

# **San Luis Low Point Improvement Project Environmental Impact Statement / Environmental Impact Report**

## **Appendix A1: Alternatives Development**

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# Appendix A1

## Alternatives Development

This Alternatives Development Appendix documents the alternatives development process for the San Luis Low Point Improvement Project (SLLPIP) Environmental Impact Statement/Environmental Impact Report (EIS/EIR).

### A1.1 Alternatives Development and Screening Process

The Lead Agencies used a comprehensive process to develop initial alternatives that included review of existing material, public input, and comparison and evaluation of initial alternatives using the Federal planning criteria and the purpose and need/project objectives.

#### A1.1.1 Alternatives Screening Criteria

The Federal planning process outlined in the *Economic and Environmental Principles and Guidelines for Water and Related Land Resources Implementation Studies*<sup>1</sup> (P&Gs) (U.S. Water Resources Council 1983) guides the formulation and evaluation studies of major Federal water resources development agencies. The planning process is intended to formulate reasonable plans responsive to Federal, State, and local objectives.

The P&Gs state that the Federal objective of water and related land resource planning is to contribute to National Economic Development (NED) while protecting the nation's environment. The P&Gs describe the Federal objective as a national goal. The process, which includes evaluation and consideration of all possible alternatives, is designed to develop a plan that provides the most economical and environmentally acceptable Federal action. The P&Gs distinguish the study objective from the Federal objective as more specific in terms of expected or desired outputs.

To meet the study objectives, the planning process follows the P&Gs' structured six-step planning approach. The structured approach, listed below, adjusts to the

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<sup>1</sup> The SLLPIP Feasibility Study was initiated by Reclamation in 2004 and as such, has been developed consistent with the guidelines presented in the P&Gs. In 2015, the Department of the Interior released the *Department of Interior Agency Specific Procedures for implementing the Council on Environmental Quality's Principles, Requirements, and Guidelines for Water and Land Related Resources Implementation Studies (PR&G)* (United States Department of the Interior 2015). These new PR&Gs are being used to provide input on the SLLPIP Feasibility Study process but are not required.

identification of new information relevant to the alternatives plans with a reiteration of the initial steps in the planning process.

1. Define the water and related land resource problems, opportunities, objectives, and constraints while coordinating among Federal, State, and local authorities, and the public.
2. Inventory and forecast existing and without project future conditions in the study area relative to the identified problems, opportunities, and constraints.
3. Formulate alternative plans by exploring a full range of possible solutions.
4. Evaluate plans relative to existing and without project future conditions.
5. Compare the plans among each other.
6. Select the recommended plan based on the comparison of plans.

Alternatives are screened in the Federal planning process based on how well they would meet the Federal screening criteria:

- *Completeness* is the extent to which a given alternative plan provides and accounts for all necessary investments or other actions to ensure realization of the planned effects. This may require relating the plan to other types of public or private plans if the other plans are crucial to realization of the contributions to the objective.
- *Effectiveness* is the extent to which an alternative plan alleviates the specified problems and achieves the specified opportunities.
- *Efficiency* is the extent to which an alternative plan is the most cost effective means of alleviating the specified problems and realizing the specified opportunities, consistent with protecting the Nation's environment.
- *Acceptability* is the workability and viability of the alternative plan with respect to acceptance by State and local entities and the public and compatibility with existing laws, regulations, and public policies.

### **A1.1.2 Alternatives Identification and Screening**

This section presents an overview of how the Federal planning process was used to develop the SLLPIP initial alternatives. This identification and formulation process is consistent with National Environmental Policy Act (NEPA) and California Environmental Quality Act (CEQA), which require a lead agency to consider a reasonable range of alternatives.

### **A1.1.2.1 Management Measures**

The first step in the development of initial alternatives was the identification of potential management measures, which could include programs, projects, or policies, that would help achieve the project objectives. The Lead Agencies identified management measures based on Santa Clara Valley Water District's (SCVWD's) past work on the project, other water resources studies, and the team's technical understanding of the project's problems, opportunities, and objectives. SCVWD's previous efforts included an extensive public outreach effort, which resulted in the inclusion of management measures suggested by the project stakeholders and the general public.

The initial list of management measures was presented in the February 2008 *SLLPIP Initial Alternatives Information Report (IAIR)*. The 87 management measures identified in the IAIR were grouped into six categories: (1) Institutional Agreements; (2) Source Water Quality Control; (3) Water Treatment; (4) Conveyance; (5) Local Reservoir Storage; and (6) Alternate Water Supplies.

These management measures were then screened according to their technical and institutional viability<sup>2</sup> as well as the degree to which their implementation would achieve the SLLPIP objectives. This screening did not evaluate management measures in detail, but rather looked for fatal flaws that would make a measure not viable. Management measures that were technically and institutionally viable and made some contribution towards meeting the project objectives were carried forward.

### **A1.1.2.2 Initial Alternatives and Screening**

A total of 26 initial alternatives were developed from the management measures. Initial alternatives included one management measure or a combination of management measures to achieve good performance relative to the project objectives. The 26 initial alternatives were screened for how well they would meet the Federal planning criteria.

In the next step, at least one initial alternative from each category and for some categories multiple initial alternatives were selected to carry forward for analysis, maintaining a reasonable range of alternative types. At the end of the process, 17 initial alternatives that were carried forward from the IAIR (United States Department of the Interior, Bureau of Reclamation [Reclamation] 2008a). The IAIR focused on existing information, so some alternatives were carried forward because the information was not adequate to determine if the alternative could be eliminated.

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<sup>2</sup> In the IAIR, technical viability was related to the general engineering viability of measures and assessed whether a measure could be constructed or implemented to effectively address the low point issue. Institutional viability accounted for the institutional aspects of a measure, including regulatory and environmental compliance and public acceptance.

### **A1.1.2.3 Plan Formulation**

In the Plan Formulation Phase, alternatives carried forward from the IAIR were further developed to allow a more detailed analysis of their ability to meet the four Federal planning criteria: completeness, effectiveness, acceptability, and efficiency. The IAIR focused on available information, but the Lead Agencies developed additional information in the Plan Formulation Phase to help evaluate potential alternatives.

The goal of this re-evaluation was to develop updated information and data to identify and screen out alternatives that would not meet the planning criteria prior to development of comprehensive plans in the *SLLPIP Plan Formulation Report* (PFR). As a result, 14 alternatives were screened out, eliminating them from further consideration. Three alternatives, the Lower San Felipe Intake Alternative, the Combination Alternative and the Pacheco Reservoir Alternative, remained for further analysis in the Feasibility Report and EIS/EIR. The results of the screening and evaluation are described in the PFR (Reclamation 2009).

### **A1.1.3 Scoping of Alternative Measures and Pre-Screening Process**

The SLLPIP study team held a series of three public open house scoping meetings in September 2008 to present the public with the alternatives' issues and potential impacts identified during plan formulation, agency roles, and opportunities for public involvement. The meetings were held in San Jose, Los Banos, and Sacramento. Attendees included members of the public and representatives from public agencies.

During each of the scoping meetings, the public was encouraged to voice questions or comments. Members of the public also submitted comments in writing during and after the public scoping meetings. Comments received included questions on the project status, plans for future public involvement, and the roles of resource agencies in the planning process. Commenters also asked questions about the alternative screening process, the alternatives that had been screened, and the alternatives that would be evaluated in the EIS/EIR. Specifically, commenters were interested in the interaction of an expanded Pacheco Reservoir with Henry Coe State Park, the addition of an alternative to treat water to reduce algae growth, and the structure of institutional measures. Multiple comments were also received on the planned analysis of alternative effects. Commenters had questions about the planned analysis process for fish in San Luis Reservoir and the Sacramento- San Joaquin Delta (Delta), potential effects on wildlife habitat in the study area, water quality effects, changes in electricity consumption resulting from changed water system operations, and recreation effects.

Reclamation prepared an *Environmental Scoping Report* (Reclamation 2008b) that documented the comments captured at the scoping meetings in detail. This

information was included during development of alternatives. The specific comments related to alternatives were incorporated as follows:

- **Pacheco Reservoir:** commenters expressed concerns about impacts to the Pacheco Creek watershed and long-term operations and maintenance requirements. They also expressed concerns about inundating portions of Henry Coe State Park. The Pacheco Reservoir Alternative was previously eliminated related to the acceptability and effectiveness criteria, because it had more potential for environmental effects and the greatest costs. However, in August 2017, SCVWD submitted an application for funding for the expansion of Pacheco Reservoir under the Water Storage Investment Program (WSIP). Based on the public and non-public benefits identified from the evaluation conducted for the WSIP application and the stakeholder support for the project, SCVWD requested that Reclamation reevaluate the Pacheco Reservoir Expansion Alternative in the SLLPIP Feasibility Report and EIS/EIR.
- **Algae Treatment:** commenters suggested treating algae before it enters San Luis Reservoir. While pre-treatment was challenging based on the quantity of inflow, an alternative was added to analyze treatment after the water is withdrawn from San Luis Reservoir (the Treatment Alternative).
- **Institutional Measures:** commenters expressed concerns that the institutional measures included in the alternatives (such as water transfers and exchanges) were not reliable. These measures are no longer included in the action alternatives.

#### **A1.1.4 Alternatives Eliminated as Part of Pre-Screening Process**

As was noted above in Section A1.1.2, 26 initial alternatives were screened down to 17 in the IAIR of which 14 were screened out in the PFR. Table A-1 displays the alternatives screened in the IAIR and PFR and the reason that they were screened.

During the feasibility phase of the alternatives evaluation, the Lead Agencies reconsidered the alternatives recommended for consideration in the EIS/EIR. The PFR considered but eliminated the Treatment Alternatives; however, new treatment methods suggested during the feasibility phase resulted in this alternative being recommended for consideration in the EIS/EIR. In addition, actions taken by SCVWD outside of this feasibility study effort to complete upgrades at the Rinconada Water Treatment Plant (WTP) will improve its capacity to address low point related water quality conditions and has resulted in the narrowing of the Treatment Alternative to focus on upgrades to the Santa Teresa WTP.

**Table A1-1. Alternative Screening Results**

Category	IAIR Screening		PFR Screening		Feasibility Report
	Alternative	Screening Result	Alternative	Screening Result	
Institutional	Institutional Alternative	Retained	Institutional Alternative	Screened out as a standalone plan under the completeness criterion	
Source Water Quality Control	Algae Harvesting Alternative	Eliminated because it had similar benefits to algaecide and was economically infeasible when compared to algaecide			
	Algaecide Alternative	Retained	Algaecide Alternative	Screened out under the effectiveness and acceptability criteria given concerns over potential capacity to treat SLR algae and the difficulty permitting the application of algaecide on a drinking water reservoir at this scale	
	Managed Stratification Alternative	Eliminated because it had similar benefits to algaecide and was economically infeasible when compared to algaecide			
Treatment	Treatment at San Felipe Intake Alternative	Retained	Treatment at San Felipe Intake Alternative	Screened out under the acceptability criterion given SCVWD's determination that DAF treatment is not an acceptable remedy to the low point issue because evaluation during previous WTP upgrades indicated DAF is less effective and more difficult to operate than current treatment methods	
	Treatment at WTPs Alternative	Retained	Treatment at WTPs Alternative		Treatment Alternative – carried forward following further analysis of developing Raw Water Ozonation at the Santa Teresa WTP.
	Treatment at Pumping Plant Alternative	Retained	Treatment at Pumping Plant Alternative		
Conveyance	Lower San Felipe Intake Alternative	Retained	Lower San Felipe Intake Alternative	Retained	Lower San Felipe Intake
	Holladay Aqueduct Alternative	Eliminated because it had similar benefits to the Lower San Felipe Intake and Southerly Bypass Alternatives and was economically infeasible when compared to those options			
	Northerly Bypass Corridor Alternative	Eliminated because it had similar benefits to the Lower San Felipe Intake and Southerly Bypass Alternatives and was economically infeasible when compared to those options			

**Table A1-1. Alternative Screening Results**

Category	IAIR Screening		PFR Screening		Feasibility Report
	Alternative	Screening Result	Alternative	Screening Result	
	Southerly Bypass Corridor Alternative	Retained	Southerly Bypass Corridor Alternative	Screened out under the efficiency criterion given the alternative's economic infeasibility when compared to the Lower San Felipe Intake Alternative	
Storage	Anderson Reservoir Expansion Alternative	Retained	Anderson Reservoir Expansion Alternative	Screened out under the efficiency criterion given the alternative's economic infeasibility when compared to the Pacheco B Alternative	
	Chesbro Reservoir Expansion Alternative	Retained	Chesbro Reservoir Expansion Alternative	Screened out because additional engineering, geotechnical, geological and hydraulic analysis determined that an alternate site between the Pacheco A and Pacheco B locations was the most efficient storage site available	
	Lower Pacheco Reservoir Alternative	Retained	Lower Pacheco Reservoir Alternative		
	Pacheco A Reservoir Alternative	Retained	Pacheco A Reservoir Alternative	Retained as a single alternative with two storage capacity configurations and a final site to be determined during development of the Feasibility Report	Pacheco Reservoir Expansion Alternative
	Pacheco B Reservoir Alternative	Retained	Pacheco B Reservoir Alternative		
	San Benito Canyon Reservoir Alternative	Retained	San Benito Canyon Reservoir Alternative	Screened out because small size made reservoir less efficient than other options	
	San Luis Reservoir Expansion Alternative	Eliminated because it had similar benefits to the other storage alternatives and was economically infeasible when compared to those options			San Luis Reservoir Expansion Alternative - multiple configurations of a reservoir expansion alternative considered by analysis of the potential combination with the connected CAS action. The Central Valley Project only dedication of the expanded reservoir was selected to move forward for further evaluation.
	Del Puerto Canyon Reservoir Alternative	Retained	Del Puerto Canyon Reservoir Alternative	Screened out under the efficiency criterion given the alternative's economic infeasibility when compared to the Pacheco Alternative	
	Ingram Canyon Reservoir Alternative	Retained	Ingram Canyon Reservoir Alternative		
	Quinto Creek Reservoir Alternative	Retained	Quinto Creek Reservoir Alternative		

**Table A1-1. Alternative Screening Results**

Category	IAIR Screening		PFR Screening		Feasibility Report
	Alternative	Screening Result	Alternative	Screening Result	
Alternate Water Supplies	Monterey Bay Desalination Alternative	Eliminated because it was economically infeasible when compared to any of the other alternatives under consideration in the IAIR			
	San Francisco Bay Desalination Alternative	Eliminated because it was economically infeasible when compared to any of the other alternatives under consideration in the IAIR			
	Combined Desalination Alternative	Eliminated because it was economically infeasible when compared to any of the other alternatives under consideration in the IAIR			
	Enlarged SBA/Los Vaqueros Expansion Alternative	Expansion of the SBA was screened out but enlarging Los Vaqueros Reservoir was retained	Los Vaqueros Expansion Alternative	Screened out under the completeness criterion given the ongoing development of the project in the Los Vaqueros Expansion Project Feasibility Study	
	Los Vaqueros Expansion Alternative	Retained			
Combination	Combination Alternative	Retained	Combination Alternative	Retained	Eliminated related to the acceptability criterion given the identification of issues with the feasibility of the Anderson Reservoir reoperation and groundwater components.

Key:

- CAS = Safety of Dams Corrective Action Study
- DAF = Dissolved Air Flootation
- IAIR = Initial Alternatives Information Report
- PFR = Plan Formulation Report
- SBA = South Bay Aqueduct
- SCVWD = Santa Clara Valley Water District
- SLR = San Luis Reservoir
- WTP = water treatment plant

The PFR also recommended consideration of the Combination Alternative; however, detailed review of the alternative by SCVWD during development of the Feasibility Report and this EIS/EIR identified issues with the feasibility of the alternative’s Anderson Reservoir reoperation component and its groundwater extraction and recharge components. These issues included concerns over the potential for future changes to operating rules for releases to Coyote Creek under the Fisheries and Aquatic Habitat Collaborative Effort Settlement Agreement between SCVWD, the Guadalupe Coyote Resource

Conservation District, and the resource agencies—California Department of Fish and Wildlife; U. S. Fish and Wildlife Service, and National Marine Fisheries Service (SCVWD 2017). These changes are anticipated with implementation of the Anderson Dam Seismic Retrofit Project currently under design (SCVWD 2017). SCVWD also determined that the operation of the groundwater extraction and recharge components of the Combination Alternative that were originally formulated by the District during development of an Infrastructure Reliability Plan, would be infeasible given issues identified with conflicts to operation of existing wells by SCVWD contractors during completion of the Infrastructure Reliability Plan (SCVWD 2017). Without these major components, the Combination Alternative would be unable to adequately address low point generated water supply interruptions (SCVWD 2017).

The IAIR considered but eliminated the Expansion of San Luis Reservoir Alternative given its higher cost and similar benefits to the other storage alternatives that were identified in the IAIR. Potential dam safety issues at Sisk Dam have been under review in a Safety of Dams Corrective Action Study (CAS) being prepared by Reclamation at the same time the SLLPIP Feasibility Study has been underway. While geologic studies and engineering design of structural alternatives to raise the dam embankment and adding abutments were underway to support development of the CAS, Reclamation completed the San Luis Reservoir Expansion Draft Appraisal Report (Reclamation 2013) that evaluated the potential water supply benefits generated by a reservoir expansion completed in coordination with the dam safety action to potentially reduce the costs of the standalone reservoir expansion alternative identified and screened in the IAIR. Results from the 2013 appraisal study indicated that inclusion of the Expansion of San Luis Reservoir Alternative in the SLLPIP Feasibility Report and EIS/EIR was warranted (Reclamation 2013).

The feasibility study considered multiple operational configurations for an expanded San Luis Reservoir. These configurations evaluated the potential water supply benefits of different dedications of the additional water stored in the reservoir – a Central Valley Project (CVP) storage only configuration, a split CVP and State Water Project (SWP) storage configuration, and a configuration that would allow CVP operators to carryover supply in this expanded space for delivery to CVP contractors in subsequent years. Table A-2 presents the results of potential water supply benefit evaluations that were completed for these optional configurations. The CVP only dedication of the expanded 120 TAF was selected to move forward for further evaluation.

**Table A1-2. Changes in San Felipe Division and CVP/Municipal and Industrial Water Supply Benefits with San Luis Reservoir Expansion**

<b>Alternative<sup>1</sup></b>	<b>Average Annual Change in San Felipe Division Municipal and Industrial Deliveries in years with Low Point Interruptions (Acre-Feet)</b>	<b>Average Annual Change in San Felipe Division Municipal and Industrial Deliveries in years without Low Point Interruptions (Acre-Feet)</b>	<b>Average Annual Change in CVP Deliveries</b>	<b>Average Annual Change in SWP Deliveries<sup>2</sup></b>
CVP Reservoir Expansion	200	700	16,700	-5,600
Shared CVP and SWP Reservoir Expansion	100	370	8,400	1,200
Increased San Luis Reservoir Carryover Storage	700	>100	10,300	0

Notes:

<sup>1</sup> All reservoir expansion configurations considered 120,000 acre-feet of additional storage capacity in San Luis Reservoir consistent with the 10 foot embankment raise under consideration in the feasibility study.

<sup>2</sup> Includes changes in SWP Table, Article 21 and Article 56 deliveries

## A1.2 References

Santa Clara Valley Water District (SCVWD). 2017. San Luis Low Point EIR/EIS, Screening of Combination Alternative from Further Evaluation. Letter from Melih Ozbilgin, SCVWD to Nicole Johnson, Reclamation. April 21, 2017.

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