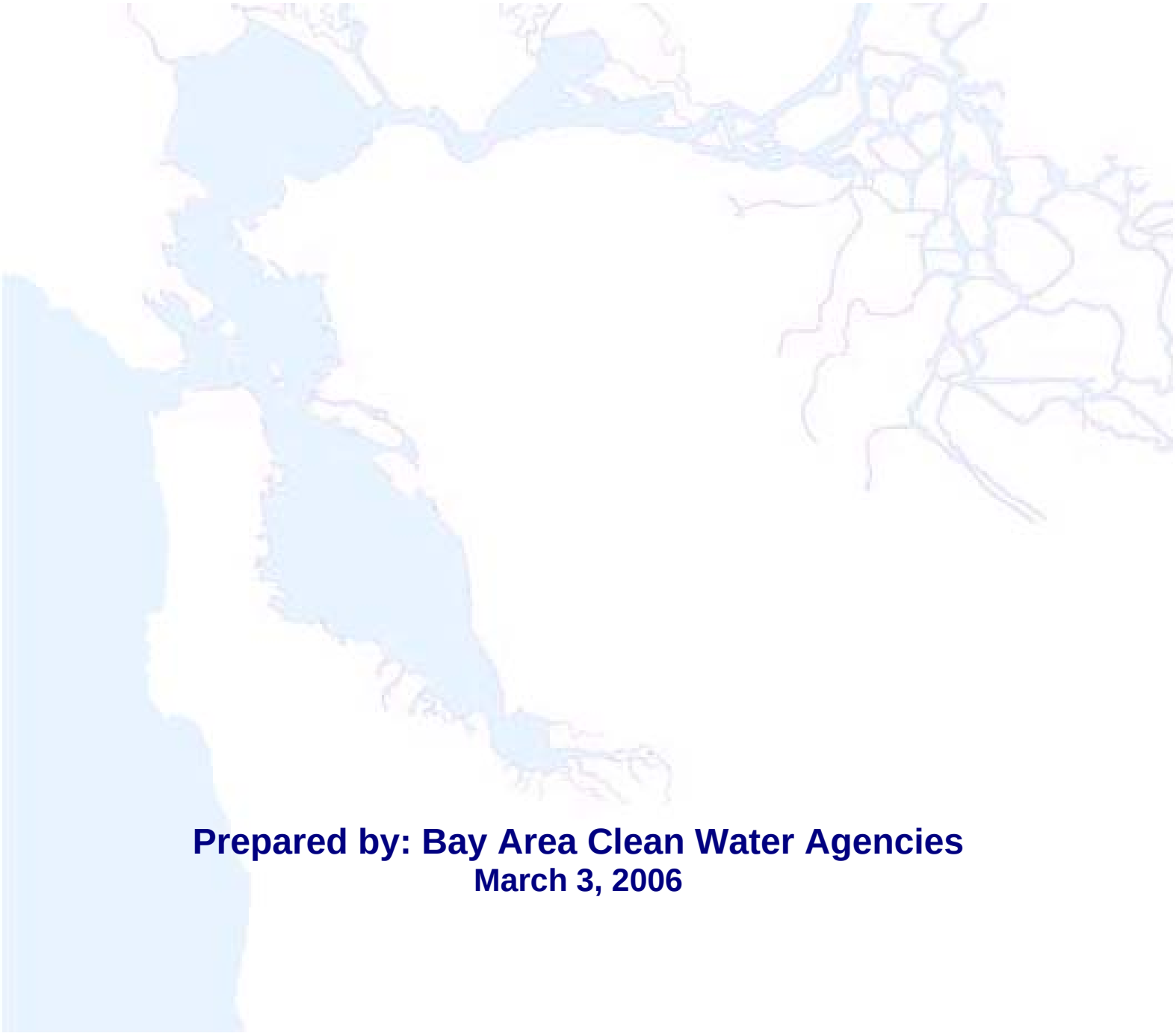
Bay Area Integrated Regional Water Management Plan

Wastewater and Recycled Water Functional Area Document



Prepared by: Bay Area Clean Water Agencies

March 3, 2006

Bay Area Clean Water Agencies
Resolution to Adopt the Wastewater and Recycled Water Functional Area Document

Whereas, state funding is currently available to support regional water management activities that improve water supply reliability and water quality, provided a plan is adopted describing how these regional water management activities were developed and will be implemented; and

Whereas, a Letter of Mutual Understanding helps coordinate the joint efforts of Bay Area utilities and other agencies toward the development of a San Francisco Bay Area Integrated Regional Water Management Plan (IRWMP); and

Whereas, the IRWMP is intended to integrate the management plans of all water related agencies and public utilities in the region, to foster coordination, collaboration and communication among those agencies, and will address water supply, water quality, wastewater, recycled water, water conservation, stormwater/flood control, watershed planning and aquatic habitat protection and restoration and

Whereas, the IRWMP for the San Francisco Bay Area will be used to secure grants and other funding for Bay Area water related projects, programs and plans, and

Whereas, the Bay Area Clean Water Agencies (BACWA) then Chairman, Jim Kelly, signed this agreement on December 19, 2003 agreeing to the Letter of Mutual Understanding and the responsibility for BACWA to provide a regional forum for compilation of individual agency service function plans into a regional functional area plan for wastewater and recycled water, and

Whereas, the BACWA Water Recycling Committee has lead the BACWA effort to develop the Recycled Water section of the Functional Area Document, with the development of an outline of the document, specific requirements for the projects, and three tiers for recycled water projects, and

Whereas, the Recycled Water Committee of BACWA noticed and held an public agency workshop for review of the recycled water section on October 24, 2005, and

Whereas, the BACWA Executive Board agreed in June of 2005, to include two regional projects into the Wastewater section of the Functional Area Document, the Regional Biosolids Project, and Risk Reduction Management for the Clean Estuary Project, and

Whereas, the Risk Reduction Management project of the Clean Estuary Partnership is an important project under development as an environmental justice project to better identify, communicate with and reduce the risk for people who are fishing and eating the fish from the San Francisco Bay, and

Whereas, the Regional Biosolids Project is important to the sustainability of beneficial reuse of biosolids which are removed from sewage through the wastewater treatment process thereby protecting the San Francisco Bay, the project provides a wide variety other benefits including economies of scale, reducing competition among agencies for marketing of similar products and streamlining permitting, and

Whereas, the schedule for preparation of the IRWMP call for BACWA to submit the Wastewater and Recycled Water Functional Area Document to the Technical Coordinating Committee (TCC) by March 1, 2006, and

Whereas, the Recycled Water Committee recommends the Executive Board approve the recycled water section of the document, and

Now, Therefore, Be It Resolved, that the Executive Board of BACWA approves the Wastewater and Recycled Water Function Area Document for submittal to the TCC with the understanding that as appropriate the descriptions of the projects, specifically the Risk Reduction Management, may be updated after March 1, 2006 but prior to October 1, 2006.

Chairman of the BACWA Executive Board Date:

February 27, 2006

_____ _____

William Keaney

Wastewater and Recycled Water Functional Area Document

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List of Abbreviations

ACWD	Alameda County Water District
ADM	Allocation Distribution Model
AF	acre-feet
AFY	acre-feet per year
BACWA	Bay Area Clean Water Agencies
BARWRP	Bay Area Regional Water Recycling Program
BASMAA	Bay Area Stormwater Management Agencies Association
CCCSD	Central Contra Costa Sanitary District
CCWD	Contra Costa Water District
CDFG	California Department of Fish and Game
CEF	Central Energy Facility
CEP	Clean Estuary Partnership
COP	ConocoPhillips
CVP	Central Valley Project
DDSD	Delta Diablo Sanitation District
DERWA	DSRSD-EBMUD Recycled Water Authority
DSRSD	Dublin San Ramon Services District
Dtpd	dry tons per day
EBMUD	East bay Municipal Utility District
EBRWP	East Bayshore Recycled Water Project
EDC	endocrine disrupting compound
gpd	gallons per day
IRWMP	Integrated Regional Water Management Plan
lf	linear feet
LAVWMA	Livermore-Amador Valley Water Management Agency
MBR	membrane bioreactor
MF	microfiltration
mgd	million gallons per day
MWWTP	Main Wastewater Treatment Plant (EBMUD)
NGO	non-governmental organization
NBWRP	North Bay Water Reuse Program
NCCWD	North Coast County Water District
NFPD	Novato Fire Protection District
NMWD	North Marin Water District
NPDES	National Pollutant Discharge Elimination System
NSD	Napa Sanitation District/Novato Sanitary District
OEHHA	Office of Environmental Health Hazard Assessment
PBDE	polybrominated diphenyl ether
PCB	polychlorinated biphenyl
PCP	personal care product
PhAC	pharmaceutically active compound
RARE	Richmond Advanced Recycled Expansion
POTW	publicly-owned treatment works
R&D	research and development
RO	reverse osmosis
RWQCB	Regional Water Quality Control Board
RWQCP	Regional Water Quality Control Plant
SBWR	South Bay Water Recycling

SBSA	South Bayside System Authority
SCVWD	Santa Clara Valley Water District
SCWA	Sonoma County Water District
SFPUC	San Francisco Public Utilities Commission
SVCSD	Sonoma Valley County Sanitation District
SVRWP	Sonoma Valley Recycled Water Project
SRWTP	Satellite Recycled Water Treatment Plant
SWRCB	State Water Resources Control Board
SWP	State Water Project
TDS	Total Dissolved Solids
TMDL	Total Maximum Daily Load
USBR	United States Bureau of Reclamation
USD	Union Sanitary District
USEPA	United States Environmental Protection Agency
UWMP	Urban Water Management Plan
WPCP	Water Pollution Control Plant

Executive Summary: Wastewater in the San Francisco Bay Area

Most of the nine counties that surround the San Francisco Bay and discharge effluent into the Bay are urbanized and sewered. Residential wastewater, consisting of all waste flushed or washed down sinks and drains of residences and commercial establishments (e.g. stores, restaurants, and office buildings), is collected in sewers and flows to secondary or advanced wastewater treatment facilities across the Bay Area. Much of the industrial wastewater produced throughout the region, following pretreatment, is also discharged to publicly owned sewers and subsequently transported to these publicly owned treatment works (POTWs). In the San Francisco Bay region, POTWs are clean water public agencies, governed by elected officials and funded with sewer user fees paid for by the public, commercial and industrial users of the sewerage systems.

Regional Wastewater Management

The Bay Area Clean Water Agencies (BACWA) is a joint powers authority dedicated to protecting the San Francisco Bay from the potentially harmful impacts that municipal wastewater could cause to the San Francisco Bay were it not properly treated or managed. A steward for the Bay, BACWA is dedicated to the development of a region-wide understanding of the watershed protection and enhancement needs through reliance on sound science, environmental and economic information and to ensuring that this understanding leads to long-term stewardship of the San Francisco Bay Estuary. The five largest clean water agencies by size of utility, population served and volume of effluent are the Principal members of BACWA which entered into the JPA. In addition, there are 14 Associate and 33 Affiliate BACWA member agencies.

Proposed Wastewater Projects

Of the many regional wastewater efforts underway in the region, the following two projects stand out as being consistent with the Proposition 50 Chapter 8 goals and objectives:

- Risk Reduction Management for the San Francisco Bay; Developing and Implementing Options for Mitigating Risks of Public Health Impacts of Eating Fish. This project involves identification of populations at risk of detrimental effects associated with consumption of fish from San Francisco Bay. In addition, the project includes outreach and education to potentially affected groups, as well as identification of appropriate actions to mitigate risk. The Risk Reduction Management for the San Francisco Bay project is included in this Functional Area Document because it promotes a truly regional approach to implementation of TMDLs and watershed goals for the San Francisco Bay and specifically addresses regional environmental justice concerns.
- Regional Biosolids Project. This project involves design and construction of a thermal drying facility, with a startup capacity of 50 dtpd. The facility will be designed for phased expansion up to a maximum of 200 dtpd. This project will provide a wide variety of benefits to the region, including economy of scale, sustainable beneficial reuse, reducing competition among agencies for marketing of similar products, and streamlining permitting. It is included in this Functional Area Document as a project that is truly regional in nature, which stands to provide multiple benefits to the region.

Executive Summary: Recycled Water in the San Francisco Bay Area

Water recycling is a critical underpinning of integrated regional water resources management in the San Francisco Bay Area. Water recycling projects embody water supply reliability, ecosystem protection and enhancement, and surface water protection, which together comprise the basis for sustainable water resources management.

In the late 1970's, the late 1980's and the early 1990's the Bay Area experienced serious water shortages as a result of droughts. As the economy continues to grow and population of the region increases, the frequency and severity of these water shortages is expected to increase. Consequently, a secure, reliable and drought-proof water supply would be a cornerstone of the long-term economic vitality of the San Francisco Bay Region and California. In response to these shortages, water recycling has emerged as a viable regional strategy for maintaining high quality, reliable water supplies.

Regional Water Recycling

The San Francisco Bay Area has a long history of regional recycled water planning. In the early 1990's, following years of drought and facing uncertain future water supplies, wastewater and water public utilities formed a partnership with the United States Bureau of Water Reclamation and the California Department of Water Resources to study the feasibility of a regional approach to water recycling in the San Francisco Bay Area. This study, the Bay Area Regional Water Recycling Program (BARWRP), remains at the foundation of regional recycled water planning throughout the Bay Area today. The BARWRP Master Plan found that the major driving forces for water recycling in the Bay require regional solutions. In addition, the master plan showed that water recycling can provide water supply and reliability and environmental benefits through stream augmentation and wetland enhancement. The master plan revealed that there is a large potential market for recycled water, up to one million acre-feet per year (AFY) by 2040.

Similarly, water supply and clean water agencies throughout the North Bay counties of Marin, Sonoma and Napa have been meeting since mid-2003 to investigate opportunities to expand the use of recycled water for agricultural and other purposes. Co-sponsored by the U. S. Bureau of Reclamation, the North Bay Water Reuse Program (NBWRP) has investigations underway to identify a regional recycled water program to increase water supply, reduce discharges to the North Bay and provide ecosystem enhancements.

The North Bay Regional Water Recycling Feasibility Study and the BARWRP Master Plan showed that regional projects do not need to connect all areas that are participating. Rather, these studies showed that local projects may provide a cost-effective means of securing the infrastructure, public acceptance, and foundation necessary for ultimately implementing a large-scale regional program. As local projects continue to establish infrastructure in the Bay Area, cost and benefit will become more broadly distributed across the region and through California.

Consistency with Proposition 50 Chapter 8

The BARWRP and the NBWRP are consistent with the goals and objectives of Proposition 50 both individually and as part of the San Francisco Bay Area IRWMP. These two regional studies examined the value of water recycling as a regional approach to protection of water resources, development of reliable water supplies, and ecosystem restoration and enhancement. While the projects in these regional water recycling studies are geared primarily towards addressing the Bay

Area's water supply reliability objectives, their design and integration allows them to address multiple water management objectives of importance to the region and state.

All of the projects included in this Functional Area Document address the multiple water management elements that are the purpose of Proposition 50, including water supply reliability, source water protection, water quality, and ecosystem enhancement.

Proposed Recycled Water Projects

This Functional Area Document presents detailed information for three tiers of planned recycled water projects throughout the San Francisco Bay Area, with a total potential recycled water yield of up to 119,942 AFY. The three tiers are defined, and estimated yields are presented, in Table ES-1.

Table ES-1: Estimated Project Yields by Tier

Project Tier	Tier Definition	Estimated Yield
Priority Near-Term Projects	Included in Prop. 50 Chapter 8 Implementation Grant applications for the Bay Area	Up to 32,081 AFY
Priority Tier 2 Projects	Intended to be implemented between 2007 and 2015	Up to 35,725 AFY
Priority Tier 3 Projects	Included in BARWRP and NBWRP and/or utility Master Plans, to be implemented by 2020	Up to 52,136 AFY
	Total	*Up to 119,942 AFY*

Summary

A variety of challenges face the Bay Area's ability to effectively collect, treat, and distribute recycled water on a regional scale. However, through years of coordinated regional planning, Bay Area clean water agencies have been able to clearly identify the challenges they face, and have developed strategies to conquer those obstacles, allowing successful implementation of large-scale water recycling programs. The Bay Area's history of regional planning, coupled with the multi-disciplinary, integrated nature of recycled water projects and the diverse benefits these projects offer, render the Bay Area's proposed water recycling platform of paramount importance to the region's ability to achieve its objective of maintaining a high quality, reliable drinking water supply, while protecting and restoring its sensitive habitats. Through staged implementation the projects and programs outlined in this Functional Area Document, the Bay Area will take real steps toward ensuring a long-term, reliable, sustainable water supply that supports the region's environmental objectives.

1 Wastewater in the San Francisco Bay Area

The San Francisco Bay Estuary is the largest estuary on the west coast of North America and is the most important estuary from an ecological and economic standpoint. Two important rivers, the Sacramento River and the San Joaquin River, when combined, drain approximately 47% of the State of California as flow through the Delta and into the San Francisco Bay. As important as these rivers are to California, there are a number of local/regional rivers, creeks and streams which also drain to the San Francisco Bay including: Napa River; Solano River; Petaluma River; Coyote Creek; and Alameda Creek.

The State of California, the Regional Water Quality Control Board for the San Francisco Bay Region (Region 2), and the United States Environmental Protection Agency have designated the uses of the San Francisco Bay and these rivers, creeks and streams to include:

- *San Francisco Bay*: estuarine habitat, industrial service supply, navigation and all of the uses supported by streams
- *Streams*: municipal and industrial supply, agricultural supply, industrial process supply, groundwater recharge, water contact recreation, wildlife habitat, cold freshwater habitat, warm freshwater habitat, fish migration and fish spawning

More than six million people live in the San Francisco Bay Region, many of whom do not fish, swim, or recreate in or on the Bay. Nevertheless, people are drawn to this unique region due to its natural beauty, mild climate, and current and historical significance of as a major shipping and commerce location for the western United States and the Pacific Rim.

1.1 Bay Area Wastewater Management

Most of the nine counties that surround the San Francisco Bay and discharge effluent into the Bay are urbanized and sewered. This means that residential wastewater, consisting of all waste flushed or washed down sinks and drains of residences and commercial establishments (e.g. stores, restaurants, and office buildings), is collected in sewers and flows to secondary or advanced wastewater treatment facilities across the Bay Area. Much of the industrial wastewater produced throughout the region, following pretreatment, is also discharged to publicly owned sewers and subsequently transported to these publicly owned treatment works (POTWs).

At these treatment plants, harmful pollutants such as bacteria, suspended solids, heavy metals, and toxic chemicals are removed. At most of the 34 POTWs across the Bay Area, biological processes are employed to remove solids as well as pollutants adhering to the solids. At four POTWs, an additional process of filtration is used to provide a higher level of protection for the San Francisco Bay.

Pursuant to the Clean Water Act and the California Porter Cologne Act, each discharge of waste into a surface water of the United States must receive a permit allowing such a discharge, dictating the limitations on the discharge, and outlining the responsibilities of the discharge agency. Each of the 34 POTWs in the San Francisco Bay Region has received National Pollution Discharge Elimination Permits (NPDES) permits from the San Francisco Bay Region of the Regional Water Quality Control Board (RWQCB), a department under the California Environmental Protection Agency. These permits are issued by the RWQCB after public notice, acceptance of comments and a public hearing. The State Water Resources Control Board (SWRCB) and the US Environmental Protection Agency (USEPA) oversees the RWQCB actions, and either agency can stop the final issuance of discharge permits.

In the San Francisco Bay region, POTWs are clean water public agencies, governed by elected officials and funded with sewer user fees paid for by the public, commercial and industrial users of the sewerage systems. Generally, sewer user fees are based on proportional use of the system. These fees account for the full financial burden of the agency, including the operations, maintenance, capital improvements and debt of the clean water agency. Proportional use of the system for residential users is determined by applying an estimate of the portion of water consumption flushed or drained to the sewers in a typical residence to the actual water consumption for that residence. For industrial and large commercial users, proportional use of the system accounts for strength and quantity of pollutant loading to the sewerage system in addition to volume.

The clean water agencies in the San Francisco Bay Region serve more than 6 million people. Some of the clean water agencies are classified as special districts under California special districts code. The governance of these special districts is either direct public election of Directors, or designation of individuals by elected officials to serve in the governance capacity. Other clean water agencies are chartered cities, non charted cities and or counties. In all cases, elected officials governing these clean water agencies are directly accountable to the public.

The clean water agencies in the San Francisco Bay Region and across the country are highly regulated public utilities that are financed by public fees and are accountable to the public.

1.2 BACWA Purpose and Membership

With the dawn of the 21st Century, the San Francisco Bay is feeling the legacy of drainage from the California Central Valley, historic and current drainage off of the urban areas that surround the Bay, and impacts of the more than six million people that live around the Bay.

The Bay Area Clean Water Agencies (BACWA) are public stewards of the Bay. These agencies are dedicated to protecting the San Francisco Bay from the potentially harmful impacts that municipal wastewater could cause to the San Francisco Bay were it not properly treated or managed. As a steward for the Bay, BACWA is dedicated to:

The development of a region-wide understanding of the watershed protection and enhancement needs through reliance on sound science, environmental and economic information and to ensuring that this understanding leads to long-term stewardship of the San Francisco Bay Estuary.

The purpose of BACWA, as stated in the 1984 Joint Powers Authority is:

- To collect, interpret, manage and disseminate data and information on the aquatic life and quality of waters of the San Francisco Bay system, with emphasis on pollution-related effects;
- To coordinate the work of this Association with related work of other agencies or organizations;
- To represent the interest of member agencies;
- To carry out other programs of mutual interest

The five largest clean water agencies by size of utility, population served and volume of effluent are the Principal members of BACWA which entered into the JPA. These five Principals are:

- **The City of San Jose, Water Pollution Control Agency.** The third largest city in California and the tenth largest in the nation, San José established a national reputation for environmental leadership and innovation during the 1980s with award-winning recycling, water conservation, and wastewater treatment programs. The San Jose/Santa Clara Water Pollution Control Plant is one of the largest advanced wastewater treatment facilities in California. It treats and cleans the wastewater of over 1,500,000 people that live and work in the 300-square mile area encompassing San Jose, Santa Clara, Milpitas, Campbell, Cupertino, Los Gatos, Saratoga, and Monte Sereno.

  The Water Pollution Control Plant has the capacity to treat 167,000,000 gallons of wastewater per day. It is located in Alviso, at the southernmost tip of the San Francisco Bay. Originally constructed in 1956, the Plant had the capacity to treat 36,000,000 gallons of water per day and only provided primary treatment. In 1964, the Plant added a secondary treatment process to its system. In 1979, the Plant upgraded its wastewater treatment process to an advanced, tertiary system.

- **The City and County of San Francisco, Public Utilities Commission.** The San Francisco Public Utilities Commission (SFPUC) is a department of the City and County of San Francisco that provides water, wastewater, and municipal power services to San Francisco. The clean water system provides the City with wastewater collection, treatment and disposal. The wastewater collection, treatment and disposal system consists of a combined sewer system (which collects both sewer and storm water), three water pollution control plants and effluent outfalls to the San Francisco Bay and Pacific Ocean. The combined sewer system reduces pollution in the San Francisco Bay and Pacific Ocean by treating urban runoff that would otherwise flow to the Bay and Ocean. The collection system consists of approximately 900 miles of underground pipes throughout the City.

  The SFPUC treats and discharges approximately 84 million gallons per day of treated wastewater during dry weather to the San Francisco Bay and Pacific Ocean. During wet weather, with additional facilities and increased operations, the plants can treat approximately 465 million gallons of combined flows per day.

- **East Bay Municipal Utility District.** The East Bay Municipal Utility District (EBMUD) supplies water and provides wastewater treatment for parts of Alameda and Contra Costa counties on the eastern side of San Francisco Bay in northern California. EBMUD is a publicly owned utility formed under the Municipal Utility District Act passed by the California Legislature in 1921. The Act permits formation of multipurpose government agencies to provide public services on a regional basis. The wastewater system serves approximately 640,000 people in an 83-square-mile area along the east shore of San Francisco Bay.
- **East Bay Dischargers Authority.** EBDA is a joint powers agency of five local agencies in Alameda, CA which was formed to collectively manage the wastewater treatment and disposal of the following member agencies:
  - City of San Leandro
  - Oro Loma Sanitary District
  - Castro Valley Sanitary District
  - City of Hayward
  - Union Sanitary District

EBDA serves a population of 800,000 and also provides service to Pleasanton, Dublin, and Livermore through an agreement with Livermore-Amador Valley Water Management Agency (LAVWMA). The Authority owns and operates four effluent pump stations, a dechlorination facility, and a force main and Bay Outfall system for effluent disposal into the San Francisco Bay.

- **Central Contra Costa Sanitation District.** Central Contra Costa Sanitary District (CCCSD) is a special district that collects and cleans an average of 45 million gallons of wastewater per day for about 440,000 residents and businesses in central Contra Costa County. The District is managed by a five–member Board of Directors which manages 250 dedicated employees to achieve the ultimate goal of providing the best possible service to the community while protecting public health and the environment.

  CCCSD also operates a household hazardous waste collection facility, recycles high-quality water, and promotes pollution prevention through various educational, informational and inspection programs.

There are 14 Associate member of BACWA which are also public agencies, governed by elected officials and financed by public sewer service rates. These 14 Associate members are:

- Central Marin Sanitation Agency
- City of Livermore
- City of Palo Alto
- City of San Mateo
- City of Sunnyvale
- Delta Diablo Sanitation District
- Dublin San Ramon Service District
- Fairfield Suisun Sewer District
- Napa Sanitation District
- Sacramento Regional County Sanitation District
- South Bayside System Authority
- South San Francisco/San Bruno WPCP
- Vallejo Sanitation and Flood Control District
- West County Agency

BACWA also has 33 Affiliate members, some of which are not treatment agencies, but special districts or cities that manage sewer collection systems that collect and transport sanitary sewage to Publicly Owned Treatment Works.

1.3 Proposed Wastewater Projects

BACWA is truly a regional organization that represents the public agencies and the population of the San Francisco Bay Area to manage the collection and treatment of wastewater and to produce clean water for the protection and restoration of the San Francisco Bay. In addition, BACWA member agencies are focused on reusing the products they produce. This extends both to the reuse of treatment plant effluent as recycled water as well as reuse and beneficial use of solid

residuals of the treatment process, or biosolids. A regional public joint powers authority, BACWA is also engaged in many regionally-focused efforts including:

- **The Regional Monitoring Program.** The Regional Monitoring Program is implemented by the San Francisco Estuary Institute. In place for ten years, the Regional Monitoring Program has developed a rich database of San Francisco Bay water quality information.
- **The Bay Area Pollution Prevention Group.** For over a dozen years, the Bay Area Pollution Prevention Group has developed Bay-wide pollution prevention programs in cooperation with the Bay Area Storm Water Management Agencies (BASMAA). In addition to providing a forum for information exchanges, sharing and regional projects, the Bay Area Pollution Prevention Group has developed public education and information programs on how to prevent pollution through individual housekeeping practices.
- **The Bay Area Regional Water Recycling Program.** The Bay Area Regional Water Recycling Program started in 1994. Over the next five years, the Program developed a regional master plan for water recycling.
- **The Clean Estuary Partnership.** Started in 2001, the Clean Estuary Partnership consists of the Regional Water Quality Control Board, BACWA, and BASMAA, and develops scientific and technical information to support total maximum daily loads (TMDLs) and other San Francisco Bay Water Quality Attainment Strategies.

Of all of the regional wastewater efforts underway in the region, there are two specific projects that stand out as being consistent with the Proposition 50 Chapter 8 goals and objectives. As such, BACWA proposes that the following two regional wastewater projects be included in the Integrated Regional Water Management Plan for the San Francisco Bay Region:

1. Risk Reduction Management for the San Francisco Bay; Developing and Implementing Options for Mitigating Risks of Public Health Impacts of Eating Fish

2. Regional Biosolids Project

These projects are described in detail in the following sections.

Risk Reduction Management for the San Francisco Bay

The Risk Reduction Management for the San Francisco Bay; Developing and Implementing Options for Mitigating Risks of Public Health Impacts of Eating Fish project is a product of the Clean Estuary Project's Risk Reduction Workgroup. The Clean Estuary Partnership Risk Reduction Workgroup and the Risk Reduction Management for the San Francisco Bay project are described below.

The Clean Estuary Partnership Risk Reduction Workgroup

The primary focus of the Clean Estuary Partnership Risk Reduction Workgroup is to identify, prioritize and support actions, where practicable, to reduce risks to vulnerable populations that consume fish caught from San Francisco Bay.

The Clean Estuary Partnership (CEP) is a cooperative partnership that facilitates efforts to improve water quality in San Francisco Bay by providing financial and staff support for technical analysis and stakeholder outreach activities.

The official CEP partners are (links open new browser window describing agency):

- San Francisco Bay Regional Water Quality Control Board (RWQCB),
- Bay Area Stormwater Management Agencies Association (BASMAA), and
- Bay Area Clean Water Agencies (BACWA).

Other key participants include the San Francisco Estuary Institute, Clean Water Fund, San Francisco Bay Keeper, Port of Oakland and the Western States Petroleum Association.

The CEP is working towards developing strategies, including Total Maximum Daily Loads (TMDLs) that: identify pollutant sources, assess impacts, and set forth actions that will lead to solutions

Purpose of the Workgroup

In January of 2004, the Executive Management Board of the Clean Estuary Partnership (CEP) adopted the following purpose statement for the Risk Reduction Work Group:

> To assist the CEP partners to develop, implement, and enhance effective programs to control pollutant-related health risks to humans and wildlife that rely on the San Francisco Bay estuarine system as a food source.
>
> Despite loading reductions and cleanup efforts, beneficial uses of San Francisco Bay will be impaired by mercury, PCBs, and perhaps other toxic pollutants for many years to come.
>
> Exposure of people to toxic pollutants must be minimized. Health risks associated with exposure must be reduced. Exposure can be reduced by targeted clean-ups and by education; health risks can be mitigated by identifying the people most likely to be affected and developing or promoting programs that provide care and services that will improve their health status. As a first priority, the Risk Reduction Work Group will focus on reducing human exposure and on mitigating risks to human health.
>
> The risks that pollutant exposure poses to wildlife populations can be partially mitigated in some cases by providing additional habitat or other interventions that encourage healthy ecological communities. The Risk Reduction Work Group may work on reducing pollutant-related risks to wildlife once programs to reduce human health risks are underway.
>
> The Clean Estuary Program Risk Reduction Work Group encourages participation by interested parties, regardless of affiliation, and especially seeks input from those with a background in public health, community health services, toxicology, risk communication,

and related fields as well as members of communities most likely to be affected by pollutants in Bay fish.

Based on this purpose statement, the Risk Reduction Workgroup is undertaking the development and evaluation of options for reducing and mitigating risks. There is an expectation that the CEP and its members will work directly with responsible state and federal organizations, non-governmental and community based organizations, and local public health agencies to ensure that funding is available to support the most effective risk reduction and mitigation activities identified across the San Francisco Bay region. Scope of work for the first step of this program is provided below.

Developing and Evaluating Options for Mitigating Risks of Public Health Impacts of Eating Fish

I. Background

The California Office of Environmental Health Hazard Assessment (OEHHA) has issued interim fish consumption advisories for San Francisco Bay due to elevated concentrations of mercury, polychorinated biphenyls (PCBs), dioxins, and organochlorine pesticides. These advisories have been issued due to the significant health concern posed by exposure to mercury, PCBs, and other pollutants in fish, including an increased likelihood of neurodevelopmental disorders. In addition, PCBs and dioxins are also on EPA's list of probable carcinogens. Although no regulatory criteria have yet been established for polybrominated diphenyl ethers (PBDEs), the presence of these pollutants in fish is cause for additional concern.

These health advisories are evidence that beneficial use of the Bay for sport fishing is impaired, causing the San Francisco Bay to be added to the official list of impaired water bodies pursuant to the federal Clean Water Act (Water Board, 2002). The San Francisco Bay Regional Water Control Board's TMDL reports for mercury (Johnson and Looker, 2004) and PCBs (Water Board, 2004) indicate that, due to large historic inputs of pollutants that still remain in the Bay, impairment of Bay waters is anticipated to persist from 70 to 150 years, even with implementation of control measures.

Consequently, it is likely that consumption health advisories for fish caught in the Bay will be required for some time to come. This fact has led to consideration of how public resources can be used to reduce this public health risk in the Bay Area.

Fish Consumption Study

A fish consumption study (California Department of Health Services and San Francisco Estuary Institute, 2001) indicates that because of different consumption rates, species consumed, and methods of preparation, anglers from particular ethnic groups (including African-Americans, Filipinos, and Pacific Islanders) are disproportionately exposed to pollutants in fish. Pregnant women and children are particularly at risk to potential health impacts associated with mercury and PCBs.

This study of over 1,300 anglers in the Bay Area found that differences in income, education, or fishing mode did not significantly correlate with the amount of fish consumed. However, environmental advocates and environmental justice advocates have expressed concern that a combination of factors unique to specific subpopulations (i.e., dependence on Bay fish as a food source; location in areas where Bay waters, sediments, and fish are more polluted than in the Bay as a whole; differences in fish preparation methods; and a higher likelihood of consumption by children and women of childbearing age) could have a multiplicative effect on risk, resulting in relatively high exposure of certain subpopulations to multiple pollutants.

There is concern that the impacts of the impairment of the Bay are inequitably borne by certain ethnic and/or socioeconomic groups. This concern is supported by national analysis by USEPA, which found that incidence of neurodevelopmental disorders is closely correlated with poverty (USEPA, 2003).

Risk Reduction Work Team

In an effort to better deal with uncertainty regarding the extent of the potential public health impacts related to consuming bay fish with high levels of mercury, the TMDL for mercury in San Francisco Bay adopted by the San Francisco Bay Regional Water Quality Control Board (Water Board) calls for dischargers to undertake actions to reduce public health risks.

To fulfill this commitment, the Clean Estuary Partnership has formed a Risk Reduction Work Team (Work Team) and provided professional staff to this group. Participants at Work Team meetings have included representatives of BACWA and municipal stormwater dischargers, the San Francisco Bay Regional Water Quality Control Board, community-based organizations performing outreach and education in potentially most-affected communities, environmental advocates, California Department of Health Services Environmental Health Investigations Branch, California Office of Environmental Health Hazard Assessment, and the CEP's non-governmental organization (NGO) Technical Representative.

The Work Team reviewed and discussed previous and ongoing outreach and education about health advisories to limit consumption of Bay fish. However, it is recognized that certain anglers are likely to continue to eat fish from the Bay despite general advisories, outreach, and education. Therefore, the Work Team identified a need to focus on the subpopulation that is more at risk through targeted and effective outreach as well as other types of interventions.

The Work Team also discussed the difficulties inherent in gauging the extent of health impacts due to the consumption of contaminated Bay fish. This is due in part to (1) the difficulty of accurately identifying specific persons or subpopulations that may be affected or at risk, and (2) the fact that there are multiple sources of contaminant exposure. The Work Team noted that, rather than waiting until greater certainty is achieved before taking action, there are actions that can be taken now to support the implementation of prudent and reasonable actions designed to reduce risk and health effects.

The Work Team recommended a multidisciplinary panel be formed to identify, evaluate, and recommend potential actions to reduce health risks and health impacts. In addition to facilitation from CEP Program staff, the panel would be assisted by a technical consultant who will help prepare the necessary background documents, refine the list of questions to be addressed, and report the Panel's conclusions and recommendations. The following Conceptual Scope of Work describes the structure and charge of this Panel. The technical consultant should have the appropriate background in public health and environmental health as well as the technical and project management expertise necessary to track and record the Panel's conclusions, clarify working assumptions as needed, and identify remaining issues/questions to be addressed as the project proceeds.

II. Statement of Work

The Risk Reduction Work Team will recruit, convene and oversee a Multidisciplinary Panel to:

1. Identify and evaluate methods to better distinguish and characterize at-risk populations for the purpose of targeting risk-reduction and impact-mitigation efforts;

2. Develop and assess of a range potential actions to evaluate, address and reduce health risks and health impacts associated with consumption of Bay fish;

3. Identify options that will (a) have an impact in both the short and long term and (b) can be integrated into institutions so as to ensure long-term implementation.

It is anticipated that the Panel will meet twice. The focus and deliverables of each step are described below. The results of this Panel will then serve as the basis for selecting a package of pilot actions to be funded and implemented by the CEP and other relevant agencies and dischargers.

Convening Process

The Work Team will identify, recruit and select the Panelists. They will also identify, recruit and recommend a technical consultant to help manage the Panel's deliberations and document its conclusions. In this role, the technical consultant will assist the Work Team prepare the background materials and refine the list of guiding questions to help structure the discussion. During the meetings, he/she will track the Panel's findings and recommendations and use this information to develop and refine reports for review by the Work Team and other interested stakeholders.

The Panel will include participants with the following range of experience and expertise

- Epidemiology, including experience with health disparities
- Neurology and diagnosis of neurological disorders, especially among children
- Local health practitioners engaged in provision of family health care to low-income and disadvantaged persons and communities
- Local practitioners engaged in direct outreach, education and community organizing in at risk communities
- Toxicology
- Dietary science, including experience with cultural dietary preferences

Initial Multidisciplinary Panel Discussion

A primary focus of the first meeting will be for the Panel to outline ways to more clearly define and characterize at-risk persons or subpopulations based on the existing literature in the field and their own experiences in the region. If more analysis is deemed both feasible and appropriate, the Panel is asked to recommend a series of actions/analyses that could be taken to better identify and analyze that population. In addition, the Panel will be asked to address a series of questions related to possible outreach options, the potential health impacts and types of health care services available. (See Appendix B for a more detail list of questions to be addressed.)

Finally, the Panel will review a draft list of potential actions to evaluate and reduce potential risks (prepared by the Work Team). They will also begin to evaluate the feasibility, expected benefits/results, technical uncertainties, potential obstacles, and cost effectiveness of each one. The Panel may also add to the list of potential actions with additional suggestions based on their experience and expertise in this area.

After the meeting, the technical consultant will draft of a summary of the feedback and recommendations received and produce a draft report. This draft report will then serve as the basis of deliberation by the panel for the second meeting.

Second Multidisciplinary Panel Discussion

At its second meeting, the Panel will be asked to review the findings and recommendations from the first meeting, and update/revise them as appropriate. They will then be asked to further evaluate and refine the list of possible actions under both topics in order to be able to recommend a feasible set of actions designed to best target available resources or for which additional resources could be obtained.

Two possible primary criteria to use in developing and ranking these options would be (1) expected short and long-term benefits and (2) ability to be institutionalized over time to ensure long-term maintenance and implementation. As part of this process, the Panel will be asked to document the process used to evaluate options and describe how the selected options could be implemented.

Table 1: Budget Estimate for Identify and Evaluating Options

Task	Cost
Development of Detailed Scope, recruiting Panel	$5,000
Convene first meeting, prepare draft report	$20,000
Convene second meeting, prepare, review, revise, and present final report	$25,000
Total	$50,000

Estimated Future Funding Needs from Proposition 50 Chapter 8

As noted above, the Panel's report will serve as the basis for selecting a package of pilot actions to be funded which are intended to lead to institutionalized programs for risk management over time. Risk Management is directly associated with implementation of TMDLs for and restoring the beneficial uses of the San Francisco Bay. Not only have the fish been harmed by the historic practices and the legacy of draining and runoff into the Bay, people who eat fish from the Bay today are harmed by this legacy.

This project represents a truly regional approach to implementation of TMDLs and watershed goals for the San Francisco Bay, and it specifically addresses regional environmental justice concerns.

Regional Biosolids Project

Widespread public concern related to biosolids land application has led to an increasing trend on both the national and state levels toward the development of county regulations and ordinances banning land application of Class B, and, in some cases, Class A biosolids. Elimination of these alternatives for biosolids recycling has resulted in an increase in biosolids management costs. The San Francisco Bay Area region is not immune to these challenges.

Spurred on by the vulnerability of the current local land application program, the BACWA Biosolids Committee initiated a study in the fall of 2003 to determine the feasibility of developing a cooperative biosolids management program among multiple agencies. Eighteen Bay Area agencies, varying in size from less than 1 million gallons per day (MGD) to over 100 MGD, participated in funding the project. These agencies recognized the potential benefits associated with developing a regional solution to biosolids management, including:

- **Economies of scale.** This approach provides opportunities for economies of scale as compared with each POTW developing and operating its own processing facilities or Class A solids handling facilities.
- **Sustainable beneficial reuse.** Regionalization provides an assurance that biosolids products can be developed and beneficially used locally, which reduces some criticism directed at Bay Area POTWs by outlying counties.
- **Diversification.** This approach would enable larger agencies to diversify beneficial use and disposal options.
- **Cooperative, coordinated approach.** Regionalization would reduce competition among agencies for marketing of similar products.
- **Project ownership.** BACWA membership is proactively directing the choice of sites and technologies rather then allowing a vendor to make all the decisions on a facility, which could result in across-the-board cost-savings.
- **Inclusive to All.** This would enable smaller agencies that produce less biosolids and have smaller influences on the market to participate.
- **Permitting.** Permitting a single facility is generally less complicated than permitting multiple facilities.

Project Goals:

The project goals include:

1. Developing a publicly supportable, regional biosolids recycling and management program that provides economical, diversified, reliable, and sustainable options that benefit communities and the environment.

2. Locating the facility in the nine-county San Francisco Bay Area.

3. Creating a product or products that can be used within the nine-county Bay Area, as well as distributed to a broader market.

Project Status

To date, the participating agencies have invested approximately $200,000 in the development of studies to ascertain whether there are suitable technologies that would achieve the project goals, if there are potential sites suitable for the project facility, and whether a sustainable governance structure can be developed for the completion of the development of the facility and for the facility's ongoing operation.

Based on preliminary delivery commitments from the agencies, the initial facility would be capable of processing approximately 50 dry tons per day (dtpd) of biosolids. It is anticipated that, over time, the facility would be expanded to accommodate processing 150 to 300 dtpd of biosolids.

Thirty-nine alternative biosolids processing technologies have been evaluated with respect to the following criteria:

1. Demonstrated full-scale operational experience for municipal biosolids

2. Successful operations for a minimum of three facilities over the past three years

3. Capability of processing biosolids with similar properties as that currently produced by the participating agencies

4. Demonstrated compliance with all current and applicable regulations

Through this extensive evaluation, agitated-bin composting, aerated static pile composting and thermal drying were identified as potential technologies that would allow the agencies to diversify their biosolids management. After closely evaluating each of the potential technologies, no single technology could easily be identified as the superior alternative – each had its advantages and disadvantages. In addition, the cost analysis indicated that the total cost for development and operation of the facility would be equivalent for all of the potential technologies.

The study evaluated the Bay Area from a geographic standpoint to identify potential sites to host a regional biosolids facility. The preliminary evaluation examined acreage, access to major freeways, potential impacts on nearby communities, proximity to power and wastewater treatment facilities, and land costs, amongst other criteria. Based on this evaluation, the agencies are considering siting the regional facility at either Delta Diablo Sanitation District's wastewater treatment plant in Antioch, East Bay Municipal Utility District's main wastewater treatment plant in Oakland, or Fairfield-Suisun Sewer District's wastewater treatment plant in Fairfield. Each of these sites can accommodate the full build-out for a thermal drying facility, but not for a composting facility.

Next Steps

Seven agencies plan to move the project forward to facility planning and environmental documentation. These agencies include:

- City of Millbrae
- City and County of San Francisco
- Delta Diablo Sanitation District
- Dublin-San Ramon Services District
- East Bay Municipal Utility District
- Fairfield-Suisun Sewer District
- Union Sanitary District

The project will include design and construction of a thermal drying facility, with a startup capacity of 50 dtpd. The facility will be designed for phased expansion up to a maximum of 200 dtpd, and will be located at one of the three short-listed sites. It is anticipated that the total capital cost for facility development will be approximately $40M.

The participating agencies will begin work on facility planning and environmental documentation in early 2006. This work should be completed within one year (March 2007). At that time, the agencies will need to identify a funding source prior to beginning design, construction and operation of the facility. It is anticipated that the facility will begin operating in early 2010, if funding can be successfully developed.

2 Water Recycling in the San Francisco Bay Area

Maximizing water recycling is critical to achieving integrated regional water resources management in the San Francisco Bay Area. This section presents a brief history of regional water recycling efforts throughout the San Francisco Bay Area. In addition, recycled water projects and programs anticipated to be implemented in the region are described in detail. The potential benefits of proposed recycled water projects and programs are related back to the requirements and preferences of the Proposition 50 Chapter 8 Integrated Regional Water Management grant program.

2.1 History of Water Recycling in the San Francisco Bay Area

The San Francisco Bay Region has a long history of regional planning for recycled water implementation. Two major regional water recycling programs established in the Bay Area have helped to pave the way for regional recycled water programs: the Bay Area Regional Water Recycling Project and the North Bay Water Reuse Program.

The Bay Area Regional Water Recycling Project

In the late 1970's and the late 1980's to early 1990's the Bay Area experienced serious water shortages as a result of droughts. In the early 1990's, following years of drought and facing limited future water supplies, wastewater and water public utilities formed a partnership along with the United States Bureau of Water Reclamation and the California Department of Water Resources to study the feasibility of a regional approach to water recycling in the San Francisco Bay Area. The focus of this feasibility study was to determine if the use of high quality recycled water could augment the water supplies, support the restoration of the Bay/Delta system and reduce the mass loading of harmful pollutants to the San Francisco Bay.

In 1999, the San Francisco Bay Area Regional Water Recycling Program (BARWRP) produced a Master Plan for Regional Water Recycling. The study area for the BARWRP Master Plan is shown in Figure 1.

This Master Plan found:

- The major driving forces for water recycling in the Bay Area, water supply reliability and environmental enhancement, are regional issues that require a regional approach to the solutions.
- Water recycling can produce benefits to water supply and reliability as well as environmental benefits through stream augmentation and wetland enhancement.
- Large scale water recycling in the Bay Area can help limit future demands on the Delta and its watershed and thus provide an important component to the statewide solutions for water and environmental demands that are placed on that system.
- There is a large potential market for recycled water, up to 240,000 acre-feet per year (AFY) by 2025, especially with implementation strategies which allow for water transfers, and develop public acceptance for use of recycled water. These implementation strategies included:
    - **Funding,** a long-term partnership between the federal, state and local agencies was recommended through the design and construction phases of recycled water projects
    - **Regional Partnership,** which would support water transfers, reduction of institutional barriers and trading of discharge credits and cost sharing;

- **Public Acceptance,** as a result of a comprehensive and regional public education and information exchange program to ensure that concerns about public health, safety and water supply integrity are understood and addressed.

- Water recycling projects in the Bay Area could produce as much as 125,000 acre feet a year by 2010 (at a cost of $700 million in 1999 dollars), and 240,000 acre feet a year by 2025 if funding were available and institutional constraints were reduced.

Figure 1: Counties and Water Wholesalers in BARWRP Study Area

Authorization for BARWRP under Title XVI and Partnership with the USBR

Title XVI of Public Law 102-575 authorized the Feasibility Assessment and created the partnership between the Bay Area water and wastewater utilities and the United States Bureau of Reclamation (USBR). The USBR contributed 50% of the funding for the two phases of the BARWRP feasibility assessments.

BARWRP Study Area

The study area included five of the nine Bay Area counties, and thirteen local public water and or wastewater utilities. The three largest public utilities in the Bay Area, the San Francisco Public

Utilities Commission (SFPUC), the Santa Clara Valley Water District (SCVWD) and EBMUD were participants in this truly regional approach to assessing the potential not only for water supply augmentation, but a broader assessment that is consistent with the goals and objectives of Proposition 50.

Participating Agencies in BARWRP

- United States Bureau of Reclamation
- California Department of Water Resources
- Central Contra Costa Sanitary District
- City of Palo Alto
- Cities of San Jose, Santa Clara, and Six other Silicon Valley communities
- City of Sunnyvale
- Zone 7 Water District
- South Bayside System Authority
- Santa Clara Valley Water District
- Delta Diablo Sanitation District
- Dublin San Ramon Services District
- East Bay Dischargers Authority
- East Bay Municipal Utility District
- San Francisco International Airport
- San Francisco Public Utilities District

The pursuit of water recycling from a regional perspective was intended to ensure that the projects with the greatest potential for regional and statewide benefits receive the highest priority for implementation. The regional approach was also intended to allow for effective resolution of traditional hurdles facing water recycling projects such as market potential, economic and financial feasibility, public policy and public acceptance. The participating agencies worked through these issues via technical committees which included participation of non-governmental stakeholders and with the support of expert consultants.

The North Bay Water Reuse Program

Water supply and clean water agencies throughout the North Bay counties of Marin, Sonoma and Napa have been meeting since mid-2003 to investigate opportunities to expand the use of recycled water for agricultural and other purposes. Co-sponsored by the U. S. Bureau of Reclamation, the North Bay Water Reuse Program (NBWRP) has investigations underway to identify a regional recycled water program to increase water supply, reduce discharges to the North Bay and provide ecosystem enhancements. The primary customers for the water are proposed to be agricultural property owners in southern Napa and Sonoma counties, as well as urban users in northern Marin County. The agricultural property owners primarily include vineyard operators who grow grapes for the premium wine market. Urban uses include landscape and golf course irrigation, as well as "purple pipe" applications in new developments, among others.

Participating agencies completed the Phase 1 Feasibility Report in June 2004. This report identified current and future available supplies from each wastewater treatment facility and started to formulate alternatives.

The findings of the North Bay Regional Water Recycling Feasibility Study show:

- There is potential to develop a recycled water supply of up to 36,500 AFY in this part of the Bay Area, though realizing this full potential would require overcoming high TDS levels in some wastewater systems caused by saltwater infiltration.

- The volume of available recycled water equals the total annual discharge volume of the eight agencies in the study area, less the water that is already used for local recycling in the summer months, 36,500 AFY. However, some of this water is high in total dissolved solids (TDS) due to Bay water infiltration into the sanitary sewer collection systems.
- There are primary markets for recycled water in the North Bay: local recycling (golf course and other landscape irrigation projects, commercial laundries, cooling towers and car washes); agricultural irrigation (dairies, pastures and vineyards); and Napa-Sonoma Salt Marsh Restoration.
- The cost of recycled water varies depending on the TDS in the source effluent and the use of the recycled water.
- The cost of recycled water could be offset by the value of increasing the local potable supply (reducing dependency on the Delta) and the cost of replacement of agricultural supplies.
- Consistent with BARWRP, the study demonstrated that initially starting with smaller systems providing backbone, catalyzing demands, and proving technologies may be most cost-effective path towards a fully integrated regional system.

Three alternatives for engineering and environmental feasibility are currently under consideration:

- **Local Reuse Alternative:** This alternative would provide 11,300 AFY of recycled water, and would include three separate local systems: a Las Gallinas/Novato system, a Petaluma system, and a Napa/Sonoma system. Recycled water projects local to each wastewater treatment plant would be developed as highest priority.
- **Subregional Systems Alternative:** This alternative would provide 18,300 AFY of recycled water. This alternative would have two subregional systems: Las Gallinas/Novato/Petaluma and Napa/Sonoma.
- **Regional System Alternative:** This alternative would provide 22,300 AFY of recycled water. This alternative would create one system that is fully interconnected between all participating wastewater treatment facilities and use areas.

North Bay agencies expect to complete the feasibility study and environmental documentation by 2008.

2.2 Relationship to the San Francisco Bay Area Integrated Regional Water Management Plan

Regional water recycling is an essential component of integrated regional water resources management because water recycling projects can incorporate and benefit water supply reliability, ecosystem protection and enhancement, and surface water protection. These are all important elements of sustainable water resources management. Local projects that provide one or more of these elements are the catalysts for the Bay Area regional approach to water recycling. Local projects, which are detailed in this Functional Area Document, are necessary in the near term in order to develop the infrastructure, public acceptance, and backbone of a regional program. Local projects in many cases require cooperative service agreements between different public utilities and agencies. As these local projects begin to build a regional system around the Bay Area, both cost and benefit will be more broadly distributed across the Bay Area and through California.

The BARWRP analysis showed the connection between the implementation of local projects in the near term (2010) and potential for greater recycled water demand in 2025. The Allocation and Distribution Model (ADM) systematically connected potential uses with sources of recycled water to determine the least costly way to provide services. This analysis showed that local and near term projects are catalysts for the expansion and enlargement of recycled water facilities to a Bay Area regional program by the year 2025. The environmental enhancements and surface water quality projection of the near term projects also have both local and regional watershed and ecosystem benefits which in turn encourage more water recycling.

With the development of the San Francisco Bay Area Integrated Regional Water Management Plan (IRWMP), these two major regional approaches to water recycling are joined. The BARWRP and the NBWRP are consistent with the goals and objectives of Proposition 50 both individually and as part of this IRWMP. These two regional studies examined the value of water recycling as a regional approach to protection of water resources, development of reliable water supplies, and ecosystem restoration and enhancement. These regional approaches valued the partnership across the water and wastewater utilities with the results of focusing on the highest priority projects for the region.

2.3 Water Management Elements

The two phases of the Bay Area Regional Water Recycling studies, the North Bay Watershed Regional Water Recycling Feasibility Study and the Proposition 50 Step 1 Integrated Regional Water Management Grant Proposals all address the water management elements shown in the table below. While the projects in these regional water recycling studies are geared primarily towards addressing the Bay Area's water supply reliability objectives, their design and integration allows them to address multiple water management objectives of importance to the region and state.

Multiple Water Management Elements Addressed

Water Management Element From IRWM Grant Program Guidelines	Addressed
Programs for water supply reliability, water conservation and water use efficiency	✔
Removal of invasive non-native plants, the creation and enhancement of wetlands, and the acquisition, protection, and restoration of open space and watershed lands	✔
NPS pollution reduction, management, and monitoring	✔
Groundwater recharge and management projects	✔
Contaminant and salt removal through reclamation, desalting, and other treatment technologies	✔
Water banking, water exchange, water reclamation, and improvement of water quality	✔

2.4 Proposed Recycled Water Projects

The projects that are included in this Functional Area Document provide clear local benefits and are the platform for regional benefits both now and in the long-term for the San Francisco Bay Region and California as a whole. The boundary of the San Francisco Bay region, for the purposes of the IRWMP, is shown in Figure 2.

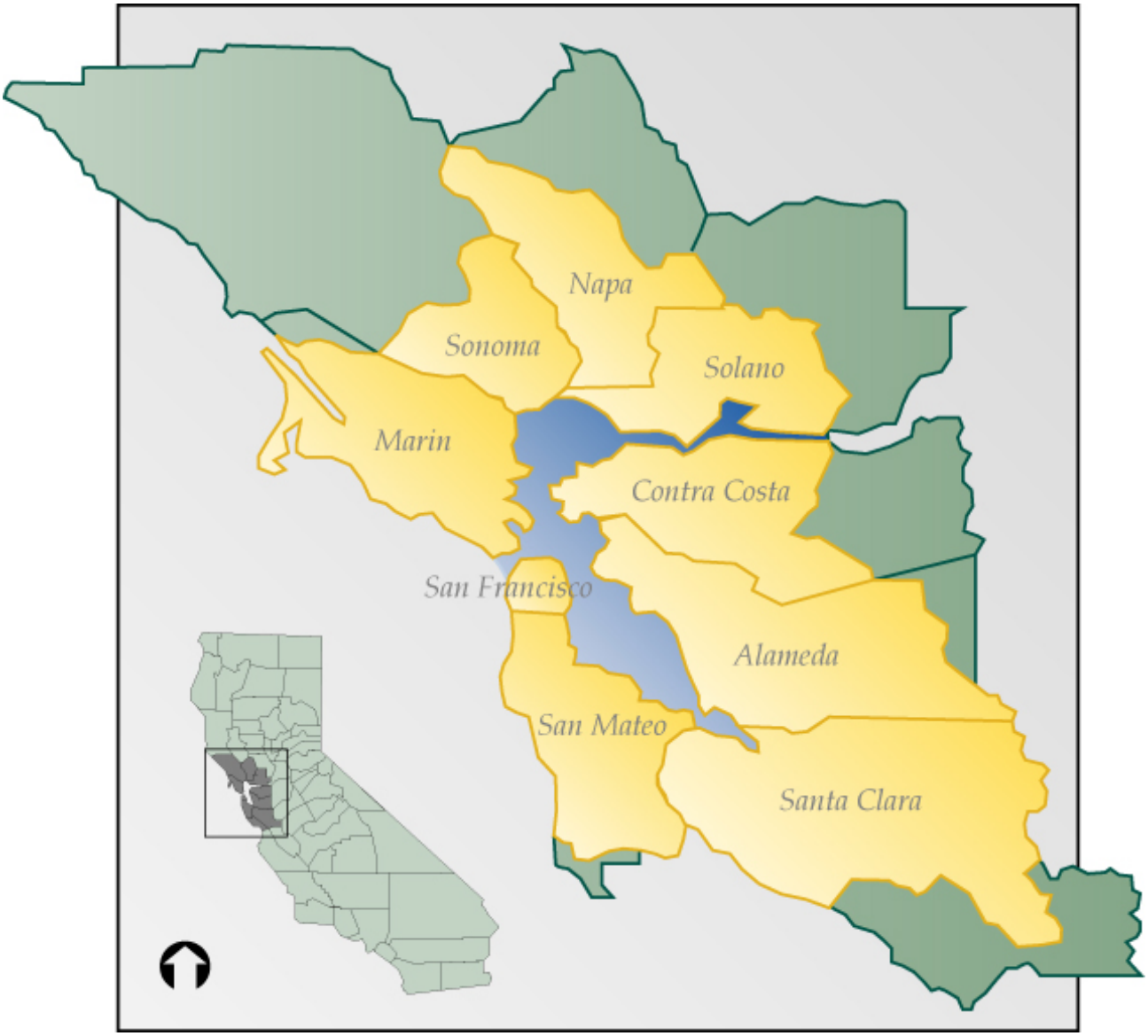


Figure 2: San Francisco Bay Area IRWMP Region Boundary

The following sections of this integrated plan provide detailed project descriptions for three levels of water recycling projects in the San Francisco Bay Area region. These are:

1) **Priority Near-Term Water Recycling Projects:** These are the projects which were included in one or more of the three Proposition 50 Chapter 8 IRWMP Implementation Grant application for the entire Bay Region in July of 2005:

    - Bay Area Regional Implementation Grant Proposal (submitted by Santa Clara Valley Water District)

- San Francisco Bay Area Recycling and Desalination Implementation Grant Proposal (submitted by the Bay Area Clean Water Agencies)
- East Contra Costa Integrated Regional Implementation Grant (submitted by Contra Costa Water District)

2) **Priority Tier 2 Water Recycling Projects:** These are projects the region intends to implement in the near term, between 2007 and 2015, but that were not included in the first cycle or Phase I Implementation Grant applications submitted in July of 2005. These projects would be considered as part of grant application for a Phase II grant.

3) **Priority Tier 3 Water Recycling Projects:** These projects were evaluated by the Regional Water Recycling Plans and/or come from utility Master Plans and could potentially be implemented by the year 2020. These projects are typically at a pre-feasibility phase, and may be the second phase of a priority project or a near term project and will ensure that we maximize water supply reliability.

All of these projects address the multiple water management elements that are the purpose of Proposition 50.

San Francisco Bay Region Water Recycling Near Term Priority Projects			
Project Name	Project Sponsor	Project Yield (mgd)	Project Yield (AFY)
South Bay Advanced Recyled Water Treatment Facility Project	South Bay Water Recycling Project and SCVWD	5 mgd	5,600 AFY
Mountain View / Moffett Area Recycling Project	City of Mountain View and City of Palo Alto	1.2 - 1.7 mgd	1,344 – 1,904 AFY
Redwood City Recycled Water Project	Redwood City	1.5 - 2.8 mgd	1,680 – 2,016 AFY
Pacifica Recycled Water Project	North Coast County Water District	0.15 mgd	171 AFY
San Ramon Valley Recycled Water Program - Phase 2 Project	DERWA, EBMUD and DSRSD	5.7 mgd	6,400 AFY
Satellite Recycled Water Treatment Plant Project	EBMUD and UC Berkeley	10 mgd	11,200 AFY
Recycled Water Program for North Marin WD and Novato Sanitary District – Phase 1	Northern Marin Water District and Novato Sanitary District	0.5 mgd	560 AFY
Napa Salt Marsh Restoration Project	Sonoma County Water Agency (SCWA) and Napa Sanitation District (NSD), Napa Sonoma Marsh Restoration Project	2.7 mgd	3,000 AFY
City of Pittsburg Recycled Water Facilities Plan	Delta Diablo Sanitation District (DDSD)	0.55 mgd	615 AFY
City of Antioch Recycled Water Facilities Plan	DDSD	0.55 mgd	615 AFY
Total Yield From Priority Near Term Projects		28 - 30 mgd	31,185 - 32,081 AFY

San Francisco Bay Region Water Recycling Priority Tier 2 Projects[a]			
Project Name	Project Sponsor	Project Yield (mgd)	Project Yield (AFY)
Pleasant Hill, Zone 1 Recycled Water Project	CCCSD	2.8 mgd	3,136 AFY
Westside Baseline and Harding Park/Lake Merced Projects	SFPUC	4.1 mgd	4,592 AFY
North San Jose Intensification Extension	SBWR	4 mgd	4,480 AFY
East Bayshore Recycled Water Project - Phase 1B	EBMUD	2.5 mgd	2,800 AFY
Richmond Advanced Recycled Expansion (RARE) Water Project	EBMUD	3 - 4 mgd	3,360 - 4,480 AFY
Rodeo Recycled Water Project	EBMUD	2 mgd	2,240 AFY
San Leandro Water Reclamation Facility Expansion Project	EBMUD	0.03 mgd	35 AFY
Peacock Gap Recycled Water Extension – Marin Municipal Water District	MMWD	NA	NA
Sonoma Valley Recycled Water Project (SVRWP)	SCWA and SVRWP	NA	NA
Phase II Recycled Water Program - City of Petaluma	City of Petaluma	0.47 mgd	522 AFY
Recycled Water Conveyance Pipeline	Novato Sanitary District	NA	NA
Mirant Cooling Recycled Water Project	DDSD	12 mgd	13,440 AFY
	Total Yield for Tier 2 Projects[b]	31 – 32 mgd	34,605 – 35,725 AFY

a. NA = not available.
b. Total yield excludes anticipated yield from Peacock Gap, SVRWP, and Recycled Water Conveyance Pipeline projects.

San Francisco Bay Region Water Recycling Priority Tier 3 Projects			
Project Name	Project Sponsor	Project Yield (mgd)	Project Yield (AFY)
Martinez Zone Landscape Irrigation Project	CCCSD/City of Martinez	2.5 mgd	2,800 AFY
North Concord Zone Landscape Irrigation	CCCSD/CCWD	2.5 mgd	2,800 AFY
Tesoro Refinery Recycled Water Project	CCCSD/CCWD	8 mgd	8,960 AFY
Industrial Recycled Water Project	CCCSD/CCWD	15.7 mgd	17,600 AFY
Walnut Creek Zone Landscape Irrigation	CCCSD/CCWD	3.8 mgd	4,256 AFY
ACWD-USD Recycled Water Feasibility Study Project, Phase I	Alameda County Water District and Union Sanitary District	1.4 mgd	1,568 AFY
Burlingame Recycled Water Project	City of Burlingame	0.25 mgd	280 AFY
Coastside County Water District Recycled Water Project	Coastside County Water District	0.5 mgd	560 AFY
Palo Alto Regional Water Recycling Project	Palo Alto Regional Water Quality Control Plant	0.56 - 2.65 mgd	627 - 2,968 AFY
SSF/San Bruno Recycled Water Feasibility Study	Cities of South San Francisco and San Bruno	NA	NA
Stanford University Local Recycled Water Projects	Stanford University	0.05 mgd	56 AFY
Sunnyvale Recycled Water Project	City of Sunnyvale	1.48 mgd	1,658 AFY
South Bay Water Recycling -Santa Clara Civic Center Schools	SBWR	0.2 mgd	224 AFY
Santa Clara High Tech A	SBWR	0.3 mgd	336 AFY
Santa Clara High Tech B	SBWR	0.1 mgd	112 AFY
Eastern Alignment	SBWR	0.1 mgd	112 AFY
San Jose Milpitas Connector	SBWR	0.3 mgd	336 AFY
King Road/Ocala Ave Extension	SBWR	1.5 mgd	1,680 AFY
Coyote Valley Extension and Distribution System	SBWR	5 mgd	5,600 AFY
Coyote Valley Advanced Treatment System	SBWR	5 mgd	5,600 AFY
Lamorinda/Satellite Recycled Water Project	EBMUD	0.2 mgd	230 AFY
	Total Yield for Tier 3 Projects[a]	44 – 47 mgd	49,795 – 52,136 AFY

a. 5 mgd yield of Coyote Valley Advanced Treatment System is the same as the 5 mgd yield from the Coyote Valley Extension and Distribution System. Total yield does not include duplication of supply.

2.5 Benefits of Proposed Projects

The benefits of the water recycling projects included in this plan are described below.

Water Supply Reliability

The primary benefit of local water recycling projects is water supply reliability. Local water recycling relies on effluent which is available even during a drought. Water recycling also assures that the highest use of potable water (domestic, specialized industrial and public health uses) will have the highest quality of water. Other non-potable uses can be served by recycled water thereby extending the total amount of water resources available in the San Francisco Bay region.

A large percentage of the potable water supply in the San Francisco Bay region is imported either from the Delta or above the Delta. These supplies are vulnerable to drought and infrastructure delivery problems that can occur after an earthquake or other natural disasters.

Ensuring water supply reliability protects public health, quality of life and economic sustainability within the region. All of the projects identified within the region help to ensure water supply reliability.

Source Water Protection

Several projects included in this plan directly address source water protection. These projects which are specifically intended to protect important groundwater resources in the region are described as follows:

- The South Bay Advanced Recycled Water Treatment Facility Project will protect shallow unconfined groundwater basins underlying parts of Santa Clara County against TDS buildup caused by use of recycled water for irrigation.
- The Westside Baseline and Harding Park/Lake Merced Projects will provide recycled water to offset groundwater currently being used for irrigation purposes, thereby allowing the groundwater to be used for potable purposes, ensuring is not overly utilized resulting in salt water intrusion.

Water Quality

The Water Recycling projects for the San Francisco Bay Region addresses water quality concerns associated with drinking water supplies and receiving water bodies in a number of ways including salinity management and improvements to water quality in the San Francisco Bay and tributaries.

Salinity Management

Many of the Bay Area's water sources, particularly groundwater, Delta and Central Valley Project (CVP) supplies, contain high levels of TDS. TDS is generally considered to reflect the salinity of supplies. A secondary standard of 500 mg/L exists for TDS levels. Even at levels below this secondary standard, TDS can result in negative taste and odor impacts. Historically, use of recycled water has been constrained by concerns over TDS impacts, especially to groundwater. Protecting existing supplies from salt impacts is an important element of the Bay Area's water management strategy. The South Bay Advanced Recycled Water Treatment Facility project, included in this plan, is designed to help manage the region's salt balance while simultaneously allowing for expanded use of recycled water. The Project will help solve South Bay Water Recycling (SBWR) salinity management issues and provide a testing platform to assess treatment strategies to support potential future SBWR and SCVWD water recycling initiatives.

Water Quality for Surface Waters such as the San Francisco Bay and Tributaries

Most of the proposed water recycling projects will take effluent from municipal wastewater treatment agencies, provide a higher level of treatment, and reuse the resource. In cases where the treatment level does not require reverse osmosis (RO) or membrane filtration (generally landscape irrigation and industrial uses), the conversion of effluent to recycled water will reduce the mass loading of pollutants to the San Francisco Bay and other surface water bodies. However, in the case where these higher levels of treatment are necessary for the recycled water uses, the load reductions of pollutants will be maintained.

Most of the Bay Area's treated wastewater is discharged to the San Francisco Bay, which is a 303(d) listed impaired water body. This plan will provide the following water quality benefits for the Bay:

The RWQCB has found that San Francisco Bay and many of its tributaries are impaired by toxic pollutants, including mercury, PCBs, chlorinated hydrocarbon pesticides, and selenium. The RWQCB is developing TMDLs to enhance control of these pollutants. The RWQCB is also concerned about other pollutants which may impair the Bay's beneficial uses, but for which there are not yet water quality standards. These pollutants include PBDEs, pharmaceuticals, and other man-made chemicals that may disrupt the endocrine systems of fish, birds, and mammals in the Bay's food web. Although wastewater treatment is generally effective and there may not be additional requirements to remove more pollutants, it is generally agreed that there can be positive benefits of any removal of loading of pollutants. Water recycling is one of the few cost-effective ways to further reduce the discharge of wastewater pollutants. Water recycling projects which do not require greater than tertiary treatment have always been considered a tool for the overall reduction of mass loading of pollutants to the San Francisco Bay.

Water quality is not only a function of the pollutants in the water body, but also of the ability of that water body to sustain aquatic life across the food web. There are several ecosystem restoration projects which will rely on recycled water (Napa Salt Marsh Restoration Project and many of the South Bay Water Recycling Projects) to enhance or restore habitat and improve the water quality.

2.6 Relationship to CALFED Bay-Delta Program Goals

CALFED Bay-Delta Program Goals that this plan will directly contribute to meeting are organized by CALFED Program Element.

1. Water Management:

Maximize use of available water supplies through conservation, water recycling, and water quality improvements.

All projects in this plan contribute to this goal

2. Water Use Efficiency:

Improve water quality by altering volume, concentration, timing and location of return flows.

Projects directly contributing to this goal: A large number of the recycled water projects in plan have potential to reduce wastewater flows to San Francisco Bay. For example, the South Bay Advanced Recycled Water Treatment Facility Project through the disposal of the waste salts via the existing San Jose – Santa Clara Water Pollution Control Plant (WPCP) outfall will

provide an increased salt concentration to enhance valuable salt marsh habitat areas surrounding the South San Francisco Bay. It will also reduce salt concentrations in recycled water to protect groundwater quality. The Redwood City Recycled Water Project and the Mountain View/Moffett Area Water Recycling Project will also reduce return flows to the Bay.

Other projects such as the Westside Baseline and Harding Park/Lake Merced Projects will protect ground water resources to protect will reduce these drinking water supply source and allowing expanded use of recycled water.

3. Ecosystem Restoration:

Rehabilitate natural processes related to hydrology, stream channels, sediment, floodplains, and ecosystem water quality.

Protect and restore functional habitats, including aquatic, upland and riparian, to allow species to thrive.

Projects directly contributing to these goals: The Napa Salt Marsh Restoration Project and the South Bay Advanced Recycled Water Treatment Facility Project, as well as other South Bay Water Recycling projects, are excellent examples of how water recycling and ecosystem restoration go hand in hand.

4. Drinking Water Quality:

Combine cost-effective improvements in source water quality, advancements in treatment technology, and innovations in water management.

Projects directly contributing to this goal: Examples of projects contributing to this goal are the South Bay Advanced Recycled Water Treatment Facility Project and the Satellite Recycled Water Treatment Plant Project.

The projects in this plan are consistent with and support the implementation of the CALFED Programmatic Record of Decision. This plan emphasizes the implementation of local and regional projects fully consistent with CALFED Solution Principles to address the Bay Area's water management challenges. The projects in this plan:

1. Help to reduce conflicts in the Bay-Delta system by reducing Bay Area dependence on Delta water supplies;

2. Are implementable, having broad public acceptance, legal feasibility and will be timely and relatively simple compared with other alternatives;

3. Are equitable, providing water supply, quality, and environmental benefits throughout the Bay Area;

4. Are affordable compared to other alternatives; and

5. Result in no significant redirected impacts.

2.7 Priority Near-Term Water Recycling Projects

The Priority Near –Term Projects listed in this plan, for which implementation grant applications were submitted in July 2005, are the current water recycling priorities for the San Francisco Bay

Area Region. These Priority Near-Term Projects will deliver 28 to 30 mgd (31,185 to 32,081 AFY) of recycled water to the Bay Area Region, offsetting potable water and providing for environmental enhancements.

These projects are priorities for the region because they contribute in a most-cost effective manner toward the regional goals of water supply reliability, economic sustainability for the region and providing environmental enhancements and benefits. Consistent with the California water code and the California Constitution, the Priority Near-Term Projects also ensure the highest and best use of California's water resources. The Priority Near-Term recycled water projects are listed in the table below.

Priority Near-Term Projects				
Project Title	Type	Location	Primary Objectives	Other Benefits
South Bay Advanced Recycled Water Treatment Facility Project	Recycled Water	South Bay	Water supply reliability Groundwater management	Habitat protection/enhancement SF Bay water quality
Mountain View/Moffett Area Recycling Project	Recycled Water	South Bay	Water supply reliability	Habitat protection/enhancement SF Bay water quality
Redwood City Recycled Water Project	Recycled Water	Peninsula	Water supply reliability	Habitat protection/enhancement SF Bay water quality
Pacifica Recycled Water Project	Recycled Water	Peninsula	Water supply reliability	Habitat protection/enhancement Pacific Ocean water quality
Phase 2 San Ramon Valley Recycled Water Program	Recycled Water	East Bay	Water supply reliability	SF Bay water quality Habitat protection/enhancement
Satellite Recycled Water Treatment Plant Project	Recycled Water	East Bay	Technology demonstration/pilot project	Public outreach/education Water supply reliability
Recycled Water Program for North Marin WD and Novato Sanitary District – Phase 1	Recycled Water	North Bay	Water supply reliability	SF Bay water quality Habitat protection/enhancement
Napa Salt Marsh Restoration Project	Recycled water	North Bay	Habitat restoration/ species protection Water supply reliability	SF Bay water quality
City of Pittsburg Recycled Water Facilities Plan	Recycled Water	East Bay	Water supply reliability	Landscape irrigation for public parks SF Bay/Delta surface water quality protection
City of Antioch Recycled Water Facilities Plan	Recycled Water	East Bay	Water supply reliability	Landscape irrigation for public parks

As described above, the Bay Area submitted Proposition 50 Chapter 8 funding requests for each of these nine recycled water projects and one ecosystem enhancement project relying on recycled water. As stated in the Implementation Grant Proposals, these Priority Near-Term water recycling projects fulfill the following goals of Proposition 50:

- **Water Supply Reliability**. Water supply reliability, both in terms of infrastructure reliability and hydrologic supply reliability, has been identified as a primary objective of the Bay Area Region.
- **Water Quality**. The projects included in this proposal are designed to help manage the region's salt balance while simultaneously allowing for expanded use of recycled water.
- **Environmental Protection.** Including environmental stewardship, these projects provide environmental protection through provision of habitat for state and federal threatened and endangered species, fishery restoration and the use of renewable energy, and reduction of pollutant loading to the San Francisco Bay and its tributaries. The projects in this proposal help the region achieve these objectives:

Consistency of Projects with IRWMP Objectives

Priority Near Term Projects	IRWMP Objectives						
	Water Supply	Water Quality	GW Mgmt	Eco-system	Waste-water	Flood Control	Imple-mentability
South Bay Advanced Recycled Water Treatment Facility Project	✓	✓	✓	✓	✓		✓
Mountain View/Moffett Area Recycling Project	✓	✓			✓		✓
Redwood City Recycled Water Project	✓	✓			✓		✓
Pacifica Recycled Water Project	✓	✓	✓	✓	✓		✓
Phase 2 San Ramon Valley Recycled Water Program	✓	✓			✓		✓
Satellite Recycled Water Treatment Plant Project	✓	✓			✓		✓
Recycled Water Program for North Marin WD and Novato Sanitary District – Phase 1	✓	✓		✓	✓		✓
Napa Salt Marsh Restoration Project	✓	✓	✓	✓	✓	✓	✓
City of Pittsburg Recycled Water Facilities Plan	✓	✓			✓		✓
City of Antioch Recycled Water Facilities Plan	✓	✓			✓		✓

The following sections provide an overview of each Priority Near-Term Project.

South Bay Advanced Recycled Water Treatment Facility Project

Treatment System	Reverse Osmosis with Microfiltration pretreatment Capacity for production of 5.0 mgd of desalinated recycled water Provisions to expand to 20 mgd of product water Brine disposal via existing South Bay outfall
Siting	Adjacent to SJ/SC WPCP and Transmission Pump Station
Cost	Estimated Capital Cost: $27.5M

The South Bay Advanced Recycled Water Treatment Facility Project (Project) is a multi-purpose project designed to solve South Bay Water Recycling salinity management issues and provide a testing platform to assess treatment strategies to support potential future SBWR and SCVWD water recycling initiatives. These initiatives include future expanded uses such as application of recycled water over regions in the County that have shallow, unconfined drinking water aquifers, new environmental enhancement uses via streamflow augmentation, and groundwater recharge. The core of the project will be a 5.0 mgd microfiltration/reverse osmosis (MF/RO) recycled water treatment facility. This project will immediately provide salinity management benefits to the region, including the more than 500 existing customers and numerous new customers served by the approximately 100 miles of SBWR pipeline throughout northern Santa Clara County.

This 5 mgd facility would enable SBWR and SCVWD to achieve important water recycling objectives:

- Increase the marketability of recycled water by improving the delivered quality, which assists in meeting:
    - Water supply reliability goals of SCVWD and
    - Effluent management goals of SBWR partner agencies
- The project will provide a platform to test complementary and alternative treatment technologies (such as advanced oxidation processes) that could be used to achieve additional water quality targets required to implement and expand future recycled water uses such as environmental enhancement via streamflow augmentation and groundwater recharge.

Project Objectives

The Project was designed to improve local water reliability by reducing dependence on imported Delta water supplies, to improve both recycled water and local groundwater quality, and to provide additional environmental benefits to the South San Francisco Bay and local salt marsh habitat. The project will realize these objectives through the following design features and outcomes:

- **Increase regional water supply reliability by** reducing salt concentration in the delivered recycled water. As regional power plants begin to use recycled water in evaporative processes and return the concentrated salts to the San Jose/Santa Clara WPCP, salt removal will be required to maintain current salinity levels. In addition, current salinity levels have been identified as a constraint to maximizing recycled water use for both irrigation and industrial customers. The reduced salt concentration will assist in maintaining the current customer base and provide the impetus to bring new customers currently using potable water onto the system. Improvement in recycled water

quality will provide incentives for future development to connect to the system and maximize recycled water use, offsetting potential future Delta water imports. More customers using recycled water will reduce drought impacts and will improve local water supply reliability. Delivered salinity levels are projected to improve by approximately 500 mg/L TDS for low flows (7.5 mgd) and approximately 200 mg/L TDS at high flows (20 mgd). A decrease in delivered salinity is a key requirement for SCVWD to achieve recycled water use goals in Santa Clara County: 5% of total County water use by 2010 (approximately 20,000 acre-feet) and 10% of total water use by 2020 (approximately 42,000 to 44,000 AF).

- **Improve water quality** for both recycled water and groundwater basins in the SBWR service area. This water quality improvement will allow customers to minimize onsite maintenance and management practices caused by a high salinity water supply. For irrigation practices, a wider variety of vegetation can be cultivated. For industrial customers, reduced chemical addition and equipment maintenance practices could result. The removal of salt provides basin-wide salt management and mitigates the impact of salts on sensitive groundwater basins. The advanced treatment process will also remove other constituents of concern from the recycled water that are not removed by conventional treatment processes. The product water quality will also be monitored to assess the suitability of the water for future use in streamflow augmentation and groundwater recharge. SCVWD and SBWR, in conjunction with Stanford University, are currently evaluating the feasibility of streamflow augmentation at a local stream. In addition, SCVWD and SBWR are conducting a pilot advanced treatment project to evaluate the optimum membranes for SBWR water. These existing projects, in conjunction with the proposed facility, will provide information on the ability of the advanced treatment process to remove constituents of concern from the SBWR recycled water.

- **Environmental Enhancement** will be established by 1) protecting shallow unconfined groundwater basins underlying the service area, and 2) increasing salinity concentration in the WPCP effluent discharged via salt marsh to South San Francisco Bay. This salt marsh salinity increase is achieved through mixing RO brine with WPCP effluent prior to discharge. The salinity increase would allow WPCP discharge to better support valuable salt marsh habitat areas surrounding the South San Francisco Bay. The project will also supply a platform for testing of brine purification technologies if National Pollutant Discharge Elimination System (NPDES) discharge permit limits are approached after the inclusion of the brine into the outfall.

- **Meet Regional Objectives** such as SCVWD's 2010 and 2020 recycled water use goals**,** by investing in local resources to meet water supply reliability and water quality improvement needs. Advanced treatment allows expanded use of recycled water and further reduces dependence on imported water and associated risks and uncertainties.

Benefits to Project Partners and Surrounding Community	
Water Supply Reliability	• Further reduces use of potable water for non-potable uses. • Provides a drought-proof source of high-quality water for use in the development of Coyote Valley. • Allows increased use by industrial customers while minimizing operations and maintenance concerns. • Reduces reliance on imported Delta water supply.
Water Quality	• Improves quality of recycled water supplied for irrigation, industrial, and indoor uses, minimizing maintenance requirements and onsite management requirements for users. • Mitigates salt import into Santa Clara groundwater basin via imported water.
Ecosystem Restoration	• Provides increased protection to nearby salt marsh habitats and associated endangered species by increasing salinity of fresh water discharge to South San Francisco Bay salt marshes.
Other Environmental Benefits	• Improves South San Francisco Bay water quality by reducing discharge of treated effluent and increasing salinity of the discharge. • Provides platform to demonstrate appropriateness of SBWR recycled water and associated technologies for future environmental enhancement strategies such as streamflow augmentation. • Protects shallow, unconfined groundwater basins used for potable supplies from the impacts of recycled water percolation.
Integrated water management strategy to promote conjunctive use of groundwater and recycled water while protecting existing groundwater and tidal marsh resources.	

Detailed Project Description

Currently, recycled water is produced at the WPCP, owned and operated by the City of San Jose, the SBWR Program Manager. The WPCP has a current production capacity of 167 mgd of filtered and partially disinfected water with a diversion facility that allows a portion of the effluent flow to comply with Title 22 requirements for un-restricted use. On a daily basis, current recycled water use can be up to 20 million gallons depending on the time of day and time of year. The current SBWR system serves over 500 customers with over 100 miles of distribution pipelines.

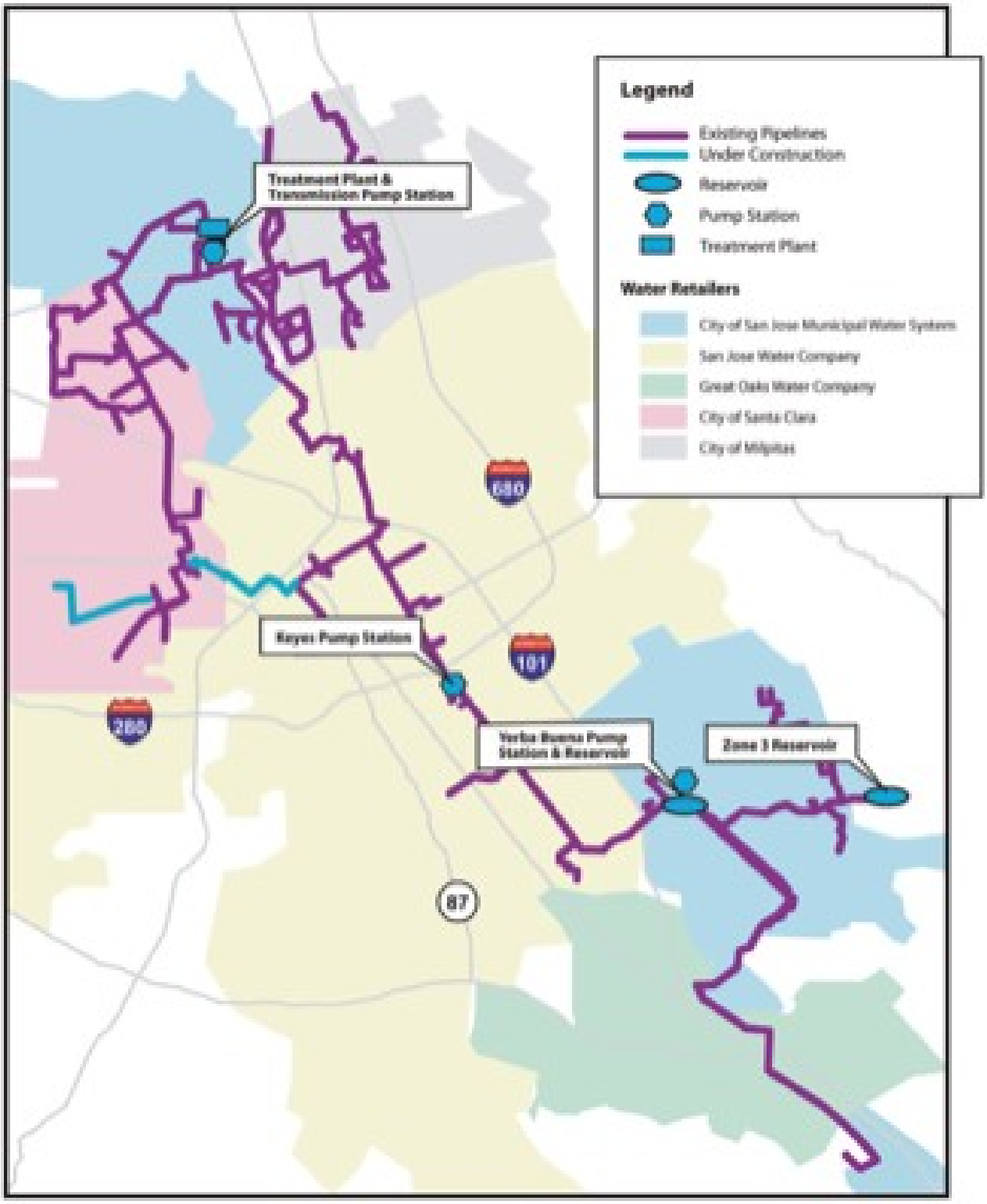
The 5.0 mgd capacity advanced treatment facility would be built on land currently owned by the City of San Jose, at the WPCP and adjacent to the existing SBWR Transmission Pump Station. The main process units would be housed in a building that would include a process area, cleaning solution storage and feed area, electrical and control room, and external area for the de-carbonation towers. In addition to the process building, a maintenance facility, electrical facility, waste brine holding tank, process feed pump station, and chemical storage and feed facility would also be constructed on the site.

The facility would divert recycled water from the junction box upstream of the transmission pump station and treat the water using microfiltration, reverse osmosis and de-carbonation. Provisions for chlorine injection to provide a residual concentration to protect against regrowth in the distribution and storage system would be included if deemed necessary. Provisions will also be included for additional advanced treatment technologies to address endocrine disrupting compounds (EDC), personal care products (PCP), pharmaceutically active compounds (PhAC) and other constituents of concern. The initial phase of the project will also allow pilot testing of

technologies to determine the effectiveness at removing these compounds. Finally the water would be returned to the splitter box just upstream of the transmission pumps.

Agency Sponsor Project Title	South Bay Water Recycling Project and SCVWD South Bay Advanced Recycled Water Treatment Facility Project
Project Location	Adjacent to SJ/SC WPCP and Transmission Pump Station
Project Description • Project Process • Amount Delivered • Market Use • Offset to Potable • Offset to Imported Water	 • Reverse Osmosis with Microfiltration pretreatment • 5.0 mgd of desalinated recycled water with provisions to expand to 20 mgd product water • Irrigation • Industrial Cooling • 5.0 mgd • 5.0 mgd
Project Schedule Milestones	Preliminary planning for the Project has been completed through the Advanced Recycled Water Treatment Feasibility Project (SCVWD/Black and Veatch 2004) and the Facilities Planning Technical Memorandum (SBWR/RMC Water and Environment 2005). The Project is ready to move forward with environmental documentation, design and construction as soon as project funding is identified. The schedule is based on grant funding being awarded and a contract executed by July 1, 2006, with the detailed design, environmental documentation, permitting and construction to begin after that date.
Project Costs	$27.5 M Capital
Footnotes/Comments	

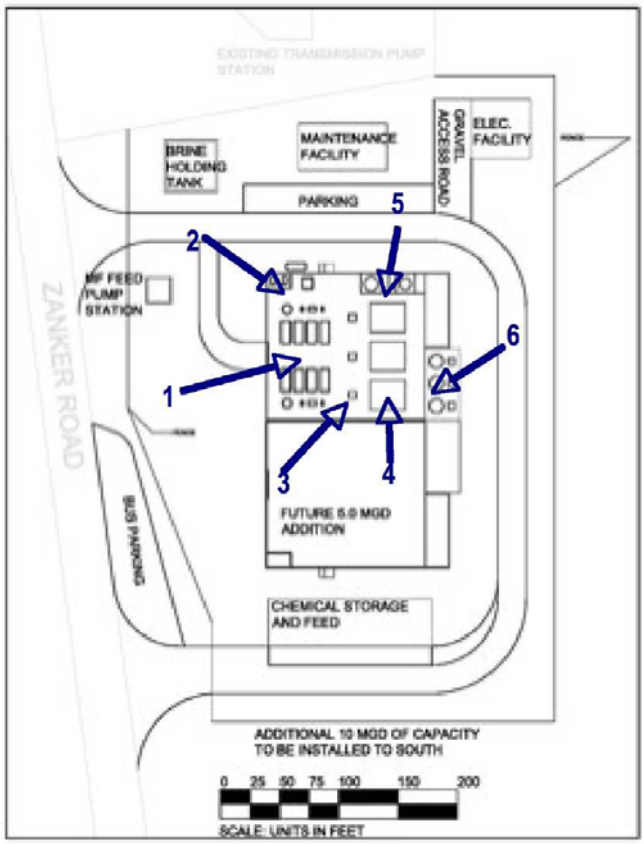
Existing South Bay Water Recycling System Process Flow Schematic



Proposed Project Site

Proposed Site Arrangement

Legend:
1 – Microfiltration Units
2 – MF Cleaning Area
3 – Reverse Osmosis Feed Pumps
4- RO Units
5 – RO Cleaning Area
6 – De-carbonation Units



Mountain View / Moffett Area Water Recycling Project

The recycled water distribution system will serve approximately 120 customers within the Mountain View and Moffett Field Area. This distribution system will serve as the backbone for a regional recycled water system in the long term.

Project Objectives

The Project was designed to meet two key goals of the Palo Alto Regional Water Quality Control Plant (RWQCP), its partners, neighboring communities, and other stakeholders (including the Santa Clara Valley Water District):

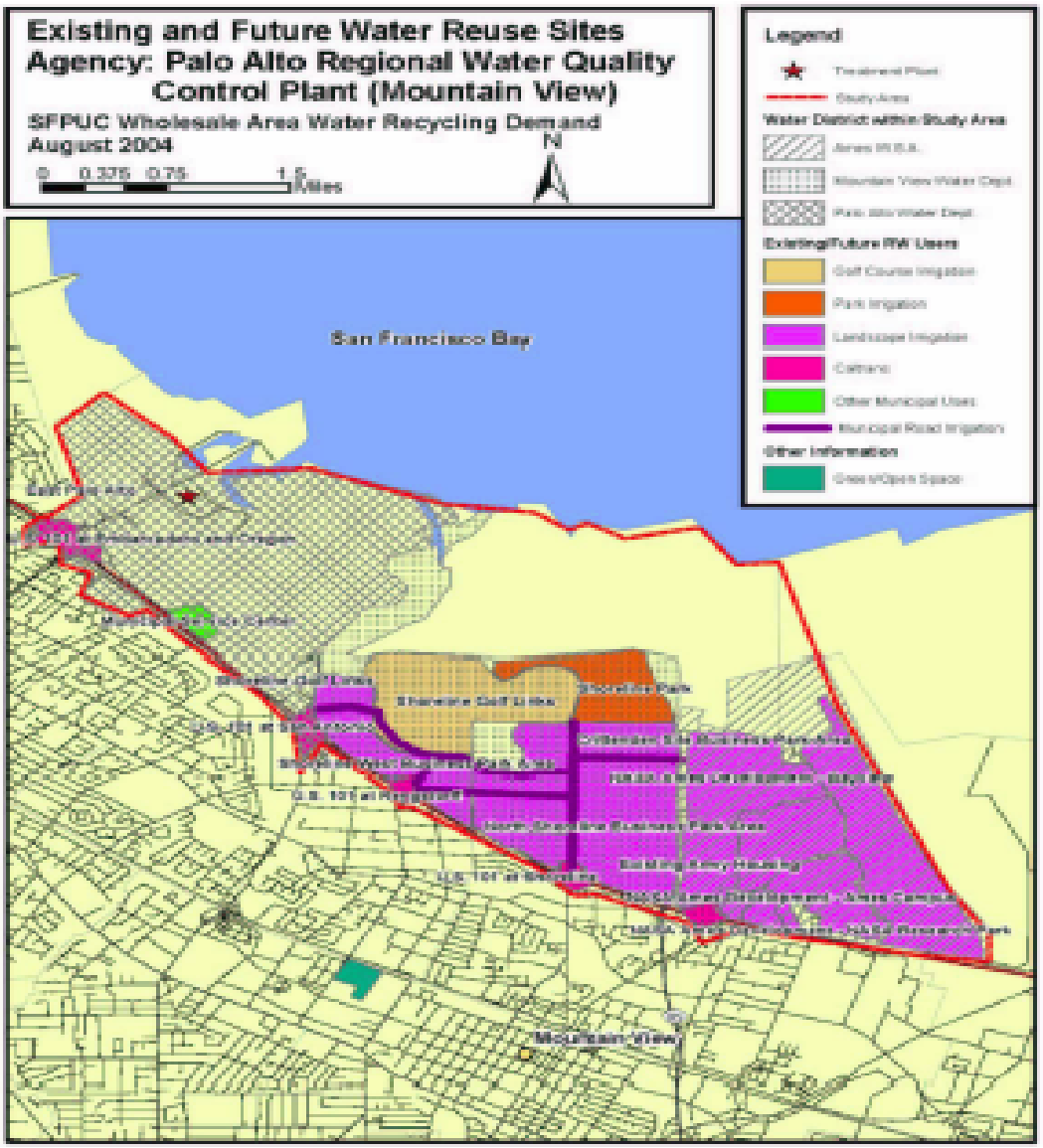
- **Water Supply Management** through the maximization of recycled water as a supplemental source. The total potable water demand in the Project service area will be reduced by 1,370 to 1,860 AFY in the near-term and by 3,310 to 5,830 AFY in the long term. This represents a large fraction of the irrigation use in the service area. Short to near-term uses within the City of Mountain View (1,300 to 1,780 AFY) represent approximately 10% of the total City water supply.
- **Regional Connectivity** through the construction of a backbone system that will ultimately allow additional regional participation and provide an interconnection to the Sunnyvale recycled water distribution system, supplementing recycled water use within that jurisdiction.

In addition, the project provides both short- and long-term benefits to the Delta:

- **Short Term Benefits to the Delta**. Although Delta water and SFPUC Regional System water have historically been conveyed through independent systems, interconnections are being created to improve supply reliability and source balancing. The SCVWD and SFPUC completed construction of an interconnection between SCVWD's treated water transmission system and the SFPUC Bay Division Pipelines 3 & 4 in 2002. The Project will offset 1,370 to 1,860 AFY of SFPUC Regional System water during its initial phase.
- **Longer Term Benefits to the Delta**. Based on the projected demand patterns and system configuration, the Project will provide a significant offset to SFPUC Regional System water during the initial phase of this project. That offset of potable supply will increase in the future as this regional system grows to serve a larger portion of the City of Mountain View and the City of Los Altos. This project will serve as the backbone for the northern end of the regional recycled water system. SCVWD is developing the regional system in part to reduce dependence on water imported from the Delta. The goal of SCVWD is to have recycled water use comprise 5% of total water use in Santa Clara County by 2010 and 10% of total use by 2020. This project is a key component of the system needed to reach this goal.

Importance of Project to the Region

The map below was developed by the SCVWD, which integrated the existing and planned recycled water projects in the South San Francisco Bay. This Project is the "Backbone" of the northern end of the regional recycled water system in the South San Francisco Bay.



Benefits to Project Partners and Surrounding Community	
Water Supply Reliability	Frees up City of Mountain View potable water, currently used for landscape irrigation in the Shoreline area, for potable uses. Provides a new, drought-proof water source for the Project service area that is not subject to external allocations and is controlled by the Project partners. Sustains landscape value in the Shoreline area during droughts and other situations where potable water use may be restricted. Reduces reliance on imported water from SCVWD and SFPUC.
Water Quality	Improves water quality of the shallow South San Francisco Bay by reducing discharge as some treated effluent is diverted for reclamation.
Ecosystem Restoration	Emily Renzel Marsh, a freshwater marsh located near the RWQCP, will continue to receive recycled water as its main water source.
Other Environmental Benefits	Reduces discharge to San Francisco Bay and associated metals that may have negative impacts on a marine environment.

Detailed Project Description

The recycled water is produced at the Palo Alto Regional Water Quality Control Plant, which manages the Water Reuse Program for this area. The RWQCP has a current production capacity of 4 mgd of recycled water meeting Title 22 requirements for un-restricted use. With some operational changes and minor modifications, the RWQCP can produce up to 8 mgd of recycled water.

This project includes:

- Conveyance pipelines consisting of the installation of approximately 3,500 linear-foot (lf) of 30-inch, 12,000 lf of 24-inch, and 9,000 lf of 18-inch recycled water pipe
- Lateral pipelines ranging from 4-inch to 12-inch
- Connections to approximately 120 customers, and corresponding on-site retrofits

Agency Sponsor Project Title	City of Mountain View and City of Palo Alto Mountain View/Moffett Area Water Recycling Project
Project Location	Portions of the City of Palo Alto, City of Mountain View and Moffett Field
Project Description • Project Process • Amount Delivered • Market Use • Offset to Potable • Offset to Imported Water	 • Disinfected Tertiary Treatment • 1.2-1.7 mgd short term (average annual yield) • Irrigation • Golf Course • Industrial Park • Parks and Medians • 1.2-1.7 mgd • NA
Project Schedule Milestones	The planning and environmental studies for the Project have been completed. The Project is ready to move forward with design and construction. The design contract for the Project was approved in May 2005. The proposed design and construction schedule is consistent with grant funding being awarded. • Water Reclamation Master Plan for Palo Alto RWQCP, April 1992 • NASA Research Park and the Environment Final Programmatic EIS, July 2002 • Mountain View-Moffett Recycled Water Facility Plan, April 2004
Project Costs	$18.5 M Capital/$300-400 K Annual O&M
Footnotes/Comments	• SFPUC Wholesale Customer Recycled Water Potential Technical Memo, December 2004 • Bay Area Water Quality and Supply Reliability Program, May 2005

Redwood City Recycled Water Project

Redwood City receives 100% of its potable water supply from the SFPUC Regional Water System. Redwood City has exceeded its SFPUC contractual water supply of 12,243 acre-feet/yr. since 1998 by an average of 780 acre-feet annually. This is only possible because other contactors have not taken delivery of their full entitlements. Regional demand projections indicate that the SFPUC Regional System will reach full contractual capacity by 2007-2009 and surplus supply will no longer be available to Redwood City. Redwood City's 2005 Urban Water Management Plan (UWMP) projects that the imbalance between supply and demand could increase to 1,290 acre-feet/yr. by 2030. The Redwood City Recycled Water Project – in concert with the City Council's "Active" Water Conservation Program - will reduce Redwood City's demand on the SFPUC Regional System and create a new, reliable, local source of water for the area.

Project Objectives

The Project was designed to improve local water supply reliability by reducing dependence on SFPUC imported water supplies, to expand regional use of recycled water, and to provide additional environmental benefits to the South San Francisco Bay. The project will realize these objectives through the following design features and outcomes:

- **Increase local water supply reliability** by reducing dependence on SFPUC imported water supplies. Redwood City has exceeded its SFPUC contractual water supply of 12,243 AFY since 1998 by an average of 780 AF annually. The Project will enable Redwood City to stay within its contractual entitlement with SFPUC and will provide a new, drought-proof supply of water for landscape and industrial applications.

- **Expand region's use of recycled water** by sizing distribution infrastructure so that it can deliver recycled water to adjacent cities. The South Bayside System Authority (SBSA) can produce more recycled water than required for Redwood City's water service area. Sizing of distribution infrastructure will allow delivery of additional recycled water production to neighboring cities. Preliminary sizing of the SBSA plant and distribution facilities is based on the maximum demand identified in the market assessment completed by Kennedy/Jenks as part of the Water Recycling Feasibility Study for Redwood City.

- **Provide environmental benefits to South San Francisco Bay** by reducing discharge of treated wastewater to the South San Francisco Bay.

Benefits to Project Partners and Surrounding Community	
Water Supply Reliability	• Allows Redwood City to stay within its SFPUC Regional System contractual entitlement. • Provides a new, drought-proof water source for the Project service area that is not subject to external allocations and is controlled by the Project partners. • Reduces reliance on imported water from Delta watershed.
Water Quality	• Improves water quality of the shallow South San Francisco Bay by reducing discharge as some treated effluent is diverted for reclamation.
Other Environmental Benefits	• Reduces discharge to San Francisco Bay and associated metals that may have negative impacts on a marine environment.

Detailed Project Description

Disinfected tertiary recycled water will be produced by the SBSA wastewater treatment plant in Redwood City. Treatment will consist of dual media sand filtration followed by disinfection via sodium hypochlorite. After the water has met continuous quality standards via continuous monitoring at the end of the contact chamber, the water will pass into Redwood City's facilities at the plant site, and will be stored in tanks adjacent to the new distribution pump station. Construction of the treatment, disinfection, storage and pumping facilities is underway and will be completed in the summer of 2006.

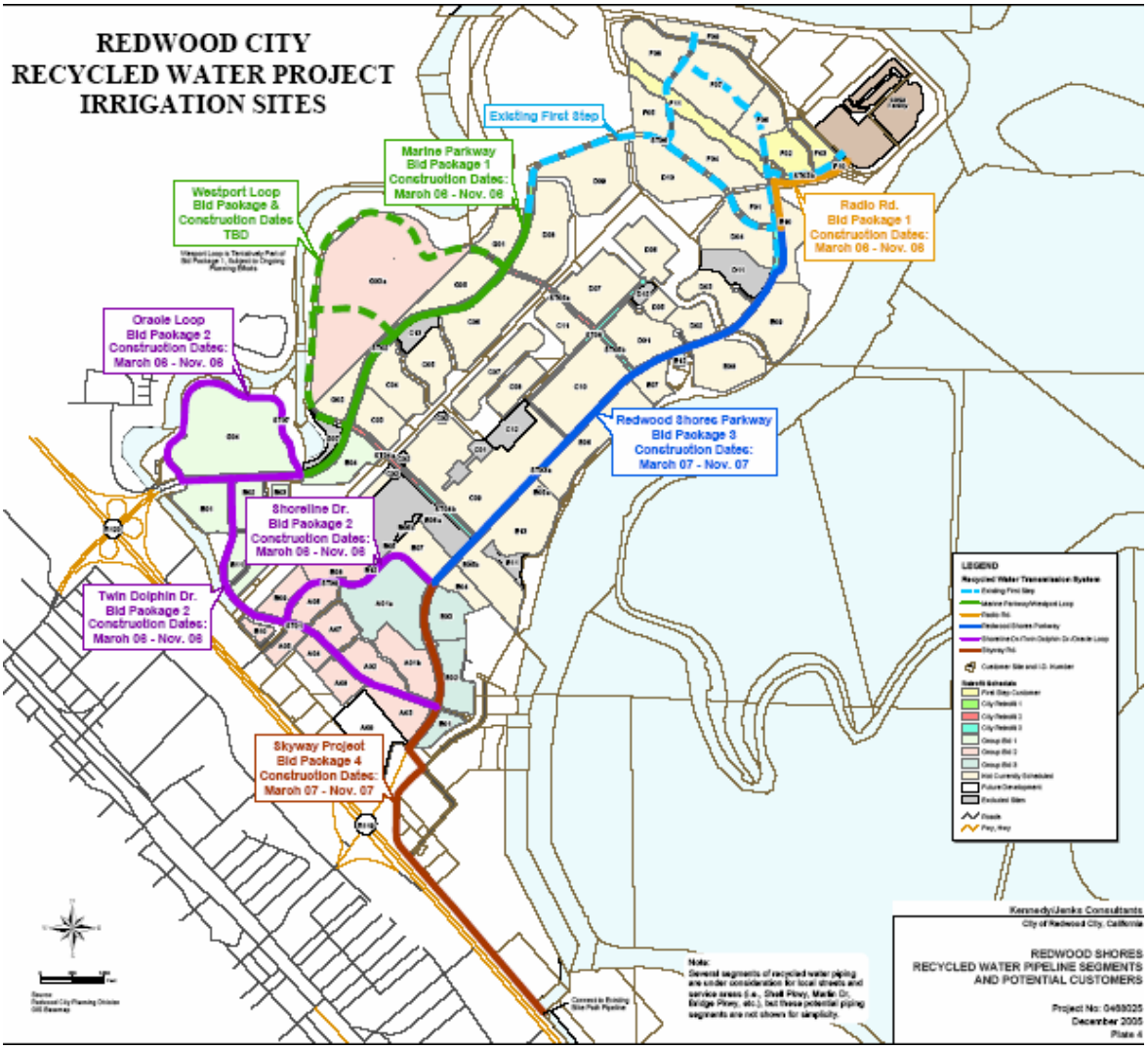
Construction of new recycled water distribution infrastructure will occur in multiple phases into 2009. Construction of the distribution system is under way, with the first $8M of pipeline contracts set to be completed by ***November of*** /2006. Distribution infrastructure will be oversized to allow for future flexibility and delivery of water to neighboring cities. The SBSA can produce more recycled water than planned for the Redwood City Recycled Water Project. The up-sized distribution infrastructure will allow delivery of additional recycled water production to neighboring cities. A sub-regional system will maximize the use of existing production capacity and better integrate regional recycled water markets. Preliminary sizing of the SBSA plant and distribution facilities is based on the maximum demand identified in the market assessment completed by Kennedy/Jenks Consultants as part of the Water Recycling Feasibility Study for Redwood City.

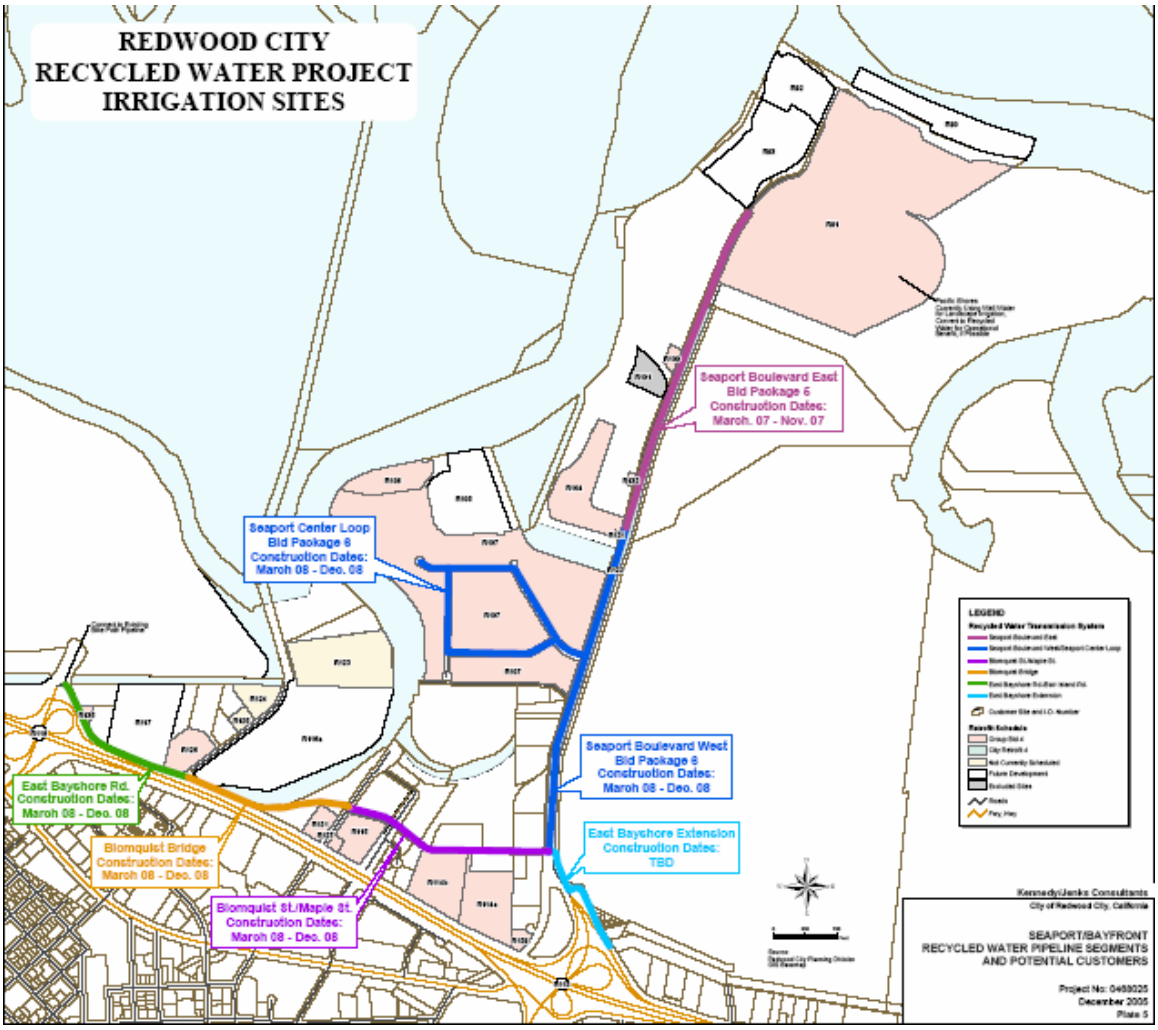
For the first phase of the project, existing city and commercial irrigation customer sites will be retrofitted for recycled water use. The next phase will involve retrofit of industrial customers. By 2015, minimum demand will be an estimated 1,180 AF/Y. Approximately 111 sites to date have been identified as potential recycled water customers.

Redwood City is currently funding the project by a series of bond issues. Grant funding will be used to accelerate construction of the distribution pipelines by up to two years, thereby reducing the City's demand on SFPUC water supply sooner.

Agency Sponsor Project Title	Redwood City Redwood City Recycled Water Project
Project Location	Redwood City
Project Description • Project Process • Amount Delivered • Market Use • Offset to Potable • Offset to Imported Water	 • Disinfected Tertiary Treatment, Title 22 • 1.0-2.85 mgd (average annual yield) • Irrigation o Commercial and residential common area landscaping o Parkways and Medians • Industrial and other Non-potable Uses • 1.0-2.85 – 7.3*mgd • 1.0-2.85 – 7.3*mgd * 2.22-4.45mgd additional potential via sub-regional project / system
Project Schedule Milestones	The planning, environmental studies, permitting, and 50% of the design for the Project have been completed. Bond financing ($56.6M) for the local match has been approved and received. The Project is moving forward with construction of the treatment

	and disinfection facilities, storage tanks, and the main distribution pump station. In addition, construction of the distribution system is under way, with the first $8M of pipeline contracts set to be completed by 11/2006. • Water Recycling Feasibility Study for Redwood City, August 2002 • Initial Study, Mitigated Negative Declaration, June 2002 • Addendum to Mitigated Negative Declaration, May 2003 • City of Redwood City Financing Plan, February 2003 (update adopted 1/2006) • Recycled Water Task Force Report, March 2003 • Agreement for Production and Delivery of Recycled Water between Redwood City and the South Bayside System Authority, July 2004 • Redwood City Recycled Water Project Customer Guidelines of Landscape Irrigation, August 2004 • Redwood City Recycled Water Project Engineering Report, August 2004 • Redwood City Use Permit, August 2004
Project Costs	$72-84 M Capital/$406 K Annual O&M
Footnotes/Comments	• SFPUC Wholesale Customer Recycled Water Potential Technical Memo, December 2004 • Bay Area Water Quality and Supply Reliability Program, May 2005


REDWOOD CITY
RECYCLED WATER PROJECT
IRRIGATION SITES
Existing First Step
Marine Parkway
Bid Package 1
Construction Dates:
March 08 - Nov. 08
Westport Loop
Bid Package &
Construction Dates
TBD
Radio Rd.
Bid Package 1
Construction Dates:
March 08 - Nov. 08
Oracle Loop
Bid Package 2
Construction Dates:
March 08 - Nov. 08
Redwood Shores Parkway
Bid Package 3
Construction Dates:
March 07 - Nov. 07
Shoreline Dr.
Bid Package 2
Construction Dates:
March 08 - Nov. 08
Twin Dolphin Dr.
Bid Package 2
Construction Dates:
March 08 - Nov. 08
Skyway Project
Bid Package 4
Construction Dates:
March 07 - Nov. 07
LEGEND
Note:
REDWOOD SHORES
RECYCLED WATER PIPELINE SEGMENTS
AND POTENTIAL CUSTOMERS
December 2005



Pacifica Recycled Water Project

The Pacifica Recycled Water Project (the Project) proposed by North Coast County Water District (NCCWD) is intended to deliver 171 AF of recycled water to six major irrigation customers including the San Francisco Recreation and Park Department's Sharp Park Golf Course, the City of Pacifica parks, CalTrans roadway medians, and a local middle school and high school.

Recycled Water Market	• Mostly Landscape Irrigation: o Golf course o Commercial and recreational landscape o Parks and Medians o Schools • 6 customers identified • 171 AFY
Distribution System	• Transmission line from Calera Creek Water Recycling Plant to Sharp Park Golf Course • Distribution Piping
Cost	• Estimated Capital Cost: $5.7M

Project Objectives

The Project is designed to comply with recycled water uses contemplated in the City of Pacifica, Calera Creek Water Recycling Plant, Wastewater Facilities Plan EIR (1994). These recycled water uses included

landscape irrigation for schools, parks and roadway medians. The Project was developed to meet two key goals of NCCWD, its partners (SFPUC and City of Pacifica) and its stakeholders:

- **Provide Desired Supply Reliability** through the configuration and operation of the SFPUC regional system to optimize the use of Sierra and local water resources to satisfy the expressed needs of customers.
- **Provide High Quality Water** through the preservation of the highest quality water for potable uses and other appropriate customers demands.
- **Reduce Dependence on SFPUC Regional System** by replacing water supply currently provided by the SFPUC Regional System. The total potable water demand in the overall Project service area will be reduced by 171 AFY. This represents a significant fraction of the irrigation use in the service area. Annual irrigation demand in Pacifica is estimated to be about 63 MG. More than 80% of that demand can be met through this project.

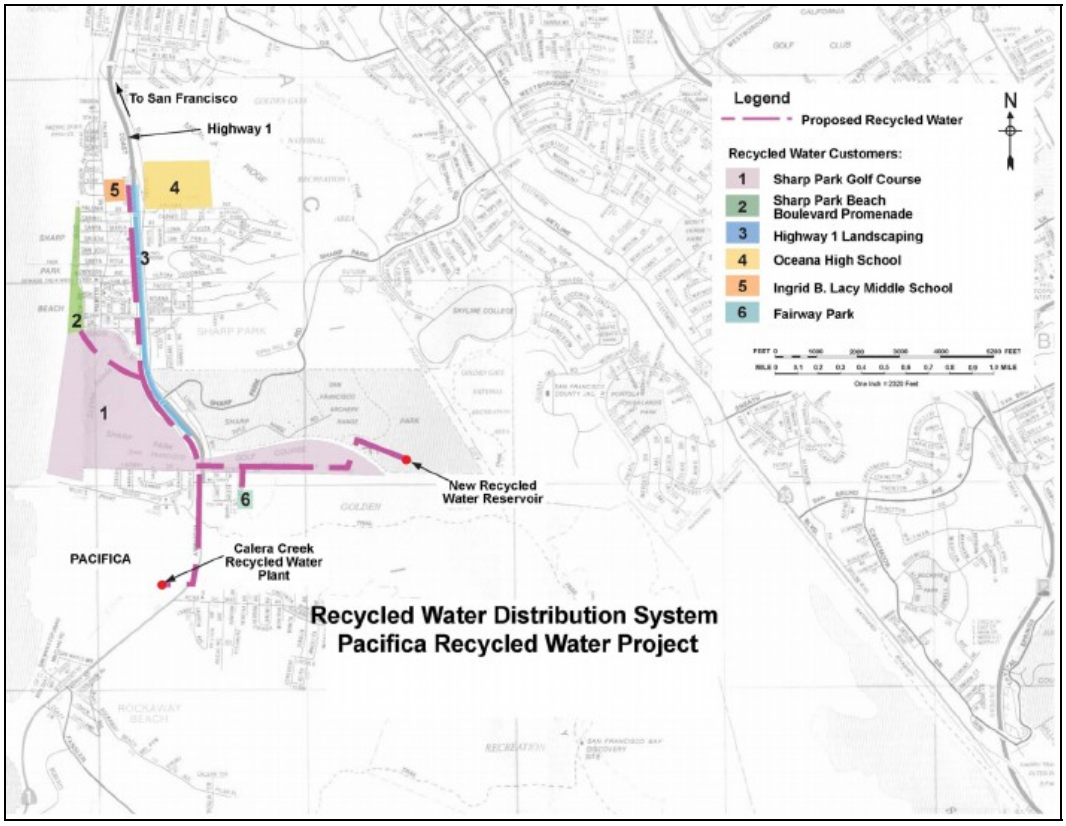
Benefits to Project Partners and Surrounding Community	
Water Supply Reliability	• Frees up NCCWD potable water, currently used for landscape irrigation, for strictly potable uses. • Provides a new water source for the Project service area that is not susceptible to external allocations and is controlled by the Project partners. • Sustains landscape value at Sharp Park Golf Course during droughts and other situations where potable water use may be restricted. • Reduces reliance on imported water from SFPUC.
Ecosystem Restoration	• Calera Creek Wetlands, a combination of riparian, freshwater marsh and pond habitats, located near CCWRP, will continue to receive recycled water as its main water source.
Other Environmental Benefits	• Reduces discharge to the Pacifica Ocean and associated metals that may have negative impacts on a marine environment.

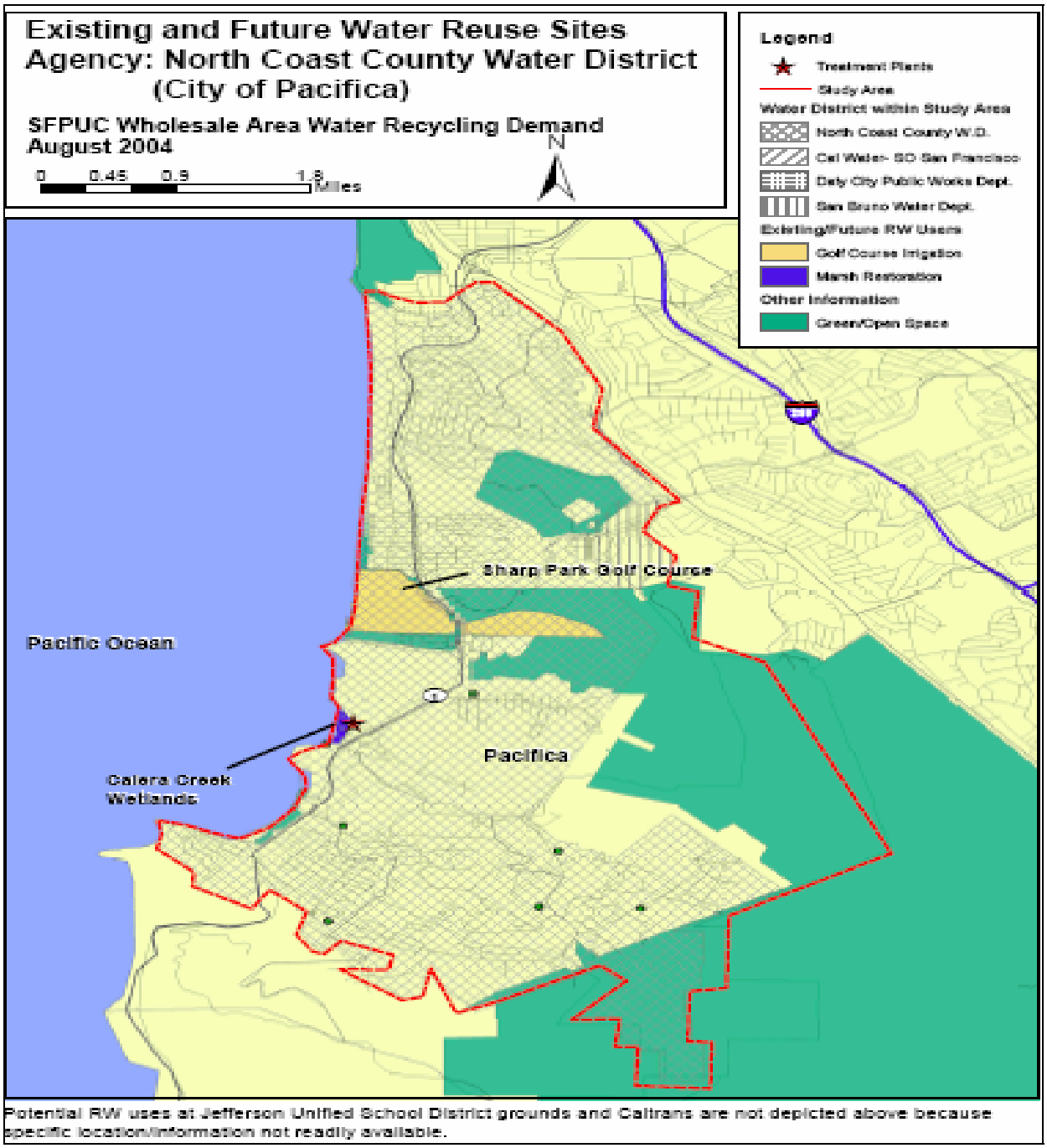
Detailed Project Description

The City of Pacifica is currently producing 3.4 mgd of tertiary treated wastewater meeting Title 22 requirements for un-restricted use. Some of this production is being used for wetlands restoration at its Calera Creek Water Recycling Plant. NCCWD, in a partnership with SFPUC, has developed a program to make recycled water available to the San Francisco owned Golf Course in Pacifica, the Sharp Park Golf Course, and also extending the offer of recycled water to the Jefferson Unified School District, the City of Pacifica and Cal Trans for Highway 1 irrigation uses, and other potential irrigation customers (RMC, 2003, Kennedy/Jenks, 2001, BAWSCA, 2004).

The Project includes upgrading Calera Creek Water Recycling Plant facilities, including new supply pumps in the Cascade Aerator Structure; constructing a 400,000 gallon storage tank above the Sharp Park Golf Course; and constructing a transmission line from the recycling plant to the storage tank, as well as distribution piping.

Agency Sponsor Project Title	North Coast County Water District Pacifica Recycled Water Project
Project Location	City of Pacifica
Project Description • Project Process • Amount Delivered • Market Use • • Offset to Potable • Offset to Imported Water	 • Disinfected Tertiary Treatment • 0.15 mgd (average annual yield) • Mostly Landscape Irrigation o Golf Course o Commercial and Recreational Landscape o Parks and Medians o Schools • 0.15 mgd • 0.15 mgd
Project Schedule Milestones	The planning and environmental studies for the Project have been completed. The Project is ready to move forward with design and construction. The proposed design and construction schedule is based on grant funding being awarded and a contract executed by July 1, 2006. • *2004 Draft Initial Study/Mitigated Negative Declaration*
Project Costs	$5.7 M Capital/$30 K Annual O&M
Footnotes/Comments	• SFPUC Wholesale Customer Recycled Water Potential Technical Memo, December 2004 • Bay Area Water Quality and Supply Reliability Program, May 2005





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

San Ramon Valley Recycled Water Program - Phase 2 Project

Recycled Water Market	• Landscape and industrial applications • 300 reuse sites at build-out • 6,400 AFY at build-out
Distribution System	• DERWA backbone pump station • 6,500 feet of 16-inch DERWA backbone transmission pipeline • 43,000 feet of distribution pipelines (6-inch to 16-inch)
Cost	• Estimated Capital Cost: $14.7M

The San Ramon Valley Recycled Water Program (SRVRWP) will ultimately provide 5.7 mgd or 6,400 AFY of recycled water to the San Ramon Valley, including the cities and communities of Dublin, San Ramon, Danville, Blackhawk and surrounding areas. This program is a regional effort between EBMUD and the Dublin San Ramon Services District (DSRSD). In 1995, EBMUD and DSRSD formed the joint powers authority of DSRSD-EBMUD Recycled Water Authority (DERWA) to implement this program. When completed, this program will supply recycled water to over 300 reuse sites (EBMUD and DSRSD customers) in the San Ramon Valley. The source of the recycled water is DSRSD's wastewater treatment plant located in Pleasanton, which currently discharges to the San Francisco Bay.

The Phase 1 Project is near completion and it is anticipated that initial recycled water deliveries will begin by spring 2006 to portions of Dublin and San Ramon.

Project Objectives/Importance of Project to the Region

The Project was designed to reduce the region's dependence on imported water supplies, increase the area's supply reliability by providing a new, drought-proof supply source for landscape uses, help reduce wastewater discharges to the San Francisco Bay, and increase flows through the Delta. The project will realize these objectives through the following design features and outcomes:

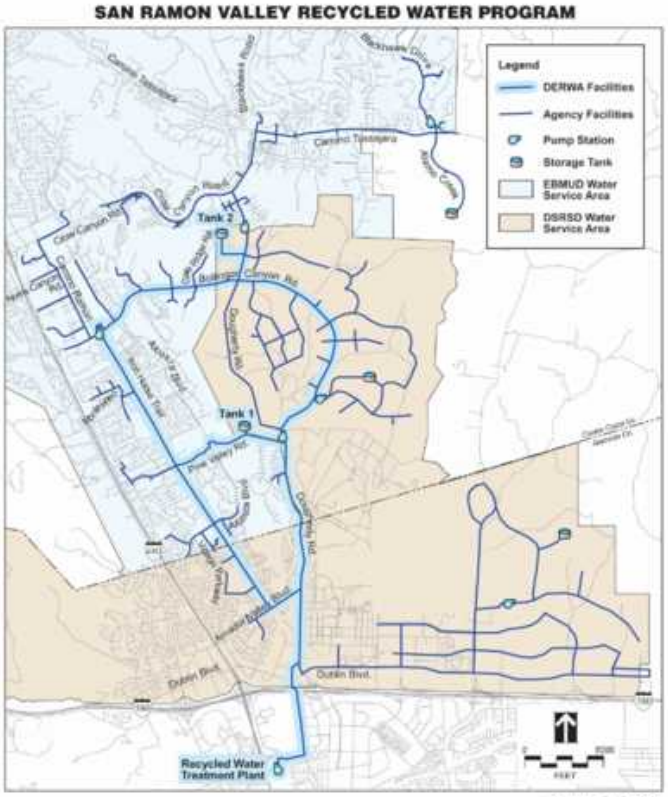
- **Reduce Regional Dependence on Imported Water Supplies.** This project will substitute recycled water for beneficial landscape water uses currently served by EBMUD's Mokelumne River supplies. During dry and critically dry years, the project will reduce EBMUD diversions from the Mokelumne and/or Sacramento River (once the Freeport Project is in service). For DSRSD, the project will reduce the need for water imported via the State Water Project (SWP). DSRSD is the water retailer for approximately 120,000 residents and businesses in the City of Dublin. DSRSD buys wholesale water from the Alameda County Flood Control Water Conservation District Zone 7 (Zone 7 Water Agency). Zone 7 obtains water from various sources, but the majority of its water is from the SWP. The water is pumped from the Delta near Tracy into the Livermore-Amador Valley. The SRVRWP Phase 2 will help to offset demands for potable water, reduce the amount of water that DSRSD will need to buy from Zone 7 Water Agency, and thereby reduce the average pumping rate from the Delta.
- **Increase regional supply reliability.** Implementing this project would benefit all of EBMUD's 1.3 million customers located in its broad service area that spans two counties and includes 20 incorporated cities and 13 unincorporated communities. This project would help to reduce the risk of severe rationing during prolonged droughts. By increasing the proportion of recycled water used, EBMUD will be able to reserve a larger percentage of its high quality potable water supplies for residential and commercial potable uses. For DSRSD, the project would reduce reliance on SWP supplies, which are viewed as increasingly unreliable.

- **Reduce wastewater discharges to San Francisco Bay.** The Project reuses wastewater that would otherwise be discharged to the San Francisco Bay via the LAVWMA pipeline.
- **Increase flows through the Delta.** Approximately 95% of EBMUD's water supply comes from the Mokelumne River, an eastside tributary to the Delta. This project will reduce the amount of water that must otherwise be delivered from the Mokelumne River to EBMUD's East Bay service area. Reducing deliveries can result in higher reservoir storage levels in EBMUD reservoirs in the Sierra Nevada foothills and increased reservoir releases to the lower Mokelumne River. Under a legally enforceable Settlement Agreement involving state and federal resource agencies, releases and flows in the lower Mokelumne River during the fall and early winter are based on storage levels so increased storage may result in some portion being released for fishery purposes. Once that water reaches the Delta, it provides additional benefits for Delta resources and water users.

Benefits to Project Partners and Surrounding Community	
Water Supply Reliability	• Increases regional supplies by 6,400 AFY • Further reduces use of potable water for non-potable uses. • Provides a drought-resistant source of supply for San Ramon Valley landscape uses. • Reduces reliance on imported Mokelumne River and Delta water supply, especially during dry and critically dry periods
Water Quality	• Reduces discharges of treated wastewater to SF Bay • Helps realize TMDLs for SF Bay
Other Environmental Benefits	• Increases Mokelumne River instream flows for environmental uses

Detailed Project Description

The map to the right shows the overall SRVRWP. Recycled water would be produced at a recycled water facility located at the existing DSRSD wastewater treatment plant located in Pleasanton, California. DERWA will be responsible for constructing the DERWA Phase 2 Project which consists of approximately 6,500 feet of a 16-inch backbone transmission pipeline along Bollinger Canyon Road and a backbone pump station near the intersection of Bollinger Canyon Road and the Iron Horse Trail in San Ramon. These facilities will complete the DERWA backbone distribution system which is needed to convey recycled water produced at the new tertiary treatment plant to the EBMUD and DSRSD service areas. The DERWA Phase 2 Project is essential



to expansion of the SRVRWP beyond the initial phase.

EBMUD will be responsible for designing and constructing the EBMUD Phase 2 Project which consists of approximately 43,000 feet of 6 to 16-inch distribution pipelines located just north of Bollinger Canyon Road to convey recycled water from the DERWA backbone transmission system to EBMUD customers in northern San Ramon.

Agency Sponsor Project Title	DERWA Phase 2 San Ramon Valley Recycled Water Program
Project Location	San Ramon Valley, including Dublin, San Ramon, Danville, Blackhawk
Project Description • Project Process • Amount Delivered • Market Use • Offset to Potable • Offset to Imported Water	 • DERWA backbone pump station, 6,500 ft of backbone transmission pipeline, 43,000 feet of transmission pipeline • 5.7 mgd (6,400 AFY) • Landscaping • Industrial Cooling • 5.7 mgd (6,400 AFY) • NA
Project Schedule Milestones	The planning and environmental studies for the Project are completed. Design of the DERWA backbone portion of the project is currently in design which is scheduled for completion by the end of 2005. The Project is ready to move forward with construction (DERWA portion) and design and construction (EBMUD portion) as soon as funding is identified. The proposed project implementation schedule is based on grant funding being awarded and a contract executed by July 1, 2006.
Project Costs	$14.7 M Capital
Footnotes/Comments	

Satellite Recycled Water Treatment Plant Project

Treatment System	• Pilot project to demonstrate Point-of-Use recycling technology • Micro filtration membrane bioreactor plant located on UC Berkeley campus • 5 MG/Y capacity
Distribution System	• Utilizes UC Berkeley existing irrigation distribution network • Point-of-Use approach eliminates need for transmission line to UC Berkeley campus •
Cost	• Estimated Capital Cost: $1.1M

The Satellite Recycled Water Treatment Plant (SRWTP) Project is an innovative approach to produce highly treated recycled water at the point of use, which eliminates the high cost for distribution piping and pumping normally associated with providing recycled water treated at a centralized wastewater treatment plant to a remotely located user. The University of California, Berkeley (UC Berkeley) campus currently uses potable water for all turf irrigation. This demonstration SRWTP Project would use a new and innovative "package" plant technology,

microfiltration membrane bioreactor (MBR), to produce approximately five million gallons per year of highly treated recycled water for irrigation of sport fields and possibly turf lawn at the campus, which replaces the same amount of potable water.

Project Objectives

The Project was designed to demonstrate the feasibility and practicality of point-of-use recycling systems. The proposed location for this project, the UC Berkeley campus, is an ideal location to demonstrate this innovative technology to other recycling agencies, researchers, students, and the general public. UC Berkeley is renowned as a premier institution that supports and educates protection of natural resources, conservation, reusing resources, and innovative technology, and is extremely supportive of this project. This project will also have the opportunity to readily illustrate the many benefits and safety of recycled water to the public, which will greatly promote water recycling.

It is anticipated that after a few years of operating this demonstration project, EBMUD and other regional water suppliers and wastewater agencies would gain the experience needed to explore implementing other larger, cost-effective satellite treatment projects throughout the Bay Area. If the approach proves practical and cost-effective, use of recycled water could be extended to remote locations where high transmission costs have previously barred its adoption.

While this is primarily a demonstration project, it will also provide the UC Berkeley campus a drought-proof water supply for irrigation purposes, reducing the irrigation demand for potable water at the UCB campus by about 10 percent.

Benefits to Project Partners and Surrounding Community	
Demonstrate Point-of-Use Recycling Technology	• Tests feasibility and practicality of microfiltration membrane bioreactor technology for satellite facilities • Partners with world renowned research institution
Public Education	• Provides a high profile demonstration of water recycling technology • Illustrates benefits and safety of recycled water to the public • Leverages UC Berkeley's public outreach infrastructure
Water Supply Reliability	• Provides UC Berkeley campus drought-proof supply of water capable of meeting 10% of current campus irrigation uses

Detailed Project Description

The picture on the right shows the location of the Satellite Project on the UC Berkeley campus. This project includes the construction of a pump station, fine screen, a "package" plant utilizing the membrane bioreactor and ultraviolet disinfection technologies, storage tanks and piping to connect to the UC Berkeley irrigation system to two sport fields. This demonstration project would be a package, skid-mounted unit of approximately 25,000 gallons per day.

Agency Sponsor	EBMUD and UC Berkeley
Project Title	Satellite Recycled Water Treatment Plant Project
Project Location	UC Berkeley campus
Project Description • Project Process	• Micro filtration membrane bioreactor plant located on UC

• Amount Delivered • Market Use • Offset to Potable • Offset to Imported Water	Berkeley campus • 5 MG/Y capacity • Irrigation • 5 MG/Y
Project Schedule Milestones	The planning studies and program-level CEQA for the Project are completed. Project-level CEQA documentation was started in January 2005 and is scheduled to be completed by the end of the year. Design is anticipated to begin in January 2006 and the project will be ready to proceed with construction by November 2006 for completion by May 2007. The proposed design and construction schedule is based on grant funding being awarded and a contract executed by July 1, 2006.
Project Costs	$14.7 M Capital
Footnotes/Comments	

Recycled Water Program for North Marin WD & Novato Sanitary District – Phase 1

Recycled Water Market	• Mostly Landscape Irrigation: Golf course Fire District NSD • 3 customers identified • 260-560 AFY
Distribution System	• Transmission tie-in line to existing pipeline • Distribution Piping
Cost	• Estimated Capital Cost: $4.0M

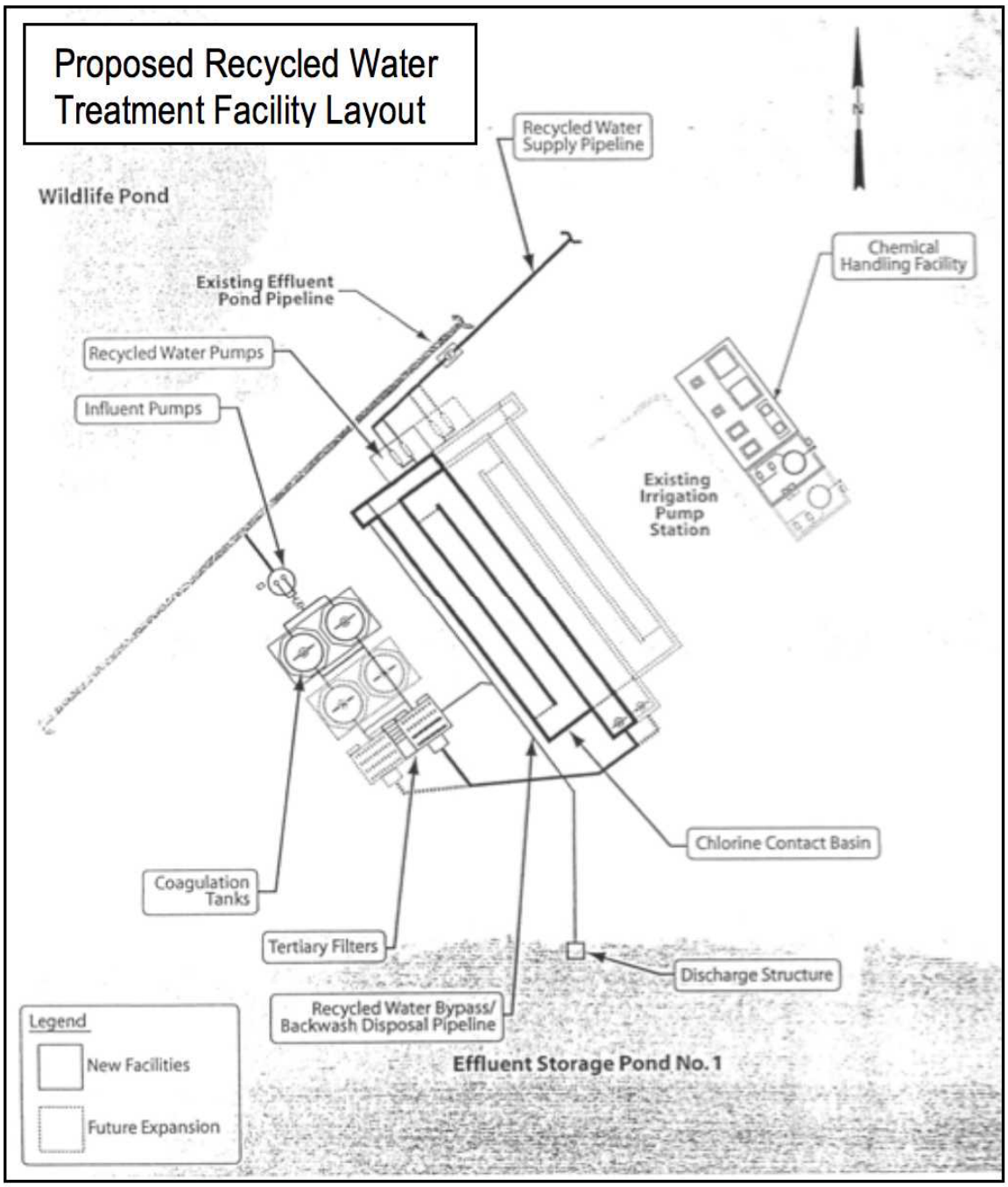
The Recycled Water Program for North Marin Water District (NMWD) and Novato Sanitary District (NSD) proposes to construct a 0.5 mgd recycled water facility for landscape irrigation at the Stone Tree golf course in Novato. The project will also deliver water to the NSD and Novato Fire Protection District (NFPD). The facility will treat secondary effluent to meet Title 22 requirements for unrestricted bodily contact. This project is a first step to introduce and expand the use of recycled water in this part of the Bay Area. As the market for recycled water grows, the facility will be expanded to meet future demands.

Project Objectives

The Project was designed to develop recycled water to offset potable water demands for landscape irrigation uses, reduce dependence on imported water supplies from the Russian River, and help reduce wastewater discharges to the San Francisco Bay.

- **Reduce Peak Potable Water Demands**. This project would help reduce peak summer potable water demands thereby allowing more high quality potable water to be used for domestic purposes.
- **Reduce Dependence on Imported Water Supplies**. This project will utilize recycled water from local wastewater thereby reducing demand for imported potable water supply from the Russian River.
- **Reduce Wastewater Discharges to San Francisco Bay**. The Project reuses wastewater that may otherwise be discharged to the San Francisco Bay.

Benefits to Project Partners and Surrounding Community	
Water Supply Reliability	• Increases regional supplies by 260-560 AFY • Further reduces use of potable water for non-potable uses. • Provides a drought-proof source of supply for North Bay landscape and industrial uses. • Reduces reliance on water supply from Russian and Eel Rivers, especially during dry and critically dry periods
Water Quality	• Reduces discharges of treated wastewater to SF Bay • Helps realize TMDLs for SF Bay
Other Environmental Benefits	• Reduces diversions from over-taxed Russian and Eel Rivers



Detailed Project Description

NSD collects wastewater from Novato and adjacent unincorporated areas. NSD operates the Novato Treatment Plant and Ignacio Treatment Plant and will operate the proposed recycled water facility. Currently the two treatment plants discharge treated effluent to the intertidal mud flats of San Pablo Bay through the NSD outfall. During summer months, discharge to San Pablo Bay is halted for water quality reasons and the effluent is instead collected in storage ponds and used to irrigate pastureland owned by NSD.

The Project includes construction of:

- Influent Pump Station
- Chemical Feed Systems for Coagulation and Disinfection
- Filtration
- Chlorine Disinfection
- Effluent Pump Station
- Recycled Water Transmission Forcemain

Agency Sponsor	Northern Marin Water District & Novato Sanitary District
Project Title	Recycled Water Program for North Marin WD & Novato Sanitary District – Phase 1
Project Location	Stone Tree Golf Course in Novato
Project Description • Project Process • Amount Delivered • Market Use • Offset to Potable • Offset to Imported Water	 • Transmission tie-in line to existing pipeline, distribution Piping • 260 – 560 AFY • Landscape Irrigation o Golf Course o Fire Department o NSD • 260 – 560 AFY • 260 – 560 AFY
Project Schedule Milestones	Planning and environmental studies, construction design, acquisition of rights of way, and permitting for the project are completed. The Project is ready to move forward with construction.
Project Costs	$4.0 M Capital
Footnotes/Comments	

Napa Salt Marsh Restoration Project

In 1994, the State of California acquired all of the salt and bittern ponds in the North Bay and created the California Department of Fish and Game (CDFG) Napa-Sonoma Marsh Wildlife Area. The bittern ponds, located in the northern portion of the CDFG Napa-Sonoma Marsh Wildlife Area near Fly Bay and Coon Island, total 750 acres, and store an estimated 2.5 billion gallons of bittern. Restoring these ponds through levee breaching or other more common techniques is not feasible because of RWQCB restrictions on discharging bittern

Recycled Water Market	• Near-Term: Restoration of bittern ponds located in Napa-Sonoma Marsh Wildlife Area • Long-term: Agricultural and M&I irrigation adjacent to pipeline alignment • 3,000 AFY
Distribution	• Pipeline and pump stations from Sonoma County Sanitation District Treatment Plant to Sonoma Marsh Wildlife Area
Cost	• Estimated Capital Cost: $11.3M

into the Bay. However, the RWQCB will consider discharge from these ponds if the compounds in the bittern are diluted to near background levels. To sufficiently dilute the quantity of bittern stored in the three ponds will require enormous amounts of fresh water.

The Sonoma County Water Agency (SCWA) has proposed constructing the necessary pipelines and pump stations from the Sonoma Valley County Sanitation District (SVCSD) wastewater treatment plant to provide recycled water to these bittern ponds for the dilution process. The project would provide approximately 3,000 AF of tertiary-treated recycled water per year to the bittern ponds. Desalination of the bittern ponds is anticipated to take between 10 and 15 years. Following the desalination of the bittern ponds, the recycled water will be used for agricultural irrigation adjacent to the pipeline alignment.

The Napa Sanitation District (NSD) is a partner, along with the Sonoma County Water Agency, in the Napa Sonoma Marsh Restoration Project. NSD, is planning to construct a recycled water pipeline through South Los Carneros which will eventually connect the Soscol Water Recycling Facility with the Napa Sonoma Marsh Restoration area. The NSD pipeline will connect with the Sonoma County Water Agency's pipeline along Buchli Station Road where the road intersects with the Northwestern Pacific railway line. Recycled water is needed from both agencies to fulfill the project goals of reducing pond salinity and restoring marsh habitat. Upon completion of the restoration phase of the project, the two pipelines would serve different agricultural areas with recycled water.

The Napa Salt Marsh Restoration Project will facilitate restoration of important salt marsh habitat located in the Napa-Sonoma Marsh Wildlife Area. The North Bay Marshes and San Pablo Bay provide habitat for Chinook salmon, delta smelt, splittail, steelhead trout, green sturgeon, striped bass, and also for hundreds of thousands of migratory waterfowl, shorebirds, and wading birds.

Project Objectives

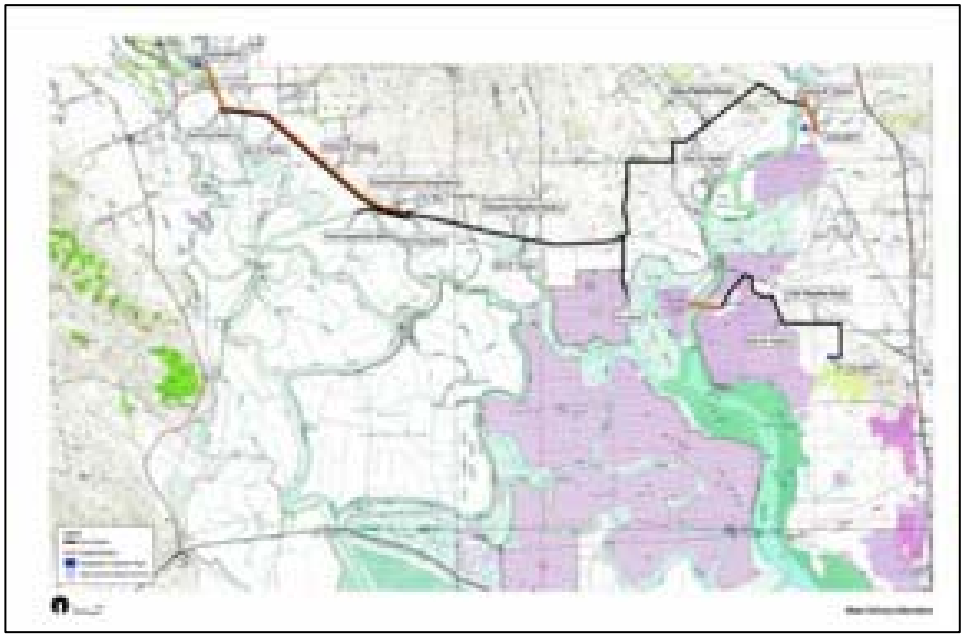
The Napa Salt Marsh Restoration Project was designed to facilitate restoration of important salt marsh habitat located in the Napa-Sonoma Marsh Wildlife Area, create a new, reliable and drought-proof supply of water for the region, and reduce discharge of treated effluent to the San Francisco Bay. The project will realize these objectives through the following design features and outcomes:

- **Facilitate restoration of salt marsh habitat located in the Napa-Sonoma Wildlife Area.** The project will provide approximately 3,000 AF of tertiary-treated recycled water per year to the bittern ponds. Desalination of the bittern ponds is anticipated to take between 10 and 15 years.
- **Create a new, reliable and drought-proof water supply for the region.** Following restoration of the bittern ponds, recycled water will be available for other uses. Initially, it is expected the water will be used for irrigation of agricultural lands adjacent to the pipeline alignment. This project will help reduce long-term demands on the Russian and Eel Rivers.
- **Reduce wastewater discharges to San Francisco Bay.** The project will divert approximately 3,000 AF of wastewater per year that otherwise would have been discharged into San Francisco Bay.

Benefits to Project Partners and Surrounding Community	
Water Supply Reliability	• Further reduces use of potable water for non-potable uses. • Provides a drought-proof source of high-quality water for agricultural and M&I irrigation uses. • Reduces reliance on Russian and Eel Rivers.
Water Quality	• Reduces discharge of treated effluent to San Francisco Bay by approximately 3,000 AFY.
Ecosystem Restoration	• Facilitates restoration of Napa-Sonoma Wildlife Area salt marsh habitats and associated endangered species.
Other Environmental Benefits	• Reduces diversions from over-taxed Russian and Eel Rivers
Integrated water management strategy to facilitate environmental restoration and provide new long-term, drought-proof supply of water to region.	

Detailed Project Description

Recycled water would be provided by Sonoma Valley County Sanitation District (SVCSD) wastewater treatment plant. SCWA would construct the necessary pipelines and pump stations to deliver this water to the bittern ponds for the dilution process. This will involve construction of the following facilities:



- 4.2 miles of 18" pipe that parallels an existing pipeline south of the Sonoma Valley County Sanitation District's Treatment Plant.
- 3.8 miles of 38" pipe from the end of the 18" pipe to the tie-in at Buchli Station Road in Napa County.
- Booster Pump Station located at junction of 18" and 36" pipeline to facilitate pumping recycled water to the Napa Salt Marsh area.

This project has used the latest hydrologic modeling techniques to analyze salinity reduction alternatives and potential impacts. The project also has an extensive post-construction monitoring and adaptive management program.

Agency Sponsor Project Title	Northern Marin Water District & Novato Sanitary District Napa Salt Marsh Restoration Project
Project Location	Bittern ponds located in Napa-Sonoma Marsh Wildlife Area
Project Description • Project Process • Amount Delivered • Market Use • Offset to Potable • Offset to Imported Water	 • Pipeline and pump stations from Sonoma County Sanitation District Treatment Plant to Sonoma Marsh Wildlife Area • 3,000 AFY • Near-Term: Restoration of bittern ponds located in Napa-Sonoma Marsh Wildlife Area • Long-term: Agricultural and M&I irrigation adjacent to pipeline alignment • NA • NA
Project Schedule Milestones	The planning and environmental studies for the project are completed. The project is ready to move forward with design and construction. The proposed design and construction schedule is based on grant funding being awarded and a contract executed by July 1, 2006.
Project Costs	$11.3 M Capital
Footnotes/Comments	

Pittsburg Recycled Water Implementation

Recycled Water Market	• Near-Term: Landscape irrigation Delta View Golf course irrigation 3 city owned parks • Long-term: • Initial Phase 615 AFY – Ultimate 800 AFY
Distribution	• Pipeline and distribution systems as a tie into the existing recycled water line
Cost	• Phase I Estimated Capital Cost: $4.61 M

DDSD recently completed the DDSD/City of Pittsburg Recycled Water Facilities Plan (Plan) that included a master plan for recycled water use in the City of Pittsburg and a detailed facilities plan for the recommended project identified in the master planning. The Plan analyzed the recycled water demands and supply infrastructure to meet the demand. The recommended project calls for a phased expansion of the recycled water infrastructure to deliver initially 615 AFY and ultimately 800 AFY of recycled water supply for landscape irrigation. This project consists of implementation of the preferred alternative from the Recycled Water Master Plan.

The recommended project from the Master Planning Work is the City of Pittsburg Golf Course and Urban Landscape Recycled Water Project (the Project). The Project is a recycled water distribution system to extend recycled water service to Delta View Golf course and three other city-owned parks within Pittsburg, California. The project will start at a tie-in to an existing recycled water line, and will involve the construction of approximately 13,270 lf of new 12-inch, 10-inch, and 6-inch PVC recycled water piping along city streets and rights-of-way. The Project will also employ an existing 10-inch pipeline that is currently abandoned, and a 20-inch pipeline that is currently in use. The project will provide 615 AFY of recycled water for landscape irrigation. There are a total of four sites for this phase of the project including Delta View Golf Course (500 AFY), Stoneman Park North (26 AFY), City Park (53 AFY), and City Hall (37

AFY). Future phases include the addition of users such as other city parks and schools. A detailed description of the project is contained in the Pittsburg/DDSD Recycled Water Facilities Plan, which makes up a portion of the East County Functional Equivalent IRWMP.

Project Need

Water recycling is a critical element to addressing California's statewide water crisis. The Governor's Water Recycling Task Force and the CALFED Bay-Delta program strongly encourage the expansion of recycled water use to spare high quality potable water from use in irrigation, making more potable water available.

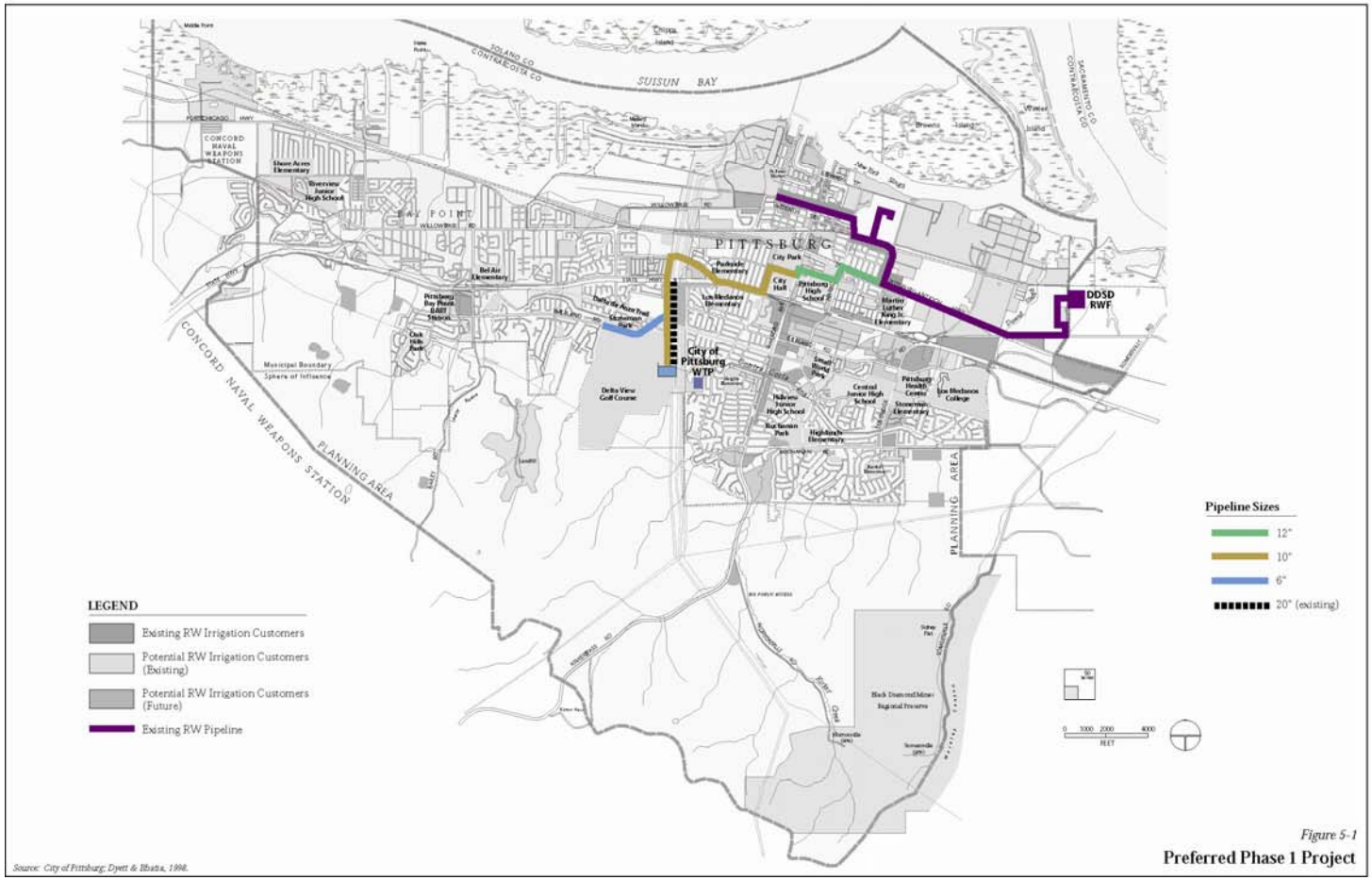
As identified in the East Contra Costa Functional Equivalent IRWMP, during dry years, East County water supplies are less than demands unless alternative water supplies are developed. This recycled water project replaces 615 AFY potable water deliveries. Using recycled water reduces the impacts to potable sources, extending the availability of high quality water in Los Vaqueros. In addition, this project will supplement existing recycled water deliveries to reduce the gap between demand and dry year water supply.

Benefits to Project Partners and Surrounding Community	
Water Supply Reliability	• Provides additional dry-year reliability for irrigation customers and other users. • Expanded use of recycled water within this area would lessen the amount of Delta water diverted by the Contra Costa Water District (CCWD), making potable water not used available for other purposes.
Water Quality	• DDSD currently discharges its wastewater effluent into the New York Slough. With the advent of Total Maximum Daily Load (TMDL) requirements for mercury and other constituents of concern, wastewater dischargers are facing increasingly stringent regulations. Increasing the production of recycled water will help DDSD to comply by reducing the amount of effluent discharged.
Other Environmental Benefits	• Use of recycled water in lieu of Delta supplies can be an important factor in developing watershed planning strategies. • Currently, there is an underutilization of existing facilities. Expanded recycled water distribution would make use of available capacity. • Recycled water on turf will enhance recreational opportunities and improve appearance of public access, especially during a drought. Landscaped areas may go without water during dry years resulting in significant financial loss.

Project Goals and Objectives:

The purpose of this project is to 1) provide the infrastructure to convey recycled water to irrigation users, 2) facilitate the use of recycled water as a replacement for potable water, and 3) reduce wastewater discharges. DDSD currently provides recycled water supply for use by two local power plants and for some irrigation needs. DDSD is intends to maximize the supply of recycled water produced by its existing facilities.

Agency Sponsor Project Title	DDSD Pittsburg Recycled Water Implementation
Project Location	City of Pittsburg
Project Description • Project Process • Amount Delivered • Market Use • Offset to Potable • Offset to Imported Water	 • Pipeline and distribution systems as a tie in to existing line • Near-Term: Landscape irrigation at Delta View Golf course, 3 city owned parks • Long-term: • Initial Phase 615 AFY – Ultimate 800 AFY • NA
Project Schedule Milestones	
Project Costs	$4.61 M Capital
Footnotes/Comments	



Source: City of Pittsburg; Dyett & Bhatia, 1998.

Figure 5-1
Preferred Phase 1 Project

Antioch Recycled Water Implementation

DDSD recently completed a draft DDSD/City of Antioch Recycled Water Facilities Plan (Plan) that included a master plan for recycled water use in the City of Antioch and a detailed facilities plan for the recommended project identified in the master planning. The Plan analyzed the recycled water demands and supply infrastructure to meet the demand. The recommended project calls for a phased expansion of the recycled water infrastructure to deliver 850 AFY of recycled water supply for landscape irrigation. This project consists of implementation of the preferred alternative from the Recycled Water Master Plan.

Recycled Water Market	• Near-Term: Landscape irrigation Lone Tree Golf course irrigation 4 city owned parks 3 Mixed Use Sports fields • Long-term: 850 AF/Y • Initial 531 AF/Y, Ultimate 850 AF/Y
Distribution	• Pipeline and distribution systems as a tie into the existing recycled water line
Cost	• Estimated Capital Cost: $11.3M

The recommended project from the Master Planning Work is the Lone Tree Golf Course and Urban Landscape Recycled Water Project (the Project). The Project is a recycled water distribution system to extend recycled water service to golf course and other city-owned parks within Antioch, California. The project will start at a tie-in to an existing recycled water line, and will involve the construction of approximately 19,800 linear feet of new 14-inch, 12-inch, and 10-inch PVC recycled water piping along city streets and rights-of-way. The Project will also employ an existing 18-inch pipeline that is currently abandoned. The project will provide 531 AFY of recycled water for landscape irrigation. There are a total of four sites for this phase of the project including Lone Tree Golf Course (438 AFY), four city parks (49 AFY) and three sports fields (45 AFY).

Future phases include the addition of users such as other city parks and schools.

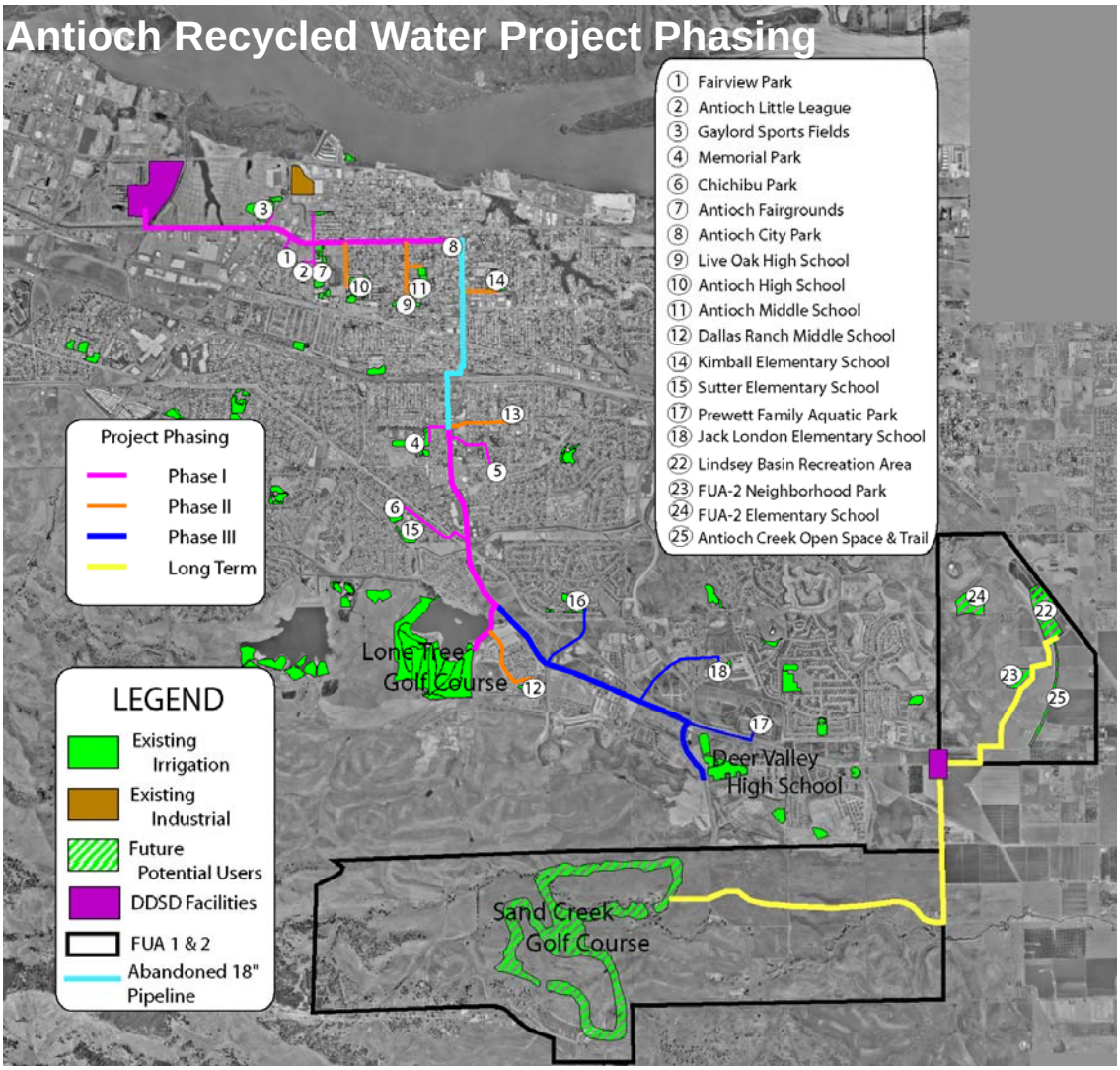
A detailed description of the project is contained in the *Antioch/DDSD Recycled Water Facilities Plan*, which makes up a portion of the East County Functional Equivalent IRWMP.

Project Need

Water recycling is a critical element to addressing California's statewide water crisis. The Governor's Water Recycling Task Force and the CALFED Bay-Delta program strongly encourage the expansion of recycled water use to spare high quality potable water from use in irrigation, making more potable water available.

As identified on Figure 2-11 of the East Contra Costa Functional Equivalent IRWMP, during dry years, East County water supplies are less than demands unless alternative water supplies are developed. This recycled water project replaces 531 acre-feet per year potable water deliveries. Using recycled water reduces the impacts to potable sources, extending the availability of high quality water in Los Vaqueros. In addition, this project will supplement existing recycled water deliveries to reduce the gap between demand and dry year water supply.

Agency Sponsor Project Title	DDSD Antioch Recycled Water Implementation
Project Location	City of Antioch
Project Description • Project Process • Amount Delivered • Market Use • Offset to Potable • Offset to Imported Water	 • Pipeline and distribution systems as a tie into the existing recycled water line • Initial 531 AF/Y, Ultimate 850 AF/Y • Near-Term: Landscape irrigation at Lone Tree Golf course, 4 city owned parks, and 3 Mixed Use Sports fields • Long-term: • 850 AF/Y • NA
Project Schedule Milestones	
Project Costs	$11.3 M Capital
Footnotes/Comments	



2.8 Priority Tier 2 Water Recycling Projects

The Priority Tier 2 Projects in this plan are the next level of projects that were not included in any Proposition 50 Chapter 8 Implementation Grant application. These projects are part of public utilities plans and many of them were part of the 1999 Regional Water Recycling Master Plan. The timeframe for implementation of these projects may coincide with Priority Near-Term Projects and in some cases extends beyond that time frame. The Priority Tier 2 Projects will deliver 31 to 32 mgd (34,605 to 35,725 AFY) recycled water to the San Francisco Bay Area offsetting potable water and providing for environmental and wetland enhancements.

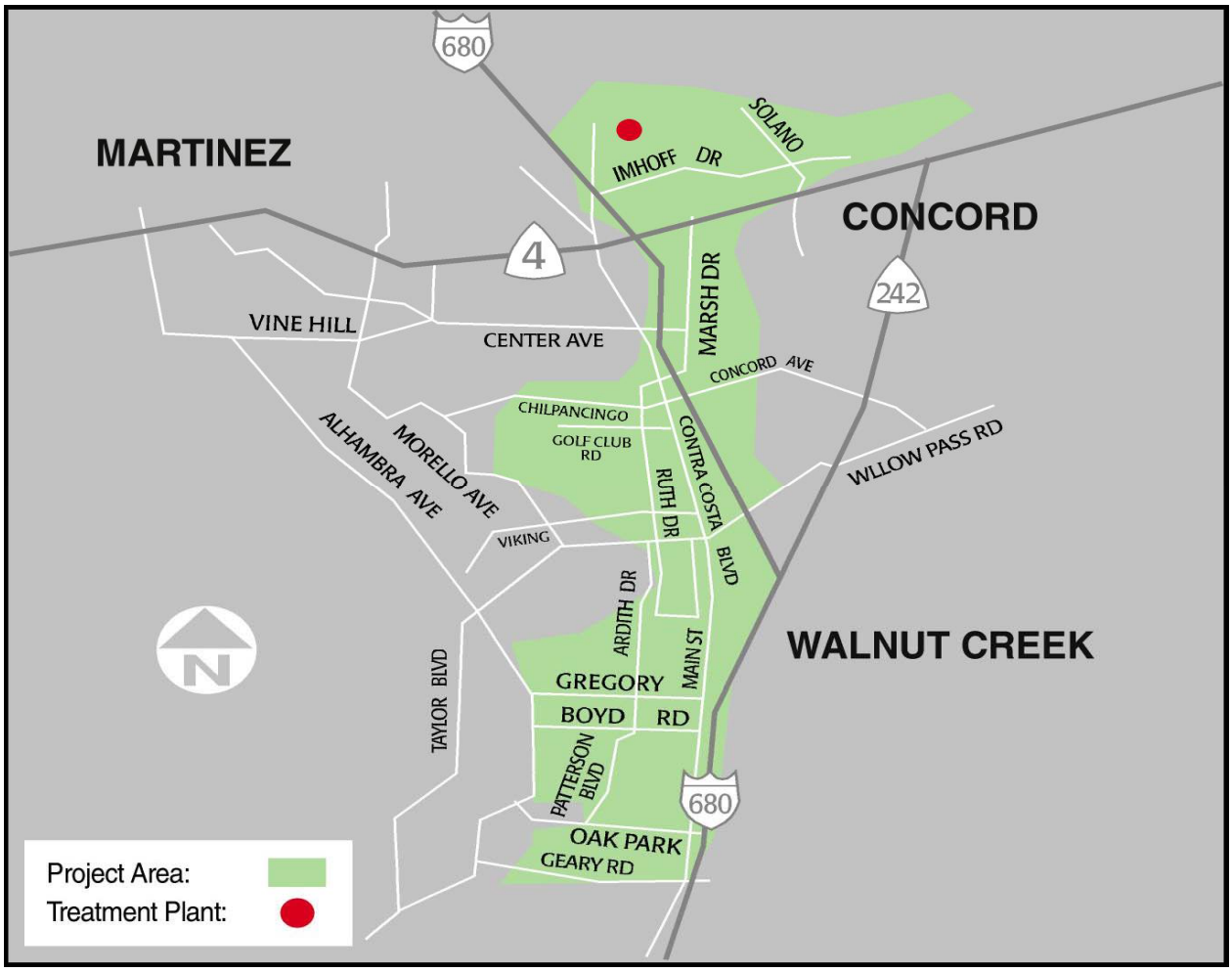
Priority Tier 2 Projects				
Project Title	Type	Location	Primary Objectives	Other Benefits
Pleasant Hill, Zone 1 Recycled Water Project	Recycled Water	East Bay Pleasant Hill, Concord and Martinez	Water supply reliability Landscape irrigation	SF Bay water quality
Westside Baseline and Harding Park/Lake Merced Projects	Recycled Water	San Francisco	Water supply reliability Landscape irrigation	Industrial dual plumbing
North San Jose Intensification Extension	Recycled Water	South Bay	Water supply reliability	Industrial water supply Wetland restoration SF Bay water quality
East Bayshore Recycled Water Project - Phase 1B	Recycled Water	East Bay, Alameda, Albany, Emeryville, Berkeley and Oakland	Water supply reliability Industrial, commercial, irrigation applications	Wetland restoration SF Bay water quality Disadvantage community
Richmond Advanced Recycled Expansion (RARE) Water Project	Recycled Water	East Bay	Water supply reliability Industrial process	SF Bay water quality
Rodeo Recycled Water Project	Recycled Water	East Bay	Water supply reliability Industrial process	San Pablo Bay water quality
San Leandro Water Reclamation Facility Expansion Project	Recycled Water	East Bay	Water supply Landscape irrigation	SF Bay water quality
Peacock Gap Recycled Water Extension – Marin Municipal Water District	Recycled Water	North Bay	Water supply reliability	Habitat protection/enhancement
Sonoma Valley Recycled Water Project	Recycled Water	North Bay	Water supply reliability	SF Bay water quality Habitat protection/enhancement Groundwater protection
Phase II Recycled Water Program - City of Petaluma	Recycled water	North Bay	Water supply reliability	SF Bay water quality Petaluma River water quality
Recycled Water Conveyance Pipeline	Recycled Water	North Bay	Water supply reliability	SF Bay water quality
Mirant Cooling Recycled Water Project	Recycled Water	Antioch	Water supply reliability Industrial applications	SF Bay/Delta surface water quality protection

The following sections include an overview of each of the Priority Tier 2 Projects.

Pleasant Hill, Zone 1 Recycled Water Project

The Pleasant Hill Zone 1 recycled water project is sponsored by CCCSD as a water supply augmentation project and surface water quality project to reduce the mass loading into the San Francisco Bay. CCCSD, located in Martinez, is the recycled water producer and purveys recycled water for the Pleasant Hill Zone 1 project under an agreement with the Contra Costa Water District (CCWD). CCCSD currently provides approximately 600 AFY of recycled water to 24 reuse sites within the Concord, Martinez and Pleasant Hill areas including: two golf courses; several parks and median strips; a community college; three middle schools; a high school; an elementary school; the City of Pleasant Hill's Community Center and Corporation Yard; a topsoil and woodchip farm; a concrete recycling and batch plant; and most recently the new dual-plumbed Contra Costa County Animal Shelter where recycled water is used both outside for landscape irrigation and inside for kennel wash down. CCCSD has identified an additional 600 AFY of potential demand for landscape irrigation within the Zone 1 project area. Over the next 10 years, CCCSD plans to continue to connect cost-effective irrigation customers in the Zone 1 area with the goal of increasing recycled water demand to a total of 1,200 AFY.

Agency Sponsor Project Title	CCCSD Pleasant Hill Zone 1
Project Location	Pleasant Hill, Concord & Martinez (near Highway 4/680 Interchange)
Project Description • Project Process • Amount Delivered • Market Use • Offset to Potable	 • Disinfected tertiary recycled water • 1,200 AFY (600 AFY already connected) • Landscape irrigation, dust control, concrete manufacturing, and kennel wash-down • 1,200 AFY
Project Schedule Milestones	This project is currently being implemented with approximately 600 AFY of customer demand already connected. The remaining 600 AFY of potential demand is scheduled for completion by 2016.
Project Costs	$15M (including an estimated $4M in future expenditures to connect the remaining 600 AFY of identified demand)

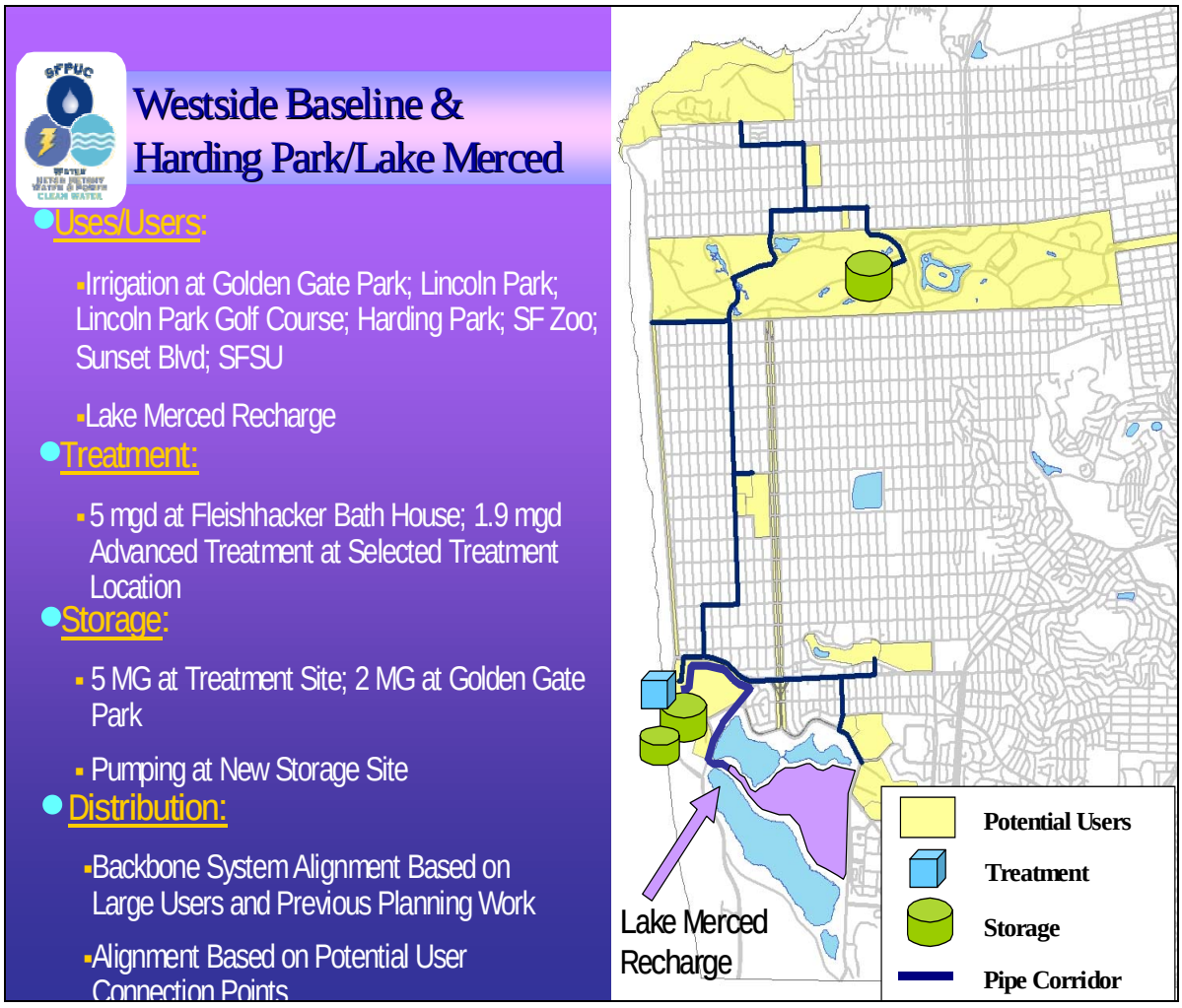


Westside Baseline and Harding Park/Lake Merced Projects

The Westside Recycled Water Project involves construction of recycled water treatment, storage, and distribution facilities to serve customers located on the western side of the City of San Francisco. This system will serve as the "backbone" for the western side of the City to serve "anchor" customers, as well as other smaller users.

Recycled Water Market	• Mostly Landscape Irrigation: a. Parks and Medians b. Golf Course c. Lake Recharge • 4,592 AFY (4.1mgd)
Distribution System	• 9.3 miles of conveyance pipe (6- to 24-inch)
Cost	• Estimated Capital Cost: $113.6M • Estimated Unit Cost: $2,340 - $2,690 per Acre-Foot

Proposed Phase 1 Projects



The City of San Francisco is looking to develop a cost-effective system to deliver recycled water to identified users. Implementation of this project will expand the City's water supply portfolio by developing an additional source of supply for overall reliability and sustainability purposes:

- **Recycled water would reduce the demand on valuable drinking water.** By replacing potable water currently being used for irrigation and other non-potable purposes with recycled water, potable water may be used for its highest use - drinking. In addition, recycled water reduces dependence on imported water.
- **Recycled water is a locally controlled reliable source.** During drought periods, recycled water will assist in reducing the level of rationing. Recycled water also allows for the continued economic vitality for the City.
- **Recycled water is environmentally beneficial.** It can be used for purposes such as lake recharge and, it reduces the amount of wastewater discharged into the Ocean.

Potable Water Supply Sources & Reduction in Water Use by Project

Potable Water Supply	Reduction in Water Use
SFPUC System Water – the SFPUC derives the majority of its water supply from a combination of local Bay Area supplies and diversions from the Tuolumne River through the Hetch Hetchy Water and Power Project	2,352 AFY (2.1 mgd)
Groundwater – recycled water would offset groundwater currently being used for irrigation purposes, thereby allowing the groundwater to be used for potable purposes	2,240 AFY (2.0 mgd)

The total potable water demand in the City of San Francisco will be reduced by 4,592 AFY (4.1 mgd). This represents a large majority of the irrigation use on the western side of the City, and approximately 4.5% of the total City's water supply.

Agency Sponsor	SFPUC
Project Title	Westside Baseline and Harding Park/Lake Merced Projects
Project Location	Western San Francisco
Project Description • Project Process • Amount Delivered • Market Use • Offset to Potable • Offset to Imported Water	 • Advanced Treatment • 4.1mgd (4,592 AFY) • Mostly Landscape Irrigation: Parks and Medians, Golf Course, Lake Recharge • 4,592 AFY (4.1mgd) • NA
Project Schedule Milestones	See below
Project Costs	• $113.6 M Capital ($2,340 - $2,690 per Acre-Foot)
Footnotes/Comments	

Source of Recycled Water

Recycled water will be produced at or near the SFPUC's Oceanside Water Pollution Control Plant. The Plant will include a 7-mgd tertiary treatment component. The wastewater source will be secondary effluent from the Plant and will include a flow equalization basin to capture diurnal flows, allowing for more predictable treatment processes and operation. The recycled water treatment process will consist of coagulant and polymer injection, media filtration, ultraviolet light disinfection, and sodium hypochlorite for residual disinfection. The recycled water will meet Title 22 requirements for unrestricted use, and will be served to the majority of the identified users.

Recycled water will be used for irrigation of Harding Park golf Course during the irrigation season, and recharge of Lake Merced during the winter months. Both users are assumed to require advanced treatment because: 1) Lake Merced has been designated as an emergency non-potable water source; and 2) nutrient levels are a concern (eutrophication). Because of these issues, in addition to tertiary treatment process described above, 2-mgd will receive advanced

treatment. This treatment process will include media filtration, microfiltration, and reverse osmosis (with concentrate disposal through the ocean outfall).

Project Benefits

Proposed Project Provides Water and Environmental Benefits to San Francisco

	Benefits
Water Supply Reliability	• Frees up potable water, currently used for landscape irrigation and other purposes, for strictly potable uses. • Provides a new water source that is locally controlled and reliable. • Reduces reliance on imported water for irrigation, and other purposes. • Recycled water also allows for the continued economic vitality for the City.
Water Supply Sustainability	• Promotes efficient use of water resources. • During drought periods, recycled water will assist in reducing the level of rationing. • Reduces wastewater discharges into the Pacific Ocean. • Sustains landscape value during droughts when potable water use may be restricted. • Provides a water source for recreational impoundments.
Water Quality	• Improves water quality of the shallow South San Francisco Bay by reducing discharge as some treated effluent is diverted for reclamation.

Project Milestones

The SFPUC is in the process of developing a Recycled Water Master Plan. The Draft Master Plan will be completed in October 2005. It is anticipated that the project will move into the environmental review process in early 2006.

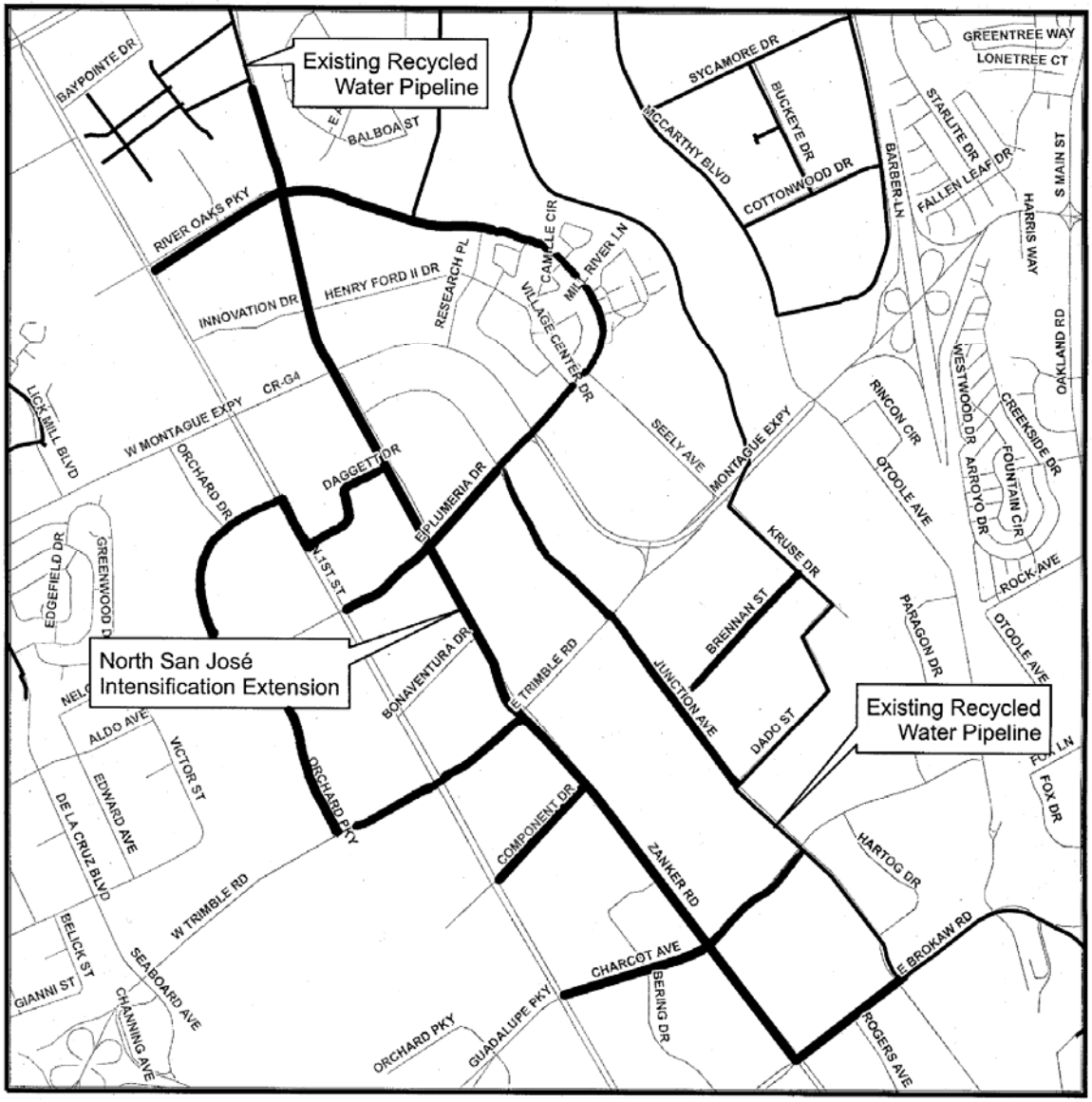
Implementation Activities and Schedule Summary

Milestone	Schedule	Notes
Mandatory Reuse Ordinances	1991	Ordinances 390-91 and 391-91 – dual plumbing installation for new or remodeled buildings of 40,000 sq. feet or more, and new and existing irrigated areas of 10,000 sq. feet or more. Ordinance 175-91- recycled water use for dust control and soil compaction
Recycled Water Master Plan Activities	2003-2007	Draft Recycled Water Master Plan will be taken before the SFPUC for adoption when the environmental review document has been certified, and will become final at that time
Environmental Review	2006-2007	-
Institutional Issues	2005-2008	-
Public Participation and Outreach	On-going	-
Engineering and Construction	2005-2013	-
Conceptual Engineering	2005-2007	-
Design	2008-2009	-
Construction Permitting	2008-2009	-
Construction	2010-2013	-
Begin Operation	2013	-

North San Jose Intensification Extension

The North San José Intensification will be a phased system of pipelines totaling 46,414 linear feet. When completed, this phased system will provide recycled water for multi-family residential land uses, commercial buildings, and office parks in the area. Industrial cooling will also be provided where the need is identified. The proposed intensification will increase industrial, office, and research and development (R&D) building space, encourage higher densities along the existing light rail system, and substantially increase residential development. The population of North San José is expected to increase five-fold from 9,613 to 50,222 people. Recycled water has been identified in the Water Supply Assessment, consistent with the requirements contained in SB 610, as a necessary component to meeting the water supply needs for the area. The annual demand is estimated to be 4,711 AFY.

Agency Sponsor and Project Title	SBWR North San José Intensification Extension
Project Location	City of San José
Project Description • Project Process • Amount Delivered • Market Use • Offset to Potable • Offset to Imported Water	 • Recycled Water Pipeline • 4 mgd • Landscape irrigation, dual plumbing, and industrial • 4 mgd
Project Schedule Milestones	
Project Costs	$18,435,000
Footnotes/Comments	



North San José Intensification Extension

South Bay Water Recycling Program
Environmental Services
City of San José

Map Legend
- North San José Intensification Extension
- Existing Recycled Water Pipeline
- Roads

4

0 0.1 0.2 0.4 0.6 0.8 1 1.2
Miles

Source:
Recycled Water Pipelines -
City of San José Environmental Services
Street Centerlines -
City of San José Public Works

Map Date:
September 12, 2005

Map By:
City of San José
Environmental Services Department
Policy and Planning Program and
South Bay Water Recycling Program

ArcMap GIS Project Name:
North San Jose Intensification Extension_02.mxd

Coordinate System Used:
California State Plane 0403 NAD83 Feet

East Bayshore Recycled Water Project – Phase 1B

The East Bayshore Recycled Water Project (EBRWP) will ultimately provide up to 2.5 mgd of recycled water to customers within the cities of Alameda, Albany, Berkeley, Emeryville, and Oakland, including the disadvantaged community of West Oakland. According to the Northern California Council for the Community, the 2000 Census reported a West Oakland household median income of $22,689, which is only 46% of the statewide median household income of $48,979.

The Phase 1A Project is currently under construction and it is anticipated that initial recycled water deliveries will begin by summer 2006. The proposed Phase 1B Project will provide an additional 1.4 mgd of recycled water to a variety of customers located in multiple cities, including the anticipated redevelopment of the former Alameda Naval Air Station and the Oakland Army Base, by expanding the recycled water distribution system and tertiary treatment facilities. Recycled water provided by this new phase of the project may be used for irrigation, industrial uses, toilet flushing in commercial buildings, and wetlands restoration.

The recycled water will be produced from treated effluent from EBMUD's main wastewater treatment plant (MWWTP) in Oakland, located near the base of the San Francisco Bay Bridge. In order to serve the maximum number of potential customers, the recycled water will be treated to the disinfected tertiary level as defined by Title 22.

Recycled Water Market	• Reuse in an urban setting • Irrigation, industrial, commercial and wetlands restoration applications • Over 100 reuse sites at buildout • 2,800 AFY at buildout
Recycled Water Facilities	• Expansion of tertiary (microfiltration) treatment facilities • 10 miles of distribution pipelines to multiple cities • Booster pump station • Distribution storage reservoir
Cost	• Estimated Capital Cost: $24M

Project Objectives/Importance of Project to the Region

The Project was designed to reduce the region's dependence on imported water supplies, increase the area's supply reliability by providing a new, drought-proof supply source for landscape uses, help reduce wastewater discharges to the San Francisco Bay, and increase flows through the Delta. The project will realize these objectives through the following design features and outcomes:

- **Reduce Regional Dependence on Imported Water Supplies.** This project will substitute recycled water for beneficial landscape, commercial and industrial water uses currently served by EBMUD's supplies from the Mokelumne River, which is a tributary to the Delta. During dry and critically dry years, the project will reduce EBMUD diversions from the Mokelumne and/or Sacramento Rivers (once the Freeport Project is in service). The EBRWP Phase 1B will help to offset demands for potable water.
- **Increase regional supply reliability.** Implementing this project would benefit all of EBMUD's 1.3 million customers located in its broad service area that spans two counties and includes 20 incorporated cities and 13 unincorporated communities. This project would help to reduce the risk of severe rationing during prolonged droughts. By increasing the

proportion of recycled water used, EBMUD will be able to save a larger percentage of its high quality potable water supplies for residential and commercial potable uses.

- **Reduce wastewater discharges to San Francisco Bay.** The Project reuses wastewater that would otherwise be discharged to the San Francisco Bay from EBMUD's main wastewater treatment plant.
- **Increase flows through the Delta.** Approximately 95% of EBMUD's water supply comes from the Mokelumne River, an eastside tributary to the Delta. This project will reduce the amount of water that must otherwise be delivered from the Mokelumne River to EBMUD's East Bay service area. Reducing deliveries can result in higher reservoir storage levels in EBMUD reservoirs in the Sierra Nevada foothills and increased reservoir releases to the lower Mokelumne River. Under a legally enforceable Settlement Agreement involving state and federal resource agencies, releases and flows in the lower Mokelumne River during the fall and early winter are based on storage levels so increased storage may result in some portion being released for fishery purposes. Once that water reaches the Delta, it provides additional benefits for Delta resources and water users.

Benefits to Project Partners and Surrounding Community	
Water Supply Reliability	• Increases regional supplies by 2,800 AFY • Further reduces use of potable water for non-potable uses. • Provides a drought-proof source of supply for East Bayshore recycled water users. • Reduces reliance on imported Mokelumne River and Delta water supply, especially during dry and critically dry periods
Water Quality	• Reduces discharges of treated wastewater to SF Bay • Helps realize TMDLs for SF Bay
Other Environmental Benefits	• Increases Mokelumne River instream flows for environmental uses

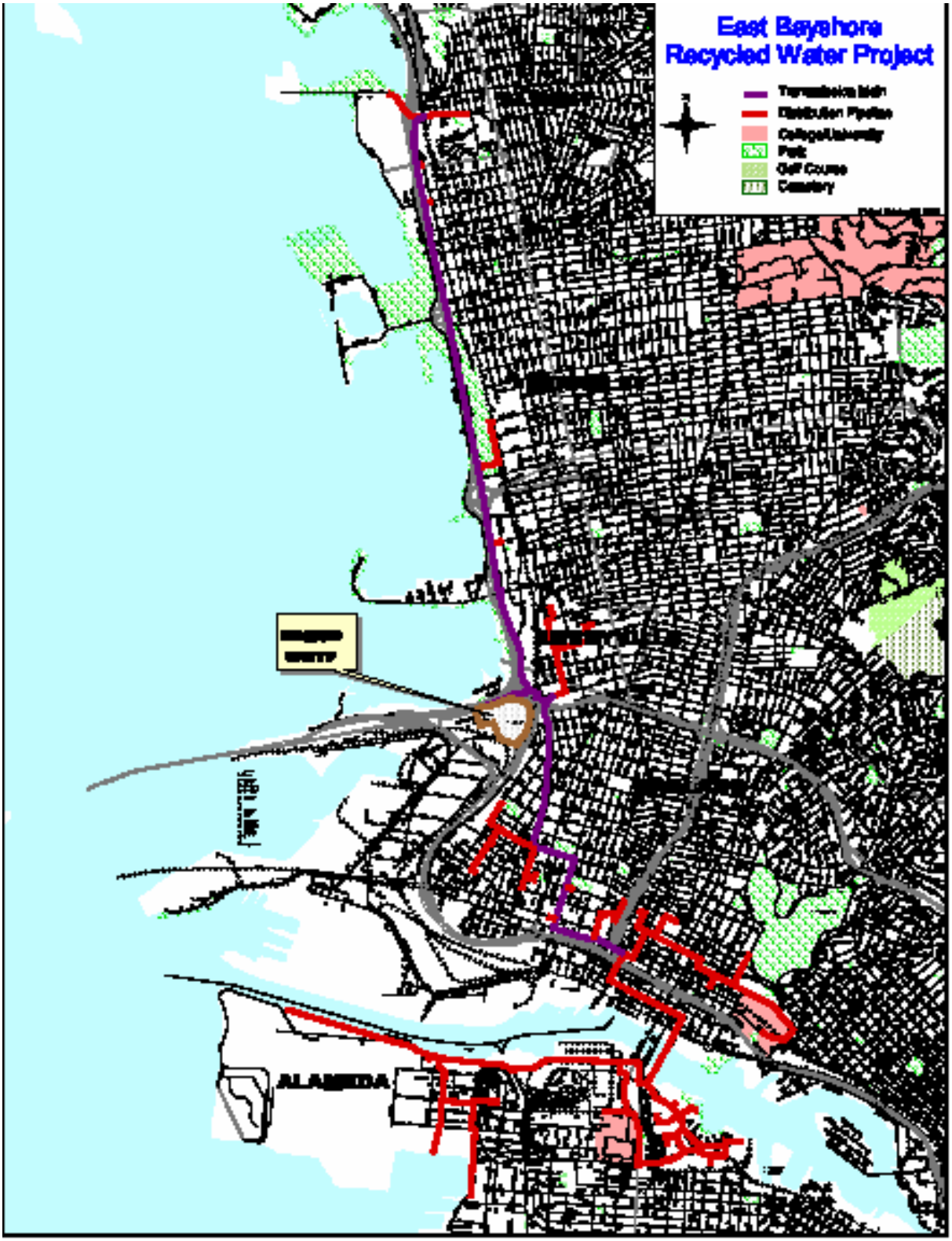
Detailed Project Description

New treatment facilities will be constructed to produce the recycled water. The proposed work for Phase 1B includes expansion of the tertiary (microfiltration) treatment facilities to accommodate an additional 1.4 mgd of demand, approximately 10 miles of distribution pipelines to reach users in multiple cities including crossing the Alameda estuary to deliver recycled water to Alameda, a booster pump station and, potentially, a distribution storage reservoir.

The EBRWP will ultimately serve over 100 customer sites with recycled water. The recycled water will be used for irrigation of public parks and gardens, highways, medians, multi-family housing, schools, and commercial properties. It will also be used for the creation and maintenance of a new wetlands area that EBMUD is discussing with the City of Oakland. The wetlands will be located at Lake Merritt in downtown Oakland. The recycled water will also be used for a number of industrial and commercial applications including cooling systems, process water, wash down water, ballast water, and toilet flushing.

Agency Sponsor Project Title	EBMUD East Bayshore Recycled Water Project – Phase 1B
Project Location	Western San Francisco
Project Description • Project Process • Amount Delivered • Market Use • Offset to Potable • Offset to Imported Water	 • Expansion of tertiary (microfiltration) treatment facilities, approximately 10 miles of distribution pipelines • 1.4 mgd • Irrigation of public parks and gardens, highways, medians, multi-family housing, schools, and commercial properties • Creation and maintenance of a new wetlands • 1.4 mgd • NA
Project Schedule Milestones	The planning and environmental studies for the Project are completed. Design is anticipated to begin in 2007 and construction is anticipated to begin in 2008-2009, pending grant funding assistance.
Project Costs	• $24 M Capital
Footnotes/Comments	

East Bayshore Recycled Water Project – Phase 1B Vicinity Map



Richmond Advanced Recycled Expansion (RARE) Water Project

EBMUD conducted a study with the Chevron Refinery in Richmond, California, to evaluate the feasibility of providing high-purity recycled water for Chevron's boiler feedwater system through the RARE Water Project. The study demonstrated that it would be feasible to implement this project. This project is separate from EBMUD's North Richmond Water Reclamation Plant, which will continue to produce recycled water for Chevron's cooling tower applications. For the RARE Water Project, new advanced water recycling facilities would produce the high-purity recycled water using microfiltration and reverse osmosis to remove minerals and other constituents, preventing scaling and foaming problems in the boilers. The nearby West County Wastewater District's treatment plant would provide secondary effluent that would be purified by the RARE Water Project facilities. The RARE Water Project proposes to deliver 3 to 4 mgd of high-purity recycled water to the refinery's boiler feedwater system to substitute for its potable water use.

Recycled Water Market	• Refinery boiler feedwater system • Potable water offset of 3,360 to 4,480 AFY
Treatment System	• Advanced treatment using microfiltration/ultrafiltration and reverse osmosis to produce high-purity recycled water
Cost	• Estimated Capital Cost: $50M

Project Objectives/Importance of Project to the Region

The Project was designed to reduce the region's dependence on imported water supplies, increase the area's supply reliability by providing a new, drought-proof supply source for landscape uses, help reduce wastewater discharges to the San Francisco Bay, and increase flows through the Delta. The project will realize these objectives through the following design features and outcomes:

- **Reduce Regional Dependence on Imported Water Supplies.** This project will substitute recycled water for industrial (refinery) potable water uses currently served by EBMUD's supplies from the Mokelumne River, which is a tributary to the Delta. During dry and critically dry years, the project will reduce EBMUD diversions from the Mokelumne and/or Sacramento Rivers (once the Freeport Project is in service). The RARE Water Project will help to offset demands for potable water.
- **Increase regional supply reliability.** Implementing this project would benefit all of EBMUD's 1.3 million customers located in its broad service area that spans two counties and includes 20 incorporated cities and 13 unincorporated communities. This project would help to reduce the risk of severe rationing during prolonged droughts. By increasing the proportion of recycled water used, EBMUD will be able to save a larger percentage of its high quality potable water supplies for residential and commercial potable uses.
- **Reduce wastewater discharges to San Francisco Bay.** The Project reuses wastewater that would otherwise be discharged to the San Francisco Bay from the joint West County Agencies outfall.
- **Increase flows through the Delta.** Approximately 95% of EBMUD's water supply comes from the Mokelumne River, an eastside tributary to the Delta. This project will reduce the amount of water that must otherwise be delivered from the Mokelumne River to EBMUD's East Bay service area. Reducing deliveries can result in higher reservoir storage levels in EBMUD reservoirs in the Sierra Nevada foothills and increased reservoir releases to the lower Mokelumne River. Under a legally enforceable Settlement Agreement involving state

and federal resource agencies, releases and flows in the lower Mokelumne River during the fall and early winter are based on storage levels so increased storage may result in some portion being released for fishery purposes. And once that water reaches the Delta it provides additional benefits for Delta resources and water users.

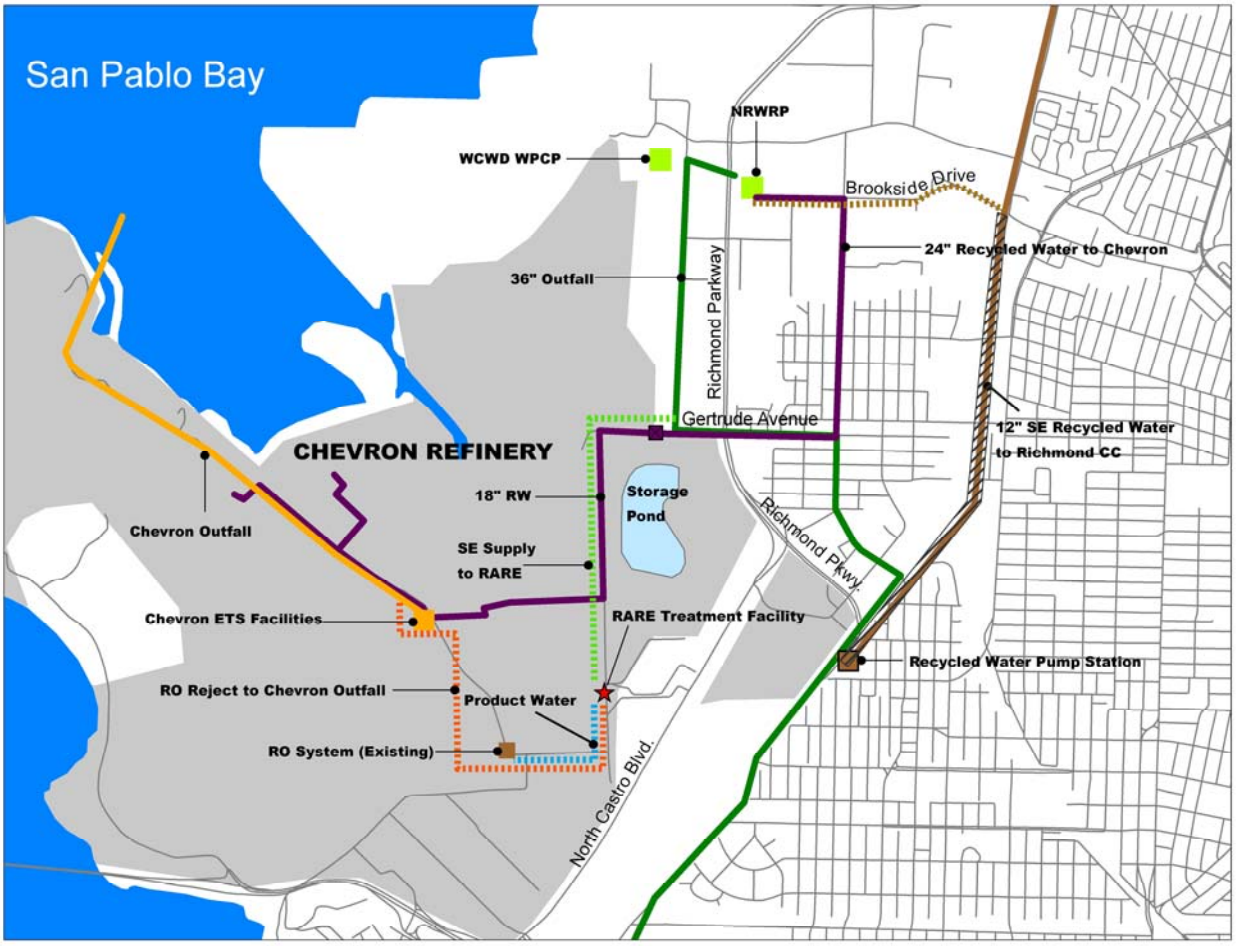
Benefits to Project Partners and Surrounding Community	
Water Supply Reliability	• Increases regional supplies by 3,360 to 4,480 AFY • Further reduces use of potable water for industrial uses. • Provides a drought-resistant source of supply for Chevron Refinery. • Reduces reliance on imported Mokelumne River and Delta water supply, especially during dry and critically dry periods
Water Quality	• Reduces discharges of treated wastewater to San Francisco Bay
Other Environmental Benefits	• Increases Mokelumne River instream flows for environmental uses

Detailed Project Description

New advanced water recycling facilities using microfiltration and reverse osmosis would be constructed to provide 3 to 4 mgd of high-purity recycled water for Chevron's boiler feedwater system. The project facilities would also include pipelines, pumps, and storage tanks for conveyance of the recycled water.

Agency Sponsor	EBMUD
Project Title	Richmond Advanced Recycled Expansion (RARE) Water Project
Project Location	Chevron Refinery in Richmond
Project Description • Project Process • Amount Delivered • Market Use • Offset to Potable • Offset to Imported Water	 • Advanced water recycling facilities using microfiltration and reverse osmosis • 3,360 to 4,480 AFY • Chevron's boiler feedwater • 3,360 to 4,480 AFY • NA
Project Schedule Milestones	The feasibility study was completed in December 2005. Environmental documentation would be completed in 2006. Design and construction are anticipated to begin in 2006. The in-service date for this project is mid-2008.
Project Costs	• $50 M Capital
Footnotes/Comments	

RARE Water Project Facilities



Rodeo Recycled Water Project

EBMUD will be conducting a study with the ConocoPhillips (COP) Refinery in Rodeo, California, to evaluate the feasibility of providing high-purity recycled water for COP's boiler feedwater system through the Rodeo Recycled Water Project. New advanced water recycling facilities would produce the high-purity recycled water using microfiltration and reverse osmosis to remove minerals and other constituents and prevent scaling and foaming problems in the boilers. The source of wastewater would be from one or a combination of nearby wastewater treatment plants: Rodeo Sanitary District (RSD), Pinole-Hercules, and/or COP WWTPs. The WWTPs would provide secondary or tertiary effluent that would be purified by the Rodeo Recycled Water project facilities. This project proposes to deliver about 2 mgd of high-purity recycled water to the refinery's boiler feedwater system to substitute for its potable water use.

Recycled Water Market	• Refinery boiler feedwater system • Potable water offset of about 2,240 AFY
Treatment System	• Advanced treatment using microfiltration/ultrafiltration and reverse osmosis to produce high-purity recycled water
Cost	• Estimated Capital Cost: $28M

Project Objectives/Importance of Project to the Region

The Project was designed to reduce the region's dependence on imported water supplies, increase the area's supply reliability by providing a new, drought-proof supply source for industrial uses, help reduce wastewater discharges to the San Pablo Bay, and increase flows through the Delta. The project will realize these objectives through the following design features and outcomes:

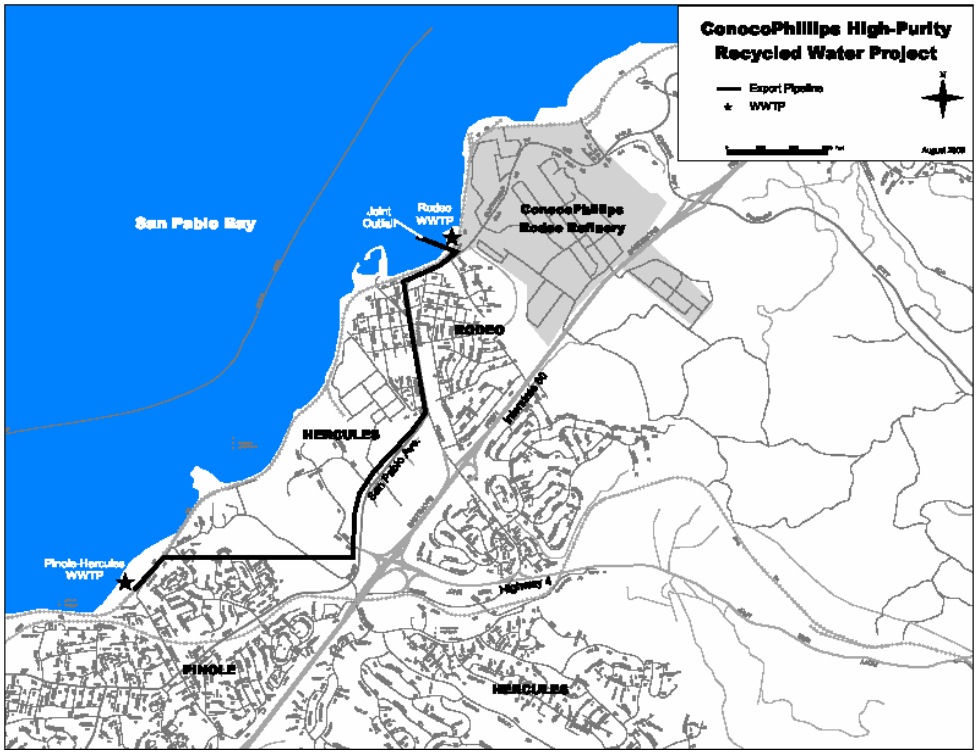
- **Reduce Regional Dependence on Imported Water Supplies.** This project will substitute recycled water for industrial (refinery) potable water uses currently served by EBMUD's supplies from the Mokelumne River, which is a tributary to the Delta. During dry and critically dry years, the project will reduce EBMUD diversions from the Mokelumne and/or Sacramento Rivers (once the Freeport Project is in service). The Rodeo Recycled Water Project will help to offset demands for potable water.
- **Increase regional supply reliability.** Implementing this project would benefit all of EBMUD's 1.3 million customers located in its broad service area that spans two counties and includes 20 incorporated cities and 13 unincorporated communities. This project would help to reduce the risk of severe rationing during prolonged droughts. By increasing the proportion of recycled water used, EBMUD will be able to save a larger percentage of its high quality potable water supplies for residential and commercial potable uses.
- **Reduce wastewater discharges to San Pablo Bay.** The Project reuses wastewater that would otherwise be discharged to the San Francisco Bay from the RSD, Pinole/Hercules, and/or COP wastewater treatment plants.
- **Increase flows through the Delta.** Approximately 95% of EBMUD's water supply comes from the Mokelumne River, an eastside tributary to the Delta. This project will reduce the amount of water that must otherwise be delivered from the Mokelumne River to EBMUD's East Bay service area. Reducing deliveries can result in higher reservoir storage levels in EBMUD reservoirs in the Sierra Nevada foothills and increased reservoir releases to the lower Mokelumne River. Under a legally enforceable Settlement Agreement involving state and federal resource agencies, releases and flows in the lower Mokelumne River during the fall and early winter are based on storage levels so increased storage may result in some portion being released for fishery purposes. Once that water reaches the Delta, it provides additional benefits for Delta resources and water users.

Benefits to Project Partners and Surrounding Community	
Water Supply Reliability	• Increases regional supplies by 2,240 AFY • Further reduces use of potable water for industrial uses • Provides a drought-resistant source of supply for COP Refinery • Reduces reliance on imported Mokelumne River and Delta water supply, especially during dry and critically dry periods
Water Quality	• Reduces discharges of treated wastewater to San Pablo Bay •
Other Environmental Benefits	• Increases Mokelumne River instream flows for environmental uses

Detailed Project Description

If project is determined to be feasible, new advanced water recycling facilities using microfiltration and reverse osmosis would be constructed to provide about 2 mgd of high-purity recycled water for COP's boiler feedwater system. The project facilities would also include pipelines, pumps, and storage tanks for conveyance of the recycled water.

Agency Sponsor Project Title	EBMUD Rodeo Recycled Water Project
Project Location	ConocoPhillips (COP) Refinery in Rodeo
Project Description • Project Process • Amount Delivered • Market Use • Offset to Potable • Offset to Imported Water	 • Advanced water recycling facilities using microfiltration and reverse osmosis • 2,240 AFY • COP's boiler feedwater system • 2,240 AFY • NA
Project Schedule Milestones	The feasibility study began in December 2005 and will be completed by the end of 2006. Pilot testing using the microfiltration and reverse osmosis will be conducted in 2006. If feasible, environmental documentation will initiate in 2007. Pending grant funding assistance, design and construction will initiate in 2007 and be completed by 2009.
Project Costs	• $28 M Capital
Footnotes/Comments	



San Leandro Water Reclamation Facility Expansion Project

EBMUD's current San Leandro reclamation facility supplies approximately 400,000 gallons per day (gpd) of recycled water for irrigation purposes. This new project proposes to expand recycled water delivery by 30,000 gpd to irrigate the Oakland's Airport's roadway landscaping, which currently uses potable water. Therefore, there would be a similar amount of potable water offset from this expansion. The estimated capital cost of this expansion is $0.7M. New project facilities would include improvements to the existing pump station and retrofit of the airport roadway irrigation system to receive recycled water. This project is currently scheduled to be implemented by 2010.

Agency Sponsor Project Title	EBMUD San Leandro Water Reclamation Facility Expansion
Project Location	San Leandro and Oakland (near Oakland International Airport)
Project Description • Project Process • Amount Delivered • Market Use • Offset to Potable • Offset to Imported Water	 • Disinfected secondary recycled water • Additional 30,000 gpd • Landscape irrigation • 30,000 gpd
Project Schedule Milestones	This project is currently scheduled to be implemented by 2010
Project Costs	• $700,000 Capital
Footnotes/Comments	

Peacock Gap Recycled Water Extension- Marin Municipal Water District

This project will provide recycled water to Peacock Gap Golf course and several other users along the pipeline route, in order to offset potable water use and to reduce pollutant loading into the San Francisco Bay. It will include upgrades to the Las Gallinas Valley Sanitary District wastewater treatment facility to enable production of increased volumes of recycled water. The wastewater treatment agency and the water supply agency will partner to gain dual benefits to their customers and the water environment of the San Francisco Bay.

Agency Sponsor Project Title	Marin Municipal Water District Peacock Gap Recycled Water Extension
Project Location	Peacock Gap Golf Course in San Rafael, CA
Project Description • Project Process • Amount Delivered • Market Use • Offset to Potable	 • Tertiary Treatment • NA • Landscape irrigation (golf course • NA
Project Schedule Milestones	Planning phase
Project Costs	• $15 M Capital
Footnotes/Comments	Result in less water diverted from the Russian River and less pollutant load to the San Francisco Bay

Sonoma Valley Recycled Water Project (SVRWP)

This project will provide a reliable recycled water distribution system serving urban and agricultural water users in the Sonoma Valley. The Sonoma Valley County Sanitation District will treat the recycled water and convey it northward to potential agricultural users. The SCRWP consist of the construction, operation and maintenance of recycled water pipelines, capacity and operational storage reservoirs; utilization of two abandoned City of Sonoma steel water storage tanks; booster pump stations distribution pumps and other appurtenances. The benefits of the project include offset of existing potable water use in the Valley of the Moon Water District and the City of Sonoma service areas, a potential decrease in agricultural groundwater use, and reduction in pollutant loading into surface waters of Sonoma Creek and San Pablo Bay from the wastewater treatment facility.

Agency Sponsor Project Title	Sonoma County Water Agency Sonoma Valley Recycled Water Project
Project Location	Sonoma County
Project Description • Project Process • Amount Delivered • Market Use • Offset to Potable • Offset to Imported Water	 • Recycled Water Treatment, storage and distribution • NA • Agricultural irrigation • NA
Project Schedule Milestones	Proposed
Project Costs	• $33 M
Footnotes/Comments	

Phase II Recycled Water Program – City of Petaluma

As proposed, this project includes a recycled water storage reservoir and distribution system to provide 170 MG per year of tertiary-treated recycled water for irrigation at an estimated 28 sites including City parks, schools, and landscapes. The project would augment the water supply and provide supply reliability. The pollutant loading to the Petaluma River and the San Pablo Bay would be reduced in proportion to the quantity of tertiary-treated water used for irrigation.

Agency Sponsor Project Title	City of Petaluma Phase II Recycled Water Program
Project Location	Petaluma and Sonoma County
Project Description • Project Process • Amount Delivered • Market Use • Offset to Potable • Offset to Imported Water	 • Recycled Water storage reservoir and distribution • 170 million gallons per year • Landscape irrigation at City facilities • 170 million gallons per year of Russian River
Project Schedule Milestones	Planning completed; need to undertake CEQA, design and construction
Project Costs	• $8 M
Footnotes/Comments	

Recycled Water Conveyance Pipeline

This project will be constructed in conjunction with the Novato Sanitary District treatment plant upgrades. It includes a pipeline to convey partially treated wastewater from the Ignacio treatment plant to the Novato treatment plant for full treatment. The recycled water will then be used to offset potable supplies at the Ignacio facility. The project will result in a reduction in pollutant loading into the San Francisco Bay.

Agency Sponsor Project Title	Novato Sanitary District Recycled Water Conveyance Pipeline
Project Location	Novato CA
Project Description • Project Process • Amount Delivered • Market Use • Offset to Potable • Offset to Imported Water	 • Recycled Water Pipeline • NA • Industrial wash down and cooling • NA
Project Schedule Milestones	CEQA completed and Design completed
Project Costs	• $2 M
Footnotes/Comments	North Marin Water District is a partner in this project

Mirant Cooling Recycled Water Project

The Mirant Cooling Recycled Water Project is sponsored by the Delta Diablo Sanitation District as a water supply augmentation project. DDSD, located in Antioch, is the recycled water producer. DDSD currently supplies approximately 7MGD of recycled water to reuse sites in the City of Pittsburg, including 6MGD of industrial process water to the Calpine power plant. The Mirant Power Plant Plants currently utilize cooling water from the Sacramento-San Joaquin Delta. The project would replace some or all of the Delta drawn water with recycled water for industrial cooling and other process uses.

DDSD and Mirant have identified an additional 12MGD of potential demand for industrial process water at the Mirant Pittsburg/Antioch power plant(s). The project is currently in the beginning stages of feasibility determination, and involves the addition of treatment facilities and distribution lines.

Agency Sponsor	Delta Diablo Sanitation District
Project Title	Mirant Cooling Recycled Water Project
Project Location	Antioch and Pittsburg
Project Description • Project Process • Amount Delivered • Market Use • Offset to Potable • Offset to Imported Water	 • Disinfected Tertiary Treatment • 12MGD • Industrial Process • 12MGD
Project Schedule Milestones	Planning start: June 2006 Environmental review: January 2007 Design: June 2007 Construction: February 2008
Project Costs	$150 M
Footnotes/Comments	

2.9 Priority Tier 3 Recycled Water Projects

Priority Tier 3 Water Recycling Projects will take longer to develop for a variety of reasons: they may depend on the implementation of the near-term projects from a market or infrastructure development standpoint; they projects may be more costly in unit price and therefore should be delayed until the demand for non-potable water increases; or they are still in a pre-feasibility planning stage in which there are project unknowns and potential constraints exist. Nevertheless, the long-term water recycling projects have the potential to deliver 44 to 47 mgd (49,795 to 52,136 AFY) of non-potable water to the San Francisco Bay Region, offsetting potable water and providing for environmental enhancements.

Priority Tier 3 Projects				
Project Title	Type	Location	Primary Objectives	Other Benefits
Martinez Zone Landscape Irrigation Project	Recycled Water	East Bay Martinez	Water supply reliability Landscape irrigation	SF Bay water quality
North Concord Zone Landscape Irrigation	Recycled Water	East Bay Concord	Water supply reliability Landscape irrigation	SF Bay water quality
Tesoro Refinery Recycled Water Project	Recycled Water	East Bay Martinez	Water supply reliability Industrial water cooling	SF Bay water quality Economic sustainability
Industrial Recycled Water Project	Recycled Water	East Bay, Martinez	Water supply reliability Industrial water cooling	SF Bay water quality Economic sustainability
Walnut Creek Zone Landscape Irrigation	Recycled Water	East Bay Walnut Creek	Water supply reliability Landscape irrigation	SF Bay water quality
ACWD-USD Recycled Water Feasibility Study Project, Phase I	Recycled Water	East Bay	Water supply reliability	SF Bay water quality Landscape irrigation
Burlingame Recycled Water Project	Recycled Water	West Bay	Water supply Landscape irrigation	SF Bay water quality
Coastside County Water District Recycled Water Project	Recycled Water	Coastside Half Moon Bay	Water supply reliability	Pollution reduction to Pacific Ocean in Monterey Bay Marine Sanctuary
Palo Alto Regional Water Recycling Project	Recycled Water	Peninsula/ South Bay Palo Alto	Water supply reliability	SF Bay water quality Landscape irrigation Economic Sustainability
SSF/San Bruno Recycled Water Feasibility Study	Recycled Water	Peninsula	Water supply reliability	SF Bay water quality Landscape irrigation Economic Sustainability
Stanford University Local Recycled Water Projects	Recycled Water	South Bay	Water supply reliability	SF Bay water quality Landscape irrigation Economic Sustainability
Sunnyvale Recycled Water Project	Recycled Water	South Bay	Water supply reliability	SF Bay water quality \ Landscape irrigation Economic Sustainability
Santa Clara Civic Center Schools	Recycled Water	South Bay	Water supply reliability	Landscape irrigation
Santa Clara High Tech A	Recycled Water	South Bay	Water supply reliability	Landscape irrigation
Santa Clara High Tech B	Recycled Water	South Bay	Water supply reliability	Landscape irrigation

Priority Tier 3 Projects				
Eastern Alignment	Recycled Water	South Bay	Water supply reliability	Landscape irrigation
San Jose Milpitas Connector	Recycled Water	South Bay	Water supply reliability	Landscape irrigation
King Road/Ocala Ave Extension	Recycled Water	South Bay	Water supply reliability	Landscape irrigation
Coyote Valley Extension and Distribution System	Recycled Water	South Bay	Water supply reliability	Landscape irrigation
Coyote Valley Advanced Treatment System	Recycled Water	South Bay	Water Supply reliability	Landscape irrigation Dual plumbing and industrial
Lamorinda/Satellite Recycled Water Project	Recycled Water	East Bay	Water supply reliability	Landscape irrigation

The following sections provide an overview of each of the Priority Tier 3 Projects.

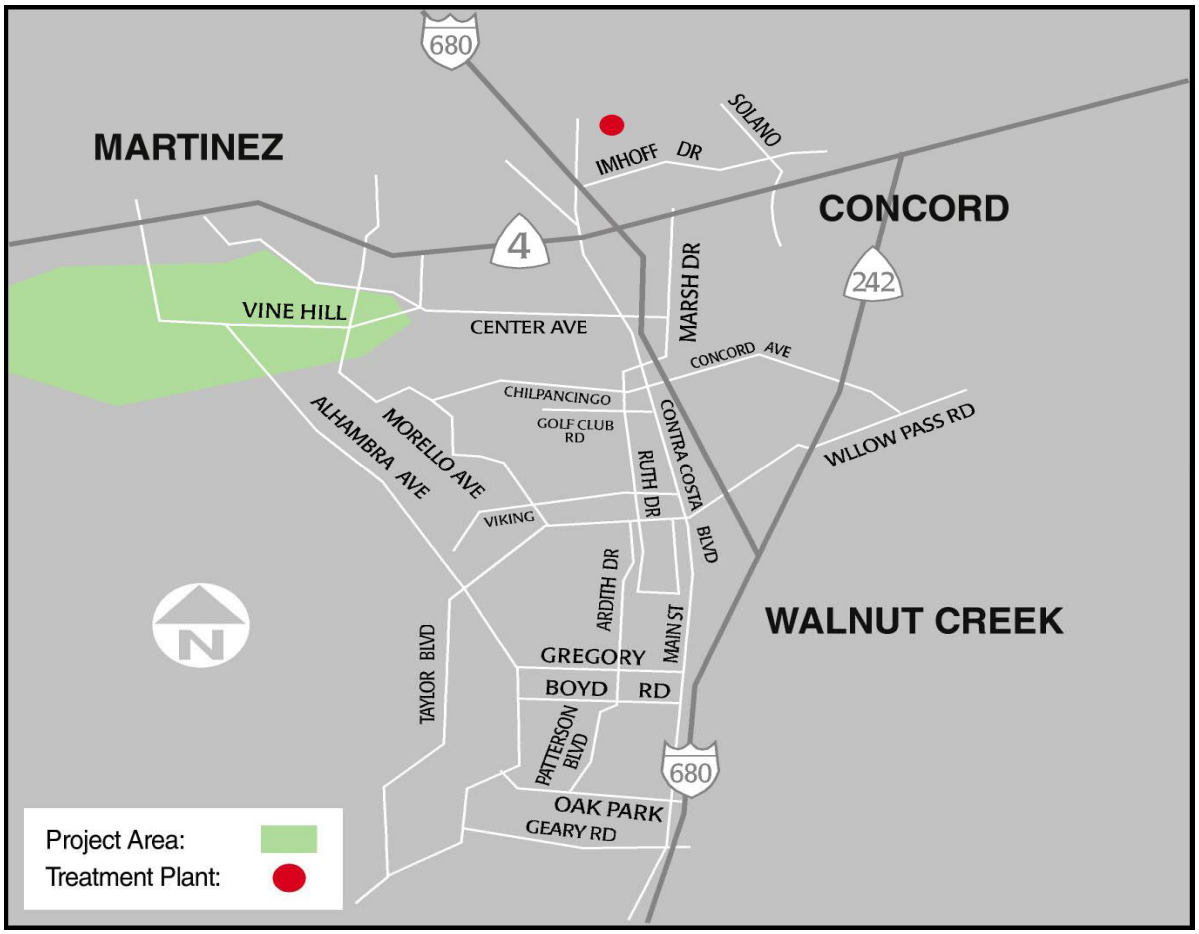
CCCSD Recycled Water Projects

CCCSD has identified a number of recycled water opportunities including urban landscape irrigation projects and industrial reuse projects that could significantly expand recycled water use within the CCCSD service area. These projects are described below and would be sponsored by CCCSD and the local potable water purveyor as water supply augmentation projects and surface water quality projects to reduce the mass loading into the San Francisco Bay.

Martinez Zone Landscape Irrigation Project

This project would provide recycled water to landscape irrigation customers in the Martinez area south of Highway 4. A new recycled water transmission pipeline would be constructed into this zone and approximately 5 large irrigation sites would be converted to recycled water. CCCSD would purvey recycled water via a project specific agreement with the City of Martinez, the local water purveyor in this zone.

Agency Sponsor Project Title	CCCSD/City of Martinez Martinez Zone
Project Location	Martinez – South of Highway 4
Project Description • Project Process • Amount Delivered • Market Use • Offset to Potable • Offset to Imported Water	 • Disinfected tertiary recycled water • 185 AFY • Landscape irrigation • 185 AFY
Project Schedule Milestones	This project is master planned, but not currently scheduled since funding not available.
Project Costs	$5 M
Footnotes/Comments	

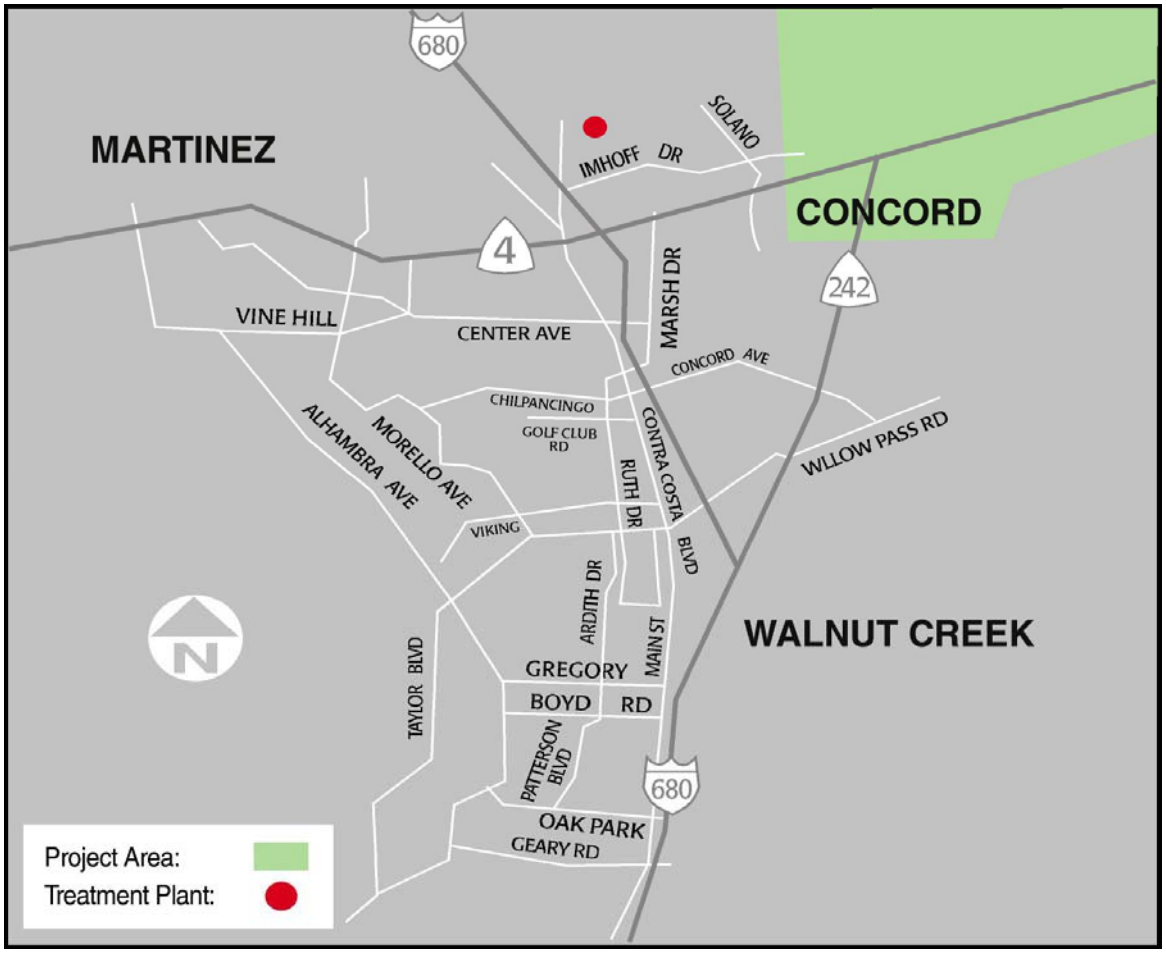


North Concord Zone Irrigation Project

This project would provide recycled water to landscape irrigation customers in the north Concord area. CCCSD's existing recycled water backbone pipeline serving the Pleasant Hill Zone would be extended into this new zone and approximately 10 sites would be converted to recycled water. CCCSD would purvey recycled water via a project specific agreement with CCWD, the local water purveyor.

Recycled water demands for the North Concord Project may increase significantly due to new demand expected from planned development of the old Concord Naval Weapons Station property. Recycled water demands and project costs will be revised if necessary following completion of the City of Concord's General Plan for development of this property.

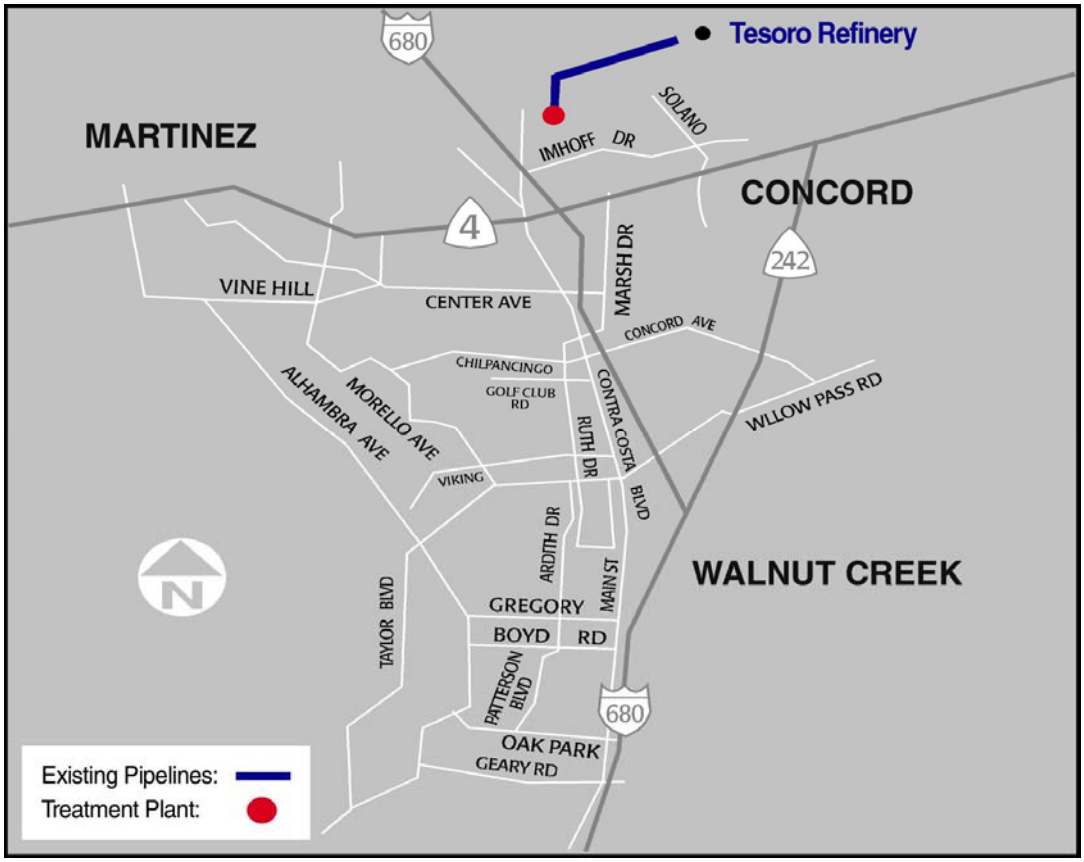
Agency Sponsor Project Title	CCCSD/CCWD North Concord Zone
Project Location	North Concord
Project Description • Project Process • Amount Delivered • Market Use • Offset to Potable • Offset to Imported Water	 • Disinfected tertiary recycled water • 1,000 AFY • Landscape irrigation • 1,000 AFY
Project Schedule Milestones	This project is master planned, but not currently scheduled since funding not available.
Project Costs	$5 M
Footnotes/Comments	



Tesoro Refinery Recycled Water Project

This project would provide recycled water to the Tesoro refinery in Martinez for process cooling water. Recycled water would be transported to the refinery from CCCSD's treatment plant in an existing 20-inch recycled water pipeline owned by CCWD. To meet refinery water quality requirements, ammonia removal equipment would be installed at the CCCSD filter plant as part of this project. CCCSD would purvey recycled water via a project specific agreement with CCWD. A cooperative agreement for CCCSD to use the CCWD recycled water pipeline would also be required.

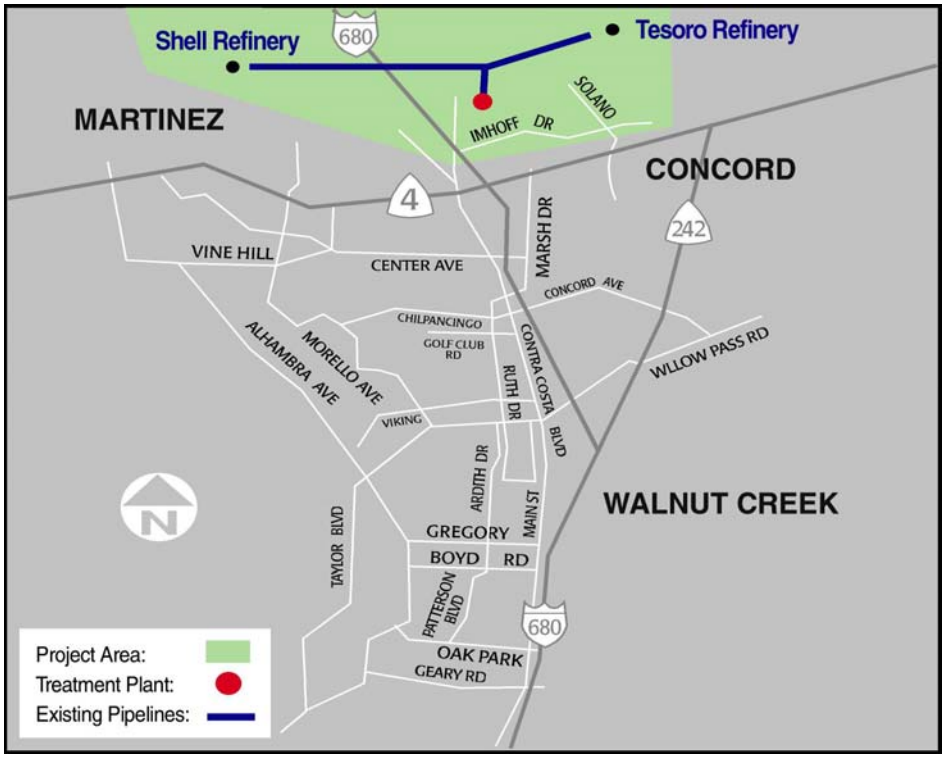
Agency Sponsor Project Title	CCCSD/CCWD Tesoro Refinery
Project Location	Tesoro Refinery, Martinez
Project Description • Project Process • Amount Delivered • Market Use • Offset to Potable • Offset to Imported Water	 • Disinfected tertiary recycled water with ammonia removal • 9,000 AFY • Industrial cooling water • 9,000 AFY
Project Schedule Milestones	This project is master planned, but not currently scheduled since funding not available.
Project Costs	$10 M
Footnotes/Comments	



Industrial Recycled Water Project

This project would expand CCCSD's industrial recycled water program to provide recycled water to the Shell refinery and other industries in the Martinez area for cooling water and boiler feedwater. Recycled water use at the Tesoro refinery would also be increased. Recycled water would be delivered to the Shell refinery in an existing 24-inch recycled water pipeline and to Tesoro in the existing 20-inch recycled water pipeline (both pipelines are owned by CCWD). New distribution pipelines would be constructed to other industries served by this project. To meet industrial water quality requirements, ammonia removal equipment would be installed at the CCCSD filter plant as part of this project. CCCSD would purvey recycled water via a project specific agreement with CCWD. A cooperative agreement for CCCSD to use the CCWD recycled water pipelines would also be required.

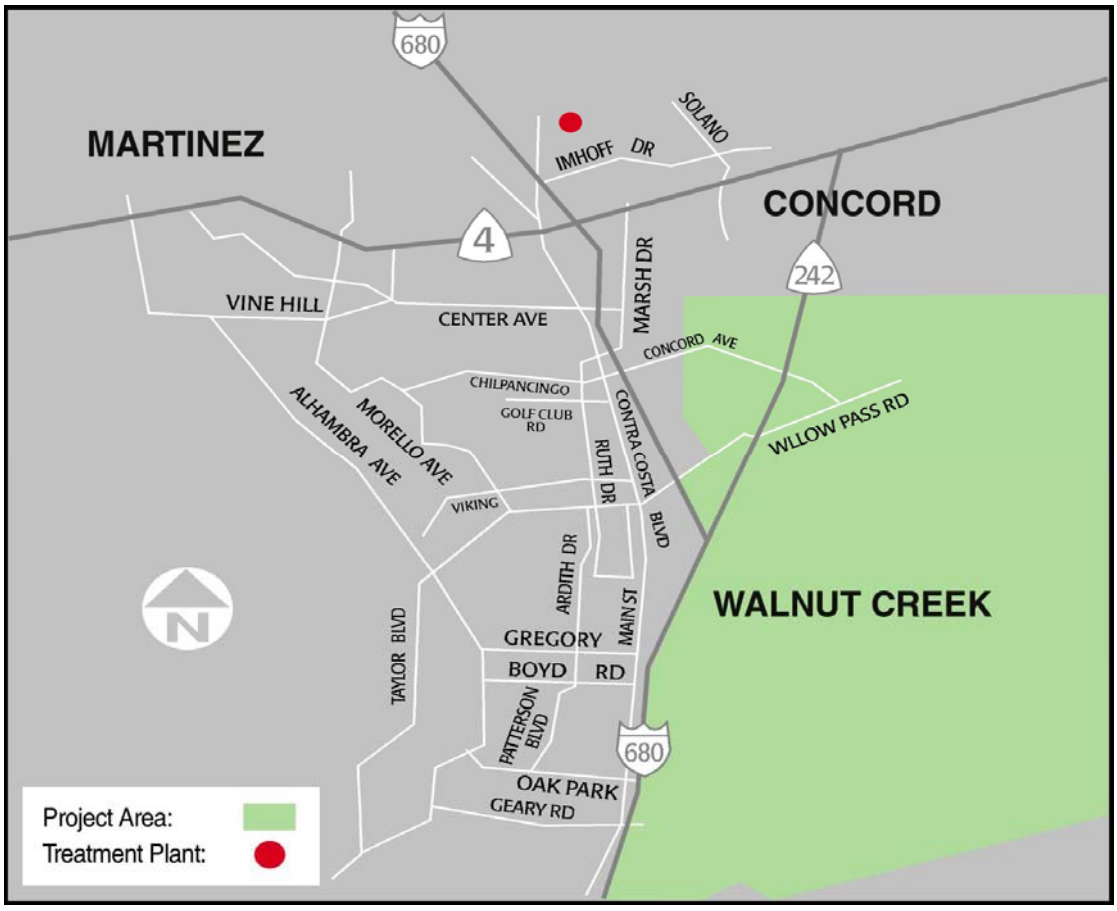
Agency Sponsor Project Title	CCCSD/CCWD Industrial – Full scale
Project Location	Shell Refinery and other heavy industry in Martinez Area
Project Description • Project Process • Amount Delivered • Market Use • Offset to Potable • Offset to Imported Water	 • Disinfected tertiary recycled water with ammonia removal • 17,600 AFY • Industrial Use: boiler feed water and cooling water • 17,600 AFY
Project Schedule Milestones	This project is master planned, but not currently scheduled since funding not available.
Project Costs	$35M
Footnotes/Comments	



Walnut Creek Zone

This project would provide recycled water to landscape irrigation customers in the Walnut Creek and south Concord areas. CCCSD's existing recycled water backbone pipeline serving the Pleasant Hill Zone would be extended into this new zone and approximately 55 sites would be converted to recycled water. CCCSD would purvey recycled water via a project specific agreement with CCWD, the local water purveyor.

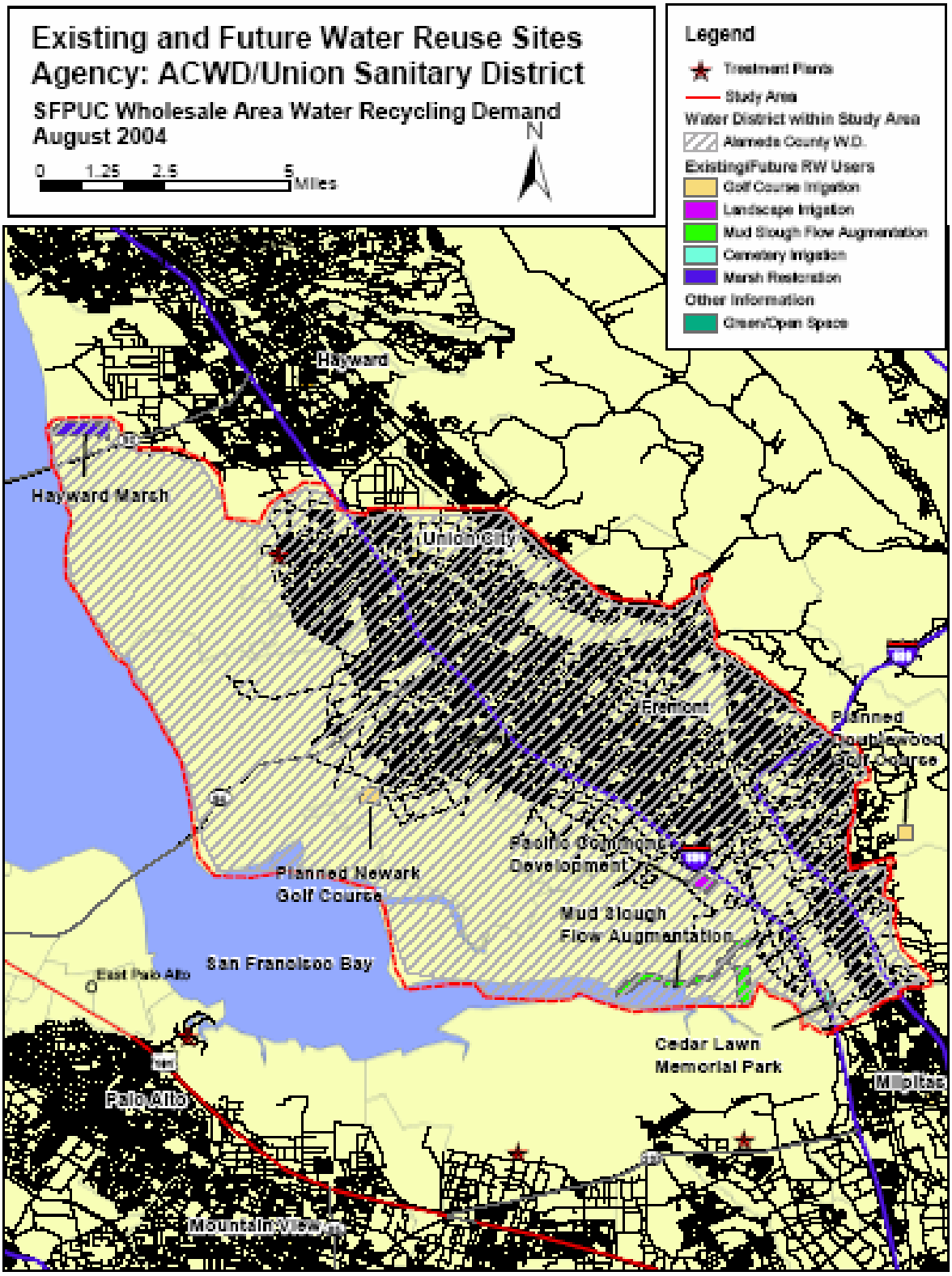
Agency Sponsor Project Title	CCCSD/CCWD Walnut Creek Zone
Project Location	North/Central Walnut Creek and South Concord
Project Description • Project Process • Amount Delivered • Market Use • Offset to Potable • Offset to Imported Water	 • Disinfected tertiary recycled water • 2,000 AFY • Landscape irrigation • 2,000 AFY
Project Schedule Milestones	This project is master planned, but not currently scheduled since funding not available.
Project Costs	$20M
Footnotes/Comments	



ACWD-USD Recycled Water Feasibility Study Project, Phase 1

Alameda County Water District (ACWD) in partnership with Union Sanitary District (USD) is actively investigating opportunities for recycled water production and use in its service area. This project will construct a recycled water satellite treatment plant at Irvington wastewater Pump Station. Recycled water will be treated to Title 22 standards. Customers will be located in southern and southwestern sections of ACWD's 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.

Agency Sponsor Project Title	Alameda County Water District and Union Sanitary District ACWD-USD Recycled Water Feasibility Study Project, Phase 1
Project Location	City of Fremont, City of Newark
Project Description • Project Process • Amount Delivered • Market Use • Offset to Potable • Offset to Imported Water	 • Disinfected Tertiary Treatment • 1.4 mgd (average annual yield) • Irrigation d. Golf Courses e. Cemetery f. Commercial Landscaping • 1.4 mgd • NA
Project Schedule Milestones	None at this time
Project Costs	$30 M Capital/$400,000 Annual O&M
Footnotes/Comments	Additional flows may serve Mud Slough for flow augmentation. SFPUC Wholesale Customer Recycled Water Potential Technical Memo, December 2004



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

Burlingame Recycled Water Project

The City of Burlingame currently generates 0.25 mgd (275 AFY) of recycled water for internal use at the City's wastewater treatment plant for equipment washdown and cleaning. The City is considering expanding recycled water production to a total of 0.5 mgd (560 AFY) for irrigation of park landscaping, and large landscaped areas in the Bay Front areas. The City's wastewater treatment plant would be upgraded to produce tertiary-level recycled water.

Agency Sponsor	City of Burlingame
Project Title	Burlingame Recycled Water Project
Project Location	City of Burlingame
Project Description • Project Process • Amount Delivered • Market Use • Offset to Potable • Offset to Imported Water	 • Disinfected Tertiary Treatment • 0.25 mgd (average annual yield) • Irrigation g. Commercial Landscaping h. Parks • 0.25 mgd • 0.25 mgd
Project Schedule Milestones	Feasibility study for conceptual planning and design of plant, storage, and distribution connections to meet demands is scheduled to begin in 2007.
Project Costs	$5-7 M Capital/$300-400 K Annual O&M
Footnotes/Comments	Currently, nearly 0.25 mgd of secondary recycled water is used for in-plant uses including equipment wash down and general facility uses at the Burlingame Wastewater Treatment Plant. • SFPUC Wholesale Customer Recycled Water Potential Technical Memo, December 2004 • Bay Area Water Quality and Supply Reliability Program, May 2005 • SFPUC Water Supply Option #4 (Spring, 2006)

Coastside County Water District Recycled Water Project

The Coastside County Water District has established the feasibility of supplying recycled water from the Sewer Authority Mid-Coastside Wastewater Treatment Facility for irrigation in the Half Moon bay area. This project would provide up to 0.52 mgd (580 AFY) of recycled water supply for irrigation uses at two golf courses in Ocean Colony and the Skylawn Memorial Park Cemetery.

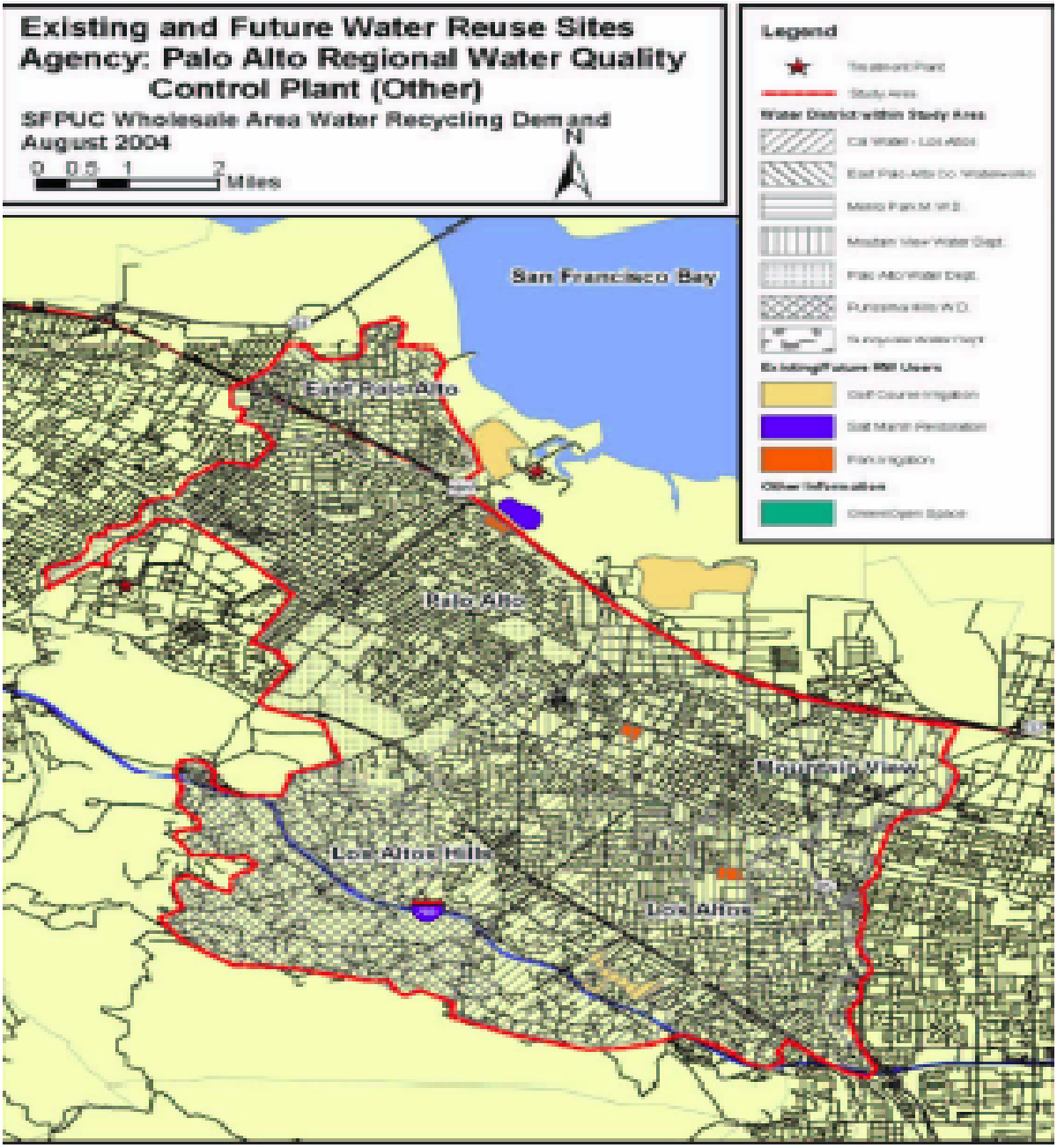
Agency Sponsor	Coastside County Water District (Half Moon Bay)
Project Title	Coastside County Water District Recycled Water Project
Project Location	Half Moon Bay and San Mateo
Project Description • Project Process • Amount Delivered • Market Use • Offset to Potable • Offset to Imported Water	 • Disinfected Tertiary Treatment • 0.5 mgd (Average Annual Yield) • Irrigation i. Golf Course j. Cemetery • 0.5 mgd • NA
Project Schedule Milestones	Water Reclamation Program, Preliminary Economic Feasibility Study, August 2003
Project Costs	$10.8 M Capital/$410 K Annual O&M
Footnotes/Comments	Project requires partnership between Sewer Authority Mid-Coastside Wastewater Treatment Plant and the Coastside County Water District. • SFPUC Wholesale Customer Recycled Water Potential Technical Memo, December 2004 • Bay Area Water Quality and Supply Reliability Program, May 2005 • SFPUC Water Supply Option #4 (Spring, 2006)


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
N
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
Skylawn Memorial Park Cemetery
Half Moon Bay
Pacific Ocean
Ocean Colony Golf Course

Palo Alto Regional Water Recycling Project

The Palo Alto Regional Water Recycling Project entails the production of 0.56-2.65 mgd of recycled water at the Palo Alto Regional Water Quality Control Plant. The tertiary-level recycled water would be distributed for irrigation and commercial/industrial uses. Potential partners for this project include the City of Palo Alto, City of East Palo Alto, Stanford University, the City of Mountain View, and the City of Los Altos/Los Altos Hills.

Agency Sponsor Project Title	Palo Alto Regional Water Quality Control Plant Palo Alto Regional Water Recycling Project
Project Location	City of Palo Alto, City of East Palo Alto, City of Los Altos/Los Altos Hills, City of Mountain View, and Stanford University
Project Description • Project Process • Amount Delivered • Market Use • Offset to Potable • Offset to Imported Water	 • Disinfected Tertiary • 0.56-2.65 mgd (average annual yield) • Irrigation • Golf Course • Parks and Medians • Commercial Landscaping • Commercial/Industrial Use • 0.56-2.65 mgd • NA
Project Schedule Milestones	• Water Reclamation Master Plan for Palo Alto RWQCP, April 1992 • Mountain View-Mofett Recycled Water Facility Plan, April 2004 • North Bayshore Main Water Recycling and Los Altos Extension Water Recycling Facility Studies, began in 2004
Project Costs	$8-32 M Capital (1992 dollars)
Footnotes/Comments	• SFPUC Wholesale Customer Recycled Water Potential Technical Memo, December 2004 • Bay Area Water Quality and Supply Reliability Program, May 2005 • SFPUC Water Supply Option #4 (Spring, 2006)


Existing and Future Water Reuse Sites
Agency: Palo Alto Regional Water Quality Control Plant (Other)
SFPUC Wholesale Area Water Recycling Demand
August 2004
0 0.5 1 2 Miles
N
Legend
San Francisco Bay
East Palo Alto
Palo Alto
Mountain View
Los Altos Hills
Los Altos

SSF/San Bruno Recycled Water Feasibility Study

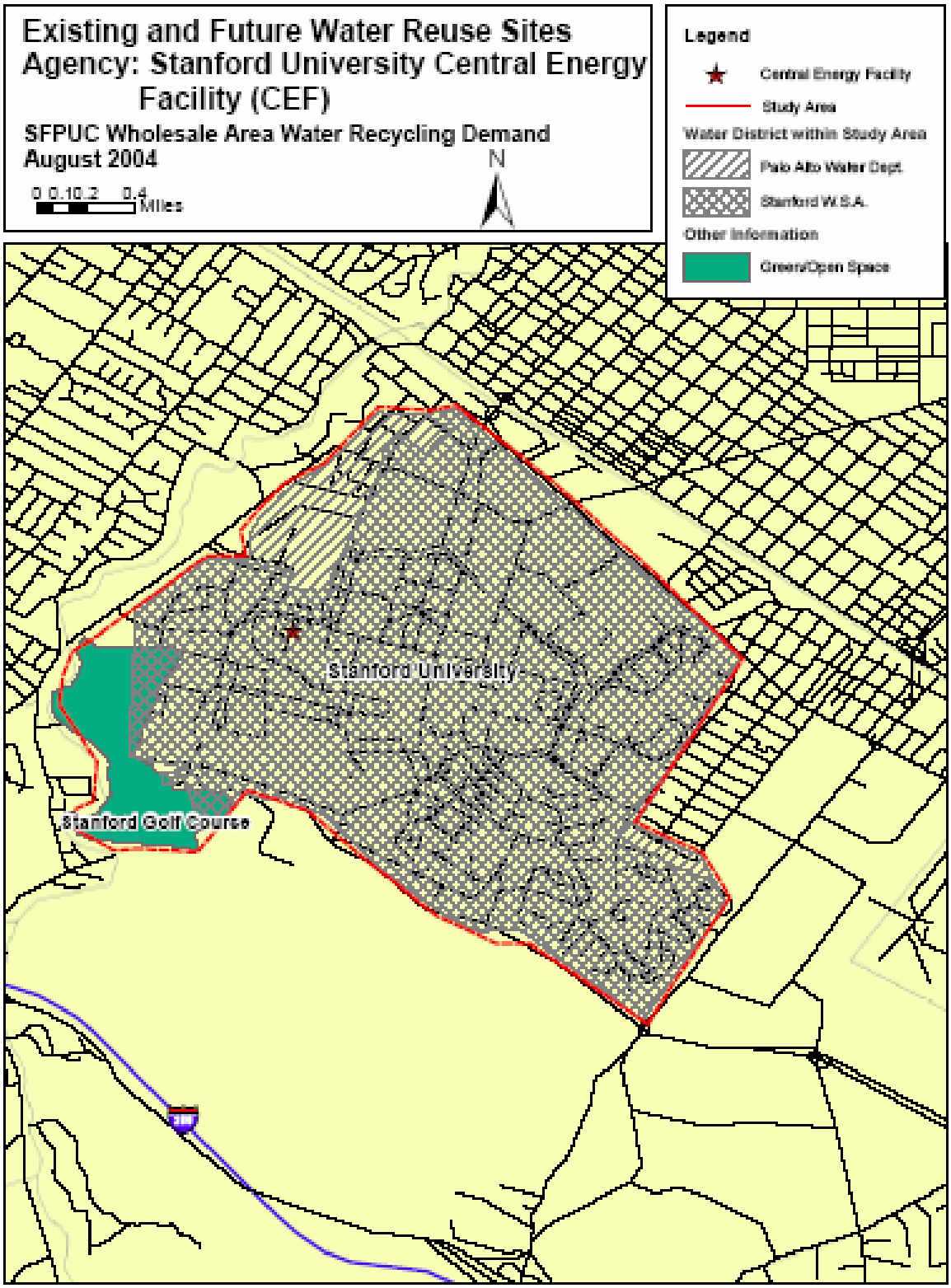
The cities of South San Francisco and San Bruno, SFPUC, and the California Water Service Company are exploring the feasibility of using recycled water as an additional and independent water resource. The purpose of the feasibility study is to identify potential recycled water users in the Northeastern portion of San Mateo County and determine whether the implementation of a recycled water treatment and distribution system is viable. The implementation of a recycled water system will lessen the demands on the SFPUC's regional water system and reduce groundwater pumping in the South Westside Basin aquifer, thereby freeing up groundwater for potable use.

Agency Sponsor Project Title	Cities of South San Francisco and San Bruno SSF/San Bruno Recycled Water Feasibility Study
Project Location	SSF/San Bruno Treatment Plant
Project Description • Project Process • Amount Delivered • Market Use • Offset to Potable • Offset to Imported Water	 • Disinfected Tertiary Treatment • NA • NA • NA • NA
Project Schedule Milestones	None at this time
Project Costs	Unknown
Footnotes/Comments	This project proposes upgrading the South San Francisco/San Bruno Wastewater Treatment Plant to tertiary treatment level and construction of a recycled water distribution system. • SFPUC Wholesale Customer Recycled Water Potential Technical Memo, December 2004

Stanford University Local Recycled Water Projects

The main source of domestic water at Stanford University is from SFPUC system. In addition, Stanford has five operating groundwater wells for domestic emergency back-up use. Stanford's Central Energy Facility (CEF) that generates power, steam, and chilled water for the campus and Stanford hospitals and clinics is one of the campus' large domestic users. The CEF cooling towers discharge blowdown water that could be captured, treated, and reused. This project concept proposes to utilize the cooling tower blowdown wastewater, rather than discharging it directly to the sanitary sewer.

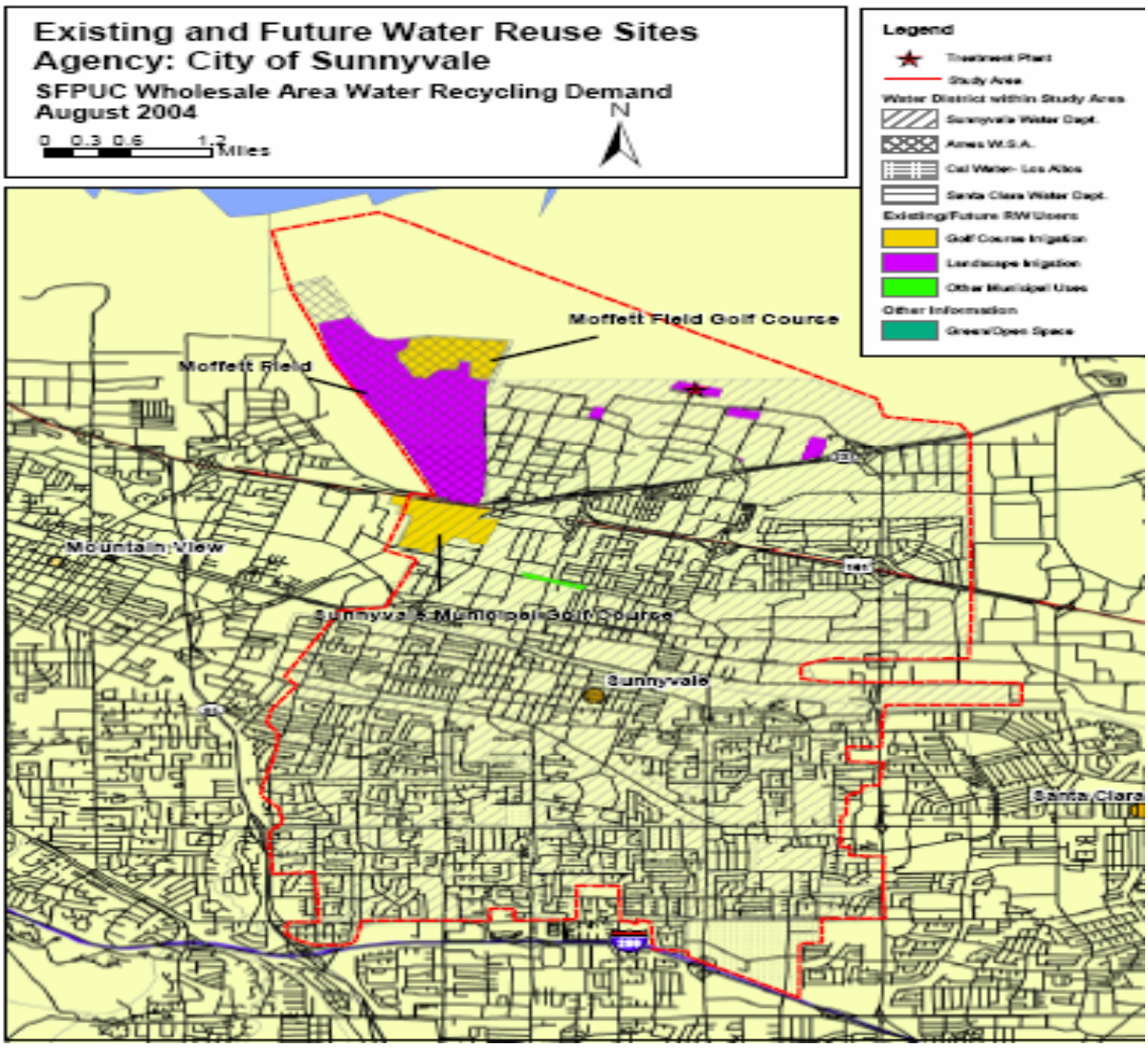
Agency Sponsor Project Title	Stanford University Stanford University Local Recycled Water Projects
Project Location	Stanford University
Project Description • Project Process • Amount Delivered • Market Use • Offset to Potable • Offset to Imported Water	 • Disinfected Tertiary Treatment • 0.05 mgd (average annual yield) • Irrigation • 0-0.05 mgd • NA
Project Schedule Milestones	• None at this time
Project Costs	To be determined (unknown at this time)
Footnotes/Comments	• SFPUC Wholesale Customer Recycled Water Potential Technical Memo, December 2004 • Bay Area Water Quality and Supply Reliability Program, May 2005 • SFPUC Water Supply Option #4 (Spring, 2006)


Existing and Future Water Reuse Sites
Agency: Stanford University Central Energy Facility (CEF)
SFPUC Wholesale Area Water Recycling Demand
August 2004
0 0.1 0.2 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
Stanford University
Stanford Golf Course

Sunnyvale Recycled Water Project

Current recycled water projects in Sunnyvale include irrigation of lawns, parks, and golf courses. In addition, a small amount of recycled water is used for in-plant purposes including process de-watering, heating, and cooling water for engines. The plant also utilizes recycled water for irrigation and washdown of process units for repair or maintenance. The City of Sunnyvale would like to expand recycled water use within the service area of Sunnyvale's Water Pollution Control Plant for irrigation and other purposes. This project would provide recycled water to potential users that are already connected to the recycled water system in the northern portion of the City.

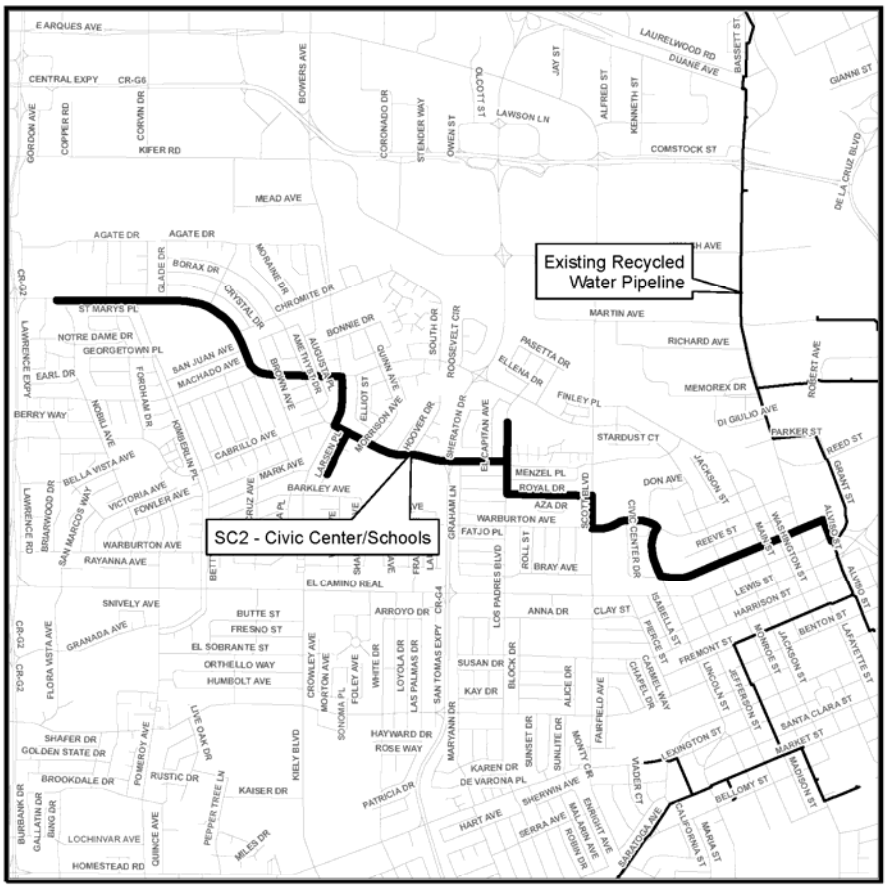
Agency Sponsor	City of Sunnyvale
Project Title	Sunnyvale Recycled Water Project
Project Location	City of Sunnyvale and Moffett Field Area
Project Description • Project Process • Amount Delivered • Market Use • Offset to Potable • Offset to Imported Water	 • Disinfected Tertiary Treatment • 1.48 mgd (average annual yield) • Irrigation • Sports Facilities • Golf Course • Parks and Medians • Commercial/Industrial Uses • Stream flow augmentation • 0.88 mgd • NA
Project Schedule Milestones	Distribution pipelines for some irrigation and commercial/industrial uses have been installed, but are currently not in use.
Project Costs	Unknown
Footnotes/Comments	SFPUC Wholesale Customer Recycled Water Potential Technical Memo, December 2004 Bay Area Water Quality and Supply Reliability Program, May 2005



Santa Clara Civic Center Schools

The Santa Clara Civic Center Schools Pipeline Extension will connect with the existing pipeline on Alviso Street near the intersection of El Camino Real Avenue and proceed west toward the Lawrence Expressway for a total extension length of 20,305 linear feet. This pipeline is included in the BARWRP Master Plan of 1999. When completed, the pipeline will provide recycled water to the civic center, schools and several parks in the area. The annual demand is estimated to be 218 AFY.

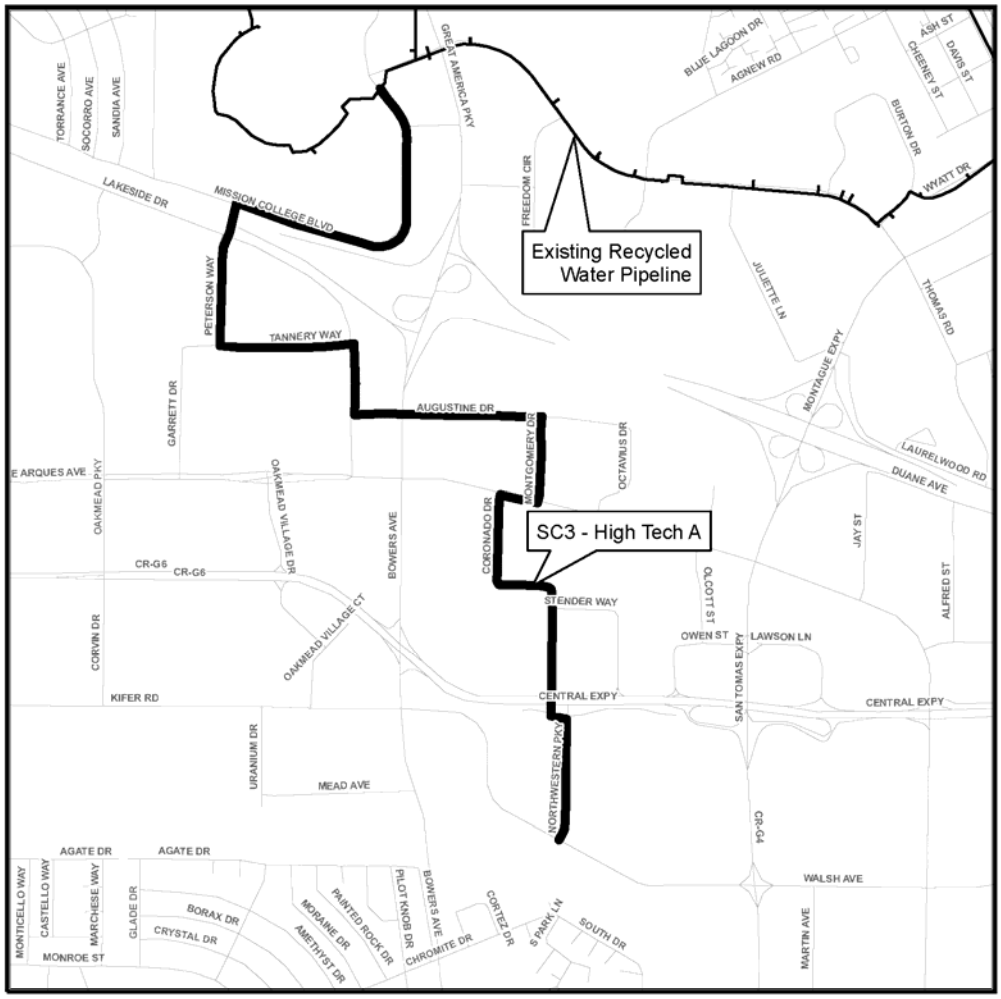
Agency Sponsor Project Title	SBWR Civic Center/Schools
Project Location	City of Santa Clara
Project Description • Project Process • Amount Delivered • Market Use • Offset to Potable • Offset to Imported Water	 • Recycled Water Pipeline • 0.2 mgd • Landscape irrigation • 0.2 mgd
Project Schedule Milestones	
Project Costs	$9,900,000
Footnotes/Comments	



Santa Clara High Tech A

The Santa Clara High Tech A Pipeline Extension will connect with the existing pipeline on Thomas Road near Great America Parkway and proceed south towards Walsh Avenue for a total extension length of 14,701 linear feet. This pipeline is included in the BARWRP Master Plan of 1999. When completed, the pipeline will provide recycled water to several commercial and industrial landscape sites in the area. Industrial cooling will also be provided where the need is identified. The annual demand is estimated to be 293 AFY.

Agency Sponsor Project Title	SBWR High Tech A
Project Location	City of Santa Clara
Project Description • Project Process • Amount Delivered • Market Use • Offset to Potable • Offset to Imported Water	 • Recycled Water Pipeline • 0.3 mgd • Landscape irrigation and industrial • 0.3 mgd
Project Schedule Milestones	
Project Costs	$7,300,000
Footnotes/Comments	



SC3 - High Tech A

South Bay Water Recycling Program
Environmental Services
City of San José

Source:
Recycled Water Pipelines -
City of San José Environmental Services
Street Centerlines -
City of San José Public Works

Map Date:
September 7, 2005

Map By:
City of San José
Environmental Services Department
Policy and Planning Program and
South Bay Water Recycling Program

ArcMap GIS Project Name:
SBWR Grants Map.mxd

Coordinate System Used:
California State Plane 0403 NAD83 Feet

4

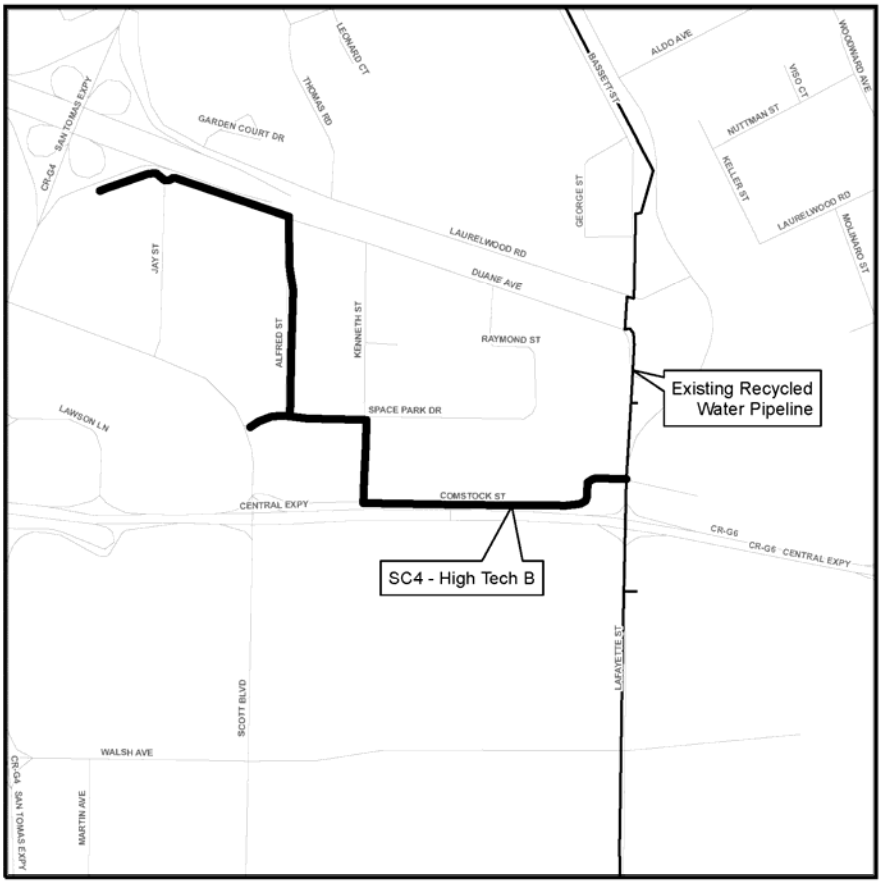
0 0.05 0.1 0.2 0.3 0.4
Miles

Map Legend
SC3 - High Tech A
Existing Recycled Water Pipeline
Roads

Santa Clara High Tech B

The Santa Clara High Tech B Pipeline Extension will connect with the existing pipeline on Lafayette Street near the intersection of Comstock Street and proceed west towards San Thomas Avenue for a total extension length of 6,318 linear feet. This pipeline is included in the BARWRP Master Plan of 1999. When completed, the pipeline will provide recycled water to several commercial and industrial landscape sites in the area. Industrial cooling will also be provided where the need is identified. The annual demand is estimated to be 117 AFY.

Agency Sponsor	SBWR
Project Title	High Tech B
Project Location	City of Santa Clara
Project Description • Project Process • Amount Delivered • Market Use • Offset to Potable • Offset to Imported Water	 • Recycled Water Pipeline • 0.1 mgd • Landscape irrigation and industrial • 0.1 mgd
Project Schedule Milestones	
Project Costs	$2,300,000
Footnotes/Comments	



SC4 - High Tech B

South Bay Water Recycling Program
Environmental Services
City of San José

4

0 0.04 0.08 0.16 0.24 0.32
Miles

Map Legend
SC4 - High Tech B
Existing Recycled Water Pipeline
Roads

Source:
Recycled Water Pipelines -
City of San José Environmental Services
Street Centerlines -
City of San José Public Works

Map Date:
September 7, 2005

Map By:
City of San José
Environmental Services Department
Policy and Planning Program and
South Bay Water Recycling Program

ArcMap GIS Project Name:
SBWR Grants Map.mxd

Coordinate System Used:
California State Plane 0403 NAD83 Feet

Eastern Alignment

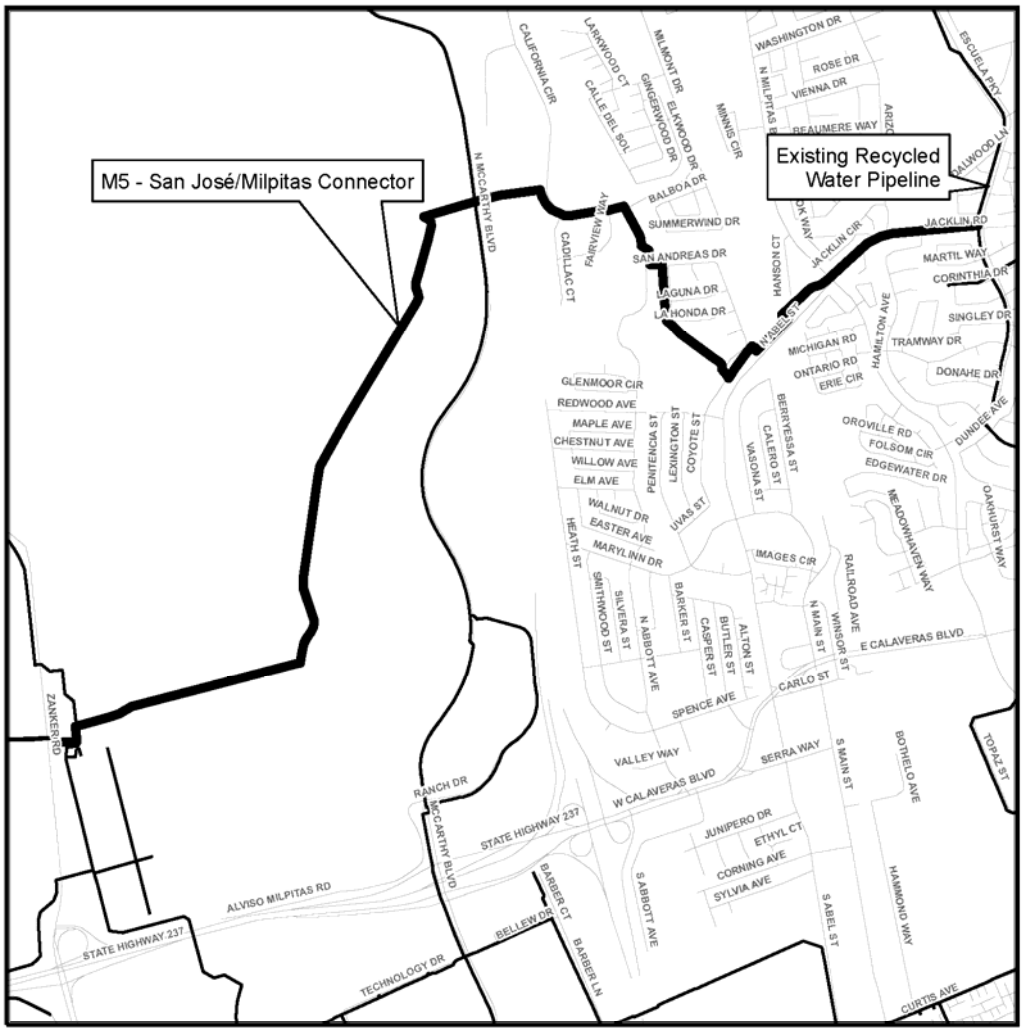
The Milpitas Eastern Alignment Pipeline will connect with the existing pipeline at the intersection of Hillview Drive and Yosemite Drive and proceed northeast towards Kennedy Drive for a total extension length of 11,886 linear feet. This pipeline is included in the BARWRP Master Plan of 1999. When completed, the pipeline will provide recycled water for the City of Milpitas Sports Center, multi-family residential land uses, schools, and several parks in the area. The annual demand is estimated to be 127 AFY.

Agency Sponsor Project Title	SBWR Eastern Alignment
Project Location	City of Milpitas
Project Description • Project Process • Amount Delivered • Market Use • Offset to Potable • Offset to Imported Water	 • Recycled Water Pipeline • 0.1 mgd • Landscape irrigation • 0.1 mgd
Project Schedule Milestones	
Project Costs	$16,700,000
Footnotes/Comments	

San Jose Milpitas Connector

The San José Milpitas Connector Pipeline Extension will connect with the existing pipeline at the intersection of Escuela Parkway and Jacklin Road and proceed southwest returning to Zanker Road for a total extension length of 19,196 linear feet. This pipeline is included in the BARWRP Master Plan of 1999. When completed, the pipeline will provide recycled water to orchards, schools, and several parks in the area. The annual demand is estimated to be 375 AFY.

Agency Sponsor Project Title	SBWR SJ/Milpitas Connector
Project Location	City of Milpitas
Project Description • Project Process • Amount Delivered • Market Use • Offset to Potable • Offset to Imported Water	 • Recycled Water Pipeline • 0.3 mgd • Landscape irrigation • 0.3 mgd
Project Schedule Milestones	
Project Costs	$16,500,000
Footnotes/Comments	



M5 - San José/Milpitas Connector

South Bay Water Recycling Program
Environmental Services
City of San José

Source:
Recycled Water Pipelines -
City of San José Environmental Services
Street Centerlines -
City of San José Public Works

Map Date:
September 7, 2005

Map By:
City of San José
Environmental Services Department
Policy and Planning Program and
South Bay Water Recycling Program

ArcMap GIS Project Name:
SBWR Grants Map.mxd

Coordinate System Used:
California State Plane 0403 NAD83 Feet

4

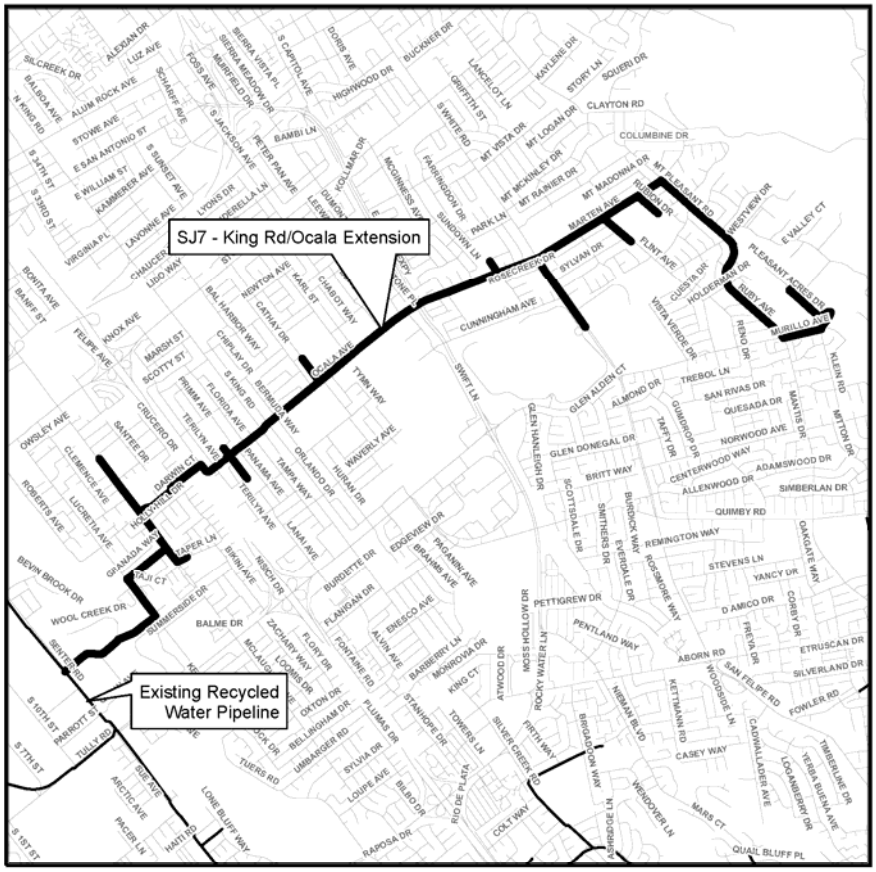
0 0.1 0.2 0.4 0.6 0.8
Miles

Map Legend
M5 - San José/Milpitas Connector
Existing Recycled Water Pipeline
Roads

King Road/Ocala Ave Extension

The King Rd/Ocala Extension will connect with the existing pipeline on Senter Road near the intersection of Wool Creek Drive and proceed west towards Mt. Pleasant Road for a total extension length of 42,487 linear feet. This pipeline is included in the BARWRP Master Plan of 1999. When completed, the pipeline will provide recycled water to schools and several parks in the area. The annual demand is estimated to be 953 AFY.

Agency Sponsor Project Title	SBWR King Road/Ocala Ave. Ext.
Project Location	City of San José
Project Description • Project Process • Amount Delivered • Market Use • Offset to Potable • Offset to Imported Water	 • Recycled Water Pipeline • 1.5 mgd • Landscape irrigation • 1.5 mgd
Project Schedule Milestones	
Project Costs	$123,300,000
Footnotes/Comments	



SJ7 - King Rd/Ocala Extension

South Bay Water Recycling Program
Environmental Services
City of San José

4

0 0.15 0.3 0.6 0.9 1.2
Miles

Map Legend
- SJ7 - King Rd/Ocala Extension
- Existing Recycled Water Pipeline
- Roads

Source
Recycled Water Pipelines - City of San José Environmental Services
Street Centerlines - City of San José Public Works

Map Date
September 7, 2005

Map By
City of San José
Environmental Services Department
Policy and Planning Program and
South Bay Water Recycling Program

ArcMap GIS Project Name
SBWR Grants Map.mxd

Coordinate System Used
California State Plane 0403 NAD83 Feet

Coyote Valley Extension and Distribution System

Significant new development is being planned in Coyote Valley. The proposed development would increase industrial, office, and R&D building space, and substantially increase residential development. The distribution system will provide recycled water for multi-family residential land uses, commercial buildings, dual plumbing, industrial uses and office parks in the area. This 122,000 linear foot distribution system is included in the BARWRP Master Plan of 1999. Recycled water storage and advanced treatment to support groundwater recharge is also being planned. The Coyote Valley Extension will connect with the Silver Creek Pipeline at Blanchard Road and proceed south. The annual demand is estimated to be 5,800 AFY.

Agency Sponsor Project Title	SBWR Coyote Valley Extension and Distribution System
Project Location	City of San José
Project Description • Project Process • Amount Delivered • Market Use • Offset to Potable • Offset to Imported Water	 • Recycled Water Pipeline, Storage • 5 mgd • Landscape irrigation, dual plumbing, and industrial • 5 mgd
Project Schedule Milestones	
Project Costs	$30,000,000
Footnotes/Comments	

Coyote Valley Advanced Treatment Systems

Recycled water advanced treatment is being planned in Coyote Valley. An advanced water treatment system is being considered to support groundwater recharge and storage. The annual supply augmentation is estimated to be 5,800 AFY.

Agency Sponsor Project Title	SBWR Coyote Valley Advanced Treatment System
Project Location	City of San José
Project Description • Project Process • Amount Delivered • Market Use • Offset to Potable • Offset to Imported Water	 • Recycled Water Advanced Treatment • 5 mgd • Landscape irrigation, dual plumbing, and industrial • 5 mgd
Project Schedule Milestones	
Project Costs	$60,000,000
Footnotes/Comments	

Lamorinda/Satellite Recycled Water Project

It could be feasible and cost-effective to implement and operate satellite recycled water facilities, and EBMUD will explore the potential to implement satellite facilities throughout EBMUD's water service area. One possibility is the Lamorinda/Satellite Recycled Water Project, which would be a joint effort between EBMUD and CCCSD. This project would provide recycled water through a satellite treatment facility to a potential new development in Moraga, California if the new development is approved. This conceptual project could potentially provide 0.2 mgd of recycled water to irrigate a proposed golf course that is part of the new development. The estimated capital cost of this project is $8M. New project facilities would include a satellite membrane bioreactor treatment facility, pipelines, pump stations and storage facilities. This project is currently scheduled to be implemented by 2016.

Agency Sponsor Project Title	EBMUD Lamorinda/Satellite Recycled Water Project
Project Location	Moraga
Project Description • Project Process • Amount Delivered • Market Use • Offset to Potable • Offset to Imported Water	 • Disinfected tertiary recycled water • 200,000 gpd • Landscape irrigation • 200,000 gpd
Project Schedule Milestones	This project is currently scheduled to be implemented by 2016
Project Costs	Estimated at $8 million
Footnotes/Comments	

3 Conclusion

The San Francisco Bay Region has a highly developed regional approach to wastewater and water recycling issues and projects which is intended to provide benefits across the region and the state. At the heart of this regional approach is broad-based protection of natural resources, including drinking water, surface waters, public health, and the aquatic life and wildlife of the region, all of which depend on these water resources. The quality of life and the sustainable economic vitality of the region are also dependent on water resources. The regional wastewater and water recycling goals are consistent with the goals and purpose of Proposition 50 and the CalFed program. The projects described in this Wastewater and Water Recycling Functional Area Document have been developed with these goals in mind and are essential to the maintenance of a sustainable, regional approach to integrated water resources management.

APPENDIX A
References - Clean Estuary Partnership Risk Reduction Project

References for CEP Risk Reduction

California Department of Health Services and San Francisco Estuary Institute. 2001. *Public Summary of the San Francisco Bay Seafood Consumption Study.* 13 pp. www.sfei.org.

Johnson, Bill and Richard Looker. 2004. *Mercury in San Francisco Bay: Total Maximum Daily Load (TMDL) Proposed Basin Plan Amendment and Staff Report.* April 30, 2004. 118 pp. + app. www.swrcb.ca.gov/rwqcb2

USEPA. 2003. *America's Children and the Environment: Measures of Contaminants, Body Burdens, and Illnesses.* EPA 240-R-03-001. February 2003. 181 pp.

http://www.epa.gov/envirohealth/children/report/index.htm

Water Board. 2002. California Regional Water Quality Control Board for the San Francisco Bay Region. Clean Water Act 303(d) List of Water Quality Limited Segments. Approved by USEPA July 2003. www.swrcb.ca.gov/rwqcb2

Water Board. 2004. *PCBs in San Francisco Bay: Total Maximum Daily Load Project Report.* January 8, 2004. 73 pp. www.swrcb.ca.gov/rwqcb2

Myers GJ, Davidson PW, Cox C, Shamlaye CF, Palumbo D, Cernichiari E, Sloane-Reeves J, Wilding GE, Kost J, Huang L-S, Clarkson TW. (2003). Prenatal methylmercury exposure from ocean fish consumption in the Seychelles child development study. Lancet 361: 1686-92.

Grandjean P, Weihe P, White RF, et al. Cognitive deficit in 7-year-old children with prenatal exposure to methylmercury. Neurotoxicol Teratol 1997; 19: 417-28.

Fan, A.M., Chang, L.W. (1991). Human Exposure and Biological Monitoring of Methylmercury and Selenium. In: Biological Monitoring of Exposure to Chemicals: Metals. Eds., Dillon, H.K. and Ho, M.H. John Wiley & Sons, New York.

Stern AH, Gochfeld M, Weisel C, Burger J. (2001). Mercury and methylmercury exposure in the New Jersey Pregnant Population. Archives of Env Health 56(1): 4-10.

Knobelach L, Anderson HA, Imm P, Peters D, Smith A. (2005). Fish consumption, advisory awareness, and hair mercury levels among women of childbearing age. Env Res 97: 220-227.

Frisch M, Schwartz BS. (2002). The pitfalls of hair analysis for toxicants in clinical practice: Three case reports. EHP 110(4): 433-436.

APPENDIX B
Draft List Questions and Issues for Multidisciplinary Panel

Step One: Specific Questions to be Addressed

To help the CEP understand who may be affected by pollutants in Bay fish, the associated health risks, and what type of health care might be available to them, the Technical Panel will be asked to address the following questions:

I. Better characterization of potentially affected persons and sub-populations

1. Based on the Seafood Consumption study and other available studies, who are the most affected subpopulations?

2. Is there additional analysis that can and should be undertaken to further understand these populations and their eating and fishing habits (e.g. what species of fish are being consumed)?

3. What would be the anticipated cost of such studies and what additional information would one expect to gain?

4. What cultural practices or language barriers need to be taken into consideration?

II. Characterization and Evaluation of Outreach Efforts

1. Given the cultural practices, language barriers and any other factors identified above, what types of outreach would be most appropriate and effective to reach the target community?

2. Has that type of outreach been undertaken in the Bay Area or elsewhere and how effective has it been? What lessons can be taken from those efforts?

3. What is the anticipated cost for such outreach?

4. What are some methods for evaluating the effectiveness of the outreach in the target population?

5. Is there additional analysis that can and should be undertaken to further evaluate the outreach and education in this area?

III. Overview of Health Risks Associated with Fish Consumption and Evaluation of Current Health Care Available to At Risk Population

1. What might some of the potential health impacts be with respect to fish consumption and contamination of mercury, PCBs and pesticides?

2. Can these potential health impacts be diagnosed and what types of treatment are currently available?

3. Where and how do the at risk subpopulations typically obtain health care services

4. Would the health care providers in these communities know what to look for in terms of signs of potential health impacts?

5. Would the health care providers know what steps to take in order to diagnose and treat those potential impacts?

6. Do the health care providers have the time and the resources necessary to take those steps?

7. What are the potential language-based, cultural, ethical and/or insurance-based constraints?

8. Is there additional analysis that can and should be undertaken to further evaluate the health care provision in this area?

Step Two. Identification and Evaluation of Potential Risk Reduction Options

To help the CEP evaluate the range of possible actions that can be taken to address risks to affected populations, the Technical Panel will be asked to develop a list of possible actions and then evaluate the feasibility, expected benefits/results, technical uncertainties, potential obstacles, and cost effectiveness of each. The Panel will also be asked to provide some guidance on how best to undertake those actions that seem to have the most promise in terms of expected benefits and cost effectiveness.

These actions will fall into at least 3 categories:

I. Actions designed to provide targeted outreach and education to at-risk communities, including evaluation of existing or proposed efforts

II. Working with and supporting health care providers

III. Actions to clarify, evaluate and address health risks and potential impacts

IV. actions that might address impacts to at risk individuals/communities

Some examples of the types of actions that should be considered and evaluated include:

I. Outreach and Education

1. Evaluation and characterization of existing educational postings: Where have signs been posted? In what languages? What is people's awareness and recollection of the signs? Of their message? Has it changed their fishing and consumption patterns?

2. Develop and evaluate educational messages that address specific consumption practices. There are clear differences among anglers in the species and parts of fish that they eat, and in how the fish are prepared or cooked. Educational messages should address these differences. For example, messages for Asians should focus on safer ways to prepare and eat fish and on limiting or eliminating white croaker consumption.

3. Development of outreach that could be conducted at time of getting license that would be effective such as requires license applicants to watch a brief video in their language.

II. Working with Health Care Providers

1. Conduct needs assessments/train-the-trainer workshops for health providers in affected communities regarding SF Bay fish consumption issues for at-risk communities.

2. Build capacity and provide technical assistance to local health departments, workers, and related CBOs to address fish-related issues, including improving access to any needed follow up care. Consider partnerships of dischargers, County health services agencies, laboratories, and community-based clinics.

III. Actions to Clarify, Evaluate and Address Health Risks and Potential Impacts

1. Screening of at-risk persons for habitual consumption of Bay fish (by interview), for exposure to pollutants of concern (e.g., by hair samples), and for neurological effects. It may be possible to begin to establish the means to perform routine screening in connection with perinatal, pediatric, and/or primary care.

2. Examination of dietary attitudes and options among at-risk consumers of Bay fish and evaluation of potential consumer acceptance of alternative food sources. This examination could be conducted by survey or focus group or both.

3. Examination of ways to reduce other pathways of exposure to environmental contaminants or mitigation of other factors linked to neurological and other health effects.

Step Three. Identification of a Recommended Package of Actions

Once the list of potential options has been identified and evaluated, the Technical Panel will be asked to address the question of how to best target available resources, and attract and obtain additional resources, to address the problem of subsistence consumption of Bay, in a way that will have an impact both in the short term and long term and that can be institutionalized over time.