Chapter 8 National Economic Development and Locally Preferred Alternative

Determination of Feasibility

This chapter considers the feasibility of the NED Plan and the Locally Preferred Alternative. As indicated in Chapter 7, Alternative Evaluation, Alternative C has the highest net NED benefits, and is therefore the NED Plan. Alternative D has been identified as the Locally Preferred Alternative. The determination of feasibility considers the following elements:

- **Technical Feasibility:** The alternative is evaluated to ensure that it is technically possible to construct, operate, and maintain.
- **Environmental Feasibility:** The alternative is analyzed to verify that construction or operation would not result in unacceptable environmental consequences to endangered species, cultural resources, Indian trust assets, or other resources.
- **Economic Feasibility:** The investment to construct the alternative is analyzed with respect to the anticipated benefits to determine if constructing and operating the project would result in net NED benefits.
- **Financial Feasibility:** The alternative is analyzed to ensure that the alternative's beneficiaries have the ability to pay or repay their assigned costs, including—but not limited to—any Federal investment over a period of time, consistent with applicable law.
- The Draft EIR/EIS does not identify an environmentally preferred alternative. An environmentally preferred alternative that is consistent with NEPA requirements will be identified in the Final EIR/EIS and Final Feasibility Report.

NED Plan

Technical Feasibility

Technical feasibility considers both the feasibility of constructing the facilities and the operations for the project.

Facilities: Alternative C facilities are considered to be constructable and can be operated and maintained. The engineering design for Alternatives C and D has been developed to support a Class 4 (appraisal) estimate (AACE International) of the construction costs; however, some facilities are currently developed to a Class 3 level (feasibility). Class 3 estimates are based on limited information and intended for project screening and determination of feasibility. A summary of the estimates is provided in the section titled "Design Considerations" in Appendix B, Engineering. Reclamation performed DEC reviews in July 2007 and May 2014. A special assessment was performed in March 2017. The special assessment identified the specific actions that are needed to bring all facilities up to the level of a Class 3 estimate.

Specifically, additional geotechnical work is needed on the pumping plants and Holthouse Dam to advance their estimates to a Class 3 level. The geotechnical investigation results will then be incorporated into the facility designs to bring them to the feasibility level. Additional drawings are also needed for the pumping plants to support quantities for the feasibility-level estimate. These actions will be completed before the Final Feasibility Report and could result in changes to the cost estimate (an increase or decrease in costs), which could change the net NED benefits.

Operations: The ability of the alternative to achieve the level of benefits identified in this report depends on cooperative operation of Sites Reservoir with the CVP and SWP. A Water Rights Strategy and Principles of Agreement between Reclamation, the Authority, and DWR (see Chapter 6, Alternative Development) are needed to support the determination of technical feasibility. The Authority is coordinating the formation of an Operations Work Group with Reclamation and DWR to develop the Principles of Agreement. The Principles of Agreement are necessary to achieve the benefits presented for Alternatives C and D in this report. One important principle is that Sites Reservoir operations will not have negative impacts on the CVP, the SWP, or their contractors.

Environmental Feasibility

The environmental effects for Alternative C are evaluated in the Sites Reservoir Draft EIR/EIS (Reclamation and Authority 2017). An environmentally preferred alternative that is consistent with NEPA requirements will be identified in the Final EIR/EIS. Constructing Sites Reservoir would affect environmental resources in the Primary, Secondary, and Extended Study Areas. Beneficial effects correspond to the following resource areas: water management, agricultural resources, fisheries and aquatic resources, socioeconomics, power and energy, and recreation. Some adverse effects would be temporary, construction-related effects that would be reduced to less-than-significant levels through mitigation. Other adverse effects would be permanent, including effects on terrestrial wildlife, land use, air quality, greenhouse gases, and cultural resources. The Draft EIR/EIS is incorporated by reference into this document. The Draft EIR/EIS evaluates the representative environmental effects, and the proposed mitigation measures are presented in Appendix 1A of the EIR/EIS and are included in the alternative cost estimates.

Additional work on climate change will be needed before the preparation of the Final EIR/EIS.

As part of the project planning process, Reclamation and the Sites Project Authority will incorporate environmental commitments and Best Management Practices (BMPs) to avoid or minimize potential project impacts.

The evaluation of environmental feasibility is an ongoing process that will incorporate public comment on the Draft EIR/EIS into the Final EIR/EIS. The Record of Decision will not be completed until pre-construction permits and approvals have been acquired.

Economic Feasibility

Based on evaluations to date, Alternative C is economically feasible and would generate a positive NED average annual benefit of $323.2 million. Alternative C offers the greatest net NED benefits ($135.8 million). The benefit cost ratio is 1.72, and the total net benefit over the 100-year planning horizon is $4.45 billion. The project’s total development cost (construction

and IDC) is approximately $5.28 billion. Ongoing work may modify both the benefits and costs, but the alternative is expected to remain economically feasible.

These evaluations will be reconfirmed after the engineering and estimates are advanced to prepare a Class 3 estimate. The Final Feasibility Report may also incorporate additional models and methods to determine economic feasibility.

Financial Feasibility

The evaluation of financial feasibility includes: (1) an allocation of costs to project purposes; (2) identification of potential project beneficiaries; and (3) a cost assignment and financial capability analysis. These steps evaluate the ability of the beneficiaries to pay their assigned capital and long-term operation, maintenance, and replacement costs. This process informs the evaluation of the appropriateness of the investment in the project by Federal and State decision makers.

Allocation of Costs to Project Purposes

Reclamation law (53 Stat. 1187, Reclamation Project Act of 1939) and policy (Reclamation 1988) require an allocation of costs to components or project purposes to (1) test financial feasibility by comparing estimated project costs with anticipated revenues, and (2) establish and measure compliance with project financial requirements after construction, and determine the final cost allocation. This report develops an application and evaluates financial feasibility consistent with item (1) above. Item (2) is evaluated post-construction.

This Draft Feasibility Report includes a cost allocation to evaluate the financial feasibility of Alternative C as the NED Plan. Estimated costs are allocated to the various project purposes, and then assigned to beneficiaries.

Allocated costs include construction costs, other costs (sunk costs), land costs, interest during construction, mitigation costs, annual OM&R costs, net power costs, and replacement costs. Because the cost allocation is a financial evaluation, project costs may be presented differently in the cost allocation than in the economic evaluation.

Once identified, all estimated costs are allocated to the project purposes. To develop a preliminary cost allocation for Alternative C, the following project purposes were identified:

- Water supply
- Incremental Level 4 water supply to Wildlife Refuges
- Anadromous fish and other aquatic species
- Hydropower generation
- Water quality
- Recreation
- Flood damage reduction

Once allocated to appropriate purposes, costs are assigned to the Federal government and non-Federal partners based on specific project authorization, established Federal cost-sharing laws

and regulations (see Table 8-1), and laws and objectives of non-Federal entities, including the State of California and local agencies.

Federal costs may be reimbursable or non-reimbursable. Non-reimbursable costs are borne entirely by the Federal government. Based on existing legislation, fish and wildlife enhancement are at least partly non-reimbursable. Table 8-1 summarizes existing legislative authorities for Federal financial participation that can be used to determine potential cost-sharing for each project purpose.

This Draft Feasibility Report does not identify any reimbursable costs to the Federal government.

Table 8-1. Authorities for Federal Financial Participation

Purpose	Pertinent Legislation	Description
Water Supply (Irrigation)	Reclamation Act of 1902, as amended	Reimbursable. This act allows for up-front Federal financing for irrigation water supply purposes, with 100% repayment of capital costs and OM&R costs by the non-Federal project sponsor.
Water Supply (M&I)	Reclamation Project Act of 1939, as amended	Reimbursable. This act allows for up-front Federal financing of M&I water supply purposes, with 100% repayment of capital costs (including IDC and interest over the repayment period); 100% of OM&R costs are non-Federal.
Incremental Level 4 Refuge	Central Valley Project Improvement Act (P.L.102-575, Title 34)	Section 3406(d)(3) provided that all incremental costs associated with providing an alternative source for incremental Level 4 water supplies would be 75% Federal non-reimbursable and 25% allocated to the State of California.
Anadromous Fish	Federal Water Project Recreation Act of 1965 (P.L. 89-72), as amended	P.L. 89-72 provides Federal non-reimbursable share of up to 75% and non-Federal share of at least 25% for fish and wildlife enhancements.
Delta Environmental Water Quality	Federal Water Pollution Control Act, as amended by the Clean Water Act of 1977	Section 102 [33 USC 1252] stipulates Federal agencies consider storage to regulate stream flow for water quality purposes when planning for any reservoir. The costs of providing area-wide water quality benefits are non-reimbursable up to 100%.
Hydropower	Reclamation Project Act of 1906, as amended	Reimbursable. This act allows for up-front Federal financing of hydropower purposes, with 100% repayment of capital costs (including IDC and interest over the repayment period); 100% of OM&R costs are non-Federal.
Flood Damage Reduction	Reclamation Project Act of 1939	Non-reimbursable. Discussed in Section 9(b) of the Act. "*In connection with any new project…there may be allocated to flood control or navigation the part of said total estimated cost which the Secretary may find proper."*
Recreation	Federal Water Project Recreation Act of 1965 (P.L. 89-72), as amended by the Reclamation Recreation Management Act (P.L. 102-575, Title XXVIII)	Federal non-reimbursable costs of 50% for separable capital costs; 100% of OM&R costs are non-Federal.

CVP = Central Valley Project
IDC = interest during construction
M&I = municipal and industrial
OM&R = operation, maintenance, and replacement
P.L. = Public Law

The Federal Water Project Recreation Act of 1965 (P.L. 89-72), as amended, provides a Federal non-reimbursable share of up to 75 percent and non-Federal share of at least 25 percent for fish and wildlife enhancements.

An initial allocation was developed for Alternative C. The separable costs-remaining benefits analysis allocates costs to project purposes.

Table 8-2 shows the estimated costs allocated to each project purpose for Alternative C. The allocated construction cost for each project purpose is the total annual cost with OM&R costs and IDC removed.

Annual Cost – OM&R Cost – IDC Cost = Construction Cost

Project components that have a single purpose have specific costs associated with them: for example, Alternative C includes three recreation areas that serve a single project purpose. Separable costs are costs that are specifically necessary because a purpose is included in a multipurpose project. Specific costs are costs that are solely necessary for the purpose to be achieved. Separable costs include specific costs, and may include a portion of joint costs; they are estimated as the reduction in financial costs that would result if a purpose were excluded from an alternative.

OM&R costs are then subtracted from the total cost to determine the capital cost allocated to each project purpose. A similar approach for developing the OM&R costs was used to subtract the separable costs and allocate the remaining OM&R costs, based on the percentage of the remaining OM&R costs. Subtracting the OM&R costs from the annual costs leaves the capital costs to be allocated to each project purpose.

Finally, the IDC is subtracted to determine the construction cost allocated to each project purpose. IDC is calculated as the percentage of the total capital cost multiplied by the total IDC. Subtracting IDC from the capital cost leaves the construction cost allocated to each project purpose.

As previously noted, realization of the benefits estimated for Alternative D depend on cooperative operations with the CVP and SWP. It would be necessary to develop Principles of Agreement between Reclamation, the Authority, and DWR to ensure these benefits are realized. The Authority is coordinating an Operations Work Group to develop Principles of Agreement.

Table 8-2. Estimated Cost Allocation Summary for Alternative C ($ Millions)

Category	Water Supply	Incremental Level 4 Refuge	Anadromous Fish & Other Aquatic	Water Quality	Hydropower (System)	Recreation	Flood Damage Reduction	Total
Allocated Total Cost (Construction, IDC, and OM&R)								
Total Costs								**$187.4**
Benefits by Purpose	$149.3	$37.3	$36.9	$74.1	$22	$2.3	$4.3	$323.2
Single-Purpose Cost	$97.6	$90.0	$98.7	$98.7	$161.2	$144.9	$144.4	-
Justifiable Expenditures	$97.6	$37.3	$36.9	$74.1	$22	$2.3	$4.3	$271.5
Separable Costs	$0.0	$0	$0	$0	$16.5	$0.3	$0	$16.8
Remaining Benefits (Justifiable Expenditures Less Separable Costs)	$97.6	$37.3	$36.9	$74.1	$5.5	$2.0	$4.3	$254.7
Percent (Distribution of Remaining Benefits)	38.3%	14.7%	14.5%	27.9%	2.2%	0.8%	1.7%	100%
Allocated Joint Costs	$65.3	$25.0	$24.7	$47.6	$3.7	$1.3	$2.9	$170.6
Total Allocated Costs (Separable Plus Allocated Joint Costs)	$65.3	$25.0	$24.7	$47.6	$20.2	$1.7	$2.9	$187.4
Percent Total Cost Allocation	34.9%	13.3%	13.2%	25.4%	10.8%	0.9%	1.5%	100%
Allocated OM&R Annual Costs								
Separable OM&R	$0	$0	$0	$0	$0	$0.2	$0	$0.2
Allocated Joint OM&R	$10.0	$3.8	$3.8	$7.3	$0.6	$0.2	$0.4	$26.0
Total Allocated OM&R	**$10.0**	**$3.8**	**$3.8**	**$7.3**	**$0.6**	**$0.4**	**$0.4**	**$26.2**
Percent Allocated OM&R	38.0%	14.6%	14.4%	27.7%	2.1%	1.5%	1.7%	100%
Allocated Construction Annual Costs								
Separable Construction	$0	$0	$0	$0	$14.6	$0.1	$0	$14.7
Allocated Construction	$49.0	$18.8	$18.5	$35.7	$2.8	$1.0	$2.2	$127.9
Total Allocated Construction	$49.0	$18.8	$18.5	$35.7	$17.4	$1.1	$2.2	**$142.7**
Percent Allocated Construction	34.4%	13.1%	13.0%	25.0%	12.2%	0.8%	1.5%	**100%**
Allocated IDC Annual Costs								
Separable IDC	$0	$0	$0	$0	$1.9	$0.02	$0	$1.9
Allocated Joint IDC	$6.4	$2.4	$2.4	$4.6	$0.4	$0.1	$0.3	$16.6
Total Allocated IDC	$6.4	$2.4	$2.4	$4.6	$2.3	$0.1	$0.3	**$18.5**
Percent Allocated IDC	34.4%	13.1%	13.0%	25.0%	12.2%	0.8%	1.5%	100%

Category	Water Supply	Incremental Level 4 Refuge	Anadromous Fish & Other Aquatic	Water Quality	Hydropower (System)	Recreation	Flood Damage Reduction	Total
Allocated Construction and IDC Costs (Nominal)								
Allocated Total Development Cost	$1,813	$694	$686	$1,321	$642	$42	$80	$5,278
Allocated IDC	$209	$80	$79	$152	$74	$5	$9	$607
Construction Cost	$1,605	$614	$607	$1,169	$569	$37	$71	$4,671

IDC = interest during construction
OM&R = operation, maintenance, and replacement

Identification of Potential Project Beneficiaries

Beneficiaries have not been specifically identified for Alternative C, but assumptions were made in the CALSIM model to distribute water to different regions and purposes throughout the state, as shown in Table 8-3.

Table 8-3. Modeled Allocation of Water under Alternative C

Modeled Beneficiaries	Average Increase in Deliveries (TAF/yr)	Dry and Critical Increase in Deliveries (TAF/yr)
Water Supply – Sacramento River Hydrologic Region		
Supplemental Water to CVP Settlement Contractors	9	15
Supplemental Water for CVP Service Area Agriculture	16	15
Supplemental Water for CVP Service Area M&I	2	1
Supplemental Water for SWP Service Area M&I	1	3
Supplemental Water for SWP Feather River Service Area	-1	-3
Water Supply – San Joaquin River Hydrologic Region		
Supplemental Water for CVP Service Area Agriculture	3	6
Water Supply – San Francisco Bay Hydrologic Region		
Supplemental Water for CVP Service Area M&I	1	1
Supplemental Water for CVP Service Area Ag	1	1
Supplemental Water for SWP Service Area M&I	10	21
Water Supply – Central Coast Hydrologic Region		
Supplemental Water for SWP Service Area M&I	2	5
Water Supply – Tulare Lake Hydrologic Region		
Supplemental Water for CVP Service Area Agriculture	8	16
Supplemental Water for SWP Service Area M&I	4	10
Supplemental Water for SWP Service Area Agriculture	35	66
Water Supply – South Lahontan Hydrologic Region		
Supplemental Water for SWP Service Area M&I	14	33
Water Supply – South Coast Hydrologic Region		
Supplemental Water for SWP Service Area M&I	67	154
Supplemental Water for SWP Service Area Agriculture	0	1
Incremental Level 4 Refuge Water Supply		
Colusa Basin	2	1
Mendota Pool	58	29
Tulare Basin	14	7
Delta Environmental Water Quality		
Upstream and Delta Inflow	243	255

CVP = Central Valley Project
M&I = municipal and industrial
SWP = State Water Project
TAF = thousand acre-feet

Beneficiaries would be associated with the purposes and geographies identified in Table 8-3. Beneficiaries for water supply in the various hydrologic regions would be water agencies in these locations. The Federal government would be the beneficiary for incremental Level 4 water supply provided to Federal wildlife refuges, State Wildlife Areas, and private wetlands. The

beneficiary for Delta environmental water quality would be the State of California (likely under the coordination of CDFW, SWRCB, and DWR).

Other beneficiaries for benefits that are not associated with increased water supply include the following:

- Reclamation, DWR, and CDFW would benefit from improved coldwater pool and flow augmentation to benefit anadromous fish.
- The State of California would benefit from flood damage reduction.
- The State of California would benefit from additional recreation.

Cost Assignment and Financial Capability Analysis

Ownership, operations, and funding scenarios were developed to support the evaluation of the NED Plan (Alternative C), as well as the subsequent evaluation of the Locally Preferred Alternative.

The costs for the NED Plan were assigned based on the following considerations:

- M&I and agricultural water supply benefits were assigned to the beneficiaries.
- State funding for construction and IDC is likely to be obtained for environmental purposes (consistent with WSIP).
- Federal funding would be limited to at most 25 percent of the total project cost (consistent with the WIIN Act).

The Federal assignment includes the following:

- 50 percent non-reimbursable funding for incremental Level 4 refuge water supply (This funding level is below the ceiling of 75 percent allowed by the Central Valley Project Improvement Act [P.L. 102-575, Title 34], but it leverages State funding for these public benefits through the Proposition 1, California Water Bond.)
- 50 percent non-reimbursable funding for anadromous fish benefits (This funding level is below the ceiling of 75 percent allowed by the Federal Water Project Recreation Act of 1965 [P.L. 89-72], but it leverages State funding for these public benefits through the Proposition 1, California Water Bond.)
- 50 percent non-reimbursable funding for flood damage reduction (This funding level is below the ceiling of 100 percent allowed by the Reclamation Project Act of 1939, but it leverages State funding for these public benefits through the Proposition 1, California Water Bond.)

Table 8-4 presents the cost assignment for the project's development cost (construction and IDC) to the Federal government and the non-Federal partners.

Table 8-4. Development Cost Assignment for Federal and Non-Federal Partners: Alternative C

Purpose/Action	Total Percent	Total Cost	Cost Assignment ($ millions)			
			Federal Non-Reimbursable		Non-Federal Partners [a]	
			Percent	Cost	Percent	Cost
Alternative C: Development Cost Assignment (Construction and IDC) – Nominal						
Water Supply	**34%**	**1,813**	**0%**	**0**	**100%**	**1,813**
M&I Water Supply	91%	1,653	0%	0	100%	1,653
CVP Service Area	3%	49	0%	0	100%	49
SWP Service Area	97%	1,605	0%	0	100%	1,605
Agricultural Water Supply	**9%**	**160**	**0%**	**0**	**100%**	**160**
CVP Service Area	51%	81	0%	0	100%	81
SWP Service Area	49%	79	0%	0	100%	79
Incremental Level 4 Refuge	**13%**	**694**	**50%**	**347**	**50%**	**347**
Anadromous Fish	**13%**	**686**	**50%**	**343**	**50%**	**343**
Water Quality	**25%**	**1,321**	**0%**	**0**	**100%**	**1,321**
M&I Water Quality	10%	130	0%	0	100%	130
Agricultural Water Quality	1%	10	0%	0	100%	10
Delta Environmental Water Quality	89%	1,181	0%	0	100%	1,181
Hydropower	**12%**	**642**	**0%**	**0**	**100%**	**642**
Recreation	**1%**	**42**	**0%**	**0**	**100%**	**42**
Flood Damage Reduction	**1.5%**	**80**	**50%**	**40**	**50%**	**40**
Total	**100%**	**5,278**	**13.8%**	**730**	**86.2%**	**4,548**

[a] Includes Non-Federal Non-Reimbursable, Non-Federal and beneficiaries' paid funding.
Assumes cost assignment based on beneficiaries' benefits.
Totals may not add exactly due to rounding.
CVP = Central Valley Project
IDC = interest during construction
M&I = municipal and industrial
OM&R = operation, maintenance, and replacement
SWP = State Water Project

The Federal government's cost share for project development (non-reimbursable funding assistance) is estimated at $730 million (13.8 percent of the total development costs).

Preliminary Financial Capability Analysis

Section 6B of CMP-09-02 in the Reclamation Manual (November 2015) requires a "determination of the financial capability of the non-Federal project to pay the non-Federal share of costs associated with designing, constructing, operating, and maintaining a proposed project." The analysis provided in this draft report is preliminary. Financial capability and cost assignment will be completed following the review of the WSIP application and potential award of WSIP funding. The Authority will provide Reclamation with a report that evaluates its overall financial capability for the Final Feasibility Report.

Table 8-5 shows the estimated total cost assignments for Federal and non-Federal partners on an annual basis over the project's expected 100-year operating life. The following sections discuss the ability to pay with respect to each project purpose.

Table 8-5. Total Annual Cost Assignment for Federal and Non-Federal Partners: Alternative C

Purpose/Action	Total Annual Percent	Total Annual Cost	Cost Assignment ($ millions)			
			Federal Non-Reimbursable		Non-Federal Partners [a]	
			Percent	Cost	Percent	Cost
Alternative C: Total Cost Assignment (Construction, IDC and OM&R) – Annual						
Water Supply	35%	65.3	0%	0	100%	65.3
M&I Water Supply	91%	59.6	0%	0	100%	59.6
CVP Service Area	3%	1.8	0%	0	100%	1.8
SWP Service Area	97%	57.8	0%	0	100%	57.8
Agricultural Water Supply	9%	5.8	0%	0	100%	5.8
CVP Service Area	51%	2.9	0%	0	100%	2.9
SWP Service Area	49%	2.8	0%	0	100%	2.8
Incremental Level 4 Refuge	**13%**	**25.0**	**50%**	**12.5**	**57%**	**12.5**
Anadromous Fish	**13%**	**24.7**	**42%**	**10.5**	**57%**	**14.2**
Water Quality	**25%**	**47.6**	**0%**	**0**	**100%**	**47.6**
M&I Water Quality	10%	4.7	0%	0	100%	4.7
Agricultural Water Quality	1%	0.4	0%	0	100%	0.4
Delta Environmental Water Quality	89%	42.6	0%	0	100%	42.6
Hydropower	**11%**	**20.2**	**0%**	**0**	**100%**	**20.2**
Recreation	**1%**	**1.7**	**0%**	**0**	**100%**	**1.7**
Flood Damage Reduction	**2%**	**2.9**	**42%**	**1.2**	**58%**	**1.7**
Total	**100%**	**187.4**	**12.9%** [b]	**24.2**	**87.1%**	**163.2**

[a] Includes non-Federal and beneficiaries' paid funding.
[b] This percentage includes both OM&R and development cost funding. Estimated Federal funding for project development is projected to be 12.9 percent of the project's overall development cost, and consistent with WIIN regulatory requirements.
Cost assignments based on beneficiaries' benefits.
Totals may not add exactly due to rounding.
CVP = Central Valley Project
IDC = interest during construction
M&I = municipal and industrial
OM&R = operation, maintenance, and replacement
SWP = State Water Project

The availability of Federal non-reimbursable funding for the project's development costs would decrease the amount of financing required, thereby reducing the IDC costs incurred. The total project cost savings from the Federal non-reimbursable funding participation in the project was estimated to be $78.3 million and equivalent to a $2.4 million annual cost. However, the cost allocation in Table 8-4 has not been adjusted based on this expected lower development cost.

Municipal and Industrial Water

M&I water users include urban water users (i.e., residential, commercial, and institutional users), manufacturing, and other industry. The allocation of costs to M&I water users includes costs for both water supply and water quality.

Affordability Threshold Analysis: The financial feasibility analysis for M&I users evaluates their payment capacity for water supply improvement in relation to assigned project costs.

Affordability threshold analysis uses median household income in the water service area to evaluate the payment capacity of M&I users. An affordability threshold of 2.5 percent of median household income was selected for the analysis. The EPA Office of Drinking Water identified this threshold through a study evaluating the costs of complying with new drinking water regulations (EPA 1980).

Representative regional data were used to evaluate whether the assigned costs were below the affordability threshold, rather than data specific to individual water agencies. The Shasta Enlargement Final Feasibility Report (Reclamation 2015) evaluated population data for areas served by 10 potential SWP M&I water supply beneficiaries from 2010 urban water management plans. This is appropriate for Alternative C because M&I water supply beneficiaries are predominantly south-of-the-Delta and in the SWP service area (M&I deliveries north-of-the-Delta are in the CVP service area and receive increased deliveries of less than 3 TAF annually). The number of households was estimated with United States Census Bureau data (U.S. Census Bureau 2013), and median household income levels were identified from county-level data for each water service provider's service area.

Table 8-6 provides updated payment capacity analysis results for ten representative SWP M&I contractors. As described above, payment capacity is estimated as 2.5 percent of median household income. To account for existing water payments, an estimate of current water rates for Southern California residential customers (Raftelis Financial Consultants Inc. and American Water Works Association n.d.) was subtracted from the gross payment capacity estimate to arrive at the estimated residual payment capacity available to support new water projects.

Table 8-6. Payment Capacity Results for Representative Municipal and Industrial Contractors

Estimated Households in 2030	Median Household Income ($/hhld/yr)	Average Current Water Rates ($/hhld/yr)	Average Household Payment Capacity ($/hhld/yr)	Estimated Total Payment Capacity ($ million/yr)
826,300	$62,363	$667	$892	$689.1

Source: Raftelis Financial Consultants Inc. and American Water Works Association n.d.; Reclamation 2015.
hhld = household(s)
yr = year(s)

As shown in Table 8-6, the estimated annual total payment capacity of representative M&I contractors is over $689 million.

M&I Ability to Pay: Financial feasibility for M&I users was determined by comparing the results of the affordability threshold analysis with the annualized construction costs, IDC, and OM&R costs of the NED Plan. A detailed breakdown of the assigned water supply and water quality costs to M&I water users is shown in Table 8-7.

Table 8-7. Annual M&I Cost Assignment with 40-Year Loan Repayment: Alternative C ($ Millions)

Item	Total
Average Deliveries (TAF/yr)	102
Amortization Cost[a] (Years 1 to 40) ($ Millions)	
Water Supply	$88.9
Water Quality	$7.0
Total	**$95.9**
OM&R Cost (Years 1 to 100)	
Water Supply	$9.1
Water Quality	$0.7
Total	**$9.8**
Conveyance Cost (Years 1 to 100)	$15.3
Total Annual Cost (Years 1 to 40)	**$121.0**
Total Annual Cost (Years 41 to 100)	**$25.1**
Total Annual Cost (Avg.)	**$63.5**

[a] 4.429 percent annual interest rate (Federal Register 2016).
M&I = municipal and industrial
OM&R = operation, maintenance, and replacement
TAF = thousand acre-feet

The total annual M&I water supply cost ($121.0 million) would be notably less than the representative M&I contractors' estimated annual payment capacity ($689 million). This indicates that the M&I contractors would be able to repay their allocated project costs.

Payment of Assigned Costs: No M&I costs are assigned to the Federal government. All costs associated with increased water supply are assigned to the Authority. M&I beneficiaries would enter into agreements with the Authority to pay their share of the construction and OM&R costs. Furthermore, M&I beneficiaries south of the Delta would be required to enter into agreements with DWR for the conveyance costs associated with the use of SWP facilities.

It is anticipated that individual M&I agencies would require loans to pay their assigned portion of the development cost to the Authority. For the purposes of the analysis, it is assumed that they would borrow at 4.429 percent and repay the principal and interest over a 40-year loan period. This results in an estimated total cost per acre-foot of $1,186 for M&I users for the first 40 years. Table 8-8 shows the projected unit cost for M&I Water over the future 100-year study period, as well as the estimated water price for users (i.e., including projected conveyance costs).

Table 8-8. Costs per Acre-Foot for M&I Water

Cost Item	Average Cost Years 1 to 40	Average Cost Years 41 to 100	Average Cost Years 1 to 100
Development	$940	$0	$376
OM&R	$96	$96	$96
Conveyance	$150	$150	$150
Total	**$1,186**	**$246**	**$622**

M&I = municipal and industrial
OM&R = operation, maintenance, and replacement

In addition, conveyance costs would be applicable for Sites Project Water conveyed through SWP or CVP facilities. The conveyance cost would vary depending on the water delivery location and user type. All water contractors would incur unit variable costs to move water through the water system. The latest DWR cost projections estimate current variable cost averages of approximately $27.50 per acre-foot. Variable costs for outlying contractors (i.e., those on the Central Coast and in Riverside County) are generally in the range of $80 to $156 per acre-foot (DWR 2016). This variable cost predominantly consists of the energy used to transport the delivered water from the reservoir. In addition, non-SWP contractors would be assessed additional conveyance costs for use of the SWP system (and similarly non-CVP contractors may incur conveyance costs for use of the CVP). However, since nearly all the future water deliveries are expected to be to SWP water contractors and using SWP facilities, no conveyance charges to non-SWP contractors are expected.

Conveyance costs were estimated specifically for the alternatives using the SWP power model for expected deliveries through the SWP service area. The estimated average annual conveyance energy cost is $15.3 million for M&I deliveries, or $150 per acre-foot.

Comparison to Current Market Conditions: The M&I water costs during the first 40 years (loan repayment period) exceed the current average water supply costs for most SWP Contractors. However, it is comparable or below the rate that a few CVP Contractors pay (e.g., Central Coast SWP Contractors pay up to $1,750 per acre-foot) (DWR 2016).

After 40 years, the annual water supply cost for M&I would decrease to $25.1 million because capital repayment would be completed. This is equivalent to a water supply cost of $246 per acre-foot—approximately a fifth of the average water cost during the project's first 40 years. On an average price basis over the entire life of the project, the M&I water cost of $622 per acre-foot is more comparable with existing water prices.

Other Considerations: Although not directly representative of beneficiaries' ability to pay, recent investment in alternative water supplies (such as recycled and desalination facilities) demonstrates the willingness of M&I agencies to invest in high-cost water sources. Recent analysis estimates that unit costs for recycled water operations range from $1,000 to $1,700 per acre-foot (California Natural Resources Agency 2015). This study also estimated that recent desalination facilities are providing water at an average cost of $1,000 to $1,500 per acre-foot (for brackish groundwater treatment), and $2,000 to $2,300 per acre-foot (for seawater treatment). Although the construction costs may be comparable, the energy and OM&R costs associated with recycling and desalination facilities are much higher than the NED plan. These facilities also are likely to have shorter operating lives (30 to 40 years) compared to the project's 100-year lifespan.

Consequently, water contractors may be willing to pay higher rates at the margin for reliable and supplemental water supplies from the NODOS/Sites Reservoir Project to meet their future water needs. The Authority's on-boarding process for development of the EIR/EIS and WSIP application demonstrated a strong interest from M&I agencies (e.g., Zone 7 Water Agency and the San Bernardino Municipal Water District) in advancing the project. This behavior indicates a willingness to pay for M&I supply, especially during Dry and Critical years.

Agricultural Water

For agricultural water users, the ability to pay was evaluated by comparing the expected average future price of NODOS-project-supplied water with current market conditions. The costs assigned to agricultural water users include costs for both water supply and water quality improvements.

Payment of Assigned Costs. No agricultural water supply costs are assigned to the Federal government. All costs associated with increased water supply are assigned to the Authority. Agricultural beneficiaries would enter into agreements with the Authority to pay their share of the construction and OM&R costs. Furthermore, agricultural beneficiaries south of the Delta would be required to enter into agreements with Reclamation or DWR for use of facilities and payment of conveyance costs associated with the use of CVP and SWP facilities.

It is anticipated that individual agencies would require loans to pay to the Authority their assigned portion of the development cost. For the purposes of the analysis, it is assumed that they would borrow at 4.439 percent, and repay the principal and interest over a 40-year loan period.

Table 8-9 provides a breakdown of the allocated agricultural water costs for the NED Plan. During the first 40 years, the agricultural water contractors would pay $18.2 million per year. This payment would secure an average annual estimated increase of 71 TAF of agricultural deliveries under the NED Plan. As a result, during this period of development cost repayment, the average water cost is estimated to be $256 per acre-foot.

Table 8-10 shows the projected unit cost for agricultural water over the future 100-year study period.

After 40 years, the annual water supply cost for agricultural supply would decrease to $9.1 million, because no subsequent amortization would remain. For the next 60 years, the average cost of the agricultural water would decrease to $127 per acre-foot. Over the entire 100-year period, the average agricultural water supply and water quality cost would be approximately $179 per acre-foot.

In addition, conveyance costs would be required for conveyance of Sites Project water for agricultural use similar to those for supplied M&I water. Under Alternative C, future agricultural water supplies are expected to be evenly shared between CVP and SWP service areas. However, since nearly all the future water deliveries are expected to be to SWP and CVP water contractors using their respective water system facilities, no conveyance charges to non-system contractors are expected.

Conveyance costs were estimated specifically for the alternatives using the LongTermGen (LTGen) power model for expected deliveries through the CVP and the SWP Power Model for future delivery use of the SWP. The estimated average annual conveyance energy cost is $8.1 million for agricultural deliveries, or $114 per acre-foot.

Table 8-9. Annual Agricultural Cost Assignment with 40-Year Loan Repayment: Alternative C ($ Millions)

Item	Total
Average Increase in Deliveries (TAF/yr)	71
Amortization Cost (Year 1 to Year 40) [a]	
Water Supply	$8.6
Water Quality	$0.6
Total	**$9.3**
OM&R Cost (Year 1 to Year 100)	
Water Supply	$0.9
Water Quality	$0.1
Total	**$0.9**
Conveyance Cost (Year 1 to Year 100)	$8.1
Total Annual Cost (Year 1 to Year 40)	**$18.2**
Total Annual Cost (Year 41 to Year 100)	**$9.0**
Total Annual Cost (Avg.)	**$12.8**

[a] Assumed 4.429 percent annual interest rate (Federal Register 2016).
OM&R = operation, maintenance, and replacement
TAF/yr = thousand acre-feet per year

Table 8-10. Costs per Acre-Foot for Agricultural Water

Cost Item	Average Cost Years 1 to 40	Average Cost Years 41 to 100	Average Cost Years 1 to 100
Development	$129	$0	$52
OM&R	$13	$13	$13
Conveyance	$114	$114	$114
Total	**$256**	**$127**	**$179**

OM&R = operation, maintenance, and replacement

Comparison to Current Market Conditions: Current water transfer prices paid by water contractors suggest that some water contractors and their agricultural water users may be willing to purchase Sites Reservoir Project water. The average conveyance cost for agricultural water delivery is estimated to be $114 per acre-foot. Water contractors may be willing to pay higher rates at the margin for reliable and supplemental water supplies from the Sites Reservoir Project to meet their future water needs.

Relief from CVP Capital Repayment and CVPIA Irrigation Restoration Fund Charge: Reclamation currently provides payment relief to some (not all) contractors in the Sacramento River Valley. Contractors in the Sacramento River Valley with ability to pay relief include Dunnigan Water District, LaGrande Water District, Orland-Artois Water District, and Proberta Water District. For the NED Plan, only 9 TAF of the 38 TAF increase in deliveries for agricultural water supply would potentially be delivered to these agencies. The remaining water for agricultural purposes would be for Sacramento Valley settlement contractors or would be exported. The Sites Project is not expected to increase the number of agencies with ability to pay relief, nor negatively affect the ability to pay for agencies that currently have this status.

Increased deliveries to CVP Contractors from Sites Reservoir would increase the water supply reliability and improve long-term agricultural revenues in the Sacramento River Valley. Changes in crop patterns made possible by the additional water from the Sites Reservoir Project could also improve the users' ability to pay the Capital component of the CVP water rate and Irrigation Restoration Fund Charge.

CVP Contractors would continue to receive their full allocation of CVP supplies; therefore, Sites Project water would be delivered as supplemental water after the CVP contract allocation has been delivered. Nothing in this report should be construed to suggest that CVP Contractors will not pay their full repayment cost.

Other Considerations: The Authority has completed an on-boarding process with investors to support the development of the EIR/EIS and the WSIP application. Agencies that cannot afford their repayment obligations could be replaced with other agricultural water suppliers or municipal water suppliers.

Incremental Level 4 Refuge Water Supply

Incremental Level 4 water supply to wildlife refuges is non-CVP water. Water is currently purchased for National Wildlife Refuges, State Wildlife Areas, and privately managed wetlands up to a maximum quantity of 3.35 TAF per year for north-of-the-Delta refuges and up to 101.1 TAF per year for south-of-the Delta refuges. Modeled increases in average deliveries under Alternative C are 2 TAF per year north-of-the Delta and 72 TAF per year south-of-the-Delta (58 TAF per year to Mendota Pool and 14 TAF per year to the Tulare Basin).

Development and Conveyance Costs: The total development cost allocated for the incremental Level 4 refuge water supply is estimated to be approximately $694 million, which is equivalent to an annualized cost of $21.2 million. The assigned total annual cost (including both OM&R and development costs) for incremental Level 4 refuge water supply is estimated to be approximately $25.0 million. This cost is well below the $37.3 million annual benefit estimated for the incremental Level 4 water supply.

Additional annual energy costs for conveyance of the incremental Level 4 refuge supplies are estimated to be up to $5.5 million, based on the LTGen and SWP Power models. This cost is equivalent to approximately $74 per acre-foot. As a result, the total annualized cost for incremental Level 4 refuge water is $30.5 million for an average delivery of 74 TAF per year, which would be equivalent to a cost of $412 per acre-foot.

Assignment of Incremental Level 4 Refuge Water Supply Costs: The costs for the incremental Level 4 refuge water supply would be shared between the Federal government and non-Federal partners (with the State of California most likely responsible for the non-Federal share).

Federal non-reimbursable funding would be expected to cover 50 percent of the development ($694 million nominal cost) and OM&R cost. The associated annual OM&R cost is $3.8 million, and conveyance costs are estimated at $5.5 million. Annual conveyance costs would be paid by the Federal and non-Federal partners to the conveying agencies.

Comparison to Market Conditions: As a result, the total annual cost assigned to the Federal government is $12.5 million (or $169/AF excluding OM&R and conveyance costs). Post-construction annual payments for incremental Level 4 refuge water supply by the Federal government are expected to be $1.9 million for its 50 percent share of the future OM&R.

Payment Capability for Non-Federal Partners: Incremental Level 4 refuge water supply is defined as a public benefit eligible for construction funding under WSIP. Although no specific project has been selected for WSIP funding, funding to invest in storage has already been authorized and continuously appropriated by the State. The Authority is developing an application for WSIP funds.

The development cost assigned to the non-Federal partners is equal to the cost assigned to the Federal government. The non-Federal partners would be responsible for covering half of the future OM&R and all of the conveyance costs for the incremental Level 4 refuge water supplies.

Anadromous Fish

Anadromous fish benefits would be provided through increases in the coldwater pool in existing reservoirs and increases in flows downstream from these reservoirs to support migrating fish. These improvements would be derived from cooperative operation of these existing facilities with Sites Reservoir. These operations would provide on average an additional 108 TAF of end-of-September storage in Shasta Reservoir and 756 Chinook salmon habitat units.

Assignment of Anadromous Fish Purpose Costs. The total development cost assigned to the anadromous fish purpose was estimated to be $686 million, which is equivalent to an annualized cost of $20.9 million ($27,646 per habitat unit). As shown in Table 8-5, the estimated corresponding annual total cost for the anadromous fish benefits is $24.7 million (equivalent to $229/AF for additional storage in Shasta).

Development costs would be shared on a 50/50 basis between the Federal government (as a non-reimbursable payment) and the State (and/or other non-Federal entities). All future OM&R costs are expected to be the responsibility of the non-Federal participants.

The resulting Federal share would be equivalent to $10.5 million for the annual development costs. The non-Federal sponsor would be required to cover the remaining 50 percent of the development cost ($10.5 million per year) and all future OM&R costs ($3.8 million).

Payment Capacity for Non-Federal Partners: The State would be expected to cover $10.5 million of the annualized total development cost allocated for anadromous fish. Anadromous fish benefits are considered as public benefits under WSIP; therefore, they would be eligible to receive potential State funding. The State would also be expected to contribute $3.6 million per year for its OM&R cost share, which would have to be funded with non-WSIP funds.

Delta Environmental Water Quality

Improvements in Delta environmental water quality are achieved through the release of water from Sites Reservoir. On average, 243 TAF/yr would be released from Sites Reservoir to the Delta for this purpose.

Assignment of Delta Environmental Water Quality Costs: The total development cost allocated to Delta environmental water quality improvement purposes was estimated to be $1,181 million, which is equivalent to an annualized cost of $36.1 million. The OM&R cost assigned for improved Delta environmental water quality was estimated to be $6.5 million per year. As shown in Table 8-5, the estimated annual total cost is $42.6 million (construction, IDC, and OM&R), which is equivalent to a $175 per acre-foot unit water cost.

No costs are assigned to the Federal government for Delta environmental water quality. Consequently, the non-Federal partners would be required to meet the entire $42.6 million total annual cost.

Payment Capacity for Non-Federal Partners: Environmental water quality improvements for the Delta and its tributaries are eligible for WSIP funding for their development costs. WSIP does not provide funding for future OM&R costs. The State (and/or other non-Federal entities) would need to cover the $6.5 million per year necessary for OM&R.

Pump-Back Hydropower Generation

The hydropower analysis for the project indicates that even though the project would be a net energy consumer, net operating revenues would result from hydropower generation. The preliminary estimate for net benefits from pump-back operations is $22 million annually (including both projected ancillary and system capacity benefits).

Pump-back hydropower generation is not considered to be a public benefit by the State of California and is not eligible for WSIP funding. The development and OM&R costs could potentially be assigned to the agencies participating in the Authority (M&I and agricultural water supply agencies); however, the Authority is also considering partnering with a utility that would develop the hydropower facilities in return for the benefits it would provide to their portfolio as an energy provider.

Cost Assignment for Hydropower Benefits: The allocated development cost for the pump-back hydropower facilities is estimated to be $642 million, which is equivalent to an annualized cost of $19.6 million. The allocated OM&R cost is $0.6 million. The total annual cost is estimated at approximately $20.2 million.

No costs are assigned to the Federal government for the hydropower purpose. All costs would be borne by the Authority and its non-Federal partners.

Payment Capacity for Non-Federal Partners: Power contractors develop electricity generation portfolios to reliably meet their load obligations in a cost-effective manner consistent with Federal, State, and local mandates. The owner/operator of the hydropower facilities would play a key role in determining the extent of its revenue and its potential ability to pay. The benefits derived from hydropower generation ($22 million annually) could potentially fund a portion of the hydropower facilities' capital and OM&R costs.

Variability in hydrology and a variety of regulatory requirements would impact the hydropower operator's price for its generated power and/or ability to meet its repayment obligations. Forecasting market-based energy prices on a long-term basis is difficult due to the high degree of uncertainty associated with energy markets and hydrologic conditions.

If the hydropower facilities are unable to fully cover their assigned costs, then the shortfall might reasonably be reassigned as a joint cost that should be distributed for repayment by the other purpose if hydropower is considered an important and essential component of the project.

Recreation

The allocated development cost for the recreational facilities was estimated to be $42 million, which is equivalent to an annualized cost of $1.3 million. There are approximately $0.4 million in annual costs for OM&R of the recreational facilities. The total annual cost for the recreation purpose is estimated to be approximately $1.7 million.

All costs would be assigned to the non-Federal sponsor. Funds from WSIP may be used for recreation as a public benefit. Recreational facilities' future OM&R costs could likely be at least partly funded by visitor fees.

Flood Damage Reduction

The total allocated development cost is $79.9 million. The future OM&R cost is approximately $0.4 million per year. As shown in Table 8-5, the total annual cost for flood damage reduction is $2.9 million for development and OM&R.

Federal assistance would potentially be available from non-reimbursable funding for 50 percent of the assigned development. Flood damage reduction is recognized as a public benefit, so these costs could receive WSIP funding. Several other State programs could potentially be used to cover the costs assigned to flood damage reduction.

Ability to Pay and WSIP Funding Considerations for the NED Plan

As noted under several of the project purposes, the State of California can cover the development costs for public benefits using California Water Bond funds through WSIP. Federal funding for projects under WIIN (P.L. 114-322) also requires a determination that the project is in compliance with the California Water Bond.

Sites Reservoir would be a State-led storage project as defined in the WIIN Act. This act allows the Secretary of the Interior to participate in funding up to 25 percent of the total cost for the project. WSIP funding is awarded through a competitive public process. Funding from WSIP can only be used to pay for public benefits. Public benefits, as defined in the Proposition 1, California Water Bond, include:

- Ecosystem improvements, including timing, amount, and temperature of flows for fisheries
- Water quality improvements in the Delta and its tributaries
- Flood damage reduction
- Emergency response
- Recreation

Consistent with Section 4007(f) of the WIIN Act, non-reimbursable costs for incremental Level 4 refuge water supply, anadromous fish, and flood damage reduction were assigned to the Federal government for the NED Plan.

The public cost share under WSIP would be limited to a maximum of 50 percent of the cost of any new storage project. Increases in agricultural and M&I water supply and power would need to be paid for by their beneficiaries. It is also assumed that the water supply beneficiaries would need to pay for M&I and agricultural water quality improvements.

It is assumed that WSIP project funding would be available for construction if the project is selected for funding by the CWC. As a result, an award of WSIP funding would reduce the interest incurred during construction and decrease the project's total development cost.

Locally Preferred Alternative (Alternative D)

Technical Feasibility

The technical feasibility for Alternative D is consistent with the technical feasibility of Alternative C. See the prior discussion of Alternative C under the NED Plan for additional work that is required to complete the evaluation of technical feasibility.

Environmental Feasibility

The environmental feasibility for Alternative D is consistent with the environmental feasibility of Alternative C. See the prior discussion of Alternative C under the NED Plan for additional work that is required to complete the evaluation of technical feasibility.

Economic Feasibility

Based on evaluations, Alternative D is economically feasible and would generate a net positive NED average annual benefit of $278.6 million. Alternative D offers net NED benefits of $90.4 million. The benefit-cost ratio is 1.48, and the total net benefit over the 100-year planning horizon is $2.96 billion. The total project cost (i.e., for both construction and IDC) is estimated to be $5.31 billion. These evaluations will be reconfirmed after the engineering has been advanced to support a Class 3 estimate. The Final Feasibility Report may incorporate additional models and methods to determine economic feasibility. Ongoing work may modify both the benefits and costs, but the alternative is expected to remain economically feasible.

Financial Feasibility

Alternative D has the same purposes as Alternative C. Although WSIP funding is being sought by the non-Federal sponsor (the Authority), the cost allocation, cost assignment, and ability-to-pay analyses did not include any assumptions of future WSIP funding. This approach provides a conservative representation of the project's future development costs.

Allocation of Costs to Project Purposes

A separable costs-remaining benefits analysis was performed on Alternative D to illustrate how costs might be allocated to project purposes. Table 8-11 shows the estimated costs allocated to each project purpose.

As previously noted, realization of the benefits estimated for Alternative D depends on cooperative operations with the CVP and SWP. It will be necessary to develop Principles of Agreement between Reclamation, the Authority, and DWR to ensure these benefits are realized. The Authority is coordinating an Operations Work Group to develop Principles of Agreement.

Identification of Potential Project Beneficiaries

The Authority has identified potential project participants for Alternative D (see Table 8-12). Although these agencies have invested in the development of the WSIP application, they are not currently under agreement to fund design, construction, or OM&R. Table 8-12 shows a conceptual distribution of investors, but water could be allocated differently between these investors or new investors could be added prior to construction. Even if these agencies became the investors responsible for M&I and agricultural water supply, it is unlikely that they would be the sole water users. The CALSIM model for Alternative D included an assumption that a water market would develop around the reservoir whereby 30 percent of the water controlled by Sacramento Valley Water Agencies would be moved through water transfers to willing buyers in Southern California. The assumed geographical distribution for water supply increases per the model is shown in Table 8-13.

The following analysis assumes the beneficiaries would be associated with the purposes and geographies identified in Table 8-13. Beneficiaries for water supply in the various hydrologic regions would be water agencies in these locations. The Federal government would be the beneficiary for incremental Level 4 water supply provided to National Wildlife Refuges, State Wildlife Areas, and privately managed wetlands. The beneficiary for Delta environmental water quality would be the State of California (likely under the coordination of CDFW, the SWRCB, and DWR).

Other beneficiaries for benefits that are not associated with increased water supply include the following:

- Reclamation, DWR, and CDFW would benefit from improved coldwater pool and flow augmentation to benefit anadromous fish.
- The State of California would benefit from flood damage reduction.
- The State of California would benefit from additional recreation.

Table 8-11. Estimated Cost Allocation Summary for Alternative D ($ Millions)

Category	Water Supply	Incremental Level 4 Refuge	Anadromous Fish & Other Aquatic	Water Quality	Hydropower (System)	Recreation	Flood Damage Reduction	Total
Allocated Total Cost								
Total Project Costs								**$188.3**
Benefits by Purpose	$137.9	$24.2	$48.1	$41.6	$20.2	$2.3	$4.3	$278.6
Single-Purpose Cost	$98.4	$80.0	$97.5	$97.5	$162.1	$146.6	$146.0	-
Justifiable Expenditures	$98.4	$24.2	$48.1	$41.6	$20.2	$2.3	$4.3	$239.1
Separable Costs	$0	$0	$0	$0	$15.1	$0.3	$0	$15.5
Remaining Benefits (Justifiable Expenditures Less Separable Costs)	$98.4	$24.2	$48.1	$41.6	$5.0	$2.0	$4.3	$223.6
Percent (Distribution of Remaining Benefits)	44.0%	10.8%	21.5%	18.6%	2.3%	0.9%	1.9%	100%
Allocated Joint Costs	$76.0	$18.7	$37.2	$32.1	$3.9	$1.5	$3.3	$172.8
Total Allocated Costs (Separable Plus Allocated Joint Costs)	**$76.0**	**$18.7**	**$37.2**	**$32.1**	**$19.0**	**$1.9**	**$3.3**	**$188.3**
Percent Total Cost Allocation	40.4%	9.9%	19.8%	17.1%	10.1%	1.0%	1.8%	100%
Allocated OM&R Annual Costs								
Separable OM&R	$0	$0	$0	$0	$0	$0.2	$0	$0.2
Allocated Joint OM&R	$11.4	$2.8	$5.6	$4.8	$0.6	$0.2	$0.5	$26.0
Total Allocated OM&R	**$11.4**	**$2.8**	**$5.6**	**$4.8**	**$0.6**	**$0.4**	**$0.5**	**$26.2**
Percent OM&R Allocated	43.7%	10.8%	21.4%	18.5%	2.2%	1.6%	1.9%	100%
Allocated Construction Annual Costs								
Separable Construction	$0.0	$0.0	$0.0	$0.0	$13.4	$0.1	$0.0	$13.5
Allocated Construction	$57.2	$14.1	$28.0	$24.2	$2.9	$1.2	$2.5	$129.9
Total Allocated Construction	**$57.2**	**$14.1**	**$28.0**	**$24.2**	**$16.3**	**$1.3**	**$2.5**	**$143.5**
Percent Construction Allocated	39.8%	9.8%	19.5%	16.8%	11.4%	0.9%	1.7%	100%
Allocated IDC Annual Costs								
Separable IDC	$0	$0	$0	$0	$1.7	$0.02	$0	$1.8
Allocated Joint IDC	$7.4	$1.8	$3.6	$3.1	$0.4	$0.15	$0.3	$16.8
Total Allocated IDC	$7.4	$1.8	$3.6	$3.1	$2.1	$0.17	$0.3	$18.6
Percent IDC Cost Allocated	39.8%	9.8%	19.5%	16.8%	11.4%	0.9%	1.7%	100%

Category	Water Supply	Incremental Level 4 Refuge	Anadromous Fish & Other Aquatic	Water Quality	Hydropower (System)	Recreation	Flood Damage Reduction	Total
Allocated Construction and IDC Costs (Nominal)								
Allocated Total Development Cost	$2,115	$521	$1,035	$893	$604	$47.8	$92.4	$5,308
Allocated IDC	$243	$60	$119	$103	$69	$5.5	$10.6	$611
Construction Cost	$1,871	$461	$916	$791	$535	$42.3	$81.8	$4,697

No capital cost adjustment applied for any potential IDC cost savings from Federal non-reimbursable funding.
Annual costs shown in 2015 dollars based on 2.875 percent discount rate and 100-year period of analysis.
Totals may not add up exactly due to rounding.
OM&R = operation, maintenance, and replacement
IDC = Interest During Construction

Table 8-12. List of Alternative D Project Participants

Agency	Class 1 (TAF/yr)	Class 2 (Waiting List) (TAF/yr)
Colusa County	10,000	—
Colusa County Water District	32,111	—
Cortina Water District	300	—
Davis Water District	2,000	—
Dunnigan Water District	5,000	—
LaGrande Water District	1,000	—
Glenn-Colusa Irrigation District	20,000	—
Orland-Artois Water District	20,000	—
Proberta Water District	3,000	—
Reclamation District 108	20,000	—
Westside Water District	25,000	—
4M WD (Mathis)	500	—
Western Canal Water District	3,500	—
City of American Canyon	2,000	—
Santa Clara Valley Water District	17,123	6,877
Westlands Water District		11,115
Antelope Valley-East Kern Water Agency	1,427	573
Castaic Lake Water Agency	3,567	1,433
Coachella Valley Water District	18,906	7,594
Desert Water Agency	4,637	1,863
Metropolitan Water District	—	50,000
San Gorgonio Pass Water Agency	9,988	4,012
San Bernardino Municipal Water District	21,403	8,597
Wheeler Ridge – Maricopa Water SD	14,269	5,731
Zone 7 Water Agency	14,269	5,731
Carter Mutual Water Company	—	1,000
Garden Highway Mutual Water Company	—	4,000
Pacific Resources Mutual Water Company	—	10,000
California Water Service	—	35,000
Total	**250,000**	**165,526**

TAF/yr = thousand acre-feet per year
— = not applicable

Table 8-13. Modeled Allocation of Water under Alternative D

Modeled Beneficiaries	Average Increase in Deliveries (TAF/yr)	Dry and Critical Increase in Deliveries (TAF/yr)
Sacramento River Hydrologic Region		
Supplemental Water to CVP Settlement Contractors	7	8
Supplemental Water for CVP Service Area Ag	88	161
Supplemental Water for CVP Service Area M&I	1	0
Supplemental Water for SWP Service Area M&I	1	2
Supplemental Water for SWP Service Area Feather River Service Area	1	4
San Joaquin River Hydrologic Region		
Supplemental Water for CVP Service Area Ag	3	5
San Francisco Bay Hydrologic Region		
Supplemental Water for CVP Service Area Ag	1	1
Supplemental Water for SWP Service Area M&I	9	16
Central Coast Hydrologic Region		
Supplemental Water for SWP Service Area M&I	2	4
Tulare Lake Hydrologic Region		
Supplemental Water for CVP Service Area Ag	7	15
Supplemental Water for SWP Service Area M&I	4	7
Supplemental Water for SWP Service Area Ag	28	50
South Lahontan Hydrologic Region		
Supplemental Water for SWP Service Area M&I	13	26
South Coast Hydrologic Region		
Supplemental Water for SWP Service Area M&I	59	119
Supplemental Water for SWP Service Area Ag	0	1
Incremental Level 4 Refuge Water Supply		
Colusa Basin	1	0
Mendota Pool	38	19
Tulare Basin	9	4
Delta Environmental Water Quality		
Upstream and Delta Inflow	174	162

CVP = Central Valley Project
M&I = municipal and industrial
SWP = State Water Project
TAF/yr = thousand acre-feet per year

Cost Assignment and Financial Capability Analysis

The cost assignment for the Locally Preferred Alternative assigns non-public benefits to the beneficiaries.

Ownership, operations, and funding scenarios were developed to support the evaluation of the Locally Preferred Alternative (Alternative D).

The costs for the Locally Preferred Alternative were assigned based on the following considerations:

- M&I and agricultural water supply benefits were assigned to the beneficiaries.
- State funding for construction and IDC is likely to be obtained for environmental purposes (consistent with WSIP).
- Federal funding would be limited to at most 25 percent of the total project cost (consistent with the WIIN Act).

The Federal cost assignment includes the following:

- 50 percent non-reimbursable funding for incremental Level 4 refuge water supply (This funding level is below the ceiling of 75 percent allowed by the Central Valley Project Improvement Act [P.L. 102-575, Title 34], but it leverages State funding for these public benefits through the Proposition 1, California Water Bond.)
- 50 percent non-reimbursable funding for anadromous fish benefits (This funding level is below the ceiling of 75 percent allowed by the Federal Water Project Recreation Act of 1965 [P.L. 89-72], but it leverages State funding for these public benefits through the Proposition 1, California Water Bond.)
- 50 percent non-reimbursable funding for flood damage reduction (This funding level is below the ceiling of 100 percent allowed by the Reclamation Project Act of 1939, but it leverages State funding for these public benefits through the Proposition 1, California Water Bond.)

Federal participation is below a threshold of 25 percent for total funding, consistent with the WIIN Act.

Table 8-14 presents the cost assignment for the project's development cost (construction and IDC) to the Federal government and the non-Federal partners. The Federal government's cost share for project development is estimated at $824 million (15.5 percent of the total development costs).

Table 8-15 shows the resulting cost assignment for the project's total annual cost (i.e., Construction, IDC, and OM&R) between Federal and non-Federal participants.

Preliminary Financial Capability Analysis

A preliminary analysis was performed of the cost assignment and financial capability of the non-Federal entities that are assigned costs for the Locally Preferred Alternative

Municipal and Industrial Water

M&I water users include urban water users (i.e., residential, commercial, and institutional users), manufacturing, and other industry. The allocation of costs to M&I water users includes costs for both water supply and water quality.

Affordability Threshold Analysis: The financial feasibility analysis for M&I users evaluates their payment capacity for water supply improvement in relation to assigned project costs.

Table 8-14. Development Cost Assignment for Federal and Non-Federal Partners: Alternative D

Purpose/Action	Total Percent	Total Cost	Cost Assignment ($ millions)			
			Federal Non-Reimbursable		Non-Federal Partners [a]	
			Percent	Cost	Percent	Cost
Alternative D: Development Cost Assignment (Construction and IDC) – Nominal						
Water Supply	**41%**	**2,115**	**0%**	**0**	**100%**	**2,115**
M&I Water Supply	85%	1,795	0%	0	100%	1,795
CVP Service Area	1%	20	0%	0	100%	20
SWP Service Area	99%	1,775	0%	0	100%	1,775
Agricultural Water Supply	**15%**	**319**	**0%**	**0**	**100%**	**319**
CVP Service Area	79%	251	0%	0	100%	251
SWP Service Area	21%	68	0%	0	100%	68
Incremental Level 4 Refuge	**10%**	**521**	**50%**	**260**	**50%**	**260**
Anadromous Fish	**19%**	**1,035**	**50%**	**517**	**50%**	**517**
Water Quality	**17%**	**893**	**0%**	**0**	**100%**	**893**
M&I Water Quality	34%	302	0%	0	100%	302
Agricultural Water Quality	2%	20	0%	0	100%	20
Delta Environmental Water Quality	64%	572	0%	0	100%	572
Hydropower	**11%**	**604**	**0%**	**0**	**100%**	**604**
Recreation	**1%**	**48**	**0%**	**0**	**100%**	**48**
Flood Damage Reduction	**2%**	**92**	**50%**	**46**	**50%**	**46**
Total	**100%**	**5,308**	**15.5%**	**824** [b]	**84.5%**	**4,484**

[a] Includes non-Federal non-reimbursable, non-Federal reimbursable, and beneficiaries' paid funding.
[b] The potential future Federal allocation has not yet been determined and it may be limited by the potential Federal contribution for the NED Plan (Alternative C). In which case, the Non-Federal Partners would have to cover the differential despite is current assignment as Federal non-reimbursable.
Assumes cost assignment based on beneficiaries' benefits.
Totals may not add exactly due to rounding.
CVP = Central Valley Project
IDC = interest during construction
M&I = municipal and industrial
SWP = State Water Project

Affordability threshold analysis uses median household income in the water service area to evaluate the payment capacity of M&I customers. An affordability threshold of 2.5 percent of median household income was selected for the analysis. The EPA Office of Drinking Water identified this threshold through a study evaluating the costs of complying with new drinking water regulations (EPA 1980).

The evaluation of affordability is the same as for Alternative C. Table 8-6 provides the payment capacity analysis results for ten representative SWP M&I contractors. As described above, payment capacity is estimated as 2.5 percent of median household income. The resulting estimated annual total payment capacity of representative M&I contractors is over $689 million.

Table 8-15. Total Annual Cost Assignment for Federal and Non-Federal Partners: Alternative D

Purpose/Action	Total		Cost Assignment ($ millions)			
			Federal Non-Reimbursable		Non-Federal Partners [a]	
	Percent	Cost	Percent	Cost	Percent	Cost
Alternative D: Total Cost Assignment (Construction, IDC and OM&R) – Annual						
Water Supply	**40%**	**76.0**	**0%**	**0**	**100%**	**76.0**
M&I Water Supply	85%	64.5	0%	0	100%	64.5
CVP Service Area	1%	0.7	0%	0	100%	0.7
SWP Service Area	99%	63.8	0%	0	100%	63.8
Agricultural Water Supply	**15%**	**11.5**	**0%**	**0**	**100%**	**11.5**
CVP Service Area	79%	9.0	0%	0	100%	9.0
SWP Service Area	21%	2.4	0%	0	100%	2.4
Incremental Level 4 Refuge	**10%**	**18.7**	**50%**	**9.4**	**50%**	**9.4**
Anadromous Fish	**20%**	**37.2**	**42%**	**15.8**	**58%**	**21.4**
Water Quality	**17%**	**32.1**	**0%**	**0**	**100%**	**32.1**
M&I Water Quality	34%	10.9	0%	0	100%	10.9
Agricultural Water Quality	2%	0.7	0%	0	100%	0.7
Delta Environmental Water Quality	64%	20.5	0%	0	100%	20.5
Hydropower	**10%**	**19.0**	**0%**	**0**	**100%**	**19.0**
Recreation	**1%**	**1.9**	**0%**	**0**	**100%**	**1.9**
Flood Damage Reduction	**2%**	**3.3**	**42%**	**1.4**	**58%**	**1.9**
Total	**100%**	**188.3**	**14.1%**	**26.6** [b]	**85.9%**	**161.7**

[a] Includes non-Federal non-reimbursable, non-Federal reimbursable, and beneficiaries' paid funding.
[b] The potential future Federal allocation has not yet been determined and it may be limited by the potential Federal contribution for the NED Plan (Alternative C). In which case, the non-Federal partners would have to cover the differential despite is current assignment as Federal non-reimbursable.

Assumes cost assignment based on beneficiaries' benefits.
Totals may not add exactly due to rounding.
CVP = Central Valley Project
IDC = interest during construction
M&I = municipal and industrial
OM&R = operation, maintenance, and replacement
SWP = State Water Project

M&I Ability to Pay: Financial feasibility for M&I users was determined by comparing the results of the affordability threshold analysis with the annualized construction costs, IDC, and OM&R costs of the NED Plan. A detailed breakdown of the assigned water supply and water quality costs for M&I water users is shown in Table 8-16.

The total annual M&I water supply cost ($138.7 million) would be notably less than the representative M&I contractors' estimated annual payment capacity ($689 million), which indicates that the M&I contractors would be able to repay their allocated project costs.

Table 8-16. Annual M&I Cost Assignment with 40-Year Loan Repayment: Alternative D
($ Millions)

Item	Total
Average Deliveries (TAF/yr)	88
Amortization Cost (Years 1 to 40) [a]	
Water Supply	$96.6
Water Quality	$16.2
Total	**$112.8**
OM&R Cost (Years 1 to 100)	
Water Supply	$9.7
Water Quality	$1.7
Total	**$11.4**
Conveyance Cost (Years 1 to 100)	$14.5
Total Annual Cost (Years 1 to 40)	**$138.7**
Total Annual Cost (Years 41 to 100)	**$25.9**
Total Annual Cost (Avg.)	**$71.1**

[a] 4.429 percent annual interest rate (Federal Register 2016).
M&I = municipal and industrial
OM&R = operation, maintenance, and replacement
TAF = thousand acre-feet

Payment of Assigned Costs: No M&I costs are assigned to the Federal government. All costs associated with increased water supply are assigned to the Authority. M&I beneficiaries would enter into agreements with the Authority to pay their share of the construction and OM&R costs. Furthermore, M&I beneficiaries south of the Delta would be required to enter into agreements with DWR for the conveyance costs associated with the use of SWP facilities.

It is anticipated that individual M&I agencies would require loans to pay their assigned portion of the development cost to the Authority. For the purposes of the analysis, it is assumed that they would borrow at 4.429 percent, and repay the principal and interest over a 40-year loan period. This assumption results in a cost per acre-foot of $1,577 for M&I users for the first 40 years. Table 8-17 shows the projected unit cost for M&I Water over the future 100-year study period.

Table 8-17. Costs per Acre-Foot for M&I Water Supply

Cost Item	Average Cost Years 1 to 40	Average Cost Years 41 to 100	Average Cost Years 1 to 100
Development	$1,282	$0	$513
OM&R	$130	$130	$130
Conveyance Cost	$165	$165	$165
Total	$1,577	$295	$808

M&I = municipal and industrial
OM&R = operation, maintenance, and replacement

In addition, conveyance costs would be applicable for Sites Project Water conveyed through SWP or CVP facilities. The conveyance cost would vary depending on the water delivery location and user type. All water contractors would incur unit variable costs to move water

through the water system. The latest DWR cost projections estimate current variable cost averages of approximately $27.50 per acre-foot. Variable costs for outlying contractors (i.e., those on the Central Coast and in Riverside County) are generally in the range of $80 to $156 per acre-foot (DWR 2016). This variable cost would predominantly consist of the energy used to transport the delivered water from the reservoir. In addition, non-SWP contractors would be assessed additional conveyance costs for use of the SWP system (and similarly non-CVP contractors may incur conveyance costs for use of the CVP). However, since nearly all the future water deliveries are expected to be to SWP water contractors and to use SWP facilities, no conveyance charges to non-SWP contractors are expected.

Conveyance costs were estimated specifically for the alternatives using the SWP Power Model for expected deliveries through the SWP service area. The estimated average annual conveyance energy cost is $14.5 million for M&I deliveries, or $165 per acre-foot.

Comparison to Current Market Conditions: The M&I water costs during the first 40 years (loan repayment period) exceed the current average water supply costs for most SWP Contractors. However, these costs are comparable to the rate that a few CVP Contractors currently pay (e.g., Central Coast CVP Contractors pay up to $1,750 per acre-foot) (DWR 2016).

After 40 years, the annual water supply cost for M&I would decrease to $25.9 million, because capital repayment would have been completed. This water supply cost is equivalent to $295 per acre-foot —less than a fifth of the average water cost during the project's first 40 years. On an average price basis over the entire life of the project, the M&I water cost of $808 per acre-foot is more comparable with existing water prices.

Other Considerations: Although not directly representative of beneficiaries' ability to pay, recent investment in alternative water supplies (such as recycling and desalination facilities) demonstrates the willingness of M&I agencies to invest in high-cost water sources. Recent analysis estimates that unit costs for recycled water operations range from $1,000 to $1,700 per acre-foot (California Natural Resources Agency 2015). The study also estimated that recent desalination facilities are providing water at an average cost of $1,000 to $1,500 per acre-foot (for brackish groundwater treatment), and $2,000 to $2,300 per acre-foot (for seawater treatment). Although the construction costs may be comparable, the energy and OM&R costs associated with recycled and desalination facilities are much higher than the NED plan. These facilities also are likely to have shorter operating lives (30 to 40 years) compared to the project's 100-year lifespan.

Consequently, water contractors may be willing to pay higher rates at the margin for reliable and supplemental water supplies from the Sites Reservoir Project to meet their future water needs. The Authority's on-boarding process for development of the EIR/EIS and WSIP application demonstrated a strong interest from M&I agencies (e.g., Zone 7 Water Agency and the San Bernardino Municipal Water District) in advancing the project. This behavior indicates a willingness to pay for M&I supply, with an emphasis on availability of water during Dry and Critical years.

Agricultural Water

For agricultural water users, the ability to pay was evaluated by comparing the expected average future price of NODOS-project–supplied water with current market conditions. The costs assigned to agricultural water users include costs for both water supply and water quality.

Payment of Assigned Costs. No agricultural water supply costs are assigned to the Federal government. All costs associated with increased deliveries are assigned to the Authority. Agricultural beneficiaries would enter into agreements with the Authority to pay their share of the construction and OM&R costs. Furthermore, agricultural beneficiaries south of the Delta would be required to enter into agreements with Reclamation or DWR for use of facilities and payment of conveyance costs associated with the use of CVP and SWP facilities.

It is anticipated that individual agencies would require loans to pay to the Authority their assigned portion of the development cost. For the purposes of the analysis, it is assumed that they would borrow at 4.429 percent, and repay the principal and interest over a 40-year loan period. Table 8-18 summarizes the allocated agricultural water costs for the Locally Preferred Alternative. During the first 40 years, the agricultural water contractors would pay $28.2 million per year. This payment would secure an average annual estimated increase of 136 TAF of agricultural deliveries under the Locally Preferred Alternative. As a result, the average agricultural water cost (local and non-local users combined) is estimated to be $207 per acre-foot. Table 8-19 shows the projected unit cost of agricultural water over the future 100-year study period.

Table 8-18. Annual Agricultural Cost Assignment with 40-Year Repayment: Alternative D ($ Millions)

Item	Total
Average Deliveries (TAF/yr)	136
Amortization Cost (Year 1 to Year 40) [a]	
Water Supply	$17.2
Water Quality	$1.1
Total	$18.2
OM&R Cost (Year 1 to Year 100)	
Water Supply	$1.7
Water Quality	$0.1
Total	$1.8
Conveyance Cost (Year 1 to Year 100) [b]	$8.1
Total Annual Cost (Year 1 to Year 40)	**$28.2**
Total Annual Cost (Year 41 to Year 100)	**$10.0**
Total Annual Cost (Avg.)	**$17.2**

[a] 4.429 percent annual interest rate (Federal Register 2016).
[b] Applies only to the 59 TAF of non-local agricultural water supplies.
OM&R = operation, maintenance, and replacement
TAF/yr = thousand acre-feet per year

Table 8-19. Costs per Acre-Foot for Agricultural Water

Cost Item	Average Cost Years 1 to 40	Average Cost Years 41 to 100	Average Cost Years 1 to 100
Development	$134	$0	$54
OM&R	$14	$14	$14
Conveyance	$60	$60	$60
Total	**$207**	**$74**	**$128**

OM&R = operation, maintenance, and replacement

After 40 years, the annual water supply cost for agricultural supply would decrease to $10.0 million because no subsequent amortization would remain. For the next 60 years, the average cost of the agricultural water (local and non-local users combined) would decrease to $74 per acre-foot. Over the entire 100-year period, the average agricultural water cost would be approximately $128 per acre-foot (for local and non-local users combined).

However, the projected conveyance costs (variable and energy) would only be incurred by the 65 TAF of non-local agricultural supply. As a result, local agricultural water users would be liable solely for the average development and OM&R costs. Table 8-20 shows the agricultural water cost for non-local water users (i.e., South of Delta CVP and SWP service areas). During the first 40 years, the average agricultural water cost to non-local users would be $293 per acre-foot, and then $154 per acre-foot for the remainder of the study period. On average over the entire life of the project, the agricultural water supply cost would be $209 per acre-foot.

Table 8-20. Costs per Acre-Foot for Agricultural Water Supplied to Non-Local Users

Cost Item	Average Cost Years 1 to 40	Average Cost Years 41 to 100	Average Cost Years 1 to 100
Development	$134	$0	$54
OM&R	$29	$29	$29
Conveyance	$125	$125	$125
Total	**$288**	**$154**	**$209**

OM&R = operation, maintenance, and replacement

Comparison to Current Market Conditions: Current water transfer prices paid by water contractors suggest that some water contractors and their agricultural water users may be willing to purchase Sites Reservoir Project water. The average conveyance cost for water deliveries ranges from $69 to $240 per acre-foot. Costs for increased deliveries to the CVP service area fall within this range, but the cost for deliveries to the SWP service area is above this range. Water contractors may be willing to pay higher rates at the margin for reliable and supplemental water supplies from the Sites Reservoir Project to meet their future water needs.

Relief from CVP Capital Repayment and CVPIA Irrigation Restoration Fund Charge: Reclamation currently provides payment relief to some (not all) contractors in the Sacramento River Valley. Contractors in the Sacramento River Valley with ability to pay relief include Dunnigan Water District, LaGrande Water District, Orland-Artois Water District, and Proberta

Water District. The Locally Preferred Alternative proposes much greater participation for local water agencies, and could potentially affect their ability to repay existing CVP obligations.

Increased deliveries to CVP Contractors from Sites Reservoir would increase the water supply reliability and improve long-term agricultural revenues in the Sacramento River Valley. Changes in crop patterns made possible by the additional water from the NODOS Project could also improve the users' ability to pay the Capital component of the CVP water rate and Irrigation Restoration Fund Charge. The CALSIM II model included an assumption that 30 percent of the water controlled by contractors in the Sacramento Valley would be available for water transfers. As modeled, this amount of water could be exported to support repayment of both construction costs and existing CVP repayment obligations. If it is determined that the Sites Reservoir Project might negatively impact the ability of current CVP Contractors to repay their outstanding CVP debt, Reclamation may consider adding repayment provisions to the agreement for cooperative operations with the Authority.

Other Considerations: The Authority has completed an on-boarding process with investors to support the development of the EIR/EIS and the WSIP application. Agencies that cannot afford their repayment obligations could be replaced with other agricultural water suppliers or municipal water suppliers.

Incremental Level 4 Refuge Water Supply

Incremental Level 4 water supply to wildlife refuges is non-CVP water. Water is currently purchased for Federal wildlife refuges, State Wildlife Areas, and privately managed wetlands at up to a maximum of 3.35 TAF per year for north-of-the-Delta refuges, and up to 101.09 TAF per year for south-of-the Delta refuges. Modeled increases in average deliveries under Alternative D are 1 TAF per year north of the Delta, and 47 TAF per year south of the Delta (38 TAF per year to Mendota Pool, and 9 TAF per year to the Tulare Basin).

Development and Conveyance Costs: The total development cost allocated for the incremental Level 4 refuge water supply is estimated to be approximately $521 million, which is equivalent to an annualized cost of $15.9 million. The assigned total annual cost (including both OM&R and development cost) for incremental Level 4 refuge water supply is estimated to be approximately $18.7 million, which is well below the estimated annual benefit value of $24.2 million for incremental Level 4 refuge supplies.

Additional annual energy costs for conveyance of the incremental Level 4 refuge supplies are estimated to be up to $3.6 million, based on the LTGen and SWP Power models. This cost is equivalent to a $74 per acre-foot unit conveyance cost for use of the CVP water system. As a result, the total annualized cost for incremental Level 4 refuge water is $22.3 million for an average delivery of 48 TAF per year, which would be equivalent to an approximately $465 per acre-foot water cost for the new incremental Level 4 refuge water supply.

Assignment of Incremental Level 4 Refuge Water Supply Costs: The development and OM&R costs for the incremental Level 4 refuge water supply would be shared between the Federal government and non-Federal partners (with the State of California most likely responsible for the non-Federal share). Federal non-reimbursable funding would be expected to cover 50 percent of the development ($260.4 million nominal cost) and future OM&R cost.

Comparison to Market Conditions: As a result, the total annual cost assigned to the Federal government is $9.4 million (or $196 per acre-foot). Post-construction annual payments would be made by the Federal government for incremental Level 4 refuge water supply for its 50 percent share of the OM&R cost.

Payment Capability for Non-Federal Partners: Incremental Level 4 refuge water supply is defined as a public benefit eligible for construction funding under WSIP. Although no specific project has been selected for WSIP funding, funding to invest in storage has already been authorized and continuously appropriated by the State. The Authority is developing an application for WSIP funds.

The cost assigned to the non-Federal partners is equal to the cost assigned to the Federal Government.

Anadromous Fish

Anadromous fish benefits would be provided through increases in the coldwater pool in existing reservoirs, and increases in flows downstream from these reservoirs to support migrating fish. These improvements would be derived from cooperative operation of these existing facilities with Sites Reservoir. These operations would provide, on average, an additional 132 TAF of end-of-May storage in Shasta Reservoir and 985 Chinook salmon habitat units.

Assignment of Anadromous Fish Purpose Costs. As shown in Table 8-14, the total development cost assigned to the anadromous fish purpose was estimated to be $1,035 million, which is equivalent to an annualized cost of $31.6 million ($32,080 per habitat unit). The corresponding annual total cost for the anadromous fish benefits is estimated to be $37.2 million (equivalent to $282/AF for additional storage in Shasta).

Development costs would be shared on a 50/50 basis between the Federal government (as a non-reimbursable payment) and the State (and/or other non-Federal entities). All future OM&R costs are expected to be paid by the non-Federal participants.

The resulting Federal share would be equivalent to $15.8 million for the annual development costs. The non-Federal sponsor would be required to cover the remaining 50 percent of the development cost and 100 percent of future OM&R costs. The total annual cost assigned to the non-Federal partners is $21.4 million. Non-federal funding for post-construction OM&R would result in annual costs of $5.6 million.

Payment Capacity for Non-Federal Partners: The State would be expected to cover $15.8 million of the annualized development cost allocated for anadromous fish. Anadromous fish benefits are considered as public benefits under WSIP, and therefore would be eligible to receive potential State funding. The State (or other non-Federal partners) would also be expected to contribute $5.6 million per year for its OM&R cost share. Future OM&R expenses would have to be funded with non-WSIP funds.

Delta Environmental Water Quality

Improvements in Delta environmental water quality are achieved through the release of water from Sites Reservoir. On average, 174 TAF per year would be released from Sites Reservoir to the Delta for this purpose.

Assignment of Delta Environmental Water Quality Costs: The total development cost allocated to Delta environmental water quality improvement purposes was estimated to be $572 million, which is equivalent to an annualized cost of $17.5 million. The OM&R cost assigned for improved Delta environmental water quality was estimated to be $3.0 million per year. As shown in Table 8-15, the estimated annual total cost is $20.5 million (construction, IDC, and OM&R).

No costs are assigned to the Federal government for Delta environmental water quality. Consequently, the non-Federal partners would be required to meet the $20.5 million total annual cost.

Payment Capacity for Non-Federal Partners: Environmental water quality improvements for the Delta and its tributaries are eligible for WSIP funding of its development cost. WSIP does not provide funding for future OM&R costs. The State (and/or other non-Federal entities) would need to cover the $3.0 million per year necessary for OM&R.

Pump-Back Hydropower Generation

The hydropower analysis for the project indicates that even though the project would be a net energy consumer, net operating revenues would result from hydropower generation. The preliminary estimate for net benefits from pump-back operations is $20.2 million annually (including both projected ancillary and system capacity benefits).

Pump-back hydropower generation is not considered to be a public benefit by the State of California and is not eligible for WSIP funding. The development and OM&R costs could potentially be assigned to the agencies participating in the Authority (M&I and agricultural water supply agencies); however, the Authority is also considering partnering with a utility that would develop the hydropower facilities in return for the benefits it would provide to their portfolio as an energy provider.

Cost Assignment for Hydropower Benefits: The allocated development cost for the pump-back hydropower facilities is estimated to be $604 million, which is equivalent to an annualized cost of $18.5 million. The allocated OM&R cost is $0.6 million. The total annual cost is estimated at approximately $19.1 million.

No costs are assigned to the Federal government for the hydropower purpose. All costs would be borne by the Authority and its non-Federal partners.

Payment Capacity for Non-Federal Partners: Power contractors develop electricity generation portfolios to reliably meet their load obligations in a cost-effective manner consistent with Federal, State, and local mandates. The ownership and operator of the hydropower facilities would play a key role in determining the extent of its revenue and its potential ability to pay. The benefits derived from hydropower generation ($20.2 million annually) could potentially fund a portion of the hydropower facilities' capital and OM&R costs.

Variability in hydrology and a variety of regulatory requirements would impact the hydropower operator's price for its generated power and/or ability to meet its repayment obligations. Forecasting market-based energy prices on a long-term basis is difficult due to the high degree of uncertainty associated with energy markets and hydrologic conditions.

If the hydropower facilities are unable to fully cover their assigned costs, then the shortfall might reasonably be reassigned as a joint cost that should be distributed for repayment by the water supply purpose if hydropower is considered an important and essential component of the project.

Recreation

The allocated development cost for the recreational facilities was estimated to be $48 million, which is equivalent to an annualized cost of $1.5 million. There are approximately $0.4 million in annual costs for OM&R of the recreational facilities. The total annual cost for the recreation purpose is estimated to be approximately $1.9 million.

All costs would be assigned to the non-Federal sponsor. Funds from WSIP may be used for recreation as a public benefit. Recreational facilities' future OM&R costs could likely be at least partly funded by visitor fees.

Flood Damage Reduction

The total allocated development cost is $92.4 million, which is equivalent to an annualized cost of $2.8 million. The future OM&R cost is approximately $0.5 million per year. As shown in Table 8-5, the total annual cost for flood damage reduction is $3.3 million for development and OM&R.

Federal assistance would potentially be available from non-reimbursable funding for 50 percent of the assigned development, which would be $46.2 million. Flood damage reduction is recognized as a public benefit, so these costs could also receive WSIP funding. Several other State programs could potentially be used to cover the costs assigned to flood damage reduction.

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