Council Meeting: August 13, 2013

SUBJECT: Discussion and Possible Action to Accept the Feasibility Study for Recycled Water Expansion

REPORT IN BRIEF

On April 24, 2012, Council approved an update of the 2000 Recycled Water Master Plan and a Feasibility Study for the expansion of recycled water (RTC 12-099). The Study would address the financial and engineering aspects of expanding recycled water services. In April 2012, the City awarded the contract for the Plan update and Study to HydroScience Engineers, Inc. (HSe).

This report presents the Feasibility Study for Council consideration. Staff recommends Council accept the Feasibility Study and direct staff to continue the planning process and complete environmental review under CEQA of a phased implementation plan for the expansion of the recycled water system in Sunnyvale, including exploration of available funding opportunities.

BACKGROUND

Existing System

The City operates a recycled water production and distribution system that serves primarily landscape irrigation demands in the City's commercial and industrial area located north of Highway 101. Recycled water is produced at the Sunnyvale Water Pollution Control Plant (WPCP).

The existing recycled water system **(Attachment A)** consists of the WPCP pump station, the San Lucar tank and pump station, and approximately 18 miles of recycled water pipelines ranging in diameter from 6 to 36 inches. The recycled water infrastructure is a network of pipelines running along the primary roadway arteries within the northern section of Sunnyvale as well as Moffett Park Specific Plan area providing irrigation water to 120 customers including Lockheed-Martin, Yahoo, the Sunnyvale Golf Course, Baylands Park, and the Twin Creeks Sports Complex. Annual recycled water demand for these existing customers is approximately 1,062 acre feet per year (AFY). (One Acre Foot is 325,829 gallons)

Current Treatment

The WPCP is a tertiary treatment plant that produces effluent meeting the City's National Pollutant Discharge Elimination System (NPDES) discharge requirements. Approximately 10% of the plant flow is treated to a higher level to meet the necessary

recycled water quality. Due to operational issues, the WPCP runs in two alternating modes.

Mode 1 – Secondary Effluent Discharge: The entire advanced secondary treated municipal effluent is discharged to the San Francisco Bay and no recycled water is produced.

Mode 2 – Recycled Water Batch Production: The entire WPCP flow is treated to meet Title 22 of the California Code of Regulations for disinfected tertiary recycled.

The City has several operational concerns associated with this batch mode recycled water production:

- The operational complexity and labor required to switch between Mode 1 and Mode 2
- The limited recycled water storage capacity, which requires frequent batch production during the summer irrigation season to meet recycled water demands; and
- The possibility of excessive chlorination during the transition from Mode 2 to Mode 1 which could result in potential negative effluent impacts during Bay discharge.

2000 Master Plan

In 2000, the City completed a Recycled Water Master Plan that described the City's resources at the time for the production and distribution of recycled water. It presented opportunities for growth of recycled water use within the City limits and beyond, and presented a phased plan to construct facilities to reach those users. It described specific use sites in the near-, mid-, and long-term timeframes and touched on the potential for stream flow augmentation and indirect potable reuse.

However, the 2000 Master Plan did not provide specific recommendations on treatment options to provide continuous production and enhance water quality, nor did it provide recommendations on constructing a looped system to improve reliability, allow additional storage, and extend the distribution system to the south, west, and central parts of the City to connect service to such locations as City Hall and the Community Center.

EXISTING POLICY

General Plan Policy EM-1.2: Maximize recycled water use for all approved purposes both within and in areas adjacent to the City, where feasible.

General Plan Policy EM-1.2a: Update the 2000 Recycled Water Master Plan to provide a current roadmap for potential expansions to the City's recycled water system.

CEQA REVIEW

Acceptance of the Feasibility Study does not require an EIR or Negative Declaration under the California Environmental Quality Act (CEQA) as long as the Feasibility Study relates only to possible future actions which have not been approved, adopted, or funded, and if acceptance of the Study will not have a legally binding effect on later activities, (14 California Code of Regulations 15262). If Council directs staff to continue the planning process for expansion of the recycled water system, staff will return to Council for approval of projects after conducting the required environmental review.

DISCUSSION

Scope of Work

On April 24, 2012 the City retained HSe to prepare a Feasibility Study for the expansion of recycled water that addresses the following:

- Identify pipeline alignments, pumping and water storage tanks required for system build-out.
- Identify treatment options to enhance water quality and allow continuous recycled water production.
- Identify potential connection and partnership with the Water District
- Provide analysis and recommendation related to recycled water policies and practices (dual plumbing).
- Identify funding opportunities for recycled water expansion.
- Prepare a recycled water pricing and marketing plan.

This Feasibility Study provides the basis for future recycled water infrastructure design and construction. It also presents the next phase of near-term recycled water demand forecasts, as well as treatment improvements required to enhance water quality and improve production processes.

System Build-out

The Feasibility Study **(Attachment B)** identified and considered 16 pipeline alignments that would represent the build-out of the non-potable recycled water system. Note that appendices for the Feasibility Study can be found on the City's website at http://recycledwater.insunnyvale.com. A review of potential high demand recycled water users and the ability to pick up potential users along particular alignments were applied as criteria to develop alignments.

Table 1 identifies the alignment name, pipeline length, total project costs in 2013 dollars, annual demand, and the targeted high demand users along that alignment.

Table 1: Proposed Recycled Water Alignments

Point of Connection	Pipeline Length (feet)	Total Project Cost	Annual Demand (acre-feet)	Target Customers
Lakehaven Drive	4,100	$1,406,000	86	Lakewood Park and Elementary School
Maude Avenue	6,800	$1,362,000	36	Columbia Park and Middle School
Duane Avenue	16,500	$5,621,000	429	Advanced Micro Devices
Kifer Road East	5,000	$1,332,000	51	Fortinet Inc.
Kifer Road West	1,900	$781,000	54	Northrop Grumman Corp
Iris Avenue	2,300	$634,000	55	Ponderosa Park and Elementary School
Marion Way	2,600	$648,000	30	Peterson Middle School, Silicon Valley Elementary School, and Raynor Park
Dartshire Way	5,500	$1,369,000	65	Ortega Park
Gail Avenue	1,700	$578,000	39	Cherry Blossom Properties and Braly Park and Elementary School
Old San Francisco Road	1,500	$450,000	26	Life's Garden Retirement Community and Ellis Elementary School
Manet Drive	1,100	$445,000	86	Orchard Heritage Park and Sunnyvale Community Center
Sunnyvale-Saratoga Road	1,900	$595,000	14	Fremont High School
Remington Drive	7,100	$1,751,000	59	Sunnyvale Middle School and De Anza Park and Elementary School
Carson Drive	1,500	$370,000	16	Vargas Elementary School
Main Loop	24,800	$15,914,000	335	Las Palmas and Washington Parks
Wolfe Road Main	13,300	$7,239,000	345	Sunken Gardens Golf Course and Apple® Campus 2 [2]
Existing System Infill Connections	0	$2,675,000	335	Various Customers
TOTALS	**97,600**	**$43,170,000**	**2,061**	

Pipes, Pumps, & Storage

The Study identified potential expansion of the recycled water distribution system to be approximately 18.5 miles of 6-inch to 24-inch pipe to connect an additional potential recycled water demand of 2,061 AFY, approximately triple the current system capacity. On-site work to retrofit existing customers will also be required.

Additional capital investment is needed for pumping and storage facility improvements to support the expansion of the recycled water system. Improvements to the San Lucar tank and pump station will be required. Additional storage will also be required at Central Tank site or Wolfe-Evelyn site. The cost estimates associated with pipeline alignments and storage requirements are included in Table 2.

Table2: Storage Tank and Pump Station Construction Cost Estimate

Storage Location	Tank Cost	Pump Station Cost	Site & Pipeline Costs	Soft Costs	Total Cost
Wolfe-Evelyn	$4,000,000	$2,912,000	$1,163,000	$2,826,000	$10,901,000
Central	$4,000,000	$2,912,000	$3,272,000	$3,565,000	$13,749,000
San Lucar	N/A	$572,000	$216,000	$276,000	$1,064,000
Total	**$8,000,000**	**$6,396,000**	**$4,651,000**	**$6,667,000**	**$25,714,000**

Prioritization

Prior to developing the phases for expansion, it is necessary to prioritize the alignments. The most practical factor used to determine the priority is the cost of an AFY of potential recycled water demand for each alignment.

The City is pursuing opportunities to expand the system beyond the City limits to connect and collaborate with the Santa Clara Valley Water District (District). As such, in terms of the CIP planning, the Wolfe Road Alignment Project has been given priority for implementation and is presented as the first phase of CIP implementation.

Table 3 presents the phasing plan for the proposed distribution system alignments including the total alignment demand, total project alignment cost, and the rank of the 16 alignments relative to each other.

Total project cost includes construction, design, permitting, construction management, and contingency of both the pipeline and associated customer retrofits. All cost figures are in 2013 dollars.

Table 3. Proposed Distribution System Alignments, Ranks, and Phases

Alignment	Demand (AFY)	Total Project Cost	Rank ($/AFY)
Phase 1			
Wolfe Road Main	345	$7,239,000	10
Iris Avenue	55	$634,000	3
Dartshire Way	65	$1,369,000	9
Marion Way	30	$648,000	11
Phase 1 Totals	**495**	**$9,890,000**	
Phase 2			
Infill Sites	335	$2,675,000	2
Duane Avenue	429	$5,621,000	4
Phase 2 Totals	**764**	**$8,296,000**	
Phase 3			
Kifer Road West	54	$781,000	5
Lakehaven Drive	86	$1,406,000	7
Kifer Road East	51	$1,332,000	13
Maude Avenue	36	$1,362,000	15
Phase 3 Totals	**227**	**$4,881,000**	
Phase 4			
Main Loop	335	$15,914,000	17
Manet Drive	86	$445,000	1
Gail Avenue	39	$578,000	6
Old San Francisco Road	26	$450,000	8
Carson Drive	16	$370,000	12
Remington Drive	59	$1,751,000	14
Sunnyvale-Saratoga Road	14	$595,000	16
Phase 4 Totals	**575**	**$20,103,000**	
Total	**2,061**	**$43,170,000**	

Treatment Options

The consultant also evaluated alternatives to enhance recycled water quality and improve reliability of recycled water production. After four alternatives, the consultant recommended the Membrane Bioreactor (MBR) process. An MBR system combines activated sludge biological treatment with an integrated membrane system to provide both secondary treatment and tertiary filtration. Only the portion of the WPCP flow necessary to meet customer demand would be diverted to the MBR system, allowing for continuous operation of the recycled water treatment system.

MBR systems do not remove salts. Salts can affect the growth and health of plants, and also impact the performance of cooling towers, which are significant potential industrial customers. Therefore, MBR systems must be followed by advanced treatment or potable blending if there is an objective to reduce salts.

The MBR system, sized to treat 3.6 million gallons per day (mgd), is needed to produce the desired amount of recycled water (3,123 AF) at an estimated capital cost of approximately $29M.

WPCP Treatment Offset Costs

The City plans to upgrade the secondary treatment processes at WPCP as part of the Strategic Infrastructure Plan (SIP) over the next ten years. Implementing an MBR treatment system or similar technology to produce recycled water would decrease the overall capacity requirements for the SIP. This would offset a portion of the water treated in the secondary process that was recommended as part of the SIP. The 22.4 mgd secondary treatment requirement for the SIP would be reduced to 18.8 mgd, since 3.6 mgd would be diverted and treated by MBR as part of the recycled water project.

Connection to Water District

Sunnyvale and District staffs, under guidance from the Recycled Water Joint Committee, have been working on a plan to extend recycled water supply to the south along Wolfe Road towards Cupertino to serve Apple® Campus 2 and other locations in the vicinity of the pipeline route. A cost sharing agreement between Sunnyvale and the District for the design and construction of the Wolfe Road Recycled Water Project is scheduled to be submitted for Council and Board consideration by this fall.

The City and District have also been discussing the potential expansion of the recycled water system. While the City is interested in expanding non-potable use of recycled water as described above, the District has also expressed interest in evaluating indirect potable use application of recycled water. The District's participation, and specifically the amount of recycled water it decides to receive from Sunnyvale, will have a significant impact on the extent Sunnyvale will expand its non-potable system.

Dual Plumbing Policy

Dual plumbing systems for buildings consist of dedicated recycled water supply lines for certain fixtures, such as water closets, urinals, trap primers for floor drains, and floor sinks. These lines are in addition to potable water supply lines to the remaining plumbing fixtures within a building.

Staff concurs with HSe's recommendation that the City not pursue the development of a dual-plumbing policy for buildings due to the limited incentive and opportunity, and the high cost of implementing a dual-plumbing system. Currently, the Green Building Program allows for developers to have the option to implement a dual-plumbing system to achieve the 20% reduction for indoor water use, which is an appropriate level of encouragement given the low incentives.

Dual plumbing is not recommended because maximizing irrigation use is a more cost effective alternative. Dual plumbing could increase plumbing costs by 40% and 30% in new construction of residential and commercial buildings respectively.

Funding Options

Funding of recycled water projects could be done by pursuing a combination of options including grants, low-interest loans, partnerships with neighboring agencies, contributions from potential customers, and user fees.

Construction grants and low-interest loans are available through the Water Recycling Funding Program, which is administered through the California State Water Resources Control Board (SWRCB). Examples of partnerships with other agencies include a cost share agreement with Apple® and Cal Water to fund portions of the Wolfe Road Main pipeline alignment. User fees may also be used to fund recycled water projects. User fees will only be used if other funding sources are not available.

Recycled Water Pricing

The City faces a number of competing objectives regarding recycled water pricing. Higher rates generate more revenue per unit, while lower rates provide more financial incentive to induce new customers to transition to recycled water use. The City's recycled water system serves as an indirect source of potable water supply as the transition from potable to recycled water use frees up potable supply to the benefit of all existing and future potable water customers.

It is worth noting that the net cost of producing recycled water is the incremental cost above that required for producing water appropriate for Bay discharge. In addition, more stringent nutrient limits on Bay discharge currently under consideration by the Bay Area Regional Water Quality Board could significantly increase the cost of Bay discharge, which will in effect reduce the incremental cost of producing recycled water.

Sunnyvale's recycled water rates are currently set at 90% of potable rates for both irrigation and industrial accounts. In December 2012 a regional survey was conducted by Bartle Wells Associates showing recycled water rates as a percentage of comparable potable water rates. The findings are shown in **Attachment C.**

Connection Fees

The City's water connection fees could also be set to recover costs for recycled water system infrastructure, since the system benefits future potable and recycled water customers.

FISCAL IMPACT

There is no fiscal impact associated with accepting the Feasibility Study for Recycled Water Expansion. Costs will be incurred after specific projects are brought back for Council consideration and approval and when a new pricing structure is recommended.

PUBLIC CONTACT

Public contact was made by posting the Council agenda on the City's official-notice bulletin board outside City Hall, at the Sunnyvale Senior Center, Community Center and Department of Public Safety; and by making the agenda and report available at the Sunnyvale Public Library, the Office of the City Clerk and on the City's Web site.

ALTERNATIVES

1. Accept the Feasibility Study and direct staff to continue the planning process and complete environmental review under CEQA of a phased implementation plan for the expansion of the recycled water system in Sunnyvale, including exploration of available funding opportunities.

2. Direct staff to further study other alternatives to expand the use of recycled water.

RECOMMENDATION

Staff Recommends Alternative 1: Accept the Feasibility Study and direct staff to continue the planning process and complete environmental review under CEQA of a phased implementation plan for the expansion of the recycled water system in Sunnyvale, including exploration of available funding opportunities.

Reviewed by:

John Stufflebean, Director, Environmental Services Department
Prepared by: Mansour Nasser, Water & Sewer Systems Division Manager

Approved by:

Gary M. Luebbers
City Manager

Attachments

A. Map of Sunnyvale's Existing Recycled Water System
B. Recycled Water Feasibility Study
C. Survey of Regional Recycled Water Rates

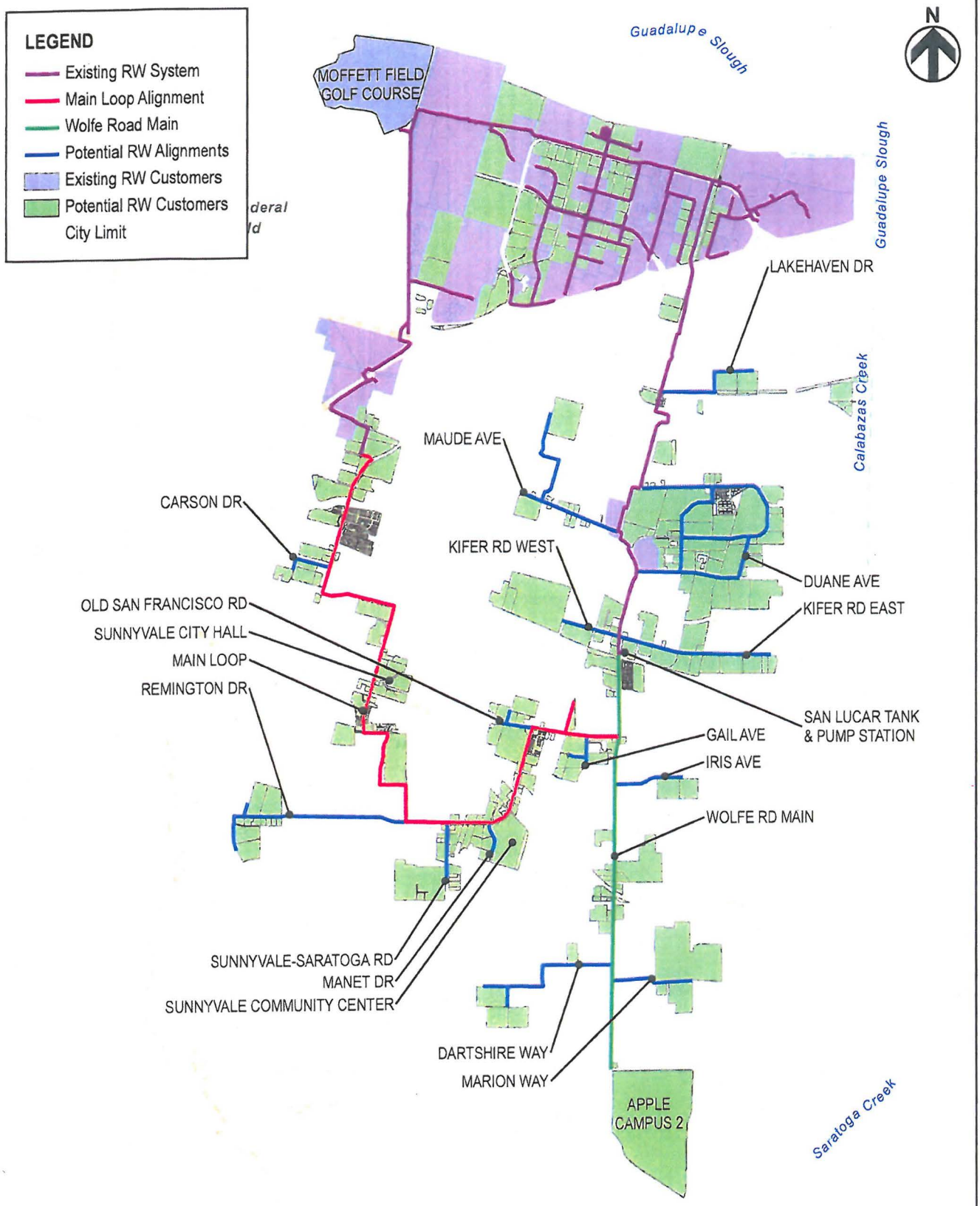

FIGURE 6-1
CITY OF SUNNYVALE
FEASIBILITY STUDY FOR RECYCLED WATER EXPANSION
PROPOSED RECYCLED WATER ALIGNMENTS

HydroScience

ATTACHMENT B

NOTE: Attachment B, the Recycled Water Feasibility Study and its associated appendices can be found at:

RecycledWater.insunnyvale.com

ATTACHMENT C

Recycled Water Rate Survey - December 2012

	Potable Charge per hcf	Recycled Charge per hcf	Recycled Rate % of Potable Rate
City of Sunnyvale			
Agriculture & Institutional	$2.09	$1.88	90%
Landscape Irrigation	$4.38	$3.95	90%
City of Redwood City			
Existing Irrigation Accounts			
Tier 1: Up to 100% of water budget (most water sold in this tier)	$4.78	$3.59	75%
Tier 2: From 101% - 200% of water budget	$9.58	$3.59	37% (75% of Tier 1)
Tier 3: Over 200% of water budget	$14.36	$3.59	25% (75% of Tier 1)
New Irrigation Accounts	same as above	$4.78 for all use	Varies
Existing Industrial Accounts			
Tier 1: 0-15 hcf	$3.72	$2.23	60%
Tier 2: 16+ hcf	$6.08	$3.65	60%
City of Santa Clara			
Irrigation	$3.17	$1.89	60%
Industrial Process	$3.17	$1.53	48%
Industrial, Otherwise Served by Private Well	$3.17	$0.72	23%
Irrigation, Otherwise Served by Private Well	$3.17	$1.18	37%
City of Mountain View			
All Recycled Water Use	$4.42	$2.64	60%
City of Milpitas			
Irrigation	$4.97	$3.89	78%
Industrial	$4.62	$2.31	50%
City of San Jose - Municipal Water			
Irrigation	$2.74	$1.82	67%
Industrial	$2.74	$1.33	49%
Agriculture	$2.74	$1.29	47%
Industrial, Otherwise Served by Private Well	*$2.74*	*$1.18*	*43%*
Irrigation, Otherwise Served by Private Well	*$2.74*	*$1.00*	*36%*
San Jose Water Company (Portions of San Jose, Cupertino Santa Clara, Los Gatos, Monte Serano, & Saratoga)			
Irrigation	$2.7160	$2.2310	82%
Industrial	$2.7160	$1.7259	64%
Agriculture	$2.7160	$1.7259	64%
East Bay Municipal Utility District			
All Recycled Water	$3.17	$2.64	83%
Dublin San Ramon Services District			
Irrigation	$3.47	$3.12	90%
City of Santa Rosa			
Commercial/Industrial	$3.84	$3.64	95%
Landscape Irrigation			
Tier 1: Up to 125% of water budget	$3.67	$3.48	95%
Tier 2: From 126 - 200% of water budget	$5.00	$5.00	100%
Tier 3: Over 200% of water budget	$7.51	$7.51	100%
South Bay Water Recycling			
Wholesale Irrigation	$1.43	$1.19	83%
Wholesale Industrial	$1.43	$0.68	48%
Recycled rates benchmarked to SCVWD Groundwater W-2 Rates.			