Desalination Engineering Feasibility Study-Update

Santa Clara Valley Water District

Recycled Water Committee

May 27, 2026

Agenda

- Study Overview and Approach
- Selection of Alternatives
- Production, Brine Discharge and Conveyance
- Project Alternatives Costs - CAPEX/OPEX
- Desal and DPR Costs
- Next Steps

Study Overview & Approach

Fatal Flaw Analysis (FFA)

Fatal Flaw

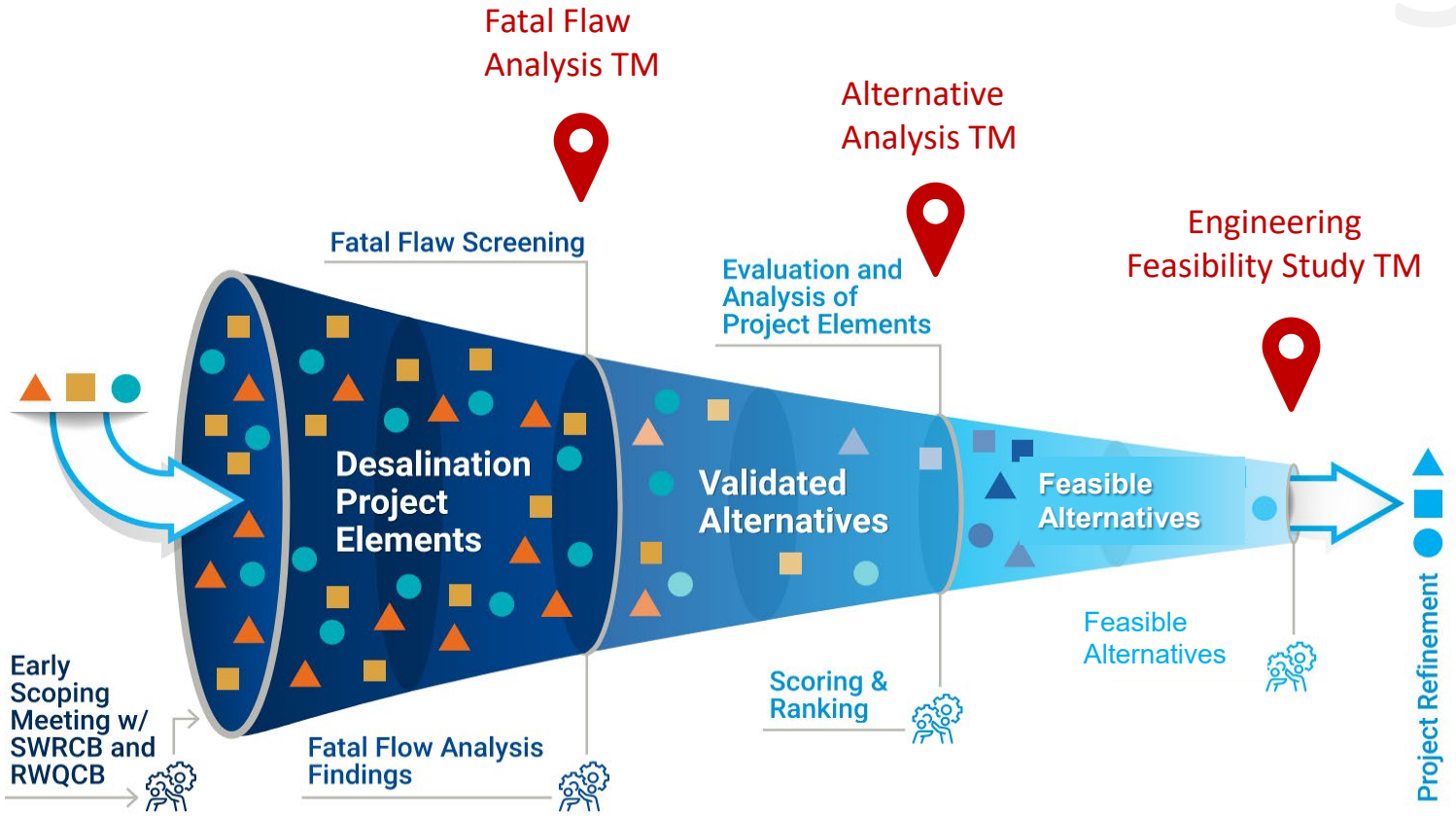
- May face permitting challenges when evaluated against relevant regulatory framework, such as the California Ocean Plan, Bay Plan, or SF Basin Plan.
- Alternative is unlikely to meet capacity needs.

Feasible as defined by CEQA and the CA Ocean Plan

- Feasible shall mean capable of being accomplished within a reasonable time, considering economic, environmental, social, and technological factors.

Fatal Flaw Analysis Components

- **Intakes**
  - Subsurface
  - Open intake
    - Type, location, and screen options
- **Facility Siting**
  - Several sites analyzed
- **Brine Management**
  - Comingling brine with treated wastewater
  - New Deep outfall with diffusers
  - Horizontal levees
  - Cargill use



Regulatory Framework

California Water Code section 13142.5(b)

Excerpt**:** "… coastal industrial installations using seawater, the best available site, design, technology and mitigation measures feasible shall be used to minimize the intake and mortality of all forms of marine life."

California Ocean Plan

CA Ocean Plan provides regulatory guidance for the application of CWC section 13142.5(b) to seawater desalination plants utilizing "ocean water".

The San Francisco Bay is not subject to the CA Ocean Plan's seawater desalination regulations; however, **the fatal flaw's feasibility analysis utilizes the CA Ocean Plan as guidance** because it represents the most conservative regulatory scenario.

Selection of Alternatives

FFA-Open Intake Location

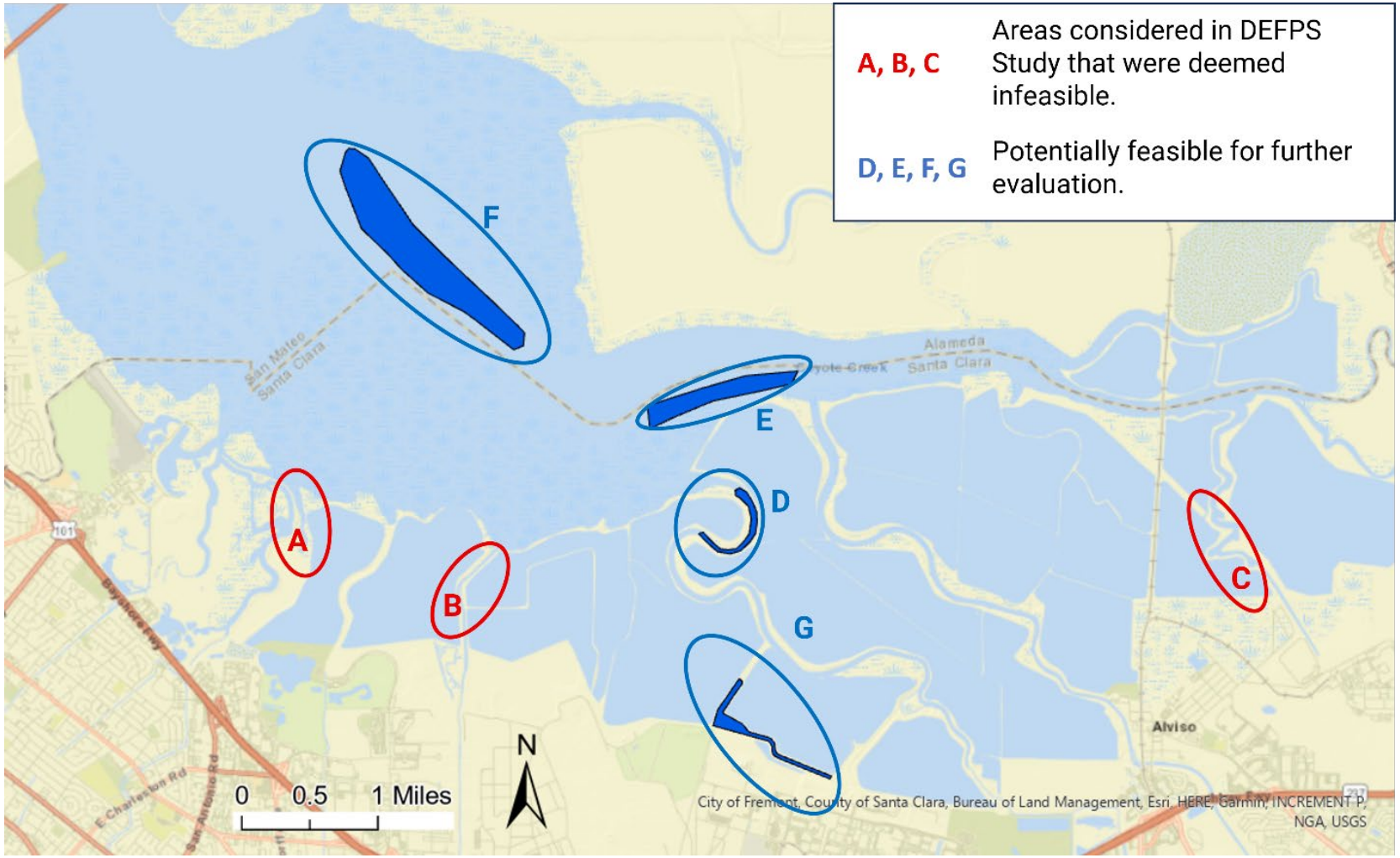
Open Intake Locations

Key Considerations:

- Sufficient depth
- Available Water
- Proximity to Treatment Sites
- Proximity to Inland locations for freshwater dilution

Passing Fatal Flaw Analysis

- ✓ **D** = Guadalupe Slough
- ✓ **E** = Coyote Creek
- ✓ **F** = Deep Bay
- ✓ **G** = Interconnecting Channel



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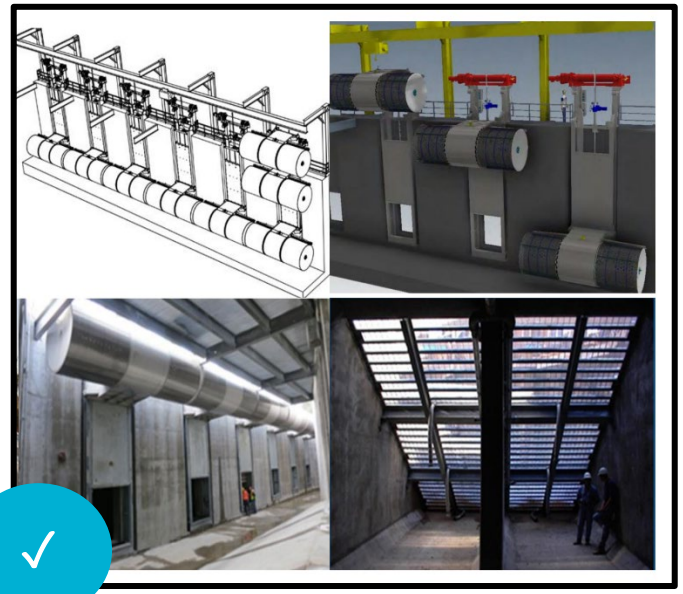
FFA-Intake Screens

Conical Screens

Retrievable Cylindrical Screens

Vertical or Inclined Bank Screens



All screens can be outfitted with active brushing systems, removable modules and foul release coatings to increase lifespan and reduce O&M

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Site Alternatives

Site No. 11, Palo Alto

Site No. 6 and 7, Sunnyvale

Site No. 12. San Jose

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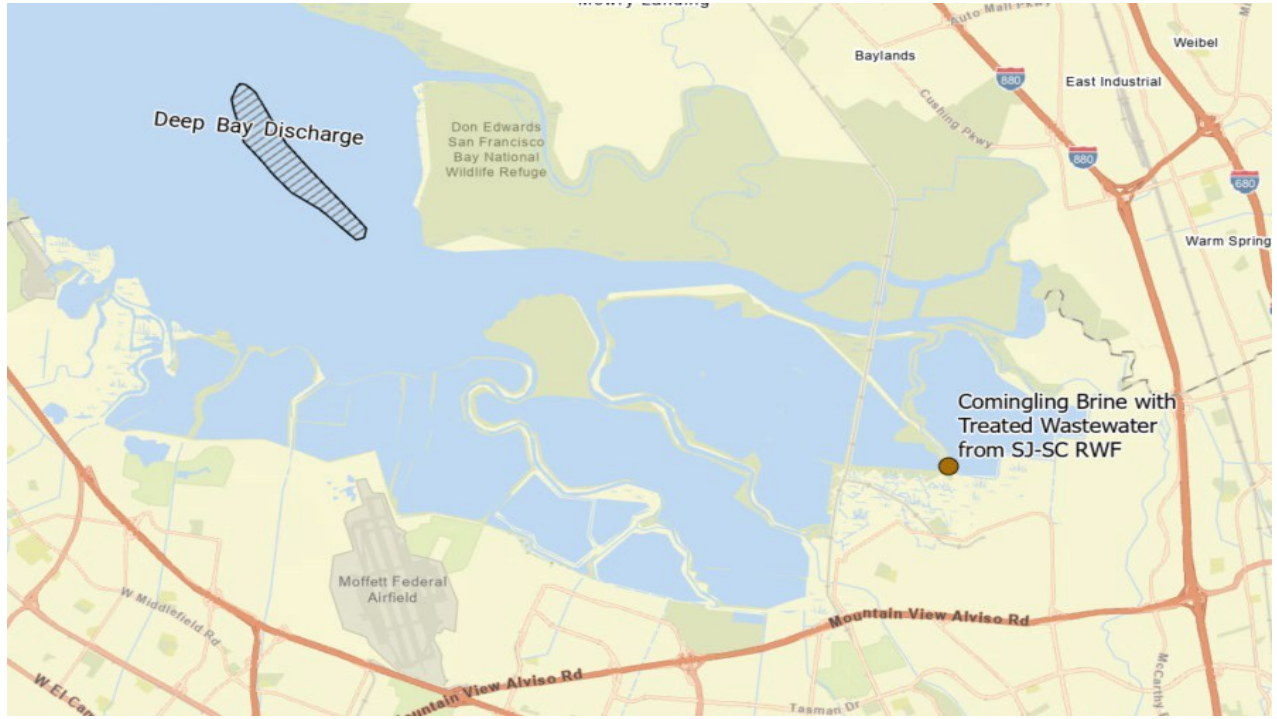
Brine Management

Options Evaluated

- Comingling with Treated Wastewater Effluent from Existing WWTP
- New Deep Bay Outfall with Brine Diffuser



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Feasible Alternatives

Ranking Alternatives

Table ES-1 Shortlisted Options with Scoring and Ranking Results

Options	Weighted Sum Method		TOPSIS	
	Aggregated Score	Option Ranking	Aggregated Score	Option Ranking
Intake				
Interconnecting Channel	**3.6**	**1**	**66%**	**1**
Guadalupe Slough	3.2	4	37%	4
Coyote Creek	3.3	2	39%	3
Deep Bay	3.2	4	40%	2
Desalination Facility Site				
6+7 (Sunnyvale)	3.9	2	41%	2
11 (Palo Alto)	3.9	2	40%	3
12 (San Jose)	**4.2**	**1**	**66%**	**1**
Brine Management				
Deep Bay Discharge	2.9	2	45%	2
Commingle with Wastewater	**3.6**	**1**	**55%**	**1**

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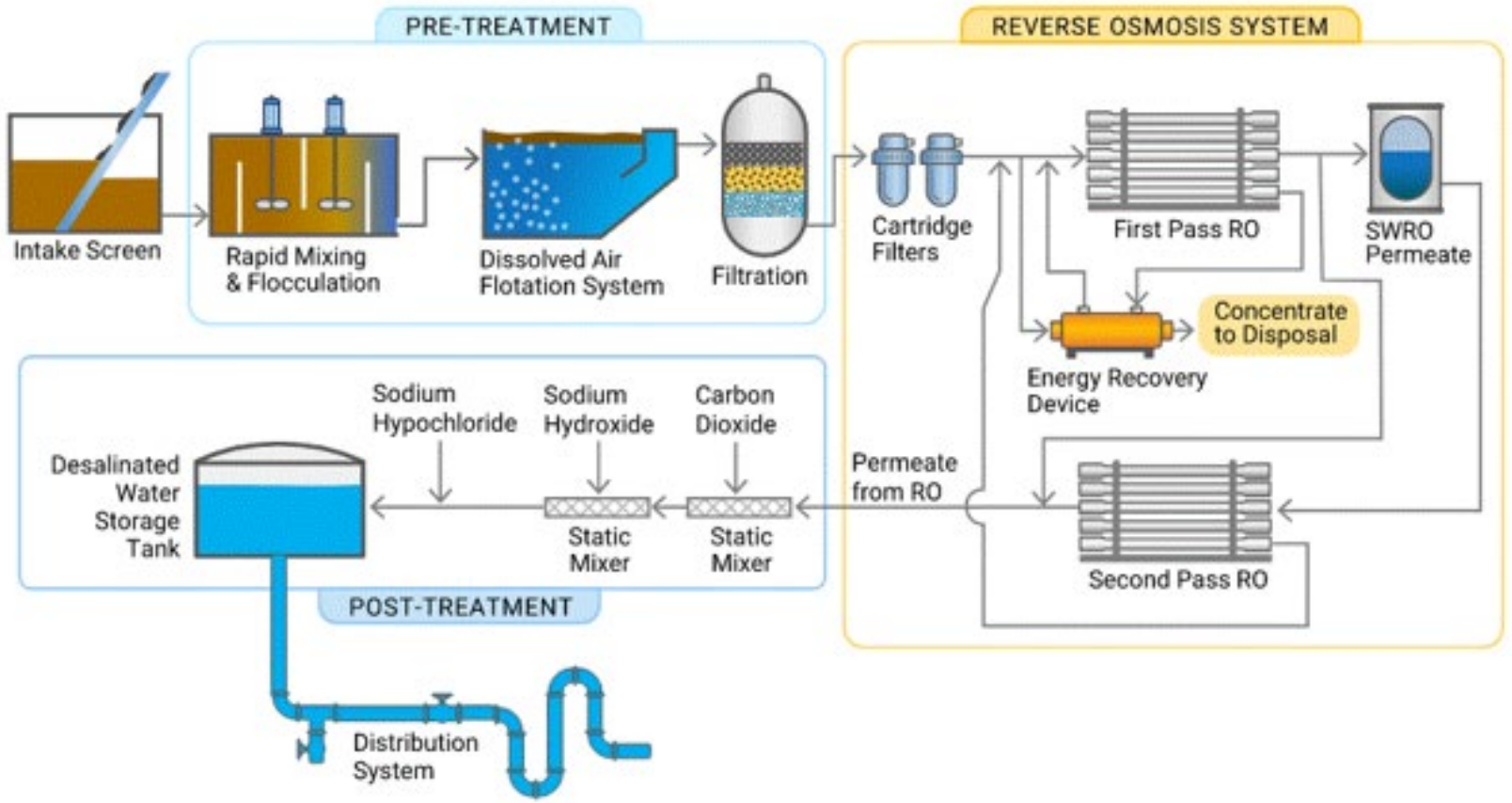
Production, Brine Discharge and Conveyance

Typical Desalination Treatment Process

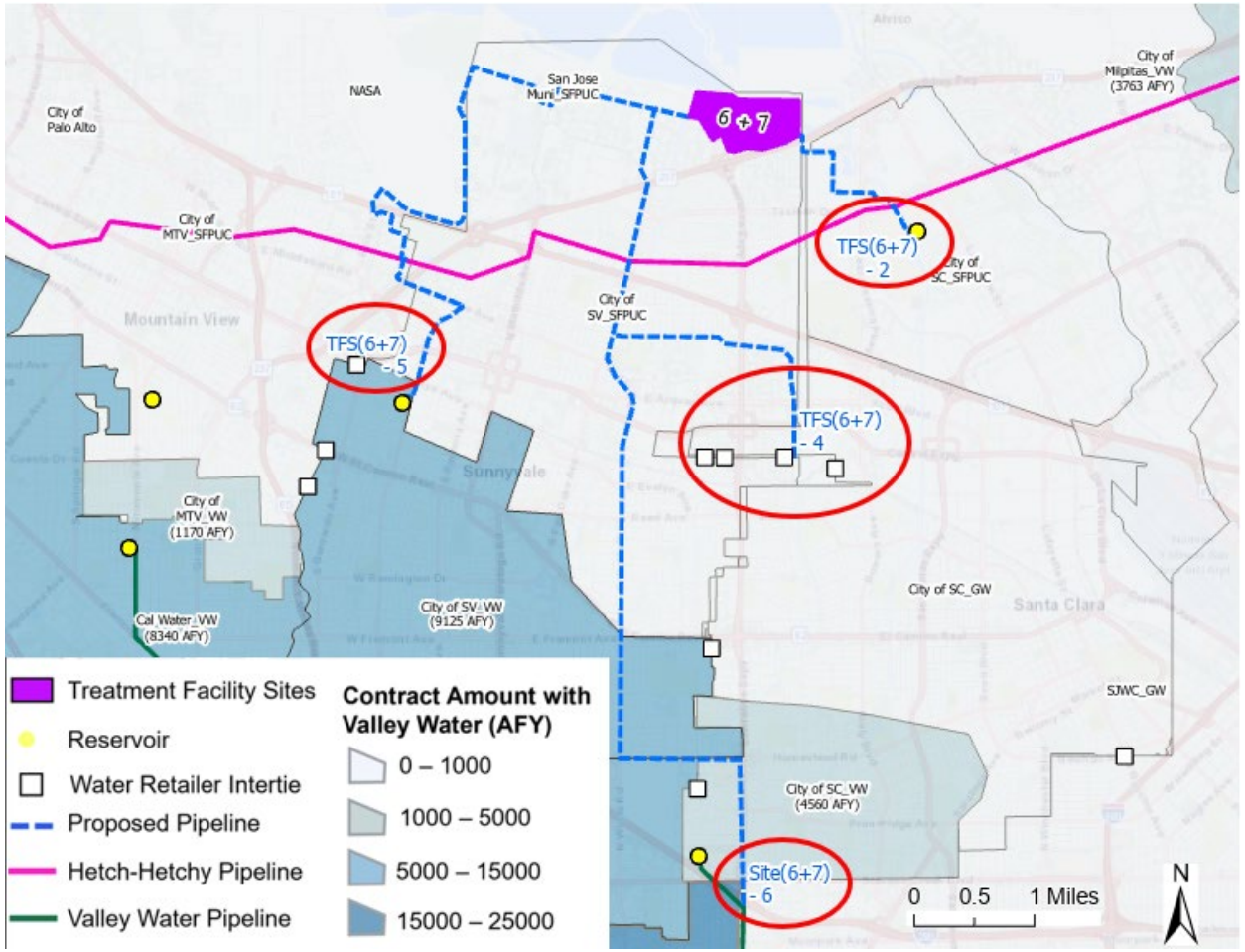


Product Water and Brine Produced

Table A. Product Water, Pipeline Diameter and Brine Produced

Source Water (MGD)	Product Water (MGD) @ 42% Recovery	Product Water Pipeline Diameter (inches)	Brine Discharge (MGD)
24	10	30	14
47	20	42	28
95	40	60	55

Conveyance and Distribution



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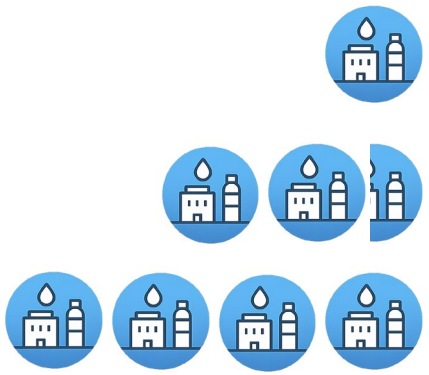
Project Alternatives Cost

Range of Capital Expenditures (CAPEX)

18 Distinct Combinations with 2 Conveyance Options

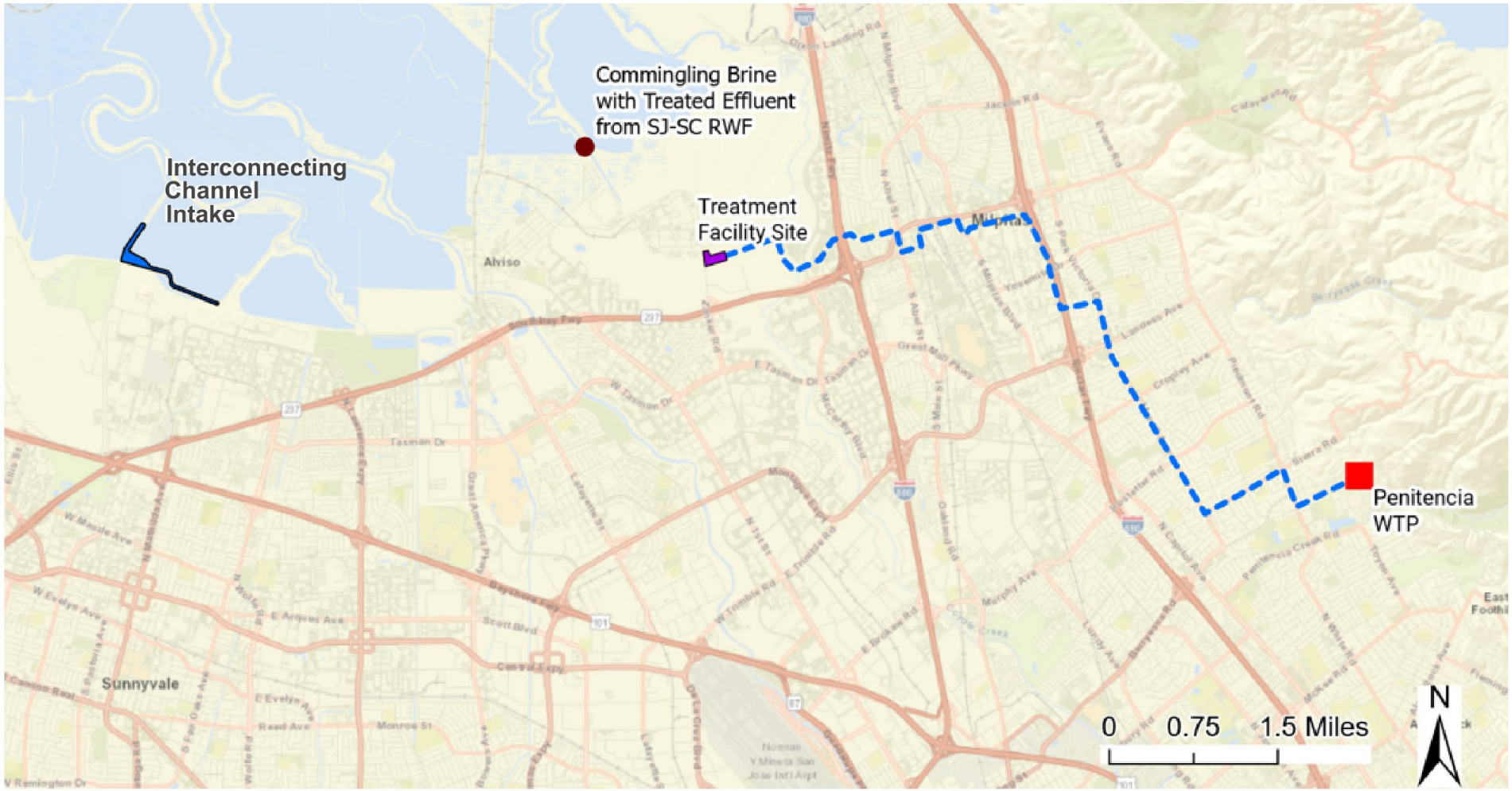
Production Capacity 10, 25 and 40 MGD



10 MGD Facility	$0.8 billion to $2.6 billion
25 MGD Facility	$1.4 billion to $3.2 billion
40 MGD Facility	$1.8 billion to $3.7 billion

Desal & DPR Costs

Top Alternative-24 MGD



Unit Cost & CAPEX- 24 MGD

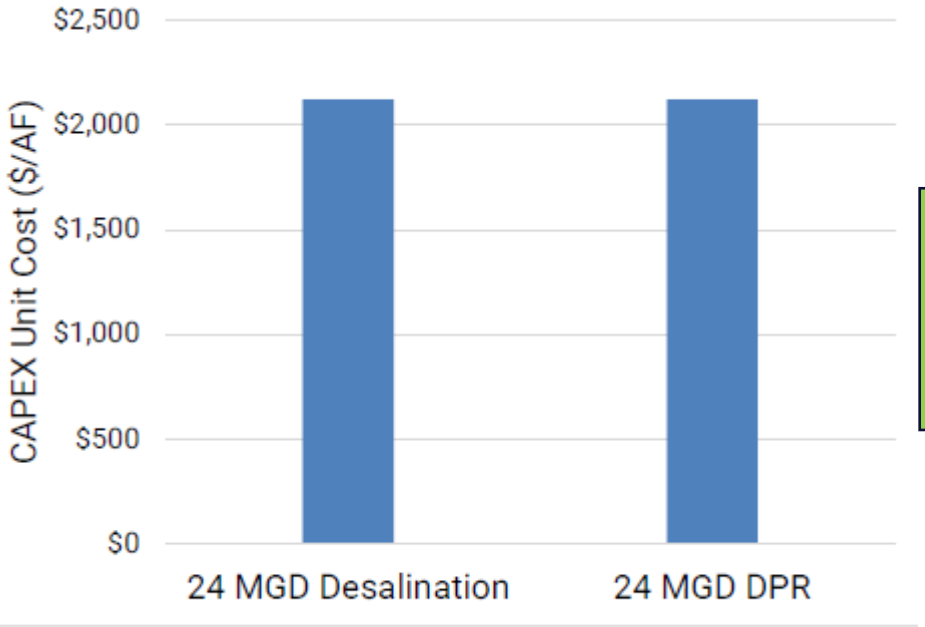
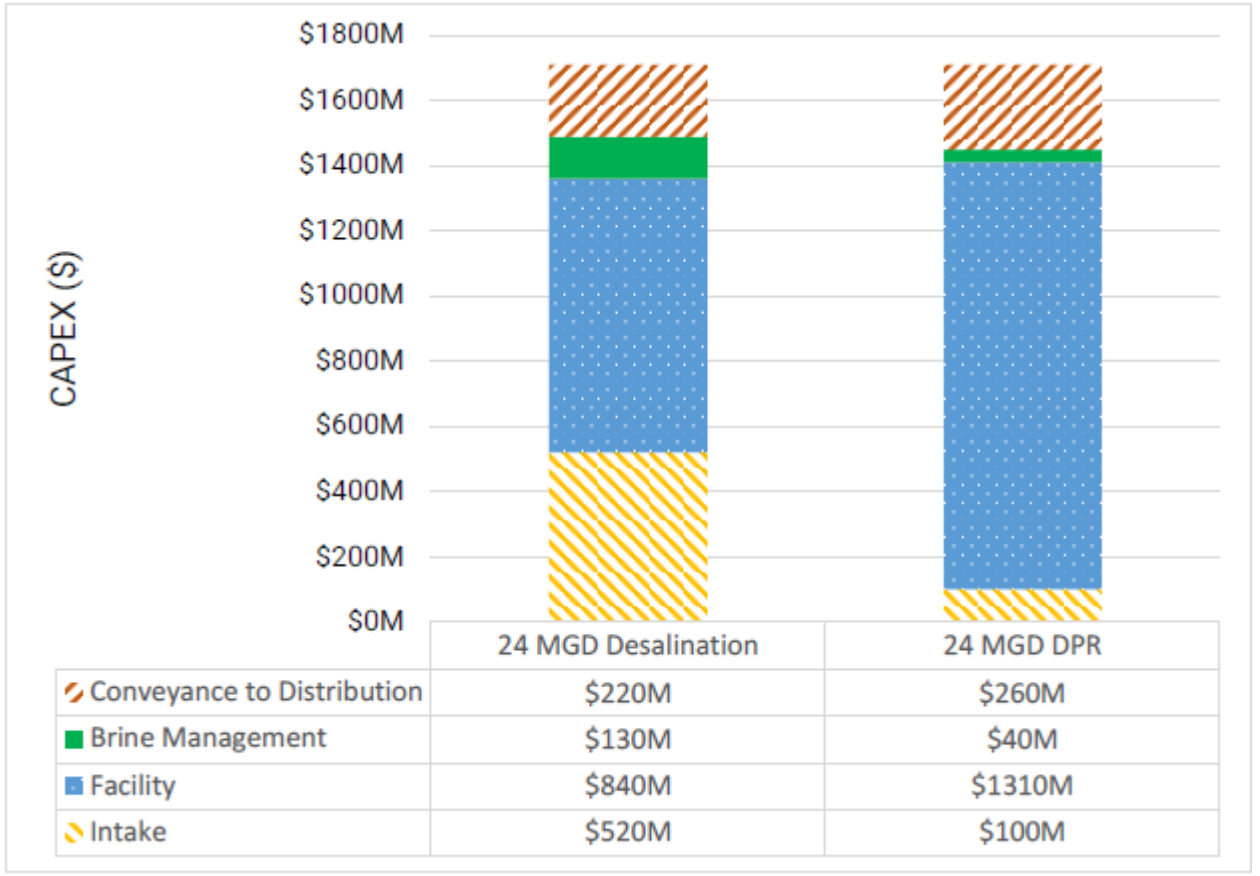


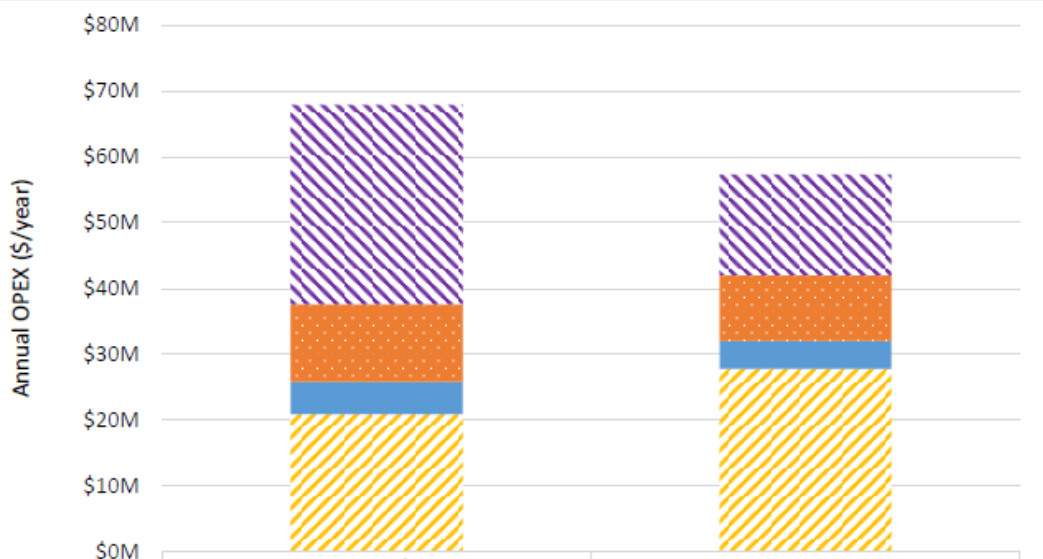
Figure 4 Comparison of CAPEX Unit Cost for Desalination and DPR



	24 MGD Desalination	24 MGD DPR
Conveyance to Distribution	$220M	$260M
Brine Management	$130M	$40M
Facility	$840M	$1310M
Intake	$520M	$100M

Figure 5 CAPEX by Component for Desalination and DPR

OPEX by Element- 24 MGD



	24 MGD Desalination	24 MGD DPR
Energy	$30M	$15M
Chemicals	$12M	$10M
Consumables	$0M	$0M
Labor	$5M	$4M
R&R	$21M	$28M

Figure 6 Annual OPEX by Element for Desalination and DPR (Note: consumables are considered negligible in the planning-level estimates for both programs)

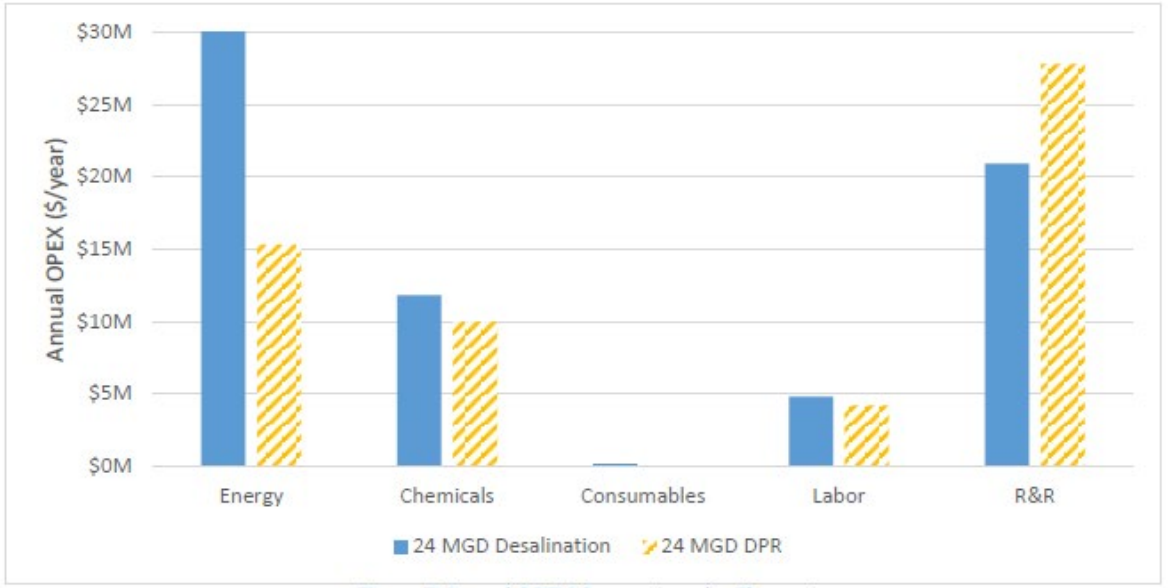


Figure 7 Annual OPEX Comparison by Element

Desal vs. DPR: Total Unit Cost (CAPEX + OPEX) 24 MGD

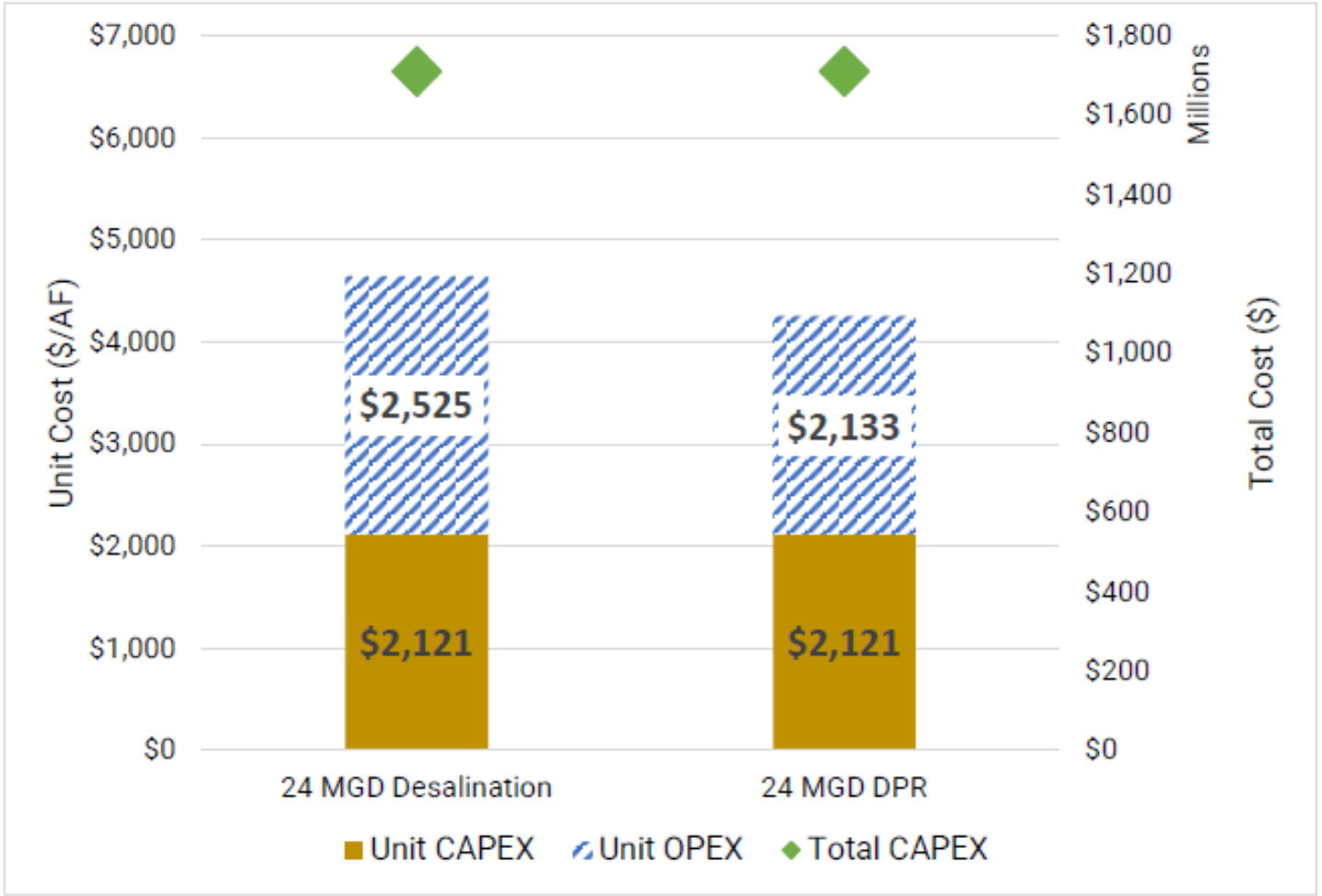


Figure 1 Comparison of Total CAPEX, Unit CAPEX, and Unit OPEX for 24 MGD Desalination and DPR

Desalination EFS - Staff Recommended Next Steps

Amend existing agreement with B&V to extend contract by one year and increase budget to complete additional work, including:

- Hydrodynamic and salinity modeling (San Jose/Deep Bay)
- Investigate water quality and bathymetry
- Investigate Interconnecting Channel near Sunnyvale Pond A4
- Additional regulatory and resource agency coordination

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