

# Purified Water Feasibility Study

North Bay Watershed Association  
July 12, 2024

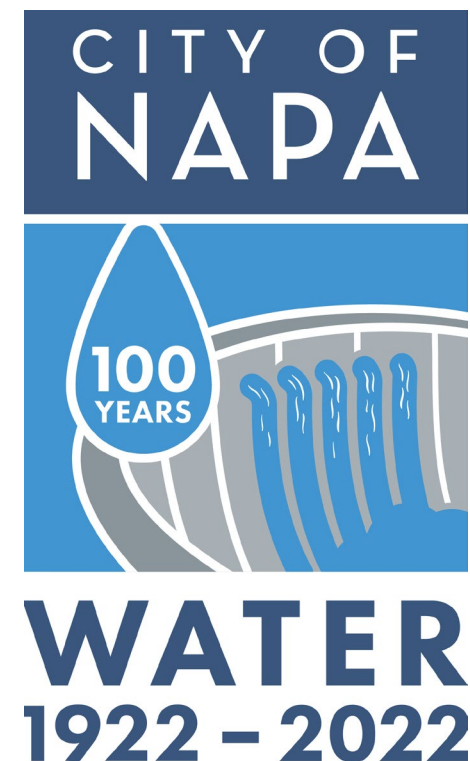


# 2023 Strategic Plan

**6C. Partner with the City of Napa to complete a preliminary feasibility study for developing a “purified water” potable reuse program**

# Background

- › **2021:** Drought Contingency Plan identifies purified water feasibility study as a near-term project
- › **February 2023:** City of Napa and NapaSan kickoff joint study performed by Carollo Engineers. Study costs shared evenly by the City and NapaSan



# Study Summary

- › **Source Water Flows:** Available water volume
- › **Source Water Quality:** Inform system design
- › **Regulatory Summary:** DPR regulations – TWA/RWA
- › **Alternatives Analysis:** System size, location, costs
- › **Residuals Management:** NPDES compliance
- › **Governance Framework:** Interagency partnership
- › **Implementation Roadmap:** Timeline

# Source Water Flows

- › Determine volume of water supply available
- › To meet existing recycled water irrigation demand, only non-dry season wastewater flow was evaluated (6 months/year)
- › Stormwater flow from urban runoff and small wet weather events considered to increase AWWPF utilization
- › 3 advanced water purification facility (AWWPF) sizes:
  - 1.8 mgd: lowest useful flow
  - 6 mgd: mid-size AWWPF
  - 10 mgd: maximum reliable source water flow

# Regulatory Summary

- › DPR regulations finalized in December 2023
- › Extensive requirements for treatment, monitoring, source control, reporting, staffing, and more
- › Each treatment component (e.g., RO, UV, ozonation) results in additional pathogen removal credits
  - Minimum credits required
- › 24/7 staffing for 12 months potentially decreasing over time
  - CPO must be Grade 5 AWTO, all operators must be certified AWTO

# Alternatives Analysis

- › 8 alternatives (combination of treatment plant size and location) considered

	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7	Alt 8
Feed Flow, mgd	1.8	6.0	10	1.8	6.0	10	1.8	6.0
AWPF Location	NapaSan SWRF						BJWTP	
Reuse Type	TWA			RWA				

- › Infrastructure requirements for all alternatives
  - AWPf feed line
  - AWPf finished line
  - RO concentrate line
  - Backwash and off-spec line





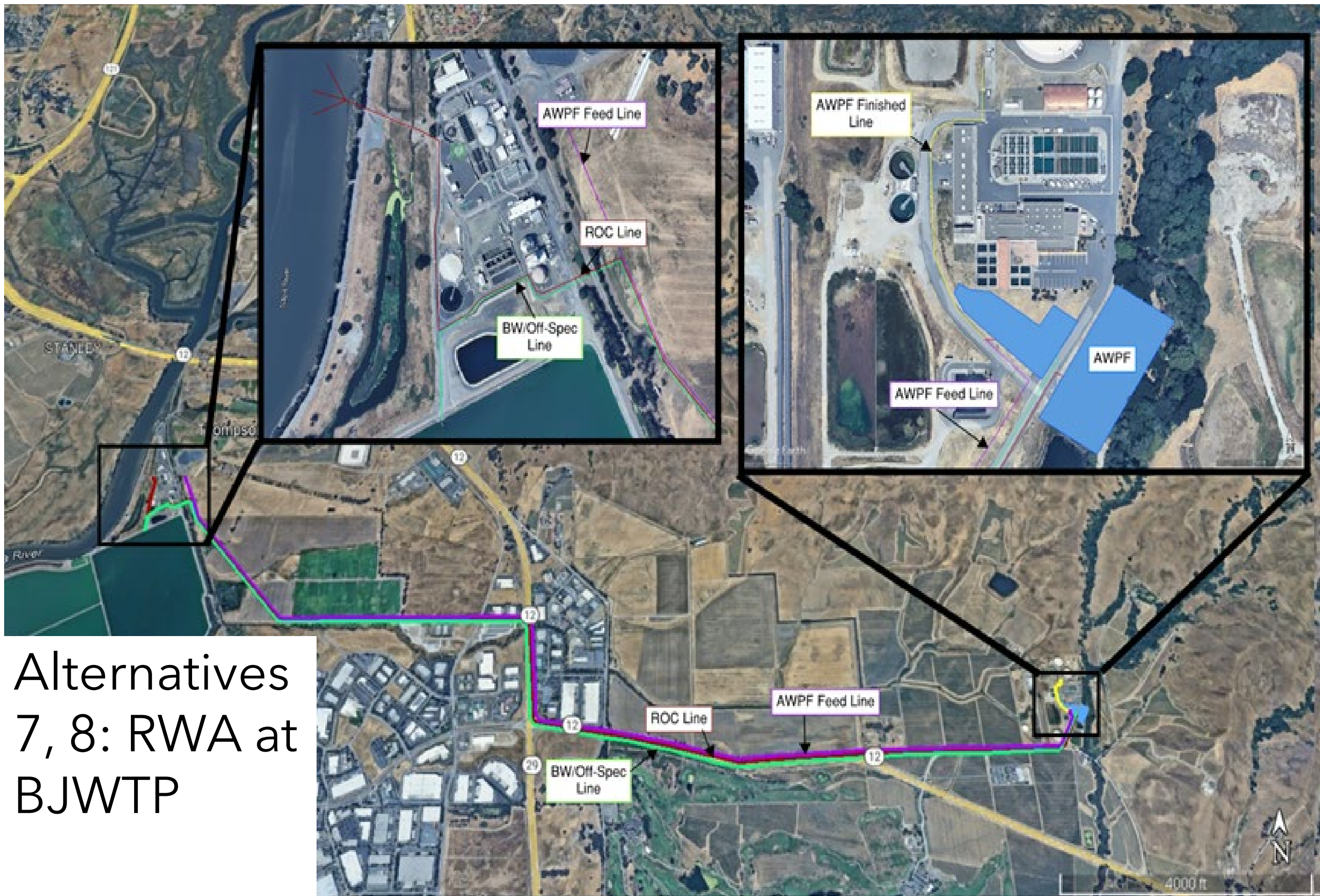
Alternatives  
1, 2, 3: TWA  
at NapaSan





Alternatives  
4, 5, 6: RWA  
at NapaSan





Alternatives  
7, 8: RWA at  
BJWTP

# Capital and O&M Cost Summary

## › Capital Cost Estimates

Cost Type	Alternative Cost (\$M)							
	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7	Alt 8
Feed Flow, mgd	1.8	6.0	10	1.8	6.0	10	1.8	6.0
AWPF Location	NapaSan SWRF						BJWTP	
Reuse Type	TWA			RWA				
Project Capital Cost	\$120.4	\$218.4	\$270.1	\$132.4	\$242.5	\$299.8	\$144.8	\$257.9

## › O&M Cost Estimates

Cost Type	Alternative Cost (\$M)							
	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7	Alt 8
Feed Flow, mgd	1.8	6.0	10	1.8	6.0	10	1.8	6.0
AWPF Location	NapaSan SWRF						BJWTP	
Reuse Type	TWA			RWA				
12 mo. Annual O&M Cost	\$5.06	\$8.33	\$11.86	\$5.16	\$8.60	\$12.33	\$5.09	\$8.36
6 mo. Annual O&M Cost	\$4.00	\$5.25	\$6.31	\$4.05	\$5.36	\$6.47	\$4.01	\$5.26

# Unit Cost Estimates

	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7	Alt 8
Feed Flow, mgd	1.8	6.0	10	1.8	6.0	10	1.8	6.0
AWPF Location	NapaSan SWRF						BJWTP	
Reuse Type	TWA			RWA				
AFY Produced: 6 mo.	758	2,231	3,181	758	2,231	3,181	758	2,231
\$/AF: 6 mo.	\$14,000	\$7,700	\$6,600	\$14,900	\$8,400	\$7,200	\$15,700	\$8,700
AFY Produced: 12 mo.	1,613	5,377	8,961	1,613	5,377	8,961	1,613	5,377
\$/AF: 12 mo.	\$7,200	\$3,800	\$3,000	\$7,700	\$4,100	\$3,200	\$8,000	\$4,200

- › Highly conservative cost estimates
- › Costs annualized over 30 years with interest
- › \$/AF much higher than current water supplies



# Complexities

- › In California DPR is novel contributing to high costs
- › New regulations are extensive, costly, but necessary since there is limited history
- › Public perception remains a hurdle
- › NPDES permit implications - increased risk
- › Residuals management a challenge
- › Requires new operator certification
- › Requires interagency cooperation for success - achievable but additional challenge

# Study Conclusions

- › A purified water project is:
  - Technically feasible
  - Not cost-effective at this time
- › Future actions for City and NapaSan
  - Monitor cost comparison of alternate water supplies (City)
  - Monitor regulatory requirements (both agencies)
  - Monitor costs and public acceptance of other facilities (both)
  - Evaluate dry-weather stormwater augmentation which has potential benefit to recycled water irrigation customers (NapaSan)

# Questions?