



San Francisco
Public Utilities Commission

2030 Purchase Estimates
Technical Memorandum

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URS

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The San Francisco Public Utilities Commission (SFPUC) is a department of the City and County of San Francisco (City) that provides water, wastewater services, and municipal power to the City. Under contractual agreements, 28 wholesale water agencies (SFPUC wholesale customers) in Alameda, San Mateo, and Santa Clara Counties also purchase water supplies from the SFPUC. The SFPUC is currently implementing a capital improvement program (CIP) to improve the reliability of the SFPUC regional water system. The CIP includes several projects to repair and replace existing transmission and storage facilities within the regional water system. Understanding the future demands on the regional water system is an important aspect of improving the system's reliability.

In Fall 2002, the SFPUC embarked on a number of comprehensive planning studies to assess future water demands, water conservation potential, and recycled water potential in its retail and wholesale customer service areas. These studies were also performed to assist in making future water management planning decisions and in developing SFPUC water purchase estimates for planning purposes. The purpose of this technical memorandum (TM) is to summarize the results of the planning studies and present the 2030 SFPUC water purchase estimates.

1.1 SFPUC SERVICE AREA

Approximately 32 percent of the SFPUC's water supply is served to retail customers in the City and County of San Francisco; the remaining 68 percent is served to wholesale customers and large retail customers outside the City.¹ In total, nearly 2.4 million people rely entirely or in part on water supplied by the SFPUC regional water system to meet their daily water demands.

The 28 SFPUC wholesale customers listed in Table 1 constitute the Bay Area Water Supply and Conservation Agency (BAWSCA).² Figure 1 illustrates the approximate locations of the wholesale customer service areas. In 2001-2002, the SFPUC wholesale customers collectively purchased two-thirds of their total water supply from the SFPUC regional water system (BAWUA 2002). The wholesale customer demand, conservation, and recycling potential studies (wholesale studies) were completed in conjunction with the 28 SFPUC wholesale customers. BAWSCA had an active role in the SFPUC wholesale studies in coordinating the efforts of the wholesale customers with the SFPUC and its consultant team to ensure overall consistency and integrity of the project.

¹ The larger retail customers receive water from direct connections to SFPUC's regional transmission mains and are the end users of SFPUC water located outside the geographical boundaries of the City, such as the San Francisco County Jail, San Francisco International Airport, and Lawrence Livermore Laboratories.

²BAWSCA, formerly Bay Area Water Users Association (BAWUA), was created to represent the interests of 26 cities, water districts, and two private utilities in Alameda, Santa Clara, and San Mateo Counties that purchase water on a wholesale basis from the San Francisco regional water system. BAWSCA is the only entity having the authority to directly represent the needs of the cities, water districts, and private utilities (wholesale customers) that depend on the regional water system.

**Table 1
SFPUC Wholesale Customers**

Alameda County	
Alameda County Water District	City of Hayward
San Mateo County	
City of Brisbane	Town of Hillsborough
City of Burlingame	Los Trancos County Water District
California Water Service Company (CWS) – Bear Gulch District Mid Peninsula District South San Francisco District	City of Menlo Park
	Mid-Peninsula Water District
	City of Millbrae
Coastside County Water District	North Coast County Water District
City of Daly City	City of Redwood City
City of East Palo Alto	City of San Bruno
Estero MID/Foster City	Skyline County Water District
Guadalupe Valley MID	Westborough Water District
Santa Clara County	
City of Milpitas	City of San Jose (portion of north San Jose)
City of Mountain View	City of Santa Clara
City of Palo Alto	Stanford University
Purissima Hills Water District	City of Sunnyvale

CWS - California Water Service (Company)
MID - Municipal Improvement District

1.2 SUMMARY OF SFPUC PLANNING STUDIES

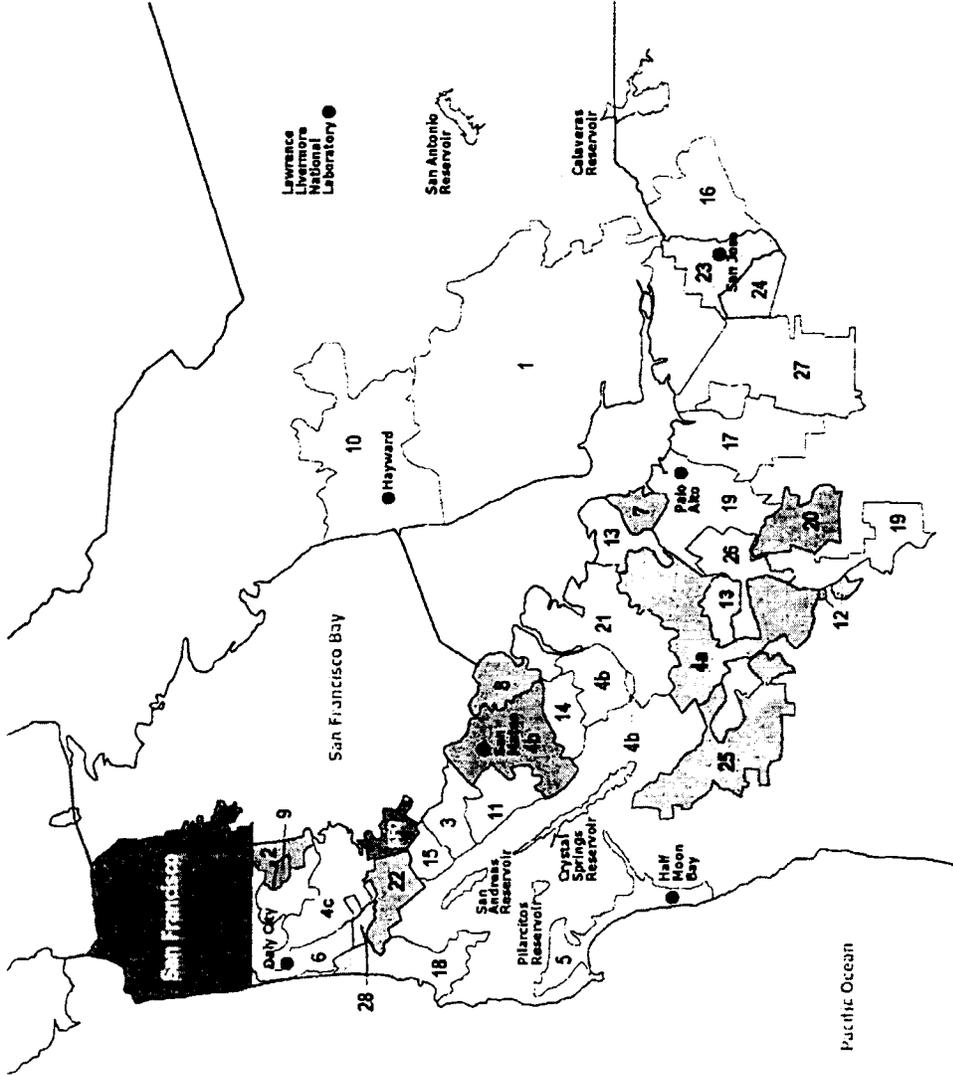
The results of the SFPUC service area (retail and wholesale service areas) planning studies are summarized in the technical memoranda and technical reports listed in Table 2. It is important to note that the results of the studies provide **total** water demand, conservation, and recycling potential for the SFPUC’s retail and wholesale customers. Because many SFPUC wholesale customers meet their water demands with multiple sources of supply, the results are not intended to imply that the total demand estimates will be met in 2030 by SFPUC supplies, or that the SFPUC system will accrue the savings associated with potential water conservation or recycled water use. Rather, the wholesale customers have provided purchase estimates that are their best estimates of their water needs from the SFPUC regional water system in 2030. Sections 2 through 4 of this TM briefly summarize the methodology and results of the studies listed in Table 2.

**Table 2
SFPUC Retail and Wholesale Customer Area 2004-2005 Planning Studies**

Planning Study	Retail Service Area	Wholesale Customer Service Area
Water Demand Projections	<i>City and County of San Francisco Retail Water Demands and Conservation Potential (SFPUC 2004)</i>	<i>SFPUC Wholesale Customer Water Demand Projections (URS 2004a)</i>
Water Conservation Potential		<i>SFPUC Wholesale Customer Water Conservation Potential (URS 2004b)</i>
Recycled Water Potential	<i>City and County of San Francisco Recycled Water Master Plan Update (scheduled for completion in mid-2005)</i>	<i>SFPUC Wholesale Customer Recycled Water Potential (RMC 2004)</i>

#	SFPUC Wholesale Customer
1	Alameda County Water District
2	Brisbane, City of
3	Burlingame, City of
4a	CWS – Bear Gulch District
4b	CWS – Mid Peninsula District
4c	CWS – South San Francisco District
5	Coastside County Water District
6	Daly City, City of
7	East Palo Alto, City of
8	Estero MID/Foster City
9	Guadalupe Valley MID
10	Hayward, City of
11	Hillsborough, Town of
12	Los Trancos County Water District
13	Menlo Park, City of
14	Mid-Peninsula Water District
15	Millbrae, City of
16	Milpitas, City of
17	Mountain View, City of
18	North Coast County Water District
19	Palo Alto, City of
20	Purissima Hills Water District
21	Redwood City, City of
22	San Bruno, City of
23	San Jose, City of (portion of north San Jose)
24	Santa Clara, City of
25	Skyline County Water District
26	Stanford University
27	Sunnyvale, City of
28	Westborough Water District

CWS - California Water Service (Company)
MID - Municipal Improvement District



Map courtesy of BAIWSCA website

Figure 1 SFPUC Wholesale Customer Service Area

1.3 SFPUC SERVICE AREA PURCHASE ESTIMATES FOR THE YEAR 2030

The SFPUC completed the wholesale studies for planning purposes, and to provide the wholesale customers with technical information to consider when making future water management planning decisions and developing their best estimates of their SFPUC water purchases in the year 2030. Each wholesale customer is responsible for its own water management planning decisions and for determining the percentage of its future water demand that it desires to meet with SFPUC supplies.

On completion of the wholesale demand and conservation studies, the SFPUC requested that each wholesale customer provide its best estimate of its SFPUC water purchases for the year 2030. In developing its SFPUC purchase estimate, each wholesale customer reviewed its available supplies in the year 2030 (e.g., local surface water, groundwater, conservation, and reclamation) and made a determination of its future mix of water sources, including the amount of SFPUC purchases.

The SFPUC used the results from its retail water demands and conservation potential studies, as well as consideration of potential recycled water and groundwater use, to develop a 2030 water purchase estimate for its retail service area. Table 3 presents the best estimates of future SFPUC water purchases for the year 2030.

**Table 3
SFPUC Service Area 2030 Purchase Estimates for the SFPUC Regional Water System**

SFPUC Service Area	Low-Range Estimates		High-Range Estimates	
	2030 Purchase Estimate (mgd)	Change in Purchases from FY01-02 (mgd)	2030 Purchase Estimate (mgd)	Change in Purchases from FY01-02 (mgd)
Alameda County Water District	13.76	1.77	NA	NA
Brisbane, City of	0.89	0.50	NA	NA
Burlingame, City of	4.70	0.06	NA	NA
CWS – Bear Gulch District	11.60	0.48	NA	NA
CWS – Mid Peninsula District	17.24	0.49	NA	NA
CWS – South San Francisco District	7.97	0.41	NA	NA
Coastside County Water District	2.24	0.44	3.02	1.22
Daly City, City of	4.90	-0.18	7.32	2.24
East Palo Alto, City of	4.64	2.60	NA	NA
Estero Municipal Improvement District	6.20	0.58	6.80	1.18
Guadalupe Valley Municipal Improvement District	0.72	0.41	NA	NA
Hayward, City of	27.95	10.34	NA	NA
Hillsborough, Town of	3.70	0.14	NA	NA
Los Trancos County Water District	0.16	0.05	NA	NA
Menlo Park, City of	4.54	0.97	NA	NA
Mid-Peninsula Water District	3.70	0.24	NA	NA
Millbrae, City of	3.19	0.72	NA	NA
Milpitas, City of	8.20	1.37	NA	NA
Mountain View, City of	13.20	2.23	NA	NA
North Coast County Water District	3.61	0.16	3.80	0.35
Palo Alto, City of	13.00	-0.19	NA	NA
Purissima Hills Water District	3.22	1.02	NA	NA
Redwood City, City of	11.60	-0.04	12.60	0.96
San Bruno, City of	4.30	1.60	NA	NA
San Jose, City of (portion of north San Jose)	6.34	1.92	NA	NA
Santa Clara, City of	4.90	1.06	NA	NA
Skyline County Water District	0.30	0.13	NA	NA
Stanford University	4.20	1.84	NA	NA
Sunnyvale, City of	12.10	2.41	NA	NA
Westborough Water District	1.20	0.18	NA	NA
Subtotal – SFPUC Wholesale Customer Service Area	204	34	209	39
SFPUC Retail Service Area	80	-10	91	1
Total SFPUC Service Area	284	24	300	40

Note:

1. Subtotals and total are rounded to the nearest whole number.

CWS – California Water Service (Company)

FY – Fiscal Year

mgd – million gallons per day

NA – Not Applicable (customer did not present high range)

2.1 METHODOLOGY FOR WATER DEMAND FORECASTING

Water demand projections for the SFPUC retail service area and the SFPUC wholesale customers' service areas were estimated yearly through 2030 using the forecasting methods and models described below. The water demand projections were forecasted from base year water demand estimates that reflect the impact of previous conservation efforts and plumbing codes.

2.1.1 Water Demand Forecasting for the SFPUC Wholesale Customer Service Area

To determine the future water demand of the SFPUC wholesale customer service area, the SFPUC employed an "end-use" model, the Demand Side Management Least-Cost Planning Decision Support System (DSS) model (Maddaus 2003). A DSS model was developed for each individual wholesale customer to forecast the 2030 water demand in its service area. The DSS model arrives at future water demand projections through two steps:

- Establishing base-year water demand at the end-use level, and
- Forecasting future water demand based on the future demands of existing water service accounts, the future growth in the number of water service accounts, and the future demands of the new accounts.

Establishing the base-year water demand at the end-use level is accomplished by breaking down total water use by residential and non-residential water service account to specific end uses (such as toilets, faucets, and irrigation). Forecasting future water demand is accomplished by first determining the growth in the number of water service accounts in a wholesale customer service area based on growth rates derived from population and employment forecasts. Once the number of accounts and the end uses per account are established, the DSS model uses the estimated number of end users (number of persons per household for residential accounts and number of employees per industry sector for non-residential accounts) together with the associated water usage per end use to arrive at the water usage for each account based on its various types of end uses. The DSS model also incorporates the effects of the plumbing code on plumbing fixtures such as toilets, showerheads, and washing machines.

2.1.2 Water Demand Forecasting for the SFPUC Retail Service Area

In the SFPUC retail service area, the following categories of water use were established to delineate projected water demands:

- **In-City Customers:** The retail customers geographically located within the corporate limits of San Francisco.
- **Other Retail Customers:** The SFPUC provides potable water to other retail customers such as the United States Navy, the Town of Sunol, San Francisco International Airport, Lawrence Livermore Laboratory, and Groveland Community Services District, as well as numerous suburban commercial and municipal accounts. SFPUC retail demand also includes non-potable water served to nurseries located in the Sunol area and other water demands existing within the corporate boundaries of San Francisco that are currently met with groundwater

extraction systems not hydraulically linked to the SFPUC. These demands are associated with Golden Gate Park, San Francisco Zoo, and irrigation along the Great Highway median.

Water demand projections were developed for In-City Customers and Other Retail Customers as discussed below.

In-City Customers

For In-City Customers an end-use model was applied to four customer sectors: (1) Single-Family Residential, (2) Multi-Family Residential, (3) Commercial, Industrial, Municipal Paying and Non-Paying, and (4) Other, which includes Docks & Shipping and Builders & Contractors.

For residential categories, an end-use model evaluated the effects of demographic and industry changes projected for San Francisco through the year 2030 and the anticipated market penetration of plumbing code changes. Non-residential water use was evaluated using an employee end-use model based on projecting the number of employees and their water use within specific industry and service categories. Water use for the "Other" customer sector, which includes Docks & Shipping and Builders & Contractors, is anticipated to remain the same into the future and therefore was held equal to the current level of delivery (fiscal years 1997-2001).

Other Retail Customers

The current demand for the "Other Retail Customers" is estimated to be 9.6 million gallons per day (mgd) per year and is assumed to remain constant over the planning horizon as further discussed in *City and County of San Francisco Retail Water Demands and Conservation Potential* (SFPUC 2004).

2.2 SFPUC SERVICE AREA TOTAL WATER DEMAND PROJECTIONS FOR 2030

Table 4 presents the total water demand projections by SFPUC customer in five-year increments to the year 2030 developed in the wholesale and retail demand studies. As previously stated, the results of these studies provide **total** water demand for the SFPUC service area and do not represent the amount of SFPUC water estimated to be purchased in 2030 (see Table 3 for purchase estimates). Each wholesale customer was involved in the wholesale water demand forecasting modeling process and concurred in writing with the demand estimates provided in Table 4.

The demand projections presented in Table 4 include unaccounted-for-water (UFW) and the projected water savings associated with the plumbing codes currently in place. UFW is defined as the mathematical difference in system water produced and water billed to customers (consumed). UFW includes water not billed or tracked in the system (i.e., water used for flushing water system pipelines, fire fighting, etc.) and water delivery system leaks. Plumbing code savings represent water use savings associated with the natural replacement of plumbing fixtures with water-efficient models (i.e., toilets, showerheads, or washing machines).

Results of the demand projection studies indicate that water demands in the SFPUC wholesale customer service area are estimated to increase by approximately 19 percent (from 272 mgd to 324 mgd) over the study period. In the SFPUC retail service area, water demands are estimated to decrease by approximately 0.2 percent (from 93.6 mgd to 93.4 mgd). The overall result is an increase in water demands for the SFPUC service area of approximately 14 percent in the year 2030.

Table 4
Demand Projections for SFPUC Service Area by Customer

SFPUC Service Area	Base Year ^{1,2} Demand Estimate (mgd)	Demand Projections (mgd) ²						Change in Demand from Base Year	
		2005	2010	2015	2020	2025	2030	mgd	Percent
Alameda County Water District	51.1	53.2	54.5	55.5	56.6	57.9	59.3	8.20	16%
Brisbane, City of	0.44	0.50	0.58	0.67	0.76	0.84	0.93	0.49	111%
Burlingame, City of	4.8	4.8	4.8	4.8	4.9	4.9	4.9	0.12	3%
CWS - Bear Gulch District	13.4	13.5	13.6	13.6	13.7	13.7	13.9	0.48	4%
CWS - Mid Peninsula District	17.2	17.5	17.7	17.7	17.8	18.0	18.1	0.94	5%
CWS - South San Francisco District	8.9	9.0	9.1	9.2	9.5	9.6	9.9	1.00	11%
Coastside County Water District	2.6	2.7	2.9	3.0	3.1	3.1	3.2	0.63	25%
Daly City, City of	8.7	8.7	9.3	9.3	9.2	9.2	9.1	0.44	5%
East Palo Alto, City of	2.5	2.6	2.8	3.5	4.3	4.6	4.8	2.30	92%
Estero MID/Foster City	5.8	6.0	6.2	6.3	6.5	6.7	6.8	0.98	17%
Guadalupe Valley MID	0.32	0.39	0.47	0.56	0.64	0.72	0.81	0.49	153%
Hayward, City of	19.3	20.8	22.2	23.3	25.0	26.8	28.7	9.40	49%
Hillsborough, Town of	3.7	3.7	3.8	3.8	3.9	3.9	3.9	0.20	5%
Los Trancos County Water District	0.11	0.11	0.12	0.13	0.14	0.14	0.14	0.03	32%
Menlo Park, City of	4.1	4.1	4.3	4.4	4.5	4.6	4.7	0.61	15%
Mid-Peninsula Water District	3.7	3.7	3.6	3.7	3.7	3.7	3.8	0.15	4%
Millbrae, City of	3.1	3.3	3.3	3.3	3.3	3.3	3.3	0.17	5%
Milpitas, City of	12.0	13.0	14.2	15.3	16.1	16.9	17.7	5.74	48%
Mountain View, City of	13.3	13.4	13.8	14.1	14.4	14.6	14.8	1.53	12%
North Coast County Water District	3.6	3.7	3.7	3.7	3.7	3.7	3.8	0.17	5%
Palo Alto, City of	14.2	14.5	14.5	14.6	14.7	14.7	14.7	0.49	3%
Purissima Hills Water District	2.2	2.4	2.6	2.8	2.9	3.1	3.3	1.12	51%
Redwood City, City of	11.9	12.1	12.7	13.0	13.2	13.3	13.4	1.54	13%
San Bruno, City of	4.4	4.2	4.3	4.3	4.4	4.4	4.5	0.07	2%
San Jose, City of (portion of north San Jose)	5.2	5.4	5.7	6.0	6.1	6.3	6.5	1.31	25%
Santa Clara, City of	25.8	28.0	29.7	30.9	31.9	32.9	33.9	8.10	31%
Skyline County Water District	0.17	0.19	0.21	0.26	0.31	0.31	0.31	0.14	82%
Stanford University	3.9	4.3	4.7	5.1	5.7	6.2	6.8	2.94	76%
Sunnyvale, City of	24.8	25.0	25.3	25.6	25.9	26.3	26.8	1.99	8%
Westborough Water District	0.99	1.00	0.95	0.93	0.91	0.89	0.88	-0.11	-11%
Subtotal – SFPUC Wholesale Customer Service Area	272	282	292	299	308	315	324	52	19%
SFPUC Retail Service Area	93.6	92.4	92.0	91.9	92.1	92.6	93.4	-0.2	-0.2%
Total SFPUC Service Area	366	374	384	391	400	408	417	51	14%

Notes:

1. Demand projections presented here include unaccounted-for-water (UFW), defined as the mathematical difference in system water produced and water billed to customers (consumed). UFW includes water not billed or tracked in the system (i.e., water used for flushing water system pipelines, fire fighting, etc.) and water delivery system leaks.

2. The subtotal for the wholesale customer service area, the Total SFPUC service area values, and all percentages are rounded to the nearest whole number.

¹SFPUC wholesale service area studies used 2001 as the base year, with the exception of Stanford University. For consistency, Stanford University's 2001 numbers are presented here. SFPUC retail service area studies used 2000 as the base year, which is presented here.

²Sources: URS 2004a and SFPUC 2004

CWS - California Water Service

mgd - million gallons per day

MID - Municipal Improvement District

Table 5 presents the demographic projections for the SFPUC retail and wholesale service areas over the study period. In the **SFPUC service area** (including the retail and wholesale service areas), population is estimated to increase by approximately 16.9 percent, and employment is expected to increase by approximately 29.1 percent.

Although **SFPUC wholesale customer** population and employment is projected to increase by approximately 19.1 percent and 31.3 percent, respectively, the increase in water demand is estimated to be limited to approximately 19 percent. This is due to the continued implementation of plumbing code requirements that effectively reduce future projected water demands by approximately 7.8 percent in the SFPUC wholesale customer service area.

In the **SFPUC retail service area**, an estimated water demand decrease of approximately 0.2 percent occurs despite a combined increase in population and employment of approximately 12.3 percent and 25.4 percent, respectively. This can also be attributed to the continued implementation of plumbing code requirements in the SFPUC retail service area.

Table 5
Summary of SFPUC Service Area Demographic Projections

SFPUC Service Area	Projection Source used for Growth Rates	Base Year ^{1,2} Population	2030 Projected ² Population	Base Year ^{1,2} Employment	2030 Projected ² Employment
Alameda County Water District	ABAG Subregional 2002	316,523	379,931	151,092	221,858
Brisbane, City of	City Planning ³	3,174	4,606	3,789	19,575
Burlingame, City of	ABAG Subregional 2002	30,154	34,967	31,205	36,160
CWS - Bear Gulch District	BAWUA Survey ⁴	66,197	73,719	42,899	47,774
CWS - Mid Peninsula District	ABAG Subregional 2002	120,856	139,834	79,493	100,568
CWS - South San Francisco District	ABAG Subregional 2002	49,207	59,584	49,288	62,344
Coastside County Water District	ABAG Subregional 2002	18,319	24,973	5,402	6,795
Daly City, City of	ABAG Subregional 2002	106,117	115,651	26,941	33,981
East Palo Alto, City of	ABAG Subregional 2002	24,395	32,712	3,289	8,673
Estero MID/Foster City	ABAG Subregional 2002	34,568	40,096	24,318	31,840
Guadalupe Valley MID	City Planning ³	446	1,558	4,442	5,668
Hayward, City of	ABAG Subregional 2002	140,439	162,757	87,473	113,843
Hillsborough, Town of	ABAG Subregional 2002	11,618	12,708	1,216	1,380
Los Trancos County Water District	LTCWD Planning Study	740	1,094	NA ⁵	NA ⁵
Menlo Park, City of	ABAG Subregional 2002	12,153	13,655	10,053	13,287
Mid-Peninsula Water District	2000 UWMP	26,443	27,997	14,705	22,221
Millbrae, City of	2002 UWMP	21,460	25,174	6,664	8,009
Milpitas, City of	ABAG Subregional 2002	62,756	88,841	53,566	76,129
Mountain View, City of	ABAG Jurisdictional 2002	71,160	81,670	75,629	95,669
North Coast County Water District	ABAG Subregional 2002	40,457	47,829	5,797	7,478
Palo Alto, City of	ABAG Subregional 2002	59,954	69,199	105,432	114,224
Purissima Hills Water District	ABAG Subregional 2002	6,032	6,763	420	457
Redwood City, City of	2003 UWMP	81,888	93,535	66,389	83,678
San Bruno, City of	Draft General Plan ⁶	40,727	48,229	16,622	25,770
San Jose, City of (portion of north San Jose)	ABAG Subregional 2002	11,098	13,686	2,500	3,353
Santa Clara, City of	ABAG Subregional 2002	104,349	140,698	138,163	177,027
Skyline County Water District	BAWUA Survey ⁷	1,210	2,683	224	224
Stanford University	Water Master Plan	19,738	27,924	NA ⁵	NA ⁵
Sunnyvale, City of	ABAG Subregional 2002	131,365	151,610	125,476	168,950
Westborough Water District	BAWUA Survey ⁴	10,017	10,146	1,610	1,631
Subtotal - SFPUC Wholesale Customer Service Area		1,623,560	1,933,829	1,134,097	1,488,566
Increase in Population/Employment from Base Year (%)			19.1%		31.3%
SFPUC Retail Service Area	Citywide Planning/ABAG 2002	756,976	849,942	634,430	795,400
Increase in Population/Employment from Base Year (%)			12.3%		25.4%
Total SFPUC Service Area		2,380,536	2,783,771	1,768,527	2,283,966
Increase in Population/Employment from Base Year (%)			16.9%		29.1%

¹ SFPUC wholesale service area studies used 2001 as the base year, with the exception of Stanford University. For consistency, Stanford University's 2001 numbers are presented here. SFPUC retail service area studies used 2000 as the base year.

² Sources: URS 2004a and SFPUC 2004.

³ City planning projections were provided by the City of Brisbane on April 8, 2004, for both the City of Brisbane and Guadalupe Valley MID.

⁴ Total population projections were used to establish a growth rate for accounts. This 2030 employment number is a projection from the 2001 employment using the total population growth rate.

⁵ Employment projections are not applicable for Los Trancos County Water District (LTCWD) and Stanford University. LTCWD only has residential accounts. Stanford University used other parameters such as increase in building square footage to forecast growth in Non-Residential accounts. Residential account growth for Stanford University was projected using increase in dwelling units rather than population projections.

⁶ The City of San Bruno provided projections from the City's Draft General Plan which has not been finalized.

⁷ Employment projections were not developed for Skyline because growth is not anticipated in Commercial and Industrial Accounts. The number of accounts was assumed to remain constant.

CWS - California Water Service (Company); MID - Municipal Improvement District; NA - Not Applicable

SFPUC customers have been implementing water conservation practices since the mid-1970s. The savings associated with previous conservation efforts are reflected in the base-year demand estimates for SFPUC customers. The SFPUC water conservation potential evaluations estimate future conservation potential associated with the continuation of the previous conservation efforts and the implementation of additional conservation measures for each SFPUC customer.

In addition to the City of San Francisco, thirteen³ of the 28 wholesale customers are signatories to the Memorandum of Understanding Regarding Urban Water Conservation in California (MOU), which was developed by urban water agencies in 1991 to encourage water conservation practices. Collectively, these 13 wholesale customers represent over 70 percent of current SFPUC wholesale deliveries. Appendix A of the *SFPUC Wholesale Customer Water Conservation Potential* technical report (URS 2004b) presents the 14 Best Management Practices (BMPs) established as part of the MOU and lists the conservation measures that each wholesale customer is currently implementing.

3.1 METHODOLOGY FOR EVALUATING CONSERVATION POTENTIAL

Following water demand forecasting, the service-area-specific water demand models were used as a baseline for evaluating the potential for water conservation in each service area. The following paragraphs discuss the methodologies of the evaluations in more detail.

3.1.1 SFPUC Wholesale Customer Service Area Conservation Evaluation

For the wholesale customer conservation potential evaluation, the DSS model was used to evaluate the cost-effectiveness of implementing 32 conservation measures over a 30-year planning period for the 28 wholesale customers. An initial list of 75 conservation measures potentially suitable for the Bay Area was evaluated qualitatively by a team that included a representative from the SFPUC, a representative from BAWSCA, a representative from the wholesale customer group, and a member of the consultant team. Each potential measure was scored⁴ based on four qualitative criteria. The qualitative criteria were related to the following:

- Does the product (water-using fixture) work well and is it readily available? **(Technology/Market Maturity)**
- Would the measure have widespread application in the Bay Area? **(Service Area Match)**
- Will the retail customer participate in the measure or use the product and is it fair how the measure is applied throughout the service area among the different customer types? **(Customer Acceptance/Equity)**
- Among similar measures that accomplish the same thing, is this measure the best way to save water? **(Relative Effectiveness of Measure Available)**

³ In addition to these 13 wholesale customers, eight wholesale customers (the Cities of Milpitas, Mountain View, San Jose, Santa Clara, Palo Alto, and Sunnyvale, the Purissima Hills Water District, and Stanford University) are located within the Santa Clara Valley Water District (District) service area and participate in the District's conservation program. The District is a signatory to the MOU and implements the 14 BMPs within its entire service area.

⁴ The results of how each measure scored for each criterion are presented in Appendix B of URS 2004b.

Based on the scores assigned by the evaluation team, 32 measures, including 10 BMPs, passed the screening and were evaluated as part of the SFPUC wholesale customer conservation potential evaluation. The market potential, costs, and benefits were identified for each of these 32 conservation measures and a benefit-cost analysis was conducted to evaluate the cost-effectiveness of each individual conservation measure for each wholesale customer.⁵

The final list of 32 measures evaluated for the wholesale customer service area included (1) rebate and other incentive programs for installing water-saving devices, (2) city/county ordinances requiring the installation of water-saving devices, and (3) educational outreach and award programs that promote water use reductions in businesses and landscaping. The measures included both indoor and outdoor water conservation measures for residential and non-residential water use.

Using the results of the benefit-cost analysis for each conservation measure, and considering other factors such as service area water use characteristics, retail customer behavioral patterns, budgetary consideration, and relative ease of implementation for each conservation measure, three packages of measures were selected by each wholesale customer to develop Programs A, B, and C.

In general, Program A represents the conservation measures from the list of 32 measures that the wholesale customer is currently implementing. Program B includes the Program A measures plus additional measures determined to be most implementable by the wholesale customer. Program C includes all the measures included in Programs A and B plus additional measures that represent the full extent of measures that appear to be implementable and cost-effective. Together, the three programs represent a reasonable⁶ range of conservation potential for long-range planning purposes. A benefit-cost analysis was conducted for each of the three conservation programs as a whole for each wholesale customer to indicate program cost-effectiveness.

Table 6 presents the results of the benefit-cost analysis results by program for the SFPUC wholesale customer service area. Potential savings due to plumbing code changes in the SFPUC wholesale customer service area (estimated to be 25.4 mgd in the year 2030) are also presented in Table 6. Table 7 presents the benefit-cost analysis results by individual program and potential plumbing code savings for the individual wholesale customers.

3.1.2 SFPUC Retail Service Area Conservation Evaluation

The methodology of the SFPUC retail water conservation evaluation mirrored that of the wholesale customer conservation evaluation. The SFPUC retail study was confined to conservation potential within the boundaries of the City and County of San Francisco. The retail study started with the list of 32 conservation measures evaluated for the wholesale service area and included 16 additional measures more suitable for the SFPUC retail service area. Most of the 16 measures added to the list were relevant to San Francisco's non-residential customer base

⁵ For further discussion on the cost-effectiveness analysis, see URS 2004b.

⁶ For the purposes of the SFPUC wholesale customer conservation study, a reasonable range of conservation potential represents a range of water savings that seems achievable based on service area water use characteristics, retail customer behavioral patterns, budgetary consideration, and ease of implementation within the individual wholesale customer service area.

focusing on schools, hospitals, grocery stores, and restaurants. The 48 measures were screened and reduced to a list of 38 measures. This screening process removed some measures that were not relevant to the water use patterns of the City of San Francisco. For example, several wholesale conservation measures were related to residential outdoor use, of which there is very little in San Francisco.

The SFPUC employed the same end-use models used in water demand forecasting to compute the cost-effectiveness of each conservation measure for the retail service area based on data gathered regarding market potential, cost of implementing the conservation measures, and other implementation factors. Using the results of this benefit-cost analysis and considering factors such as geographic conditions, water use patterns, budgetary consideration, and ease of implementation, the SFPUC developed three conservation packages: Programs A, B, and C.

Program A consists of the measures San Francisco is currently implementing. Program B includes all the elements of Program A plus additional measures that reflect an expansion of the current conservation program to an achievable, socially acceptable level that the SFPUC believes it can fund. (Moving to Program B will require a considerable expansion in current funding, but it is assumed that this expansion is reasonable.) Program C consists of Program B plus four additional measures and represents an upper bound of conservation that is considered achievable and fundable. The difference between Programs B and C is based on possible improvements in technology and information. For example, dishwasher rebates are included in Program C only because the current models of efficient dishwashers do not show significant water savings; these rebates are included in Program C assuming the potential water efficiency of dishwashers will improve.

Together, the three different programs represent a reasonable range of conservation potential for long-range planning purposes. A benefit-cost analysis was conducted for each of the three conservation programs as a whole to indicate program cost-effectiveness. The results of the benefit-cost analyses are presented in Table 6. Potential savings due to plumbing code changes in the SFPUC retail service area (estimated to be 10.3 mgd in the year 2030) are also presented in Table 6.

3.2 SFPUC SERVICE AREA TOTAL WATER CONSERVATION POTENTIAL FOR 2030

Table 6 presents the results of the cost-effectiveness analysis for the SFPUC retail and wholesale service areas. Table 7 presents the results for the individual SFPUC wholesale customers. Results are provided for the range of conservation potential associated with implementation of Programs A, B, and C. The range of conservation potential reflects a potential water savings associated with packages of specific conservation measures chosen by the City and by the individual wholesale customers that are considered implementable in their individual service areas. The tables also include an estimate of the savings associated with the effects of plumbing code changes that result in more water-efficient toilets, showerheads, and clothes washers.

Each wholesale customer was involved in developing the packages of conservation measures that form its conservation programs and concurred in writing with the range of savings presented in its conservation evaluation.

SECTION THREE

Evaluation of Conservation Potential In the SFPUC Service Area

As previously stated, the results of the SFPUC studies, such as those presented in Tables 6 and 7, do not necessarily represent water savings to the SFPUC regional water system because many wholesale customers have multiple sources of water supply. Each wholesale customer is responsible for its own water management decisions and for determining what available water supplies it will use to meet its projected 2030 total water demand, including increased water use efficiency.

Table 6
Program-Specific Conservation Evaluation Results for SFPUC Service Areas

SFPUC Customer Conservation Program	Water Utility Benefit-Cost Ratio (30-Year Period)	Present Value of Water Utility Costs (\$1,000) (30-Year Period)	2030 Water Savings due to Conservation Programs (mgd)	2030 Outdoor Only Water Savings due to Conservation Programs (mgd)	Cost of Water Saved (\$/AF) (30-Year Period)	Total Potential 2030 Water Savings (mgd)
<i>SFPUC TOTAL Wholesale Customer Service Area</i>						
(Plumbing Code) ¹	NA	NA	-	NA	NA	25.4
Program A	1.95	\$62,601	7.7	3.5	\$280	33.1 ²
Program B	2.35	\$93,385	14.5	7.8	\$235	40.0 ³
Program C	2.50	\$117,866	19.6	10.6	\$226	45.0 ⁴
<i>SFPUC Retail Service Area</i>						
(Plumbing Code) ¹	NA	NA	-	NA	NA	10.3
Program A	3.30	\$6,901	0.64	0.03	\$326	10.9 ²
Program B	4.11	\$24,085	3.5	0.08	\$262	13.8 ³
Program C	4.19	\$25,663	4.0	0.08	\$257	14.3 ⁴

Notes:

1. Value of water estimated at \$1,076/AF. For those agencies with multiple sources of supplies, some chose to use a blended cost of water (see URS 2004b)

2. Present value is calculated using an effective discount rate of 3%.

3. Monetary values have been rounded to the nearest dollar.

¹Plumbing code savings represent water use savings associated with the natural replacement of plumbing fixtures with water-efficient models (i.e., toilets, showerheads, or washing machines).

²Includes plumbing code savings and Program A savings.

³Includes plumbing code savings and Programs A and B savings.

⁴Includes plumbing code savings and Programs A, B, and C savings.

AF – acre-feet

mgd – million gallons per day

NA – Not Applicable

Table 7 Program-Specific Conservation Evaluation Results by SFPUC Wholesale Customer

SFPUC Wholesale Customer	Water Utility Benefit-Cost Ratio (30-Year Period)			Present Value of Water Utility Costs (\$1,000) (30-Year Period)			2030 Water Savings due to Conservation Programs (mgd)			2030 Outdoor Water Savings due to Conservation Programs (mgd)			Cost of Water Saved (\$/AF) (30-Year Period)			
	A	B	C	A	B	C	(Plumbing Code)	A	B	C	A	B	C	A	B	C
Alameda County Water District	1.64	1.44	1.51	\$8,207	\$14,977	\$15,321	4.75	2,020	3,159	3,483	1,273	1,781	1,979	\$153	\$175	\$164
Benhaim, City of	1.04	7.90	7.49	\$46	\$73	\$100	0.16	0.002	0.041	0.050	0.000	0.035	0.035	\$640	\$80	\$84
Burlingame, City of	1.57	2.15	2.22	\$1,600	\$2,073	\$3,027	0.63	0.113	0.245	0.375	0.017	0.083	0.134	\$920	\$300	\$291
CWS - Bear Gulch District	2.43	3.84	3.74	\$1,986	\$3,709	\$3,925	1.08	0.217	0.930	0.962	0.068	0.635	0.658	\$275	\$165	\$169
CWS - Mid Peninsula District	1.33	1.66	1.52	\$7,293	\$10,407	\$14,204	2.08	0.415	0.863	1.166	0.038	0.167	0.375	\$497	\$394	\$425
CWS - South San Francisco District	1.08	1.62	1.75	\$4,345	\$6,511	\$6,700	0.92	0.208	0.560	0.650	0.047	0.139	0.170	\$608	\$400	\$307
Coastside County Water District	2.15	2.16	1.86	\$1,098	\$1,337	\$2,297	0.26	0.125	0.183	0.239	0.071	0.115	0.135	\$302	\$299	\$348
Daly City, City of	1.52	1.91	1.86	\$1,242	\$4,759	\$5,604	1.06	0.093	0.448	0.531	0.020	0.076	0.106	\$438	\$342	\$350
East Palo Alto, City of	1.47	2.26	2.26	\$134	\$866	\$1,402	0.33	0.069	0.092	0.163	0.001	0.024	0.043	\$462	\$293	\$289
Estero MID	5.29	5.89	5.01	\$1,585	\$1,817	\$2,405	0.42	0.469	0.624	0.720	0.373	0.479	0.538	\$122	\$109	\$128
Gratiot Valley MID	0.63	20.15	18.34	\$30	\$7	\$64	0.03	0.001	0.097	0.098	0.000	0.096	0.096	\$1,058	\$32	\$35
Hayward, City of	2.51	2.53	2.83	\$1,461	\$4,268	\$6,288	1.45	0.195	0.755	1.202	0.042	0.493	0.511	\$264	\$248	\$222
Hillborough, Town of	2.65	6.51	6.09	\$461	\$712	\$1,031	0.17	0.056	0.308	0.427	0.020	0.259	0.353	\$251	\$97	\$103
Los Trancos County Water District	2.08	2.02	1.81	\$15	\$20	\$31	0.01	0.002	0.002	0.003	0.001	0.002	0.002	\$321	\$321	\$356
Menlo Park, City of	1.97	9.41	4.04	\$144	\$269	\$1,408	0.22	0.014	0.160	0.349	0.005	0.141	0.243	\$342	\$68	\$158
Mid-Peninsula Water District	1.74	3.04	1.84	\$576	\$738	\$1,558	0.40	0.048	0.102	0.129	0.016	0.016	0.016	\$384	\$317	\$358
Millbrae, City of	1.45	1.75	2.71	\$1,168	\$1,296	\$1,549	0.34	0.078	0.113	0.236	0.016	0.051	0.130	\$455	\$375	\$377
Milpitas, City of	2.55	3.89	3.72	\$2,578	\$2,762	\$4,175	0.72	0.361	0.601	0.968	0.108	0.277	0.336	\$253	\$166	\$171
Mountain View, City of	1.61	4.78	4.60	\$2,986	\$3,391	\$4,494	1.20	0.241	0.945	1.207	0.056	0.760	0.822	\$400	\$132	\$137
North Coast County Water District	1.51	1.82	1.99	\$1,814	\$1,975	\$2,704	0.55	0.126	0.185	0.300	0.028	0.073	0.125	\$437	\$358	\$323
Palo Alto, City of	2.99	2.64	2.68	\$1,396	\$3,179	\$3,943	1.24	0.229	0.466	0.592	0.108	0.174	0.230	\$219	\$345	\$341
Purisima Hills Water District	6.24	6.41	10.02	\$149	\$185	\$411	0.02	0.055	0.077	0.388	0.043	0.066	0.278	\$104	\$99	\$63
Redwood City, City of	2.45	2.44	2.40	\$3,058	\$6,533	\$7,949	1.51	0.593	0.828	1.026	0.292	0.489	0.546	\$270	\$267	\$270
San Bruno, City of	1.42	1.90	2.08	\$422	\$1,929	\$2,297	0.68	0.028	0.185	0.266	0.004	0.028	0.082	\$476	\$342	\$319
San Jose, City of (portion of north San Jose)	4.55	4.55	11.25	\$563	\$571	\$896	0.17	0.155	0.157	0.395	0.054	0.054	0.485	\$139	\$140	\$57
Santa Clara, City of	1.72	2.12	2.03	\$5,441	\$6,064	\$7,683	1.77	0.647	1.011	1.233	0.276	0.568	0.633	\$298	\$238	\$248
Skyline County Water District	1.47	2.32	1.90	\$82	\$82	\$150	0.04	0.003	0.009	0.015	0.000	0.001	0.004	\$447	\$279	\$339
Stanford University ¹	2.43	2.19	2.24	\$3,515	\$5,431	\$5,509	0.42	0.488	0.646	0.663	0.341	0.491	0.491	\$306	\$335	\$330
Stamvale, City of	1.95	2.15	2.78	\$6,470	\$6,615	\$10,071	2.72	0.640	0.711	1.396	0.199	0.199	0.779	\$333	\$304	\$231
Westborough Water District	0.76	0.81	1.61	\$463	\$579	\$673	0.13	0.015	0.020	0.055	0.001	0.001	0.031	\$868	\$815	\$408

Source: DSS Models

Note:
 1. Monetary values have been rounded to the nearest dollar.
 2. Plumbing code savings represent water use savings associated with the natural replacement of plumbing fixtures with water-efficient models (i.e., toilets, showerheads, and washing machines).
 3. Stanford University's model used 2000 for its base year rather than 2001, therefore Stanford University's numbers reflect water savings in the year 2023.
 CWS - California Water Service (Company)
 mgd - million gallons per day
 MID - Municipal Improvement District

SECTION FOUR

4.1 SFPUC SERVICE AREA EVALUATION OF RECYCLED WATER POTENTIAL

Recycled water has been used in the SFPUC service area since the early 1990s. The SFPUC evaluated the potential for additional recycled water in the retail and wholesale service areas to estimate the future potential for recycled water use in the SFPUC service area.

Potential recycled water demands for the Bay Area were previously projected through the Bay Area Regional Water Recycling Program (BARWRP)⁷ Master Plan in 1999. The BARWRP study was a market assessment of areas in the Bay Area that could use recycled water. The BARWRP study did not focus on the feasibility of implementing recycled water projects.

The purpose of the SFPUC wholesale recycled water study was to gather and document the most recent information relating to on-going recycled water activities, plans to expand recycled water use in the future, and the amount of potable supplies that could potentially be offset by future recycled water uses. The recycled water study currently under way for the SFPUC retail service area is investigating the potential for developing and using recycled water in the City. The following paragraphs briefly describe these two studies.

4.1.1 Evaluation of SFPUC Wholesale Customer Service Area Recycled Water Potential

The objective of the SFPUC wholesale customer service area recycled water study was to provide current estimates of recycled water potential for the wholesale customers. The recycled water potential was determined from information provided directly by contacted wastewater and water agencies. Recycled water potential is summarized for the SFPUC wholesale service area under three main categories: (1) *Current (2004) Recycled Water Projects*, (2) *Planned and Being Implemented Recycled Water Projects*, and (3) *Under Study or Previously Studied Recycled Water Projects*. Table 8 presents the totals for each category and provides the **Total Recycled Water Project Potential (2020)** for each applicable wholesale customer. The approximate range of total recycled water project potential for the year 2020 is estimated to be between 39.6 and 46.0 mgd for the SFPUC wholesale customer service area, which includes 12.6 mgd of current recycled water project use and approximately 27.0 – 33.4 mgd of additional recycled water potential.

4.1.2 Evaluation of SFPUC Retail Service Area Recycled Water Potential

The City and County of San Francisco is currently preparing a Recycled Water Master Plan Update to provide guidance for the implementation of recycled water projects in the City. The development of recycled water will help San Francisco meet its long-term water supply needs while increasing its overall water supply reliability.

The Recycled Water Master Plan Update builds upon recycled water plans and studies conducted in the City in the 1990s. It will consider new technologies as well as potential new markets for

⁷ BARWRP was originally formed in the late 1990s as part of a regional master planning effort dedicated to promoting beneficial water recycling in the Bay Area. In 1999 BARWRP completed a comprehensive Regional Water Recycling Master Plan (BARWRP 1999) to assess the future feasibility of water recycling in the Bay Area. The SFPUC and SCVWD were co-lead agencies in BARWRP. BAWSCA was also major participants in this process.

recycled water. The draft Plan is scheduled to be complete in the summer of 2005. The final Plan including the CEQA review process will be complete in 2006, so that construction of recycled water projects can begin. The document will present a range of recycled water potential within the corporate limits of the City and County of San Francisco, including the San Francisco International Airport (SFIA). Other opportunities for recycled water use by retail users outside the city limits are being considered on a case-by-case basis, such as Sharp Park in Pacifica. Preliminary estimates suggest that the potential for recycled water use in the western portion of San Francisco by 2020 could be approximately 7 mgd. Potential for recycled water use in other portions of San Francisco is being considered in the Master Planning process.

4.2 SFPUC SERVICE AREA TOTAL RECYCLED WATER POTENTIAL RESULTS

Table 8 presents the results for the evaluations of the recycled water potential for the SFPUC retail and wholesale service areas by project category. Because some wholesale customers have multiple sources of water supply, these volumes do not represent offsets to any specific source of potable supply.

It is interesting to note that the results of the SFPUC studies presented in Table 8 (ranging from approximately 46.6 to 53 mgd), which includes the preliminary ranges for the SFPUC retail service area, are relatively consistent with the 1999 BARWRP⁸ ultimate projections for recycled water potential in the SFPUC service area (approximately 54.9 mgd).⁹

⁸ Source: BARWRP 1999.

⁹ These potentials do not include environmental uses of recycled water.

**Table 8
Summary of SFPUC Service Area Recycled Water Potential**

SFPUC Service Area Recycled Water Project Area(s)	Current (2004) Recycled Water Projects Average Annual Yield (mgd)	Planned and Being Implemented Recycled Water Projects Average Annual Yield (mgd)	Additional Potential Projects			Total Recycled Water Potential (2020) (Current and Additional Potential) Average Annual Yield (mgd)
			Under Study or Previously Studied Recycled Water Projects Average Annual Yield (mgd)	Subtotal - Additional Potential Projects Average Annual Yield (mgd)		
ACWD/Union Sanitary District	3.5	0	1.5	1.5	5	
City of Burlingame	0	0	3.9	3.9	3.9	
Coastside County Water District (Half Moon Bay)	0	0	0.5	0.5	0.5	
City of Hayward	0.2	0	8.3-10.3	8.3-10.3	8.5-10.5	
City of Millbrae	0.003	0	1	1	1.003	
North San Mateo County Sanitary District (Daily City)	0.001	2.77	0	2.77	2.771	
North Coast County Water District (Pacifica)	3.4	0.2	0	0.2	3.6	
Palo Alto RWQCP - Mountain View Project	0	1.3-1.7	0	1.3-1.7	1.3-1.7	
Palo Alto RWQCP - Other	1.5	0	2.26-4.18	2.26-4.18	3.76-5.68	
Redwood City Recycled Water Project	0.1	1.65-2.8	0	1.65-2.8	1.75-2.9	
South Bay Water Recycling Project ¹	3.1	0.19	1.91	2.1	5.2	
Cities of South San Francisco - San Bruno	0	0	TBD	TBD	TBD	
Stanford University	0	0	0.06-0.98	0.06-0.98	0.06-0.98	
City of Sunnyvale	0.81	0.18	1.3	1.48	2.29	
Subtotal - SFPUC Wholesale Customer Service Area	12.6	6.3-7.8	20.7-25.6	27.0-33.4	39.6-46.0	
SFPUC Retail Service Area²	0	0	7	7	7	
Total SFPUC Service Area	12.6	6.3-7.8	27.7-32.6	34.0-40.4	46.6-53.0	

Notes:

- Source for wholesale customer information: RMC 2004.
- Yields associated with each project(s) area and totals have been rounded to the nearest 0.1 mgd (there area a few exceptions per BA WSCA's request)

¹Includes portion of total project yields only for SFPUC wholesale customers (City of Milpitas, City of Santa Clara, and City of San Jose).

²Potential for recycled water use in the western portion of the City of San Francisco only.

ACWD - Alameda County Water District

mgd - million gallons per day

RWQCP - Regional Water Quality Control Plant

TBD - To Be Determined

Following the completion of the water demands, conservation, and recycled water potential studies, the customers were asked to provide the SFPUC with their best estimates of their SFPUC purchases for the year 2030. The 2030 water purchase estimates for the total SFPUC service area range from approximately 284 mgd to 300 mgd. Table 9 presents a comparison of the 2001 SFPUC customer purchases with the 2030 SFPUC water purchase estimates. The SFPUC will consider the results of the planning studies and the 2030 water purchase estimates as it moves forward with policy making and arrives at decisions on how much demand can be met by the SFPUC regional water system in 2030.

**Table 9
Summary of SFPUC 2001 Purchases and 2030 Purchase Estimates**

SFPUC Customer	2001 ¹		2030		
	FY01-02 SFPUC Purchases (mgd)	Percentage of 2001 Demand met by SFPUC Purchases	2030 Purchase Estimates (mgd)		Percentage of 2030 Demand Estimated as SFPUC Purchase (Low Range)
			Low	High	
Alameda County Water District	11.99	24.3%	13.76	NA	23.2%
Brisbane, City of	0.39	100%	0.89	NA	95.6%
Burlingame, City of	4.64	100%	4.70	NA	95.9%
CWS - Bear Gulch District	11.12	90.6%	11.60	NA	83.5%
CWS - Mid Peninsula District	16.75	100%	17.24	NA	95.3%
CWS - South San Francisco District	7.56	88.9%	7.97	NA	80.5%
Coastside County Water District	1.8	70.3%	2.24	3.02	70%
Daly City, City of	5.08	63.6%	4.90	7.32	53.9%
East Palo Alto, City of	2.04	100%	4.64	NA	96.6%
Estero MID/Foster City	5.62	100%	6.20	6.80	100%
Guadalupe Valley MID	0.3	100%	0.72	NA	88%
Hayward, City of	17.61	100%	27.95	NA	97.4%
Hillsborough, Town of	3.56	100%	3.70	NA	94.9%
Los Trancos County Water District	0.11	100%	0.16	NA	114.3%
Menlo Park, City of	3.57	96%	4.54	NA	96.6%
Mid-Peninsula Water District	3.46	100%	3.70	NA	97.3%
Millbrae, City of	2.47	100%	3.19	NA	96.6%
Milpitas, City of	6.83	59.3%	8.20	NA	46.3%
Mountain View, City of	10.97	89.4%	13.20	NA	89.2%
North Coast County Water District	3.45	100%	3.61	3.80	100%
Palo Alto, City of	13.19	99.4%	13.00	NA	88.4%
Purissima Hills Water District	2.2	100%	3.22	NA	97.7%
Redwood City, City of	11.64	100%	11.60	12.60	86.6%
San Bruno, City of	2.7	64.4%	4.30	NA	95.6%
San Jose, City of (portion of north San Jose)	4.42	96%	6.34	NA	97.6%
Santa Clara, City of	3.84	16.2%	4.90	NA	14.5%
Skyline County Water District	0.17	100%	0.30	NA	97.1%
Stanford University	2.36	68%	4.20	NA	61.8%
Sunnyvale, City of	9.69	43.6%	12.10	NA	45.2%
Westborough Water District	1.02	100%	1.20	NA	136.4%
Subtotal - SFPUC Wholesale Customer Service Area	171	63%	204	209	63%
SFPUC Retail Service Area	90	96%	80	91	86%
Total SFPUC Service Area	261	71%	284	300	68%

Note:

1. Subtotals and total SFPUC service area numbers are rounded to the nearest whole number.

¹Percentages are based on BAWUA 2002.

CWS - California Water Service (Company), FY - Fiscal Year, mgd - million gallons per day, MID - Municipal Improvement District,

NA - Not Applicable

- Bay Area Water Users Association (BAWUA). 2002. 2001–2002 BAWUA Annual Survey.
- Bay Area Regional Recycling Program (BARWRP). 1999. Recycled Water Master Plan. September.
- Maddaus Water Management. 2003. Demand-Side Management and Least-Cost Planning Decision Support System (DSS) Model.
- Maddaus Water Management. 2004. DSS SFPUC Wholesale Customer Models. August 31.
- Raines Melton & Carella, Inc. (RMC). 2004. SFPUC Wholesale Customer Recycled Water Potential. December.
- San Francisco Public Utilities Commission (SFPUC). 2004. City and County of San Francisco Retail Water Demands and Conservation Potential. November.
- URS Corporation. 2004a. SFPUC Wholesale Customer Water Demand Projections. November.
- URS Corporation. 2004b. SFPUC Wholesale Customer Water Conservation Potential. December.

Bay Area Water Supply and Conservation Agency Annual Survey - Form 2

City of Redwood City

Contact: Manny Rosas

Phone: (650) 780-7468 Email: mrosas@redwoodcity.org

Revised and Resubmitted to BAWSCA per P. Ingram Letter to SFPUC Dated Nov. 10, 2005

20 Year Period, 5 Year Increments: 2010 through 2030

Demand Projections by Source Comparison with Total Demand (mgd)*		2005	2010	2015	2020	2025	2030
Source of Supply							
San Francisco Public Utilities Commission***		11.4	10.8	11.2	11.4	11.5	11.6
Local Groundwater							
Local Surface Water							
Recycled Water (Potable Offset)		0.0	0.8	1.0	1.0	1.0	1.0
Conservation		0.4	1.1	0.8	0.8	0.8	0.8
Other Sources							
Total**		11.8	12.7	13.0	13.2	13.3	13.4
Demand (From 11/04 Demand Study)		12.1	12.7	13.0	13.2	13.3	13.4

*Conversion formula for ccf to mgd: $ccf \times 748 / 1,000,000 / 365$

**Source of Supply total should equal demand from 11/04 Demand Study.

***Source: Minute Order City Council Meeting Nov. 8, 2004 (MO. 04/207) & April 8, 05 Redwood City Best Estimate of

Water Purchases Memo

Redwood City Supply Assurance-MGD: 10.93

Redwood City Supply Assurance-AF/yr: 12,243

Demand Projections by Source Comparison with Total Demand (af/yr)*		2005	2010	2015	2020	2025	2030
San Francisco Public Utilities Commission***		12,768	12,096	12,544	12,768	12,880	12,992
Local Groundwater							
Local Surface Water							
Recycled Water (Potable Offset)		0	896	1,120	1,120	1,120	1,120
Conservation		448	1,232	896	896	896	896
Other Sources							
Total**		13,216	14,224	14,560	14,784	14,896	15,008
Demand (From 11/04 Demand Study)		13,552	14,224	14,560	14,784	14,896	15,008

Nov. 7, 2005

November 10, 2005

Paula Kehoe
Manager of Water Resources Planning
San Francisco Public Utilities Commission
1145 Market Street, Suite 401
San Francisco, CA 94103

SUBJECT: REVISED REDWOOD CITY BEST ESTIMATE OF WATER PURCHASES

Dear Ms. Kehoe,

On April 8, 2005, Redwood City provided its best estimate of future purchases from the SFPUC regional water system in five-year increments. Those projections showed a range of purchases for 2025 and 2030, consistent with the August 2004 "Best Estimate" for planning purposes submittal to the SFPUC. At the time, the 1.0 MGD difference represented the pending approval of recycled water use to offset potable water demand on the regional system. Subsequently, the City Council of Redwood City has approved the implementation of the Redwood City Recycled Water Project, and staff has refined the purchase projections accordingly. The table below has been revised to show the new projections, which will be incorporated into the 2005 Redwood City Urban Water Management Plan. Please ensure that the revised amounts are incorporated into the SFPUC's long-term planning process and, as applicable, reflected in the San Francisco Urban Water Management Plan.

Year	Projected SFPUC Purchases – MGD (lower)	Projected SFPUC Purchases – MGD (higher)
2010	10.8	-
2015	10.3 11.2	-
2020	10.7 11.4	-
2025	11.1 11.5	12.1
2030	11.6	12.6

If you have any questions, please feel free to call me at 650-780-7466.

Sincerely,

PETER C. INGRAM
Public Works Services Director

Copy: Karen Hurst, SFPUC
Nicole Sandkulla, BAWSCA
Manny Rosas, Public Works Superintendent
Chu Chang, Engineering & Construction Manager
John Whitcomb, UWMP Consultant

APPENDIX E

**WATER SHORTAGE CONTINGENCY
ORDINANCE**

ORIGINAL

DES:d 05/17/90 (001/9)

DES:djk 05/21/90R

DES:djk 06/11/90R

ORDINANCE NO. 2018

JUN 25 1990

ORDINANCE DETERMINING AND DECLARING WATER SHORTAGE EMERGENCY, ESTABLISHING REGULATIONS AND RESTRICTIONS ON THE DELIVERY AND CONSUMPTION OF WATER, AND ESTABLISHING PENALTIES FOR VIOLATIONS THEREOF

THE COUNCIL OF REDWOOD CITY DOES ORDAIN, AS FOLLOWS:

SECTION 1. FINDINGS AND DETERMINATIONS. The Council of Redwood City hereby finds and determines that:

- (a) Pursuant to agreement dated as of August 8, 1984, by and between the City of Redwood City, California, and the City and County of San Francisco, California, the City of Redwood City purchases water for municipal purposes and for resale to customers and users of its water system.
- (b) A generally prevailing condition of drought has seriously reduced the supply of water available to the City and County of San Francisco and the City of Redwood City.
- (c) The City and County of San Francisco, acting by and through the San Francisco Water Department pursuant to direction of the Public Utilities Commission of said City and County, has requested that all of its water resale customers, including the City of Redwood City, immediately institute a water conservation program designed to effect an annual reduction in water usage equal to 25 percent of the water usage for corresponding periods of time in 1987.
- (d) The ordinary demands and requirements of water customers and users of the water system of the City of Redwood City cannot be satisfied without depleting the water supply of the City to the extent that there would be insufficient water for human consumption, sanitation, and fire protection.
- (e) On June 11, 1990, following notice duly given, a public hearing was held by this Council at which all consumers of the water supply of the City of Redwood City had an opportunity to be heard on the question of the existence of a water shortage emergency condition, to protest against the declaration thereof, and to present their respective needs to the Council.
- (f) The rules, regulations, and restrictions set forth in this ordinance on the delivery of water and the consumption within the water service area of the City

of Redwood City of water supplied for public use are intended to conserve the water supply of said City for the greatest public benefit with particular regard to domestic use, sanitation, and fire protection.

- (g) The specific water uses prohibited or restricted by this ordinance are non-essential, if allowed would constitute waste of the water supply of the City of Redwood City, and should be prohibited or restricted pursuant to the provisions of Water Code Sections 350, et seq., the authority granted this Council pursuant to the Charter of the City of Redwood City, and the common law.
- (h) The actions taken by and under this ordinance are exempt from the provisions of Sections 21000, et seq., of the Public Resources Code pursuant to Title 14, California Administrative Code, Section 15269 as specific actions necessary to prevent or mitigate an emergency.

SECTION 2. DECLARATION OF EMERGENCY. This Council hereby declares, based upon the findings and determinations of Section 1 hereof, that a water shortage emergency condition prevails within the water service area of the City of Redwood City.

SECTION 3. DEFINITIONS. For purposes of this ordinance, the following words or phrases shall have the meanings respectfully ascribed thereto:

(a) Base Year - Calendar year 1987; provided, that for users whose bi-monthly billing period includes the months of December-January, the base year shall be February 1, 1987 - January 31, 1988.

(b) Billing Period - That bi-monthly or monthly period for which the City measures and determines the quantity of water furnished to premises and calculates a water quantity charge therefor. As used in this ordinance, any billing period of the base year shall include any portion of such billing period which

may have occurred in the year preceding or following the base year.

(c) City - The City of Redwood City, a municipal corporation of the State of California.

(d) Council - The Council of Redwood City, governing body of the City.

(e) Director - The Director of General Services of the City, or his or her duly authorized deputy, officer, employee or agent.

(f) Person - Any person, firm, association, organization, partnership, business trust, corporation, company, or public agency.

(g) Premises - Any parcel of land or any improvement thereon, or any portion of such parcel of such improvement to which water is furnished by the City's water system, and for which water quantity charges are assessed.

(h) Public Agency - Any user which uses any premises for a public use or a quasi-public use, as such terms are defined and described in Ordinance No. 1130, as amended, the Redwood City Zoning Ordinance.

(i) Unit - The unit of measure of water. One unit equals 100 cubic feet of water, or 748 gallons.

(j) User - Any person who purchases or is otherwise furnished, or uses, water from the water system of the City, whether such person resides within or without the corporate limits of the City.

(k) Water - Water furnished by, through, or from the water system of the City.

SECTION 4. PROHIBITION. It shall be, and hereby is declared unlawful for any person to use water obtained from the water system of the City for non-essential uses hereinafter in Section 5 set forth.

SECTION 5. NON-ESSENTIAL USES. The following uses of water are hereby determined and declared non-essential, except as expressly to the contrary hereinafter provided:

(a) Allotments. The use of water in excess of the individual monthly allotments for each user calculated in accordance with the following formulae:

- (1) For the months of December and January through March, inclusive:

$$A_{mw} = 0.9 M_w; \text{ and}$$

- (2) For the months of April through November, inclusive:

$$A_{md} = 0.9 M_w + 0.4 (M_d - M_w),$$

where:

A_{mw} is the monthly allotment (expressed in units) for the months of December and January through March, inclusive ("wet-weather months"), established for each user so long as this ordinance shall remain in effect;

M_w is the average monthly consumption of water calculated for each user based upon actual consumption of such user during the months of December and January through March, inclusive, of the user's base year;

A_{md} is the monthly allotment (expressed in units) for the months of April through November, inclusive, ("dry-weather months") established for each user so long as this ordinance shall remain in effect;

Md is the average monthly consumption of water calculated for each user based upon actual consumption of such user during the months of April through November, inclusive, of the user's base year.

- (3) Notwithstanding the foregoing, no such allotment shall be less than 10 units in any bi-monthly billing period, or 5 units in any monthly billing period for water provided to any single family dwelling unit of any residential premises.
- (4) Notwithstanding the allotments provided pursuant to (1) and (2) above, in any bi-monthly billing period in which the factor 0.9 Mw exceeds 40 units or in any monthly billing period where said factor exceeds 20 units of water provided to any single family dwelling unit of any residential premises, the use of water in excess of said 40 units or 20 units, respectively, shall be deemed non-essential.
- (5) Notwithstanding the allotments provided pursuant to (1) and (2) above, for any month in which the actual consumption of water is less than the corresponding allotment for said month, the difference between said allotment and the actual consumption shall be credited toward any use of water in excess of the individual monthly allotments in any succeeding months; provided, that said credits shall be applied in each instance against the amount of excess usage to the greatest effect to reduce the amount of excess, such that credits shall not be retained or accumulated when excess usage occurs.

(b) Specific Uses Prohibited. Any of the following methods, types, or techniques of use, or activities or circumstances relating to, or associated with, water use:

- (1) Defective Equipment - Use of water through, with, or by any plumbing, sprinkler, watering or irrigation system, or other device, equipment or appliance which is broken or defective, or which, for any reason, consumes or fails to use water in the ordinary and customary manner or quantity for which it was designed, constructed or manufactured.
- (2) Surface Flow - Any use of water in any manner which causes, allows or permits the flooding of any premises, or any portion thereof, or which causes, allows, or permits water to escape from any premises or any portion thereof and flow therefrom into gutters, streets, or any surface water drainage system.

- (3) Vehicles - The use of any hose or similar device without a nozzle, valve, or other shut-off mechanism attached thereto, for washing or cleaning any automobile, truck, trailer, trailer house, boat, mobile home, camper, recreational vehicle, or any other vehicle by directing water at or upon such vehicle; or the use of any such hose with such nozzle, valve, or other shut-off mechanism attached thereto for such purpose, but without activating such mechanism so as to control the flow of water to the minimum amount necessary to complete the task.
- (4) Building Exteriors - The use of any hose or similar device, irrespective of whether a nozzle, valve, or other shut-off mechanism is attached thereto, for washing or cleaning the exterior surface of any dwelling, garage, commercial or industrial building, or appurtenance thereto, including, but not limited to, sidewalks, walkways, driveways, patios, parking lots, tennis courts, or similar or like hard-surfaced areas by directing water at or upon such surface.
- (5) Swimming Pools - The use of water for filling any new, or completely refilling any existing, swimming pool, basin, lake, lagoon, or other contrivance for holding water for swimming, or other recreational or decorative purpose.
- (6) Fountains - The use of water to clean, fill, or maintain operating levels in decorative fountains, or similar or like ornamental structures.
- (7) Construction - The use water in construction projects for backfill consolidation or compaction, or for dust control purposes; provided, however, that the Director may permit such use of water upon written application therefor pursuant to the provisions of Section 6 hereof, upon a determination by the Director that no other source of water for such purpose is available, or that no other method of compaction, consolidation, or dust control is reasonably available.
- (8) Irrigation Facilities - The use of new irrigation facilities, or the use of extended, expanded or enlarged portions of existing such facilities; provided, however, that nothing herein contained shall prohibit the construction or installation of such facilities so long as they are not supplied with water, or placed in use; provided, further, that the Director may permit such use of water upon written application therefor pursuant to the provisions of Section 6 hereof upon a determination by the Director that such use shall be in conjunction with an irrigation system and

landscaping expressly designed for reduced ("low-water") consumption.

- (9) Restaurants - The service of water by any restaurant, or other eating or refreshment establishment, to any patron thereof except upon the specific request by a patron for such service.

SECTION 6. EXCEPTIONS; ADJUSTMENTS. (a) New or Changed Usage. For any premises to which water was not furnished during the base year, or any portion thereof, and for any premises for which a change in the type of occupancy has occurred from that during any billing period of the base year, the Director shall, at the time application for water service to such premises is made, establish a standard quantity of water consumption to be used in lieu of the actual amount of water furnished during corresponding billing periods of the base year for purposes of determining allotments pursuant to Section 5(a) hereof. "Change in the types of occupancy" as used herein means a change in the use of the premises from one type of usage permitted in the zoning district within which the premises is located to another type of usage, or to a different degree of the same usage permitted in such district, or a change in the use of the premises from one type of usage permitted in one zoning district to another type of usage, or to a different degree of the same usage permitted in a different zoning district. The standard quantity of water to be established by the Director hereunder shall be based upon the average consumption of users during billing periods of the base year having similar consumption characteristics to that of the new user to whom the standard is to apply. Such standard quantity shall be the same for all such

new users similarly situated as to consumption characteristics. "Consumption Characteristics" for purposes of establishing standard quantities of water shall include the number of persons located at the premises, prior use by the same household, lot size, and such other criteria as the Director determines to be relevant.

(b) Existing Usage. The Director is hereby authorized to grant to any person or user (1) an adjustment to the allotments set forth in Section 5(a) hereof, and, (2) an exception to the prohibitions set forth in Section 5(b) hereof, upon a finding by him that such adjustment or exception is necessary to prevent an emergency condition affecting the health, sanitation, or fire protection for, or creating an economic hardship upon, such person or user, or his or her property, and that the person or user to whom such adjustment or exception pertains has adopted or used all practicable water conservation measures.

Adjustments or exceptions permitted under this Section 6(b) shall be made only upon written application therefor to the Director setting forth a statement of justification for such adjustment or exception. The Director may attach conditions, specifications, or other qualifying provisions to any adjustment or exception granted pursuant hereto in furtherance of the general purposes of this ordinance, or any provision hereof.

Use of water by any person or user in accordance with the provisions of any adjustment or exception duly granted by the Director shall not be deemed a non-essential use.

SECTION 7. EXCESS WATER USE CHARGES. Excess water use charges are hereby established in the following amounts for the amounts of water consumed, respectively, by any user in excess of the water use allotment established for such user under Section 5(a) hereof, for any billing period:

<u>CHARGE PER UNIT</u>	<u>USAGE OVER ALLOTMENT</u>
\$ 2.00	0 - 10%
\$ 4.00	10.01 - 25%
\$ 6.00	over 25%

SECTION 8. ADMINISTRATIVE CHARGE. Upon a determination by the Director that a user has consumed or used water in violation of any of the provisions of subdivision (b) of Section 5, above, the Director may issue an order to cease and desist from such violation, and further order such user to comply forthwith with the prohibitions specified in said subsection. If, after the issuance of such cease and desist order, such user continues to consume, or use, or again consumes or uses water in violation of any provision of said subdivision, the Director may impose an administrative enforcement charge in the amount of Fifty Dollars (\$50.00) for each such violation. Said administrative enforcement charge is hereby established at the foregoing amount to compensate the City for the costs of enforcing the foregoing provisions of this ordinance, and shall be added to, and collected with, the water quantity charges periodically billed to the user found to be in violation of said provisions. Nothing contained in this section shall be deemed a limitation upon the enforcement of other provisions of this ordinance with respect to the violations herein specified.

SECTION 9. FLOW RESTRICTING DEVICES. Upon a determination by the Director that a user has consumed or used water in violation of any of the provisions of this ordinance, or of any adjustment or exception granted pursuant to the provisions of Section 6(b) hereof, the Director may issue an order to cease and desist from such violation, and further order such user to comply forthwith with such provisions, adjustment, or exception, or otherwise to take appropriate remedial or preventative action. If, after the issuance of such cease and desist order, such user continues to consume or use, or again consumes or uses water in violation of any such provision, adjustment, or exception, the Director may order the installation of a flow restricting device upon the water service line to the premises of such user. Such flow restricting device shall be installed and maintained for a period of not less than three days nor more than ten days for a first violation, and shall be installed and maintained for not less than ten days for each succeeding violation, and may be ordered to remain installed and maintained for the duration of the emergency declared herein upon a finding by the Director that any user is habitually in violation of any of the provisions of this ordinance, or the provisions of any adjustment or exception granted pursuant to Section 6(b) hereof.

There are hereby established, and there shall be imposed and levied, charges for the installation and removal of flow restricting devices under this Section in accordance with the following schedule:

<u>Water Meter Size</u>	<u>Installation Charge</u>	<u>Removal Charge</u>
5/8" to 1", inclusive	\$50	\$50
1-½" to 2", inclusive	\$100	\$100
3" and larger	Actual cost, determined by the Director	Actual cost determined by the Director

SECTION 10. DISCONTINUANCE OF SERVICE. Upon a determination by the Director that a user has consumed water in violation of any of the provisions of this ordinance, or of any adjustment or exception granted pursuant to Section 6(b) hereof, the Director may issue an order to cease and desist from such violation, and further order such user to comply forthwith with such provisions, adjustment or exception, or otherwise to take appropriate remedial or preventative action. If, after the issuance of such cease and desist order, such user continues to consume or use, or again consumes or uses water in violation of any such provision, adjustment or exception, the Director may, subject to the provisions for notification and hearing hereinafter set forth, discontinue water service to the premises of such user.

Prior to the discontinuance of water service to any premises, the Director shall give written notice of intention to discontinue such service, and of hearing to be held by the Director upon the question of termination, not less than ten days prior to such hearing. A user determined to be in violation of the provisions of this ordinance, or of any adjustment or exception issued pursuant to Section 6(b) hereof, the owner of the premises (if not such user), and such other persons as the Director may deem appropriate, shall be heard at the hearing on the question of termination. If, upon completion of the hearing,

the Director finds that no violation has occurred, the Director shall order that the service shall not be terminated. If, upon completion of the hearing, the Director determines that such violation has occurred, or is occurring, the Director may order the water service to be terminated, or may order that service be terminated within a specified period of time unless such violation or the conditions or activities causing such violations cease forthwith, or within a specified period of time, or the Director may make such other order as he or she deems appropriate under the circumstances and in furtherance of the purposes and intent of this ordinance.

SECTION 11. APPEALS. (a) Water Conservation Committee.

(1) Established. There is hereby established a Water Conservation Committee which shall consist of three (3) members appointed by the Council. The term of office for each member of the Committee shall expire 120 days following the repeal of this ordinance, or upon such earlier date as the Committee shall determine in order to complete its pending business upon such repeal; provided, that if this ordinance is not repealed within three years of the date of its adoption, the term of office of each member of the Committee shall be three years. The Committee shall elect one of its members to be its chairperson, and another such member to be its secretary. The chairperson shall preside over all meetings of the Committee, and the secretary shall keep accurate records of proceedings before the Committee.

Upon notification by the City Clerk of the filing of an appeal pursuant to subdivision (2) hereof, the Committee shall

meet upon the call of the chairperson, who shall direct the City Clerk to notify the appellant of the time, date and place of the hearing on the appeal. All decisions of the Committee shall be prepared in writing, and signed by the chairperson. The City Manager shall designate a member of the City's staff to assist the Committee and to carry out administrative functions thereof.

(2) Appeals to Committee. Any user aggrieved by a determination, order, or directive of the Director made pursuant to the provisions of subdivisions (a) and (b) of Section 6, Section 8, Section 9 or Section 10 of this ordinance may appeal such determination, order, or directive to the Water Conservation Committee. Written notification of such appeal shall be filed with the City Clerk within ten (10) days after notification of the determination, order, or directive of the Director, and shall set forth in detail the facts and reasons supporting the appeal. Hearing on the appeal shall be held by the Committee within thirty (30) days from the date of filing the notice of appeal. The appellant, the Director, and such other persons as the Committee may deem appropriate, shall be heard at the hearing on appeal. Upon conclusion of the hearing, the Committee may affirm, reverse, or modify the determination, order or directive of the Director as the Committee deems just and equitable, and in furtherance of the provisions, purposes and intent of this ordinance. During the pendency of any such appeal, the determination, order or directive of the Director shall remain in full force and effect. All decisions of the Committee shall be in writing and shall be delivered personally or sent to the

appellant by first class (or equivalent) postage prepaid mail.

(b) Appeals to Council. Any user aggrieved by a determination, order, or directive of the Water Conservation Committee made pursuant to the provisions of subdivision (a)(2) hereof may appeal such determination, order, or directive to the Council. Written notification of such appeal shall be filed with the City Clerk within ten (10) days after notification of the determination, order, or directive of the Committee, and shall set forth in detail the facts and reasons supporting the appeal. Hearing on the appeal shall be held by the Council within thirty (30) days from the date of filing the notice of appeal. The appellant, the Director, and such other persons as the Council may deem appropriate, shall be heard at the hearing on appeal. Upon conclusion of the hearing, the Council may affirm, reverse or modify the determination, order or directive of the Committee as the Council deems just and equitable, and in furtherance of the provisions, purposes, and intent of this ordinance. During the pendency of any such appeal, the determination, order or directive of the Committee shall remain in full force and effect. The Council's action on the appeal shall be final.

SECTION 12. PENALTY. Any person violating, or causing the violation of, any of the provisions of this ordinance or of the provisions of any adjustment or exception granted pursuant to the provisions of Section 6(b) hereof, shall be guilty of a misdemeanor and, upon conviction thereof, shall be punishable by a fine of not more than One Thousand Dollars (\$1,000.00) or imprisonment for a term not exceeding thirty days, or by both

such fine and imprisonment. Every day, or any portion thereof, any violation of any provision of this ordinance, or of any provision of any adjustment or exception granted pursuant to the provisions of Section 6(b) hereof, shall continue, shall constitute a separate offense and shall be punishable as hereinbefore provided.

SECTION 13. REMEDIES CUMULATIVE. The remedies and penalties provided for in this ordinance shall be cumulative and not exclusive, and shall be in addition to any or all other remedies available to the City.

SECTION 14. NOTICES. Notices required to be given pursuant to the provisions of this ordinance shall be in writing, may be combined with water service bills or other written communications, and shall be delivered personally, or by posting with the United States Mail Service, first class postage prepaid, and addressed to the last known address of the user to whom given, or to the owner of the premises to which the water service of such user pertains, shown on the last equalized assessment roll of the County Assessor, County of San Mateo.

SECTION 15. IMPLEMENTATION. The Director is hereby authorized and empowered to delegate his or her authority hereunder to such deputies, officers, employees, or agents of the City as he or she shall designate, and to establish such rules, regulations, and procedures, and to prepare or furnish such forms, as he or she deems necessary or appropriate to carry out the provisions of this ordinance.

SECTION 16. INTERPRETATION. In the event any provision of this ordinance conflicts with any provision of any other ordinance, any resolution, regulation, rule, order, or permit, the provisions of this ordinance shall govern and control over the provisions in conflict therewith.

SECTION 17. SECTION, SUBSECTION HEADINGS. Section and subsection headings as used in this ordinance are for convenience only, and shall not be deemed to amend, modify, or otherwise affect the section or subsection headed thereby.

SECTION 18. SEVERABILITY. If any provision of this ordinance or any provision of any adjustment or exception granted pursuant to the provisions of Section 6(b) hereof, or the application of this ordinance to any person or circumstance is held invalid by the judgment or decree of a Court of competent jurisdiction, such invalidity shall not affect any other provision of this ordinance, or any other provision of any adjustment or exception, or the application of this ordinance which can be given effect without the invalid provisions or application, and to this end, the provisions of this ordinance are severable.

SECTION 19. EMERGENCY MEASURE; EFFECTIVE DATE. This Council hereby declares this ordinance to be necessary as an emergency measure for the immediate preservation of public peace, health, or safety for the reasons set forth in Section 1 hereof, and in accordance with the declaration of emergency set forth in Section 2 hereof. This ordinance shall be effective upon its adoption.

* * *

Passed and adopted by the Council of the City of Redwood City, California,
at a regular meeting thereof held on the 25th day of June, 1990,
by the following votes:

AYES, and in favor of the passage and adoption of the foregoing ordinance:

Councilmembers Buchan, Bury, Claire, Greenalch, Murray, Stangel,
and Mayor La Berge

NOES: None

ABSENT: None

George La Berge
Mayor of the City of Redwood City

Attest:

Arlyn C. Jorgenson
Clerk of the City of Redwood City

I hereby approve the foregoing Ordinance
this 26th day of June, 1990.

Mayor of the City of Redwood City

George La Berge

Arlyn C. Jorgenson, City Clerk of the
City of Redwood City, California, does hereby
certify that the above and foregoing is a full,
true and correct copy of ORDINANCE NO. 2018

In Witness Whereof, I have hereunto set my hand
and the Seal of said City this 26th day of
June, 1990

ARLYN C. JORGENSON
City Clerk

By Arlyn C. Jorgenson

APPENDIX F

WATER CONSERVATION PROGRAMS COSTS AND SAVINGS WORKSHEETS

Table 3. Water Conservation Water Savings

Program	Unit Water Savings GPD	Conservation Program Net Water Savings in AF/Year (Fiscal Year Starting)												
		2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
1a SF Residential Water Surveys	24.1	0	2	6	19	33	44	54	54	54	54	54	54	54
1b MF Residential Water Surveys	4.5	0	0	0	0	1	1	2	2	2	2	2	2	2
2a SF Plumbing Retrofit	4.1	0	0	2	5	7	9	12	14	14	14	14	14	14
2b MF Plumbing Retrofit	4.5	0	0	0	0	1	3	4	5	4	3	1	0	0
3 Water System Audits	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
4 Water Metering	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
5a Landscape Water Budget	443	149	149	149	149	120	103	65	65	65	65	65	65	65
5b Landscape Field Inspection	443	7	12	24	30	35	31	24	19	16	16	16	16	16
5c Landscape Field Followup	443	0	0	12	25	35	31	24	19	16	16	16	16	16
6a SF Clothes Washer Rebates	15	0	9	15	19	18	17	15	14	13	11	10	9	9
6b MF Clothes Washer Rebates	82	0	3	3	6	6	5	5	5	4	4	4	3	3
7 Public Information Programs	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
8 School Education Programs	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
9a CII ULFT Toilets	25	0	0	0	7	18	21	21	21	21	21	21	21	21
9b CII Water Use Surveys	105	0	0	0	6	12	18	18	18	12	6	0	0	0
9c CII Urinals	14,200	0	0	0	1	3	4	4	4	4	4	4	4	4
10 Wholesale Agency Assistance	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
11 Conservation Pricing	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
12 Conservation Coordinator	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
13 Water Waste Prohibition	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
14a SF ULFT Replacement	22.6	0	0	27	116	150	143	136	129	122	116	110	105	100
14b MF ULFT Replacement	33.2	0	0	0	72	177	168	160	152	144	137	130	124	117
15 Water Allocation Program	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
16 Pre Rinse Spray Nozzles	156.0	0	13	38	64	64	64	51	26	0	0	0	0	0
17 Artificial Turf Replacement	0.102	0	0	15	48	48	65	65	65	65	65	65	65	65
18 Hot Water Recirculation Pumps	16.4	0	0	0	1	3	5	6	6	6	4	2	0	0
19 ET Controller Incentive Program	443	0	0	2	15	15	15	15	12	0	0	0	0	0
Total		156	187	294	583	746	747	681	632	563	540	517	500	488

