or during a drought if seawater intruded into the Delta to an extent that would make it too saline for human consumption. In such cases, the additional water storage available in Los Vaqueros Reservoir, the physical interconnections among the Local Agency Partners, and the operational integration provided by the Phase 2 Expansion would help to mitigate the impacts of the emergency. The non-drought emergency benefits of the Phase 2 Expansion are not quantified, as the benefit could change depending on the nature and frequency of the emergency.

3.1.2 Drought Emergency Reliability (CWC Public Benefit)

Phase 2 Expansion would also deliver supplies to Local Agency Partners during declared drought emergencies. Based on the historical record of emergency declarations due to droughts in California and the hydrologic time series used to analyze the Phase 2 Expansion, a declared drought emergency was assumed during the periods of simulation from 1929-1934, 1976-1977, and 1989-1992. Water delivered from the Phase 2 Expansion to Local Agency Partners during these periods are considered an emergency response action and a public benefit. Water delivered to Local Agency Partners during a drought emergency would be conveyed through the Transfer-Bethany Pipeline, CCWD's existing conveyance system, through the EBMUD-CCWD intertie, through the proposed ECCID Intertie, or through the proposed Brentwood Pipeline. Each of the Local Agency Partners have a unique set of demands, supplies, and operational constraints, during droughts as described in Chapter 2.

Table 3-1 shows the annual average drought emergency supply reliability benefits of the action alternatives for the periods 1929-1934, 1976-1977, and 1989-1992. Although deliveries to each individual Local Agency Partner are specified, the deliveries could be shifted among agencies depending on the timing of their demands. Alternative 1A would provide the greatest drought supply reliability benefit by delivering 39 TAF/year on average to all of the Local Agency Partners. Alternative 1B would also provide a high level of drought supply reliability benefit by delivering 36 TAF/year on average to Local Agency Partners. Alternative 2A would provide the least drought supply reliability benefit by delivering 7 TAF/year on average to Local Agency Partners. Alternative 4A would provide drought supply reliability benefit by delivering 23 TAF/year of on average to Local Agency Partners.

TABLE 3-1
ANNUAL AVERAGE OF THE PHASE 2 EXPANSION DROUGHT EMERGENCY SUPPLY RELIABILITY BENEFIT
[1929-1934, 1976-1977, 1989-1992] [TAF/YR]

	ACWD	BAWSCA	BBID	City of Brentwood	CCWD	EBMUD	ECCID	SCVWD	SFPUC	Zone 7	SLDMWA	Total
Alt 1A	4	2	8	5	2	3	0.4	4	4	7	0	39
Alt 1B	3	2	8	5	2	3	0.4	4	5	6	0	36
Alt 2A	0	0	0	5	2	0	0.4	0	0	0	0	7
Alt 4A	2	2	3	5	2	1	0.5	2	4	2	0	23

3.1.3 Supplemental Water Supply

Supplemental water supplies are delivered to Local Agency Partners outside of the drought emergency periods depending on the specified needs of the agency. Deliveries to ACWD, EBMUD, and SCVWD that occur outside of the drought emergency periods are intended to help the agencies recover from droughts and are considered part of their drought management programs. Other agencies such as BBID, Brentwood, and ECCID require high quality water when the Delta is too salty and the Delta can be too salty on a seasonal basis during most water year types. Other agencies such as SFPUC, SLDMWA, and Zone 7 have indicated a need for new water supplies every year.

SFPUC and its wholesale customers (represented by BAWSCA) have indicated a possible need for an additional 16.7 TAF in all years to provide uninterruptible supply contracts to certain wholesale customers that currently have an interruptible water supply contract. Deliveries would be conveyed to the SFPUC/BAWSCA service area in either or both of two ways: (1) via the proposed Transfer-Bethany Pipeline connecting to the South Bay Aqueduct and then to the existing intertie in Milpitas between the SCVWD system and SFPUC's Regional Water System; and/or (2) through the existing EBMUD-CCWD Intertie that connects the Project to EBMUD's system and then to the existing intertie in the City of Hayward that connects EBMUD's system to SFPUC's Regional Water System. Supplemental water supplies delivered to SFPUC/BAWSCA would be Delta Surplus Water or water previously stored in Los Vaqueros Reservoir by EBMUD or SCVWD. See Chapter 2 for an expanded discussion of Delta Surplus Water and the other potential sources of water.

SLDMWA also has indicated a need for supplemental water supplies in all years. The Phase 2 Expansion would be operated in integration with CVP's Delta export operations in Alternatives 1A and 1B; CCWD would wheel Level 2 water supplies for the Refuges and by doing so could free up pumping capacity at the Jones Pumping Plant and enable additional Delta deliveries to other CVP south-of-Delta contractors and SLDMWA member agencies. For example, when Old and Middle River flow restrictions are controlling CVP and SWP export operations, CCWD could increase diversions at the Rock Slough or Freeport Intakes, which do not influence flows on Old and Middle Rivers, so that Refuges could receive water from CCWD facilities rather than from the CVP/SWP export facilities. Diversions at the CVP and SWP export facilities would not change, but exports that would have gone to the Refuges could then be delivered to other SLDMWA agencies.

Zone 7 has also indicated a need for up to 5 TAF of supplemental water supplies in all years. Supplies made available by the Phase 2 Expansion would be conveyed to Zone 7 via the Transfer-Bethany Pipeline and then through the South Bay Aqueduct.

Table 3-2 shows the long-term average of supplemental water supply benefits for the action alternatives. Alternatives 1A would deliver 32 TAF/year of supplemental water supply on average to Local Agency Partners. Alternative 1B would deliver 31 TAF/year of supplemental water supply on average to Local Agency Partners. Alternative 2A would provide the least supplemental water supply because deliveries to the Refuges rather than the Local Agency Partners are prioritized; Alternative 2A would deliver 9 TAF/year of supplemental water supplies. Alternative 4 A would deliver 26 TAF/year of supplemental water supply on average to Local Agency Partners.

TABLE 3-2
LONG TERM AVERAGE OF PHASE 2 EXPANSION SUPPLEMENTAL WATER SUPPLY BENEFITS NOT INCLUDING EMERGENCY DROUGHT PERIODS [TAF/YR]

	ACWD	BAWSCA	BBID	City of Brentwood	CCWD	EBMUD	ECCID	SCVWD	SFPUC	Zone 7	SLDMWA	Total
Alt 1A	5	0	1	2	0	4	0.2	1	17	1	1	32
Alt 1B	5	0	1	2	0	4	0.2	1	16	1	1	31
Alt 2A	0	0	0	2	0	0	0.2	0	5	0	0	9
Alt 4A	4	0	1	2	0	1	0.2	1	15	0	0	26

3.2 Ecosystem Improvement (CWC Public Benefit)

Storage projects submitting applications to the CWC will be evaluated and funded in part based on the value of the ecosystem improvements provided by the project. The CWC and CDFW have identified specific ecosystem priorities in the Water Storage Investment Program, one of which is water provided to enhance seasonal wetlands, permanent wetlands, and riparian habitat for aquatic and terrestrial species on State and Federal wildlife refuges. The primary ecosystem improvement benefit of the Phase 2 Expansion would be the increased deliveries of Incremental Level 4 supplies to the Refuge Water Supply Program for the Refuges. The Refuges are the few remaining sizable wetland habitats in the Central Valley and provide habitat and food for migratory birds of the Pacific Flyway and resident bird species, as well as many wildlife species.

As described in greater detail in Section 2.3.3, the CVPIA specifies two refuge water types, Level 2 and Incremental Level 4, for delivery to the Refuges. Level 2 supply is the average annual water supply received by these Refuges from various sources including agricultural return flows, accretion water, groundwater, water rights water, and limited amounts of Central Valley Project supplies, when available, between approximately 1974 through 1983. Incremental Level 4 supply is defined as the increment over Level 2 supplies needed to provide the full quantity of water required for optimal wetlands habitat development to support migratory birds, resident birds, and wildlife in the Refuges, to be acquired from willing sellers or by other voluntary measures. CVPIA authorizes CVP water transfers and exchanges to provide Incremental Level 4 supplies. Full Level 2 supplies have been made available annually to those Refuges with

sufficient conveyance capacity except in the drought years 2014 and 2015, but the full amount of Incremental Level 4 water has yet to be delivered due to several contributing factors including availability of these water supplies.

The Phase 2 Expansion seeks to provide the needed Incremental Level 4 supplies required under CVPIA to the Refuge Water Supply Program for the Refuges. Incremental Level 4 water would be conveyed through the proposed Transfer-Bethany Pipeline to the California Aqueduct and then to San Luis Reservoir, with limitations as described in Section 2.3.3. Incremental Level 4 supplies would be delivered directly from diversions at intakes in the Delta (Rock Slough, Old River, Middle River, and Freeport) and/or released from storage in Los Vaqueros Reservoir. Most of the Incremental Level 4 water delivered to the Refuge Water Supply Program for the Refuges by the Phase 2 Expansion would be Delta Surplus Water and existing CVP contract water from willing sellers such as the SCVWD.

Table 3-3 provides a summary of the long term average of the ecosystem improvement benefits of the action alternatives. Alternative 2A would provide the greatest ecosystem improvement benefit because meeting Refuge needs is the highest operational priority; 71 TAF/year on average of Incremental Level 4 water would be delivered to the Refuge Water Supply Program for the Refuges. The other action alternatives would provide lower ecosystem improvement benefits, between 38 and 46 TAF/year on average of Incremental Level 4 water would be delivered to the Refuge Water Supply Program for the Refuges. During the emergency drought periods identified above, Alternative 2A would deliver an average of 9 TAF/year of Incremental Level 4 water to the Refuge Water Supply Program for the Refuges while the other action alternatives would deliver an average of 1-2 TAF/year.

TABLE 3-3
LONG TERM AVERAGE OF PHASE 2 EXPANSION ECOSYSTEM IMPROVEMENT BENEFITS [TAF/YR]

	Long Term Average [TAF/yr]	Drought [TAF/yr]
Alt 1A	38	2
Alt 1B	46	1
Alt 2A	71	9
Alt 4A	41	1

3.3 Delivered Water Quality Improvements

Los Vaqueros Reservoir was initially constructed in 1998 to provide water quality benefits to CCWD customers while also providing benefits to the environment. Los Vaqueros Reservoir operations are unique in that diversions of fresh water to storage are timed to occur when fresh water is abundant in the Delta and the release of fresh water from storage into the CCWD system is timed to blend with Delta diversions when the Delta is salty or when there is an extended drought. These operations ensure reliable and consistently high quality water delivered to CCWD's customers.

The City of Brentwood (Brentwood) and East Contra Costa Irrigation District (ECCID) both rely on diversions from the Delta for a portion of their water supply and are therefore subject to variations in salinity and Delta water quality. ECCID has identified a need for water from the Phase 2 Expansion when Delta salinity exceeds 150 mg/L chloride to ensure that water delivered to their customers would not exceed their 150 mg/L salinity threshold for maintaining optimal agricultural conditions. Brentwood has identified a need for a source of water quality blending water, in order to help to continue to meet its National Pollutant Discharge Elimination System (NPDES) permit requirements for salinity in its treated wastewater effluent. Water from the Phase 2 Expansion would replace a portion of their more saline water supplies and would reduce the total salinity in the water delivered and ultimately discharged.

The Phase 2 Expansion would provide water quality improvements for Brentwood and ECCID and could result in incidental water quality improvements for CCWD customers by reducing the salinity of the water delivered to customers. **Table 3-4** shows a summary of the water quality benefits as measured by the reduction in salinity of water delivered to customers. Water quality benefits would be fairly uniform across all of the action alternatives. Although not shown, the Phase 2 Expansion would enable ECCID to achieve their desired water quality consistency and reliability goal by ensuring they could always deliver water at or below 150 mg/L chlorides. There would be no change to the operational rules for Los Vaqueros facilities currently used to ensure CCWD delivered water quality; any water quality benefits that accrue to CCWD are incidental to the operations of the action alternatives and do not represent an operational priority.

TABLE 3-4
LONG TERM AVERAGE OF PHASE 2 EXPANSION DELIVERED WATER QUALITY BENEFITS [REDUCTION IN MG/L CHLORIDE]

	CCWD	Brentwood	ECCID
Alt 1A	3	28	6
Alt 1B	3	29	6
Alt 2A	2	28	6
Alt 4A	2	28	6

3.4 State-wide and Regional Water System Integration

Under the Phase 2 Expansion, Los Vaqueros Reservoir would be operated in integration with the operation of other regional water supply projects to provide ancillary benefits and increase the flexibility of state-wide water operations. The Phase 2 Expansion would provide an additional way to store available CVP and SWP allocations for Local Agency Partners during wetter times for use at a later time. The Phase 2 Expansion would also provide greater flexibility to convey water to Local Agency Partners during times when CVP and SWP export facilities are constrained by regulations for fisheries protection. This increased operational flexibility would be particularly useful in delivering supplies during a drought. Integrating Phase 2 Expansion operations with CVP system operations could reduce constraints on CVP and SWP Delta export operations and enable incidental benefits to accrue to the Refuges and the Local Agency Partners.

Phase 2 Expansion operations would also be integrated with the operation of SCVWD's Silicon Valley Advanced Water Purification Center. SCVWD's Advanced Water Purification Center produces 8 million gallons per day currently, and at least 24,000 acre-feet per year of additional capacity is planned for the future. Water produced at the expanded facility would be used for groundwater recharge or direct potable reuse. The membrane technology employed at the Advanced Water Purification Center to treat the water produces purified water continuously, and that water must be sent somewhere even during wet times when local groundwater storage is at capacity and/or SWP and CVP allocations are sufficient to meet treated water demands. During wet times when SCVWD has excess supplies from the Advanced Water Purification Center, and/or SWP and CVP allocations, and limited local storage, the Phase 2 Expansion would allow the excess CVP and SWP supplies to be stored in Los Vaqueros Reservoir. These excess CVP and SWP supplies stored in Los Vaqueros Reservoir would then be used by SCVWD during a drought or would be made available to other Local Agency Partners and the Refuges when they have an unmet demand. Environmental review and permitting for the planned expansion of the Advanced Water Purification Center is being done by SCVWD outside the scope of the Phase 2 Expansion.

SCVWD and Zone 7 have also identified times when the Phase 2 Expansion would improve groundwater recharge and conjunctive use operations in their respective service areas. Deliveries from Los Vaqueros Reservoir to enhance groundwater recharge would typically occur after a major drought when deliveries from the Delta and local precipitation have been limited and groundwater resources are in need of replenishment.

3.5 Recreation (CWC Public Benefit)

The Los Vaqueros Watershed currently includes public recreational facilities that provide opportunities for boating, fishing, and education on 20,000 acres of managed land. The watershed has an extensive trail network open to equestrians, hikers and cyclists, and provides excellent bird watching opportunities for raptors such as Golden and Bald Eagles. The Phase 2 Expansion would provide increased recreational opportunities for visitors and maintain other existing benefits.

For Alternatives 1A, 1B, and 2A the existing Marina Complex would be inundated to make way for an expanded 275-TAF reservoir. A proposed new Marina Complex would replace the existing Marina Complex upslope of the existing facilities at the southern end of Los Vaqueros Reservoir.

The new Marina Complex would include an enlarged Marina building, and appurtenant buildings for storage, workshop space, water treatment and electrical equipment and other facilities needed for the operations and maintenance of the Marina Complex, as well as fishing piers and the fish cleaning station. An outdoor amphitheater, picnic tables, other public outdoor facilities, and parking would be built further upslope from the existing Marina facilities. Interpretive displays would be incorporated in the new Marina Complex. Docks with covered berths for three boats for rescue and water quality sampling would be constructed. Berths for 50 electric-powered rental boats and three pontoon boats would also be available. Solar panels would be incorporated into the roofing of the Marina Complex and other roofs as appropriate.

Los Vaqueros Interpretive Center. The existing Los Vaqueros Interpretive Center would be upgraded and enlarged within the existing developed location just north of the dam upslope of Kellogg Creek. This site has an educational pond, which would remain unchanged.

Los Vaqueros Watershed Office Barn. The existing old barn near the Los Vaqueros Watershed Office would be seismically and structurally upgraded without expanding the existing footprint, and would contain an interpretive exhibit about ranching history in the area and a classroom area for demonstrations and to complement the existing outdoor education program. A new conservation and native plant demonstration garden and an expanded parking area to accommodate school buses would be located in the vicinity of the old barn.

Los Vaqueros Watershed Trail. A new 0.5-mile ADA accessible interpretive trail surrounding the Mortero Wetland Complex located north of the Los Vaqueros Watershed Office would be added. The new trail would include interpretive displays, viewing facilities, and shade structures and would generally follow the existing gravel road/trail with loops, turnouts, and rest areas.

3.6 Summary of Benefits by Alternative

3.6.1 Alternative 1A Benefits

Table 3-5 contains a summary of the Phase 2 Expansion Alternative 1A benefits. Alternative 1A prioritizes water supply reliability to the Local Agency Partners. Most Local Agency Partners have identified their greatest water supply needs during drought emergencies. Alternative 1A would provide the greatest drought emergency supply reliability benefit by delivering 39 TAF/year on average to Local Agency Partners. Alternative 1A would provide a supplemental water supply benefit delivering 32 TAF/year on average to Local Agency Partners outside times of drought emergencies. Alternative 1A would provide an ecosystem improvement benefit by increasing the delivery of Incremental Level 4 supplies to the Refuge Water Supply Program for the Refuges by 38 TAF/year on average. Drinking water quality would improve because salinity of delivered water would be reduced by up to 28 mg/L chlorides.

3.6.2 Alternative 1B Benefits

Table 3-6 contains a summary of the Phase 2 Expansion Alternative 1B benefits. Alternative 1B would provide an ecosystem improvement benefit by increasing delivery of Incremental Level 4 supplies to the Refuge Water Supply Program for the Refuges by 46 TAF/year on average. Alternative 1B would provide a drought emergency supply reliability benefit by increasing deliveries to Local Agency Partners by 36 TAF/year. Alternative 1B would provide a supplemental water supply benefit by delivering 31 TAF/year on average to Local Agency Partners outside times of drought emergency. Delivered water quality would improve because salinity would be reduced by up to 29 mg/L chlorides.

TABLE 3-5
LONG TERM AVERAGE OF PHASE 2 EXPANSION ALTERNATIVE 1A BENEFITS

	Total Benefit
Water Supply Reliability: Non- Drought Emergency Supply Reliability – Public Benefit	Additional storage, infrastructure interconnections among Local Agency Partners, and integrated operations could improve water supply reliability in the event of a flood, earthquake, or levee failure in the Delta
Water Supply Reliability: Drought Emergency Supply Reliability [TAF/yr] – Public Benefit[1]	39
Water Supply Reliability: Supplemental Water Supply [TAF/yr][2]	32
Ecosystem Improvement Benefit [TAF/yr] – Public Benefit	38
Delivered Water Quality Improvement [reduction in mg/L Cl^-]	Up to 28
State-wide Water System Integration	Integration with CVP/SWP Delta operations and conjunctive use operations of Local Partner Agencies, facilitation of storing, transferring, and delivering water among Local Agency Partners
Recreation – Public Benefit	New marina, expanded interpretive center, upgraded interpretive facilities, new trail

NOTES:
1 Deliveries shown are for emergency drought periods (14 years total). Long-term average of drought deliveries over 82 years is 7 TAF/yr.
2 Deliveries shown are for non-emergency drought periods (68 years total). Long-term average of drought deliveries over 82 years is 27 TAF/yr.

TABLE 3-6
LONG TERM AVERAGE OF PHASE 2 EXPANSION ALTERNATIVE 1B BENEFITS

	Total Benefit
Water Supply Reliability: Non- Drought Emergency Supply Reliability – Public Benefit	Additional storage, infrastructure interconnections among Local Agency Partners, and integrated operations could improve water supply reliability in the event of flood, earthquake, or levee failure in the Delta
Water Supply Reliability: Drought Emergency Supply Reliability [TAF/yr] – Public Benefit[1]	36
Water Supply Reliability: Supplemental Water Supply [TAF/yr][2]	31
Ecosystem Improvement Benefit [TAF/yr] – Public Benefit	46
Delivered Water Quality Improvement [reduction in mg/L Cl-]	Up to 29
State-wide Water System Integration	Integration with CVP/SWP Delta export operations, conjunctive use operations of Local Partner Agencies, facilitation of storing, transferring, delivery water from Local Agency Partner to another
Recreation – Public Benefit	New marina, expanded interpretive center, upgraded interpretive facilities, new trail

NOTES:
1 Deliveries shown are for emergency drought periods (14 years total). Long-term average of drought deliveries over 82 years is 6 TAF/yr.
2 Deliveries shown are for non-emergency drought periods (68 years total). Long-term average of drought deliveries over 82 years is 26 TAF/yr.

3.6.3 Alternative 2A Benefits

Table 3-7 shows a summary of the benefits for Phase 2 Expansion Alternative 2A. Alternative 2A would provide the greatest amount of ecosystem improvement benefits by increasing delivery of Incremental Level 4 supplies to the Refuge Water Supply Program for the Refuges by 71 TAF/year on average. Alternative 2A would provide the smallest level of drought emergency supply reliability benefits by increasing deliveries to Local Agency Partners by 7 TAF/year on average during drought emergency periods. Alternative 2A would provide the smallest supplemental water supply benefits by delivering 9 TAF/year on average to Local Agency Partners during times outside drought emergency periods. Delivered water quality would improve because salinity would be reduced by up to 28 mg/L chlorides.

TABLE 3-7
LONG TERM AVERAGE OF PHASE 2 EXPANSION ALTERNATIVE 2A BENEFITS

	Total Benefit
Water Supply Reliability: Non- Drought Emergency Supply Reliability – Public Benefit	Additional storage, infrastructure interconnections among Local Agency Partners, and integrated operations could improve water supply reliability in the event of flood, earthquake, or levee failure in the Delta
Water Supply Reliability: Drought Emergency Supply Reliability [TAF/yr] – Public Benefit[1]	7
Water Supply Reliability: Supplemental Water Supply [TAF/yr][2]	9
Ecosystem Improvement Benefit [TAF/yr] – Public Benefit	71
Delivered Water Quality Improvement [reduction in mg/L Cl-]	Up to 28
State-wide Water System Integration	Integration with CVP/SWP Delta export operations, conjunctive use operations of Local Partner Agencies, facilitation of storing, transferring, delivery water from Local Agency Partner to another
Recreation – Public Benefit	New marina, expanded interpretive center, upgraded interpretive facilities, new trail

NOTES:
1 Deliveries shown are for emergency drought periods (14 years total). Long-term average of drought deliveries over 82 years is 4 TAF/yr.
2 Deliveries shown are for non-emergency drought periods (68 years total). Long-term average of drought deliveries over 82 years is 7 TAF/yr.

3.6.4 Alternative 4A Benefits

Table 3-8 shows a summary of benefits for Phase 2 Expansion Alternative 4A. Alternative 4A would not expand the existing 160-TAF Los Vaqueros Reservoir storage capacity. Alternative 4A has the same operational priorities as Alternative 1B and is formulated to maximize potential project deliveries to both the Local Agency Partners and the Refuge Water Supply Program for the Refuges. Alternative 4A would provide ecosystem improvement benefits by increasing delivery of Incremental Level 4 supplies to the Refuge Water Supply Program for the Refuges by 41 TAF/year on average. Alternative 4A would provide drought emergency supply benefits by delivering 23 TAF/year on average to Local Agency Partners during the drought emergency periods.

Alternative 4A would provide supplemental water supply benefits by delivering 26 TAF/year to Local Agency Partners during times outside of the drought emergency periods. Delivered water quality would improve because salinity would be reduced by up to 28 mg/L chlorides.

TABLE 3-8
LONG TERM AVERAGE OF PHASE 2 ALTERNATIVE 4A BENEFITS

	Total Benefit
Water Supply Reliability: Non- Drought Emergency Supply Reliability – Public Benefit	Additional storage, infrastructure interconnections among Local Agency Partners, and integrated operations could improve water supply reliability in the event of flood, earthquake, or levee failure in the Delta
Water Supply Reliability: Drought Emergency Supply Reliability [TAF/yr] – Public Benefit[1]	23
Water Supply Reliability: Supplemental Water Supply [TAF/yr][2]	26
Ecosystem Improvement Benefit [TAF/yr] – Public Benefit	41
Delivered Water Quality Improvement [reduction in mg/L Cl-]	Up to 28
State-wide Water System Integration	Integration with CVP/SWP Delta export operations, conjunctive use operations of Local Partner Agencies, facilitation of storing, transferring, delivery water from Local Agency Partner to another
Recreation – Public Benefit	Expanded interpretive center, upgraded interpretive facilities, new trail

NOTES:
1 Deliveries shown are for emergency drought periods (14 years total). Long-term average of drought deliveries over 82 years is 4 TAF/yr.
2 Deliveries shown are for non-emergency drought periods (68 years total). Long-term average of drought deliveries over 82 years is 21 TAF/yr.

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