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**To:** "To: Barbara Keegan"; "Richard Santos"; "Jim Beall"; "Nai Hsueh"; Vincent Gin; "Ryan McCarter"; "Kristen Struve"  
**Cc:** "Clerk of the Board"; "Board of Directors"; "John Varela"; "Tony Estremera"; "Barbara Keegan"; "Richard Santos"; "Jim Beall"; "Nai Hsueh"; "Rebecca Eisenberg"; "Rachael Gibson"; "Matt Keller"; "Mike Potter"; "Aaron Baker"; Vincent Gin; "Lorraine Gabbert"; "Paul Rogers"; "B.Sakura Cannestra"; "Ramona Giwargis"; "Joseph Geha"; California Water Commission; Swanson, Matthew@CWC; Steiner, Fern@CWC; Bland, Tyrone (Ty)@CWC; Curtin, Daniel@CWC; Gallagher, Kimberly@CWC; Makler, Alexandre(Alex)@CWC; Matsumoto, Sandra(Sandi)@CWC; Moulene, Katherine@CWC; Solorio, Jose@CWC; Yun, Joseph@DWR; "Sylvia Arenas"; "D2 Supervisor Chavez"; "SCC D3 Supervisor Lee"; "D4 Supervisor Sussan Ellenberg"; "Joe Simitian"; "Matt Mahan"; "Rosemary Kamei"; "Sergio Jimenez"; "Omar Torres"; "David Cohen"; "Peter Ortez"; "Devora "Dev" Davis"; "Bien Doan"; "Domingo Candelas"; "Pam Foley"; "Arjun Batra"  
**Subject:** Water Supply & Demand Management Committee Meeting – Pacheco Reservoir Expansion Project Update - "Comment"  
**Date:** Tuesday, May 14, 2024 7:00:42 AM  
**Attachments:** PREPEcoOptnsAnalysis PDF 5-14-24.pdf

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**To:** Director Richard Santos, Director Barbra Keegan and Director Nai Hsueh  
**Email Date:** Tuesday, May 14, 2024  
**From:** Jim Kuhl  
**Meeting Date:** Friday, May 17, 2024  
**Subject:** Water Supply & Demand Management Committee Meeting – Pacheco Reservoir Expansion Project Update  
**“Comment”**  
**Topic:** Pacheco Reservoir Expansion Project (PERP) versus Recycling Wastewater to Direct Potable Water Project Economic Comparison

### “Comment Summary”

World-famous Orange County’s Water District’s wastewater to potable water recycling plant and San Diego’s Carlsbad Desalination Plant infrastructure investment and operating cost data have been employed as benchmark references. The economic analysis on Table A, in the “Comment Supporting Information with References, has determined that **the amortized operating cost converting wastewater to potable water would be 30% less than the projected estimated amortized operating cost of water stored in the Pacheco Reservoir Expansion Project (PERP).** Three north county wastewater treatment plants are currently processing 179,000AF/Y treated wastewater annually that could be recycled into potable water to cumulatively exceed the average Delta imported water requirement of 133,000AF/Y with 100% confidence as identified in the 2040 Water Supply Master Plan. **With more severe droughts caused by climate change, the strategic advantage of using wastewater recycling aggressively in water supply planning is enormous. Aggressive recycling wastewater would be a more cost-effective alternative to PREP and would provide a solution regarding future water supply resilience issues associated with drought susceptible Delta imported water allocations.** PREP could be terminated and a portion of its planned funding employed to expand the planned wastewater to potable water recycling from the current planned 33,000AF/Y up to 152,000AF/Y by 2035 plus make water more affordable.

The following actions need to be pursued by Valley Water (VW) Staff in developing the 2050 Water Supply Master Plan:

1. Before more funding and time are committed to PREP, conduct a rigorous scoping comparison analysis between: (i) VW’s PREP’s proposed 140,000AF storage capacity, (ii) increasing VW’s wastewater to potable water planned project capacity goal to 133,000AF/Y by 2035 and (iii) Orange County’s Wastewater Recycling Plant to potable water with 145,000AF/Y conversion capacity as a world class performance benchmark. In the report, provide economic comparisons of investment requirements and operational costs coupled with alternative project strategic pros and cons. Publish the results for critical review.
2. If step 1’s comparison analysis verifies the conversion of wastewater into potable water is more economic and strategically superior to PREP, in the development of the 2050 Water Supply Master Plan, eliminate Delta allocation water supply drought concerns using wastewater recycling to achieve sustainable water supply resiliency.

### ===== “Comment” Supporting Information with References =====

Pacheco Reservoir Expansion Project (PREP) is a very expensive \$2.7B Valley Water (VW) infrastructure project intended to improve water supply resiliency given longer deeper droughts due to climate change. **PREP is the prime planned infrastructure cost driver for a projected 12 X<sup>0</sup> increase between FY23 and FY34 for M&I groundwater ‘North County Valley Zone W2’ wholesale water rates.** Retail water utilities meter rates serving 1.6M northern Santa Clara County residents will reflect those cost increases. This PREP driven projected wholesale water price increase projection results in **significant long-term water affordability concerns** for consumers and **the need to examine PREP alternative water supply reliability solutions.**

**Table A, on page 2, assesses whether there are potential economic superior project alternatives to PREP and identifies relevant water supply planning strategic considerations.** No VW comparable study to Table A has been performed and published by VW. **Developing the 2050 Water Supply Master Plan should contain a Table A type economic evaluation of wastewater to direct potable water alternative as a prerequisite prior to seeking PREP additional funding.**

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**Table A: Pacheco Reservoir Expansion Alternative Projects Economic Comparisons**

Economic Parameter	Pacheco Reservoir Expansion	Creating Potable Water Options Providing Supply Resiliency			
		Wastewater Conversion	Brackish Water desalination	Seawater Desalination	
	Valley Water	Orange County	Oceanside	Carlsbad	
	Imports water from Delta	Groundwater Replacement Program	Two Phase Project Φ1 Underway	Desalination Plant	
Conversion to Potable Water Process	Fresh Runoff Water	Reverse Osmosis	Reverse Osmosis	Reverse Osmosis	
<b>Imported Water Cost from SWP &amp; CVP</b>					
Delta - Average	\$301/AF	1			
Delta - 1987-92 Drought Average	\$453/AF				
<b>Delta Imported Water Average</b>					
	133,000AF/Y	2	0	0	0
<b>Project Investment</b>					
Original Bonds and/or Loans	\$2.7B	\$487M	insufficient info	\$1B	10
Date Issued	Future	2008		2015	
Adjusted to 2023 Economics	\$2.7B	\$700M	6	\$1.43B	11
Bond payback plus interest	\$4.1B	\$1B		\$2.17B	12
Bond Payments	\$137M/Y	\$35.5M/Y		\$72.5M/Y	13
<b>Water Storage Capacity</b>					
	140,000AF	4	0	0	0
<b>Plant Design Water Production Capacity</b>					
		145,000 AF/Y	Varies	56,000 AF/Y	
<b>North Valley Wastewater Portable Water Capacity</b>					
		152,000AF/Y	7		

### Operational Cost

Cost without Loan Amortization	\$301/AF	5	\$750/AF	8	\$1,336/AF	9	\$1,629/AF	14
<b>Cost with 30-year Loan Amortization</b>	<b>\$1,330/AF</b>	5	<b>\$1,036/AF</b>	8	Estimate		<b>\$2,923/AF</b>	
Cost over Asset Life Amortization	\$610/AF	5	\$922/AF				\$2,405/AF	
Estimated Asset Life	100 years		50 years				50 years	

### Table A Conclusions

- Orange County's wastewater conversion to potable water amortized operational cost is **\$1,036/AF**, 30% less than the projected Pacheco Reservoir amortized operational cost of **\$1,330/AF**.
- At Santa Clara County's 3 northern wastewater treatment plants, sufficient wastewater is now processed that would yield up to 152,000AF/Y of potable water. This potential potable water yield amount exceeds the planned average Delta imported water requirements of 133,000AF/Y.
- Urban Water Conservation by recycling wastewater can cost-effectively eliminate all future water supply resiliency concerns regarding Delta imported water constraints caused by droughts, given climate change.

### Table A: Informational Notes and References

2040 Water Supply Master Plan's water supply strategy states: Employ excess imported water from wet years and store it in ground water banks and reservoirs for dry years. This simplistic strategy curtailed and diminished examination of alternatives to increase water supply. Wastewater recovery to potable water nor brackish San Francisco Baywater wasn't pursued by VW as a significant potential solution to water supply resiliency.

Information shown on Table A is derived from internet research using Water District website material and other creditable sources. However, the publicized website operating costs needs to be reverified and made current by VW Staff by contacting the sources.

- ◊ 12X is a simple year to year mathematical calculation of VW's total % projected ground water wholesale growth from FY23 to FY34. Reference: "Staff Report" Exhibit 3 titled 5-Year Water Charge and Financial Indicator Projection North County (W-2 M&I GWP charge (\$/AF) Y-Y Growth %. See link: [VWGrdWaterZoneW2-2024-25Charge 4-8-24.pdf](#)
- 1. Delta water is acquired from SWP and CWP under a \$40M/Y contract that can provide a maximum allocation of 252,000AF/Y. **Underestimated \$301/AF** is equal to \$40M/Y divided by the average of 133,000AF/Y Delta imported water but excludes needed additional 'allocated' costs. Cost 'allocation' is the accounting practice of adding to direct water acquisition contract cost an appropriate fair assignment of local Santa Clara County area infrastructure import/export pipes & pumps investments' amortization, pumping energy cost and relevant infrastructure repair & maintenance cost that enables Pacheco Reservoir's expanded operation. The goal is to spread costs fairly to measure financial performance and improve decision making. **The understated \$301/AF PREP water contract acquisition operating cost was used in the economic comparison analysis on Table A.** On 4/26/24, VW was requested to provide Delta fully 'allocated' water cost into and out of PREP.
- 2. In the 2040 Water Supply Master Plan, VW receives an average of 133,000AF/Y of Delta water. 2006 was the last year VW received their full Delta water desired allocation of 252,500AF/Y. **Given an extended (e.g., 8 years) severe drought cause by climate change, the amount of SWP+CVP delta water would receive per year is highly speculative and likely insufficient.**
- 3. The total bond + loan investment, including interest, for PREP keeps growing. **Significant risk exists that the investment requirement for PREP will surge when underground problems are encountered after breaking ground.** As an example, Anderson Reservoir's seismic repair costs increased 58%, from \$1.2B to \$1.9B, once construction began and problems surfaced.
- 4. Large Northern California reservoir water storage and groundwater (aquifers) banked stored water for future use are the most essential elements in VW's water supply strategy. In the 5-year 1987 to 1992 'Design Drought' period (i.e., reference 2040 Water Supply Master Plan page 14) analysis, the stored water diminishes to zero. PREP's capacity expansion from 6KAF to 140KAF was identified as a major required project, among others, to solve that deficient water supply problem. However, 45% of PREP's stored water, is allocated to uncommitted but planned Pacheco Pass Water District and San Benito County Water District Pacheco Reservoir partners. The year-to-year transfer amount from PERP is small (i.e., 24,000AF), as verbally expressed by VW Staff in recent Board meetings. PERP's expanded storage year to year transfer capacity benefit seems highly questionable in extended (i.e., beyond 5-years) drought periods, diminishing PREP's strategic value. PREP's investment cost of \$29,000/AF for expanded capacity is just too high, at ≈5.7X to 2.5X, compared to the capacity expansion cost of Los Vaqueros cost at \$5,100/AF and San Luis Reservoir's at \$11,800/AF. PERP's basin terrane characteristics appear to be much less favorable for expansion.
  - Expanding 5,000 AF Pacheco Reservoir by 135,000 AF [to total capacity 140K AF] for \$2.7B (Payment total of ≈\$4.1B total with 3% interest) yields \$29,500/AF for additional stored water capacity.
  - Expanding 160,00 AF Los Vaqueros Reservoir by 275,000 AF [to total capacity 435K AF] for \$1.25B (Payment total of ≈\$1.4B with 3% interest) yields ≈\$5,100/AF for additional stored water capacity.
  - Expanding 2,000,000 AF San Luis Reservoir (B.F. Sisk Dam Raise) by 130,000 AF [to total capacity 2.13 MAF] for \$1B (Payment total of ≈\$1.5B with 3% interest) yields ≈\$11,800/AF for additional stored water capacity.
- 5. **To make an accurate comparison, the additional cost to convert Delta fresh water to drinking water should be**

**added as the alternative reverse osmosis process provides directly potable drinking water.** Information hasn't been received, as yet, on a 5/8/24 VW Staff request for the operational cost with needed 'allocation' costs to convert imported non turbid Delta water to drinking water

6. Wastewater recycling plant infrastructure cost will vary due to import/export piping pumping requirements and whether the treatment is in one centralized facility or dispersed. The north Santa Clara County wastewater treatment operations under consideration are San Jose Santa Clara Regional Wastewater Facility (123KAF/Y), Palo Alto Regional Water Quality Plant (22.4 AF/Y) and Donald Somers Water Pollution Control Plant (33K AF/Y).
7. The 3 north county wastewater treatment plants are currently processing ≈179,000AF/Y of wastewater. VW 2040 Water Supply Master Plan calls for only 33,000AF/Y<sup>Δ</sup> (22%) potable water conversion versus north county's ≈152,000AF/Y potential. California Water Resources Board now deems it safe<sup>Ⓢ</sup> for humans to directly drink potable water recovered from waste water. The brine to dispose of is unchanged by water reverse osmosis conversion directly to potable water but must be diluted to comply with California's Clean Water Act. **Obtaining acceptable business agreements between Valley Water and the municipally owned wastewater treatment plant operators to achieve cost-effective operations remains an obstacle. VW should consider purchasing the sewerage treatment plants from the municipalities and fairly charge for their operating costs. Bay Area and statewide political leadership is needed to overcome the obstacles.**

**Wastewater recycling directly to potable water is a great example of *urban water conservation* that can benefit Santa Clara County residents by assuring the water supply.**

<sup>Δ</sup> See 2040 Water Supply Master Plan page 9 section 2.1 Baseline Water Supplies Systems 4<sup>th</sup> bullet down on link: [https://www.valleywater.org/sites/default/files/Water%20Supply%20Master%20Plan%202040\\_11.01.2019\\_v2.pdf](https://www.valleywater.org/sites/default/files/Water%20Supply%20Master%20Plan%202040_11.01.2019_v2.pdf)

<sup>Ⓢ</sup> See link: <https://www.epa.gov/waterreuse/summary-californias-water-reuse-guideline-or-regulation-potable-water-reuse>

8. See Project Benefits, second to last bullet in the document text link: [About GWRS - Orange County Water District \(ocwd.com\)](#)
9. The main cost difference between seawater and brackish water conversion to potable water is energy cost. The less salt content the less energy required.
10. 30-year payback period.
11. Adjusted for inflation.
12. 30-year loan at ≈3% interest. Multiple CA bonds, grants, FWFIA loans, etc. are obtained from federal and state agencies that have different interest rates (e.g., range 1% to 4.04%). An average of 3% was selected as most representative.
13. 30 payments once per year.
14. In link [www.carlsdaddesal.com](http://www.carlsdaddesal.com); See video titled: "Desalinated water costs half a penny per gallon." Convert \$/G to \$/AF.

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If you have any questions or concerns regarding this "Comment" or the "Comment's" Supporting Information with References, please contact the author (email: [jim.kuhl@comcast.net](mailto:jim.kuhl@comcast.net)).

**Best regards,**

*Jim Kuhl*

**Jim Kuhl**, Civic issue activist and Environmental Advocate

# Pacheco Reservoir Expansion Project (PREP) Alternative Infrastructure Projects Economic Comparison

To: Director Richard Santos, Director Barbra Keegan and Director Nai Hsueh

Email Date: Tuesday, May 14, 2024

From: Jim Kuhl

Meeting Date: Friday, May 17, 2024

Subject: Water Supply & Demand Management Committee Meeting – Pacheco Reservoir Expansion Project Update  
“Comment”

Topic: Pacheco Reservoir Expansion Project (PERP) versus Recycling Wastewater to Direct Potable Water Project  
Economic Comparison

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The following actions need to be pursued by Valley Water (VW) Staff in developing the 2050 Water Supply Master Plan:

1. Before more funding and time are committed to PREP, conduct a rigorous scoping comparison analysis between: (i) VW’s PREP’s proposed 140,000AF storage capacity, (ii) increasing VW’s wastewater to potable water planned project capacity goal to 133,000AF/Y by 2035 and (iii) Orange County’s Wastewater Recycling Plant to potable water with 145,000AF/Y conversion capacity as a world class performance benchmark. In the report, provide economic comparisons of investment requirements and operational costs coupled with alternative project strategic pros and cons. Publish the results for critical review.
2. If step 1’s comparison analysis verifies the conversion of wastewater into potable water is more economic and strategically superior to PREP, in the development of the 2050 Water Supply Master Plan, eliminate Delta allocation water supply drought concerns using wastewater recycling to achieve sustainable water supply resiliency.

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# PREP Alternative Infrastructure Projects Economic Comparisons

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	Imports water from Delta	Groundwater Replacement Program	Two Phase Project Φ1 Underway	Desalination Plant	
Conversion to Potable Water Process	Fresh Runoff Water	Reverse Osmosis	Reverse Osmosis	Reverse Osmosis	
<b>Imported Water Cost from SWP &amp; CVP</b>					
Delta - Average	\$301/AF	1			
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<b>Project Investment</b>					
Original Bonds and/or Loans	\$2.7B		\$487M	insufficient info	\$1B
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<b>Water Storage Capacity</b>	140,000AF	4	0	0	0
Plant Design Water Production Capacity			145,000 AF/Y	Varies	56,000 AF/Y
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<b>Operational Cost</b>					
Cost without Loan Amortization	\$301/AF	5	\$750/AF	8	\$1,336/AF
<b>Cost with 30-year Loan Amortization</b>	<b>\$1,330/AF</b>	5	<b>\$1,036/AF</b>	8	Estimate
Cost over Asset Life Amortization	\$610/AF	5	\$922/AF		\$2,405/AF
Estimated Asset Life	100 years		50 years		50 years

**Table A Conclusions**

- Orange County’s wastewater conversion to potable water amortized operational cost is **\$1,036/AF**, 30% less than the projected Pacheco Reservoir amortized operational cost of **\$1,330/AF**.
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# PREP Alternative Infrastructure Projects Economic Comparisons

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## PREP Alternative Infrastructure Projects Economic Comparisons

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**Jim Kuhl**, Civic issue activist and Environmental Advocate