



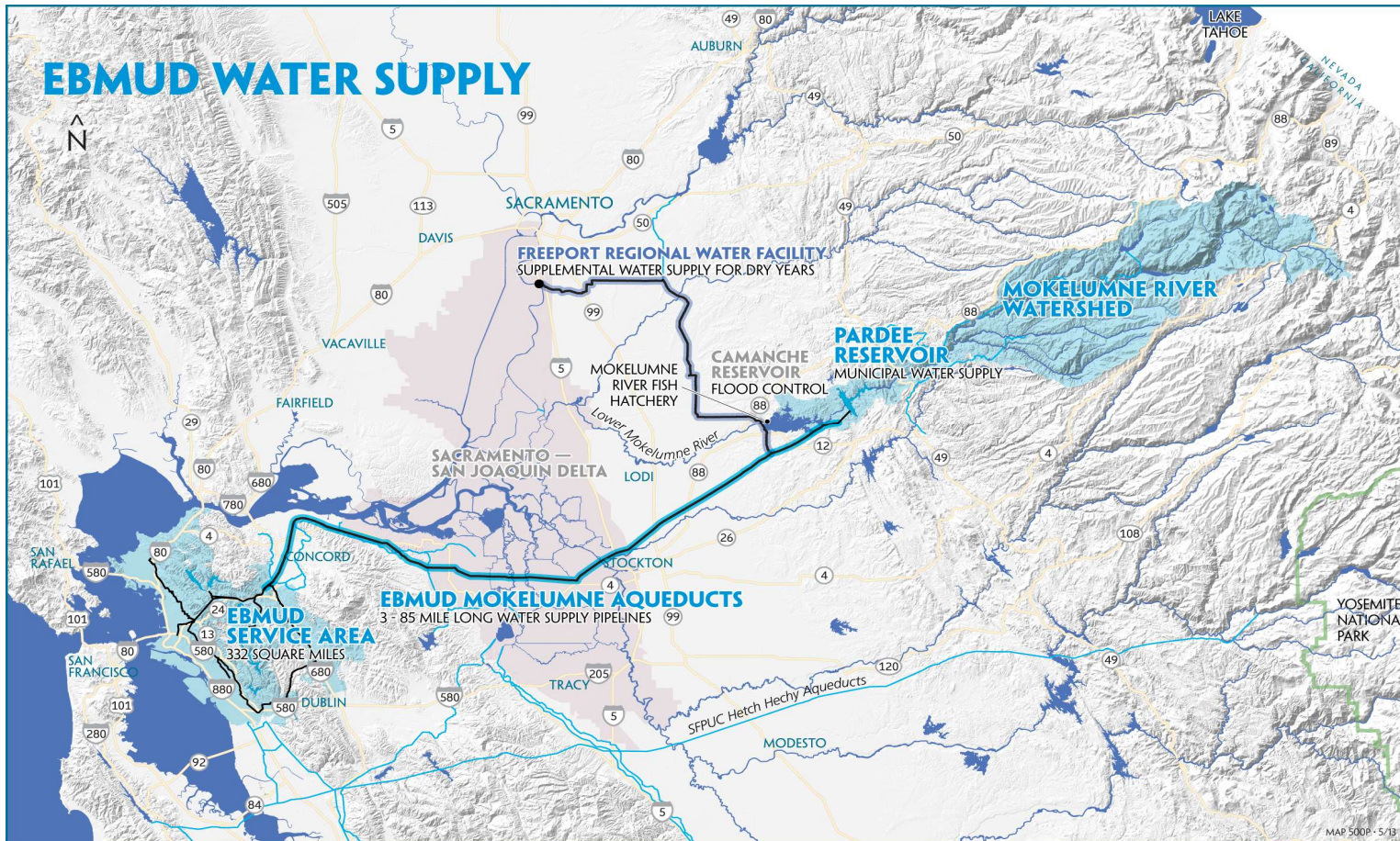
EAST BAY MUNICIPAL UTILITY DISTRICT



**EBMUD
The Future of Water in
Central Contra Costa**

**Director John Coleman
October 26, 2022**

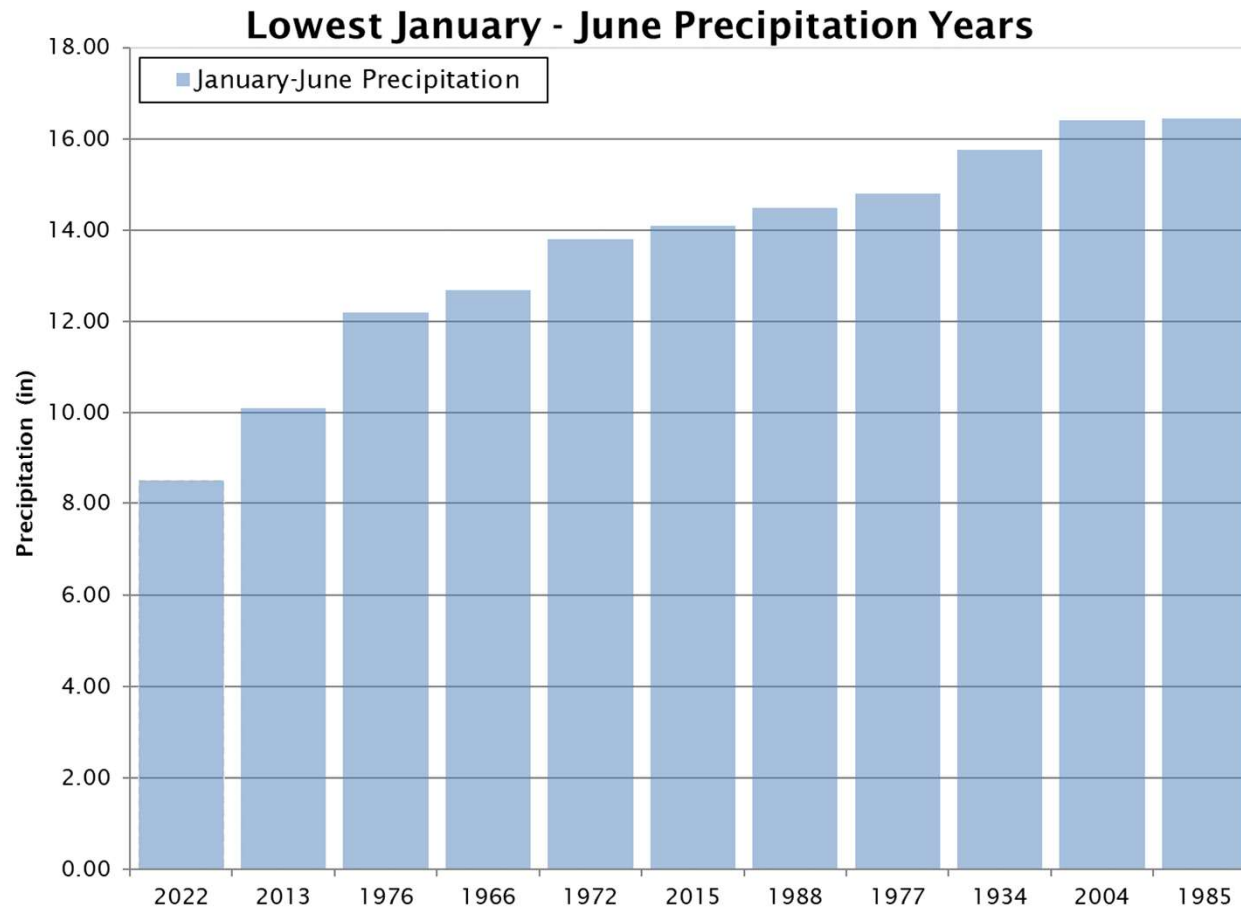
Your Water Today From the Snowflake to the Bay



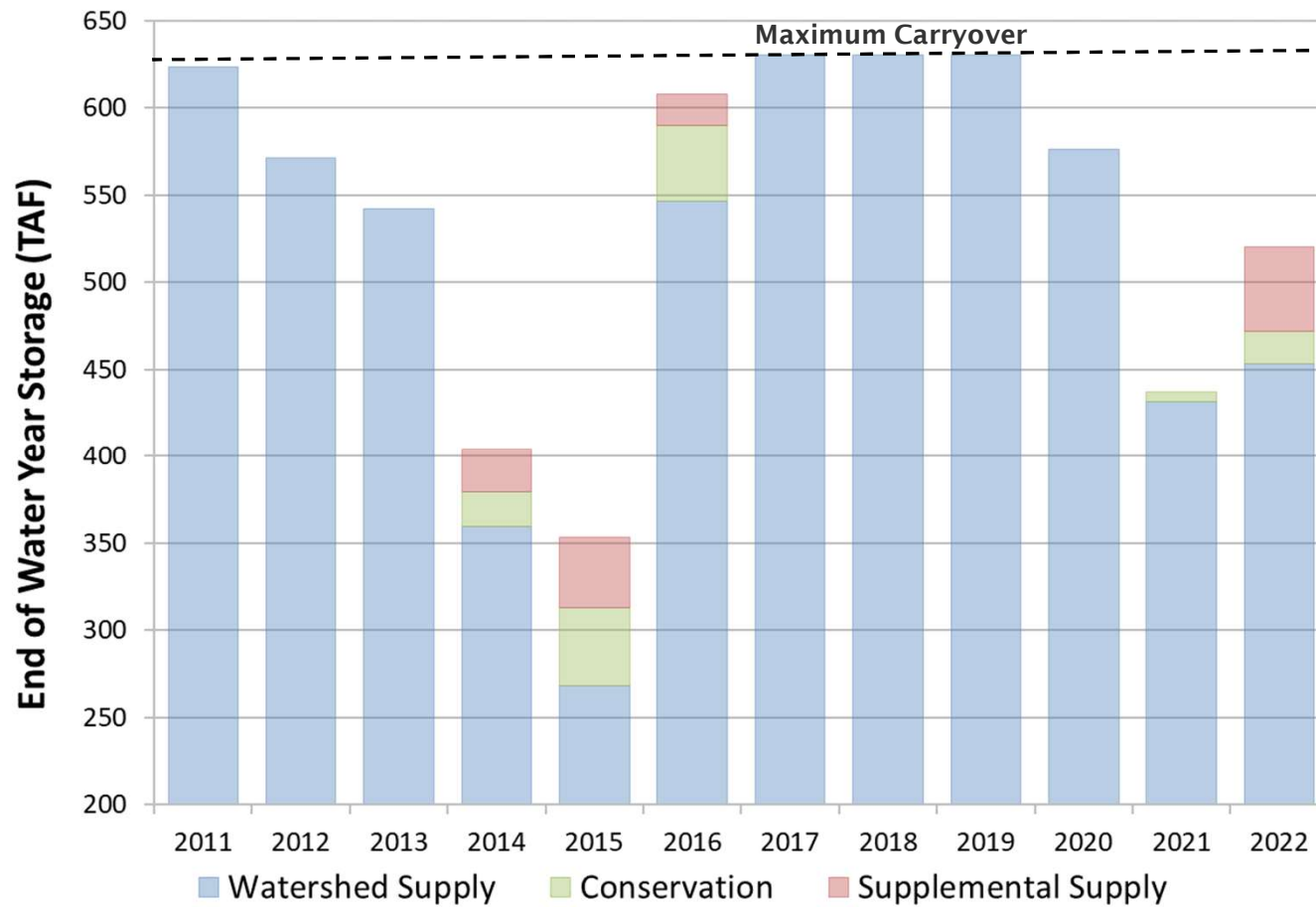
Where Your Water Comes From



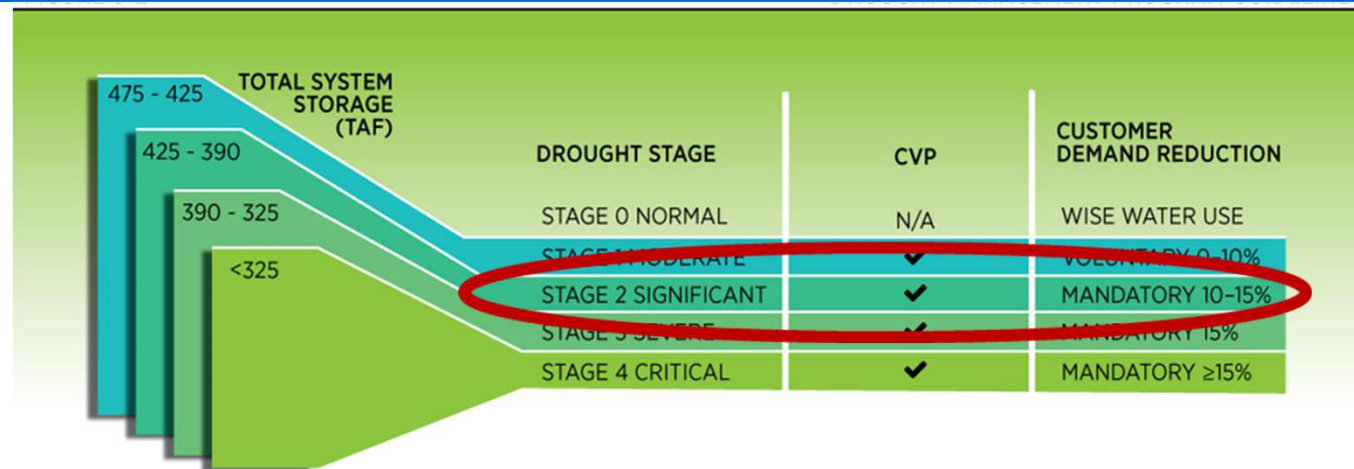
Historical Precipitation



Storage to End Water Year 2022



Drought – Stage 2 Declared



TSS - TOTAL SYSTEM STORAGE
includes Pardee, Camanche, Upper San Leandro,
Briones, Lafayette, Chabot, and San Pablo Reservoirs

- 10% mandatory water use reductions
- Excessive Use Penalty Ordinance
- Section 28 regulations – restrictions on water use
- 8% drought surcharge- effective as of July 1, 2022

Uncertainty with Existing Water Supplies



Climate Change Projections

Temperature

- Projected 6.5°F increase by the late 21st century (> 2066)

Precipitation Changes

- Increased precipitation variability since 1970s

Snowpack

- Shifts in timing of melt, runoff and streamflow
- Decreased Snow Water Equivalent

Evapotranspiration

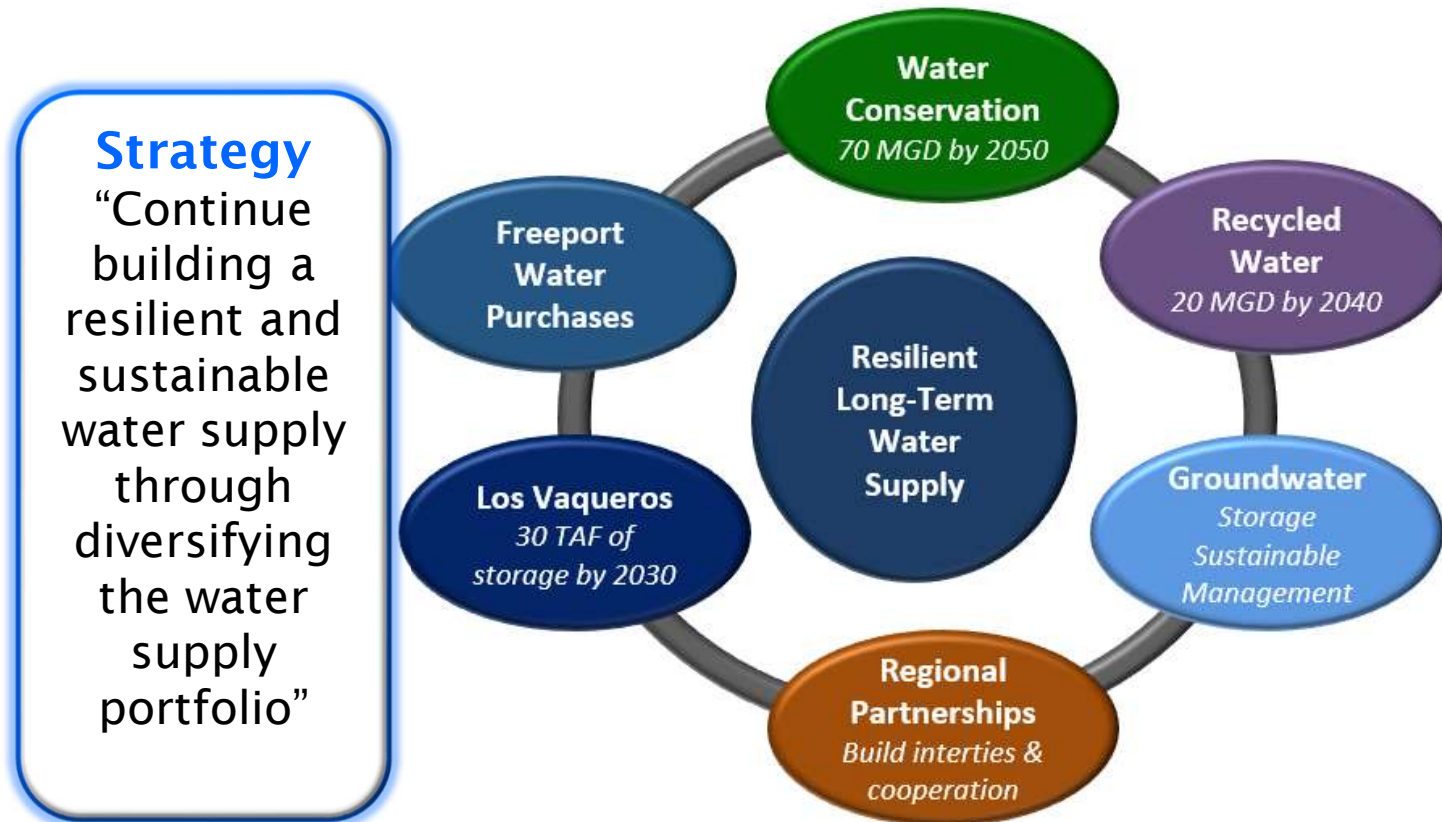
- 15 Percent increase in Northern/Central Sierra

Sea Level Rise

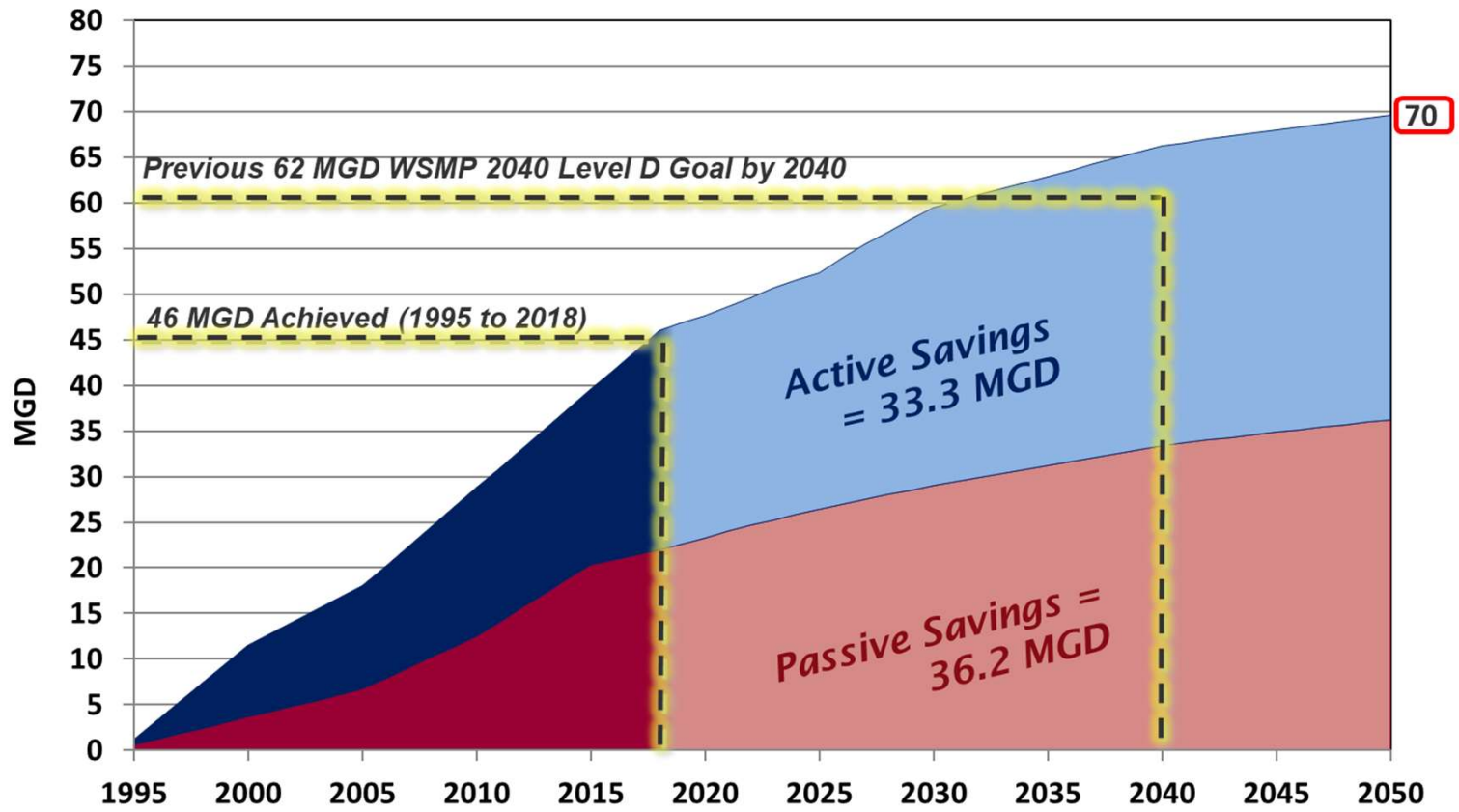
- 1' Sea Level Rise by Midcentury
- 3' Sea Level Rise by End of Century

For more info see: Sacramento and San Joaquin River Basins | Water Reliability in the West - 2021 SECURE Water Act Report, <https://www.usbr.gov/climate/secure/docs/2021secure/basinreports/SanJoaquinBasinChapter.pdf>

EBMUD Water Supply Portfolio



Water Conservation



Supplemental Supplies

Long-Term Water Transfers



Placer County Water Agency Long-Term Water Transfer

- Up to 47,000 acre-feet (AF) to provide environmental benefit to Lower American River
- Completion target date is 2024
- Water purchases (2014, 2015, 2022)



Sycamore Mutual Water Company Ten-Year Water Transfer

- Up to 6,000 AF based on a rolling fallowing of rice fields
- Collaborating with Environmental Defense Fund and The Nature Conservancy
- Water purchase (2015, 2023 option)



Yuba Water Agency Five-Year Water Transfer

- Up to 10,000 AF to provide environmental benefits to Yuba River
- Water purchase (2023-2025 option)

Key Takeaways

- 1 EBMUD is working on long-term agreements with multiple agencies/sources.
- 2 EBMUD is prepared for short-term water purchases through interim agreements.

Bay Area Regional Reliability (BARR)

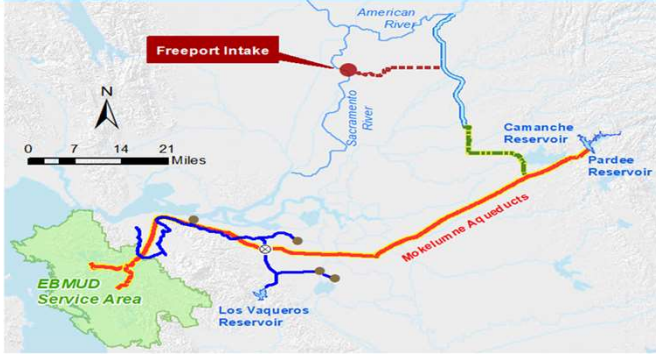


Bay Area's eight largest water agencies are working together to develop a **regional solution** to improve water supply reliability and drought resilience.

Bay Area water agencies have a history of collaboration.

Los Vaqueros Reservoir

Purpose & Participants



		Voting Members			
JPA formed in 2021	1	ACWD	5	San Luis DMWA	
	2	Contra Costa WD <i>(w/ Brentwood)</i>	6	SF PUC <i>(w/ BAWSCA)</i>	
	3	EBMUD	7	Valley Water	
	4	Grasslands	8	Zone 7	

Item	Capital, \$M (2020 \$)
Project	\$942
CWC Grant	(\$470)
Local Share	\$472

CWC: California Water Commission

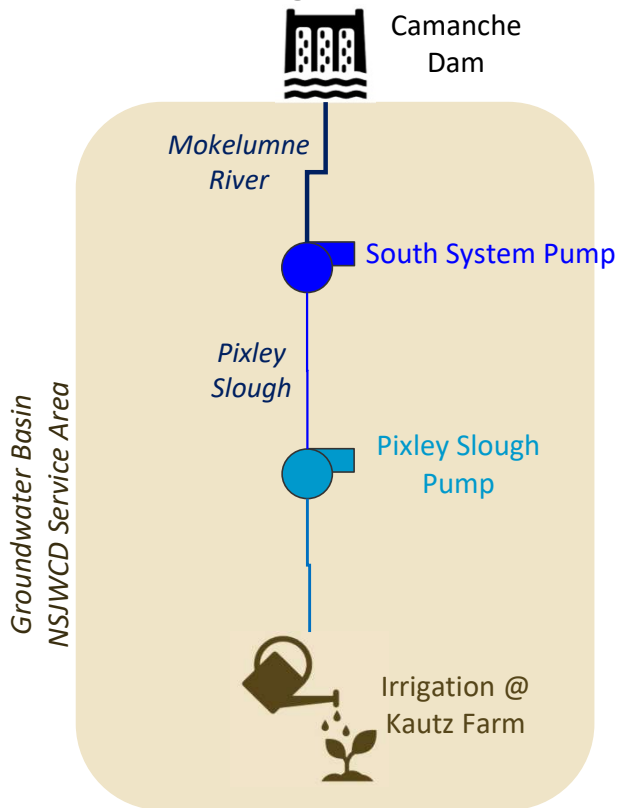
Key Takeaways

- 1 EBMUD is evaluating whether to secure 30 TAF of storage in Los Vaqueros.
- 2 The estimated cost for EBMUD is \$50M to \$100M depending on grant funding.

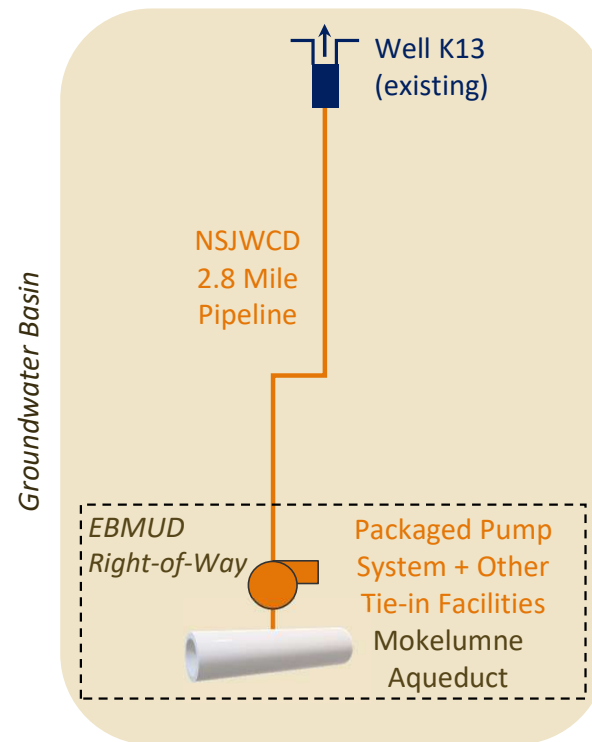
Groundwater: DREAM Project



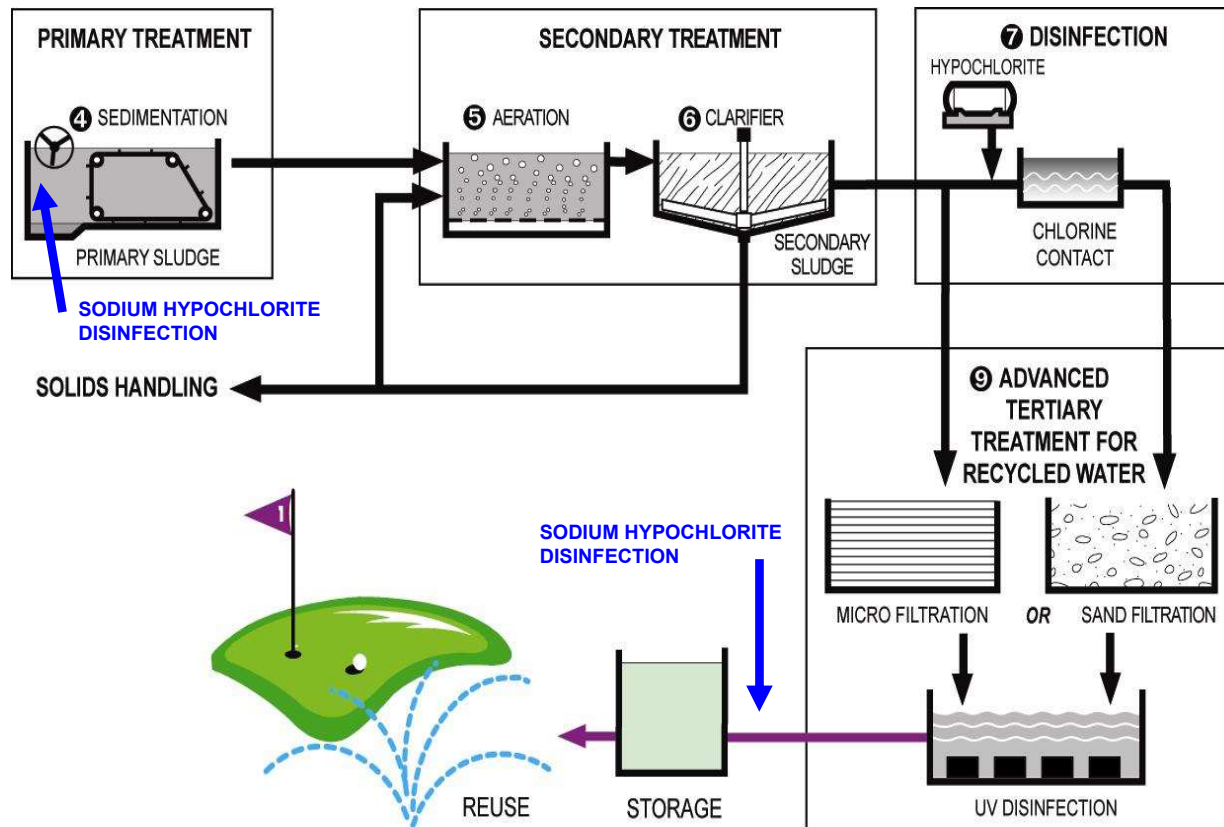
Existing Facilities



New Facilities Recently Constructed



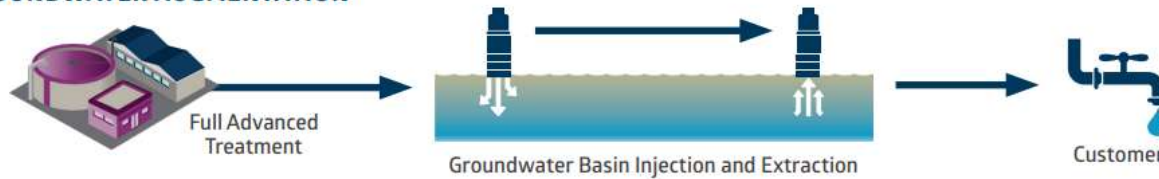
Making Safe Recycled Water: Non-Potable Uses



Making Safe Recycled Water: Potable Uses



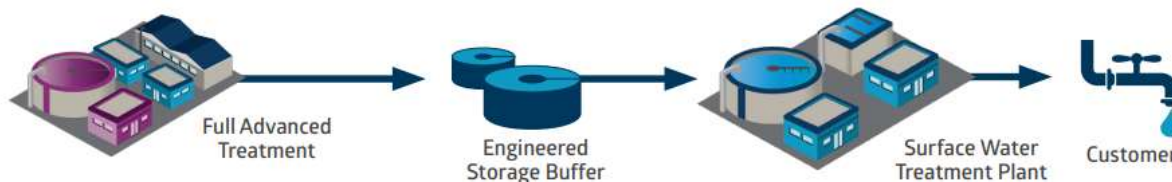
GROUNDWATER AUGMENTATION



RESERVOIR AUGMENTATION



RAW WATER AUGMENTATION



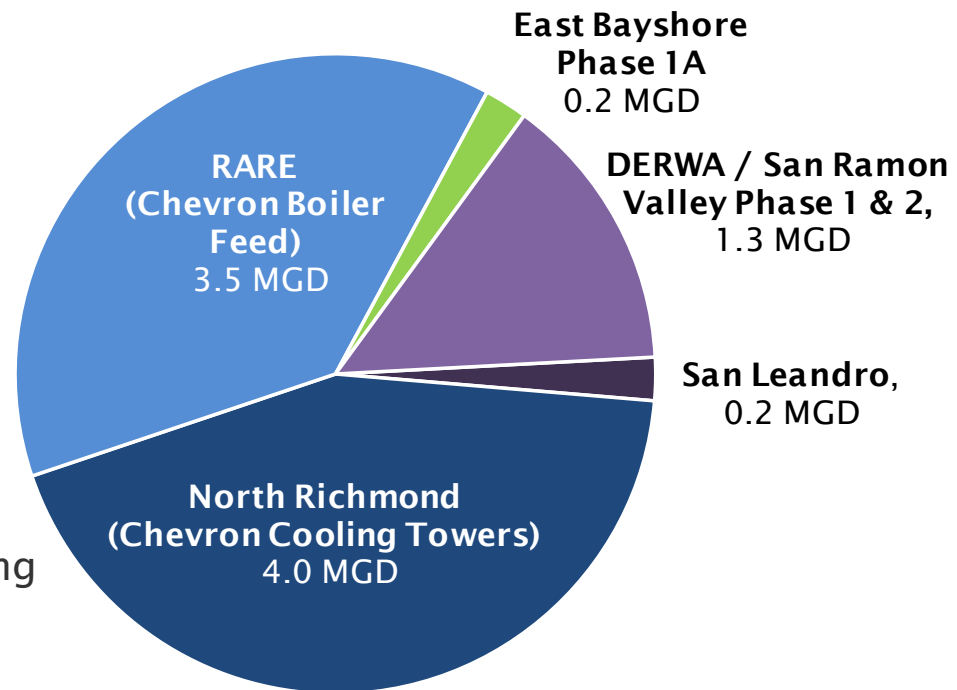
TREATED WATER AUGMENTATION



Current Recycled Water Program



- 5 non-potable projects
- Production capacity 9 MGD
- Goal of 20 MGD by 2040
- Future projects to provide additional 11 MGD non-potable water (\$343M)
- \$145 M invested to date state/federal/private funding



Recycled Water Program Updates



East Bayshore Recycled Water Project (Since 2008)

Pilot Study

- 45 customers connected to date
- Evaluate advanced treatment alternatives
- Final recommendations available in 2023
- Recommend upgrades to increase customer base



San Ramon Valley Recycled Water Project (Since 2006)

San Ramon Valley Retrofits

- Continue to connect irrigation sites, 77 customers to date

DERWA

- JPA with DSRSD
- Demand Management (AMI)
- Supplemental supplies for future expansion



Courtesy of: Crow Canyon Country Club Golf Course

North Richmond and RARE (Since 2010)

North Richmond

- Capital improvements to replace aging infrastructure

RARE

- RO membrane replacement
Evaluate future expansion opportunities with Refinery



San Ramon Valley Recycled Water Program



- Over 1,765 million gallons of recycled water delivered to the Tri-Valley, including San Ramon in 2021
- Potential for EBMUD to expand recycled water to Danville and Blackhawk in the future, pending supplemental supply
- Supplemental supply development
 - Recent droughts and water conservation have decreased water use and wastewater flows
 - Upcoming year: Central San diversion to supply wastewater to DERWA (began last year)
 - Long-term: diversion of other non-potable sources, continued collaboration with Central San, increased storage



Phillips 66

Rodeo Renewed Project

- Coming in 2024
- 2.8 MGD on-site recycled water facility
- Continue to coordinate with Phillips 66 as they transition to renewable energy



Satellite Recycled Water Projects

Three potential projects:

- Diablo Country Club
- Rossmoor Community
- Sequoyah Country Club



Rossmoor Community



Potential Satellite Project

- 0.5 MGD
- Irrigation for golf courses
- Self-financed by Rossmoor/GRF

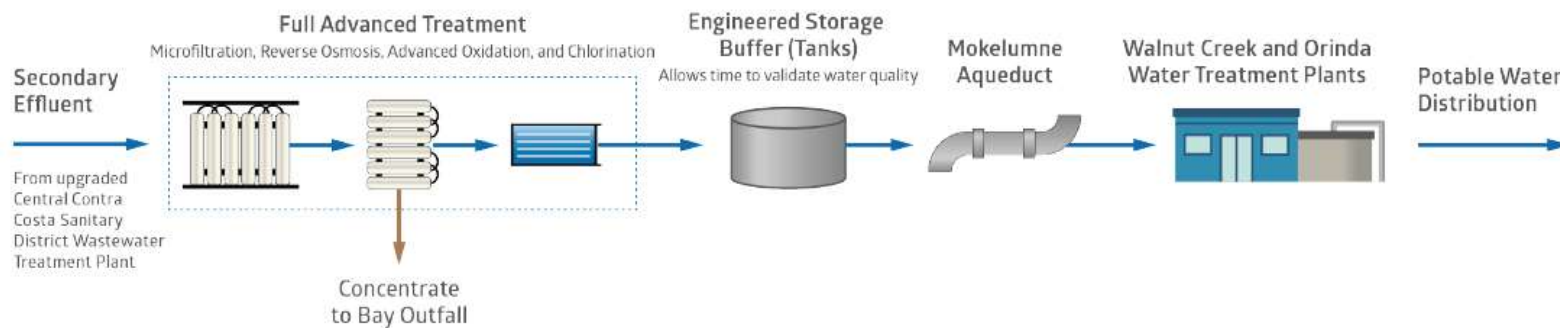
Project Partners

- Rossmoor/GRF
- EBMUD
- Central San
- City of Walnut Creek

Central San MOU Background



- 2019 Recycled Water Master Plan Update evaluated non-potable and potable reuse projects
- Recommended portfolio of non-potable reuse projects to meet goal of recycling 20 MGD by 2040
- Potable reuse opportunities identified for future evaluation for 2024 Plan Update
 - Central San identified as potential partner



Potential Project Concepts



- ① **Direct Potable Reuse Project**
 - Recycle Central San's available supply through advanced purification and convey to Mokelumne Aqueducts
- ② **Indirect Potable Reuse Project**
 - Recycle Central San's available supply through advanced purification and convey and store in Los Vaqueros Reservoir
- ③ **Refinery Recycled Water Exchange Project**
 - Assist Central San in funding recycled water treatment/service to refineries in exchange for receiving raw water supply from CCWD
- ④ **Satellite Water Recycling Facility Projects**
 - Package treatment facilities at customer sites
- ⑤ **Lamorinda Project**
 - Recycled water to portions of Lamorinda
- ⑥ **San Ramon Valley Recycled Water Program**
 - Explore concept of Central San as a DERWA partner
 - Expand the DERWA-Central San Diversion Project

Challenges and Opportunities



Challenges

- Availability of Recycled Water Supply
- Location of treatment and distribution infrastructure
- Cost/Benefit Evaluation

Opportunities

- Innovation
- Regional Collaborations
- Resource Sharing



EAST BAY MUNICIPAL UTILITY DISTRICT

Questions & Discussion

Contact John Coleman
john.coleman@ebmud.com

Follow us @ebmud
on Facebook, Twitter, LinkedIn, and Nextdoor

Conservation: What We're Asking of Our Customers



1. Irrigate efficiently



2. Find and fix leaks



3. Be mindful of indoor use



Conservation: Rebates and Incentives



Rebate	Amount
Lawn Conversion	Standard: \$1.25/sq. ft. Super and Median: \$2.50/sq. Ft
Drip Conversion	\$0.25/sq. ft.
Smart Controllers	\$100 + \$20 per active station
High Efficiency Nozzles	\$4 per nozzle
Pressure Regulatory	\$75 per device
Irrigation Submeter	\$75+ per device
Flowmeter	Up to \$200
Custom Rebate	Based on potential water savings



Lawn rebates: apply before you buy! Rebates are not retroactive

Rebate total: Up to \$2,000 for Residential or \$15,000 for Commercial & Multi-family (5 or more units) Over a two-year period

Ebmud.com/rebates

Customer Rebates



Rebate	Increased Rebate as of July 1
Lawn Conversion	Standard: \$1.25/sq. ft. Super and Median: \$2.50/sq. ft.
Smart Controller	Residential: \$100 + \$20 per active station (\$200 max) Commercial: \$100 + \$20 per active station (\$1,000 max)
High Efficiency Nozzles	\$4 per nozzle

Groundwater East Bay Plain Subbasin



GSA: Groundwater Sustainability Agency



Sustainable Groundwater Management Act

Phase 1
GSA
Formation

*Completed April
2017*

Phase 2
GSP
Development

*Completed
January 2022*

Phase 3
GSP
Implementation

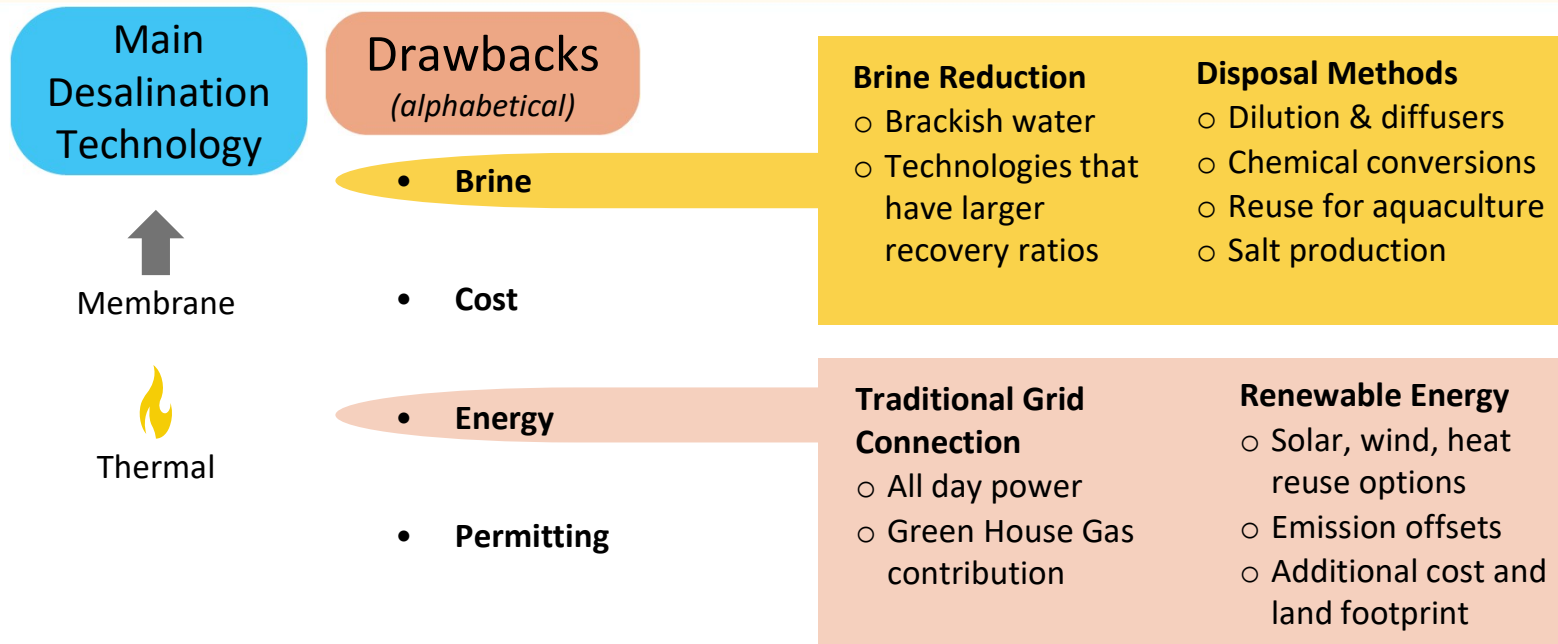
*Ongoing after
GSP adoption*

- Continued Stakeholder involvement
- Evergreen document

Key Takeaways

- 1 Groundwater sustainability plan was submitted to DWR in January
- 2 EBMUD and Hayward moving into implementation

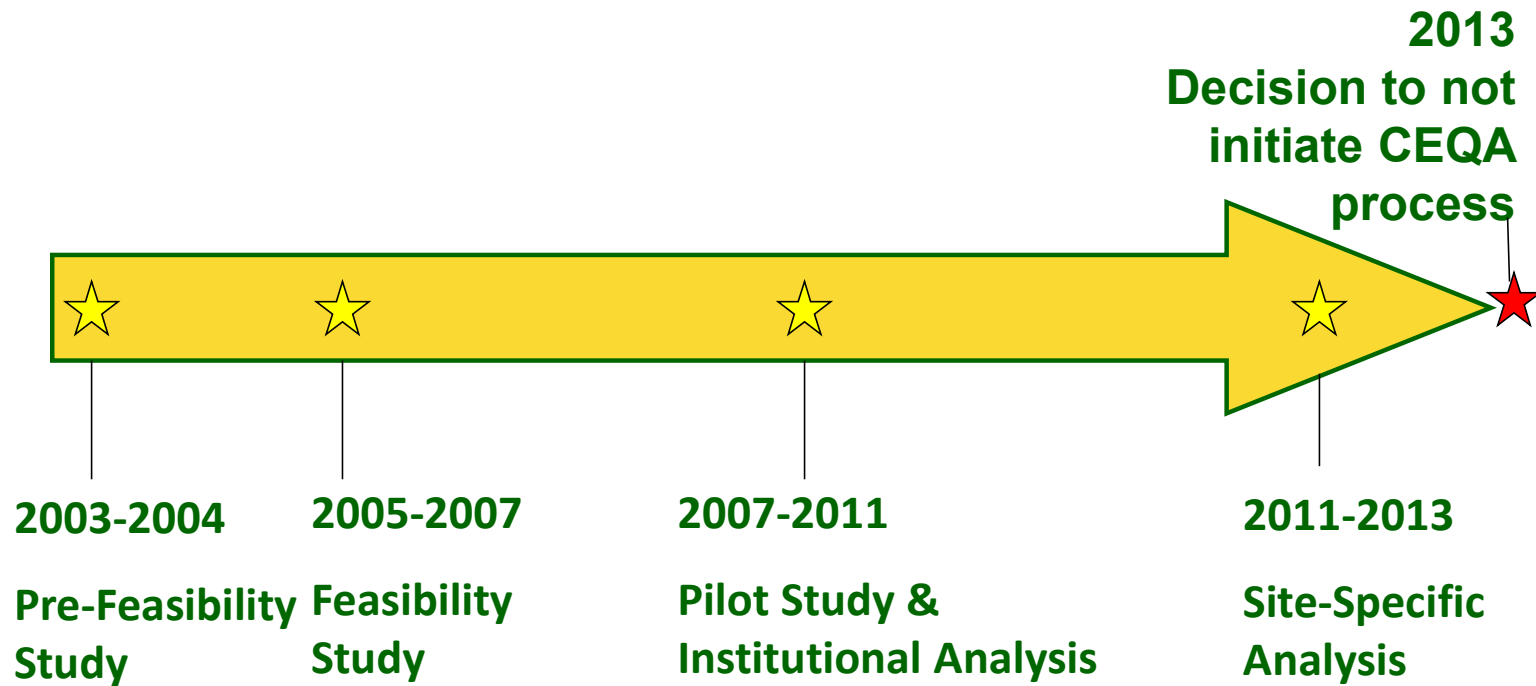
Desalination Technology & Options



Key Takeaway

- 1 Energy requirements and brine disposal are constraints in building desalination.
- 2 Technological progress is advancing desalination prospects.

Bay Area Regional Desalination Project



Site Selection (2007)

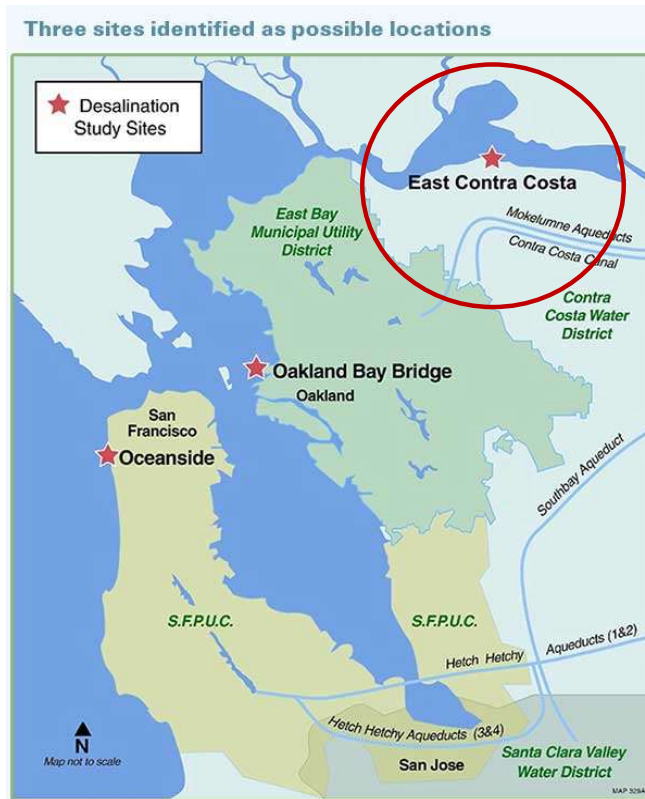


Sites evaluated in 2003 feasibility study



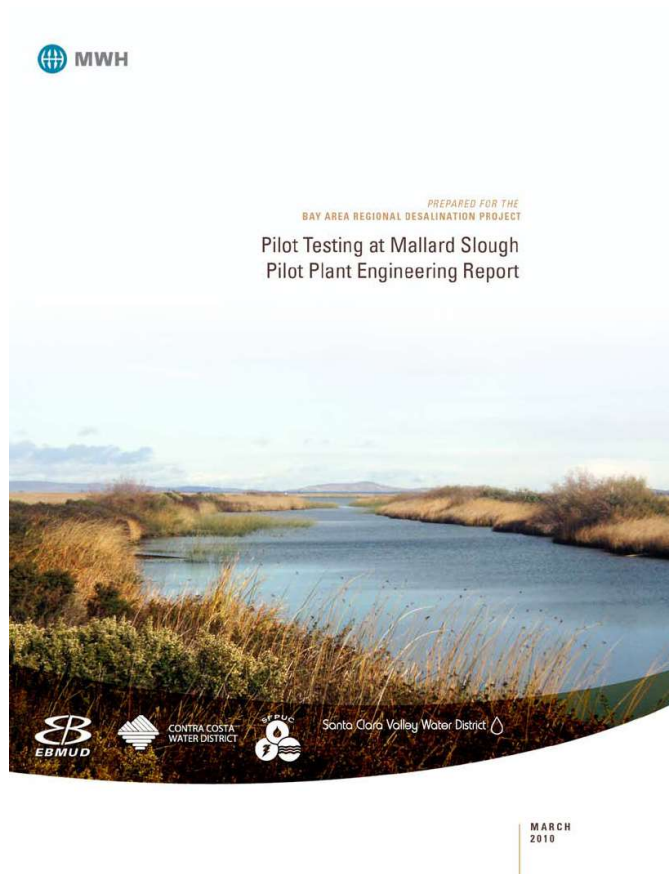
Narrowed down to 3 potential sites

Site Selection for Pilot Testing



- East Contra Costa selected
- *Benefits:*
 - Opportunity to add to body of research: testing of brackish water desalination
 - Permitted CCWD water intake (Mallard Slough Pump Station)
 - Existing facilities with state-of-the-art fish screen

Summary of Pilot Results

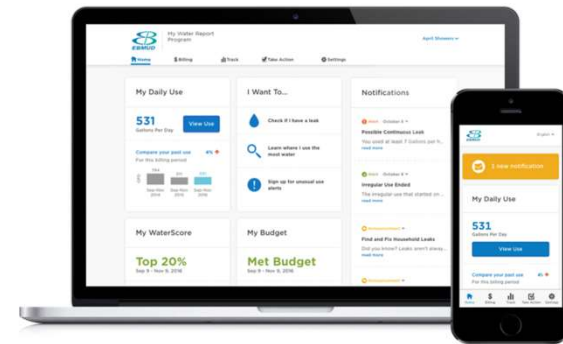


- Technically viable
- Significant variation in salinity range
 - (<1,000 - 12,000 mg/L TDS)
- 2-Stage RO had highest recovery
 - (> 80%)
- Wet-year operations possible impacts to fish species
 - (Longfin and Delta Smelt)
- Brine toxicity produced no effects on local species
- Estimated costs:
 - Production: \$900-\$1000/AF, 2012 dollars
 - Delivery: \$500-\$750/AF, 2012 dollars
 - Total \$1400-\$1750/AF, 2012 dollars

Let Us Help You Save Water!



- Sign up for EBMUD's web portal
 - Leak alerts
 - Check your water use
- Order a free Home Water Survey Kit
 - Send in survey for free water saving devices
- Visit our webinar for webinars, irrigation guides, and other resources
 - Ebmud.com/watersmart



Outreach and Education



You're taking shorter showers. Make sure your lawn does, too.

Every drop of water in California counts, especially during drought. This summer, save water by watering your garden three times per week max, and at dusk or dawn to avoid evaporation. For irrigation schedules, rebates, and other tips, visit ebmud.com/drought.

make
every drop
count



October 26, 2022

How Central San Can Help Meet the Region's Water Supply Needs

Future of Water Townhall

Melody LaBella

Resource Recovery Program Manager

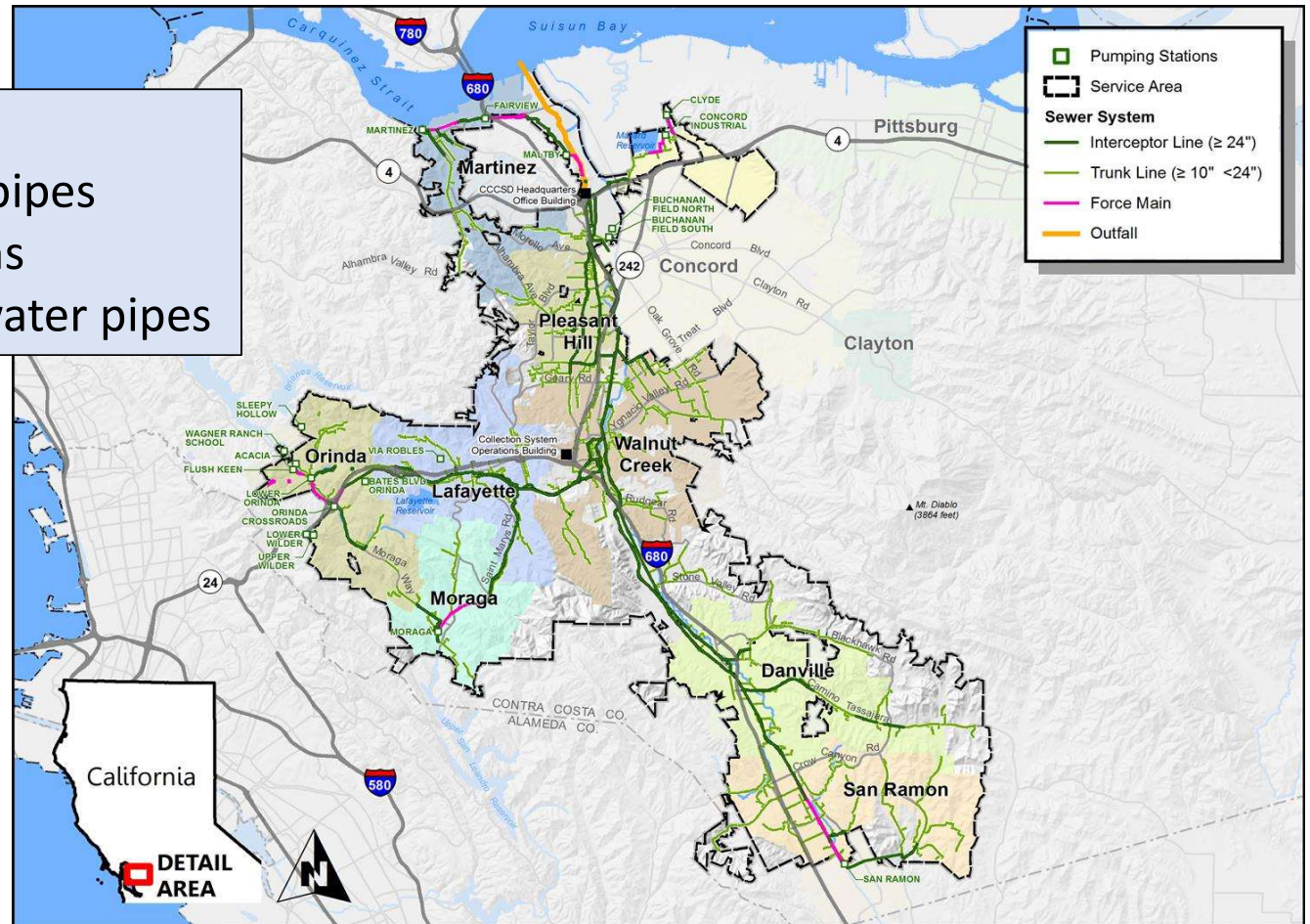
Roger S. Bailey

General Manager



Central San's Service Area

- 145 square miles
- 1,540 miles of sewer pipes
- 23 miles of force mains
- 15 miles of recycled water pipes



What We Do



- Wastewater collection & treatment for nearly 500,000 residents & 3,000+ businesses
- Produce 600 million gallons of recycled water/year; distribute ~250 million gallons/year

HHW Collection Facility



- Operate a Household Hazardous Waste Collection Facility for central Contra Costa County residents

History of Central San's Recycled Water Program and the Lamorinda Recycled Water Project



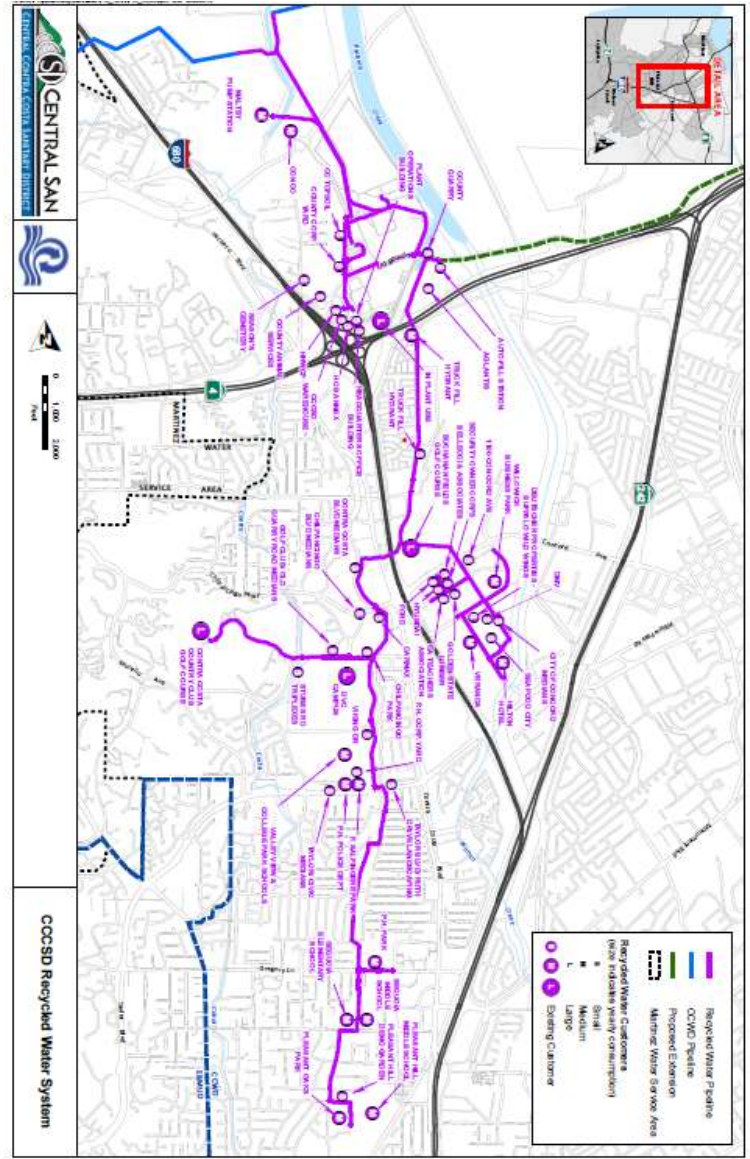
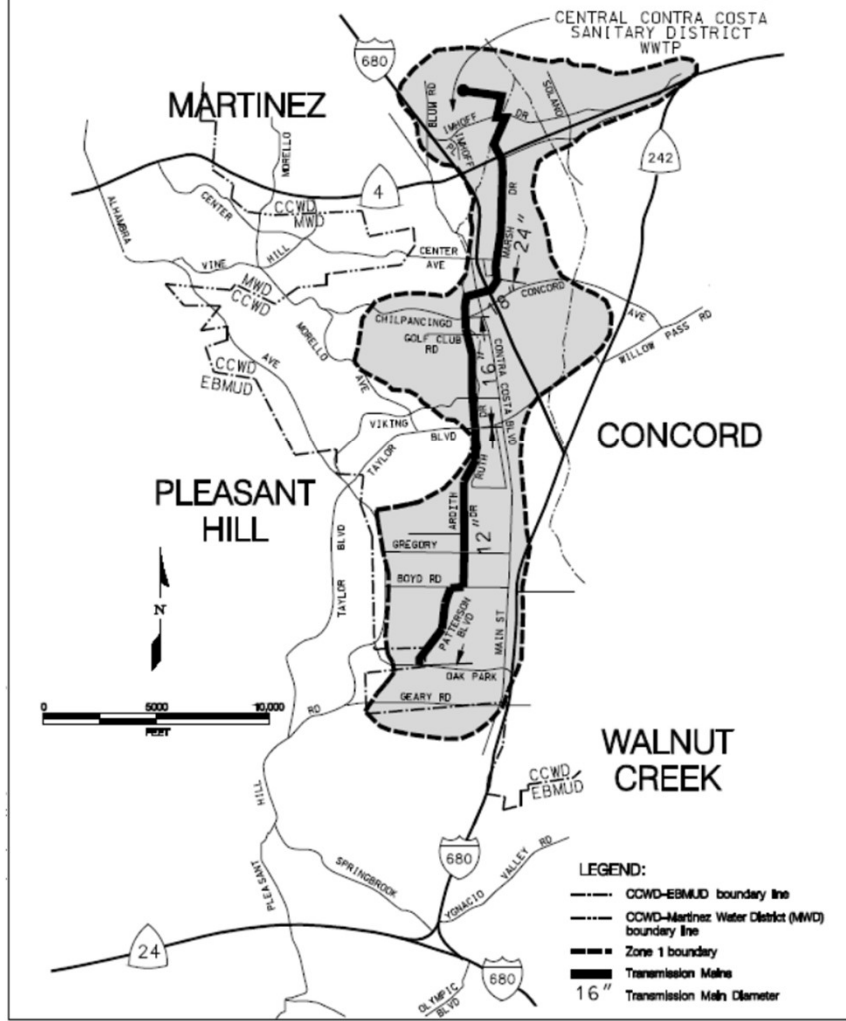
History of Recycled Water at Central San

- The Clean Water Act required wastewater treatment plants to upgrade to secondary treatment standards.
- The EPA provided 50% grant funding for these upgrades and 25% more if a water reuse component was included.
- As a result, Central San constructed recycled water facilities to serve the Martinez refineries in the late 1970s.
- The Refinery Project didn't come to fruition, so Central San had to find an alternative or repay the grant funding.
- Central San worked with EBMUD to attempt to develop a recycled water project to serve Rossmoor and Lamorinda.





ZONE 1 RECYCLED WATER PROJECT



CCCSD Recycled Water System

Central San's Zone 1 Recycled Water Program

- Central San's Wastewater Treatment Plant
- Two golf courses
- Several public schools
- Community College
- Parks
- Businesses
- Landscape medians
- Truck Fill Program
- Residential Fill Program



Re-evaluation of the Lamorinda Project

- Recycled Water Demands in/near Rossmoor and in Lamorinda
- Conceptual Alternatives for Delivering Recycled Water
 - Expanding Central San's recycled water delivery system reusing the abandoned Shell Fuel Product Pipeline (Alternative 1)
 - Expanding Central San's recycled water delivery system using the Shell Pipeline corridor (Alternative 2)
 - Using satellite treatment facilities to serve the golf courses at Rossmoor, Moraga Country Club and Orinda Country Club (Alternatives 3A/3B/3C)
 - Using a larger, regional satellite treatment facility at CSO to serve the Rossmoor and Lamorinda areas (Alternative 4)
- Estimated High-Level Capital Costs

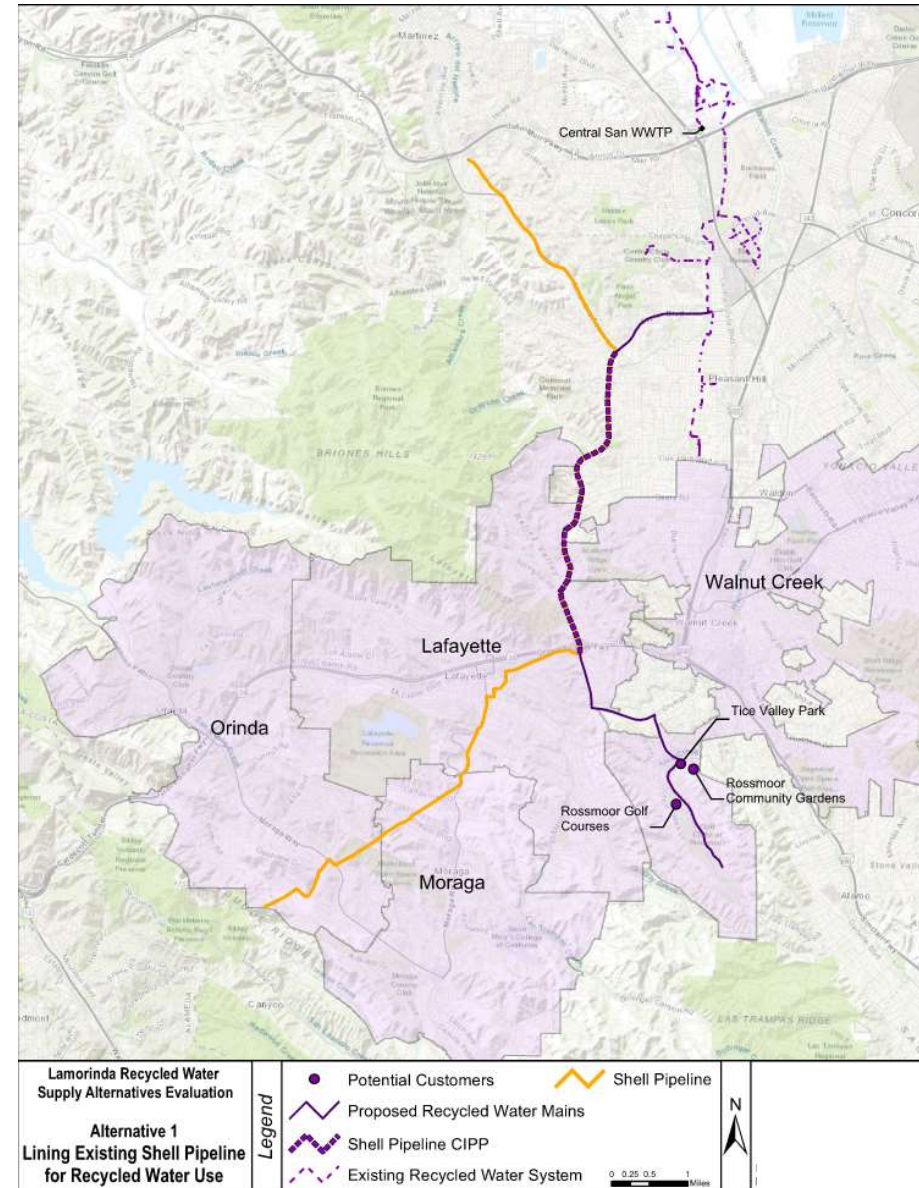
Key Assumptions and Context for Unit Costs

- These cost estimates generally include the infrastructure costs to deliver recycled water and the annual costs to pump the water and maintain the infrastructure.
- What is not included:
 - Cost of recycled water treatment upgrades at Central San
 - Unit cost for the treated recycled water
 - Cost of pipeline right-of-way, easements, or land acquisition
- For water market context - the unit cost for *retail* drinking water in our region exceeds \$2,000 per acre-foot (AF), with tiered pricing approaching \$3,000/AF. In other communities (especially served by San Francisco Public Utilities Commission), *wholesale* rates are projected to reach \$3,000/AF.

Alternative 1: Lining Shell Pipeline for Recycled Water Use

- ▶ 10-inch Shell Pipeline only has sufficient capacity for Walnut Creek demands
- ▶ Average Annual Demand: 0.24 MGD (Peak 1.5 MGD)

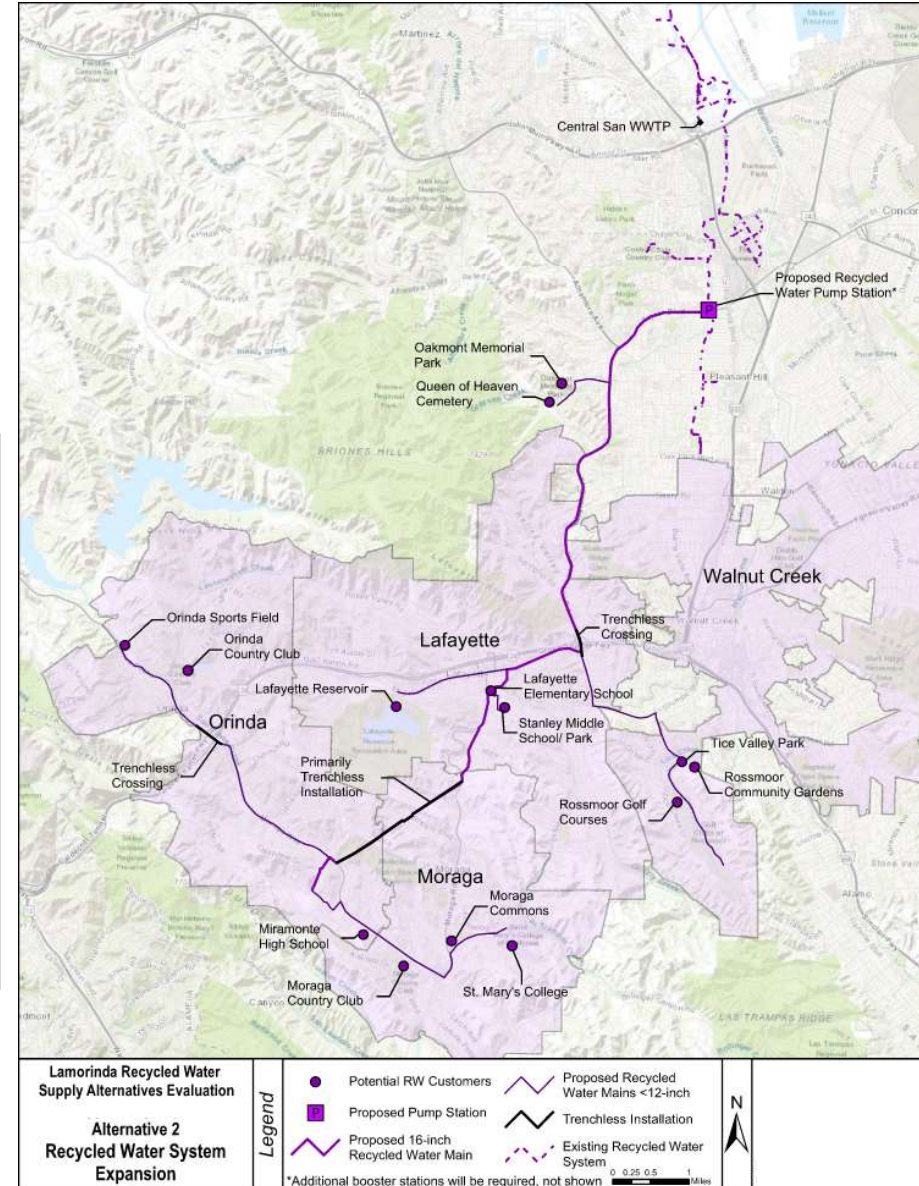
Capital Costs	
Distribution Capital Cost 52,000 LF; 10-inch Pipeline	\$26,500,000
Total Capital Cost	\$26,500,000
Annualized Project Cost (30 years, 3.5%)	\$1,441,000
Annual O&M Cost	\$294,000
Total Annualized Cost	\$1,735,000
Annual Yield (AFY)	272
per AF	~\$6,400



Alternative 2: Recycled Water System Expansion Along Shell Pipeline Corridor

Average Annual Demand: 0.77 MGD (Peak 4.6 mgd)

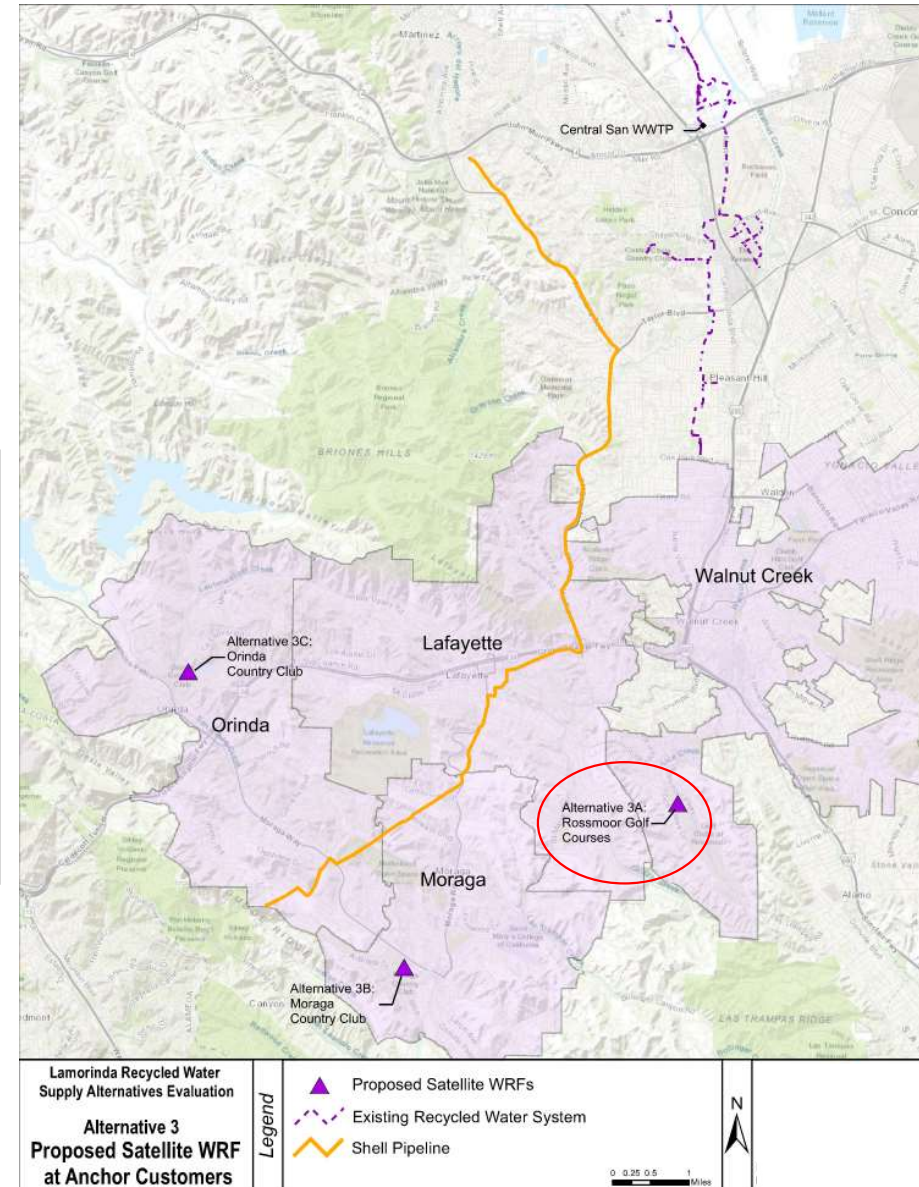
Capital Costs	
Distribution Capital Cost 44,500 LF; 16-inch Pipe 39,000 LF; 10-inch Pipe 26,000 LF; 8-inch Pipe 9,500 LF; 6-inch Pipe	\$167,100,000
Total Capital Cost	\$167,100,000
Annualized Project Cost (30 years, 3.5%)	\$9,081,000
Annual O&M Cost	\$1,391,000
Total Annualized Cost	\$10,472,000
Annual Yield (AFY)	861
per AF	~\$12,200



Alternative 3A: Rossmoor Golf Course Satellite Treatment Facility

Average Annual Demand: 0.23 MGD (Peak 1.4 mgd)

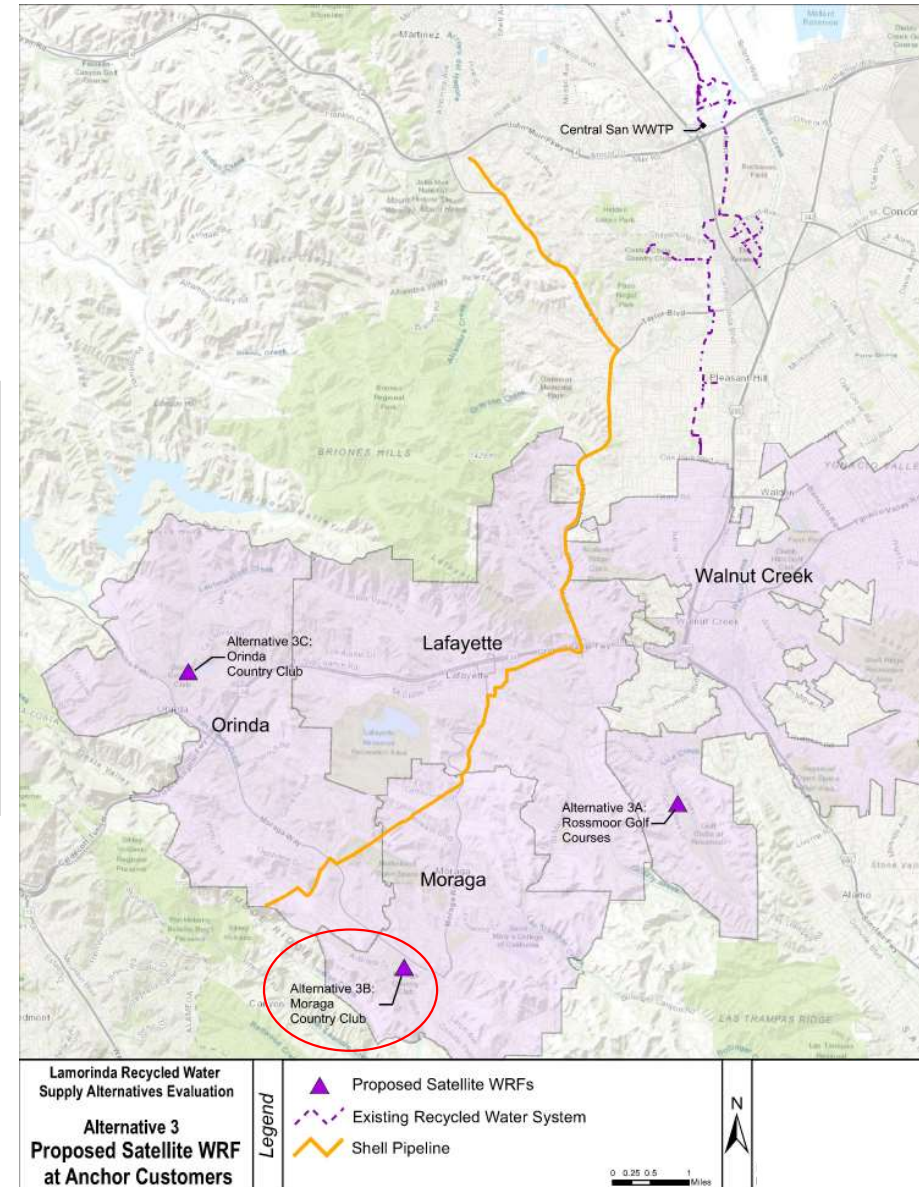
Capital Costs	
Treatment, Diversion & Disposal Capital Cost	\$21,100,000
Distribution Capital Cost	\$400,000
Total Capital Cost	\$21,500,000
Annualized Project Cost (30 years, 3.5%)	\$1,165,000
Annual O&M Cost	\$790,000
Total Annualized Cost	\$1,955,000
Annual Yield (AFY)	255
per AF	~\$7,700



Alternative 3B: Moraga Country Club Satellite Treatment Facility

Average Annual Demand: 0.16 MGD (Peak 0.9 mgd)

Capital Costs	
Treatment, Diversion & Disposal Capital Cost	\$15,700,000
Distribution Capital Cost	\$1,800,000
Total Capital Cost	\$17,500,000
Annualized Project Cost (30 years, 3.5%)	\$950,000
Annual O&M Cost	\$674,000
Total Annualized Cost	\$1,624,000
Annual Yield (AFY)	174
per AF	~\$9,300

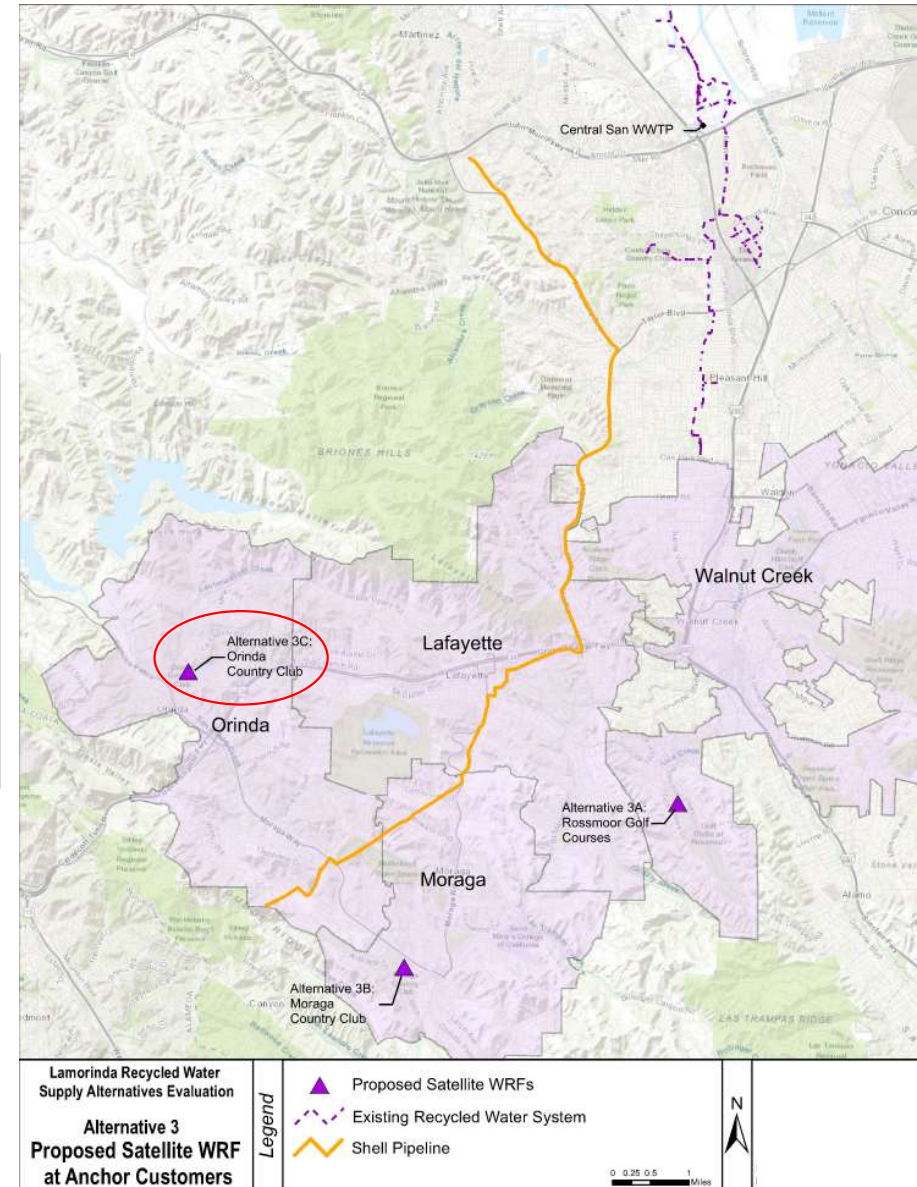


Alternative 3C: Orinda Country Club Satellite Treatment Facility

Average Annual Demand: 0.16 MGD (peak 0.9 mgd)

Capital Costs	
Treatment, Diversion & Disposal Capital Cost	\$15,700,000
Distribution Capital Cost	\$1,800,000
Total Capital Cost	\$17,500,000
Annualized Project Cost (30 years, 3.5%)	\$950,000
Annual O&M Cost	\$674,000
Total Annualized Cost	\$1,624,000
Annual Yield (AFY)	174
per AF	~\$9,300

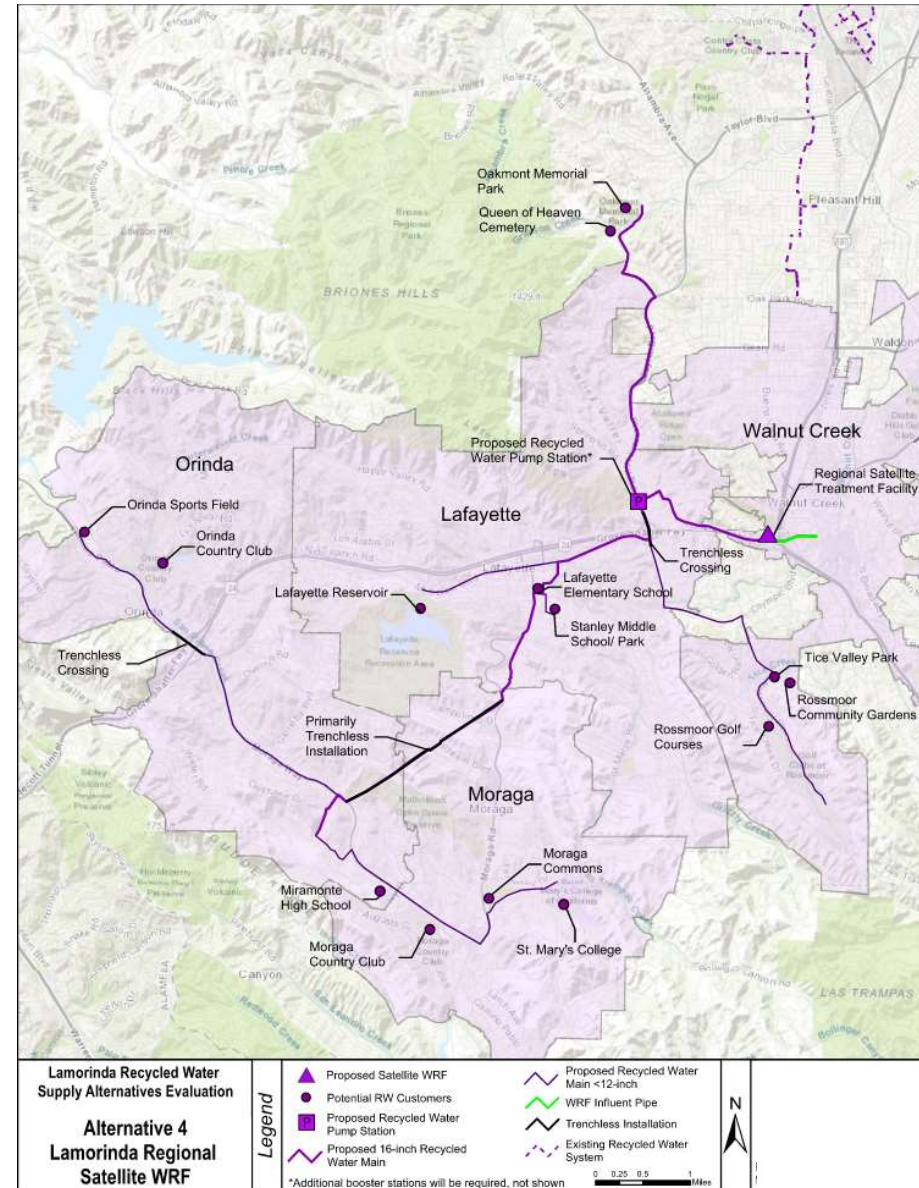
* Estimated demand and costs are extrapolated from Moraga Country Club.



Alternative 4: Lamorinda Regional Satellite Treatment Facility

Average Annual Demand: 0.77 MGD (Peak 4.6 mgd)

Capital Costs	
Treatment, Diversion & Disposal Capital Cost	\$57,000,000
Distribution Capital Cost	\$155,000,000
Total Capital Cost	\$212,000,000
Annualized Project Cost (30 years, 3.5%)	\$11,503,000
Annual O&M Cost	\$3,493,000
Total Annualized Cost	\$14,996,000
Annual Yield (AFY)	861
per AF	~\$17,400



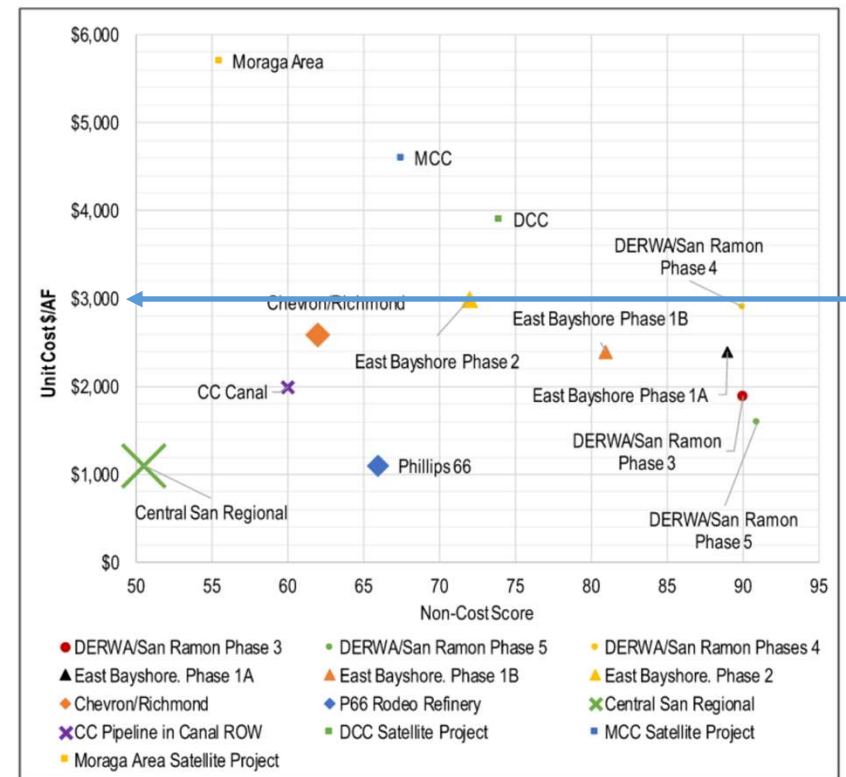
EBMUD 2019 Recycled Water Master Plan Projects

- ~\$3,000/AF unit price cutoff in 2019

 1. 4,300 AFY RARE & N. Richmond Expansion
 2. 4,100 AFY Phillips 66 Refinery
 3. 2,900 AFY East Bayshore Expansion
 4. 1,400 AFY DERWA/San Ramon Valley Ph. 3-5



Figure 5-1: Non-Potable Reuse Alternative Comparison



Note: For DERWA/San Ramon Valley Recycled Water Project Phases, unit costs shown are based on District's share for capital, average O&M and average energy costs.
 □ = Satellite RWTP, Δ = East Bayshore RWF, ○ = DERWA/San Ramon, ◇ = Refinery, x = CCCSD and CC Pipeline in Canal ROW.

Source: EBMUD Updated Recycled Water Master Plan, 2019

Evaluation Conclusions

- The cost of serving recycled water to Rossmoor and Lamorinda continues to be prohibitive without significant external funding.
- Since they are self-funded, satellite water recycling facilities remain a potentially viable way to serve recycled water to the golf courses in Rossmoor, Moraga and Orinda.
- Reservoir augmentation/potable reuse is a more cost-effective way to leverage Central San's treated wastewater in EBMUD's service area.

Next Steps

- A Memorandum of Understanding (MOU) with Rossmoor, EBMUD, Central San and the City of Walnut Creek is under development for future consideration.
- An MOU between Central San and EBMUD to evaluate recycled water opportunities, including non-potable (landscape irrigation) and potable reuse options, has recently been approved by each agency's Board.

Using Recycled Water to Augment the Region's Water Supply



Water Challenges are Water Opportunities

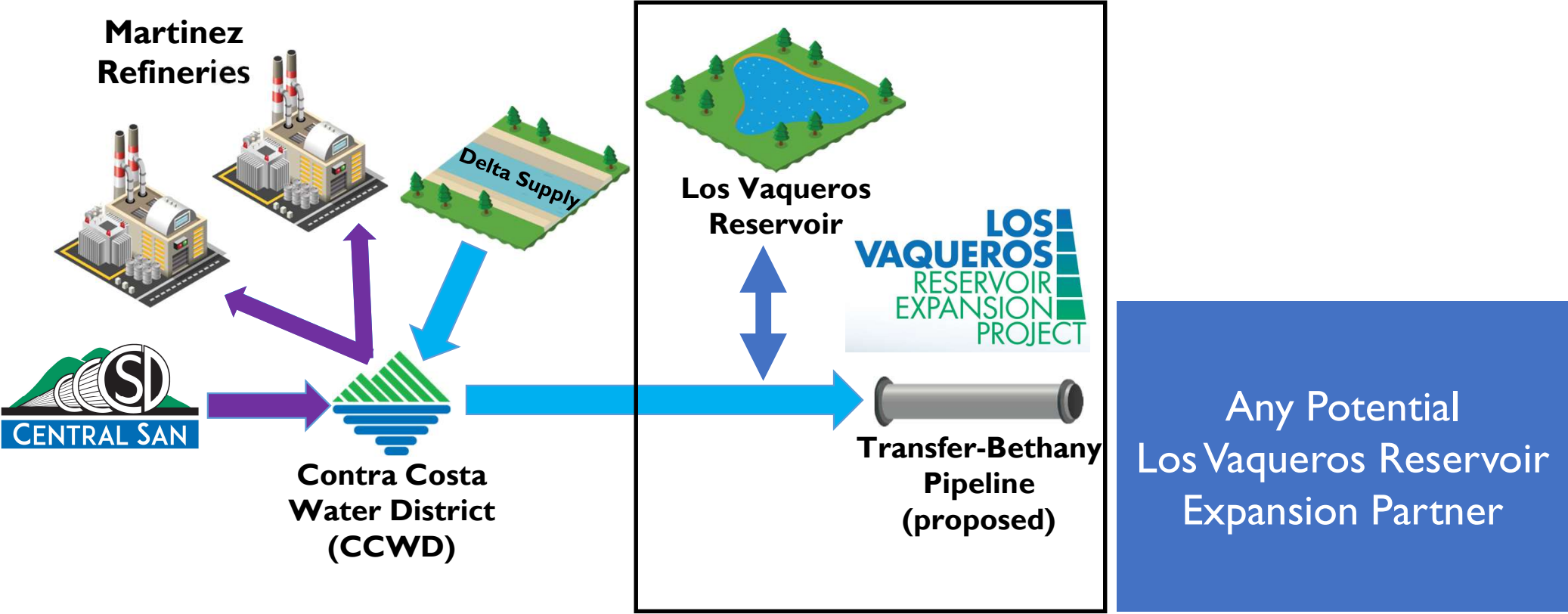
Future SF Bay Nutrient Discharge Regulations



Frequent Droughts/Water Supply Shortages



Refinery Recycled Water Exchange Project Concept



Innovative Recycled Water Concepts

- Incentivize regional solutions
- Incentivize big recycled water projects that have year-round demand/usage
 - Refinery Exchange
 - Reservoir Augmentation/Potable Reuse
- Recycled Water Project Credits
 - Allow water regulators to give credits to water agencies who implement recycled water projects to assist other areas with a water supply deficit



Questions?

