



San Francisco Public Utilities Commission

Wholesale Customer Recycled Water Potential Technical Memorandum

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This technical memorandum (TM) presents the findings of the San Francisco Public Utilities Commission (SFPUC) Wholesale Customer Recycled Water Potential Study (Study) for the SFPUC wholesale customer service area.

The objectives of this Study were to (1) document on-going recycled water activities by SFPUC wholesale customers and plans to expand recycled water use in the future, and (2) provide estimates of the recycled water potential for the SFPUC wholesale customer service area.

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1 Introduction

The objectives of this Study were to document on-going recycled water activities by SFPUC wholesale customers and plans to expand recycled water use in the future, and provide estimates of the recycled water potential for the SFPUC wholesale customer service area.

It is important to recognize that while this TM may provide estimates of the recycled water potential within the SFPUC wholesale customer service area, the actual realization of this potential will require overcoming several challenges. The challenges of implementing recycled water projects vary according to the specific project and agencies involved. Challenges associated with recycled water implementation typically include securing outside funding necessary to make the project cost-effective, gaining public support, establishing new partnerships, and managing recycled water quality/salinity. The ability to address these challenges will largely determine the degree to which the recycled water potential presented in this TM will be implemented.

The following sub-sections provide (1) background information on the SFPUC and its wholesale customer service area, (2) background information on other relevant planning studies undertaken by the SFPUC in 2003/2004, and (3) a description of the study approach to achieve the objectives stated above.

1.1 BACKGROUND

The SFPUC is a department of the City and County of San Francisco (City) that provides water, wastewater services and municipal power to the City.

The SFPUC retails water within the City. In addition, the SFPUC wholesales water to twenty-eight (28) wholesale customers in San Mateo, Alameda and Santa Clara counties under contractual agreements. The 28 wholesale customers comprise the Bay Area Water Supply and Conservation Agency (BAWSCA).

Table 1 lists the 28 wholesale customers that purchase water from the SFPUC. Figure 1 illustrates the location of the 28 wholesale customers.

TABLE 1: SFPUC WHOLESAL 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):	City of Menlo Park
o Bear Gulch District	Mid-Peninsula Water District
o Mid Peninsula District	City of Millbrae
o South San Francisco District	North Coast County Water District
Coastside County Water District	City of Redwood City
City of Daly City	City of San Bruno
City of East Palo Alto	Skyline County Water District
Estero MID/Foster City	Westborough Water District
Guadalupe Valley MID	
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

Notes:

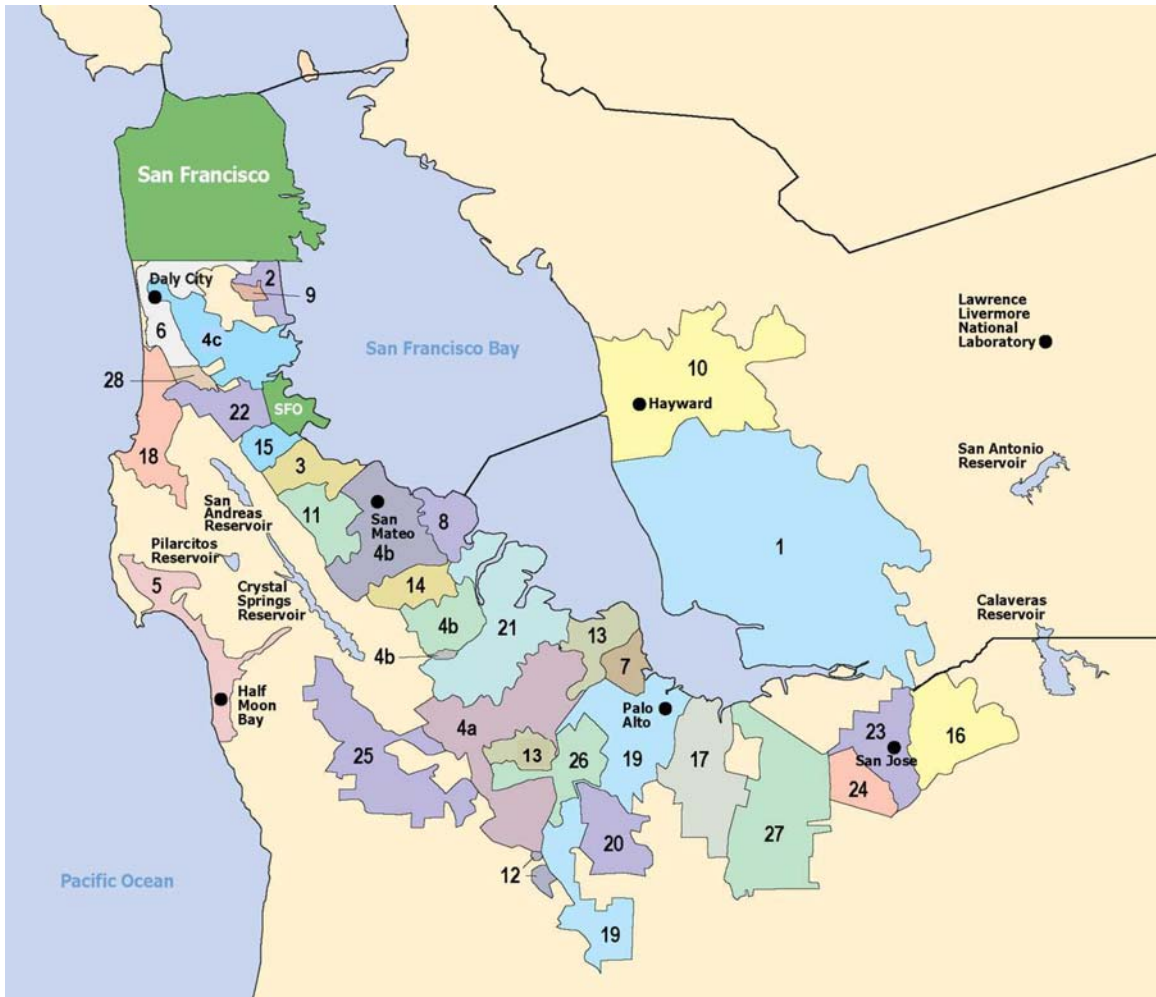
CWS - California Water Service
 MID – Municipal Improvement District

Source: SFPUC

Approximately 32 percent of SFPUC’s water supply serves customers within the City. The remaining 68 percent serves wholesale and large retail customers in surrounding areas¹. In all, nearly 2.4 million people rely on water supplied by the SFPUC to meet their daily water demands.

In Fiscal Year 2001-2002, the SFPUC wholesale customers collectively purchased two-thirds of their water supply from SFPUC, or approximately 170 million gallons per day (*BAWUA Annual Survey 2001-2002*, BAWUA 2002). The remaining demands were met through a combination of local surface water, groundwater, recycled water, water conservation and other supply sources such as the State Water Project and the Santa Clara Valley Water District (SCVWD).

¹ Large retail customers receive water from direct connections to SFPUC’s mains and are the end users of the water. These customers include the San Francisco County Jail, San Francisco International Airport and Lawrence Livermore Laboratories.



Map courtesy of BAWSCA website

#	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

FIGURE 1 SFPUC WHOLESAL CUSTOMER SERVICE AREA

1.2 2003/2004 SFPUC PLANNING STUDIES

Table 2 lists SFPUC water supply and demand planning studies completed or initiated in 2003/2004. The three wholesale area studies were prepared in conjunction with SFPUC’s wholesale customers and BAWSCA.

TABLE 2: 2003/2004 SFPUC WATER SUPPLY AND DEMAND PLANNING STUDIES

Subject	Retail Area	Wholesale Area
Water Demand	<i>City and County of San Francisco Retail Water Demands and Conservation Potential (SFPUC 2004)</i>	<i>SFPUC Wholesale Customer Water Demand Projections (URS 2004)</i>
Water Conservation		<i>SFPUC Wholesale Customer Water Conservation Potential (URS 2004)</i>
Recycled Water	<i>City and County of San Francisco Recycled Water Master Plan (scheduled for completion in 2005)</i>	<i>SFPUC Wholesale Customer Recycled Water Potential (this Study)</i>

1.3 STUDY APPROACH

The Study approach involves three main steps.

- **Step 1: Review of Existing Documents** – The first step consisted of gathering and reviewing existing documentation on water recycling in the SFPUC wholesale customer service area, and extracting the most current information.

The following list identifies the documents that were reviewed under Step 1.

- 1999 Bay Area Regional Water Recycling Program (BARWRP) Master Plan² – The BARWRP Master Plan presents an assessment of potential recycled water use in 2010, 2025, and 2040. The BARWRP Master Plan is the only existing comprehensive study on the recycled water potential of the Bay Area (including the SFPUC wholesale area). The content of this document as it relates to this Study is therefore summarized in Section 2 of this TM.
- Draft Bay Area Water Quality and Water Supply Reliability Program (BAWQ&WSRP) TMs – BAWQ&WSRP is a CALFED³ supported program that examines potential regional actions, which address water quality and supply reliability challenges of the Bay Area. Water recycling is one of the elements currently being examined as part of this effort.

Draft TMs have been prepared as part of BAWQ&WSRP to define recycled water concepts in the Bay Area. Specifically the TMs identify the greatest potential for future recycled water yields under ideal funding and institutional conditions. These TMs provide general project descriptions, estimated project costs, and ultimate yields for the recycled water concepts. The TMs were developed after the initial phase of this Study was complete and are in the process of being finalized. This Study was closely coordinated with BAWQ&WSRP to avoid duplicating efforts and/or producing conflicting information. The descriptions for a few of the recycled water projects in the BAWQ&WSRP TMs differ slightly from the descriptions presented in this Study, which is based on more realistic conditions. Other differences between the two efforts is that the BAWQ&WSRP TMs do not identify

² The Bay Area Regional Water Recycling Program (BARWRP) was originally formed in the late 1990’s 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 to assess the market potential for future water recycling in the Bay Area.

³ CALFED represents a state-federal cooperation formalized in June 1994 with management and regulatory responsibility in the Bay-Delta Estuary.

how much potable water would be off-set by implementing the recycled water projects and they do not include maps of recycled water projects distribution areas.

- Recycled water planning studies completed by the agencies were reviewed and are listed in Section 5 (References) of this TM. Section 5 does not constitute a comprehensive list of available recycled water planning studies. Rather, it reflects those reports that were readily available at the time the Study was conducted.

Several wastewater agencies (including the Palo Alto Regional Water Quality Control Plant and Union Sanitary District) and water purveyors (such as Stanford University and Redwood City) have completed recycled water master plans or feasibility studies. At the time this TM was finalized several agencies (including the City of San Jose and the Cities of South San Francisco and San Bruno) had initiated or had plans to initiate feasibility studies for conceptual design of recycled water plants, distribution, and/or storage.

- **Step 2: Personal Communications with Water and Wastewater Agencies** – The second step consisted of directly contacting the wholesale customers as well as the publicly owned wastewater agencies located within the SFPUC wholesale service area. The intent of that step was to verify that the information collected under Step 1 was the most reliable information available to their knowledge, and if not, to obtain the information that should be documented in this TM.

The wastewater agencies were contacted by phone in May 2003 after a letter requesting their assistance was issued by SFPUC. A copy of the letter and a list of agency staff contacted are provided in **Appendix A**⁴.

Agencies were also contacted by phone as part of the BAWQ&WSRP. Information collected through the BAWQ&WSRP effort was combined and reconciled with information obtained from the agencies and documented in this Study.

After initial contact with the agencies in May 2003, information regarding recycled water was continually refined through follow-up phone calls and email communication with the wastewater agencies as well as the SFPUC wholesale customers.

- **Step 3: Final Review with Water Agencies** – The third step consisted of summarizing the information collected through Steps 1 and 2 in a TM for final review by the wholesale customers. The final review was coordinated by the SFPUC and BAWSCA. The information displayed in this TM reflects all the comments received from the wholesale customers as of December 2004.

2 Previous Recycled Water Projections

BARWRP completed a comprehensive Regional Water Recycling Master Plan in 1999 (BARWRP Master Plan) to assess the recycled water market potential in the Bay Area. As mentioned in Section 1 of this TM, this is the only existing, comprehensive study on the recycled water potential of the Bay Area (including the SFPUC wholesale area). Therefore, the estimates presented in the BARWRP Master Plan were considered the best available starting point for this Study.

This section (1) summarizes the approach used in the BARWRP Master Plan to evaluate the potential recycled water demands, (2) summarizes the results, and (3) discusses the need for identifying more current and realistic projections for recycled water potential in the SFPUC wholesale service area.

⁴ A total of 15 agencies were contacted, but only 14 agencies are included in the list of projects in Table 5 and in Appendix B. The City of San Mateo was contacted but not included in the project list because they currently do not have any plans to implement recycled water.

- **BARWRP Master Plan Approach** – The BARWRP Master Plan evaluated the recycled water potential for five Bay Area counties (Alameda, Contra Costa, San Francisco, San Mateo, and Santa Clara) as well as San Benito County. It evaluated the recycled water potential from two perspectives: treatment plant capacity (i.e. supply perspective) and water agency service area demand (i.e. demand perspective). This Study is concerned with water agency service area demand. Therefore, of the two perspectives, the BARWRP estimates from the water agency service area demand perspective are presented hereafter.

The recycled water potential evaluation was based on the following elements:

- Demand Estimate Methodology – The recycled water demand estimate was based on (1) recycled water projects existing as of 1995, (2) future projects described in agency recycled water master plans, and (3) residential and irrigation agricultural needs estimated from the ABAG land use database in conjunction with standard water use rates. The Market Assessment Appendix of the BARWRP Master Plan lists recycled water demand estimates by use and retail agency.
- Demand Scenarios – Existing (year 1995), near-term (year 2010), mid-term (year 2025), and long-term (year 2040) demand scenarios were developed. The long-term demand was evaluated under a “conservative” and a “visionary” scenario. The conservative scenario projected additional recycled water demand for projects previously defined in existing and near-term markets and projected a groundwater recharge demand. The visionary scenario supplemented the conservative scenario with more substantial indirect potable reuse. Recycled water use types associated with each demand scenario are identified in **Table 3**.

TABLE 3: 1999 BARWRP MASTER PLAN DEMAND SCENARIOS

Demand Scenario	Type of Recycled Water Uses Considered ⁵	Comments
Near-Term (2010) Mid-Term (2025) Long-Term “Conservative” (2040)	Residential Irrigation	Irrigation of residential green spaces and front yard irrigation in new developments
	Commercial/Industrial	Water use for both process and irrigation at commercial/industrial facilities
	Parks/Golf Courses/Cemeteries	Includes city and regional parks, golf courses, cemeteries
	Agricultural	Includes vineyards, salt tolerant agriculture, and salt sensitive agriculture
	Environmental	Includes streamflow augmentation, wetlands creation/restoration
	Groundwater Recharge	Includes recharging groundwater basins through percolation ponds or injection wells (2 sites only were identified)
Long-Term “Visionary” (2040)	Reservoir Augmentation	Includes augmentation of surface impoundments for indirect potable reuse
	Groundwater Recharge	Includes recharge of additional groundwater basins for indirect potable reuse

- Recycled Water Potential – The estimated demands were grouped according to use and/or water agency overall service area (for SFPUC, this area included both the retail and wholesale areas) and then input into a computer decision-modeling tool to estimate the “feasible” demands (i.e. the recycled water potential) based on various evaluation criteria such as public acceptance, institutional constraints, environmental benefits and economic feasibility. The estimated recycled water potential was not extrapolated back to the retail agency level. In the case of the SFPUC, the BARWRP Master Plan presents a combined market potential for the retail and wholesale service areas.

⁵ All types of recycled water do not involve the same degree of feasibility.

- **BARWRP Master Plan Results** – The recycled water potential projected in the BARWMP Master Plan from a water agency service area perspective is 125,500 AFY in 2010 and 226,100 AFY in 2025⁶. Specifically, for the SFPUC service area (wholesale and retail), the total recycled water potential was estimated at 30,300 AFY in 2010, and 61,500 AFY in 2025⁷.
- **BARWRP Master Plan Limitations** – The BARWMP Master Plan presents three major limitations as it pertains to the objectives of this Study (including estimating recycled water potential in the SFPUC wholesale customer service area):
 - The method of developing of the SFPUC service area recycled water potential for the BARWRP study (see Master Plan approach above) does not allow for separating the retail and wholesale service area potentials. The estimates presented in the BARWRP Master Plan for the SFPUC service area include the wholesale and retail area collectively.
 - Although the recycled water potential evaluation did consider public acceptance, institutional constraints, environmental benefits and economic feasibility in estimating the Bay Area recycled water potential, water agencies were not directly consulted.
 - Since the completion of the BARWRP Master Plan, the economic, regulatory and institutional conditions that influence recycled water planning and use have changed significantly, and many agencies have implemented specific recycled water projects. This has resulted in many agencies refining their future plans, particularly regarding recycled water for environmental use.

This Study will build on the work of the BARWRP Master Plan and alleviate the three major limitations identified above for the SFPUC wholesale customer service area. As highlighted in Section 1 of this TM, this Study will indeed (1) provide estimates of the recycled water potential for the SFPUC wholesale customer service area specifically, (2) rely to a great extent on direct consultation with the SFPUC wholesale customers, (3) present the most current information relative to on-going recycled water activities by SFPUC wholesale customers and plans to expand recycled water use in the future.

3 Projections for Recycled Water Potential

The projections for recycled water potential documented in this section were developed based on the three-step approach presented in Section 1 of this TM.

The projections are organized by “Recycled Water Project(s) Area”. Fourteen recycled water project(s) areas were identified within the SFPUC wholesale service area. These areas are listed in **Table 4** along with the corresponding SFPUC wholesale customer within whose service area the project(s) would serve recycled water.

⁶ BARWRP Master Plan, Table 7-6. This estimate does not include San Benito County.

⁷ BARWRP Master Plan, Table 7-6. This estimate includes the SFPUC service area and ACWD yields from Table 7-6. The final demands were not categorized by retail agencies and/or geographic area, and therefore the retail demands cannot be separated from the SFPUC wholesale demands (see description of approach earlier in this section).

TABLE 4: RECYCLED WATER PROJECT(S) AREA AND CORRESPONDING SFPUC WHOLESALE CUSTOMERS

Recycled Water Project(s) Area		SFPUC Wholesale Customer Served by the Recycled Water Project
1	ACWD/Union Sanitary District	ACWD
2	City of Burlingame	City of Burlingame
3	Coastside County Water District (Half Moon Bay)	Coastside County Water District
4	City of Hayward	City of Hayward
5	City of Millbrae	City of Millbrae
6	North San Mateo CSD	California Water Service Co City of Daly City Westborough Water District
7	North Coast County Water District (City of Pacifica)	North Coast County Water District
8	Palo Alto Regional Water Quality Control Plant (RWQCP)-Mountain View Project	City of Palo Alto City of Mountain View
9	Palo Alto RWQCP-Other	City of Palo Alto City of Mountain View Stanford University
10	Redwood City Recycled Water Project	City of Redwood City
11	South Bay Water Recycling (San Jose/Santa Clara Water Pollution Plant)	City of Milpitas City of San Jose City of Santa Clara
12	South San Francisco/San Bruno	California Water Service Company City of San Bruno
13	Stanford University	Stanford University
14	City of Sunnyvale	City of Sunnyvale

Table 5 summarizes the projected recycled water potential for each recycled water project(s) area. The recycled water potential is split into four categories,⁸ defined as follows:

- **Current (2004) Recycled Water Projects** – These are yields for existing recycled water projects. These yields do not include recycled water use within treatment plants (in-plant use). Data sheets for each recycled water project are provided in Appendix B and describe in-plant use where appropriate.
- **Planned and Being Implemented Recycled Water Projects** – These are yields for recycled water projects for which agencies have already completed planning studies, may have secured financing and have begun or will start construction in the upcoming year.
- **Under Study or Previously Studied Recycled Water Projects** – These are yields for recycled water projects that have been or are currently undergoing planning studies. The degree to which agencies have explored the feasibility of these projects varies considerably. These projects will not move forward unless appropriate funding and institutional arrangements are made.
- **Total Recycled Water Project Potential (2020)** – This represents the total recycled water potential for each agency. It includes the sum of all projects: Current, Planned and Being Implemented, and Under Study or Previously Studied.

⁸ In-plant uses of recycled water are not included in Table 5.

TABLE 5
SFPUC WHOLESALE CUSTOMERS PROJECTIONS FOR RECYCLED WATER POTENTIAL ⁽¹⁾

Recycled Water Project(s) Area		Current (2004) Recycled Water Projects				Additional Recycled Water Potential												Total Recycled Water Project Potential (2020) (Current and Additional Potential) ⁽⁸⁾			
						Planned and Being Implemented Recycled Water Projects				Under Study or Previously Studied Recycled Water Projects				Subtotal Additional Recycled Water Potential							
		Total Annual Average Yield		Replaces a Potable Water Supply ⁽²⁾		Total Annual Average Yield		Replaces a Potable Water Supply ⁽²⁾		Total Annual Average Yield		Replaces a Potable Water Supply ⁽²⁾		Total Annual Average Yield		Replaces a Potable Water Supply ⁽²⁾		Total Annual Average Yield		Replaces a Potable Water Supply ⁽²⁾	
		mgd	AFY	mgd	AFY	mgd	AFY	mgd	AFY	mgd	AFY	mgd	AFY	mgd	AFY	mgd	AFY	mgd	AFY	mgd	AFY
1*	ACWD/Union Sanitary District	3.5	3,900	0	0	0	0	0	0	1.5	1,650	1.5	1,650	1.5	1,650	1.5	1,650	5	5,550	1.5	1,650
2*	City of Burlingame	0	0	0	0	0	0	0	0	3.9	4,400	3.9	4,400	3.9	4,400	3.9	4,400	3.9	4,400	3.9	4,400
3	Coastside County Water District (Half Moon Bay)	0	0	0	0	0	0	0	0	0.5	580	0.5	580	0.5	580	0.5	580	0.5	580	0.5	580
4	City of Hayward	0.2	244	0.2	244	0	0	0	0	8.3-10.3	9,296-11,536	8.3-10.3	9,296-11,536	8.3-10.3	9,296-11,536	8.3-10.3	9,296-11,536	8.5-10.5	9,540-11,780	8.5-10.5	9,540-11,780
5*	City of Millbrae	0.003 ⁽³⁾	3.5	0.003 ⁽³⁾	3.5	0	0	0	0	1	1,120	1	1,120	1	1,120	1	1,120	1.003	1,124	1.003	1,124
6*	North San Mateo County Sanitary District (Daly City) ⁽⁴⁾	0.001	1.5	0.001	1.5	2.77	3,102	2.77	3,102	0	0	0	0	2.77	3,102	2.77	3,102	2.771	3,104	2.771	3,104
7	North Coast County Water District (Pacifica)	3.4	3,800	0	0	0.2	225	0.2	225	0	0	0	0	0.2	225	0.2	225	3.6	4,025	0.2	225
8	Palo Alto RWQCP-Mountain View Project	0	0	0	0	1.3-1.7	1,480-1,860	1.3-1.7	1,480-1,860	0	0	0	0	1.3-1.7	1,480-1,860	1.3-1.7	1,480-1,860	1.3-1.7	1,480-1,860	1.3-1.7	1,480-1,860
9*	Palo Alto RWQCP-Other	1.5	1,700	0.36	400	0	0	0	0	2.26-4.18	2,536-4,677	2.26-4.18	2,536-4,677	2.26-4.18	2,536-4,677	2.26-4.18	2,536-4,677	3.76-5.68	4,236-6,377	2.62-4.54	2,936-5,077
10*	Redwood City Recycled Water Project	0.1	112	0.1	112	1.65-2.8 ⁽⁵⁾	1,848-3,126	1.65-2.8 ⁽⁵⁾	1,848-3,126	0	0	0	0	1.65-2.8	1,848-3,126	1.65-2.8	1,848-3,126	1.75-2.9	1,960-3,238	1.75-2.9	1,960-3,238

TABLE 5
SFPUC WHOLESALE CUSTOMERS PROJECTIONS FOR RECYCLED WATER POTENTIAL ⁽¹⁾

Recycled Water Project(s) Area		Current (2004) Recycled Water Projects				Additional Recycled Water Potential												Total Recycled Water Project Potential (2020) (Current and Additional Potential) ⁽⁸⁾			
						Planned and Being Implemented Recycled Water Projects				Under Study or Previously Studied Recycled Water Projects				Subtotal Additional Recycled Water Potential							
		Total Annual Average Yield		Replaces a Potable Water Supply ⁽²⁾		Total Annual Average Yield		Replaces a Potable Water Supply ⁽²⁾		Total Annual Average Yield		Replaces a Potable Water Supply ⁽²⁾		Total Annual Average Yield		Replaces a Potable Water Supply ⁽²⁾		Total Annual Average Yield		Replaces a Potable Water Supply ⁽²⁾	
		mgd	AFY	mgd	AFY	mgd	AFY	mgd	AFY	mgd	AFY	mgd	AFY	mgd	AFY	mgd	AFY	mgd	AFY	mgd	AFY
11*	South Bay Water Recycling (SBWR) ⁽⁶⁾	3.1	3,481	3.1	3,481	0.19	217.49	0.19	217.49	1.91	2,141	1.91	2,141	2.1	2358.5	2.1	2358.5	5.2	5,839	5.2	5,839
12	Cities of South San Francisco-San Bruno ⁽⁷⁾	0	0	0	0	0	0	0	0	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD
13	Stanford University	0	0	0	0	0	0	0	0	0.06-0.98	72-1,094	0.06-0.98	72-1,094	0.06-0.98	72-1,094	0.06-0.98	72-1,094	0.06-0.98	72-1,094	0.06-0.98	72-1,094
14*	City of Sunnyvale	0.81	905	0.5	600	0.18	200	0.18	200	1.3	1,470	0.7	805	1.48	1670	0.88	1005	2.29	2,575	1.38	1,605
TOTAL ⁽⁸⁾		12.6	14,147	4.3	4,842	6.3-7.8	7,072-8,730	6.3-7.8	7,072-8,730	20.7-25.6	23,265-28,668	20.1-25.0	22,600-28,003	27.0-33.4	30,337-37,398	26.4-32.8	29,672-36,733	39.6-46.0	44,484-51,545	30.7-37.1	34,514-41,575

Notes:

WQCP – Water Quality Control Plant; WPCP – Water Pollution Control Plant; mgd – million gallons per day; AFY – acre feet per year; TBD – to be determined

- The projections for annual average yield were developed based on the three-step approach presented in Section 1 of this TM. The sources for the recycled water yield figures provided in the table are listed in Appendix B, Recycled Water Project Summaries and Maps.
- Total volume of recycled water replacing current or future potable water supply, based on conversations with agency recycled water staff and master plans. This volume includes all sources of potable water supply including SFPUC, SCVWD, local supplies and groundwater.
- The City of Millbrae produces recycled water for irrigation purposes only six months per year (approximately April to mid-October). During those six months, the daily rate of recycled water production is approximately 0.0055 mgd. The mgd rate above has been adjusted to reflect the mgd value that would produce the average annual yield.
- Currently, a portion of the yield identified under “Planned and Being Implemented Recycled Water Projects” is being delivered. Delivery of the entire 2.77 mgd of recycled water is expected in Spring 2005. Appendix B provides more information regarding the status of this project.
- The peak day demand for the Redwood City planned project is 3.7-6.3 mgd. The mgd rate above reflects the mgd value that would produce the average annual yield for the project.
- The yields presented for South Bay Water Recycling (SBWR) do not represent the entire SBWR project, but rather the wholesale customers served by SBWR that receive some portion of their water from SFPUC. These customers include the Cities of Milpitas, San Jose, and Santa Clara.
- Currently undergoing feasibility studies
- Yields associated with each project(s) area and TOTALs are rounded to the nearest 0.1 mgd and 1 AFY (there are a few exceptions per BAWSCA’s request).

*These projects provided statistics on in-plant recycled water use. However, because data was not available from every project and because in-plant use in many cases significantly distorts the recycled water yields, the above yields do not include in-plant use. Data on the in-plant use of the identified projects can be found in Appendix B, individual recycled water project summaries (see No. 1, 2, 5, 6, 9, 10, 11, 14).

Each category in Table 5 is assigned a specific recycled water yield. If no projects are planned for one of the three categories, the yield is zero for that category. The total amount of recycled water yield is listed in Table 5 along with the yield that would replace potable water supply for each category. Potable water supply is defined as supply that meets all state and federal drinking water standards. Non-potable water is water that is not approved for drinking, but can be used for other purposes such as irrigation or industrial cooling.

Specific details for each recycled water project(s) area listed in Table 5 are provided in **Appendix B** and include tables documenting the projections for recycled water potential for each of the categories identified above, and the type of recycled water use (industrial, irrigation, etc) and maps illustrating the location of the recycled water projects and water agency boundaries.⁹

As shown in Table 5, the total additional recycled water potential, beyond what is currently used today, is 30,337 to 37,398 AFY with the total combined current and additional recycled water potential (2020) estimated to be 44,484 to 51,545 AFY. The additional potential is more than two times the current recycled water use in the SFPUC wholesale service area. An incremental 29,672 to 36,733 AFY of potable water currently used for non-potable purposes could ultimately be offset through water recycling. Because several SFPUC wholesale customers have multiple sources of supply, this potential potable offset does not represent an offset to any specific source of potable water supply. Recycled water could offset supplies from the SFPUC, the Santa Clara Valley Water District, State Water Project, local surface water supplies, or groundwater.

The following paragraphs summarize other important findings made when collecting recycled water data for this Study:

- **Level of Detail Provided for Recycled Water Projects** – Agencies contacted defined recycled water projects in general terms. Few agencies had fully developed the level of detail needed to provide project specifics. Recycled water projections provided were considered conceptual if the agencies had not completed recycled water master plans.
- **Recycled Water for Environmental Use** – The BARWRP Master Plan included 15,500 AFY of recycled water to be developed for environmental uses such as wetland enhancement and stream flow augmentation by 2025. This Study projects 8,000 AFY for environmental uses. More detailed information on potential recycled water demands for environmental use is summarized in **Appendix C**.

This decrease can be attributed to increasingly stringent State and Federal water quality regulations on the environmental uses of recycled water for activities such as streamflow augmentation. Other water quality issues discussed below are also relevant to the use of recycled water for environmental purposes.

- **Recycled Water Implementation Challenges** – Recycled water implementation typically poses a number of challenges. Some of these typical challenges are highlighted below.
 - **Securing Cost/Funding** – Currently, recycled water can be a less cost-effective option in the Bay Area compared to other water supply sources. Note that the retail unit cost of recycled water associated with projects currently planned within the SFPUC wholesale customer service area are estimated to range from \$420/AF to \$2,600/AF.¹⁰ (Note that these costs should not be directly compare to the current (2005) and anticipated future (2015) SFPUC wholesale water costs of \$492/AF and \$1,076/AF as the wholesale costs do not include the distribution and operation and maintenance costs incurred by water agencies to deliver SFPUC water to the end users – these costs are included in the

⁹ Maps are not included for Hayward (Project 4), and the Cities of South San Francisco/San Bruno (Project 11). The necessary data was not available at the time the project maps were developed.

¹⁰ These unit costs were provided in the *BAWQ&WSRP Report*, RMC and CDM, September 2004. The costs were either developed by RMC or were provided by individual water and wastewater agencies through personal communication or agency reports. The costs are in 2004 dollars assuming a 30-year return period with a 6% interest rate.

“retail cost” of water. Successful implementation of recycled water projects will require competitive costs compared to other available sources of supply.

The majority of future planned recycled water projects or upgrades of existing projects described in this Study have not been financed. The implementation of these projects will largely depend on securing additional funds to increase the cost-effectiveness of the individual projects. Though previous recycled water grant opportunities have fallen short of expectations, future funds in the California Proposition 50 and the Federal CALFED Bill will provide additional funds.

- Gaining Public Support – General public perception of recycled water (e.g., concerns about safety) can still represent a major hurdle for recycled water projects implementation. Significant public outreach efforts are usually necessary to guarantee the success of recycled water projects (particularly in the urban setting), adding to the overall cost of these projects. Public perception might evolve as recycled water use becomes more common.
- Establishing New Partnerships – In order for water recycling to be both effective and feasible, water and wastewater agencies will have to continue to work towards negotiating new partnerships across agency boundaries and service areas.
- Managing Water Quality/Salinity – Recycled water is a proven, acceptable and safe source of water for many uses. However, the quality of recycled water is often less desirable compared to other available sources in terms of salt and other constituents content. For example, recycled water higher salinity content can be a concern for some industrial users using recycled water as boiler feed water, or for salt sensitive landscape irrigation. In addition, there is a growing concern over emerging pollutants, particularly related to the protection of underlying groundwater basins and surface water quality.

4 Conclusions

The objectives of this Study were to (1) document on-going recycled water activities by SFPUC wholesale customer area and plans to expand recycled water use in the future, and (2) provide estimates of the recycled water potential for the SFPUC wholesale customer service area.

The key findings relative to these objectives are summarized below:

- **Current (2004) Recycled Water Projects** – The recycled water yield associated with current (2004) recycled water projects within the SFPUC wholesale customer service area is estimated at 14,147 AFY. This yield does not include recycled water use within wastewater treatment plants (in-plant use).
- **Planned and Being Implemented Recycled Water Projects** – The incremental recycled water yield associated with recycled water projects for which agencies have completed planning studies, secured financing and have begun or will start construction in the upcoming year is estimated at 7,072 AFY to 8,730 AFY.
- **Total Recycled Water Project Potential (2020)** – The total recycled water potential for the year 2020 for SFPUC wholesale customer service area ranges from 44,484 to 51,545 AFY. Of this 30,337 to 37,398 AFY is additional recycled water potential, beyond what is currently used today. This additional potential is more than two times the current recycled water use in the SFPUC wholesale customer service area. An incremental 29,672 to 36,733 AFY of potable water is currently used for non-potable purposes and could ultimately (2020) be offset through water recycling. Because several SFPUC wholesale customers have multiple sources of supply, this potential potable offset does not represent an offset to any specific source of potable water supply. Recycled water could offset supplies from the SFPUC, the Santa Clara Valley Water District, State Water Project, local surface water supplies, or groundwater.

The following should be noted about these findings:

- **Level of Detail Provided for Recycled Water Projects** – Agencies contacted defined recycled water projects in general terms. Few agencies had fully developed the level of detail needed to provide project specifics. Recycled water projections provided were considered conceptual if the agencies had not completed recycled water master plans.
- **Recycled Water for Environmental Use** – The total recycled water potential identified in this Study includes 8,000 AFY for environmental uses.
- **Recycled Water Implementation Challenges** – The recycled water projections presented in this Study demonstrate the future potential to expand recycled water use in the SFPUC wholesale customer service area. The implementation of recycled water will continue to improve water supply and reliability for SFPUC customers. However, it is important to recognize that while this TM may provide estimates of the recycled water potential within the SFPUC wholesale customer service area, the actual realization of this potential will require overcoming several challenges. The challenges of implementing recycled water projects vary according to the specific project and agencies involved. Challenges associated with recycled water implementation typically include securing outside funding necessary to make the project cost-effective, gaining public support, establishing new partnerships, and managing recycled water quality/salinity. The ability to address these challenges will largely determine the degree to which the recycled water potential presented in this TM will be implemented.
- **Comparison with BARWRP Projections** – **Table 6** shows the BARWRP projections for the SFPUC service area and the estimated SFPUC wholesale customer service area recycled water potential per this Study. However, at this point in time, these numbers are not comparable. SFPUC is currently developing the City and County of San Francisco Recycled Water Master Plan, which will include projections for recycled water potential in the SFPUC retail service area. Once these projections are published, the total recycled water potential projections could be compared to the BARWRP projections for the SFPUC service area.

**TABLE 6: BARWRP MASTER PLAN FINDINGS AND
 TOTAL RECYCLED WATER POTENTIAL PROJECTIONS**

Recycled Water Uses	1999 BARWRP Master Plan Ultimate Projections (AFY) ⁽¹⁾ <i>SFPUC Wholesale and Retail Service Area</i>	Total Recycled Water Potential Projections (AFY) (2020) ⁽²⁾ <i>SFPUC Wholesale Service Area Only</i> ⁽⁴⁾
All	61,500	51,545
Environmental only ⁽³⁾	15,500	8,000

Notes:

1. Projections through year 2025.
2. Projections through year 2020.
3. Project specific figures for environmental use are presented in Appendix C.
4. SFPUC retail recycled water preliminary estimates suggest a potential of 7,840 AFY.

5 References

- BAWUA. *Bay Area Water Users Association Annual Survey 2001-2002*, December 2002.
- Bay Area Regional Water Recycling Program (BARWRP). *Recycled Water Master Plan*, September 1999.
- Brown and Caldwell. *Water Reclamation Master Plan for the Palo Alto Regional Water Quality Control Plant*, April 1992.
- Carollo. Coastside County Water District, *Water Reclamation Program – Preliminary Economic Study*, August 2003.
- CDM and RMC. *Bay Area Water Quality & Water Supply Reliability Study Technical Memorandums (DRAFT)*, September 2004.
- CH2MHILL. *Recycled Water Feasibility Study*, completed for ACWD and USD, May 2003.
- City of Redwood City. *Water Recycling Feasibility Study for Redwood City*, Kennedy/Jenks Consultants, August 2002.
- Maddaus Water Management and Stanford University. *Water Conservation, Reuse and Recycling Master Plan*, October 2003.
- RMC. *Mountain View-Moffett Field Recycled Water Facility Plan*, April 2004.
- City of San Jose. *South Bay Water Recycling Development Plan and Expansion Strategy*, South Bay Water Recycling, May 2001.

Appendix A

SFPUC Letter to Wholesale Area Wastewater Agencies and Distribution List



SAN FRANCISCO PUBLIC UTILITIES COMMISSION

1145 Market Street, Suite 401 • San Francisco, CA 94103 • (415) 934-5700 FAX (415) 934-5750



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Ann Moller Caen
President

E. Dennis Normandy,
Vice President
Ashok Kumar Bhatt
Jeffrey Chen
Robert Costello

Patricia E. Martel
General Manager

April 24, 2003

Mr. David Castagnoto
195 Bel Air Rd.
South San Francisco, CA 94080

Dear Mr. Castagnoto:

As part an ongoing commitment to improve water supply reliability, the San Francisco Public Utilities Commission (SFPUC), in partnership with the Bay Area Water Users Association (BAWUA), are re-evaluating long-term recycled water demand projections in all communities receiving all or part of their potable water supply from SFPUC. Of particular interest is defining current or projected potable water demands that could potentially be met with recycled water. A reliable, drought-proof water supply is essential for sustaining economic vitality in the Bay Area. Understanding the potential for water recycling in the regional area is an important component of this reliability enhancement effort.

The San Francisco Bay Area Regional Water Recycling Program (BARWRP) produced a Regional Water Recycling Master Plan in 1999. This master plan assessed existing and potential recycling projects and projected future recycled water demands within each agency service area. These projections were based on wastewater supply and quality data provided by BARWRP wastewater agencies. We are now updating recycled water demand information provided by each agency in the BARWRP Master Plan, and request your assistance and cooperation.

The SFPUC has retained URS Corporation to assist with our water supply reliability evaluation efforts. Raines, Melton, & Carella, Inc., as a subconsultant to URS Corporation, will be contacting you directly in the next few weeks to verify and update original BARWRP Master Plan projections for your agency. We appreciate your assistance in our efforts to provide a more reliable water supply for the Bay Area.

Sincerely,

Michael P. Carlin
Director of Planning

cc: Nicole Sandkulla, BAWUA
Jim Kelley, Chair, Bay Area Clean Water Agencies (BACWA)
Don Birrer, Executive Director, BACWA

SFPUC LETTER OF SUPPORT DISTRIBUTION LIST

Wastewater Agency	Contacts	Address	City	Zip Code
City of Burlingame	Mike Thompson, Assistant Plant Manager	501 Primrose Rd	Burlingame	94010
City of Hayward	Henry Vink, Water Pollution Control Facility Manager	24499 Soto Road	Hayward	94544
City of Millbrae	Dick York, WPCP Superintendent	621 Magnolia Ave	Millbrae	94030
North San Mateo County Sanitary District	Mark Baker, Chief of Operations Cynthia Royer, Manager of Technical Services	333 90th St	Daly City	94015
North Coast County Water District	Dave Gromm, Plant Manager George Kanakaris, General Manager, North Coast County Water District	700 Coast Highway 2400 Francisco Blvd, P.O. Box 1039	Pacifica	94044
Palo Alto Regional Water Quality Control Plant	Daisy Stark, Plant Engineer	2501 Embarcadero Rd	Palo Alto	94303
San Francisco International Airport	Dave Thompson, Plant Superintendent	1145 Market St, Suite 401	San Francisco	94103
San Jose/Santa Clara Water Pollution Control Plant	Diane Zarate, Supervising Environmental Services Specialist	4245 Zanker Rd	San Jose	95134
City of San Mateo	Steve Danehy, Plant Manager Darla Reams, City Engineer	2050 Detroit Dr	San Mateo	94404
City of Santa Clara	<i>Note: San Jose/Santa Clara Water Pollution Control Plant survey included the City of Santa Clara</i>	1500 Warburton Ave	Santa Clara	95050
South Bayside System Authority	Jim Bewley, Manager Brent Brown, Operations Supervisor	1400 Radio Rd	Redwood City	94065
City of South San Francisco	David Castagnato, Plant Superintendent	195 Belle Air Rd	South San Francisco	94080
City of Sunnyvale Water Pollution Control Plant	John Addeo, WPCP Operations Manager Val Conzet, Recycled Water Coordinator	456 West Olive Ave., P.O. Box 3707	Sunnyvale	94088
Union Sanitary District	David Livingston, Manager, Treatment & Disposal Services; Richard Curry, Manager, Technical Support & Customer Services; Jessie Gill, Engineer Manager	5072 Benson Rd	Union City	94587

Appendix B

Recycled Water Project Summaries and Maps

Foreword

For each Recycled Water Project Area identified in Section 3 of this TM, this Appendix includes the following:

- **Summary Table** – The summary table includes projections for recycled water potential for each of the categories (see definition in Section 3 of this TM), type of recycled water use (industrial, irrigation, etc), and project and distribution service area boundaries. See Section 1 of the TM for a description of the Study approach, which provides the basis for how the data was developed.

Note that in-plant use is not included in the overall sum of demands, but it is noted in the project description for the agencies that were able to provide figures for this amount. In-plant use was not included in the overall project yields for several reasons including: in-plant use may be significantly larger than other uses and therefore distorts overall demand figures, it would not allow for consistency with BAWQ&WSRP figures, and in-plant use data is not available for all projects.

- **Map(s)** – The map(s) details the location of recycled water projects and water agency boundaries. These maps are intended to give a brief geographic overview of the current and potential future areas serviced by recycled water projects. Maps are included for all projects, except for Hayward and South San Francisco-San Bruno. Project data was not available at this time to develop a map for the Hayward and South San Francisco-San Bruno projects. In addition, to maintain consistency with the varying levels of detail provided on recycled water projects, current and future recycling projects are designated the same. Redwood City has developed maps designating the phasing of their project and therefore this map is provided in addition to the general map created as part of this Study.

The maps were developed using ArcGIS and involved using or modifying existing shapefile and creating new shapefiles. None of these shapefiles that were created or modified are based on actual survey points. The shapefiles that were used are as follows:

- **Background Map:** The background layer was created using the Census track, road and highways shapefiles from the ESRI Media Kit (2003).
- **Study Area:** RMC created a “study area” shapefile for each of the wastewater agencies following the jurisdictional boundaries of the cities served by the wastewater agencies, unless the wastewater agency service area shapefile was immediately available from RMC or agencies files.
- **Water District Boundaries:** Shapefile provided to RMC by ABAG in June 2004.
- **Potential Recycled Water Customers:** This shapefile was created by RMC based on hard copy information from available reports and maps from RMC files or provided by the water and wastewater agencies.
- **Other Information:** Parklands and open space areas are represented on the maps in addition to the identified potential recycled water customers since they may represent future recycled water use sites. However, only major parks and open spaces have been identified and therefore smaller parks may have been excluded. This shapefile was developed by using ESRI data from the ESRI Media Kit (2003) as a starting point and adding large parks not shown based on hard copy AAA maps.

**RECYCLED WATER PROJECT NO. 1
 ACWD/Union Sanitary District (USD)**

1. SOURCE STATISTICS:

USD Wastewater Treatment Plant Statistics:

Dry Weather Plant Capacity: 38.0 mgd
2003 Average Dry Weather Flow: 29.0 mgd
 Disinfected Tertiary: 0
 Disinfected Secondary (2.2 mpn): 29.0 mgd
 Disinfected Secondary (23 mpn): 0
 Undisinfected Secondary: 0
2003 Average Peak-Day Flow: 44.0 mgd
Typical TDS: 650 mg/L

2. CURRENT RECYCLED WATER PROJECTS:

Type of Use	Average Annual Yield		Facility Cost	
	mgd	AFY	Capital	Annual O&M
Wetland Restoration	3.5	3,900	Unknown	Unknown

Project Description:

Secondary treated recycled water is discharged into the Bay to facilitate the restoration of Hayward Marsh. In addition, 2.5 mgd is utilized for in-plant uses.

3. PLANNED AND BEING IMPLEMENTED RECYCLED WATER PROJECTS:

None

4. UNDER STUDY OR PREVIOUSLY STUDIED RECYCLED WATER PROJECTS:

Type of Use	Average Annual Yield		Facility Cost	
	mgd	AFY	Capital	Annual O&M
Irrigation and Commercial/Industrial Uses	1.5	1,650	\$33.3 M	\$400,000

Project Description:

Alameda County Water District in partnership with Union Sanitary District is actively investigating opportunities for recycled water production and use in its service area. This project would construct a recycled water satellite treatment plant at Irvington Wastewater Pump Station. Recycled water would be treated to Title 22 standards. Customers will be located in southern and southwestern sections of ACWD service area and include the planned Newark Golf Course, planned Doublewood Golf Course, Pacific Commons Development, Cedar Lawn Memorial Park, and Sunny Hill Golf Center. Additional flows may serve Mud Slough for flow augmentation (amount of flow augmentation unknown).

**RECYCLED WATER PROJECT NO. 1
ACWD/Union Sanitary District (USD)**

5. EXISTING RECYCLED WATER MASTER PLANS AND REPORTS:
None

6. SOURCE OF YIELDS:
Current Projects: Eric Cartwright, ACWD, Personal Communications, May 2004.
Projects Under Study or Previously Studied: CH2MHILL. <i>Recycled Water Feasibility Study</i> , August 2003.

Notes:

AFY=acre feet per year
mpn=most probable number

mg/L=milligrams per liter
TDS=Total Dissolved Solids

mgd=million gallons per day

Existing and Future Water Reuse Sites










Agency: ACWD/Union Sanitary District

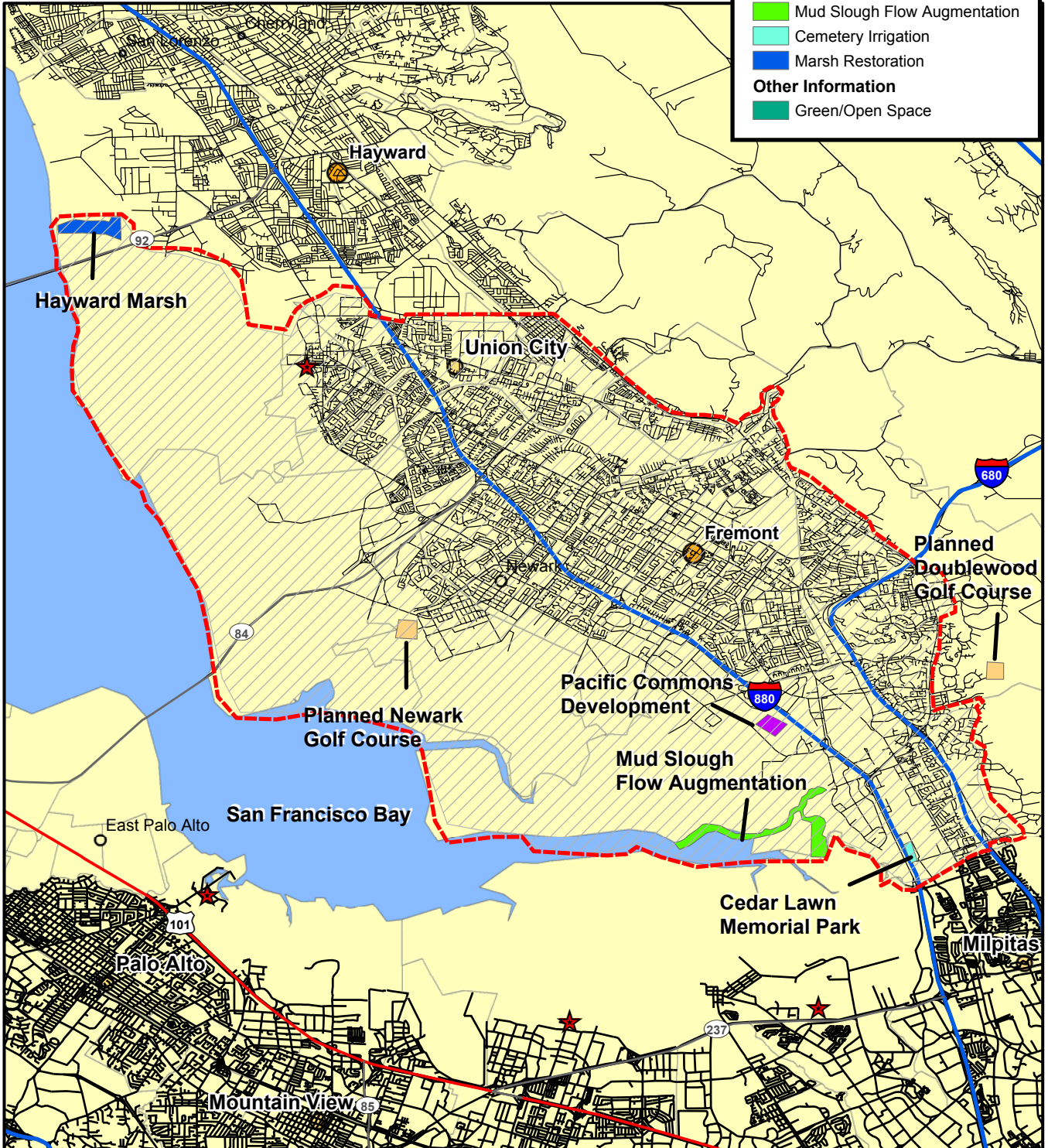
SFPUC Wholesale Area Water Recycling Demand
August 2004

0 1.25 2.5 5 Miles



Legend

-  Treatment Plants
-  Study Area
- Water District within Study Area**
-  Alameda County W.D.
- Existing/Future RW Users**
-  Golf Course Irrigation
-  Landscape Irrigation
-  Mud Slough Flow Augmentation
-  Cemetery Irrigation
-  Marsh Restoration
- Other Information**
-  Green/Open Space



Note: Location of Sunny Hill Golf Center not readily available.

RECYCLED WATER PROJECT NO. 2
City of Burlingame

1. SOURCE STATISTICS:

City of Burlingame Wastewater Treatment Plant (WWTP) Statistics:

Dry Weather Plant Capacity: 5.5 mgd
2003 Average Dry Weather Flow: 4.7 mgd
 Disinfected Tertiary: 0
 Disinfected Secondary (2.2 mpn): 0
 Disinfected Secondary (23 mpn): 0
 Undisinfected Secondary: 4.7 mgd
2003 Average Peak-Day Flow: 6.0 mgd
Typical TDS: 260 mg/L

2. CURRENT RECYCLED WATER PROJECTS:

Project Description:

Nearly 0.25 mgd of secondary recycled water is utilized for in-plant uses including equipment washdown and general facility uses at the WWTP.

3. PLANNED AND BEING IMPLEMENTED RECYCLED WATER PROJECTS:

None

4. UNDER STUDY OR PREVIOUSLY STUDIED RECYCLED WATER PROJECTS:

Type of Use	Average Annual Yield		Facility Cost	
	mgd	AFY	Capital	Annual O&M
Irrigation and Commercial Landscaping	3.9	4,400	\$18-20 M	\$300,000– \$400,000

Project Description:

The city of Burlingame has plans to build a recycled water plant for irrigation of commercial landscaping and Bay Front parks.

5. EXISTING RECYCLED WATER MASTER PLANS AND REPORTS:

Feasibility study for conceptual planning and design of plant, storage, and distribution connections to meet demands is scheduled to begin 2007.

6. SOURCE OF YIELDS:

Current Projects: City of Burlingame Staff, Electronic Communication, June 2004.

Projects Under Study or Previously Studied: City of Burlingame Staff, Electronic Communication, June 2004

Notes:

AFY=acre feet per year mg/L=milligrams per liter mgd=million gallons per day
 mpn=most probable number TDS=Total Dissolved Solids

Existing and Future Water Reuse Sites Agency: City of Burlingame

SFPUC Wholesale Area Water Recycling Demand
August 2004

0 0.5 1 2 Miles



Legend

★ Treatment Plants

--- Study Area

Water District within Study Area

▨ Burlingame Water Services

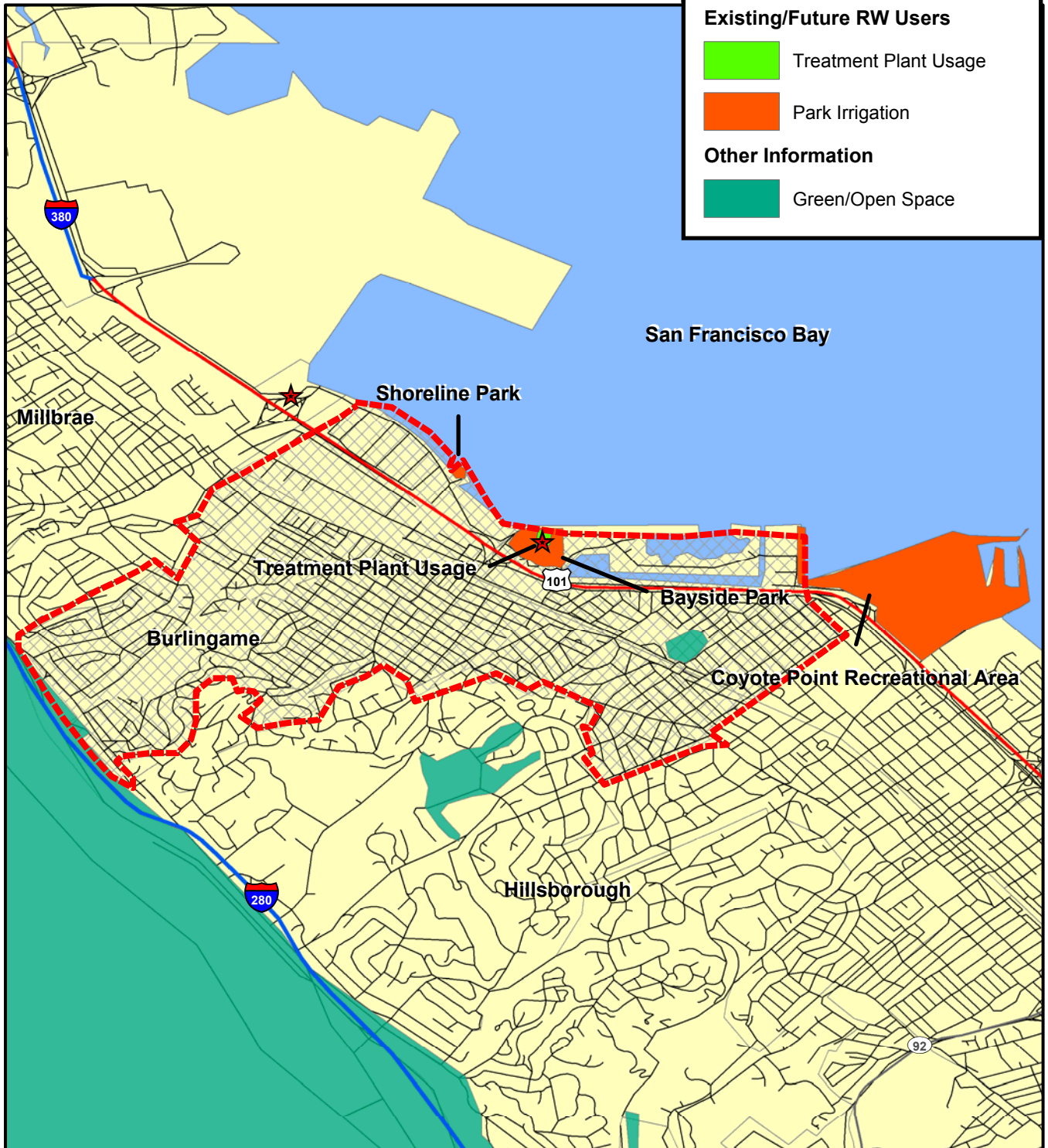
Existing/Future RW Users

■ Treatment Plant Usage

■ Park Irrigation

Other Information

■ Green/Open Space



**RECYCLED WATER PROJECT NO. 3
 Coastside County Water District (Half Moon Bay)**

1. SOURCE STATISTICS:

Sewer Authority Mid-Coastside (SAM) Wastewater Treatment Plant (WWTP) Statistics:

Dry Weather Plant Capacity:

2003 Average Dry Weather Flow:

Disinfected Tertiary:

Disinfected Secondary (2.2 mpn): 0

Disinfected Secondary (23 mpn): 0

Undisinfected Secondary: 13.2 mgd

2003 Average Peak-Day Flow: 19.0 mgd

Typical TDS: 700 mg/L

2. CURRENT RECYCLED WATER PROJECTS:

None

3. PLANNED AND BEING IMPLEMENTED RECYCLED WATER PROJECTS:

None

4. UNDER STUDY OR PREVIOUSLY STUDIED RECYCLED WATER PROJECTS:

Type of Use	Average Annual Yield		Facility Cost	
	mgd	AFY	Capital	Annual O&M
Irrigation	0.5	580	\$10.8 M	\$410,000

Project Description:

This project would require a partnership between SAMP WWTP and Coastside County Water District (CCWD). Recycled water would be distributed to two users: Ocean Colony Golf Course and Skylawn Memorial Park Cemetery.

5. EXISTING RECYCLED WATER MASTER PLANS AND REPORTS:

Corollo. Coastside County Water District, *Water Reclamation Program, Preliminary Economic Feasibility Study*, August 2003.

6. SOURCE OF YIELDS:

Projects Under Study or Previously Studied: Carollo. Coastside County Water District, *Water Reclamation Program, Preliminary Economic Feasibility Study*, August 2003.

Notes:

AFY=acre feet per year

mpn=most probable number

mg/L=milligrams per liter

TDS=Total Dissolved Solids

mgd=million gallons per day

Existing and Future Water Reuse Sites Agency: Coastside County Recycled Water (Half Moon Bay)

SFPUC Wholesale Area Water Recycling Demand
August 2004

0 0.5 1 2 Miles



Legend

★ Treatment Plant

--- Study Area

Water District within Study Area

▨ Coastside County Water District

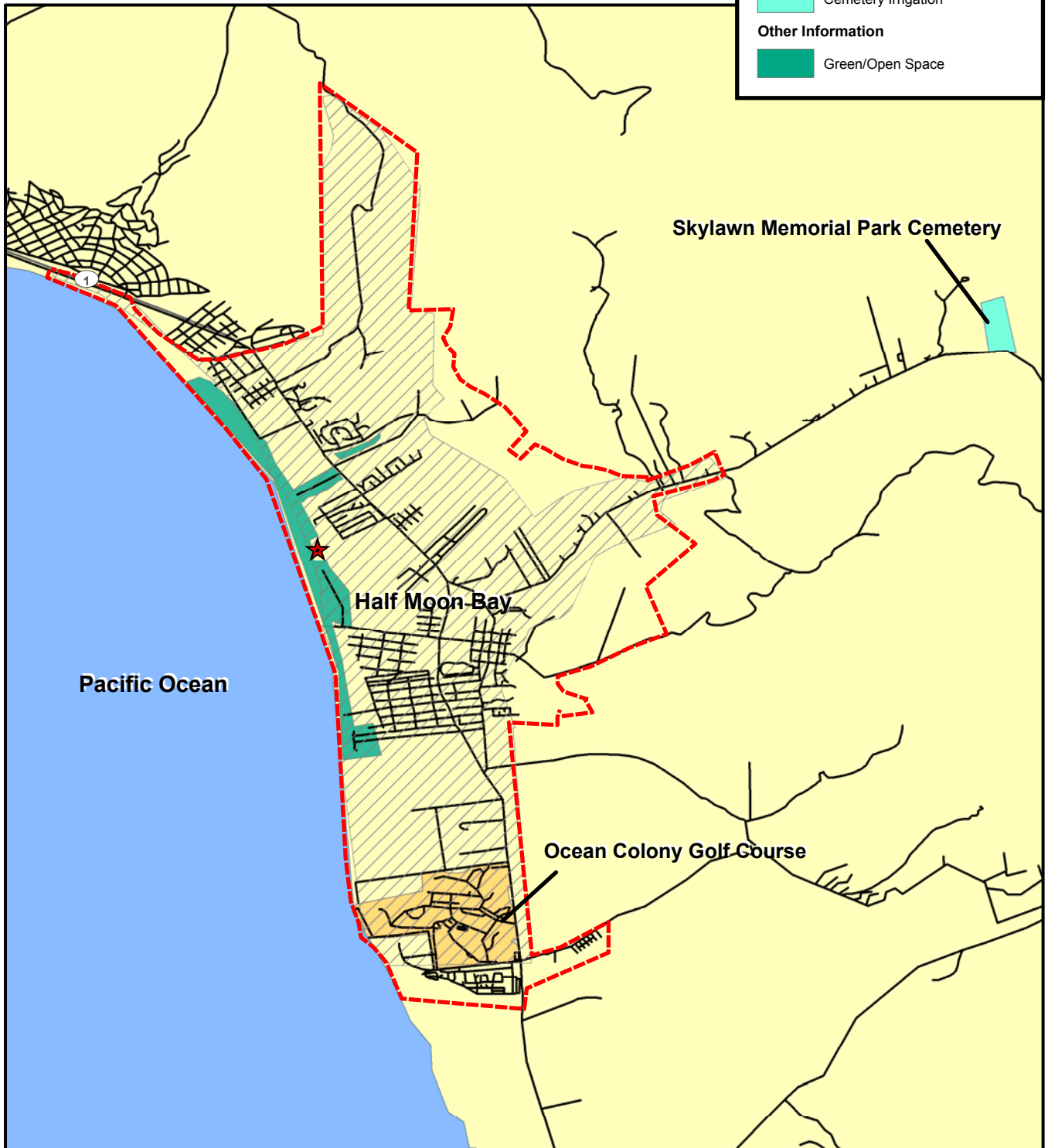
Existing/Future RW Users

■ Golf Course Irrigation

■ Cemetery Irrigation

Other Information

■ Green/Open Space



**RECYCLED WATER PROJECT NO. 4
 City of Hayward¹¹**

1. SOURCE STATISTICS:
<p>City of Hayward Wastewater Treatment Plant Statistics: <i>Dry Weather Plant Capacity:</i> 16.5 mgd <i>2003 Average Dry Weather Flow:</i> 13.3 mgd Disinfected Tertiary: 0.2 Disinfected Secondary (2.2 mpn): 0 Disinfected Secondary (23 mpn): 0 Undisinfected Secondary: 13.1 mgd <i>2003 Average Peak-Day Flow:</i> 19.0 mgd <i>Typical TDS:</i> 700 mg/L</p>

2. CURRENT RECYCLED WATER PROJECTS:				
Type of Use	Average Annual Yield		Facility Cost	
	mgd	AFY	Capital	Annual O&M
Skywest Golf Course Irrigation (EBDA)	0.2	224	Unknown	Unknown
<p>Project Description: Water is diverted from the combined East Bay Dischargers Authority (EBDA) effluent, including treated effluent from Hayward, to irrigate Skywest Golf Course in Hayward.</p>				

3. PLANNED AND BEING IMPLEMENTED RECYCLED WATER PROJECTS:
None

4. UNDER STUDY OR PREVIOUSLY STUDIED RECYCLED WATER PROJECTS:				
Type of Use	Average Annual Yield		Facility Cost	
	mgd	AFY	Capital	Annual O&M
RCEC Commercial/Industrial	3.3–5.3	3,696–5,936	Unknown	Unknown
Other Commercial/Industrial	Up to 5.0	Up to 5,600	Unknown	Unknown
Total	8.3–10.3	9,296–11,536		
<p>Project Description: Provide tertiary treated recycled water to the proposed Russell City Energy Center (RCEC), a natural gas-fired, combined cycled electric generating facility. The project was approved by the California Energy Commission in 2002 and the approval is valid for five years, but the construction status is uncertain at this time. If construction proceeds, the project owner will be required to construct a 5 mgd recycled water plant and utilize highly treated recycled water for RCEC operations. The City intends to provide up to an additional 5 mgd for other industrial/commercial uses. Note that, because of the uncertainty regarding construction, the water demand for the RCEC project was not factored into Hayward’s overall future water demand projections. Also, it is not expected that the additional recycled water would replace existing usage, but would be used to fill the need created by the RCEC and to augment existing or projected usage. The City of Hayward Water Pollution Control Facility discharges effluent to the East Bay Dischargers Authority (EBDA) system. EBDA manages wastewater effluent disposal for its five member agencies through a joint powers agreement, as well for two other non-member agencies. In 1993 EBDA prepared a Water Recycled Master</p>				

¹¹ A map is not included for Hayward because of lack of data.

RECYCLED WATER PROJECT NO. 4
City of Hayward¹¹

Plan to identify potential recycled water projects that could be implemented to benefit all EBDA members. The projects described in the Master Plan formed the basis for potential recycled water usage in Hayward identified in the BARWRP study. The projects have not been implemented and, at this time, EBDA does not anticipate implementing them in the near future due to costs.

5. EXISTING RECYCLED WATER MASTER PLANS AND REPORTS:

EBDA Water Recycling Master Plan, 1993

6. SOURCE OF YIELDS:

Current Projects: BAWSCA, Electronic Communication, November 2004.

Projects Under Study or Previously Studied: BAWSCA, Electronic Communication, November 2004.

Notes:

AFY=acre feet per year

mg/L=milligrams per liter

mgd=million gallons per day

mpn=most probable number

TDS=Total Dissolved Solids

RECYCLED WATER PROJECT NO. 5
City of Millbrae

1. SOURCE STATISTICS:
<p>City of Millbrae Wastewater Treatment Plant Statistics: <i>Dry Weather Plant Capacity:</i> 3.0 mgd <i>2003 Average Dry Weather Flow:</i> 1.8 mgd Disinfected Tertiary: 0.0055 Disinfected Secondary (2.2 mpn): 0 Disinfected Secondary (23 mpn): 0 Undisinfected Secondary: 1.8 mgd <i>2003 Average Peak-Day Flow:</i> 4.0 mgd <i>Typical TDS:</i> 250 mg/L</p>

2. CURRENT RECYCLED WATER PROJECTS:				
Type of Use	Average Annual Yield		Facility Cost	
	mgd	AFY	Capital	Annual O&M
Irrigation of US 101	0.003 ¹	3.5	None	\$6,000
<p>Project Description: Currently recycled water (restricted use) is being provided to Caltrans for irrigation along US 101. In addition, on average, about 0.08 mgd of recycled water is used for in-plant uses such as equipment washdown and general facility uses. ¹The City of Millbrae produces recycled water for irrigation purposes only six months per year (approximately April to mid-October). During those six months, the daily rate of recycled water production is approximately 0.0055 mgd. The mgd rate above has been adjusted to reflect the average annual yield.</p>				

3. PLANNED AND BEING IMPLEMENTED RECYCLED WATER PROJECTS:
None

4. UNDER STUDY OR PREVIOUSLY STUDIED RECYCLED WATER PROJECTS:				
Type of Use	Average Annual Yield		Facility Cost	
	mgd	AFY	Capital	Annual O&M
Irrigation	1	1,120	Unknown	Unknown
<p>Project Description: The Millbrae Plant would be upgraded to produce 1,120 AFY unrestricted use recycled water with potential distribution to customers located in Millbrae and adjacent areas of San Bruno, Burlingame, and the San Francisco Airport. Due to high cost and a lack of a retail market, this project is not currently being pursued but it still considered a potential project for the purposes of this TM. The cost for this project has not been evaluated.</p>				

5. EXISTING RECYCLED WATER MASTER PLANS AND REPORTS:
None

RECYCLED WATER PROJECT NO. 5
City of Millbrae

6. SOURCE OF YIELDS:
Current Projects: Dick York, City of Millbrae, Personal Communication , February 2004.
Projects Under Study or Previously Studied: Dick York, City of Millbrae, Personal Communication, February 2004.

Notes:

AFY=acre feet per year
mpn=most probable number

mg/L=milligrams per liter
TDS=Total Dissolved Solids

mgd=million gallons per day

Existing and Future Water Reuse Sites

Agency: City of Millbrae

SFPUC Wholesale Area Water Recycling Demand
August 2004

0 0.15 0.3 0.6 Miles



Legend

★ Treatment Plants

--- Study Area

Water District within Study Area

▨ Millbrae Water Dept.

▤ Burlingame Water Services

▩ San Bruno Water Department

Existing/Future RW Users

■ Caltrans

Other Information

■ Green/Open Space



RECYCLED WATER PROJECT NO. 6
North San Mateo County Sanitation District (Daly City)

1. SOURCE STATISTICS:

Treatment Plant Statistics:

Dry Weather Plant Capacity: 10.3 mgd
2003 Average Dry Weather Flow: 6.8 mgd
 Disinfected Tertiary: 0.001
 Disinfected Secondary (2.2 mpn): 6.8 mgd
 Disinfected Secondary (23 mpn): 0
 Undisinfected Secondary: 0
2003 Average Peak-Day Flow: 8.3 mgd
Typical TDS: 350 mg/L

2. CURRENT RECYCLED WATER PROJECTS:

Type of Use	Average Annual Yield		Facility Cost	
	mgd	AFY	Capital	Annual O&M
Irrigation	0.001	1.5	Minimal	Minimal

Project Description:

Current projects include irrigation of West John Daly Boulevard and Central John Daly Boulevard medians during summer months. There is minimal cost to treatment plant since water is produced through current operations. In addition about 1 mgd is expected to be used for in-plant uses such as equipment washdown and general WWTP water needs.

3. PLANNED AND BEING IMPLEMENTED RECYCLED WATER PROJECTS:

Type of Use	Average Annual Yield		Facility Cost	
	mgd	AFY	Capital	Annual O&M
Irrigation	2.77	3,102	\$7.75 M	\$430,000

Project Description:

This project involves a treatment plant upgrade to produce 2.77 mgd disinfected tertiary recycled water for irrigation of Olympic, San Francisco and Lake Merced Golf Clubs; Westlake and March Bank Parks, and medians along Junipero Serra Blvd. Demand is based on average monthly peak demand April-October and 50% usage November-March.

The project construction was completed July 2004. The scheduled delivery of water from this project is as follows:

Olympic Golf Club – August 2004

Lake Merced Golf Club – August 2004

San Francisco Golf Club and Juniper Serra Blvd. – To Be Determined, but no later than April 2005

4. UNDER STUDY OR PREVIOUSLY STUDIED RECYCLED WATER PROJECTS:

None

RECYCLED WATER PROJECT NO. 6
North San Mateo County Sanitation District (Daly City)

5. EXISTING RECYCLED WATER MASTER PLANS AND REPORTS:
None

6. SOURCE OF YIELDS:
Current Projects: Cynthia Royer, North San Mateo County Sanitary District, Personal Communication, November 2003.
Projects Planned and Being Implemented: Cynthia Royer, North San Mateo County Sanitary District, Personal Communication, November, 2003.

Notes:

AFY=acre feet per year

mpn=most probable number

mg/L=milligrams per liter

TDS=Total Dissolved Solids

mgd=million gallons per day

Existing and Future Water Reuse Sites












Agency: North San Mateo County Sanitation District (Daly City)

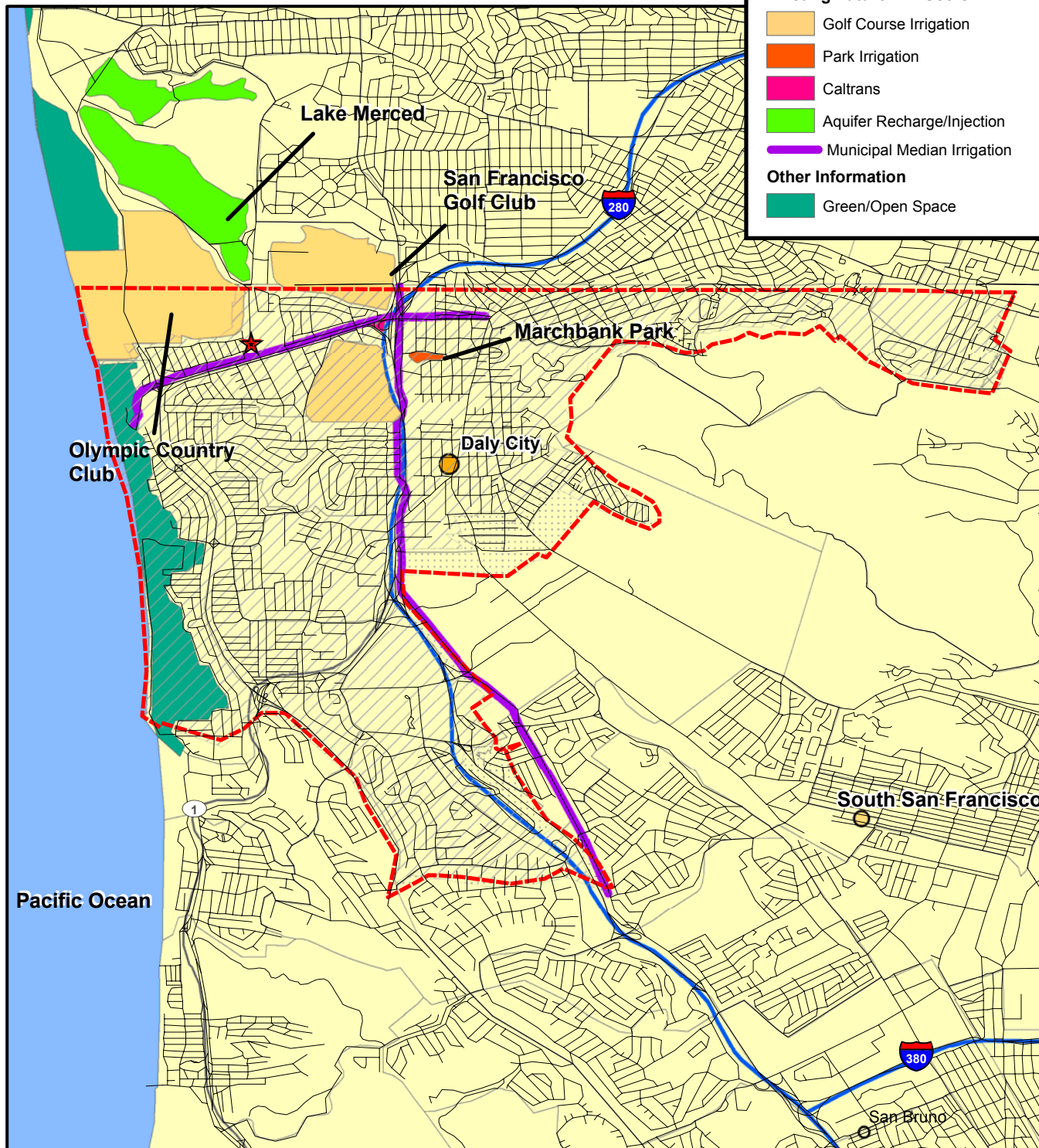
SFPUC Wholesale Area Water Recycling Demand
August 2004

0 0.45 0.9 1.8 Miles



Legend

-  Treatment Plant
-  Study Area
- Water District within Study Area**
-  Daly City Public Works Dept.
-  Brisbane Public Works Dept.
-  Cal Water- So San Francisco
- Existing/Future RW Users**
-  Golf Course Irrigation
-  Park Irrigation
-  Caltrans
-  Aquifer Recharge/Injection
-  Municipal Median Irrigation
- Other Information**
-  Green/Open Space



RECYCLED WATER PROJECT NO. 7
North Coast County Water District (City of Pacifica)

1. SOURCE STATISTICS:

Treatment Plant Statistics:

Dry Weather Plant Capacity: 7.2 mgd
2003 Average Dry Weather Flow: 3.4 mgd
 Disinfected Tertiary: 3.4 mgd
 Disinfected Secondary (2.2 mpn): 0
 Disinfected Secondary (23 mpn): 0
 Undisinfected Secondary: 0
2003 Average Peak-Day Flow: 7.2 mgd
Typical TDS: 750 mg/L

2. CURRENT RECYCLED WATER PROJECTS:

Type of Use	Average Annual Yield		Facility Cost	
	mgd	AFY	Capital	Annual O&M
Wetland Restoration	3.4	3,800	Unknown	Unknown

Project Description:

Currently tertiary treated recycled water is being used for wetland restoration in the area surrounding the Calera Creek Water Recycling Plant.

3. PLANNED AND BEING IMPLEMENTED RECYCLED WATER PROJECTS:

Type of Use	Average Annual Yield		Facility Cost	
	mgd	AFY	Capital	Annual O&M
Irrigation	0.2	225	\$4.0 M	\$30,000

Project Description:

Approximately 225 AFY (expected peak annual demand during dry years) will be diverted from the Calera Creek wetlands for the Pacifica Recycled Water Project. The project includes recycled water storage and distribution for irrigation of Sharp Park Golf Course (owned and operated by City and County of San Francisco Department of Parks & Recreation) and possibly Jefferson Unified School District grounds, the City of Pacifica, Highway 1 and Caltrans irrigation uses and other potential irrigation customers.

Note: Approximately 225 AFY will replace potable water demand. This amount will be diverted from existing recycled water project demand and therefore no increase is shown for near-term recycled water projects

4. UNDER STUDY OR PREVIOUSLY STUDIED RECYCLED WATER PROJECTS:

None

RECYCLED WATER PROJECT NO. 7
North Coast County Water District (City of Pacifica)

5. EXISTING RECYCLED WATER MASTER PLANS AND REPORTS:

Kennedy/Jenks is currently working on a recycled water feasibility study report for this project.

6. SOURCE OF YIELDS:

Current Projects: George, Kanakaris, North Coast County Water District, Personal Communication, February 2004.

Projects Planned and Being Implemented: George, Kanakaris, North Coast County Water District, Personal Communication, February 2004.

Notes:

AFY=acre feet per year

mpn=most probable number

mg/L=milligrams per liter

TDS=Total Dissolved Solids

mgd=million gallons per day

Existing and Future Water Reuse Sites Agency: North Coast County Water District (City of Pacifica)

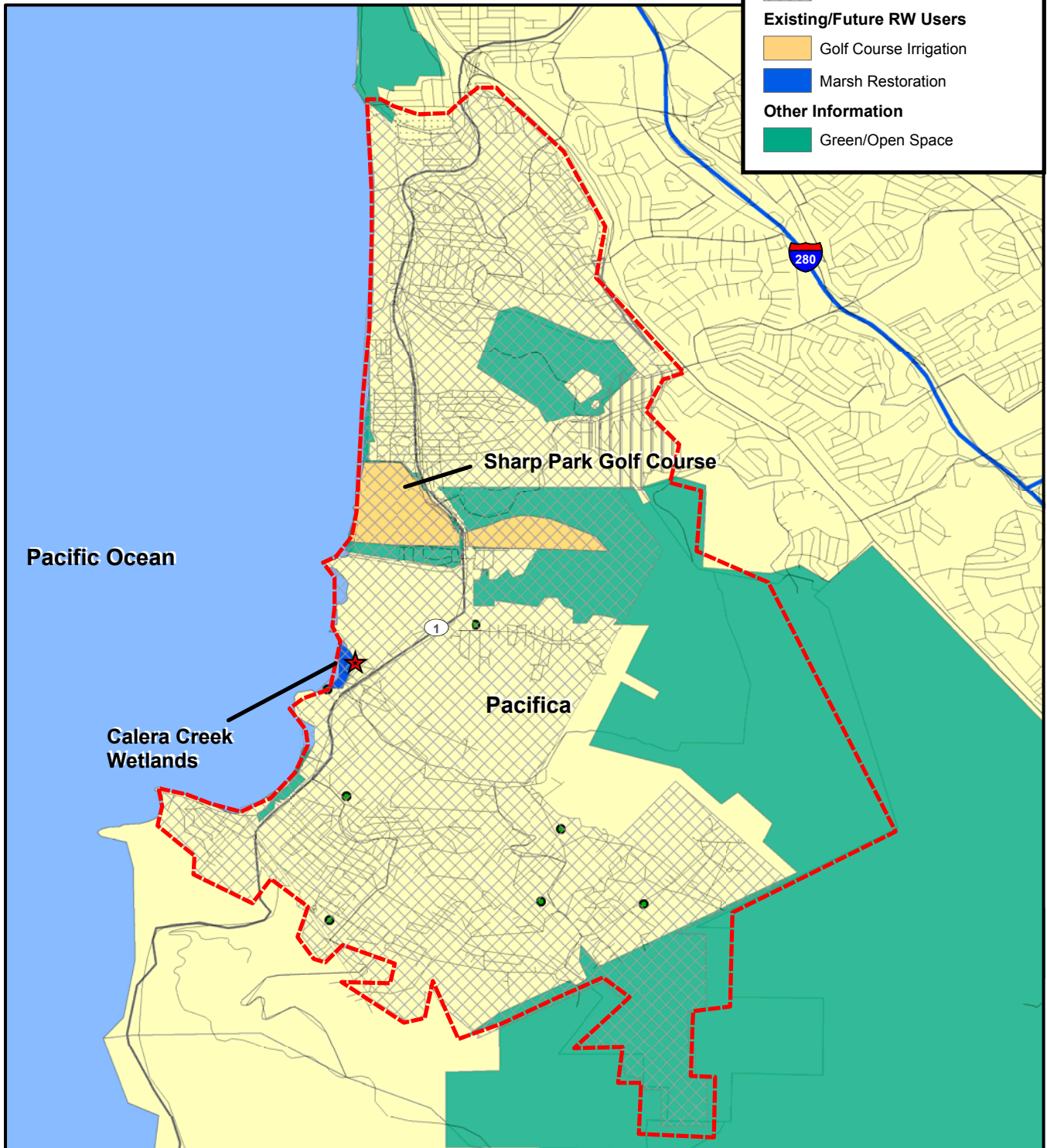
SFPUC Wholesale Area Water Recycling Demand
August 2004

0 0.45 0.9 1.8 Miles



Legend

- Treatment Plants
- Study Area
- Water District within Study Area**
 - North Coast County W.D.
 - Cal Water- SO San Francisco
 - Daly City Public Works Dept.
 - San Bruno Water Dept.
- Existing/Future RW Users**
 - Golf Course Irrigation
 - Marsh Restoration
- Other Information**
 - Green/Open Space



Potential RW uses at Jefferson Unified School District grounds and Caltrans are not depicted above because specific location/information not readily available.

RECYCLED WATER PROJECT NO. 8
Palo Alto Regional Water Quality Control Plant (RWQCP) – Mountain View

1. SOURCE STATISTICS:

RWQCP Statistics:

Dry Weather Plant Capacity: 38.0 mgd
2003 Average Dry Weather Flow: 24.0 mgd
 Disinfected Tertiary: 1.5 mgd
 Disinfected Secondary (2.2 mpn): 0
 Disinfected Secondary (23 mpn): 22.5 mgd
 Undisinfected Secondary: 0
2003 Average Peak-Day Flow: 35.0 mgd
Typical TDS: 900 mg/L

2. CURRENT RECYCLED WATER PROJECTS:

None

3. PLANNED AND BEING IMPLEMENTED RECYCLED WATER PROJECTS:

Type of Use	Average Annual Yield		Facility Cost	
	mgd	AFY	Capital	Annual O&M
Irrigation, Palo Alto		70–80		
Irrigation, Mountain View		1,300–1,520		
Irrigation, Moffett Field*		110–260		
Total	1.3–1.7	1,480–1,860	\$16.3 M	\$300,000

Project Description:

The recycled water projects include distributing recycled water to portions of Palo Alto for irrigation and industrial usage in the Mountain View Shoreline area and Moffett Field. The range of potential yields is based on annual demand estimates and factors of usage described in the Mountain View-Moffett Field Recycled Water Facility Plan (RMC 2004). The specific yield will depend upon the water utilized for each project and the project partners.

*The City of Palo Alto will proceed with this project even if the Moffett field portion is on hold because the area is under federal jurisdiction. The Moffett field use was not separated from the other uses in the Planned and Being Implemented Water Projects because the costs have not been developed for each specific use. If the uses were separated the costs would be unknown.

4. UNDER STUDY OR PREVIOUSLY STUDIED RECYCLED WATER PROJECTS:

None

5. EXISTING RECYCLED WATER MASTER PLANS AND REPORTS:

RMC. *Mountain View-Moffett Field Recycled Water Facility Plan*, April 2004.
 NASA *Research Park and the Environment* Final Programmatic EIS, July 2002.
 Brown and Caldwell. *Water Reclamation Master Plan for the Palo Alto Regional Water Quality Control Plant*, April 1992.

RECYCLED WATER PROJECT NO. 8
Palo Alto Regional Water Quality Control Plant (RWQCP) – Mountain View

6. SOURCE OF YIELDS:
Current Projects: Daisy Stark, Palo Alto RWQCP, Personal Communication, February 2004.
Projects Planned and Being Implemented: RMC. <i>Mt. View/Moffett Field Area Water Reuse Project Regional Recycled Facilities Planning Study</i> , March 2004.

Notes:

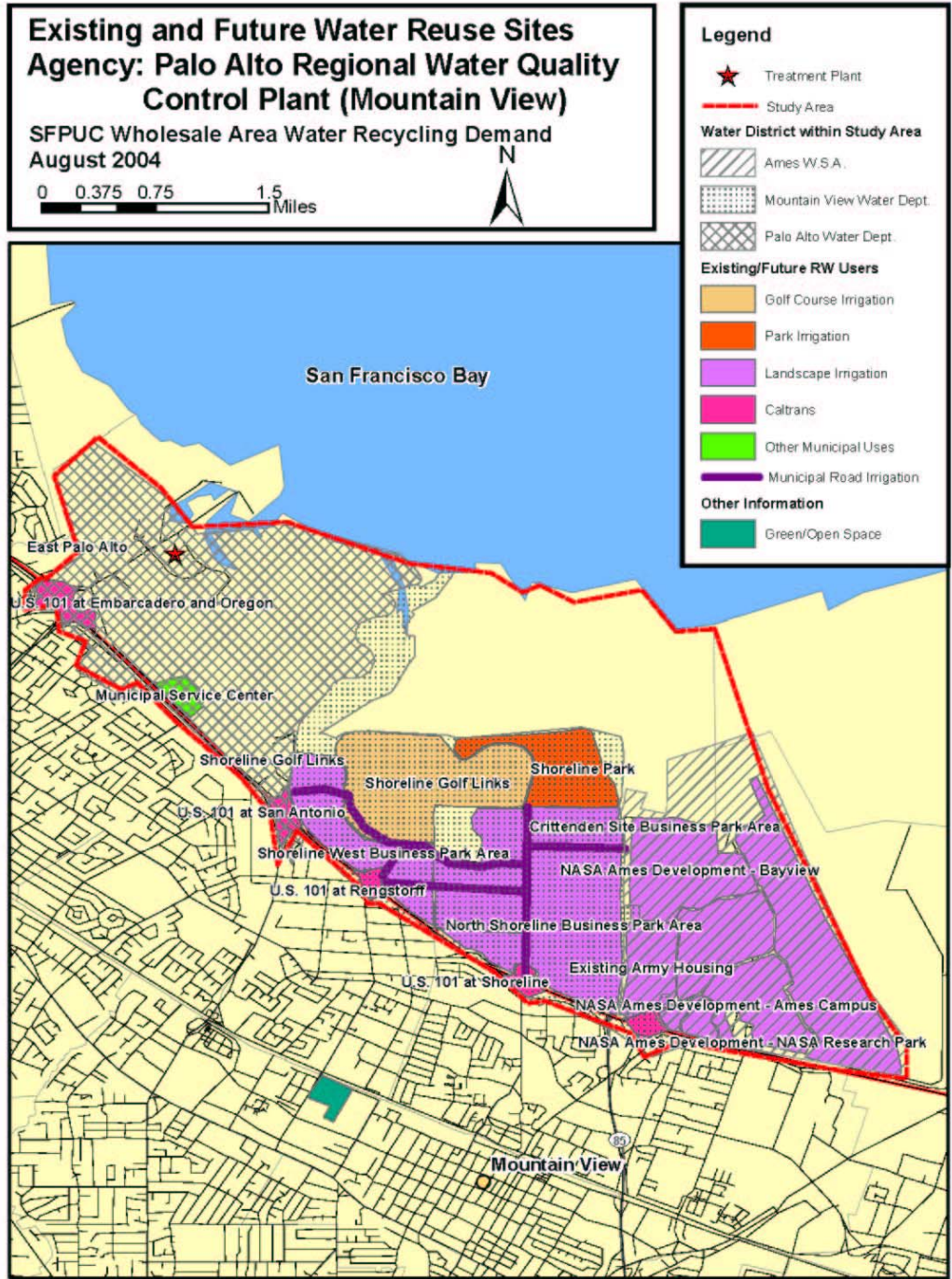
AFY=acre feet per year

mpn=most probable number

mg/L=milligrams per liter

TDS=Total Dissolved Solids

mgd=million gallons per day



**RECYCLED WATER PROJECT NO. 9
 Palo Alto Regional Water Quality Control Plant (RWQCP) – Other**

1. SOURCE STATISTICS:	
Treatment Plant Statistics:	
<i>Dry Weather Plant Capacity:</i> 38.0 mgd	
<i>2003 Average Dry Weather Flow:</i> 24.0 mgd	
Disinfected Tertiary: 1.5 mgd	
Disinfected Secondary (2.2 mpn): 0	
Disinfected Secondary (23 mpn): 22.5 mgd	
Undisinfected Secondary: 0	
<i>2003 Average Peak-Day Flow:</i> 35.0 mgd	
<i>Typical TDS:</i> 900 mg/L	

2. CURRENT RECYCLED WATER PROJECTS:				
Type of Use	Average Annual Yield		Facility Cost	
	mgd	AFY	Capital	Annual O&M
Irrigation	1.5	1,700	Unknown	Unknown
Project Description:				
Current projects include irrigation of Greer Park, Palo Alto Municipal Golf Course, and Shoreline Golf Links/Park; industrial uses; and wetlands restoration of Emily Renzel Marsh – 1700 AFY. In addition about 1 mgd is currently utilized for in-plant uses such as equipment washdown.				
Note: Approximately 400 AFY replaces potable water demand.				

3. PLANNED AND BEING IMPLEMENTED RECYCLED WATER PROJECTS:	
None	

4. UNDER STUDY OR PREVIOUSLY STUDIED RECYCLED WATER PROJECTS:				
Type of Use	Average Annual Yield		Facility Cost	
	mgd	AFY	Capital	Annual O&M
Irrigation, Palo Alto and East Palo Alto	1.06–2.14	1,203–2,401		
Irrigation, Los Altos and Los Altos Hills	0.36–0.96	407–1,080		
Irrigation, Mountain View	0.21–0.44	220–490		
Irrigation, Stanford University*	0.63*	706*		
Total	2.26–4.18	2,536–4,677	\$16–41 M	\$0.4–1.2 M

RECYCLED WATER PROJECT NO. 9
Palo Alto Regional Water Quality Control Plant (RWQCP) – Other

Project Description:

With upgrades to the existing treatment plant, mid-term projects would include additional irrigation of parks and medians as well as commercial/industrial applications within the local service area including East Palo Alto, Los Altos, Mountain View, Palo Alto and potentially Stanford University. The lower limit factors in annual yield estimates for the RWQCP Mountain View Project without a plant upgrade or expansion. The upper limit assumes the RWQCP Mountain and therefore the maximum amount the RWQCP can produce without further upgrades or expansions.

*Stanford has projected a total estimated future recycled water demand of 1,800 AFY. Based on wastewater flows and treatment capacity Stanford could potentially treat 1,094 AFY of recycled water on campus. Any demand exceeding 1,094 AFY up to the maximum of 1,800 AFY (or a total of 706 AFY) would be served by Palo Alto RWQCP as shown in the table on the previous page. For further description of the Stanford project see Project No. 13.

5. EXISTING RECYCLED WATER MASTER PLANS AND REPORTS:

RMC. *Mountain View-Moffett Field Recycled Water Facility Plan*, April 2004.

Brown and Caldwell. *Water Reclamation Master Plan for the Regional Water Quality Control Plant*, April 1992.

North Bayshore Main Water Recycling and Los Altos Extension Water Recycling Facility Studies to begin 2004.

6. SOURCE OF YIELDS:

Current Projects: Daisy Stark, Palo Alto RWQCP, Personal Communication, February 2004.

Projects Under Study or Previously Studied: RMC. *Mt. View/Moffett Field Area Water Reuse Project Regional Recycled Facilities Planning Study*, March 2004.

Notes:

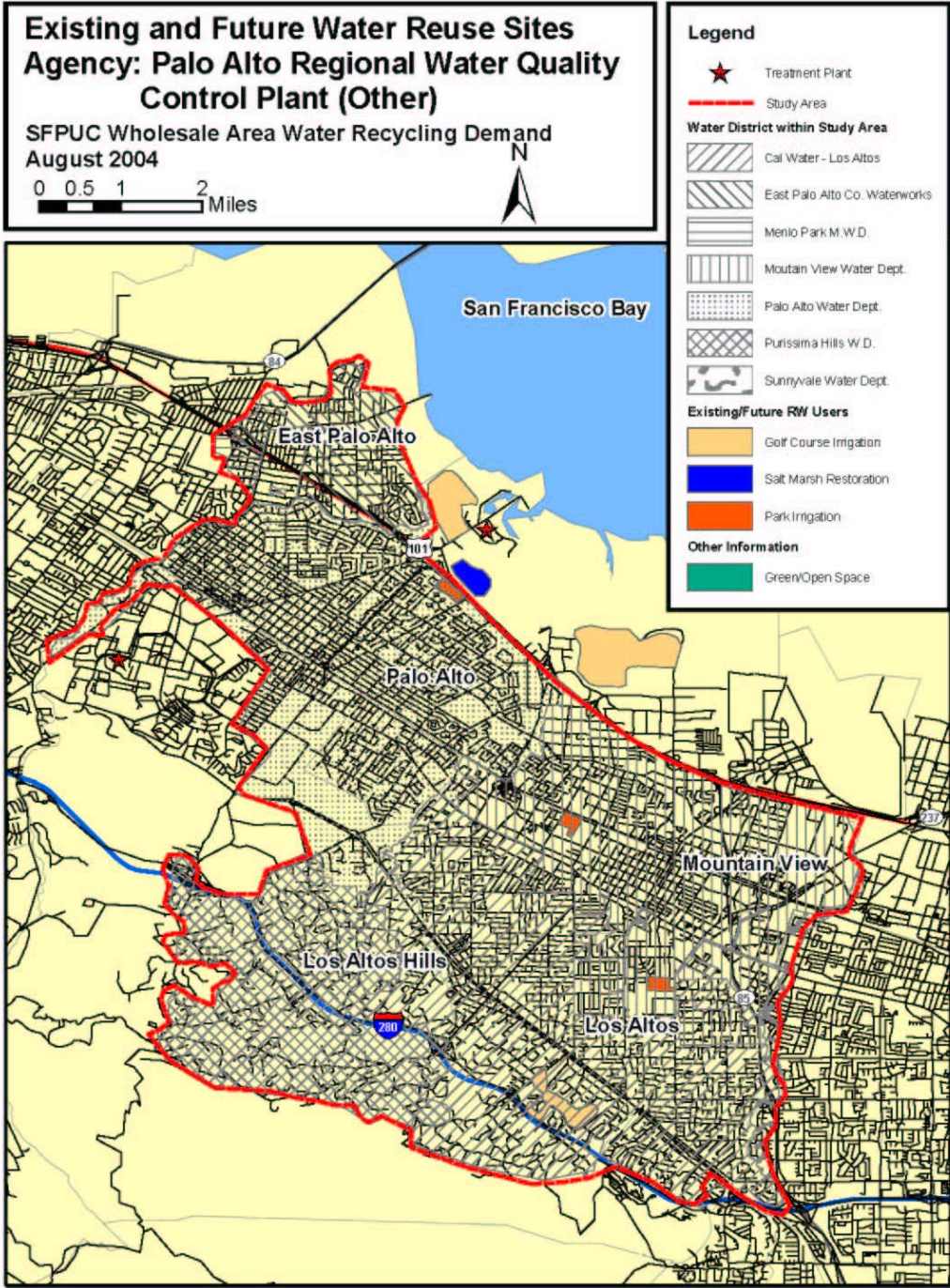
AFY=acre feet per year

mg/L=milligrams per liter

mgd=million gallons per day

mpn=most probable number

TDS=Total Dissolved Solids



**RECYCLED WATER PROJECT NO. 10
 Redwood City Recycled Water Project**

1. SOURCE STATISTICS:
<p>South Bayside System Authority (SBSA) Wastewater Treatment Plant Statistics (Redwood City): <i>Dry Weather Plant Capacity:</i> 29.0 mgd <i>2003 Average Dry Weather Flow:</i> 18.0 mgd Disinfected Tertiary: 0 Disinfected Secondary (2.2 mpn): 0 Disinfected Secondary (23 mpn): 18.0 mgd Undisinfected Secondary: 0 <i>2003 Average Peak-Day Flow:</i> 23.0 mgd <i>Typical TDS:</i> 820 mg/L</p>

2. CURRENT RECYCLED WATER PROJECTS:				
	Average Annual Yield		Facility Cost	
Type of Use	mgd	AFY	Capital	Annual O&M
Irrigation	0.1	112	Unknown	Unknown
Project Description:				
<p>In addition to identified irrigation use via the SBSA “First Step Project,” about 0.06 mgd of recycled water is utilized for in-plant uses such as vehicle washdown. SBSA’s landscape impoundment is populated by a variety of aquatic and shore birds, including American avocet, black neck stilt, Canada goose, spotted sandpiper, willet, and ducks. It encompasses approximately 20 acres of buffer land between the treatment plant and the neighboring community. Each year about 20 million gallons of recycled water are discharged to the impoundment.</p>				

3. PLANNED AND BEING IMPLEMENTED RECYCLED WATER PROJECTS:				
	Average Annual Yield		Facility Cost	
Type of Use	mgd	AFY	Capital	Annual O&M
Irrigation, industrial and other non-potable uses, Redwood city	1.65- 2.8 ¹	1,848-3,126	\$72–84 M	\$406,000
Project Description:				
<p>This project includes irrigation, industrial and other non-potable uses in Redwood Shores, the greater Bayfront area and Central Redwood City.</p> <p>¹The peak day demand for the Redwood City planned project is 3.7-6.3 mgd. The mgd rate above reflects the mgd value which would produce the average annual yield for the project.</p>				

4. UNDER STUDY OR PREVIOUSLY STUDIED RECYCLED WATER PROJECTS:
None

RECYCLED WATER PROJECT NO. 10
Redwood City Recycled Water Project

5. EXISTING RECYCLED WATER MASTER PLANS AND REPORTS:

Bartle Wells Assoc . *City of Redwood City Financing Plan.*, February 2003.
CH2MHILL. *Initial Study, Mitigated Negative Declaration*, June 2002.
CH2M Hill . *Addendum to Mitigated Negative Declaration*, , May 2003.
Kennedy Jenks . *Water Recycling Feasibility Study for Redwood City*, August 2002.
City of Redwood City. *Recycled Water Task Force Report*, March 3, 2003.
City of Redwood City. *Urban Water Management Plan*, 2003. Agreement for Production & Delivery of Recycled Water Between SBSA and The City of Redwood City, August 1, 2004.
Whitley Burchett & Associates *Redwood City Recycled Water Project Customer Guidelines for Landscape Irrigation*, August 2004.
Whitley Burchett and Associates. *Redwood City Recycled Water Project Engineering Report*, August 2004.

6. SOURCE OF YIELDS:

Current Projects: Peter Ingram, Redwood City Staff, Electronic, December 2004 and Craig Litchy, Kennedy/Jenks. *Water Recycling Feasibility Study*, August 2002.

Projects Planned and Being Implemented: City of Redwood City Recycled Water Task Force Report, March 3, 2003 (lower estimate: 1,848 AFY), Kennedy Jenks . *Water Recycling Feasibility Study for Redwood City*, August 2002 (upper estimate, 3,126 AFY).

Notes:

AFY=acre feet per year mg/L=milligrams per liter mgd=million gallons per day
mpn=most probable number TDS=Total Dissolved Solids

REDWOOD CITY RECYCLED WATER PROJECT



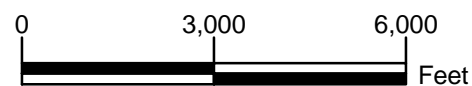
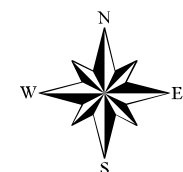
PROPOSED PHASE ONE DISTRIBUTION SYSTEM AND DISCRETE PROJECT AREAS

LEGEND

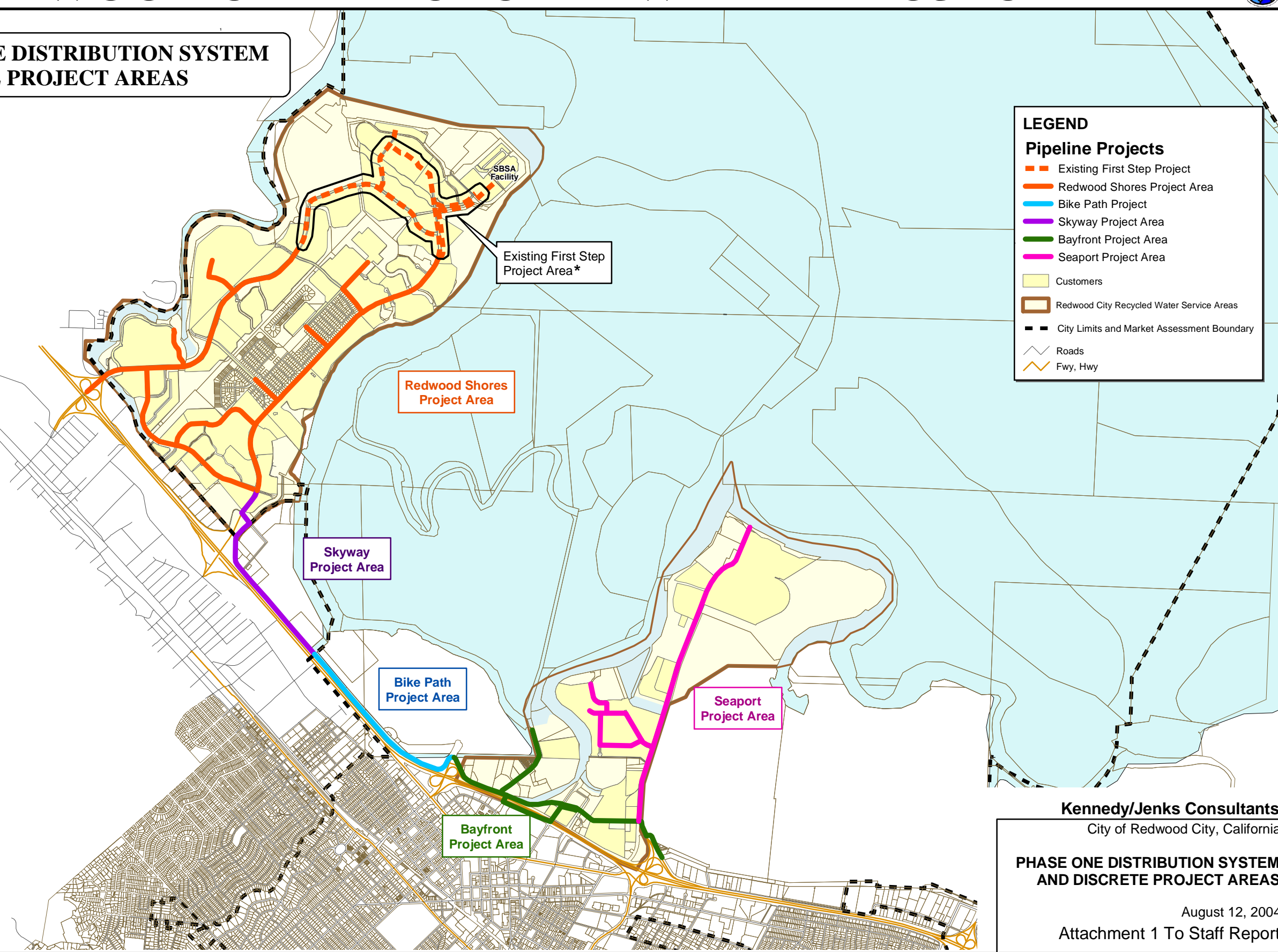
Pipeline Projects

- Existing First Step Project
- Redwood Shores Project Area
- Bike Path Project
- Skyway Project Area
- Bayfront Project Area
- Seaport Project Area

- Customers
- Redwood City Recycled Water Service Areas
- City Limits and Market Assessment Boundary
- Roads
- Fwy, Hwy



Source:
Redwood City Planning Division
GIS Basemap



* First step distribution system and existing customers to be incorporated into Redwood Shores Project Area.

Kennedy/Jenks Consultants
City of Redwood City, California

PHASE ONE DISTRIBUTION SYSTEM AND DISCRETE PROJECT AREAS

August 12, 2004
Attachment 1 To Staff Report

**RECYCLED WATER PROJECT NO. 11
 South Bay Water Recycling (SBWR)**

1. SOURCE STATISTICS:

San Jose/Santa Clara Water Pollution Control Plant Treatment Plant Statistics:

Dry Weather Plant Capacity: 167.0 mgd
2003 Average Dry Weather Flow: 118.0 mgd
 Disinfected Tertiary: 8.3 mgd
 Disinfected Secondary (2.2 mpn): 0
 Disinfected Secondary (23 mpn): 109.7 mgd
 Undisinfected Secondary: 0
2003 Average Peak-Day Flow: 129.2 mgd
Typical TDS: 708 mg/L

2. CURRENT RECYCLED WATER PROJECTS:

Type of Use	Average Annual Yield		Facility Cost	
	mgd	AFY	Capital	Annual O&M
City of Milpitas: Irrigation, Commercial and Industrial Uses	0.92	1,027	Unknown	Unknown
City of Santa Clara: Irrigation, Commercial and Industrial Uses	1.6	1,795	Unknown	Unknown
City of San Jose (North): Irrigation, Commercial and Industrial Uses	0.59	659	Unknown	Unknown

Project Description:

Currently recycled water serves customers in Santa Clara, San Jose, and Milpitas. In addition, 2 mgd is used for in-plant purposes such as equipment washdown.

3. PLANNED AND BEING IMPLEMENTED RECYCLED WATER PROJECTS:

Type of Use	Average Annual Yield		Facility Cost	
	mgd	AFY	Capital	Annual O&M
City of Milpitas: Irrigation, Commercial and Industrial Uses	0.06	67.49	Unknown	Unknown
City of Santa Clara: Irrigation, Commercial and Industrial Uses	0.13	150	Unknown	Unknown

Project Description:

These projects include the known conversions of existing and new accounts to recycled water.

4. UNDER STUDY OR PREVIOUSLY STUDIED RECYCLED WATER PROJECTS:

Type of Use	Average Annual Yield		Facility Cost	
	mgd	AFY	Capital	Annual O&M
City of San Jose (North): Irrigation, Commercial and Industrial Uses	1.91	2,141	Unknown	Unknown

Project Description:

These Projects include the identified potential future use of recycled water by existing and new accounts in north San Jose area.

RECYCLED WATER PROJECT NO. 11
South Bay Water Recycling (SBWR)

5. EXISTING RECYCLED WATER MASTER PLANS AND REPORTS:

South Bay Water Recycling Development Plan and Expansion Strategy, South Bay Water Recycling, May 2001.

6. SOURCE OF YIELDS:

Current Projects: BAWSCA, Electronic Communication, December 2004.

Projects Planned and Being Implemented: BAWSCA, Electronic Communication, November 2004.

Projects Under Study or Previously Studied: BAWSCA, Electronic Communication, November 2004.

Notes:

AFY=acre feet per year

mg/L=milligrams per liter

mgd=million gallons per day

mpn=most probable number

TDS=Total Dissolved Solids

Existing and Future Water Reuse Sites



Agency: San Jose/Santa Clara Water Pollution Control Plant

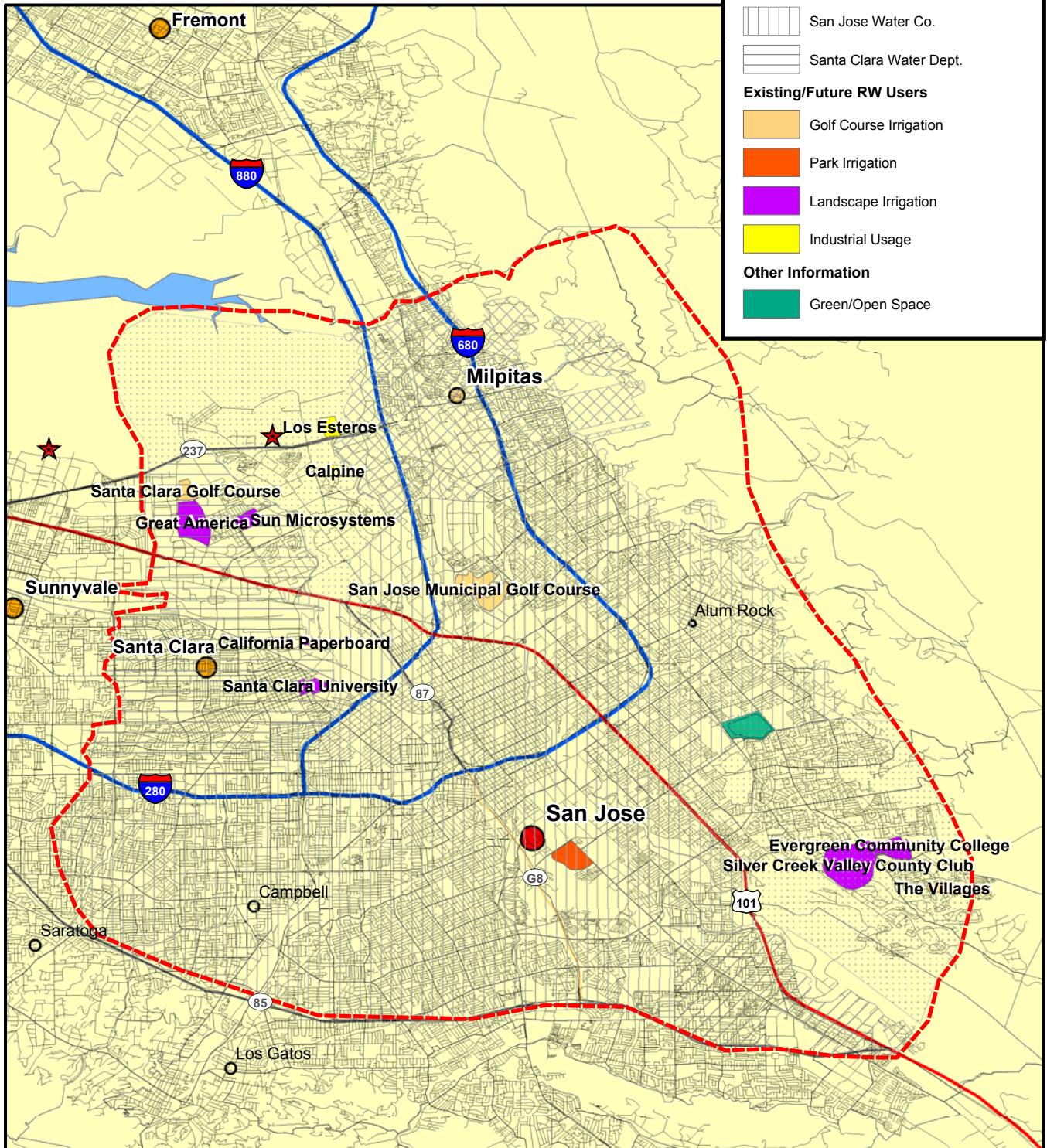
SFPUC Wholesale Area Water Recycling Demand
August 2004

0 0.5 1 2 Miles



Legend

-  Treatment Plant
-  Study Area
- Water District within Study Area**
-  Great Oaks W.S.A.
-  Milpitas Water Dept.
-  San Jose Municipal Water System
-  San Jose Water Co.
-  Santa Clara Water Dept.
- Existing/Future RW Users**
-  Golf Course Irrigation
-  Park Irrigation
-  Landscape Irrigation
-  Industrial Usage
- Other Information**
-  Green/Open Space



RECYCLED WATER PROJECT NO. 12
Cities of South San Francisco & San Bruno

1. SOURCE STATISTICS:

South San Francisco/San Bruno Treatment Plant Statistics:

Dry Weather Plant Capacity: 13.0 mgd
2003 Average Dry Weather Flow: 9.4 mgd
 Disinfected Tertiary: 0
 Disinfected Secondary (2.2 mpn): 0
 Disinfected Secondary (23 mpn): 0
 Undisinfected Secondary: 9.4 mgd
2003 Average Peak-Day Flow: 15.0 mgd
Typical TDS: 800 mg/L

2. CURRENT RECYCLED WATER PROJECTS:

None

3. PLANNED AND BEING IMPLEMENTED RECYCLED WATER PROJECTS:

None

4. UNDER STUDY OR PREVIOUSLY STUDIED RECYCLED WATER PROJECTS:

Project Description:

Proposed tertiary upgrades to wastewater treatment plant and construction of a recycled water distribution system.

5. EXISTING RECYCLED WATER MASTER PLANS AND REPORTS:

The cities of South San Francisco and San Bruno along with San Francisco and the California Water Service Company are funding a recycled water feasibility study for the South San Francisco/San Bruno wastewater treatment plant. The plant is operated by South San Francisco. The purpose of the study would be to produce a comprehensive report on potential recycled water alternatives that can be used to further public understanding, grant applications and future environmental assessments in support of the project.

6. SOURCE OF YIELDS:

Not Applicable – Yields To Be Determined.

Notes:

AFY=acre feet per year

mpn=most probable number

mg/L=milligrams per liter

TDS=Total Dissolved Solids

mgd=million gallons per day

**RECYCLED WATER PROJECT NO. 13
 Stanford University**

1. SOURCE STATISTICS:

Stanford University Local Recycled Water Projects:
*Local recycled water yield: 72–1,094 AFY**
Additional recycled water yield from Palo Alto RWQCP: 706 AFY
Sources: Cooling tower blowdown, other non-domestic and domestic waste water sources
Typical TDS: 300 mg/L
 Currently, Stanford does not maintain or operate a wastewater treatment plant on campus.
 * Stanford has projected a total recycled water demand of 1,800 AFY. Based on wastewater flows and treatment capacity Stanford could potentially treat 1,094 AFY of recycled water on campus. Any demand exceeding 1,094 AFY up to the maximum of 1,800 AFY (or a total of 706 AFY) would be served by Palo Alto RWQCP as shown in the table on the previous page. For further description of the demand served by Palo Alto RWQCP see Project No. 9.

2. CURRENT RECYCLED WATER PROJECTS:

None

3. PLANNED AND BEING IMPLEMENTED RECYCLED WATER PROJECTS:

None

4. UNDER STUDY OR PREVIOUSLY STUDIED RECYCLED WATER PROJECTS:

Type of Use	Average Annual Yield		Facility Cost	
	mgd	AFY	Capital	Annual O&M
Irrigation	0.06–0.98	72–1,094	\$2.6–\$15.7 M	\$0.224–1.7 M

Project Description:
 The main source of water at Stanford University is from the SFPUC system. In addition Stanford has five operating groundwater wells. One large use of water at Stanford is the Central Energy Facility (CEF). This project concept proposes to utilize wastewater from this facility rather than dispose of it to the sanitary sewer system. In addition wastewater could be collected from other campus and off-campus Stanford facilities* (hospitals, Stanford Shopping Center, Stanford West residences) and treated for recycled water uses. The costs would vary significantly depending on the scale of the project and whether or not domestic wastewater will be utilized and therefore need to be treated. The details of the project are presented in an unpublished study (see Source of Yields) and therefore the project description was provided directly from Marty LaPorte at Stanford Utilities (June, 2004).

RECYCLED WATER PROJECT NO. 13
Stanford University

5. EXISTING RECYCLED WATER MASTER PLANS AND REPORTS:

Maddaus Water Management and Stanford University. *Water Conservation, Reuse and Recycling Master Plan*, October 2003.

6. SOURCE OF YIELDS:

Projects Under Study or Previously Studied: BAWSCA, June 2004 and Hse, *Draft Feasibility Study for Water Recycling at Stanford University*, August 2003 (Unpublished)

Notes:

AFY=acre feet per year

mg/L=milligrams per liter

mgd=million gallons per day

mpn=most probable number

TDS=Total Dissolved Solids

*This option would have to be negotiated with the City of Palo Alto.

Existing and Future Water Reuse Sites Agency: Stanford University Central Energy Facility (CEF)






SFPUC Wholesale Area Water Recycling Demand
August 2004

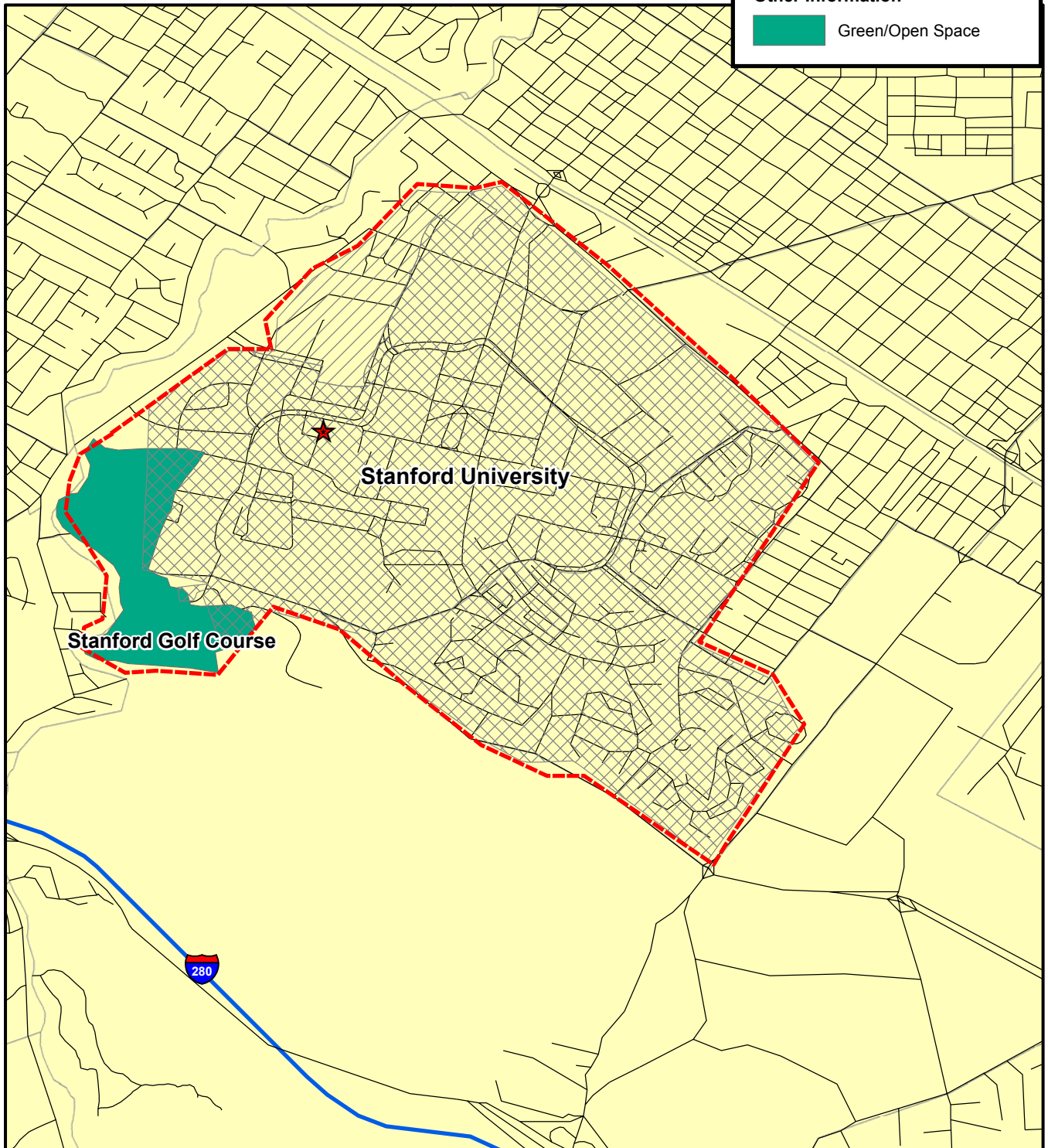
0 0.10.2 0.4
Miles

N



Legend

-  Central Energy Facility
-  Study Area
- Water District within Study Area**
 -  Palo Alto Water Dept.
 -  Stanford W.S.A.
- Other Information**
 -  Green/Open Space



**RECYCLED WATER PROJECT NO. 14
 City of Sunnyvale**

1. SOURCE STATISTICS:	
Sunnyvale Water Pollution Control Plant Statistics:	
<i>Dry Weather Plant Capacity:</i> 29.5 mgd	
<i>2003 Average Dry Weather Flow:</i> 15.3 mgd	
Disinfected Tertiary: 1.5 mgd	
Disinfected Secondary (2.2 mpn): 0	
Disinfected Secondary (23 mpn): 13.8 mgd	
Undisinfected Secondary: 0	
<i>2003 Average Peak-Day Flow:</i> 17.4 mgd	
<i>Typical TDS:</i> 800 mg/L	

2. CURRENT RECYCLED WATER PROJECTS:				
Type of Use	Average Annual Yield		Facility Cost	
	mgd	AFY	Capital	Annual O&M
Irrigation	0.81	905	Unknown	Unknown
Project Description:				
Current projects include irrigation of lawns, parks, and golf courses including Sunnyvale Golf Course, Twin Creeks Sports Complex, corporations on north side of town such as Lockheed, Yahoo, Arriba, and Network Appliances. In addition about 0.8 mgd of recycled water is used for in-plant purposes, such as vehicle washdown.				

3. PLANNED AND BEING IMPLEMENTED RECYCLED WATER PROJECTS:				
Type of Use	Average Annual Yield		Facility Cost	
	mgd	AFY	Capital	Annual O&M
Irrigation	0.18	200	Unknown	Unknown
Project Description:				
Planned and Being Implemented projects consist of five new irrigation sites including Lockheed Martin's sports facilities, Moffett Field area (awaiting approval), and Moffett Field Golf course. The Recycled Water Maude Connector will distribute water to customers along Maude Street. The financing for this project is currently awaiting approval.				

4. UNDER STUDY OR PREVIOUSLY STUDIED RECYCLED WATER PROJECTS:				
Type of Use	Average Annual Yield		Facility Cost	
	mgd	AFY	Capital	Annual O&M
Irrigation and Streamflow Augmentation	1.3	1,470	Unknown	Unknown
Project Description:				
These projects include additional irrigation and commercial/industrial uses. The distribution pipelines for these projects has already been installed, but are currently not in use. In addition, Stevens Creek streamflow augmentation may be provided with recycled water (amount of streamflow augmentation unknown).				

RECYCLED WATER PROJECT NO. 14
City of Sunnyvale

5. EXISTING RECYCLED WATER MASTER PLANS AND REPORTS:
None

6. SOURCE OF YIELDS:
Current Projects: Val Conzet, City of Sunnyvale, Personal Communication, April 2004 .
Projects Planned and Being Implemented: BAWSCA, Electronic Communication, November 2004.
Projects Under Study or Previously Studied: BAWSCA, Electronic Communication, November 2004.

Notes:

AFY=acre feet per year

mg/L=milligrams per liter

mgd=million gallons per day

mpn=most probable number

TDS=Total Dissolved Solids

Existing and Future Water Reuse Sites

Agency: City of Sunnyvale

SFPUC Wholesale Area Water Recycling Demand
August 2004

0 0.3 0.6 1.2 Miles



Legend

Treatment Plant

Study Area

Water District within Study Area

Sunnyvale Water Dept.

Ames W.S.A.

Cal Water- Los Altos

Santa Clara Water Dept.

Existing/Future RW Users

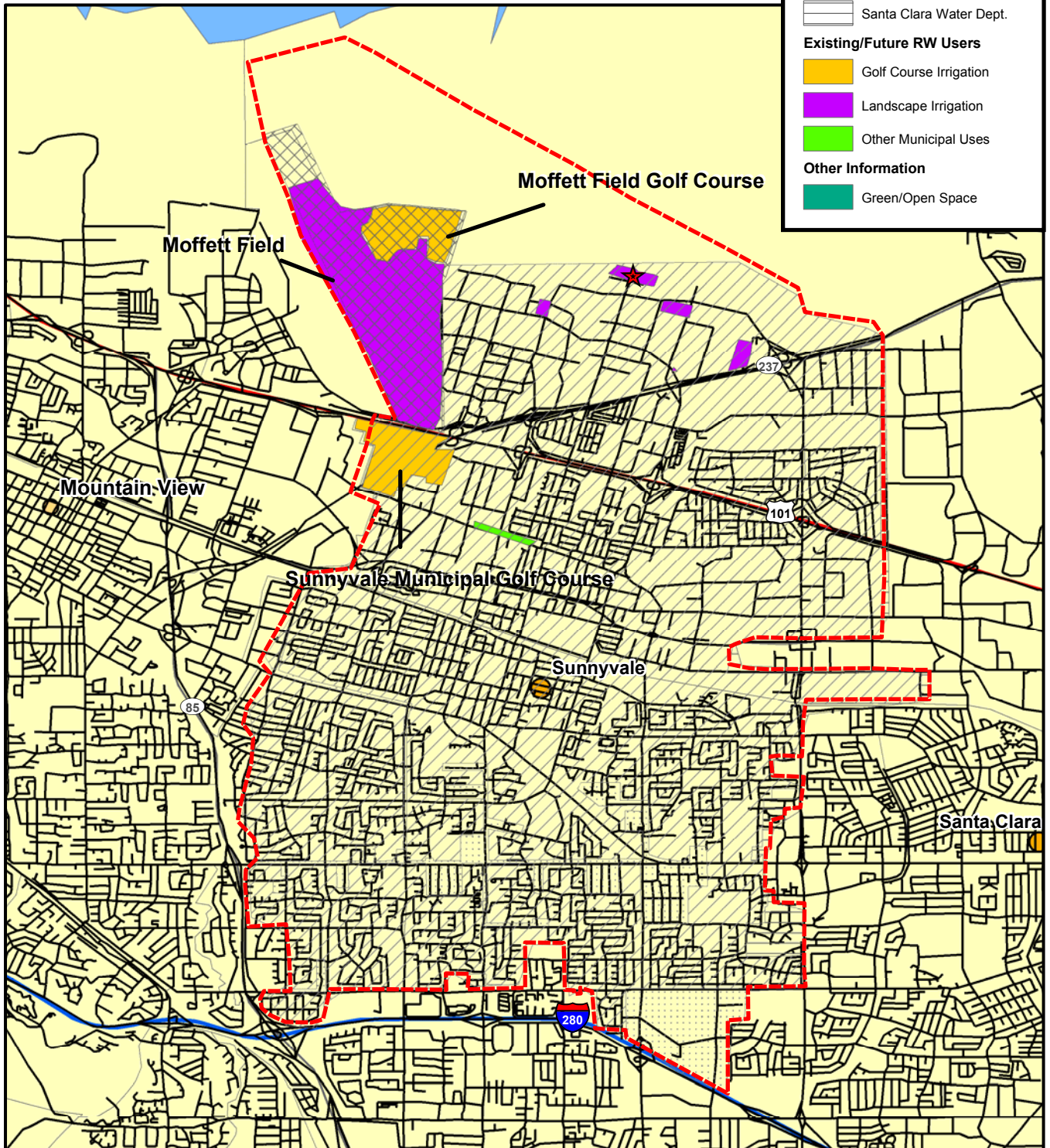
Golf Course Irrigation

Landscape Irrigation

Other Municipal Uses

Other Information

Green/Open Space



Appendix C

Projections for Recycled Water Potential for Environmental Uses

Wastewater Agency	Type of Environmental Use	BARWRP Potential Environmental Recycled Water Demands			Updated Potential Environmental Recycled Water Demands ⁽¹⁾	
		Name	2010	2025	Name	Existing/Future
City of Burlingame	None	-	0	0	-	0
City of Hayward	None	-	0	0	-	0
City of Millbrae	None	-	0	0	-	0
North San Mateo County Sanitary District	Aquifer recharge	-	0	0	Westside Basin aquifer recharge	Unknown
					Recycled water injection at Lake Merced	Unknown
North Coast County Water District	Wetlands	-	0	0	Pacifica wetlands ⁽²⁾	3,800
Palo Alto Regional WQCP	Streamflow Augmentation	San Francisquito Creek	900	900	-	0
	Wetlands	Mountain View Wetland	700	700	Emily Renzel Marsh ⁽²⁾	300
San Jose/Santa Clara WPCP	Wetlands	National Wildlife Refuge	500	500	-	0
		Streamflow Augmentation	Coyote Creek	3,110	3,000	-
	Guadalupe River		0	3,000	-	0
	Stevens Creek		0	800	-	0
	Upper Penitencia Creek	0	2,000	-	0	
City of San Mateo	Wetlands	Coyote Point	300	300	-	0
	Streamflow Augmentation	San Mateo Creek	600	600	San Mateo Creek augmentation remains a possibility	Unknown
South Bayside System Authority	None	-	0	0	-	0
Cities of South San Francisco-San Bruno	Wetlands	San Bruno Wetlands	200	200	None	None
City of Sunnyvale	Wetlands	Sunnyvale Wetlands	300	300	Stevens Creek	Unknown
Union Sanitary District	Wetlands	Coyote Hills	2,000	2,000	Mud Slough	Unknown
		Hayward Extension	1,200	1,200	Hayward Marsh ⁽²⁾	3,900
TOTALS			9,810	15,500		> 8,000

Notes: BARWRP: Bay Area Regional Water Recycling Program; WQCP- Water Quality Control Plant; WPCP – Water Pollution Control Plant; mgd – million gallons per day

1. Based upon wastewater agency survey and agency recycled water master plans, if available.

2. Existing projects.