Executive Summary

The Los Vaqueros Reservoir Expansion Investigation (Investigation) is a feasibility study that provides an evaluation of alternatives to develop environmental water supplies and improve the reliability and quality of San Francisco Bay Area (Bay Area) water supplies, primarily through the expansion of Los Vaqueros Reservoir in Contra Costa County, California. This Feasibility Report for the Investigation presents potential plans to accomplish the project objectives and makes recommendations for further action.

Expansion of Los Vaqueros Reservoir, owned and operated by Contra Costa Water District (CCWD), is being conducted in two phases. A Final Environmental Impact Statement (EIS)/Environmental Impact Report (EIR) was completed in 2010 (2010 Final EIS/EIR) and served as the basis for Phase 1 construction, which was completed in 2012. A draft Supplement to the Final EIS/EIR (Supplement) was released to the public in July of 2017 to reflect changes since the 2010 Final EIS/EIR, including refined alternatives being considered for a Phase 2 expansion.

This Feasibility Report presents the results of planning, engineering, environmental, social, economic, and financial studies and potential benefits and effects of alternative plans. The Feasibility Report, along with the 2010 Final EIS/EIR and Supplement, will eventually be used by the Secretary of the Interior and U.S. Congress to determine the type and extent of Federal interest in enlarging Los Vaqueros Reservoir.

Background

Los Vaqueros Reservoir is an offstream storage facility located in the coastal foothills west of the Sacramento-San Joaquin Delta (Delta) in the eastern Bay Area. CCWD, owner and operator of the reservoir, provides water for 500,000 customers throughout central and eastern Contra Costa County as one of the largest urban water districts in California (CCWD 2017). CCWD completed construction of the Los Vaqueros Project in 1997 with an original storage capacity of 100 thousand-acre-feet (TAF). CCWD stores water in Los Vaqueros Reservoir that is diverted from the Delta when water quality is favorable, for later release and blending when Delta water quality is degraded. An initial expansion, Phase 1, to 160 TAF was completed in 2012. The primary purpose of both phases of the project is to address seasonal water quality degradation associated with CCWD’s Delta water supplies. The 160 TAF reservoir also provides important emergency water supply storage and, as secondary benefits, recreation and flood management.
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Expansion of Los Vaqueros Reservoir was one of five potential surface water storage projects identified by the CALFED Bay-Delta Program (CALFED) as warranting further study. In 2001, the U.S. Department of the Interior, Bureau of Reclamation (Reclamation), California Department of Water Resources, and CCWD began appraisal-level studies of the potential to expand Los Vaqueros Reservoir to address regional water quality and supply reliability needs. The appraisal-level studies indicated that expanding the reservoir to as much as 500 TAF capacity was technically feasible and could provide water quality and supply reliability to agencies in the region, as well as providing potential benefits to fisheries sensitive to water management operations in the Delta.

Subsequently, Reclamation was directed in Public Law 108-7 (Omnibus Appropriations Act of 2003) to conduct a feasibility-level investigation of the potential expansion of Los Vaqueros Reservoir. In 2004, voters in CCWD’s service area were asked to vote on whether CCWD should consider expanding the reservoir. The advisory ballot measure won approval, and as a result, the proposed expansion project was further developed and refined through preparation of environmental documentation in accordance with the National Environmental Policy Act (NEPA) and California Environmental Quality Act (CEQA), and extensive public outreach.

After the Draft EIS/EIR was published in 2009 by Reclamation, a two-step approach was implemented for expanding Los Vaqueros Reservoir. This was done in order for CCWD to move forward with addressing urgent water supply and quality needs, particularly during dry years, while the feasibility-level investigation was still in process. The initial Phase 1 expansion was completed as a local action by CCWD, without financial assistance from the Federal government. Because it was done without State or Federal assistance, this feasibility-level investigation was put on hold until after completion of the initial expansion. To implement this initial expansion, the CCWD Board of Directors (CCWD Board) certified the EIS/EIR (Reclamation and CCWD 2010) and approved an expansion from 100 TAF to 160 TAF on March 31, 2010. Reclamation issued a Record of Decision (ROD) in February 2011 to enter into an Integrated Operations Agreement with CCWD based on the 2010 EIS/EIR. Construction on the initial expansion began in early 2011 and was completed in 2012.

Reclamation and CCWD continue to investigate the feasibility of larger expansion alternatives, as documented in this Feasibility Report, because earlier appraisal-level studies indicated that an additional expansion of Los Vaqueros Reservoir beyond the initial 60 TAF would provide additional regional water supply reliability and statewide environmental benefits. This feasibility-level investigation includes updates to the project plans and studies previously performed to account for significant changes to existing conditions that have occurred since the
2010 EIS/EIR was released, as well as to account for changes that are anticipated to take place within the coming years. These changes include CCWD’s initial expansion of Los Vaqueros Reservoir to 160 TAF and the operation of this expanded storage space, other local infrastructure changes (e.g., Contra Costa Canal Replacement Project), likely water management constraints resulting from regulatory actions in the Delta and large programs such as California WaterFix, and new project beneficiaries to participate in the Investigation.

Study Area

Los Vaqueros Reservoir is located in the Kellogg Creek watershed of Contra Costa County, California in the central and south Delta, as shown in Figure ES-1. The primary study area for the Investigation includes the Los Vaqueros Reservoir watershed and associated facilities, central and south Delta, and service areas of potential Bay Area partner water agencies. The central and south Delta is roughly bound by the San Joaquin River on the north and the boundaries of the legal Delta to the south (as established in Section 12220 of the California Water Code). Potential local partner water agencies include CCWD, Alameda County Water District, Santa Clara Valley Water District, the Alameda County Flood Control and Water Conservation District, Zone 7, East Bay Municipal Utility District, Bay Area Water Supply and Conservation Agency, Byron-Bethany Irrigation District, City of Brentwood, East Contra Costa Irrigation District, San Francisco Public Utilities Commission, and San Luis & Delta-Mendota Water Authority. These are collectively referred to as Local Agency Partners herein. Other potential partners include the California Department of Fish and Wildlife and U.S. Fish and Wildlife Service, managing agencies of the south-of-Delta Central Valley Project Improvement Act (CVPIA) designated wildlife refuges (Refuges), and the Grassland Water District, which represents those privately owned/managed wetlands also included in these fourteen total Refuges.

Due to the potential influence on other programs and projects, an extended study area was identified for the Investigation. The extended study area includes south-of-Delta Central Valley wildlife Refuges, operational areas of the Central Valley Project (CVP) and State Water Project (SWP), and the service areas of other Bay Area water agencies that may be indirectly affected by project operations.

Problems, Needs, and Opportunities

Major identified water and related resources problems, needs, and opportunities in the primary study area include environmental water management, Bay Area water supply reliability, and Bay Area water quality, as described below.
Environmental Water Management

The Delta is the largest estuary on the West Coast and provides essential habitat for a diverse array of wildlife, resident and migratory fish, and other freshwater and estuarine organisms. Because of Delta ecosystem decline over the past decades, several of the resident and migratory fish species in the Delta have been listed under the Federal Endangered Species Act and/or California Endangered Species Act, including delta smelt, winter-run Chinook salmon, spring-run Chinook salmon, Central Valley steelhead, longfin smelt, and Green Sturgeon.

Environmental water management programs have been created to provide CVP and SWP operators with flexibility in meeting or exceeding environmental requirements in the Delta, and to support related water and environmental management objectives elsewhere in the Central Valley. Current environmental water management programs include CVPIA Section 3406 (b)(2) water, the CVPIA Section 3406 (b)(3) Water Acquisition Program, and the Anadromous Fish Restoration Program water supplies.

The CVPIA established fish and wildlife management as a co-equal priority with other CVP water uses. It also mandated creation of the Refuge Water Supply Program to secure and deliver a reliable, clean water supply to support the wetland habitat needs of nineteen Federal, state, and private wildlife refuges in California’s Central Valley. The refuges encompass a critical portion of the last remaining five percent of the historic wetlands that once existed in the Central Valley, providing birds of the Pacific Flyway habitat during vital migration periods.
Sections 3406(d)(1) through 3406(d)(4) of the CVPIA define requirements for refuge water supplies. The CVPIA directs Reclamation to deliver 555,515 acre-feet per year of firm and reliable water supplies to the refuges, comprised of Level 2 and Level 4 (optimum) supplies. Level 2 water is provided from CVP supplies and Incremental Level 4 (the difference between Level 2 and full Level 4 supplies) is acquired through voluntary measures. However, current programs have a limited ability to provide reliable, long-term, and year-round water supplies that meet the established wildlife refuge needs. Since passage of the CVPIA, full Level 4 refuge supplies to the nineteen refuges have never been achieved.

The Refuge Water Supply Program is responsible for acquiring and delivering refuge water supplies. Since its inception in 1994, the program has secured 9,300 acre-feet of permanent water supplies for Incremental Level 4 toward the annual target of 131,521 acre-feet. Remaining historical deliveries have been met by short-term (annual) and medium-term (multi-year) purchases or exchanges from willing sellers of both surface water and groundwater supplies.

Since passage of the CVPIA, delivery of full Level 4 refuge supplies to all of the designated refuges has never been achieved. Refuges without conveyance constraints have received full Incremental Level 4 deliveries only in the wettest of years, i.e. 2011 and 2017. From 1994 to 2016, average annual Incremental Level 4 refuge water supply deliveries were less than 50 percent of total Incremental Level 4 demands, before accounting for conveyance losses. During the peak of California’s historical drought in 2014 and 2015, the Refuge Water Supply Program was unable to acquire water supplies on the spot market because of scarcity and high prices. This further demonstrates the need for additional reliable and economical long-term supplies for Incremental Level 4.

Challenges in meeting wildlife refuge allocations include the availability of limited water supplies, particularly during droughts; the ability of the Refuge managers to move and store water supplies (lack of dedicated conveyance and storage capacity); water quality and groundwater pumping impacts, especially under the Sustainable Groundwater Management Act; and the increasing cost of water supplies. Water pricing inflation and increasing conveyance costs, combined with static funding levels, will continue to constrain water deliveries to wildlife Refuges. These challenges are likely to increase into the future due to forecasted increases in competition for the finite water resources in California, suggesting the need to provide reliable, long-term water supplies and improve operational flexibility for unmet environmental water needs. An expanded Los Vaqueros Reservoir could provide a dedicated, long-term, Incremental Level 4 Refuge water supply through dedicated storage and new conveyance facilities, allowing environmental water management programs to improve operational flexibility.
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Water Supply Reliability
Bay Area water agencies rely heavily on the Delta and other imported water supplies. CCWD customers receive more than 90 percent of their supply from the Delta, while the three Bay Area water agencies that receive SWP water – Alameda County Water District, Santa Clara Valley Water District, and Alameda County Flood Control and Water Conservation District, Zone 7 – each receive 40 to 65 percent of their supply from the Delta (ACWD 2015; SCVWD 2015; Zone 7 2016). Bay Area water agencies have each diversified their water supply portfolios to include increased conservation, water recycling, and multiple sources of supply, including local groundwater and storage. Although these diversified supply portfolios provide flexibility in responding to droughts and emergencies, Bay Area water agencies remain especially vulnerable to Delta supply interruptions and statewide water supply shortages.

During recent droughts, Bay Area water agencies experienced substantial cutbacks in water supply. Aggressive conservation programs, storage in local reservoirs and groundwater basins, and water transfers have helped these agencies manage water supplies and minimize the severity of rationing for their customers during dry years. However, shortages in dry and critically dry years are expected to increase, and competition for California’s finite water supplies may affect the ability of Bay Area water agencies to acquire water on the open market. There is an increasing need to improve dry-year water supply reliability for Bay Area water agencies and California as a whole, particularly beyond 2030. An expanded Los Vaqueros Reservoir, associated intakes equipped with state-of-the-art fish screens, and conveyance facilities would provide valuable operational flexibility to improve Bay Area supply reliability.

Emergency Water Supply
California’s water operations, as well as Bay Area water agencies, rely on a fragile Delta levee system that is under increasing risks from floods, earthquake, and climate change. Multiple levee failures, or a failure when Delta inflows are low, could cause saltwater intrusion as far south as the CVP and SWP pumping facilities, affecting the water supplies of millions of Californians. As seismic strain continues to accumulate on Bay Area faults, aging levees are increasingly vulnerable to failure caused by earthquakes. Sea level rise and climate change further compound these risks.

An expanded Los Vaqueros Project, as part of a regional water resources project, could provide a reliable source of emergency water supply in the event that Delta water deliveries were disrupted by a severe flood or earthquake, or constrained by regulatory actions. Water stored in an expanded Los Vaqueros Project could provide emergency supplies to a variety of Bay Area water agencies in the event of a prolonged disruption.

Bay Area Water Quality
Although California water quality standards have been maintained, the quality of water supplies in the study area has generally declined over the past century due to saline intrusion resulting from water resources development; polluted runoff from urban, agricultural, and other development; and changes to the physical environment. Because Bay Area water agencies typically blend water from various local and imported sources to attain a desired quality, water quality in the study area is a function of both water source and volume. The ratio of local to imported supplies in any given year, and effectiveness of blending, depends on CVP and SWP allocations, the quality of supplies drawn from the Delta, and the availability of local supplies.
Furthermore, water imported from the Delta represents a key resource for local groundwater recharge and management programs.

Various projects and programs have been implemented to improve the quality of Bay Area water supplies. However, seasonal degradation of Delta water quality will likely continue into the future as rising demands for water in the Central Valley exert pressure on the Delta system and sea levels continue rising. As substitute supplies become scarcer in the future, it will become more difficult and costly for Bay Area water agencies to provide high quality water. Accordingly, the desire to improve or maintain the quality of water deliveries to municipal and industrial (M&I) customers in the Bay Area will continue into the future.

Public Involvement and Outreach and Study Management

In Phase 1 of the Investigation, an extensive public and stakeholder involvement process was implemented that included working groups, public workshops, stakeholder and agency meetings, newsletters, and a project website. Between 2001 and 2006, Reclamation and CCWD conducted more than 170 meetings with regional water task forces, city and county governments and local water agencies (approximately 100), elected officials (approximately 15), media (approximately 10), other Delta-related projects, environmental and stakeholder groups, homeowners associations in the project area, and potentially-affected landowners (approximately 45). During the period of study in which CALFED was still active, CCWD and Reclamation presented at various CALFED-related public meetings, including environmental justice workshops and tribal forums, and met with individual agency staff. Reclamation, California Department of Water Resources, and CCWD were also regular participants in the CALFED Bay-Delta Public Advisory Committee, Water Supply Subcommittee.

Public and stakeholder involvement has continued throughout Phase 2 of the Investigation, including coordination meetings between the Local Agency Partners and CCWD; multi-agency meetings among Reclamation, CCWD, and Local Agency Partners; and meetings among CCWD, Reclamation, Refuge managers, non-governmental organizations, and other Refuge stakeholders. Public meetings to present the Phase 2 expansion project and receive input were also held after the Supplement to the Final EIS/EIR was released to the public in July 2017. In addition, presentations and discussions of the Phase 2 expansion occurred regularly in venues such as East Bay Leadership Council Water Task Force meetings, Bay Area Regional Reliability Drought Task Force meetings, Association of California Water Agency meetings and conferences, and Water Education Foundation activities.

Planning Objectives, Constraints, Principles, and Criteria

This section discusses the planning objectives, constraints, and other considerations specific to the Investigation.
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National Planning Objectives
The Federal objective is defined in the Economic and Environmental Principles and Guidelines for Water and Related Land Resources Implementation Studies (P&G) (WRC 1983) as follows:

*The Federal objective of water and related resources project planning is to contribute to national economic development consistent with protecting the Nation’s environment, pursuant to national environmental statutes, applicable executive orders, and other Federal planning requirements.*

The National Water Resources Policy defined in the Water Resources Development Act of 2007 (Public Law 110-114, Section 2031), also specifies that Federal water resources investments should reflect national priorities, encourage sustainable economic development, and protect people and the natural environment.

For the Investigation, the approach to evaluating public benefits is consistent with the P&G. In 2015, the Council on Environmental Quality completed an interagency effort to update the 1983 P&G. This effort led to the development of the Principles, Requirements and Guidelines for Water and Land Related Resources Implementation Studies (PR&G), and various agency specific guidelines for their application. However, the PR&G apply only to plans or projects that are initiated after the PR&G take effect; therefore the P&G are the primary guidelines used for the Investigation. The approach to quantifying and monetizing benefits in the PR&G and the P&G are not significantly different (DOI 2015).

Los Vaqueros Expansion-Specific Planning Objectives
The Investigation planning objectives were developed based on identified water resources problems, needs, and opportunities in the study area and specific direction in the study authorization, and are consistent with the P&G and other Reclamation guidance.

The Investigation objectives are to use an expanded Los Vaqueros Reservoir system to:

**Primary Objectives**
- Develop water supplies for environmental water management that support fish protection, habitat management, and other environmental water needs.
- Increase water supply reliability for water providers within the Bay Area, help meet M&I water demands during drought periods and emergencies, or to address shortages due to regulatory and environmental restrictions.

**Secondary Objective**
- Improve the quality of water deliveries to M&I customers in the Bay Area without impairing the project's ability to meet the environmental and water supply reliability objectives stated above.

Planning Constraints and Other Considerations
The P&G provides fundamental guidance for the formulation of Federal water resources projects. In addition, basic constraints and other considerations specific to the Investigation must
be developed and identified. Several key constraints identified for the Investigation are described below.

**Study Authorizations**
The Secretary of the Interior was authorized to undertake feasibility studies for enlarging Los Vaqueros Reservoir in February 2003 through the Bay-Delta Authorization Act (Public Law 108-7). This act authorized the Secretary of the Interior to conduct feasibility studies for several storage projects identified in the CALFED Programmatic ROD (CALFED 2000a), including the Investigation. Federal authorization was reaffirmed in Public Law 108-361.

Additionally, the CCWD Board adopted a set of principles in April 2000 governing CCWD’s participation in an expansion project. On June 25, 2003, the CCWD Board formally adopted the conditions approved by the voters to guide CCWD’s participation in any expansion of Los Vaqueros Reservoir. On March 2, 2004, voters in the CCWD service area authorized the CCWD Board to participate with Federal and California state agencies in feasibility studies and environmental review of an expanded Los Vaqueros Reservoir.

**CALFED Programmatic ROD**
CALFED was established to “develop and implement a long-term comprehensive plan that would restore ecological health and improve water management for beneficial uses of the Bay-Delta system.” The 2000 CALFED Programmatic Environmental Impact Statement/Environmental Impact Report and Programmatic ROD (CALFED 2000b, CALFED 2000a) include program goals, objectives, and projects to benefit the Bay-Delta system. The CALFED Programmatic ROD has been adopted by various Federal and California state agencies as a framework for further consideration. The objectives for the Investigation are consistent with the CALFED Programmatic ROD (CALFED 2000a) for Los Vaqueros enlargement, as follows:

*Expand Los Vaqueros Reservoir by up to 400 TAF with local partners as part of a Bay Area water quality and water supply reliability initiative. As part of a Bay Area initiative, an expanded Los Vaqueros Reservoir would provide water quality and water supply reliability benefits to Bay Area water users. As an existing reservoir operated by the Contra Costa Water District (CCWD), the Los Vaqueros Reservoir is subject to a number of mandates and agreements. DWR and Reclamation will work with CCWD and interested stakeholders to assure that previous commitments, including local voter approval required for expansion, are respected.*

The Investigation relies on alternative development and screening included in the CALFED Programmatic Environmental Impact Statement/Environmental Impact Report. CALFED conducted an initial screening of 52 potential surface water storage sites to reduce the number of sites to a more manageable number for more detailed evaluation during project-specific studies (2000b). Surface water storage sites recommended by CALFED for subsequent evaluation, and included in the Preferred Program, focused on those with the most potential for helping meet CALFED goals and objectives: Shasta Lake enlargement, Los Vaqueros Reservoir Expansion, Sites Reservoir, In-Delta Storage, and development of storage in the upper San Joaquin River Basin (CALFED 2000a).
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California Water Quality, Supply, and Infrastructure Improvement Act of 2014 (Proposition 1)

California Water Quality, Supply, and Infrastructure Improvement Act of 2014 (Proposition 1) is a general obligation bond proposal that provides funding for California water supply infrastructure projects such as public water system improvements, surface and groundwater storage, drinking water protection, water recycling and advanced water treatment technology, water supply management and conveyance, wastewater treatment, drought relief, emergency water supplies, and ecosystem and watershed protection and restoration. The bond dedicated $2.7 billion for investments in water storage projects and designated the California Water Commission as the California state agency responsible for appropriately allocating these funds. The California Water Commission, through the Water Storage Investment Program, will fund the public benefits of these projects. CCWD submitted a funding application to the Water Storage Investment Program in August 2017 for state funding of the public benefits of the Phase 2 expansion project.

Laws, Regulations, and Policies

Numerous laws, regulations, executive orders, and policies need to be considered, including, for example, NEPA and CEQA, the CVPIA of 1992, the SECURE Water Act, the Clean Water Act, and the Water Infrastructure Improvements for the Nation Act (Public Law 114-322), which provides requirements for storage projects using this authorization mechanism.

CCWD Board Principles

The CCWD Board’s 2003 Resolution No. 03-24 and Measure N, approved by the CCWD voters on March 2, 2004, were both considered in developing alternatives. In Resolution No. 03-24, the CCWD Board determined that CCWD would not participate in or support the proposal for expansion of Los Vaqueros Reservoir unless the CCWD Board determined the proposal meets conditions relating to CCWD ownership, CCWD customer water rates, and project benefits.

Planning Criteria

The Federal planning process in the P&G includes four specific criteria for consideration in formulating and evaluating alternatives: completeness, effectiveness, efficiency, and acceptability (WRC 1983).

- Completeness is a determination of whether a plan includes all elements necessary to realize planned effects and the degree to which intended benefits of the plan depend on the actions of others.

- Effectiveness is the extent to which an alternative alleviates problems and achieves objectives.

- Efficiency is the measure of how efficiently an alternative alleviates identified problems while realizing specified objectives consistent with protecting the Nation’s environment.

- Acceptability is the workability and viability of a plan concerning its potential acceptance by other Federal agencies, California state and local governments, and public interest groups and individuals.
Formulation of Alternative Plans

The interactive plan formulation process was separated into multiple phases, as described below:

- **Initial Plans Phase** – The Initial Plans Phase identified future conditions without the project and identified resulting resource problems and opportunities; a specific set of planning objectives; planning criteria and constraints; resources management measures to address the planning objectives; a set of initial plans (also referred to as “concept plans”); and initial plans for further evaluation in the Comprehensive Alternatives Phase. The Initial Plans Phase is summarized in the *Initial Alternatives Information Report* (Reclamation 2005) and the *Initial Economic Evaluation for Plan Formulation Report* (Reclamation 2006). The initial alternatives explored various combinations of management measures, including: (1) increased storage in Los Vaqueros Reservoir to achieve up to 500 TAF total storage capacity; (2) new and expanded raw water intakes in the Delta; (3) conveyance pipelines and tunnels to enable delivery of water from the expanded reservoir to SWP users; (4) desalination; and (5) operational scenarios and priorities to achieve the primary planning objectives. Among the key findings, a 275 TAF reservoir expansion option was identified as an important cost breakpoint in reservoir expansion, and a pipeline with a tie-in to Bethany Reservoir was identified as providing high potential to deliver water supplies to a variety of potential beneficiaries.

- **Alternative Plans Phase** – The Alternative Plans Phase included further refinement of the initial plans to develop a set of alternative plans, followed by evaluation and comparison of the alternative plans. This phase included preparing and circulating the 2009 Draft and 2010 Final EIS/EIR (Reclamation and CCWD), which evaluated expansion of Los Vaqueros Reservoir in a two-phase approach with an initial expansion to 160 TAF (Phase 1), followed by a later expansion up to 275 TAF (Phase 2). Based on the 2010 Final EIS/EIR and other supplemental evaluations, CCWD implemented the initial expansion of Los Vaqueros Reservoir to 160 TAF without financial assistance from the Federal Government. Construction was completed in 2012, but did not preclude opportunities for further expansion of the reservoir.

- **Alternative Refinement and Recommended Plan Phase** – This current phase of the plan formulation process focuses on evaluating the feasibility of further expanding Los Vaqueros Reservoir through refinement, evaluation, and comparison of the alternative plans evaluated in the 2010 Final EIS/EIR. These alternatives are refined to reflect (1) the implementation of the 160 TAF dam raise in 2012, (2) updated information about water supply demand and operational preferences from Local Agency Partners and the Refuges, and (3) changes in regulatory and environmental conditions since 2010. A draft Supplement was released in July of 2017 to address changes since the 2010 Final EIS/EIR was completed. This Feasibility Report summarizes evaluation of the refined alternatives and identifies a recommended plan for implementation in Phase 2.

**Final Alternatives**

The Final Alternatives evaluated in this Feasibility Report are described below.
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No Action Alternative (No Additional Federal Action)

The No Action Alternative represents a projection of reasonably foreseeable future conditions that could occur if no action alternatives are implemented (i.e., the future without the proposed project). Reclamation recommends several criteria for including proposed future actions within the No Action Alternative; proposed actions should be (1) authorized; (2) approved through completion of NEPA, CEQA, and Endangered Species Act compliance processes; (3) funded; and (4) permitted.

Under the No Action Alternative, the Federal Government would continue to implement reasonably foreseeable actions, as defined above, but Reclamation and CCWD would not take additional actions toward implementing the second phase of Los Vaqueros Reservoir expansion to help improve water supply reliability and environmental water management. The No Action Alternative is considered the basis for comparison with the Final Alternatives, consistent with NEPA and the P&G (WRC 1983) guidelines. Therefore if no proposed action is determined feasible, the No Action Alternative is the default option.

For the purpose of this Feasibility Report, the action that was implemented by CCWD following certification of the 2010 Final EIS/EIR, Alternative 4, is the existing condition and is used to represent the No Action Alternative. CCWD would continue operating the 160 TAF 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, and no new facilities would be constructed. 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 Project, except through separate partnership agreements that could be developed in the future but are not contemplated in this analysis.

Action Alternatives

The Action Alternatives evaluated in the Feasibility Report are summarized in Table ES-1. These alternatives are refined options of the original four alternatives evaluated in the 2010 EIS/EIR and account for changes to existing conditions that have occurred since the 2010 EIS/EIR was released (e.g., expansion of Los Vaqueros Reservoir to 160 TAF, completion of other local projects). They also account for changes that are anticipated to take place within the coming years. These alternatives are operated to provide varying levels of emphasis to project objectives.

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. None of these actions would occur under Alternative 4A. All of the action alternatives would upgrade the existing Transfer Facility, build a new Transfer-Bethany Pipeline, increase capacity at Pumping Plant #1, and add facilities to deliver water to the Transfer Facility from the Rock Slough Intake, including a new Neroly High-Lift Pump Station. Alternatives 1A, 1B, and 2A differ from one another only in the proposed operations of the facilities. Figure ES-2 shows the facilities associated with Alternatives 1A, 1B, and 2A. Figure ES-3 shows the facilities associated with Alternative 4A.
Table ES-1. Summary of Facilities for the Final Alternatives

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<th>Existing Facilities (no change)</th>
<th>No Action</th>
<th>Alternatives 1A, 1B, 2A</th>
<th>Alternative 4A</th>
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<tr>
<td>Old River Intake</td>
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<td>Middle River Intake</td>
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<td>EBMUD-CCWD Intertie</td>
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<td>Transfer Reservoir</td>
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<td>Expanded Transfer Facility Pump Station Capacity</td>
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</tr>
<tr>
<td>Los Vaqueros Watershed Trails</td>
<td>None</td>
<td>Expanded</td>
<td>None</td>
</tr>
<tr>
<td>Los Vaqueros Interpretive Center</td>
<td>No change</td>
<td>Improved</td>
<td>Improved</td>
</tr>
<tr>
<td>Los Vaqueros Watershed Office Barn</td>
<td>No change</td>
<td>Seismically upgraded and improved</td>
<td>Seismically upgraded and improved</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Associated Local Projects(^3)</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>EBMUD Mokelumne Aqueduct relining</td>
<td>None</td>
<td>Included</td>
<td>Included</td>
</tr>
<tr>
<td>EBMUD Walnut Creek Pumping Plant Variable Frequency Drives</td>
<td>None</td>
<td>Included</td>
<td>Included</td>
</tr>
<tr>
<td>EBMUD-CCWD Intertie Pump Station</td>
<td>None</td>
<td>155 cfs</td>
<td>155 cfs</td>
</tr>
<tr>
<td>Brentwood Pipeline</td>
<td>None</td>
<td>Included</td>
<td>Included</td>
</tr>
<tr>
<td>ECCID Intertie</td>
<td>None</td>
<td>80 cfs</td>
<td>80 cfs</td>
</tr>
</tbody>
</table>

Note:
1 Alternatives 1A, 1B, and 2A differ from one another only in the proposed operations of the facilities.
2 Permitted capacity is 350 cfs as defined in the Supplement to the Final EIS/EIR. 300 cfs is the capacity modeled and designed under the Feasibility Study to reflect the current operation requirements.
3 Local Projects developed separately from the Feasibility Study, but linked to the operations of the project.

Key:
CCWD = Contra Costa Water District
cfs = cubic-feet per second
EBMUD = East Bay Municipal Utility District
ECCID = East Contra Costa Irrigation District
TAF = 1,000 acre-feet
Executive Summary

Figure ES-2. Major Components of Alternatives 1A, 1B, and 2A
Figure ES-3. Major Components of Alternative 4A
Executive Summary

Alternative 1A
Alternative 1A is formulated to maximize deliveries for water supply reliability to the Local Agency Partners, including drought and emergency supply reliability. The operations follow these four priorities:

1) Available water (Delta surplus and Local Agency Partners’ water rights and contracts) would first be delivered to meet Local Agency Partner demand, if any.

2) If water and CCWD system capacity were still available, water would then be stored in Los Vaqueros Reservoir for later use by the Local Agency Partners.

3) If additional CCWD system capacity were still available and if CVP north-of-Delta storage conditions allowed withdrawals (high storage conditions only), the next priority would be to wheel CVPIA Level 2 Refuge water through CCWD facilities for delivery to the Refuges. Conducted in coordination with Refuge managers, this operation would release capacity at Jones Pumping Plant that could then be used to move additional water to CVP south-of-Delta contractors. This wheeling operation would not provide additional water supply to the Refuges; rather the released capacity at Jones Pumping Plant could be used to make additional CVP allocations or water transfers.

4) If water and CCWD system capacity were still available after the above three operations, additional deliveries would then be made to help meet Incremental Level 4 Refuge demand.

Alternative 1B
Alternative 1B includes the same facilities as Alternative 1A. Alternative 1B is formulated to maximize potential project deliveries to both Local Agency Partners and Refuges. Alternative 1B balances the priorities of water supply reliability to the Local Agency Partners with environmental water management for the Refuges. The operations follow these four priorities:

1) Available water (Delta surplus and Local Agency Partners’ water rights and contracts) would first be delivered to meet Local Agency Partner demand, if any.

2) If water and CCWD system capacity were still available, additional deliveries would then be made to help meet Incremental Level 4 Refuge allocations.

3) If water and CCWD system capacity were still available, water would then be stored in Los Vaqueros Reservoir for later use by the Local Agency Partners or Refuges.

4) If additional CCWD system capacity were still available after the above three operations, the next priority would be to wheel Delta surplus water through CVP facilities to meet Level 2 Refuge demands. Conducted in coordination with the Refuge managers, this operation would release capacity at Jones Pumping Plant to move additional water to CVP south-of-Delta contractors. Wheeling would not provide a new water supply to the Refuges; rather the released capacity at Jones Pumping Plant could be used to make additional CVP allocations or water transfers.
**Executive Summary**

**Alternative 2A**
Alternative 2A includes the same facilities as Alternatives 1A and 1B. Alternative 2A is formulated to maximize potential project Incremental Level 4 deliveries to the Refuges, prioritizing environmental water management operations. The operations follow these three priorities:

1) Available water (Delta surplus and Local Agency Partners’ water rights and contracts) would first be delivered to help meet Incremental Level 4 Refuge allocations.

2) If water and CCWD system capacity were still available, water would then be stored in Los Vaqueros Reservoir for later use by the Refuges.

3) If water and CCWD system capacity were still available after the above two operations, additional deliveries would be made to meet any Local Agency Partner water supply needs.

**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. Alternative 4A would include an upgrade of the Transfer Facility, a new Transfer-Bethany Pipeline, and facilities to enable filling of Los Vaqueros Reservoir from the Rock Slough Intake. Similar to Final EIS/EIR Alternative 4, Alternative 4A has a Los Vaqueros Reservoir storage capacity of 160 TAF. Alternative 4A uses similar operational priorities as Alternative 1B, with the exception of the Level 2 wheeling operation, which is not included. Alternative 4A is formulated to maximize potential project deliveries to both the Local Agency Partners and Refuges, but without the benefit of expanded storage in Los Vaqueros Reservoir.

**Plan Evaluation and Comparison**
The alternatives were compared based on the four P&G criteria of completeness, effectiveness, efficiency, and acceptability (WRC 1983). Each of the plans is estimated to be complete and each appears to be effective in achieving its intended objectives. Efficiency was evaluated based on summarized annual costs and benefits, as shown in Table ES-5. As summarized in Table ES-2, Alternatives 1A, 1B, and 4A were ranked moderate-high. Alternative 2A ranked moderate-low due to lower scores for effectiveness and efficiency. All Final Alternatives ranked high or moderate-high for completeness, as they would meet and satisfy all objectives for this criterion. All Final Alternatives ranked high for acceptability. Alternative 4A ranked moderate for effectiveness due to lower project benefits relative to the other Final Alternatives, and high for efficiency because it would have the highest benefit-cost ratio. Alternative 2A ranked moderate-low for effectiveness and low for efficiency because it would result in negative M&I, emergency, and agricultural water supply benefits and would not have a benefit-cost ratio greater than 1.
## Table ES-2. Summary Comparison of Final Alternatives

<table>
<thead>
<tr>
<th>Alternative</th>
<th>Completeness</th>
<th>Effectiveness</th>
<th>Efficiency</th>
<th>Acceptability</th>
<th>Overall Relative Ranking</th>
</tr>
</thead>
<tbody>
<tr>
<td>No Action Alternative</td>
<td>Would include none of the elements required to achieve benefits</td>
<td>Would include none of the elements required to achieve benefits</td>
<td>No cost would be accrued by the No Action Alternative; there would be no economic benefits</td>
<td>Would include none of the elements required to achieve benefits</td>
<td>N/A</td>
</tr>
<tr>
<td>Alternative 1A</td>
<td>Would contribute to all planning objectives; high reliability and no dependency on other projects; physically implementable; impacts would be avoidable or could be mitigated with net positive environmental benefits</td>
<td>Highest M&amp;I, emergency, and agricultural water supply benefits; lower Refuge water supply benefits</td>
<td>Positive net NED benefit of $11.6 million/year; Benefit-Cost ratio of 1.25</td>
<td>Federal and California state support; consistent with CCWD's Board Principles of Participation and CALFED goals; environmental and stakeholder support</td>
<td>Moderate-High</td>
</tr>
<tr>
<td>Relative Rank</td>
<td>High</td>
<td>Moderate-High</td>
<td>Moderate</td>
<td>High</td>
<td></td>
</tr>
<tr>
<td>Alternative 1B</td>
<td>Similar to Alternative 1A</td>
<td>High emergency water supply benefits; moderate M&amp;I and agricultural water supply benefits; moderate Refuge water supply benefits</td>
<td>Positive net NED benefit of $12.6 million/year; Benefit-Cost ratio of 1.27</td>
<td>Similar to Alternative 1A</td>
<td>Moderate-High</td>
</tr>
<tr>
<td>Relative Rank</td>
<td>High</td>
<td>Moderate-High</td>
<td>Moderate</td>
<td>High</td>
<td></td>
</tr>
<tr>
<td>Alternative 2A</td>
<td>Similar to Alternative 1A, except some planning objectives are not met in all water year types</td>
<td>Highest Refuge water supply benefits; negative long term average M&amp;I benefits; moderate emergency, and agricultural water supply benefits</td>
<td>Cost would be slightly higher than quantified benefits (net NED benefit of -$2.2 million/year); Benefit-Cost ratio of 0.95</td>
<td>Similar to Alternative 1A</td>
<td>Moderate-Low</td>
</tr>
<tr>
<td>Relative Rank</td>
<td>Moderate-High</td>
<td>Moderate-Low</td>
<td>Low</td>
<td>High</td>
<td></td>
</tr>
<tr>
<td>Alternative 4A</td>
<td>Similar to Alternative 1A</td>
<td>Moderate M&amp;I, emergency, and agricultural water supply benefits; moderate Refuge water supply benefits</td>
<td>Highest net NED benefit of $16.9 million/year; Benefit-Cost ratio of 1.66</td>
<td>Similar to Alternative 1A</td>
<td>Moderate-High</td>
</tr>
<tr>
<td>Relative Rank</td>
<td>High</td>
<td>Moderate</td>
<td>High</td>
<td>High</td>
<td></td>
</tr>
</tbody>
</table>

**Notes:**
- October 2015 dollar values.
- Key:
  - M&I = municipal and industrial
  - CALFED = CALFED Bay-Delta Program
  - CCWD = Contra Costa Water District
  - NED = National Economic Development
Identification of National Economic Development Plan, Locally Preferred Plan, and Environmentally Preferable Alternative

As required by the P&G, the plan with the greatest net National Economic Development (NED) benefits is to be identified as the NED Plan and is typically selected for recommendation to the Secretary of the Interior for consideration and approval (WRC 1983). If another plan is recommended instead of the NED Plan, such as a locally preferred plan (LPP), the NED Plan is still presented as a basis of comparison to define the extent of Federal financial interest in the plan recommended for implementation. Alternative 4A is the NED Plan based upon the plan evaluation and comparison process.

Alternative 1B has been identified by the non-Federal sponsor as the LPP. Alternative 1B provides water supply benefits to a variety of beneficiaries (M&I, environmental, and agriculture). It also efficiently balances the need to provide reliable Refuge water supplies in all year types with the seasonal/dry-year water supply needs of M&I agencies. Alternative 1B’s mix of environmental and M&I water supplies makes it more competitive under current State funding programs, such as California’s Proposition 1. Alternative 1B has received expressions of support from all Local Agency Partners and was the basis for a 2017 state funding request by CCWD.

CEQ Regulations require identification of the environmentally preferable alternative (or alternatives) in the ROD (40 Code of Federal Regulations 1505.2(b)). The environmentally preferable alternative may be different from the preferred or recommended alternative, and refers to the alternative that would result in the fewest adverse effects on the human environment. A detailed discussion of possible environmental effects of the Final Alternatives and proposed mitigation measures is included in the 2010 Final EIS/EIR and the 2017 Draft Supplement. The No Action Alternative is tentatively identified as the environmentally preferable alternative on the basis of avoiding impacts to Prime Farmland and temporary impacts associated with constructing new facilities. The No Action Alternative would not improve Bay Area M&I water supply or Incremental Level 4 water supply reliability.

Summary of Benefits and Costs

Table ES-3 summarizes the long-term average estimated benefits of the Final Alternatives. Estimating the economic benefits of potential effects is necessary to establish economic feasibility and identify a corresponding final alternative that maximizes net benefits, consistent with Federal objectives.

Table ES-4 compares the total NED benefits for each alternative. Economic valuation of water supply benefits was conducted using simulated market prices as an approximation of total willingness to pay value, consistent with the P&G. For Refuge water supplies, short-term water market purchases are considered the most likely alternative for achieving the volume of firm water supplies that could be achieved through the Alternatives. While there are a number of alternative methods for estimating these costs, and the benefit/cost ratio is somewhat sensitive to the method chosen, the California water pricing model, used to estimate the cost of Refuge water supplies under 2030 conditions is a widely accepted model that has been applied to prior Reclamation studies, including the Shasta Lake Water Resources Investigation and Upper San Joaquin River Basin Storage Investigation, as well as other state and local studies. The model is a regression based tool that uses historical spot market transactions occurring from 1990 through 2016 to simulate market prices based on locations of supplies, location of buyer, type of buyer,
Executive Summary

length and nature of the contract, water year type, and inflation. The model also adjust for conveyance losses, conveyance and pumping costs, and other typical transactional costs.

Table ES-3. Summary of Estimated Long-term Average Benefits for Final Alternatives

<table>
<thead>
<tr>
<th>Benefit</th>
<th>Unit</th>
<th>Alternative 1A</th>
<th>Alternative 1B</th>
<th>Alternative 2A</th>
<th>Alternative 4A</th>
</tr>
</thead>
<tbody>
<tr>
<td>Increase in M&amp;I Water Supply Reliability</td>
<td>TAF/year</td>
<td>15.5</td>
<td>12.9</td>
<td>-5.4</td>
<td>11.2</td>
</tr>
<tr>
<td>Emergency Water Supplies Available to M&amp;I Purveyors $</td>
<td>TAF</td>
<td>168</td>
<td>162</td>
<td>71</td>
<td>79</td>
</tr>
<tr>
<td>Increase in Incremental Level 4 Refuge Water Supplies</td>
<td>TAF/year</td>
<td>35.8</td>
<td>45.7</td>
<td>69.0</td>
<td>41.2</td>
</tr>
<tr>
<td>Increase in Agricultural Water Supplies</td>
<td>TAF/year</td>
<td>3.4</td>
<td>1.2</td>
<td>1.2</td>
<td>0.8</td>
</tr>
<tr>
<td>Increase in recreation days to the Los Vaqueros watershed</td>
<td>visits/year</td>
<td>165,445</td>
<td>165,445</td>
<td>165,445</td>
<td>0</td>
</tr>
</tbody>
</table>

Notes:
1 Available reservoir storage in a given year that would be diverted for emergency M&I use. This excludes the 70 TAF already reserved for CCWD in-district emergency use.

Key:
M&I = municipal and industrial
TAF = thousand acre-feet

Table ES-4. Summary of Estimated Annual Benefits for Final Alternatives ($ million)

<table>
<thead>
<tr>
<th>Benefit Category</th>
<th>Alternative 1A</th>
<th>Alternative 1B</th>
<th>Alternative 2A</th>
<th>Alternative 4A</th>
</tr>
</thead>
<tbody>
<tr>
<td>M&amp;I Water Supplies $</td>
<td>$12.4</td>
<td>$10.3</td>
<td>-$5.0</td>
<td>$9.5</td>
</tr>
<tr>
<td>Emergency Water Supplies $</td>
<td>$24.7</td>
<td>$23.8</td>
<td>$10.4</td>
<td>$11.6</td>
</tr>
<tr>
<td>Refuge Water Supplies $</td>
<td>$17.9</td>
<td>$23.6</td>
<td>$37.4</td>
<td>$21.1</td>
</tr>
<tr>
<td>Agricultural Water Supplies $</td>
<td>$1.9</td>
<td>$0.6</td>
<td>$0.6</td>
<td>$0.4</td>
</tr>
<tr>
<td>Recreation $</td>
<td>$0.3</td>
<td>$0.3</td>
<td>$0.3</td>
<td>$0.0</td>
</tr>
<tr>
<td>Total Annual NED Benefits</td>
<td>$57.2</td>
<td>$58.61</td>
<td>$43.7</td>
<td>$42.6</td>
</tr>
</tbody>
</table>

Notes:
General: October 2015 dollar values.
1 Market-based estimates of the cost of water transfers to Bay Area M&I agencies.
2 Market-based estimates of water users' willingness to pay to avoid interruptions in water deliveries
3 Market-based estimates of the cost of water transfers to wildlife Refuges in the San Joaquin Valley. Represents the increase in Incremental Level 4 Refuge water supplies provided through the Investigation.
4 Market-based estimates of the cost of water transfers to agricultural users in the San Joaquin Valley.
5 Visitation days estimates using California State parks recreation data, and the U.S. Army Corps of Engineers' Unit Day Values for Recreation for Fiscal Year 2015.

Key:
M&I = municipal and industrial
NED = National Economic Development

Table ES-5 summarizes estimated field, construction, capital, and annual costs for the Final Alternatives. The cost estimates were developed to a feasibility level and all investigation alternatives are projected to be technically feasible, constructible, and could be operated and maintained.
## Table ES-5. Estimated Capital and Annual Costs of the Final Alternatives ($ million)

<table>
<thead>
<tr>
<th>Cost Item</th>
<th>Alternative 1A</th>
<th>Alternative 1B</th>
<th>Alternative 2A</th>
<th>Alternative 4A</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Opinion of Probable Construction Costs</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>275 TAF Dam Raise</td>
<td>$267.00</td>
<td>$267.00</td>
<td>$267.00</td>
<td>$0.00</td>
</tr>
<tr>
<td>Bethany-Transfer Conveyance Facilities</td>
<td>$144.36</td>
<td>$144.36</td>
<td>$144.36</td>
<td>$144.36</td>
</tr>
<tr>
<td>Delta-Transfer Pipeline</td>
<td>$44.52</td>
<td>$44.52</td>
<td>$44.52</td>
<td>$0.00</td>
</tr>
<tr>
<td>Expanded Transfer Pump Station</td>
<td>$36.00</td>
<td>$36.00</td>
<td>$36.00</td>
<td>$36.00</td>
</tr>
<tr>
<td>Existing Transfer Pump Station Modifications</td>
<td>$10.90</td>
<td>$10.90</td>
<td>$10.90</td>
<td>$10.90</td>
</tr>
<tr>
<td>Neroly Pump Station</td>
<td>$37.00</td>
<td>$37.00</td>
<td>$37.00</td>
<td>$37.00</td>
</tr>
<tr>
<td>Pumping Plant #1 Improvement</td>
<td>$17.80</td>
<td>$17.80</td>
<td>$17.80</td>
<td>$17.80</td>
</tr>
<tr>
<td>Los Vaqueros Marina Complex Relocation</td>
<td>$21.00</td>
<td>$21.00</td>
<td>$21.00</td>
<td>-</td>
</tr>
<tr>
<td>Los Vaqueros Watershed Trails</td>
<td>$0.60</td>
<td>$0.60</td>
<td>$0.60</td>
<td>-</td>
</tr>
<tr>
<td><strong>EBMUD Facilities</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mokelumne Aqueduct Relining</td>
<td>$12.10</td>
<td>$12.10</td>
<td>$12.10</td>
<td>$12.10</td>
</tr>
<tr>
<td>Walnut Creek Pumping Plant Variable Frequency Drives</td>
<td>$4.00</td>
<td>$4.00</td>
<td>$4.00</td>
<td>$4.00</td>
</tr>
<tr>
<td><strong>Expanded Recreation Facilities</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Los Vaqueros Interpretive Center Improvement</td>
<td>$0.71</td>
<td>$0.71</td>
<td>$0.71</td>
<td>$0.00</td>
</tr>
<tr>
<td>Los Vaqueros Watershed Office Barn and Interpretive Features</td>
<td>$0.74</td>
<td>$0.74</td>
<td>$0.74</td>
<td>$0.00</td>
</tr>
<tr>
<td><strong>Total Field Cost</strong></td>
<td><strong>$596.73</strong></td>
<td><strong>$596.73</strong></td>
<td><strong>$596.73</strong></td>
<td><strong>$262.26</strong></td>
</tr>
<tr>
<td>Non-Contract Cost&lt;sup&gt;1&lt;/sup&gt;</td>
<td>$239.00</td>
<td>$239.00</td>
<td>$239.00</td>
<td>$105.00</td>
</tr>
<tr>
<td><strong>Total Construction Cost</strong></td>
<td><strong>$835.73</strong></td>
<td><strong>$835.73</strong></td>
<td><strong>$835.73</strong></td>
<td><strong>$367.26</strong></td>
</tr>
<tr>
<td>Interest During Construction&lt;sup&gt;2&lt;/sup&gt;</td>
<td>$92.56</td>
<td>$92.56</td>
<td>$92.56</td>
<td>$50.54</td>
</tr>
<tr>
<td><strong>Total Capital Cost</strong></td>
<td><strong>$928.29</strong></td>
<td><strong>$928.29</strong></td>
<td><strong>$928.29</strong></td>
<td><strong>$417.80</strong></td>
</tr>
<tr>
<td>Interest and Amortization</td>
<td>$33.57</td>
<td>$33.57</td>
<td>$33.57</td>
<td>$15.11</td>
</tr>
<tr>
<td>Total Annual Operations, Maintenance, and Replacement&lt;sup&gt;3&lt;/sup&gt;</td>
<td>$9.85</td>
<td>$9.85</td>
<td>$9.85</td>
<td>$7.75</td>
</tr>
<tr>
<td>Increase in Replacement Costs for Existing Facilities&lt;sup&gt;4&lt;/sup&gt;</td>
<td>TBD</td>
<td>TBD</td>
<td>TBD</td>
<td>TBD</td>
</tr>
<tr>
<td>Increased in Annual Energy Costs&lt;sup&gt;5&lt;/sup&gt;</td>
<td>$3.41</td>
<td>$3.78</td>
<td>$3.71</td>
<td>$3.08</td>
</tr>
<tr>
<td><strong>Total Annual Cost</strong></td>
<td><strong>$46.96</strong></td>
<td><strong>$47.33</strong></td>
<td><strong>$47.25</strong></td>
<td><strong>$25.98</strong></td>
</tr>
</tbody>
</table>

**Notes:**
- General: October 2015 dollar values. Totals may not sum exactly due to rounding.
- Non-contract costs, including planning, engineering, design, and construction management, are assumed to be 40 percent of the total field costs.
- Interest during construction is based on a 3.5 percent Federal discount rate over a seven-year construction period for October 2015 price level cost estimates.
- Operation, Maintenance, and Replacement costs cover only new or modified facilities.
- Increased replacement costs of existing facilities due to reoperation under proposed alternatives are under development.
- Additional information can be found in Appendix C – Engineering Appendix.
- Interest and amortization is based on a 3.5 percent Federal discount rate over a 100-year period of analysis.
- Key: EBMUD = East Bay Municipal Utility District
- TAF = thousand acre-feet
- TBD = to be determined
**Executive Summary**

A comparison of the NED benefits and costs and benefit-cost ratios of each Final Alternative are shown in Table ES-6. All alternatives, except Alternative 2A, have a benefit-cost ratio of greater than one, providing net NED benefits. Alternative 4A would generate the maximum net economic benefits, $16.9 million annually.

**Table ES-6. Summary of Estimated Annual Costs and Benefits for Final Alternatives ($ million)**

<table>
<thead>
<tr>
<th></th>
<th>Alternative 1A</th>
<th>Alternative 1B</th>
<th>Alternative 2A</th>
<th>Alternative 4A</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Annual NED Benefits$</td>
<td>$57.2</td>
<td>$58.6</td>
<td>$43.7</td>
<td>$42.6</td>
</tr>
<tr>
<td>Total Annual Cost$</td>
<td>$46.6</td>
<td>$47.0</td>
<td>$46.9</td>
<td>$25.7</td>
</tr>
<tr>
<td>Net NED Benefits$</td>
<td>$10.6</td>
<td>$11.6</td>
<td>-$3.2</td>
<td>$16.9</td>
</tr>
<tr>
<td>Benefit Cost/Ratio</td>
<td>1.23</td>
<td>1.25</td>
<td>0.93</td>
<td>1.66</td>
</tr>
</tbody>
</table>

Notes:
$ October 2015 dollar values

Key:
NED = National Economic Development

**Feasibility Determination for the National Economic Development Plan and Locally Preferred Plan**

Feasibility determination includes technical feasibility, environmental feasibility, economic feasibility, and financial feasibility.

**Technical Feasibility**

Both the NED Plan and LPP are projected to be technically feasible; both are constructible, and can be operated and maintained.

A Design, Estimating, and Construction (DEC) Review was performed for the Investigation in September 2007. The DEC Review concluded that when the DEC recommendations were adequately addressed, the design and cost estimate for the NED Plan would be at a level suitable (i.e., feasibility level) for use for Congressional authorization and appropriation. Based on recommendations from the DEC review, designs and costs were refined to bring construction features to a feasibility level. Additional work is planned to address remaining recommendations. A second DEC Review is planned for 2018 to verify implementation of the DEC review recommendations and provide review of additional project facilities not included in the 2007 review.

The DEC review recommended additional geotechnical investigation to enhance the adequacy of available geotechnical information for the proposed Los Vaqueros Dam raise, and for the Transfer-Bethany pipeline (specifically the tunnel segment that was under considerations at the time). The 2012 dam raise to 160 TAF provided detailed geotechnical information to support feasibility evaluation of the full 275 TAF raise. The tunnel segment in the Transfer-Bethany pipeline has been discarded following a Value Planning Study conducted in August 2016. Additional geotechnical investigation along the Transfer-Bethany Pipeline alignment will occur post-authorization. The result of this investigating will not affect the determination of technical
feasibility of the pipeline. Rather, it will help reduce uncertainty in the cost related to the open-cut construction and the need for dewatering and cathodic protection along the pipeline.

For some of the NED Plan and LPP features (Neroly High Lift Station, and Pumping Plant # 1 replacement) design and cost estimates were prepared to a pre-feasibility level. Additional analysis to bring these designs and costs to feasibility-levels is planned, pending availability of Federal funding. No change in the determination of technical feasibility is anticipated from the additional feasibility level analyses. These analyses will help reduce uncertainty in the cost related to unlisted items, and other details for their integration with the existing system.

Operations associated with the NED Plan and LPP would be similar to existing operations of the Los Vaqueros Project, with the addition of deliveries through the Transfer-Bethany Pipeline and from the Rock Slough Intake. Additional operations and maintenance are anticipated for the new project features, but minimal changes are expected in maintenance requirements for existing project features. Other operations and maintenance considerations include increased pumping requirements associated with increased delivery of water supplies.

Environmental Feasibility
The NED Plan and LPP were evaluated in the 2010 Final EIS/EIR and in the 2017 Draft Supplement, which included detailed discussion of possible effects of the NED Plan (Alternative 4A) and the LPP (Alternative 1B) and proposed mitigation measures.

The NED Plan and LPP are identified as having significant and unavoidable impacts on Prime Farmland, Unique Farmland, or Farmland of Statewide Importance that would be permanently converted to nonagricultural use because of construction activities. However, the significant and unavoidable impacts of the NED Plan were caused by Associated Local Projects (to be implemented by Local Agency Partners independent of any Federal action) included in the environmental review and not the proposed project components described in this feasibility study. No other significant and unavoidable impacts were identified. Some of the adverse effects would be temporary, construction-related effects that would be less than significant or would be reduced to less-than-significant levels through mitigation. Environmental commitments and best management practices to avoid or minimize potential effects will be incorporated in the design and construction, and operations and maintenance phases of the project in coordination with applicable resource agencies. The LPP would have additional less than significant impacts with mitigation specifically tied to the dam raise.

Economic Feasibility
The NED Plan provides the greatest net NED benefits of the alternatives evaluated, as discussed in Chapter 5. The NED Plan is projected to be economically feasible, generating net benefits of $16.9 million annually. The LPP is also projected to be economically feasible, generating net benefits of $11.6 million annually. Alternate valuation methods and sensitivity analyses (presented in Appendix D – Economic Analysis) demonstrate that, overall, the estimated economic benefits values and assumptions are reasonable and are consistent with values generated through different approaches.
Financial Feasibility

Financial feasibility consists of examining and evaluating project beneficiaries’ ability to repay their allocated portion of the Federal investment in the project over a period of time, consistent with applicable law. Financial feasibility determination during the planning stage consists of (1) allocating costs to project purposes, (2) assigning reimbursable and non-reimbursable costs for each identified project purpose, (3) identifying potential project beneficiaries, and (4) determining project beneficiaries’ potential ability to pay their allocated and assigned costs, including capital and long-term operations, maintenance, and replacement costs.

A separable costs-remaining benefits analysis was performed to equitably allocate costs to the project purposes for both the NED Plan and the LPP. Afterwards, allocated costs were categorized as either Federal non-reimbursable costs or non-Federal costs. No reimbursable Federal funds are included in the assignment. Federal non-reimbursable funds are requested under the Refuge water supply purpose, under the Water Infrastructure Improvements for the Nation Act (Public Law 114-322). Non-Federal costs will be funded by Local Agency Partners or potentially through Water Storage Investment Program state funding, as described below.

The assignment of costs includes costs to accomplish all purposes consistent with the planning objectives. For Alternative 4A, these costs amount to a total capital cost of $411 million. For Alternative 1B, these costs amount to a total capital cost of $922 million. Table ES-7 compares the initial cost assignments of the NED Plan, the LPP, and the LPP when constrained by the NED Plan’s Federal funding. Tables ES-8, ES-9, and ES-10 provide additional details of these initial cost assignments for the NED Plan, the LPP, and the constrained LPP, respectively.

CCWD is pursuing funding for $434 million towards Alternative 1B from the State of California under the Water Storage Investment Program component of Proposition 1. It is anticipated that funds awarded through Proposition 1 would be applied towards the non-Federal costs. Since the funding request is less than the total non-Federal portion of project costs, a future funding award is highly unlikely to impact Federal funding. No funding from the California Water Commission is assumed in the initial cost assignment and allocation presented below. If the California Water Commission does not award funding toward the project, or if less than the requested amount is awarded, Local Agency Partners would need to contribute more toward the non-Federal cost share.

Table ES-7. Summary of Initial Cost Assignment for the NED Plan (Alternative 4A), and the LPP (Alternative 1B) ($ million)

<table>
<thead>
<tr>
<th></th>
<th>NED Plan – Alternative 4A</th>
<th>LPP – Alternative 1B</th>
<th>LPP – Alternative 1B, Constrained by NED Plan</th>
</tr>
</thead>
<tbody>
<tr>
<td>Non-Reimbursable Federal Costs</td>
<td>$102.5</td>
<td>$230.0</td>
<td>$102.5</td>
</tr>
<tr>
<td>Non-Federal Costs</td>
<td>$308.5</td>
<td>$692.3</td>
<td>$819.9</td>
</tr>
<tr>
<td>TOTAL Capital Costs</td>
<td>$411.0</td>
<td>$922.3</td>
<td>$922.3</td>
</tr>
</tbody>
</table>

Notes: October 2015 dollar values.

Key:
LPP = Locally Preferred Plan
NED = National Economic Development
## Table ES-8. Initial Cost Assignment for the NED Plan (Alternative 4A)

<table>
<thead>
<tr>
<th>Cost Type</th>
<th>Category</th>
<th>Units¹</th>
<th>M&amp;I Water Supply²</th>
<th>Irrigation Water Supply³</th>
<th>Refuge Water Supply⁴</th>
<th>Total</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Construction</td>
<td>Non-Reimbursable Federal Costs</td>
<td>$ million</td>
<td>$0.0</td>
<td>$0.0</td>
<td>$92.1</td>
<td>$92.1</td>
<td>25.0%</td>
</tr>
<tr>
<td></td>
<td>Non-Federal Costs</td>
<td>$ million</td>
<td>$181.7</td>
<td>$3.5</td>
<td>$91.1</td>
<td>$276.2</td>
<td>75.0%</td>
</tr>
<tr>
<td>Interest During Construction</td>
<td>Non-Reimbursable Federal Costs</td>
<td>$ million</td>
<td>$0.0</td>
<td>$0.0</td>
<td>$10.4</td>
<td>$10.4</td>
<td>24.4%</td>
</tr>
<tr>
<td></td>
<td>Non-Federal Costs</td>
<td>$ million</td>
<td>$20.8</td>
<td>$0.4</td>
<td>$11.1</td>
<td>$32.3</td>
<td>75.6%</td>
</tr>
<tr>
<td>OM&amp;R</td>
<td>Non-Reimbursable Federal Costs</td>
<td>$ million/year</td>
<td>$0.0</td>
<td>$0.0</td>
<td>$2.9</td>
<td>$2.9</td>
<td>26.4%</td>
</tr>
<tr>
<td></td>
<td>Non-Federal Costs</td>
<td>$ million/year</td>
<td>$5.0</td>
<td>$0.1</td>
<td>$2.9</td>
<td>$8.0</td>
<td>73.6%</td>
</tr>
</tbody>
</table>

Notes:
1 October 2015 dollar values.
2 Cost assignment for M&I water supply is based on Reclamation Act of 1939, as amended.
3 Cost assignment for irrigation water supply is based on Reclamation Act of 1902, as amended.
4 Cost assignment for Refuge water supply is based on Central Valley Project Improvement Act, Public Law 102-575.

Key:
M&I = municipal and industrial
NED = National Economic Development
OM&R = operation, maintenance, and replacement

## Table ES-9. Initial Unconstrained Cost Assignment for the LPP (Alternative 1B)

<table>
<thead>
<tr>
<th>Cost Type</th>
<th>Category</th>
<th>Units¹</th>
<th>M&amp;I Water Supply²</th>
<th>Irrigation Water Supply³</th>
<th>Refuge Water Supply⁴</th>
<th>Total</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Construction</td>
<td>Non-Reimbursable Federal Costs</td>
<td>$ million</td>
<td>$0.0</td>
<td>$0.0</td>
<td>$209.8</td>
<td>$209.8</td>
<td>25.0%</td>
</tr>
<tr>
<td></td>
<td>Non-Federal Costs</td>
<td>$ million</td>
<td>$490.1</td>
<td>$7.2</td>
<td>$132.1</td>
<td>$629.5</td>
<td>75.0%</td>
</tr>
<tr>
<td>Interest During Construction</td>
<td>Non-Reimbursable Federal Costs</td>
<td>$ million</td>
<td>$0.0</td>
<td>$0.0</td>
<td>$20.2</td>
<td>$20.2</td>
<td>24.3%</td>
</tr>
<tr>
<td></td>
<td>Non-Federal Costs</td>
<td>$ million</td>
<td>$48.4</td>
<td>$0.7</td>
<td>$13.7</td>
<td>$62.9</td>
<td>75.7%</td>
</tr>
<tr>
<td>OM&amp;R</td>
<td>Non-Reimbursable Federal Costs</td>
<td>$ million/year</td>
<td>$0.0</td>
<td>$0.0</td>
<td>$2.9</td>
<td>$2.9</td>
<td>20.9%</td>
</tr>
<tr>
<td></td>
<td>Non-Federal Costs</td>
<td>$ million/year</td>
<td>$7.8</td>
<td>$0.1</td>
<td>$2.9</td>
<td>$10.8</td>
<td>79.1%</td>
</tr>
</tbody>
</table>

Notes:
1 October 2015 dollar values.
2 Cost assignment for M&I water supply is based on Reclamation Act of 1939, as amended.
3 Cost assignment for irrigation water supply is based on Reclamation Act of 1902, as amended.
4 Cost assignment for Refuge water supply is based on Central Valley Project Improvement Act, Public Law 102-575.

Key:
LPP = Locally Preferred Plan
M&I = municipal and industrial
OM&R = operation, maintenance, and replacement
Table ES-10. Initial Constrained Cost Assignment for the LPP (Alternative 1B)

<table>
<thead>
<tr>
<th>Cost Type</th>
<th>Category</th>
<th>Units¹</th>
<th>M&amp;I Water Supply²</th>
<th>Irrigation Water Supply³</th>
<th>Refuge Water Supply⁴</th>
<th>Total</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Construction</td>
<td>Non-Reimbursable Federal Costs</td>
<td>$ million</td>
<td>$0.0</td>
<td>$0.0</td>
<td>$92.1</td>
<td>$92.1</td>
<td>11.0%</td>
</tr>
<tr>
<td></td>
<td>Non-Federal Costs</td>
<td>$ million</td>
<td>$490.1</td>
<td>$7.2</td>
<td>$249.9</td>
<td>$747.2</td>
<td>89.0%</td>
</tr>
<tr>
<td>Interest</td>
<td>Non-Reimbursable Federal Costs</td>
<td>$ million</td>
<td>$0.0</td>
<td>$0.0</td>
<td>$10.4</td>
<td>$10.4</td>
<td>12.5%</td>
</tr>
<tr>
<td>During</td>
<td>Non-Federal Costs</td>
<td>$ million</td>
<td>$48.4</td>
<td>$0.7</td>
<td>$23.5</td>
<td>$72.6</td>
<td>87.5%</td>
</tr>
<tr>
<td>Construction</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>OM&amp;R</td>
<td>Non-Reimbursable Federal Costs</td>
<td>$ million/year</td>
<td>$0.0</td>
<td>$0.0</td>
<td>$2.9</td>
<td>$2.9</td>
<td>21.0%</td>
</tr>
<tr>
<td></td>
<td>Non-Federal Costs</td>
<td>$ million/year</td>
<td>$7.8</td>
<td>$0.1</td>
<td>$2.8</td>
<td>$10.8</td>
<td>79.0%</td>
</tr>
</tbody>
</table>

Notes:
¹ October 2015 dollar values.
² Cost assignment for M&I water supply is based on Reclamation Act of 1939, as amended.
³ Cost assignment for irrigation water supply is based on Reclamation Act of 1902, as amended.
⁴ Cost assignment for Refuge water supply is based on Central Valley Project Improvement Act, Public Law 102-575.

Key:
LPP = Locally Preferred Plan
M&I = municipal and industrial
OM&R = operation, maintenance, and replacement

Financial Analyses
The beneficiaries of the NED Plan and LPP have been evaluated for their ability to pay the non-Federal portion of project costs, based on a cost allocation and cost assignment analysis. No reimbursable Federal costs are included in the cost assignment analysis. The majority of NED Plan and LPP benefits, approximately 99 percent, are allocated to M&I water supply and Refuge water supply. For M&I water supply beneficiaries, the estimated average annual ability to pay of M&I users was found to be large in comparison to the estimated total annual M&I water supply cost of the project, indicating that M&I beneficiaries would be able to pay their allocated costs on an annual basis. An initial analysis of agricultural beneficiaries has indicated they would have ability to pay for their relatively small (1.2 TAF/year) volume of agricultural water supplies provided by the project.

CCWD is pursuing $434 million in funding through California’s Proposition 1 for public benefits of water storage projects (ecosystem benefits, emergency water supplies, recreation, water quality, and flood management). If successful, this funding would contribute to applicable portions of the non-Federal cost share. This potential source of non-Federal funding, which was not considered in the financial analysis of ability to pay, would further improve upon the financial feasibility of the LPP.
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Implementation Timeline

The remaining major activities in completing the Investigation include completing the Final Feasibility Report and accompanying Final Supplement to the Final EIS/EIR, executive-level review and processing of these documents, determination by the Secretary of the Interior of compliance with requirements of the Water Infrastructure Improvements for the Nation Act (Public Law 114-322), and Congressional appropriations. Reclamation will also issue a Record of Decision for the Investigation.

If and when the Secretary of the Interior makes a determination of consistency with the Water Infrastructure Improvements for the Nation Act (Public Law 114-322), and Congressional appropriations occur, project implementation is expected to take place in two phases. The initial phase is estimated to span approximately three years and would include: developing detailed project designs, acquiring necessary permits, acquiring required real estate interests, and other advanced planning and design activities. Once these initial phase activities are complete, construction of major project features would begin. Construction activities for project features would likely span three years. A detailed timeline of post authorization activities will be developed once a recommended plan is confirmed.

Findings and Recommendations

The overall recommendation of this Feasibility Report is that the Secretary of the Interior, acting through Reclamation, participate in funding and implementing the LPP, Alternative 1B, including the environmental commitments and mitigation measures identified in the planned Final Supplement to the Final EIS/EIR. The following summarizes key Investigation findings, recommendations, and considerations related to this recommendation.

- **Need for the Project** – A compelling need exists to contribute to CVP operational flexibility and reliability, to increase the reliability of water supplies delivered to the Bay Area, and to increase environmental water storage and operational flexibility and secure reliable long-term water supplies for the for management of wildlife refuges. Demands for water in the Central Valley and elsewhere in the State exceed available supplies, especially in dry years and during extended drought, and this condition is expected to become more pronounced in the future. Developing projects to increase the reliability of water supplies for environmental, agricultural, and M&I purposes is necessary to meet demands, and is consistent with the CALFED Programmatic ROD, the CVPIA, and other Federal and State laws and initiatives. The LPP contributes to these needs by providing a reliable, long-term water supply to Refuges, improving the ability of the Refuge Water Supply Program to fulfill Incremental Level 4 water supply obligations in a cost-effective manner. The LPP also provides M&I water supplies for Local Agency Partners during dry years, when supplies are most needed.

- **Multiple cost-effective plans** – A range of alternatives were formulated and evaluated to address the study objectives. Three of the Final Alternatives – 1A, 1B, and 4A – have positive net NED benefits. The benefit-cost ratio for Alternative 4A is 1.66; for Alternative 1A is 1.23; and for Alternative 1B is 1.25.
**Recommended Plan** – Alternative 1B is identified as the Recommended Plan. Based on evaluation of the potential physical accomplishments and the benefits and costs of the Final Alternatives, Alternative 4A is the alternative that would achieve the highest net NED benefits while protecting the environment and ranks the highest among the Final Alternatives in meeting the P&G criteria. Alternative 1B is identified as the LPP by the non-Federal sponsor, CCWD. CCWD has also submitted an application for State funding of public benefits of Alternative 1B. Both Alternatives 4A and 1B were found to be technically, environmentally, economically, and financially feasible. The costs of the LPP (Alternative 1B) exceed the costs of the NED Plan (Alternative 4A); therefore, the non-Federal sponsor will be required to pay for the cost of the LPP in excess of the NED.

- **Facilities** – The Recommended Plan (Alternative 1B) would include expansion of Los Vaqueros Reservoir to 275 TAF from the current 160 TAF capacity, new conveyance from Transfer Station to Bethany Reservoir, expanded pumping station at Transfer Facility, Neroly High Lift pump station, and replacement of Pumping Plant #1. Additional local facilities, to be implemented independent of any Federal action, include East Contra Costa Irrigation District Intertie Pipeline, the Brentwood Pipeline, and East Bay Municipal Utility District Variable Frequency Drives at Walnut Creek Pump Station.

- **Operations** – Under the Recommended Plan (Alternative 1B), new facilities would be operated in combination with existing Los Vaqueros Project facilities to provide firm water supplies to both Local Agency Partners and Refuges. Available Delta water supplies would be moved through project facilities first to meet Local Agency Partner demands, if any, and then to meet Incremental Level 4 Refuge demands. When system capacity is available, water would also be moved to storage in Los Vaqueros Reservoir for later use in meeting Local Agency Partner and/or Refuge demands. Incremental Level 4 supplies provided by the Recommended Plan would not replace current short- and mid-term acquisitions by the Refuge Water Supply Program; rather, new Incremental Level 4 water provided by the project would be in addition to current acquisitions. During certain conditions, Level 2 Refuge demands could be met by moving Delta surplus flows through project facilities, freeing pumping capacity at Jones Pumping Plant to move additional water to CVP SOD contractors.

- **Water Supply Benefits** – The Recommended Plan (Alternative 1B) would provide increased water supplies to municipal and industrial users, agricultural users, and Refuges, as well as emergency water supplies. Water supplies provided would vary by year type. Municipal and industrial supplies provided to Local Agency Partners are estimated to be about 12.9 TAF/year (long-term average), with deliveries in excess of 42 TAF/year in critical years, when demands are the greatest. Water supplies to Refuges are estimated to be about 45.7 TAF/year (long-term average), and as high as 96 TAF/year in wet years. Agricultural water supplies are estimated to be about 1.2 TAF/year (long-term average). The Recommended Plan would also provide an estimated 162 TAF/year (long-term average) of supply available in the event of a regional water supply disruption (emergency water supply).
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- **Estimated Costs and Benefits** – The total construction cost of the Recommended Plan (Alternative 1B) is estimated to be $839.3 million, and the total annual cost is $46.6 million. The estimated total annual monetary benefit is about $58.6 million. The net economic benefit is about $11.6 million per year.

- **Feasibility** – The Recommended Plan (Alternative 1B) is determined to be technically, environmentally, economically, and financially feasible.

- **Environmental Review** – Environmental review is documented in the 2010 Final EIS/EIR and 2017 Draft Supplement to the Final EIS/EIR. The Supplement satisfies NEPA and CEQA by providing a meaningful analysis of all issues relevant to the human environment.

- The Recommended Plan (Alternative 1B) is identified as having significant and unavoidable impacts on Prime Farmland, Unique Farmland, or Farmland of Statewide Importance, which would be permanently converted to nonagricultural use because of project construction activities. No other significant and unavoidable impacts were identified. Some of the adverse effects would be temporary, construction-related effects that would be less than significant or would be reduced to less-than-significant levels through mitigation.

- Federal, State, and local agencies with permitting or approval authority are expected to use the 2010 Final EIS/EIR and the Supplement to make decisions and/or issue permits for an authorized project. Implementation of an authorized project would include review of prior consultation under the Fish and Wildlife Coordination Act and implementation of any associated recommendations, as appropriate. An addendum to the 2011 Coordination Act Report, which was prepared for Phase I expansion of Los Vaqueros Reservoir, will be prepared and published by U.S. Fish and Wildlife Service. In addition, permits and consultations may be required with the U.S. Army Corps of Engineers, the California Department of Fish and Wildlife, National Marine Fisheries Service, and U.S. Fish and Wildlife Service.

- **Applicable Authorities for Federal Participation** – The Water Infrastructure Improvements for the Nation Act (Public Law 114-322) establishes Federal participation in a State-led project providing a benefit in meeting any obligation under Federal law. Public Law 114-322 also limits overall Federal cost-share in a State-led project to no more than 25 percent of total costs. The Central Valley Project Improvement Act (Public Law 102-575) institutes a Federal obligation for refuge water supply and provides for a Federal non-reimbursable share of up to 75 percent for voluntary acquisition of supplemental supplies to meet full Level 4 deliveries (in addition to Level 2 delivery requirements). The Reclamation Act of 1939, as amended, provides for upfront, reimbursable, financing of M&I water supply purposes. The Reclamation Act of 1902, as amended, provides for upfront Federal financing of irrigation water supply purpose, with 100 percent repayment of construction costs, without interest. These authorities provided the basis for cost allocation.
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- **Initial Allocation of Costs** – An initial allocation of costs was performed for the Recommended Plan (Alternative 1B). About 42 percent of the costs were allocated to Refuge water supply and 57 percent to M&I water supply, with the remaining 3 percent of costs allocated to recreation and irrigation. Appendix G – Cost Allocation documents the cost allocation analysis.

- **Initial Assignment to Beneficiaries** - Allocated costs are assigned according to the applicable Federal authorities. For the NED Plan (Alternative 4A), the Federal cost share is $102.7 million, 25 percent of the total construction costs, and the non-Federal share is $308.2 million. The Federal cost share for the Recommended Plan (Alternative 1B), constrained by the NED Plan, is $102.7 million, 11 percent of the total construction costs, and the non-Federal share is $819.6 million. Cost shares for both alternatives are capped by the Public Law 114-322 maximum Federal cost-share of 25 percent. Appendix G – Cost Allocation documents the cost assignment analysis. The non-Federal cost share will be borne by Local Agency Partners and may potentially include state funding through Proposition 1, if CCWD’s application for funding of public benefits is successful. State funds, if provided through Proposition 1 or other sources, would be applied to the non-Federal costs and are unlikely to impact Federal funding.

- **Financial Ability to Pay** – Based on costs allocated to various project purposes, an initial assessment of financial repayment capability of project beneficiaries was conducted for the Recommended Plan (Alternative 1B). The analysis of representative M&I beneficiaries’ ability to pay confirmed that M&I beneficiaries would have the ability to pay the allocated costs by setting new water rates. An initial analysis of agricultural beneficiaries’ ability to pay indicated that agricultural beneficiaries are likely able to pay their relatively low proportion of project costs.

- **Federal Interest** – For an action to be executable, there must be Federal interest in the action and it must be technically, environmentally, economically, and financially feasible, as defined by the P&G. The Recommended Plan (Alternative 1B) provides positive NED benefits for M&I, agricultural, and environmental purposes. Reclamation’s interest in the action is based upon the agency’s mission “to manage, develop, and protect water and related resources in an environmentally and economically sound manner in the interest of the American public.” Implementing any of the plans would improve water supply reliability and flexibility of the water management system for M&I and environmental uses, and for the CVP overall. The economic benefits of implementing the Recommended Plan (Alternative 1B) exceed the cost when evaluated at the National level. Federal interest is also emphasized through the existing authorities described above, including Public Law 102-575, Section 3406, which establishes Federal obligations in providing water supplies to Central Valley refuges and wildlife habitat areas.

- **Local Actions** – CCWD is seeking State funding for the Recommended Plan (Alternative 1B) through the California Water Commission’s Water Storage Investment Program, which will issue $2.7 billion in Proposition 1 funds for water storage projects. Preliminary cost allocations and assignment analyses indicate that the Recommended Plan (Alternative 1B) would be eligible for the maximum amount of funding available through Proposition 1. If successful, up to 50 percent of the total construction costs of the
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Recommended Plan (Alternative 1B) could be funded. The funding application for $434 million was submitted by CCWD in August 2017 and the Commission plans to make initial funding determinations in mid-2018. This potential funding would contribute towards the non-Federal cost share of public benefits. There is strong local support for Alternative 1B.

- **Consistency with Other Projects and Programs**
  - The Recommended Plan (Alternative 1B) would contribute to CALFED objectives, including water supply reliability and environmental water supply reliability.
  - The Recommended Plan (Alternative 1B) would comply with CVPIA objectives by providing a more reliable, long-term Incremental Level 4 water supply to the Refuges. The CVPIA identifies actions and programs to mitigate for CVP impacts. Under the CVPIA, the Department of Interior is obligated to provide full Level 4 water supplies to the Refuges. The obligation for Incremental Level 4 water supplies is not a Central Valley Project obligation.
  - CCWD is applying for State Proposition 1 funding through the California Water Commission’s Water Storage Investment Program. The Investigation alternatives are consistent with the goals and objectives of the Water Storage Investment Program.

- **Uncertainty in Technical, Economic, Financial, and Environmental Feasibility** – Certain assumptions were made for the Investigation based on engineering, economic, and scientific judgment and the availability of data/information. While this is effective in estimating relative outcomes, various risks and uncertainties could affect implementation of an authorized project.
  - Climate change could produce conditions that differ from today, affecting future CVP and SWP operations. The Investigation’s Final Alternatives were evaluated under 2030 and 2070 climate change condition scenarios. The analysis concluded that these alternatives continue to provide benefits under a range of future climate scenarios. Therefore, the Final Alternatives are robust in that they can continue to provide benefits, even under changed conditions. Appendix F – Climate Change Risk and Uncertainty Analysis documents this climate change analysis.
  - A major unknown aspect of future water system operations is California WaterFix. CCWD’s settlement agreement with the State in regard to California WaterFix reduces some of this uncertainty by providing stipulations that California WaterFix operations cannot have a negative impact on the quantity or quality of CCWD’s water. Sensitivity analysis using planned California WaterFix operations, combined with settlement stipulations, showed that the Recommended Plan (Alternative 1B) continued to provide benefits with WaterFix in place. Appendix B – Modeling documents this sensitivity analysis.
  - Reclamation conducted a DEC review in 2007. A second DEC Review is planned in 2018 to verify compliance with the 2007 DEC review recommendations and review
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additional design components not included in the 2007 review. Results would be included in the Final Feasibility Report.

− Construction cost estimates, even at a feasibility-level, have inherent risks and uncertainties due to unknown future labor, market, and field conditions, and the level and schedule of appropriations. Appropriate contingencies have been applied to account for these uncertainties. Cost estimates included in this Draft Feasibility Report are presented at both appraisal- and feasibility-levels. The appraisal cost estimates for the Neroly Pump Station and modifications to existing Transfer Station will be brought to feasibility level for the Final Feasibility Report.

− Non-contract costs, including mitigation costs, are estimated as 40 percent of the total construction cost. This percentage reflects CCWD’s actual costs encountered during the initial Los Vaqueros Project construction and the Phase 1 Expansion of Los Vaqueros Reservoir.

− Annual operations, maintenance, and replacement costs include (1) operation, maintenance, and replacement for the new and modified facilities under Phase 2 expansion, and (2) increase in replacement costs for existing facilities due to changed operations under Phase 2 expansion. The estimate of increased replacement costs for existing facilities is underdevelopment and has not been reflected in the annual operations, maintenance, and replacement costs herein. These estimates are expected to be developed for the Final Feasibility Report. In addition to appropriations for the Federal portion of construction costs, long-term appropriation authorization may be needed to secure funding for the annual operational costs associated with delivering Refuge water supplies.

− The estimation of economic (monetized) benefits of potential project accomplishments is subject to uncertainties associated with valuation methods and assumptions. To address the risk and uncertainty related to economic valuation of benefits, alternate valuation methods are presented in Appendix D – Economic Analysis for each benefit category as a sensitivity analysis. Overall, the economic risk and uncertainty analyses demonstrate that the estimated economic benefit values and assumptions are reasonable and are consistent with values generated through different approaches.

− Much information is known about physical and geological conditions in the vicinity of the proposed project features due to prior design and construction activities associated with the existing Los Vaqueros Project. Additional geotechnical investigation is planned post-authorization to confirm the design and cost estimate assumptions for some of the conveyance features.

− In addition to Federal funding, non-Federal funding for a majority of the construction costs of a recommended plan would need to be identified and secured for the Secretary of the Interior to recommend Congressional appropriations for construction. Alternative financing arrangements are being actively explored by CCWD and the
Implementation Requirements

Implementation of the Recommended Plan, Alternative 1B, would require the following:

- **Project authorization** – The Water Infrastructure Improvements for the Nation Act (Public Law 114-322), Section 4007 provides authority for the Secretary of the Interior to (1) participate in State-led storage projects, and (2) provide financial assistance to carry out these projects within any Reclamation State, subject to a set of requirements.

  - Of these requirements, this feasibility report confirms the following:

    o The State-led storage project is technically and financially feasible and provides a Federal benefit in accordance with the reclamation laws;

    o In return for the Federal cost-share investment in the State-led storage project, a proportional share of the project benefits are the Federal benefits, including water supplies dedicated to wildlife refuges; and

    o The Federal cost-share is an amount equal to but not more than 25 percent of the total cost of the State-led storage project.

  - CCWD, as the local sponsor, and the State of California must assist in confirming the following remaining Section 4007 requirements, as they are determined:

    o Federal participation has been requested by the Governor of the State in which the State-led storage project is located.

    o Sufficient non-Federal funding is available to complete the State-led storage project.

    o The State-led storage project sponsors are financially solvent.

    o California Water Commission has determined that the State-led storage project is consistent with the California Water Quality, Supply, and Infrastructure Improvement Act, approved by California voters on November 4, 2014.

  - Pursuant to fulfilling the remaining requirements of the Water Infrastructure Improvements for the Nation Act (Public Law 114-322), the Secretary of the Interior would need to submit to Congress a written notification of determinations on compliance with Section 4007 requirements, within 30 days of making such determinations.

- **Project funding/appropriations** – The Water Infrastructure Improvements for the Nation Act (Public Law 114-322), Section 4007 (h) authorizes $335 million of funding
for qualified State-led storage projects, but requires specific appropriation to designate funding for a project by name, after the Secretary of Interior recommends the project to the appropriate committees of Congress.

- Total Federal investment may not exceed 25 percent of the total construction cost of $839 million (October 2015 dollars), consistent with Public Law 114-322 requirements.

- Construction cost may be adjusted to allow for escalation from stated price levels (October 2015) to the notice to proceed, based upon Reclamation’s Construction Cost Trends publication or similar source.

- Total construction cost may be increased, but not by more than 15 percent, if needed for modifications that do not materially alter the scope or functions of the project as authorized.

The timing, source, availability, and appropriation process will affect the construction schedule and cost estimates included in the Feasibility Report. In addition to requesting appropriations for the Federal share of construction cost, the Secretary of the Interior, in coordination with non-Federal cost-share partner(s), would request appropriations annually to conduct preconstruction activities, including advanced planning and design. The Secretary of the Interior, in coordination with the managing agencies of the Refuge Water Supply Program, would also request appropriations annually to fund the operational costs associated with delivering water supplies to Refuges.

- **Regulatory and related requirements for construction** – Construction and operation of the authorized plan would be subject to the requirements of Federal, state, and local laws, policies, and environmental regulations. Reclamation and/or CCWD (the CEQA-lead agency) would need to obtain various Federal, state, and local permits and regulatory authorizations before project construction would begin. A list of potential permits and approvals is included in the Draft Supplement to Final EIS/EIR. Reclamation would also have to make the determination that the proposed project partnerships would not injure Reclamation water rights.

- **Advanced planning and design activities** – If the Secretary of Interior determines that the requirements of Section 4007 of the Water Infrastructure Improvements for the Nation Act (Public Law 114-322) are met and Congress authorizes appropriations for construction of a project, Reclamation and CCWD would initiate and complete, in coordination with project partners and stakeholders, required advanced planning and design activities. Key activities include:
  
  - Additional geotechnical investigations and surveys;
  
  - Advanced planning studies and design activities;
  
  - Execution of agreements with key partners and stakeholders regarding advanced planning, design, and construction activities;
– Funding agreements with beneficiaries;
– Operations and maintenance plans and agreements;
– Acquisition of lands, easements, and rights of ways; and
– Water rights modifications, including changes to points of use or diversion, as required. This will require coordination with Reclamation to obtain appropriate modifications to its water rights and to prevent injury to its existing water rights.

**Federal and Non-Federal Responsibilities** – If project approvals and appropriations occur, Reclamation and CCWD, in collaboration with project partners or beneficiaries, would coordinate to perform pre-construction and design studies for the authorized plan. After Project Cooperation Agreements are signed and non-Federal partners have provided any required financial contributions and assurances, CCWD, in coordination with Reclamation, would acquire real estate, construct the new project facilities, and complete related mitigation requirements. It is likely that CCWD, as owner and operator of the existing Los Vaqueros Project, or a future Joint Powers Authority, would take a lead role in final design and construction of project facilities, in coordination with Reclamation. CCWD would likely remain the operator and maintainer of all facilities associated with the expansion project. There is also potential for the involvement of Local Agency Partners as part of a Joint Powers Authority to oversee the operation and maintenance of the new facilities.
Executive Summary

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