Executive Summary

Introduction

Raftelis Financial Consultants, Inc. and Hazen and Sawyer (the "project team") were engaged by Santa Clara Valley Water District (Valley Water) to conduct an integrated study comprising three interrelated tasks: 1) review and refinement of water use projections for rate setting, 2) estimation of water demand price elasticity, and 3) assessment of customer affordability of water rates in Santa Clara County. Valley Water provides wholesale water and groundwater management services to local municipalities and private water retailers who deliver drinking water directly to approximately two million residents across Santa Clara County. This executive summary synthesizes the findings from all three tasks and highlights the critical linkages among them.

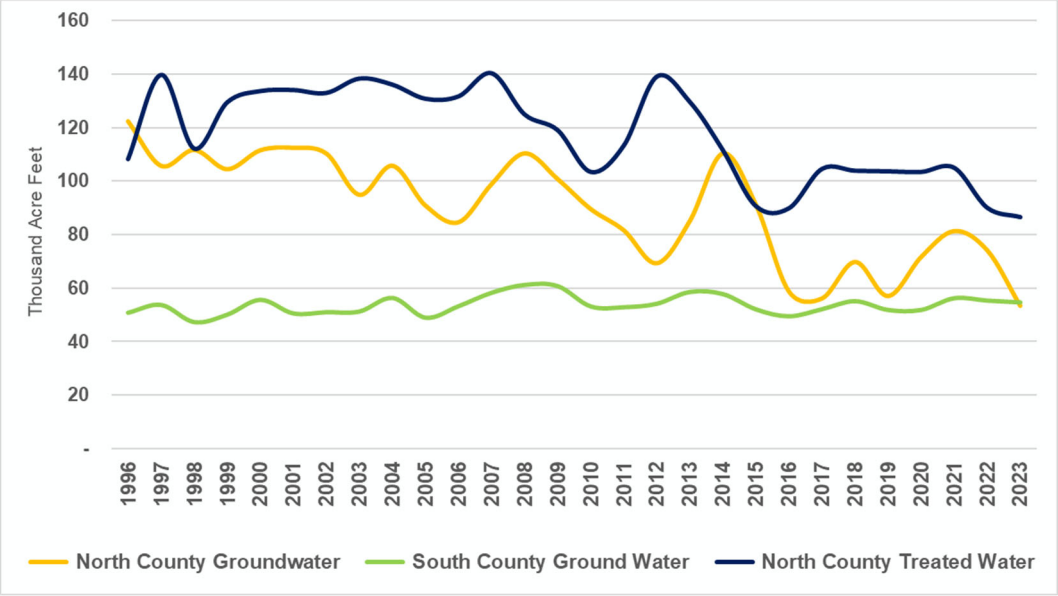
Task 1: Water Use Projections for Rate Setting

Task 1 evaluated Valley Water's methodology for projecting near-term water demand used in annual rate setting. The project team reviewed the District's existing approach, which relies on a three-part framework:

- Historical demand data weighted toward the prior year for the upcoming fiscal year (Year 1);
- Institutional knowledge and professional judgment for interim years (Years 2–3); and
- Growth rates from the 2010 Urban Water Management Plan (UWMP) for the longer term (Year 4 and beyond).

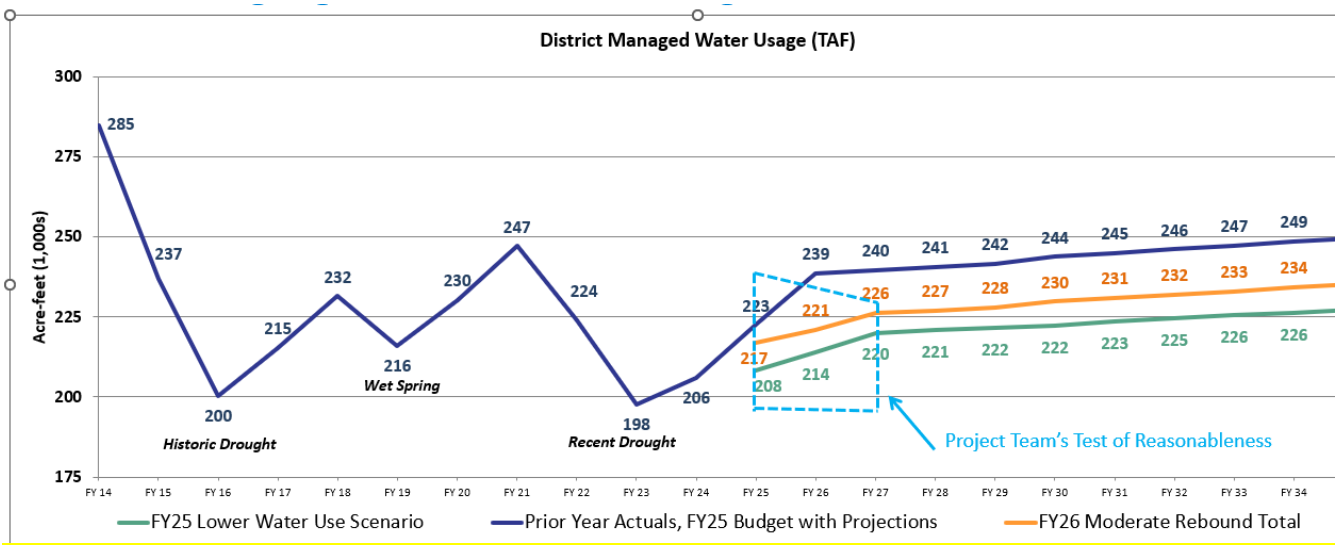
The analysis found that Valley Water's existing approach is largely consistent with practices at peer wholesale agencies and has produced modest forecast variances—averaging 1.41% over the 2012–2024 period—that have narrowed over time. Long-term trends show declining Treated Water and North County Groundwater demands since 1996, while South County Groundwater has remained relatively stable.

ES-1: Water Demand Trends



The project team applied regression and time series methods to generate a range of alternative demand projections with which to compare against Valley Water staff's approach. As shown in Exhibit ES- 2, Valley Water's baseline projection and higher and lower end ranges for FY 2025 fall between the ranges estimated by the project team (ES-3). However, the statistical approaches project declining demand in future years compared to Valley Water's projections which increase over time due to growth assumptions. Valley Water's demand projections could be enhanced by updating their methodology using growth demand forecasts from the most recent UWMP and by weighting demand projections for lower and moderate scenarios more to reflect the overall elasticity results from Task 2.

ES-2: Valley Water District Managed Water Use Demand Projection Ranges Compared to Project Team's Range of Projections



ES-3: Valley Water District Managed Water Use Demand Projection Ranges – Comparison of Alternative Methods

FY 2025 Ranges	Valley Water Method	Time Series Method	Regression Method	*Average of Methods*
Low Range	**208**	**187**	**221**	***205***
Medium Range	**217**	**198**	**230**	***215***
High Range	**223**	**204**	**234**	***220***

Task 2: Water Demand Price Elasticity

Task 2 estimated the relationship between water prices and water consumption in the Valley Water service area. The analysis used available data which included historical billed water use data from 10 retailers served by Valley Water, over the period from January 2000 to December 2024, which included Valley Water supplies delivered to retailers and classified by source as well as non-Valley Water supplies delivered to retailers. Historical water rate data, including Valley Water wholesale rates, San Francisco Public Utilities Commission (SFPUC) wholesale rates, and individual retailer rates, as well as relevant demographic, economic, public health, and weather data, were also collected.

The study conducted exploratory data analyses involving several different model configurations to estimate price elasticity for water demand from the available data. These configurations experimented with different aggregations of volumes by source, as well as different measures of price, or price instruments. Ultimately, the study applied three general estimation methodologies relating total per capita water use (both Valley Water- and non-Valley Water-sourced) by retailer using a price instrument defined as the incremental residential charge for the 15th water consumption unit.

Three econometric methods—Ordinary Least Squares (OLS), Error Correction Models (ECM), and Cointegrating Regression—produced consistent system-wide price elasticity estimates ranging from -0.18 to -0.21. These results confirm that water demand in Santa Clara County is inelastic with respect to price: a 10% increase in price would be expected to reduce retail demand by only about 2%. This finding aligns with prior Valley Water studies and the broader academic literature. The ECM analysis further indicates that consumer adjustment to price changes occurs relatively rapidly, within approximately two months.

A significant supplementary finding is that approximately 83% of the annual variation in volumetric retail prices assessed by the retailers is explained by variation in Valley Water's wholesale rates, and statistical tests confirm that wholesale price changes lead to volumetric retail price changes. This wholesale-to-retail volumetric price pass-through establishes a direct pathway through which Valley Water's rate decisions influence end-user costs and, consequently, water demand and affordability outcomes.

Task 3: Customer Affordability Assessment

Task 3 established a baseline assessment of water service affordability across Valley Water's service area using multiple quantitative indicators and qualitative analysis. Water affordability is fundamentally a measure of the financial burden that water service places on a household relative to its ability to pay. The most common approach expresses a household's water bill as a percentage of income—the higher the percentage, the greater the burden. The study employed affordability calculations/metrics embraced by the water industry, California water associations, and the California Public Utilities Commission (which regulates several of Valley Water's private water providers). Four primary affordability indicators were evaluated across 12 retailer service areas and 459 census tracts:

1. **Lowest Quintile of Income (LQI):** Annual essential water bill (monthly bill at 47 gpcd × 12) divided by the weighted lowest quintile income for the retailer's service area.
2. **Median Household Income (MHI):** Annual average water bill (monthly bill at 69 gpcd × 12) divided by the weighted median household income for the retailer's service area.
3. **Hours at Minimum Wage (HMW):** Monthly essential water bill divided by the applicable minimum wage (dollars per hour) for the retailer's jurisdiction.

4. **Affordability Ratio at the 20th Percentile of Income (AR_{20}):** Annual essential water bill divided by annual discretionary income (lowest quintile income minus rent minus other utilities minus the essential water bill itself), expressed as a percentage.

Calculating a household's water bill is shaped not only by the wholesale rates charged by Valley Water, but also by the retail rate structures implemented independently by each of the retailers. Five retailers employ tiered rate structures that charge progressively higher rates for higher consumption, while five utilize uniform rates that apply a single volumetric charge regardless of usage. Tiered structures can promote affordability by keeping the cost of essential water use lower—the average Tier 1 rate among tiered retailers was $4.70 per HCF, compared to $6.48 per HCF for those with uniform rates. Beyond volumetric pricing, the balance between fixed and variable charges plays a critical role: fixed charges as a percentage of the total bill ranged from 25% to 65% across retailers, representing the portion of a customer's bill that cannot be reduced through conservation. Similarly, the volume of water allocated to the lowest-priced tier varied from 3 HCF to 6 HCF, affecting how much essential use a household can consume before facing higher rates.

Each retailer's water rate structure was used to estimate a single-family household's water bill at both essential and average water use. The water bill was then compared to various income levels – lowest quintile household income, median household income, minimum wage, or discretionary household income at the lowest quintile. Affordability of water service was calculated in aggregate (weighted based on population within a retailer's service area), granularly by census track within a retailer's service area for the AR_{20} metric only, and extrapolated using ***self-reported*** household income and estimated indoor water use based on ***self-reported*** household size. The resulting range of affordability metrics and estimate of the number of households with affordability challenges are shown in exhibits ES – 3 through ES -5.

ES-4: Resulting Aggregated Single Family Residential Water Affordability Metrics

	Single-Family Water Affordability Metrics			
Retailer	**LQI**	**MHI**	**HMW**	**AR_{20}**
City Of Gilroy	0.7%	0.4%	2.7	1.5%
City Of Milpitas	1.1%	0.7%	4.6	2.0%
City Of Morgan Hill	0.9%	0.5%	3.8	1.6%
City Of Mountain View	0.9%	0.5%	3.1	1.8%
City Of Santa Clara	1.1%	0.6%	4.2	2.3%
City Of Sunnyvale	0.7%	0.4%	2.8	1.4%
CWSC Los Altos Suburban	0.9%	0.5%	4.1	1.6%
Great Oaks Water Company	0.8%	0.5%	2.9	1.7%
San Jose Municipal Water System Coyote	1.1%	0.7%	3.6	2.5%
San Jose Municipal Water System Evergreen/Edenvale	1.2%	0.8%	5.4	2.0%
San Jose Municipal Water System North San Jose/Alviso	0.8%	0.6%	4.6	1.3%
San Jose Water	1.6%	0.8%	5.3	3.4%
Valley Water Service Area of Included Retailers*	**1.2%**	**0.7%**	**4.6**	**2.5%**
Affordability Thresholds - Water Service	*2.0%*	*2.0%*	*4.0*	*5.0%*

Census tract information - American Community Survey maintained by the US Census Bureau and Consumer Expenditure survey

**Weighted based on the population served by each retailer.*

ES-5: Single Family Residential Water Affordability, by Retailer - AR_{20} Metrics

Retailer	Weighted Average Census Tracts	Most Affordable Census Tract	Least Affordable Census Tract	Affordable Census Tracts (Count)	Unafford. Census Tracts (Count)
City Of Gilroy	1.5%	0.7%	7.8%	13	1
City Of Milpitas	2.0%	0.8%	18.1%	16	5
City Of Morgan Hill	1.6%	0.9%	7.8%	9	2
City Of Mountain View	1.8%	0.5%	34.2%	22	3
City Of Santa Clara	2.3%	0.9%	-63.5%	26	7
City Of Sunnyvale	1.4%	0.7%	5.9%	40	1
CWSC Los Altos Suburban	1.6%	0.6%	33.2%	40	2
Great Oaks Water Company	1.7%	0.8%	52.7%	18	5
San Jose Municipal Water System Coyote	2.5%	1.0%	8.0%	4	1
San Jose Municipal Water System Evergreen/Edenvale	2.0%	0.6%	40.9%	18	4
San Jose Municipal Water System North San Jose/Alviso	1.3%	0.8%	8.9%	8	1
San Jose Water	3.4%	0.8%	-132.4%	125	88

Census tract information - American Community Survey maintained by the US Census Bureau and Consumer Expenditure survey

ES-6: Extrapolated Unaffordable Bills Per Retailer Using Reported Household Income

Retailer	Percentage Unaffordable From PUMS Sample Data	Estimated Service Area Households	Estimated Households with Unaffordable Bills
City of Gilroy	6.06%	20,324	1,232
City of Milpitas	3.02%	25,675	775
City of Morgan Hill	6.06%	17,308	1,049
City of Mountain View	9.65%	34,188	3,300
City of Santa Clara	2.19%	48,138	1,052
City of Sunnyvale	0.50%	47,272	236
CWSC Los Altos Suburban	7.79%	40.308	3,142
Great Oaks Water Company	1.62%	30,249	489
San Jose Muni	5.22%	40,191	2,096
San Jose Water	7.41%	320,902	23,775
Retailer Total	**5.95%**	**624,555**	**37,145**

Self-reported household data - Public Use Microdata Sample (PUMS) data available from the ACS maintained by the US Census Bureau

At the aggregate level, water service in Santa Clara County remains generally affordable, and Valley Water's service area performs favorably compared to peer agencies. However, household-level analysis using Public Use Microdata Sample (PUMS) data estimates that approximately 6% of households, or roughly 37,000 households in the service area, currently face water affordability challenges. This estimate aligns with other social indicators such as 7.7% of county households receiving Supplemental Nutrition Assistance Program (SNAP) benefits and 8.3% dependent on fixed incomes via Social Security Income (SSI).

Several retailers within Valley Water's service area offer customer assistance programs to help households manage the cost of water and wastewater services, including bill discount programs, flexible payment arrangements, and crisis assistance funds. The availability and design of these programs vary by retailer, and it should be noted that private / investor-owned utilities and public / municipal utilities in California operate under distinct, and different, regulatory requirements that govern how they may fund and administer affordability programs. Beyond retailer-led efforts, Valley Water contributes directly to addressing water affordability through an annual $1 million contribution to Sacred Heart Community Service, a San Jose–based nonprofit that provides water bill assistance to low-income households in Santa Clara County. In its 2023/2024 Impact Report, Sacred Heart reported providing $681,701 in water bill assistance to over 1,545 households alongside other forms of financial relief. Together, these retailer and Valley Water initiatives represent a layered approach to mitigating water affordability challenges.

Linking the Three Tasks: An Integrated Framework

While each task produced discrete and valuable results, the study's design recognizes the dynamic interrelationships among water demand projections, price elasticity, and affordability. These connections form a feedback loop central to Valley Water's rate setting and policy decisions:

- **Demand forecasts drive rate levels.** Valley Water's costs are predominantly fixed. When demand declines, rates must increase to recover the same revenue requirement. The demand projection methodology evaluated in Task 1 directly determines the denominator in the rate equation—estimated annual water sales—making demand forecasting for rate setting essential to rate stability.

- **Rate increases reduce demand through price elasticity.** Task 2 established that a 10% wholesale-driven price increase reduces *overall* retail demand (supply from Valley Water and other water providers) by approximately 2%. This creates a recursive dynamic: rate increases needed to offset declining demand may further suppress demand, requiring additional rate adjustments. Explicitly incorporating the elasticity estimate into demand forecasts could produce more realistic revenue projections and reduce forecast variance identified in Task 1, but more analysis is needed to identify which water types of Valley Water's supply, such as treated water, groundwater, etc., would decline.

- **Wholesale prices pass through to volumetric retail rates.** Task 2 demonstrated that 83% of the variation in volumetric retail prices is explained by Valley Water wholesale rates, with wholesale price changes leading retail volumetric price changes. This pass-through means Valley Water's investment decisions and rate increases directly affect the retail volumetric prices that determine affordability for end users.

- **Affordability constrains rate-setting flexibility.** Task 3 identified that while water service is broadly affordable in aggregate, approximately 37,000 households already face affordability challenges, and 26% of census tracts exceed the AR_{20} threshold. Future rate increases—driven by capital investments, supply reliability needs, and statewide efficiency mandates that reduce volumetric revenue—will intensify these pressures. The inelastic demand estimated in Task 2 means that low-income households, who have the least discretionary water use to curtail, may bear a disproportionate burden from price increases, not only because their water use may be inelastic but also because the fixed portion of their monthly water bill could represent a larger portion of their total water bill and which

is designed based on each retailer's pricing objectives. All of these factors highlight the importance of funding customer assistance programs to offset the burden to these customers.

Looking Forward

Together, the three tasks provide Valley Water with an analytical framework for informed decision-making. Improved demand forecasting (Task 1) enables more accurate rate setting, reducing revenue volatility and unexpected rate adjustments. Price elasticity estimates (Task 2) allow the District to anticipate how rate changes will affect both demand and revenue, and can be explicitly integrated into the demand forecast to improve projections. The affordability baseline (Task 3) equips the District to evaluate how future investments and rate decisions will impact vulnerable populations and the levels of future funding for customer assistance programs to promote affordability. This integrated approach supports Valley Water's mission of delivering reliable, affordable water service while maintaining the financial health of the water enterprise.

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