

IRWMP Chapter on Wastewater and Water Recycling

V. Water Recycling in the San Francisco Bay Region

History of the Bay Area Regional Water Recycling Project

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 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 produced a Master Plan for Regional Water Recycling.

This Master Plan found:

- The major driving force 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 will 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 place on that system.
- There is a large potential market for recycled water, up to one million acre feet a year by 2040, 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 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 .

Authorization under Title XVI and the 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 BRWRP feasibility assessments.

The study area included five of the eight 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, the Santa Clara Valley Water District and the East Bay Municipal Utility District were participant in this truly regional approach to assessing the potential not only for water supply augment, 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 potential for the greatest 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 acceptances. The participating agencies worked through these issues via technical committees which included participation of non governmental stakeholders and with the support of expert consultants.

Water Recycling is an Essential Element of Regional Solution to Sustainable Water Resources Management

Regional water recycling is an essential component of integrated regional water resources management because water recycling project inherently embody the water supply reliability, the ecosystem protection and enhancement and the protection of surface water are elements which together are part of sustainable water resources management. Local projects which 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 the chapter, are necessary in the near term in order to

develop the infrastructure, the public acceptance and the backbone of a regional program. Local projects in many cases require cooperative service agreements between different public utilities and agencies. As these local project 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 also 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 told us that local and near term projects are catalysts for the expansion and enlargement of recycled water facilities 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.

North Bay Projects and Approaches to Water Recycling

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 and 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 development, 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:

- 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 locally recycling in the summer months, 36,500 af/yr. However some of this water is high in TDS due to Bay water infiltration into the sanitary sewer collection systems.
- There are three market types for this recycled water:
 1. Local Recycling: such as golf course and other landscape irrigation projects, commercial laundries, cooling towers and car washes. 12 mgd is already used for local recycling and the market could support and additional 3 mgd.
 2. Agricultural Irrigation: such as dairies, general agricultural pastures and vineyards. There is a potential for 35,000 af/yr of serviceable demand for recycled water in Sonoma Valley.

3. Napa-Sonoma Salt Marsh Restoration: this 8,000 acre salt marsh is located along the San Pablo Bay between the Napa River and the Sonoma Creek. This project is intended to restore the salt and bittern area of the Marsh for habitat and other benefits requiring the use of recycled water as dilution of the salt and bittern. The demand is currently estimated at 14 mgd or 15,700 af/yr
- The cost of recycled water ranges depending of the TSD in the source effluent and the use of the recycled water. The cost of recycled water could be offset by the value of increase the local potable supply (not dependent on the Delta) and the cost of replacement of agricultural supplies.

Consistent with the earlier BARWRP Feasibility study (which did not include Marin County and the North Bay), this report found that a regional project does not necessarily need to connect all areas that are participating, that smaller systems may be more cost-effective. The participating agencies have since chosen three alternatives to proceed into engineering and environmental feasibility:

- Local Reuse Alternative: would provide 11,300 acre-feet/year of recycled water and would prioritize the importance of recycled water projects local to each wastewater treatment plant. It would have three separate local systems: a Las Gallinas/Novato system, a Petaluma system, and a Napa/Sonoma system.
- Subregional Systems Alternative: would provide 18,300 acre-feet/year of recycled water. This alternative would have two subregional systems: Las Gallinas/Novato/Petaluma and Napa/Sonoma.
- Regional System Alternative: would provide 22,300 acre-feet/year of recycled water. This alternative would create one system that is fully interconnected between all participating wastewater treatment facilities and use areas.

The participating agencies are working to define pipeline layouts and hydraulics to enable them to complete the feasibility study and environmental documentation by 2008.

With the development of the San Francisco Region IRWMP, these two major regional approaches to water recycling are joined. Both the BARWRP and the NBWRP are individually and as part of this IRWMP, consistent with the goals and objectives of Proposition 50. These two Regional Studies examined the value of water recycling as a regional approach to protection of water resources and 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.

The projects which are included in this chapter provide clear local benefits and are the platform for the Regional benefits both now and in the long-term for the San Francisco Bay Region and California as a whole.

MAP OF THE REGION WILL BE HERE WITH DOTS WHERE THE WATER RECYCLING PROJECTS ARE LOCATED

San Francisco Bay Region Water Recycling Near Term Priority Projects		
Project Name	Project Sponsor	Project Yield
South Bay Advanced Recycled Water Treatment Facility Project	South Bay Water Recycling Project and Santa Clara Valley Water District (SCVWD)	5 mgd
Mountain View/Moffet Area Recycling Project	San Francisco PUC (SFPUC) and SCVWD	1.2 to 1.7 mgd
Redwood City Recycled Water Project	Redwood City	1.5 to 2.8 mgd
Pacifica Recycled Water Project	North Coast County Water District	171 AF/Y
Mocho Groundwater Demineralization Project	Zone 7	6.2 mgd
Phase 2 San Ramon Valley Recycled Water Program	DERWA	6,400 AF/Y
Satellite Recycled Water Treatment Plant Project	EBMUD and UC Berkeley	5 mgd
Bay Water Desalination Project	Marin Municipal Water District (MMWD)	10 mgd
Recycled Water Program for North Marin WD and Novato Sanitary District – Phase 1	Northern Marin Water District and Novato Sanitary District	0.5 mgd
Napa Salt Marsh Restoration Project	Sonoma County Water Agency (SCWA) and Napa Sanitation District (NSD), Napa Sonoma Marsh Restoration Project	3,000 AF/Y
City of Pittsburg Recycled Water Facilities Plan	Delta Diablo Sanitation District	615 AF/Y
Total Yield From Priority Near Term Projects		

San Francisco Bay Region Water Recycling Priority Tier 2 Projects		
Project Name	Project Sponsor	Project Yield
Pleasant Hill Zone 1	Central Contra Costa Sanitary District (CCCSD)	2.8 mgd
Westside Baseline and Harding Park/Lake Merced Projects	SFPUC	4.1 mgd
North San Jose Intensification Extension	SBWR	4 mgd
East Bayshore Recycled Water Project Phase 1B	EBMUD	2,800 AF/Y
Richmond Advanced Recycled Expansion (RARE) Water Project	EBMUD and Chevron	3,360 to 4,480 AF/Y
Rodeo Recycled Water Project	EBMUD and Conoco Phillips	2,240 AF/Y
San Leandro Water Reclamation Facility Expansion Project	EBMUD	30,000 gallons per day
Peacock Gap Recycled Water Extension	MMWD	

Sonoma Valley Recycled Water Project (SVRWP)	SCWA and SVRWP	
City of Petaluma's Phase II Recycled Water Program	City of Petaluma	170 mg/y
Recycled Water Conveyance Pipeline	Novato Sanitary District	
Total Yield for Tier 2 Projects		

San Francisco Bay Region Water Recycling Priority Tier 3 Projects		
Project Name	Project Sponsor	Project Yield
Martinez Zone Landscape Irrigation Project	CCCSD/City of Martinez	2.5 mgd
North Concord Zone Landscape Irrigation	CCCSD/CCWD	2.5 mgd
Tesoro Refinery Recycled Water Project	CCCSD/CCWD	8 mgd
Industrial Full Scale Recycled Water Project	CCCSD/CCWD	17,600 AF/Y
Walnut Creek Zone Landscape Irrigation	CCCSD/CCWD	3.8 mgd
ACWD-USD Recycled Water Feasibility Study Project Phase I	Alameda County Water District and Union Sanitary District	1.5 mgd
Burlingame Recycled Water Project	City of Burlingame	3.9 mgd
Coastside Water District Recycled Water Project	Coastside County Water District	0.5 mgd
Russell City Energy Center	City of Hayward	8.3 to 10.3 mgd
Millbrae Recycled Water Project	City of Millbrae	1 mgd
Regional Water Recycling	Palo Alto Regional Water Quality Control Plant	2.26 to 4.18 mgd
SSF/San Bruno Recycled Water Feasibility Study	Cities of South San Francisco and San Bruno	unknown
Stanford University Local Recycled Water Project	Stanford University	0.06 to 0.98 mgd
Sunnyvale Recycled Water	City of Sunnyvale	1.48 mgd
South Bay Water Recycling Civic Center Schools	SBWR	0.2 mgd
South Bay Water Recycling High Tech A	SBWR	0.3 mgd
South Bay Water Recycling High Tech B	SBWR	0.1 mgd
South Bay Water Recycling Eastern Alignment	SBWR	0.1 mgd
South Bay Water Recycling SJ/ Milpitas Connector	SBWR	0.3 mgd
South Bay Water Recycling King Road/Ocala Ave Extension	SBWR	1.5 mgd
Coyote Valley Extension and Distribution System	SBWR	5 mgd
Lamorinda/Satellite Recycled Water Project	EBMUD	0.2 mgd
Total Yield for Tier 3 Projects		59.9 to 64.74 mgd

Bay Area Water Recycling Plan Addresses Multiple 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 East Contra Costa County Implementation

Grant Proposal 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 Are Addressed By Plan

Water Management Element From IRWM Grant Program Guidelines	Addressed by Proposal
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	✓

Water Supply Reliability

The primary benefit of local water recycling projects is the water supply reliability that results. Local water recycling relies on effluent which is available even in a drought. Water recycling also assures that the highest use of potable water, namely 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 supports the public health, quality of life and the economic sustainability of the region.

Source Water Protection

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

- The South Bay Advanced Recycled Water Project will protect shallow unconfined groundwater basins underlying parts of Santa Clara County against TDS buildup caused by use of recycled water for irrigation.
- Harding Park/Lake Merced Project which will provide recycled water to offset groundwater currently being used for irrigation purposes, thereby allowing the groundwater to be used for potable purposes, and to ensure it is not overly utilized resulting in salt water intrusion.
- The Mocho Groundwater Demineralization Project will protect groundwater underlying the Livermore-Amador Valley from salt loading caused by imported surface water and expanded use of recycled water in the region.

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.

1. Salinity Management

Many of the Bay Area's water sources, particularly groundwater, Delta and CVP supplies, contain high levels of TDS. TDS is generally considered to reflect 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. Two of the projects included in this plan are designed to help manage the region's salt balance while simultaneously allowing for expanded use of recycled water.

- South Bay Advanced Recycled Water Treatment Facility Project is designed to solve South Bay Water Recycling (SBWR) salinity management issues and provide a testing platform to assess treatment strategies to support potential future SBWR and Santa Clara Valley Water District (SCVWD) water recycling initiatives.
- The Mocho Groundwater Demineralization Project is a core element of the Salt Management Plan (SMP) for the Livermore-Amador Valley. The Project is necessary in order to (1) manage salt loading caused by imported surface water supplies and (2) expand the use of recycled water in this part of the Bay Area. Without this project, expanded use of recycled water in the area would violate the RWQCB's General Water Reuse Order No. 96-011.

2. 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 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 polybrominated diphenyl ethers (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, has always been considered a tool for the overall reduction of mass loading of pollutants to the San Francisco Bay.

- Many of the pollutants existing in the Bay are attached to microscopic particulate matter. Unlike most proposed surface water desalination plants, The Bay Water Desalination Project will not discharge particulate material removed by the pretreatment process back into the Bay. These pollutants will be filtered out prior to the reverse osmosis and removed to a landfill. The proposed desalination process will effectively reduce the pollutant loading to the San Francisco Bay.
- Water quality is not only a function of the pollutants in the water body, but the ability of that water body to sustain the 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.

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 Treatment 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.

Other projects such as the Mocho Groundwater Demineralization Project and the 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 Advanced Recycled Water Treatment Project and other South Bay Water Recycling projects are excellent examples of how water recycling and ecosystem restoration go hand in hand.

5. 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: Several examples of this goal are the South Bay Advanced Recycled Water Treatment Project, Mocho Groundwater, Demineralization Project, the Bay Water Desalination Project and the Satellite Recycled Water Project with UC Berkeley.

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.

Priority Near-Term, Priority Tier 2 and Priority Tier 3 Water Recycling Projects for the San Francisco Bay Area Region

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

- 1) Priority Near-Term Projects,
- 2) Priority Tier 2 Projects; and
- 3) Priority Tier 3 Projects.

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

Definitions

Priority Near-Term Water Recycling Projects: These are the projects which were included in the IRWMP application grants for the entire Bay Region including the projects which were included in the separate application from the East Contra Costa County (Implementation Grant Proposal for the IRWMP, July 2005).

Priority Tier 2 Water Recycling Projects: These are other projects which are intended to be implemented in the near term, between 2007 and 2015; were not included in the implementation grant but would be considered part of grant application for a Phase II grant.

Priority Tier 3 Water Recycling Projects: These are projects that are included in both Regional Water Recycling Plans and/or utility Master Plans and would be implemented by the year 2020. These projects are often the second phase of a priority project or a near term project and will ensure that we maximize water supply reliability.

Priorities for Recycled Water Projects within the San Francisco Bay Region

The **Priority Near –Term Projects** listed in this plan, and for which a implementation grant was submitted in July 2005, are the water recycling priorities for the San Francisco Bay Area Region. These projects will deliver [REDACTED] of recycled water to the Bay Area Region. An estimated [REDACTED] of potable water will be offset by the implementation of these Priority Near-Term Projects and [REDACTED] to environmental enhancements.

These projects are priorities because they contributed in a most-cost effective manner toward the Regional goal of water supply reliability, economic sustainability for the region and provide environmental enhancements and benefits. Consistent with the California water code and the State Constitution, the Priority Near-Term Projects also ensure the highest and best use of California’s water resources.

The **Priority Tier 2 Projects** in this plan are the next level of projects, these were not included in the Proposition 50 Chapter 8 Implementation Grant application. These projects are part of public utility’s 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 [REDACTED] recycled water to the San Francisco Bay Region offsetting [REDACTED] of potable water and delivering [REDACTED] for environmental and wetland enhancements.

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; these projects may be more costly in unit price and therefore should be delayed until the demand for non potable water increases; or they are not fully planned as yet due to public utility’s resource constraints. Nevertheless, these Priority Tier 3 Water Recycling Projects that are included in this plan have the potential to deliver [REDACTED] of non potable water to the San Francisco Bay Region, offsetting [REDACTED] potable water and providing [REDACTED] of environmental enhancements.

Priority Near-Term Water Recycling Projects

The Bay Area submitted two requests for Proposition 50 Chapter 8 funding for eight recycled water and two desalination/demineralization projects and one ecosystem enhancement project which relies on recycled water. One request was from the Bay Area Clean Water Agencies dated July 14, 2005 and the other was from East Contra Costa County dated July 2005. The recycled water projects included these in July 2005 proposals 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/Moffet Area Recycling Project	Recycled Water	South Bay	Water supply reliability	- Habitat protection/enhancement - SF Bay water quality
Redwood City Recycled Water Project	Recycled Water	South Bay	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
Mocho Groundwater Demineralization Project	Groundwater Demineralization	East Bay	- Groundwater management - Water supply reliability	SF Bay 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
Bay Water Desalination Project	Ocean/Bay Desalination	North Bay	Water supply reliability	- SF Bay water quality - Habitat protection/enhancement
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

As stated in the July Proposals, these Priority Near-Term water recycling project fulfill the goals of Propositions 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, 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	Implementability
South Bay Advanced Recycled Water Treatment Facility Project	✓	✓	✓	✓	✓		✓
Mountain View/Moffet Area Recycling Project	✓	✓			✓		✓
Redwood City Recycled Water Project	✓	✓			✓		✓
Pacifica Recycled Water Project	✓	✓	✓	✓	✓		✓
Mocho Groundwater Demineralization Project	✓	✓	✓				✓
Phase 2 San Ramon Valley Recycled Water Program	✓	✓		✓			✓
Satellite Recycled Water Treatment Plant Project	✓	✓			✓		✓
Bay Water Desalination 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	✓	✓			✓		✓

South Bay Advanced Recycled Water Treatment Facility Project

The South Bay Advanced Recycled Water Treatment Facility Project (Project) is a multi-purpose project designed to solve South Bay Water Recycling (SBWR) salinity management issues and provide a testing platform to assess treatment strategies to support potential future SBWR and Santa Clara Valley Water District (SCVWD) water recycling initiatives. These initiatives include future expanded uses such as application of recycled water over

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

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 Water Pollution Control Plant (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 their 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 acre-feet).

- **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**, 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 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.	

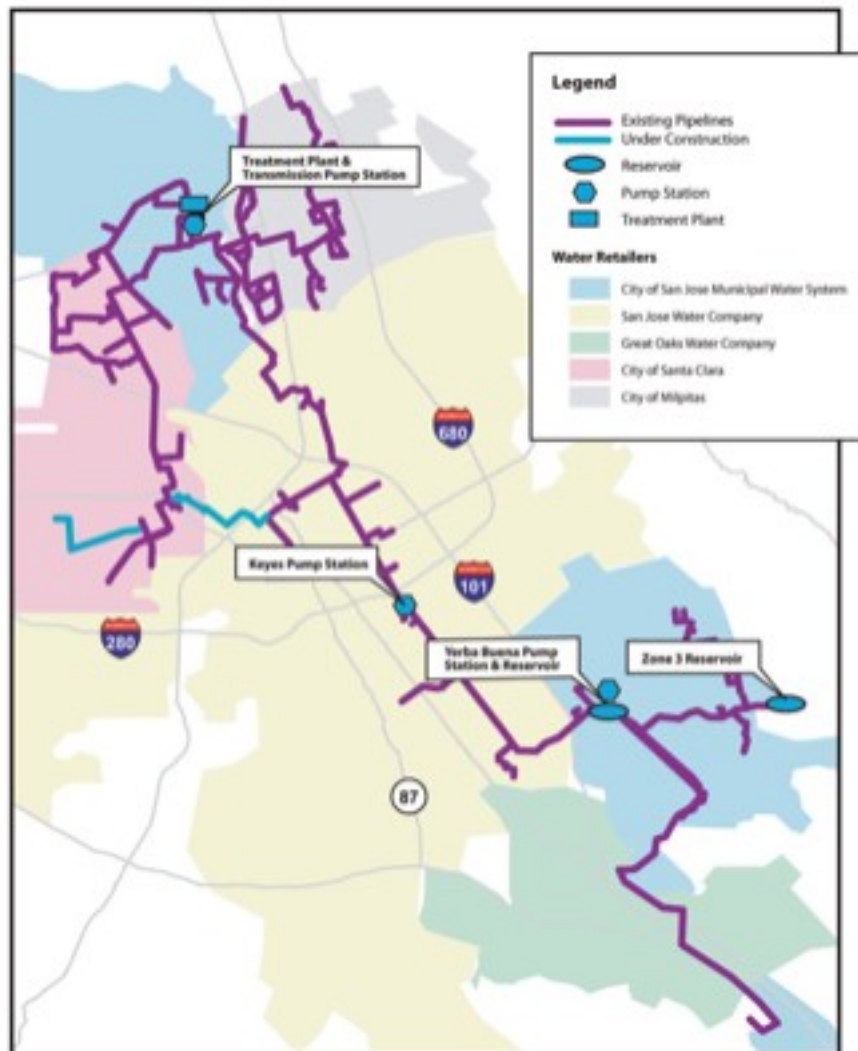
Detailed Project Description

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.

Existing South Bay Water Recycling System

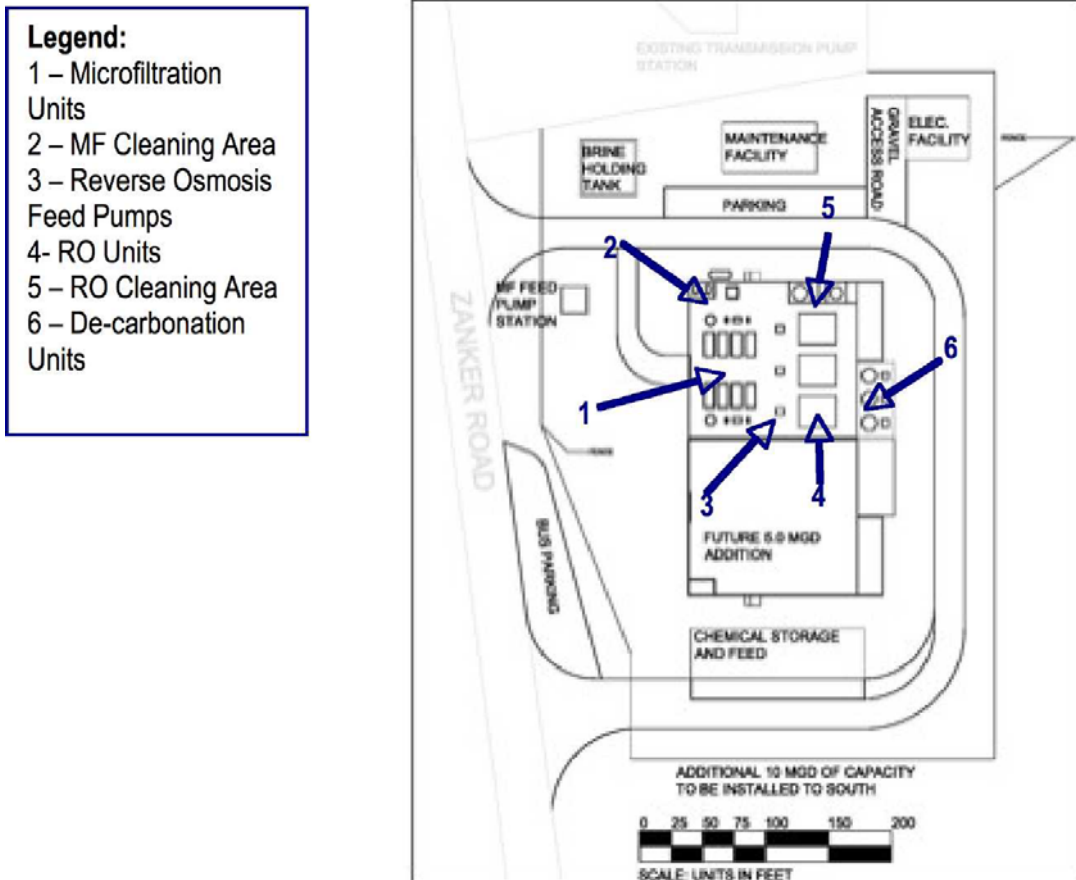


Process Flow Schematic

Proposed Project Site



Proposed Site Arrangement



Project 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.

Mountain View / Moffett Area Water Recycling Project

The recycled water distribution system will serve 122 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 the Delta water and Hetch Hetchy water have historically been 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 acre-feet/year of Hetch-Hetchy 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 Hetch-Hetchy 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 this 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.

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.

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.

Detailed Project Description

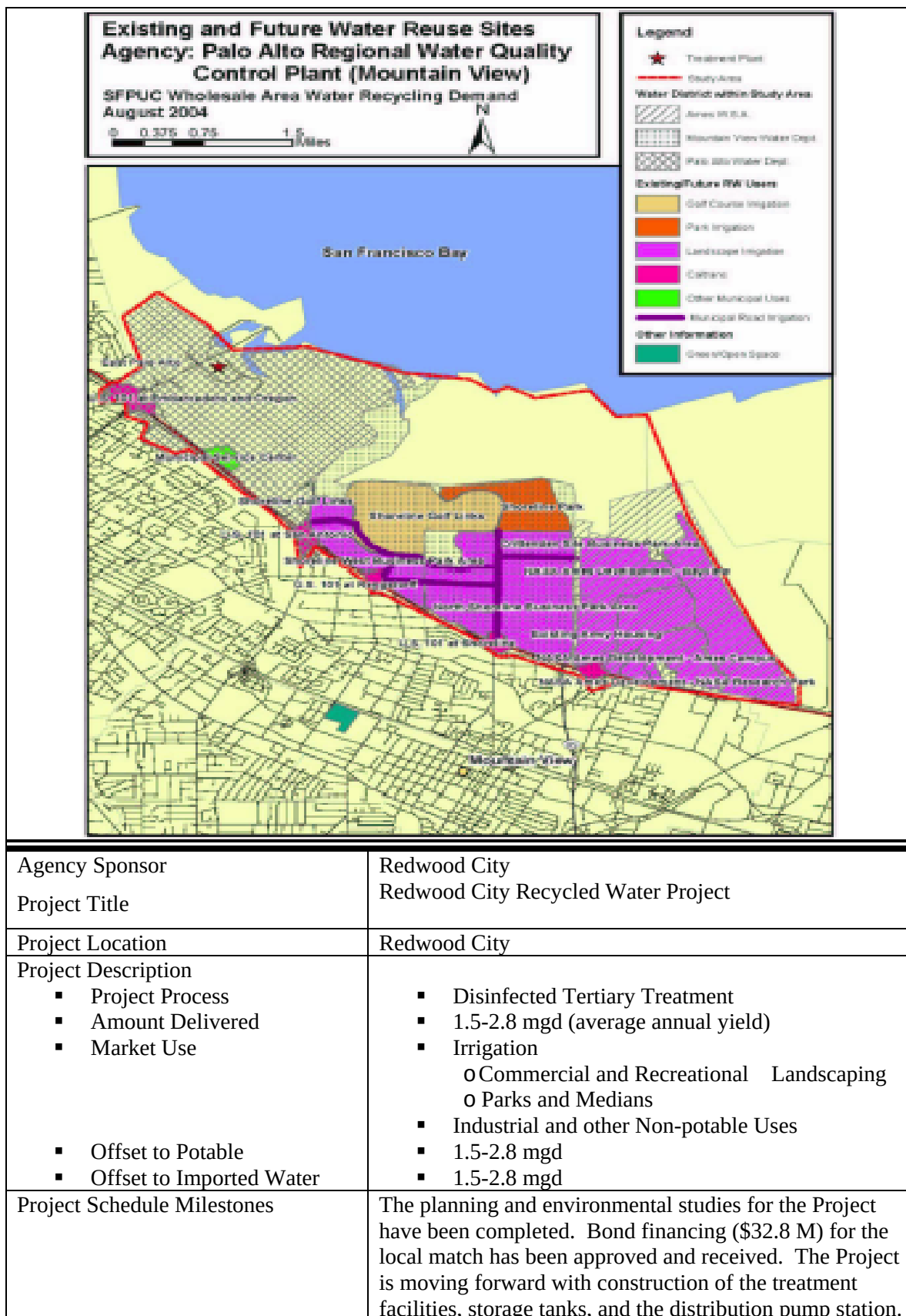
The recycled water is produced at the Palo Alto Regional Water Quality Control Plant, which manages the Water Reuse Program for this area. The RWQCP has a current production capacity of 4 mgd of recycled water meeting Title 22 requirements for un-restricted use. With some operational changes and minor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

This project includes:

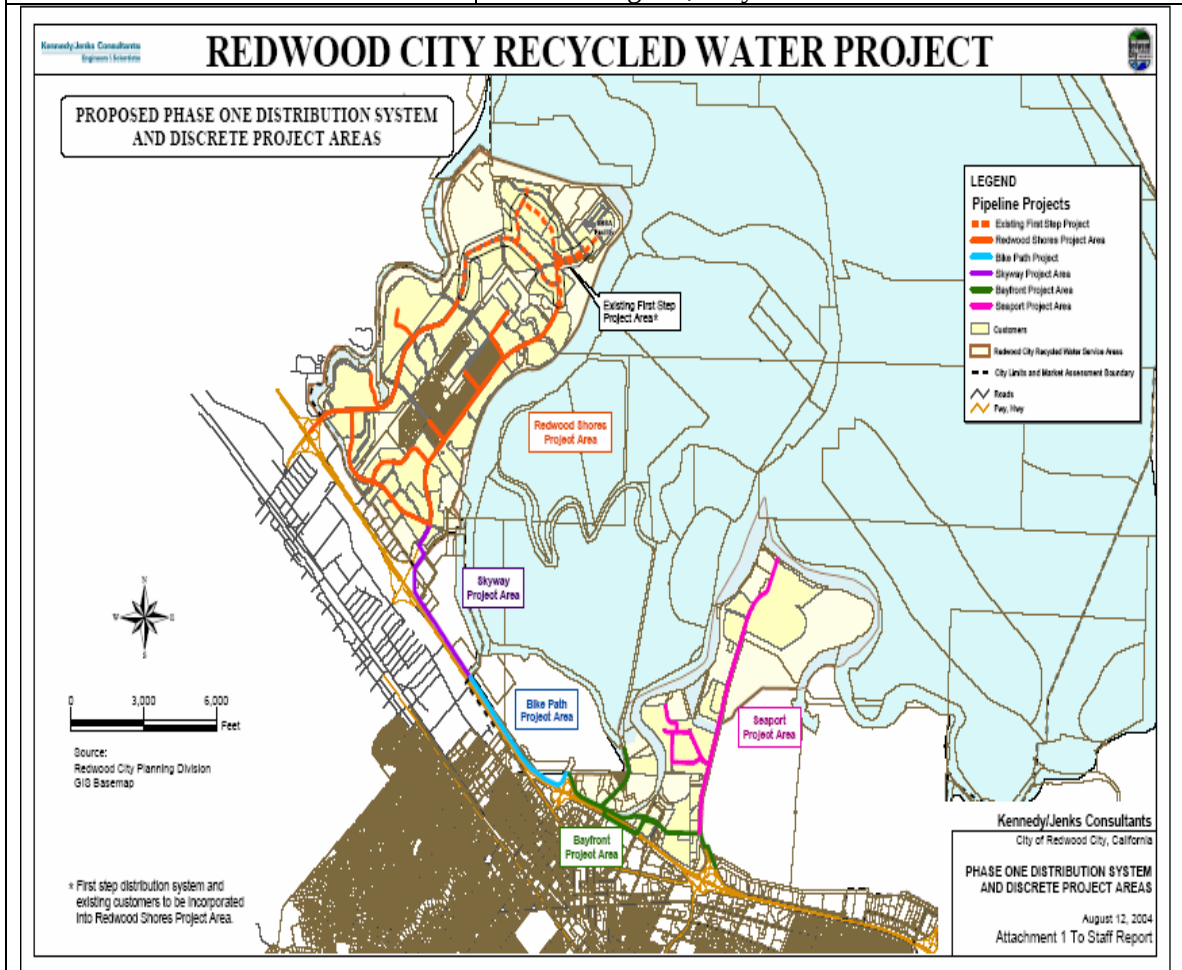
- Conveyance pipelines consisting of the installation of approximately 3,500 linear-foot (lf) of 30-inch, 12,000 linear-foot (lf) of 24-inch, and 9,000 linear-foot (lf) of 18-inch recycled water pipe
- Lateral pipelines ranging from 4-inch to 12-inch
- Connections to approximately 120 customers, and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

Agency Sponsor	Palo Alto Regional Water Quality Control Plant
Project Title	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 - o Golf Course - o Industrial Park - o Parks and Medians ▪ 1.2-1.7 ▪ 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 has 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



	In addition, the design of the distribution system is in progress. The proposed design and construction schedule is consistent with grant funding being awarded. - 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 - Recycled Water Task Force Report, March 2003 - Redwood City Recycled Water Project Customer Guidelines of Landscape Irrigation, August 2004 - Redwood City Recycled Water Project Engineering Report, 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 receives 100% of its potable water supply from the Hetch-Hetchy regional water system operated by the San Francisco Public Utilities Commission (SFPUC). Redwood City currently exceeds its SFPUC contractual water supply of 12,243 acre-feet by 1,100 acre-feet. This is only possible because other contactors have not taken delivery of their full entitlements. Regional demand projections indicate that the Hetch-Hetchy system will reach full contractual capacity by 2007-2009 and surplus supply will no longer be available to Redwood City. Redwood City's Urban Water Management Plan (UWMP) projects that the imbalance between supply and demand could increase to 2,700 acre-feet or more by 2010, when the SFPUC supply contract expires. The Redwood City Recycled Water Project – in concert with the City Council's "Active" Water Conservation Program - will reduce the Redwood City's demand on the Hetch-Hetchy regional water system and create a new reliable 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 currently exceeds its SFPUC contractual water supply of 12,243 acre-feet by 1,200 acre-feet. Redwood City's Urban Water Management Plan (UWMP) indicates that the imbalance between supply and demand could increase to 2,700 acre-feet or more by 2010. 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 SBSA can produce more recycled water than planned for the Redwood City Recycled Water Project. 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 Hetch-Hetchy 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

Recycled water will be produced and stored at the South Bayside System Authority (SBSA) wastewater treatment plant in Redwood City. SBSA will produce disinfected tertiary recycled water for the Project. Treatment will consist of dual media sand filtration followed by disinfection via sodium hypochlorite. Recycled water will be stored in the two storage tanks that will be constructed at SBSA. Construction of the treatment and storage facilities is underway and will be completed in the summer of 2006.

Redwood City is planning for construction of new recycled water distribution infrastructure to occur in multiple phases into 2009. Design is underway for construction for the first phase of pipeline construction to begin in spring 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 planned distribution infrastructure will allow delivery of additional recycled water production to neighboring cities. A regional project 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, demand will be an estimated 1,960 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 for SFPUC water sooner.

Project Milestones

The planning and environmental studies for the Project are completed. Bond financing (\$32.8M) for the local match has been approved and received. The Project is moving forward with construction of the treatment facilities, storage tanks, and the distribution pump station underway, and design of the distribution system in progress. The proposed design and construction schedule is consistent with grant funding being awarded.

Pacifica Recycled Water Project

The Pacifica Recycled Water Project (the Project) proposed by North Coast County Water District (NCCWD) is intended to deliver 171 acre-feet 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

Recycled Water Market	■ Mostly Landscape Irrigation: ● Golf course ● Commercial and recreational landscape ● Parks and Medians ● 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

middle school and high school.

Project Objectives

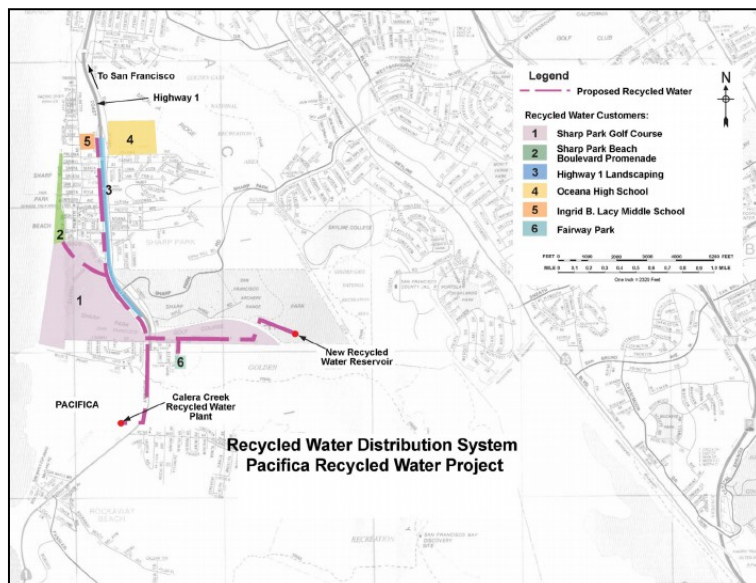
The Project is designed to comply with recycled water uses contemplated in the City of Pacifica, Calera Creek Water Recycling Plant, Wastewater Facilities Plan EIR (1994); these recycled water uses included landscape irrigation for schools, parks and roadway medians. The Project was also developed to 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 Hetch-Hetchy System** by replacing water supply currently provided by the SFPUC Hetch-Hetchy 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 million gallons (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



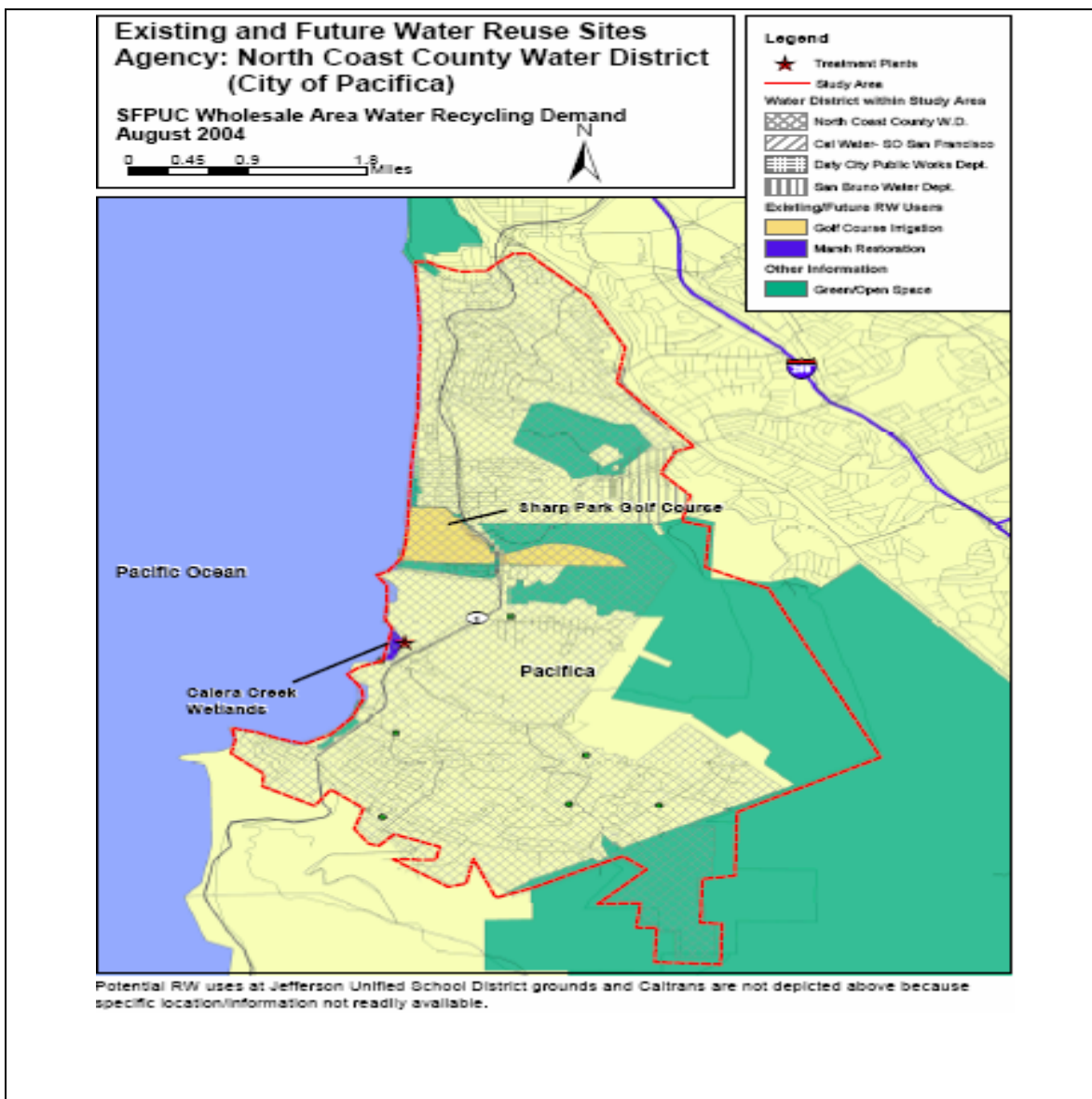
San Francisco owned Golf Course in Pacifica, the Sharp Park Golf Course, and also extending the offer of recycled water to the Jefferson Unified School District, the City of Pacifica and Cal Trans for Highway 1 irrigation uses, and other potential irrigation customers (RMC, 2003, Kennedy/Jenks, 2001, 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.

Project 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.

Recycled Water Project	
Agency Sponsor	North Coast County Water District
Project Title	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. ▪ <i>2004 Draft Initial Study/Mitigated Negative Declaration</i>
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



Mocho Groundwater Demineralization Plant Project

The Salt Management Plan (SMP) and the Water Quality Master Plan (WQMP) for the Livermore-Amador Valley identified the need to construct and operate groundwater demineralization facilities to improve the groundwater basin's salt balance and to improve delivered water quality on the west side of Zone 7's treated water delivery system. In December 2003, Zone 7 contracted with Carollo Engineers, RMC, Burks Toma

Treatment System	- Reverse Osmosis - Capacity for production of 6.2 mgd of demineralized groundwater for potable use - GW RO concentrate disposed to SF Bay by LAVWMA pipeline
Siting	Mocho well field (northwest corner of Santa Rita road and Stoneridge road in Pleasanton)
Cost	Estimated Capital Cost: \$30.0M

Architects and ESA to provide consulting services for site selection, design and CEQA analysis for Zone 7's first demineralization plant, the Mocho Groundwater Demineralization Plan Project.

Project Objectives

The San Francisco Bay Regional Water Quality Control Board (RWQCB) issued Order No. 93-159, the "Master Water Recycling Permit," to the Zone 7 Water Agency, City of Livermore and Dublin San Ramon Services District in December of 1993. The Master Permit specified requirements for implementation of recycled water projects in the Livermore-Amador Valley, including development and implementation of a SMP. One component of the SMP was to ensure that the overall impact of permitted water recycling projects would not unacceptably degrade groundwater resources.

In January 2005, DSRSD and Livermore received approval under the RWQCB's General Water Reuse Order No. 96-011 to administer their current and future recycled water irrigation projects. As with the Master Water Recycling Permit, the completion and implementation of the SMP is also required under the General Water Reuse Order.

Zone 7 developed a comprehensive SMP over the last several years with input from the citizen-comprised Groundwater Management Advisory Committee (GMAC) and Technical Advisory Group (TAG), including Livermore, DSRSD, and others. The interim SMP was completed in 1999 and the final SMP was approved by the RWQCB in September 2004.

The SMP's main goal is to offset current salt loading (year 2003 salt loading of 5,000 tons/year) and to provide a mechanism for offsetting future salt loading to the main groundwater basin, including salt loading from water recycling projects. Groundwater demineralization is the primary tool recommended in the SMP to offset the current and future salt loading. Two to three Groundwater Demineralization plants will be required to offset the existing and future salt loading. The construction and operation of Mocho Groundwater Demineralization Project is essential for implementation of SMP and development of wastewater reuse in the valley. It is also needed to achieve the objectives for potable water hardness established by the valley's WQMP.

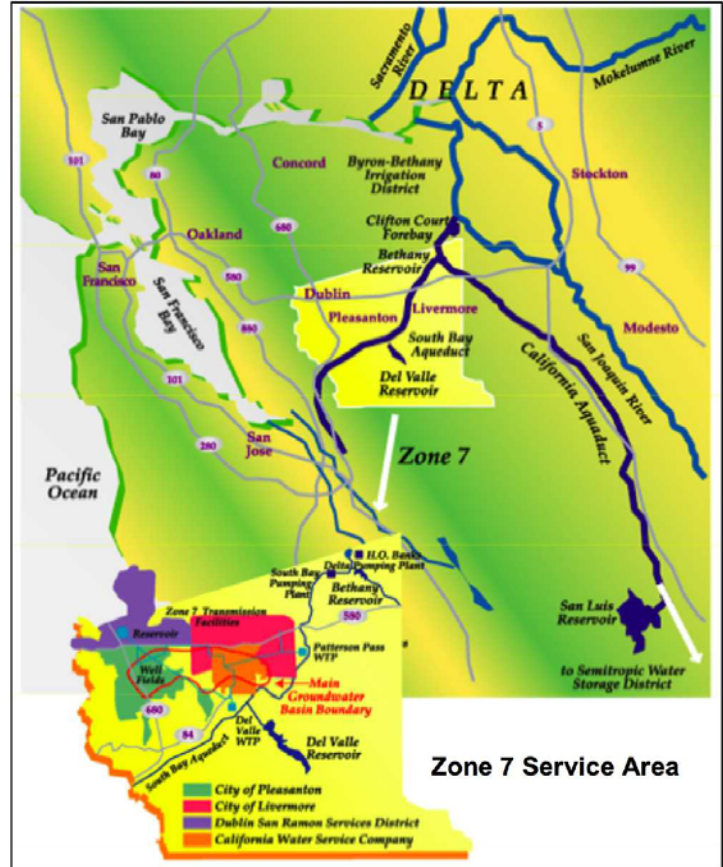
Importance of Project to the Region

The Mocho Groundwater Demineralization Plant Project is important to the region for two reasons. First, it is a key component to the Livermore-Amador Valley SMP. The region needs the project to protect groundwater resources providing M&I and agricultural water supply for much of the valley. Second, the Project is necessary in order to expand the use of recycled water in the valley. Without the Project, expanded use of recycled water in the area would violate the RWQCB's General Water Reuse Order No. 96-011.

Benefits to Project Partners and Surrounding Community	
Water Supply Reliability	- Protects existing groundwater resources for future M&I and agricultural beneficial uses. - Allows expanded use of recycled water in the Livermore-Amador Valley
Water Quality	- Offsets salt loading of groundwater and protects the water quality of the basin - Helps achieve RWQCB Water Quality Control Plan (Basin Plan) groundwater quality TDS objectives, defined as ambient or 500 mg/l, whichever is less.

Detailed Project Description

The Mocho Groundwater Demineralization Plant Project, to be located on the northwest corner of Santa Rita Road and Stoneridge Drive in Pleasanton, will construct a 7.7 MGD groundwater demineralization plant. The plant will use reverse osmosis (RO) membrane technology to treat groundwater pumped from Zone 7's existing Mocho wells, produce about 6.2 MGD treated permeate of less than 5 mg/l hardness, blend the permeate with additional groundwater or a stream of distribution system water, and pump the resulting blended supply to the Zone 7 potable water system. The RO concentrate will be discharged to the Bay by the LAVWMA pipeline via the Livermore interceptor. The Project will remove 3,000 to 4,000 tons of salt annually from the Livermore-Amador Valley Main Groundwater Basin and lower the hardness of Zone 7's groundwater deliveries. The Project involves construction of a new reverse osmosis (RO) membrane demineralization plant capable of producing 6.2 MGD of permeate. This will include the following:



- Construction of a new building with cartridge filters, RO membrane feed pumps, RO membrane skids, decarbonation towers, chlorine contact basin, high service pumps, concentrate disposal pumps, chemical feed systems (including aqueous ammonia, sodium hypochlorite, caustic soda, and scale inhibitor systems), membrane clean-in-place (CIP) system, electrical room, storage room, control room, water quality station, and restroom. The new demineralization plant will be located on the existing Mocho Well No. 4 site.
- Modifications to Mocho Well No. 4 facilities, including well discharge piping, appurtenances, instrumentation and control modifications, yard piping, valve and meter vaults, and miscellaneous site improvements (including curbing, paving, landscaping, and fencing).
- Modifications to Mocho Wells 1-3, including, well discharge piping, appurtenances, instrumentation and control modifications, yard piping, and valve and meter vaults.
- Installation of groundwater transmission pipeline from Mocho Wells No. 1, No. 2, No. 3, and No. 4 to the demineralization plant.

Project Milestones

Currently, Zone 7 is working on finalizing the 90% design, preparing the CEQA administrative draft document, and working with Livermore, DSRSD, East Bay Dischargers Authority (EBDA) and RWQCB to obtain necessary permits for concentrate disposal. The Project is scheduled to be completed by September 2007.

San Ramon Valley Recycled Water Program - Phase 2 Project

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

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

regional effort between the East Bay Municipal Utility District (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, and 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:

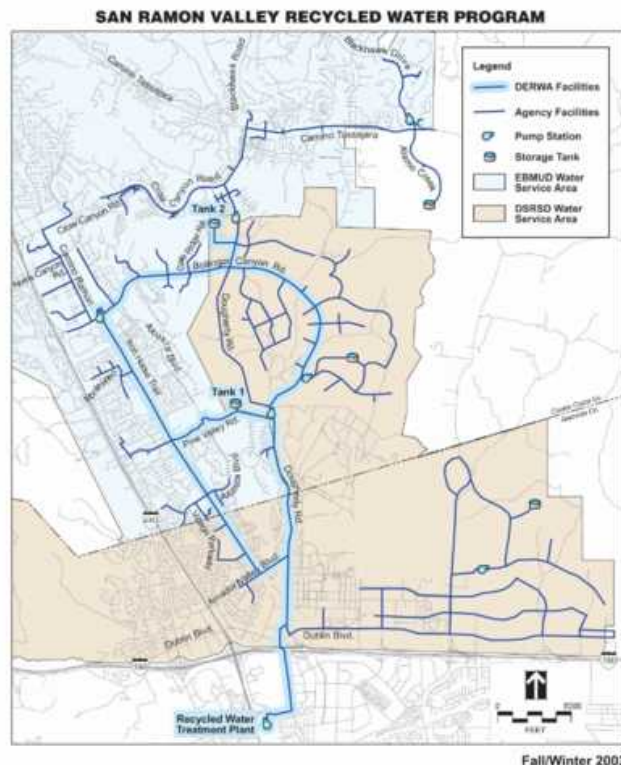
- **Reduce Regional Dependence on Imported Water Supplies.** This project will substitute recycled water for beneficial landscape water uses currently served by EBMUD's Mokelumne River supplies. During dry and critically dry years, the project will reduce EBMUD diversions from the Mokelumne and/or Sacramento River (once the Freeport Project is in service). For DSRSD, the project will reduce the need for water imported via the 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 save a larger percentage of its high quality potable water supplies for residential and commercial potable uses. For the DSRSD, the project would reduce its 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. 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 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 left 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.

Project 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.

Satellite Recycled Water Treatment Plant Project

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.

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 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.



Project 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.

MMWD Bay Water Desalination Project

MMWD faces a near and long-term water supply shortfall. MMWD is developing the Bay Water Desalination Project to provide a reliable and drought-proof supplemental water supply for the District's 190,000 residents while reducing the demands on both local and imported water supplies. The project, in combination with increased conservation and water recycling, meets the community's long-term needs based on current plans of

Treatment System	- Pre-treatment process to remove suspended solids - Partial two-pass RO system 10 MGD capacity
Siting	- Intake facility near San Rafael Bay Bridge - Plant location, San Rafael near existing pilot facility - Brine discharge via Central Marin Sanitation Agency outfall
Cost	Estimated Capital Cost: \$115.2M

the County of Marin and the ten cities within MMWD's service area. Currently MMWD receives about 8,000 acre-feet annually from Sonoma County Water Agency (SCWA) with some limited potential for increasing this amount. However, SCWA's proposed expansion of its water supply has resulted in litigation, endangered species impacts, water rights proceedings, and the prospect of millions of dollars in infrastructure upgrades and environmental mitigations. MMWD's desalination plant will benefit the North Bay communities who rely on SCWA by reducing the long-term demands on an over-taxed SCWA system. The desalination plant will reduce reliance on diversions from the Russian and Eel Rivers by more than 7,000 acre-feet per year and give MMWD greater local control over its water supply. In addition, by reducing its use of water diverted from these river systems, MMWD will be making available a substantial block of water that could be used for environmental restoration purposes.

Project Objectives

This project is needed to increase the reliability of MMWD water supply and to avoid severe rationing resulting from prolonged droughts or critically dry periods. Specific objectives of the project include the following:

- Provide a new reliable, drought-proof source of water for MMWD customers to avoid severe rationing. MMWD planning documents indicate that in the absence of this project a prolonged drought could require water delivery cutbacks as high as 67%.
- Replace water imported from the Russian and Eel Rivers, both of which are increasingly impacted by water diversions.
- Further diversify MMWD's water resources, which already include aggressive conservation and recycling programs.
- Demonstrate the feasibility, practicality, and cost-effectiveness of desalination through the successful application of the newest desalination technologies in an estuarine environment with widely varying salinities and turbidities in the source water.
- Minimize potential impacts to the marine environment by using innovative techniques to dilute brine discharges to mimic receiving water salinities, construct an isolated intake designed to minimize intake impacts, and use pretreatment filtrate as landfill cover rather than discharging it to the bay.

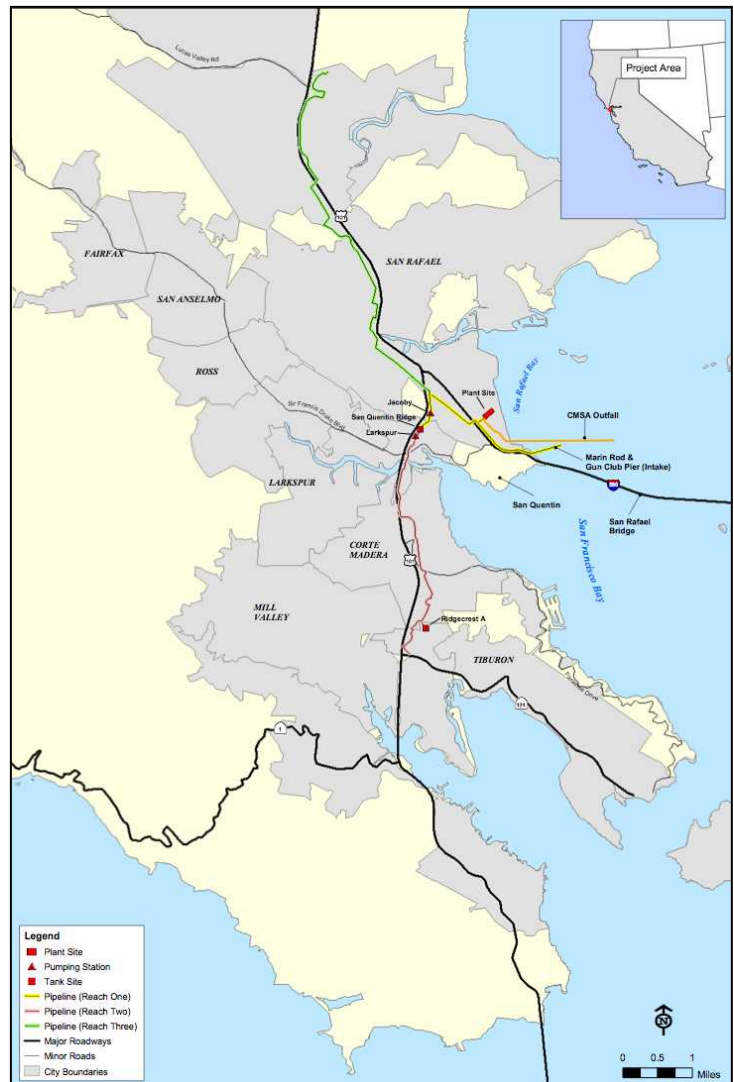
Benefits to Project Partners and Surrounding Community	
Water Supply Reliability	- Provides MMWD customers 10,000 AFY of reliable, drought-proof water supply. - Eliminates need for severe water delivery cutbacks during prolonged droughts and critically dry periods - Reduces need for less reliable supply from Russian and Eel Rivers - Further diversifies regional water supply resources
Other Environmental Benefits	Reduces MMWD demand for Russian and Eel River supply and potentially makes this water available for instream uses.

Detailed Project Description

The proposed MMWD Bay Water Desalination Project includes construction of a desalination plant and associated distribution system improvements. The desalination plant will be constructed in two phases. The first phase will be to construct a 10 MGD facility, and the second phase – *if needed* -- will add a capacity of 5 MGD to the facility. The plant will be located in San Rafael, California, in close proximity to the location of the District's 2005-2006 pilot plant project. One of the benefits of this phased approach is that it offers maximum opportunities for MMWD's ongoing conservation and recycling efforts to reduce demand, which would allow the district to avoid additional water supply development.

Bay water will be piped west along East Francisco Boulevard from an intake located near the Richmond-San Rafael Bridge to the plant site at Pelican Way in San Rafael. The raw water will be treated with chemical coagulants, in-line flocculation, and two stages of filtration to remove suspended solids. Solids produced from the pretreatment process will be dewatered and trucked to Redwood Landfill in northern Marin County for disposal. All solids disposed of at the landfill will meet Title 22 California Code of Regulations (Environmental Health) requirements.

Following pretreatment, a partial two-pass RO system will be used to produce water that meets water quality objectives, including a maximum total dissolved solids concentration of 170 mg/l, which is comparable to that of MMWD's present water sources. The raw water, or feed water, will pass through cartridge filters to protect membrane elements and high-



pressure pumps from suspended matter that may have inadvertently entered the process. The RO process will produce product water for drinking that meets all primary and secondary drinking water standards, testing requirements, and California Title 22 procedures. The product water will be piped into the District's distribution system for delivery to MMWD's customers. Brine produced by the RO process will be discharged back into San Rafael Bay through the Central Marin Sanitation Agency (CMSA) wastewater treatment pipeline located in close proximity to the plant site. Blending of brine with CMSA's treated wastewater effluent will reduce the concentration of dissolved salts in the brine prior to its release into San Francisco Bay.

Project Milestones

An Environmental Impact Report (EIR) will be completed in 2005. MMWD is currently implementing a pilot-scale project to provide additional data and analysis in preparation for the construction of the full-scale project. The information obtained from the pilot project will be used to refine the final plans for the proposed full-scale desalination project. Construction of the first phase of the project is anticipated to begin in summer 2007. Plant operation is expected to start in winter 2008. The second phase of the project, *if constructed*, would be operational approximately 10 years later, or around 2018.¹

¹ This project has also requested construction grant funding under DWR's 2004 Water Desalination Program. DWR was consulted prior to including this project in the Chapter 8 proposal to confirm that it is eligible for funding. None of the local match funds pledged in this Chapter 8 proposal was part of the local match under DWR's 2004 Water Desalination Program. The Desalination Review Panel gave this project its highest ranking.

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

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

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

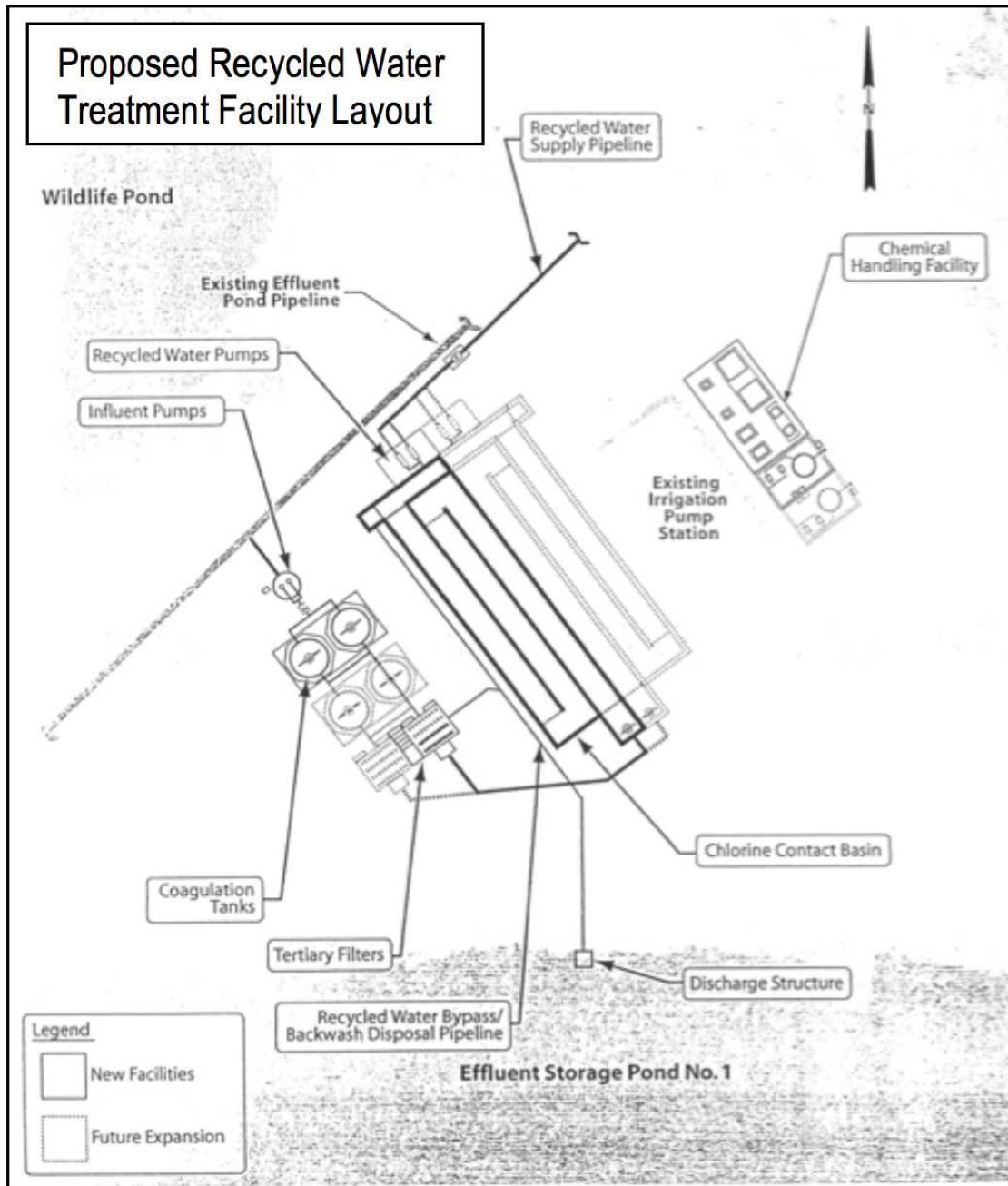
District (NFPD). The facility will treat secondary effluent to meet Title 22 requirements for unrestricted bodily contact. This project is a first step to introduce and expand the use of recycled water in this part of the Bay Area. As the market for recycled water grows, the facility will be expanded 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

Project 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.

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 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

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

through levee breaching or other more common techniques is not feasible because of RWQCB restrictions on discharging bittern 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 acre-feet (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 Soscot 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 acre-feet (AF) of tertiary-treated recycled water

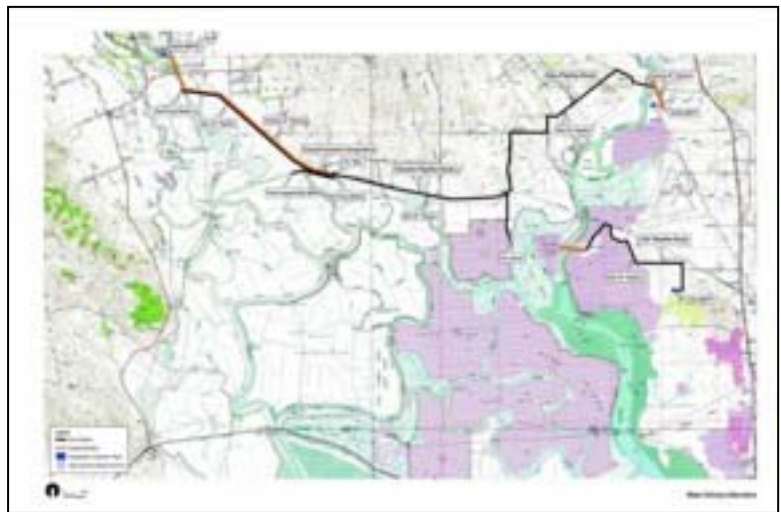
per year to the bittern ponds. Desalination of the bittern ponds is anticipated to take between 10 and 15 years.

- **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 acre-feet 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: The project includes construction of the following components:



- 4.2 miles of 18" pipe that parallels an existing pipeline south of the Sonoma Valley County Sanitation District's Treatment Plant (see map previously provided to you).
- 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.

Project 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.

Pittsburg Recycled Water Implementation

Project Description:

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 expanding the recycled water infrastructure to deliver 615 acre feet per year (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

Recycled Water Market	■ Near-Term: ● Landscape irrigation ● Golf course irrigation ● 3 city owned parks ■ Long-term: ● ■ 615 AF/Y
Distribution	■ Pipeline and distribution systems as a tie into the existing recycled water line
Cost	■ Estimated Capital Cost: \$11.3M

project will start at a tie-in to an existing recycled water line, and will involve the construction of approximately 13,270 linear feet 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 on Figure 2-11 of the IRWMP, during dry years, the East County water supplies are less than demand unless alternative water supplies are developed. This recycled water project replaces 615 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.

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. DDSO currently provides recycled water supply for use by two local power plants and for some irrigation needs. DDSO is intends to maximize the supply of recycled water produced by its existing facilities.

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, 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 DDSO 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 be go without water during dry years resulting in significant financial loss.

Priority Tier 2 Water Recycling Projects in the San Francisco Bay Region

The **Priority Tier 2 Projects** in this plan are the next level of projects, these were not included in the 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.

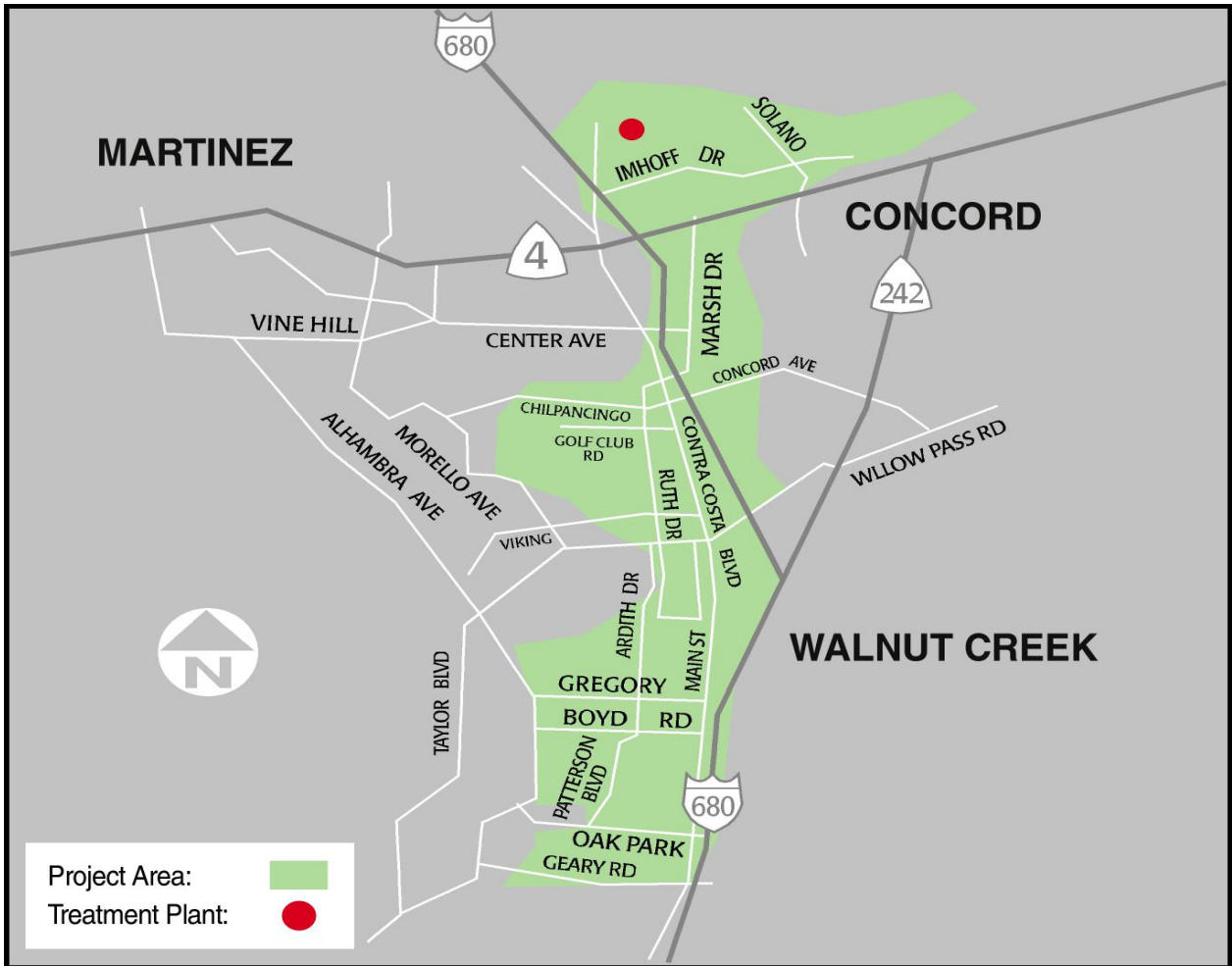
The Priority Tier 2 Projects will deliver [REDACTED] recycled water to the San Francisco Bay Region offsetting [REDACTED] of potable water and delivering [REDACTED] for environmental and wetland enhancements.

Priority Tier 2 Projects				
Project Title	Type	Location	Primary Objectives	Other Benefits
Pleasant Hill Zone 1	Recycled Water	East Bay Pleasant Hill, Concord and Martinez	- Water supply reliability - irrigation	- Habitat protection/enhancement - 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	- Habitat protection/enhancement - Pacific Ocean water quality
Richmond Advanced Recycled Expansion (RARE) Water Project	Recycled Water	East Bay	Water supply reliability	SF Bay water quality
Rodeo Recycled Water Project	Recycled Water	East Bay	Water supply reliability	SF 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	Recycled Water	North Bay	Water supply reliability	Habitat protection/enhancement
Sonoma Valley Recycled Water Project (SVRWP)	Recycled Water	North Bay	Water supply reliability	- SF Bay water quality - Habitat protection/enhancement - Groundwater protection
City of Petaluma's Phase II Recycled Water Program	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

Pleasant Hill, Zone 1 Recycled Water Project

The Pleasant Hill Zone 1 recycled water project is sponsored by the Central Contra Costa Sanitary District (CCCSD) as a water supply augmentation project and surface water quality project to reduce the mass loading into the San Francisco Bay. The 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.

CCCSD Pleasant Hill Zone 1 Recycled Water Project	
Agency Sponsor: Project Title:	CCCSD Pleasant Hill Zone 1
Project Location:	Pleasant Hill, Concord & Martinez (near Highway 4/680 Interchange)
<i>Project Description:</i> ▪ 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)



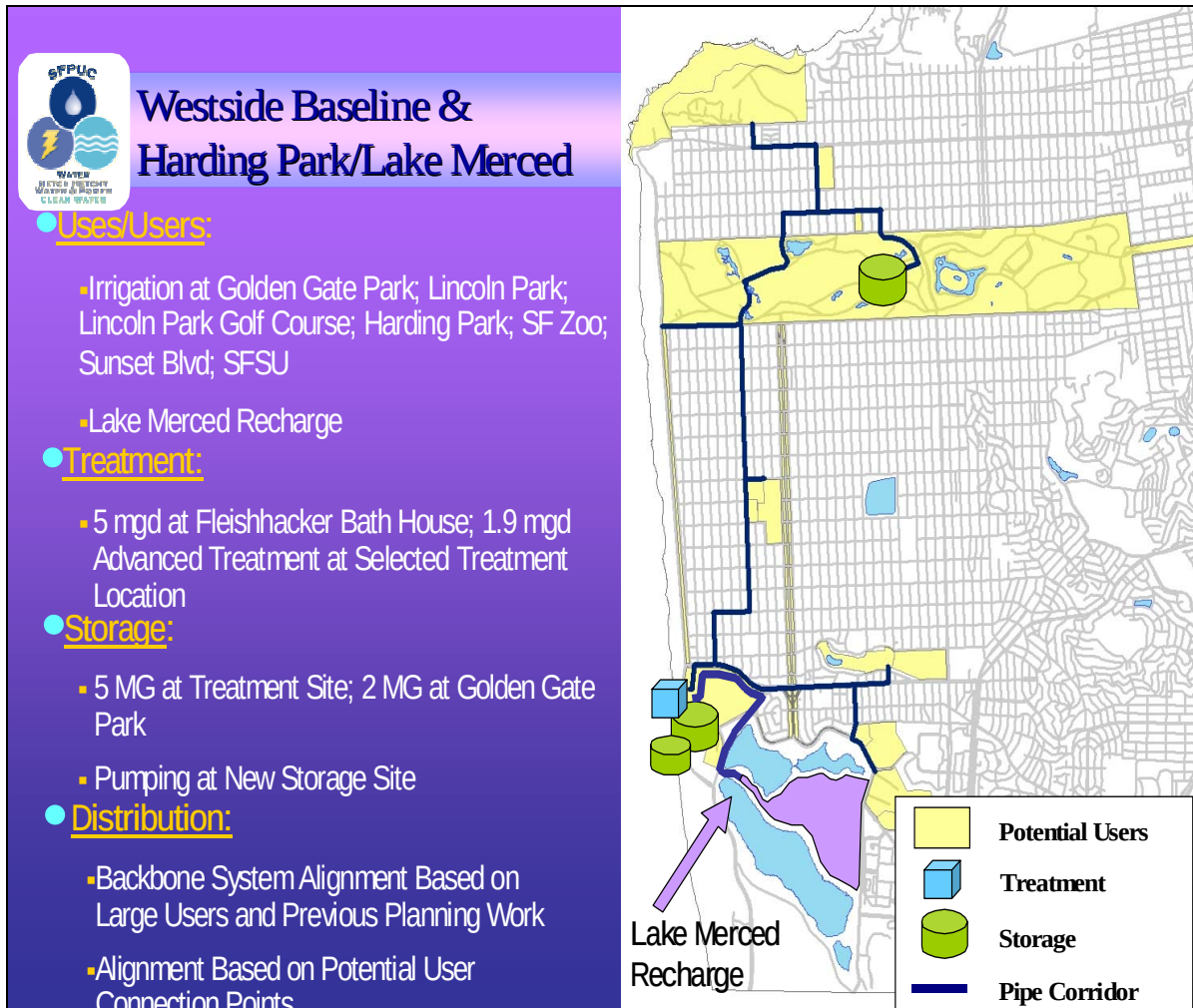
Westside Baseline and Harding Parking/Lake Merced Projects

Project Summary

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 (see graphic below).

Recycled Water Market	- Mostly Landscape Irrigation: - Parks and Medians - Golf Course - 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. This would allow potable water to 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. This represents approximately 4.5% of the total City's water supply.

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 would meet Title 22 requirements for un-restricted 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 lake recharge for lake Merced during the winter months. Both users are assumed to require advanced treatment because: 1) the lake has been designated as an emergency non-potable water source; and 2) concerns about nutrient levels (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.

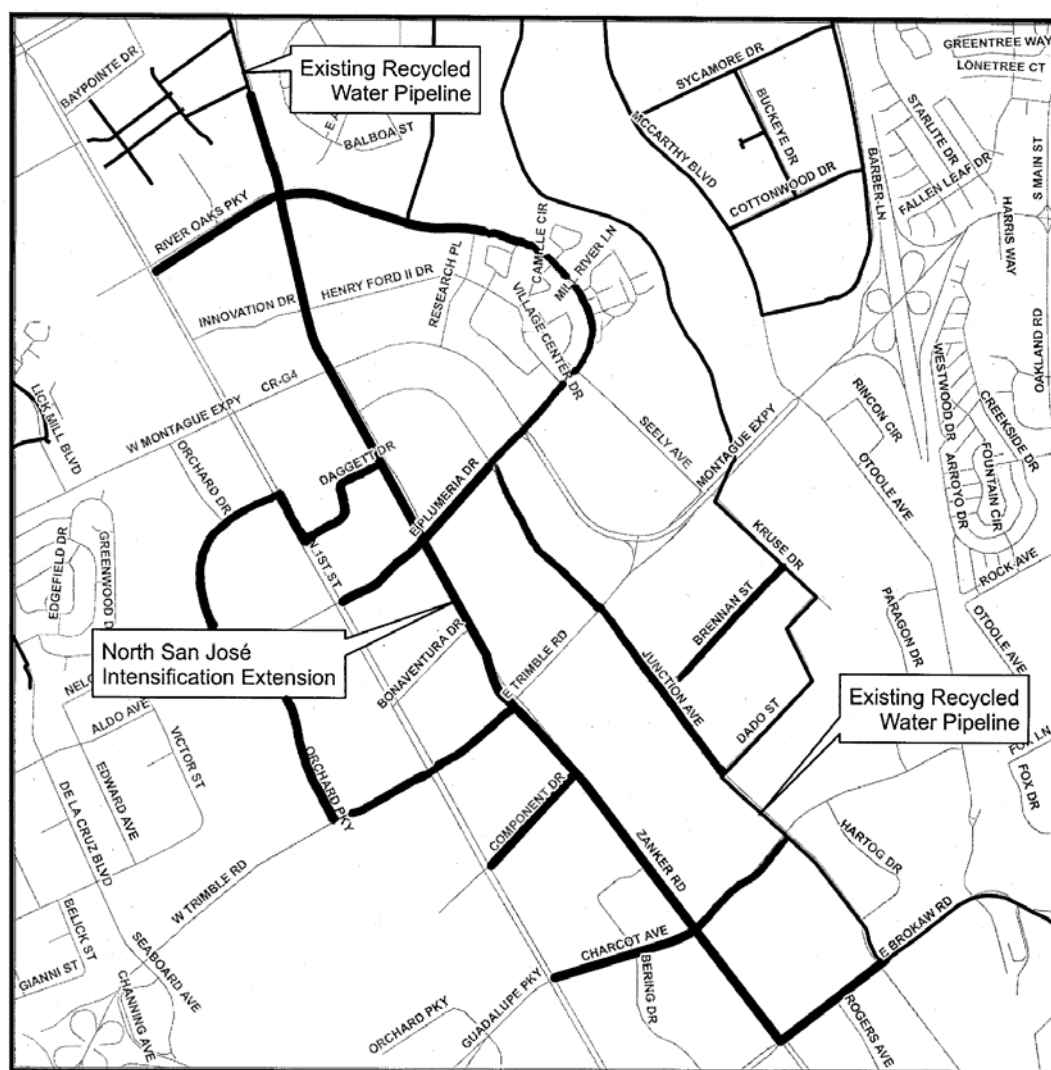
Project Milestones Implementation Activities and Schedule Summary

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.

Recycled Water Projects	
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	



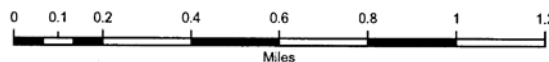
North San José Intensification Extension

South Bay Water Recycling Program Environmental Services City of San José

Map Legend

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

4



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 José 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 million gallons per day (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 the East Bay Municipal Utility District's (EBMUD) 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, and 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 Mokelumne River supplies 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 River (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. 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 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.

Project 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.

Richmond Advanced Recycled Expansion (RARE) Water Project

EBMUD is conducting 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. This project is a separate project 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 that remove minerals and other constituents to prevent 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, and 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 Mokelumne River supplies 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 River (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 SF Bay
Other Environmental Benefits	• Increases Mokelumne River instream flows for environmental uses

Detailed Project Description

If project is determine to be feasible, 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.

Project Milestones

The feasibility study, including pilot testing, is currently in progress. If determined to be feasible, 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.

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 that remove minerals and other constituents to prevent scaling and foaming problems in the boilers. The nearby joint effluent pipeline of Pinole/Hercules and Rodeo wastewater treatment plants would provide secondary 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 landscape uses, and 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 Mokelumne River supplies 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 River (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 Francisco Bay.** The Project reuses wastewater that would otherwise be discharged to the San Francisco Bay from the joint outfall of the Pinole/Hercules and Rodeo 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. 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 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 SF Bay
Other Environmental Benefits	Increases Mokelumne River instream flows for environmental uses

Detailed Project Description

If project is determine 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.

Project Milestones

The feasibility study is anticipated to begin in 2005 and will be completed by mid-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.

San Leandro Water Reclamation Facility Expansion Project

EBMUD's current San Leandro reclamation facility supplies approximately 400,000 gallons per day of recycled water for irrigation purposes. This new project proposes to expand recycled water delivery by 30,000 gallons per day 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.

Need charts on specific statistics and benefits and a graphic

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 would include upgrade 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 the dual benefit to their customers and the water environment of the San Francisco Bay.

Recycled Water Projects	
Agency Sponsor and 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 - Offset to Imported Water	- Tertiary Treatment ■ mgd - Landscape irrigation (golf course ■ mgd
Project Schedule Milestones	Planning phase
Project Costs	\$15,000,000
Footnotes/Comments	Result in less water diverted from the Russian River and less pollutant load to the San Francisco Bay

INSERT GRAPHIC OF PROJECT LOCATION

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.

Recycled Water Projects	
Agency Sponsor and Project Title	Sonoma County Water Agency Sonoma Valley Recycled Water Project (SvrwP)
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 ■ mgd - Agricultural irrigation ■ mgd

Project Schedule Milestones	Proposed
Project Costs	\$33,000,000
Footnotes/Comments	

INSERT GRAPHIC WITH MAP LOCATION

Phase II Recycled Water Program –City of Petaluma

As proposed this project includes a recycled water storage reservoir and distribution system to provide 170 mgs per year of tertiary recycled water for irrigation at an estimated 28 sites including City parks, schools, and landscapes. The project would provide the benefit augmenting the water supply and providing reliability. The pollutant loading to the Petaluma River and the San Pablo Bay will be reduced as proportionally to the use of the tertiary water for irrigation purposes.

Recycled Water Projects	
Agency Sponsor and 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	\$8,000,000
Footnotes/Comments	

INSERT GRAPHIC WITH MAP LOCATION OF THE PROJECT

Recycled Water Conveyance Pipeline

In conjunction with the Novato Sanitary District treatment plant upgrades, this project will be constructed. It includes a pipeline to convey not fully treatment 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.

Recycled Water Projects	
Agency Sponsor and 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 - mgd - Industrial wash down and cooling - mgd
Project Schedule Milestones	CEQA completed and Design completed
Project Costs	\$2,000,000
Footnotes/Comments	North Marin Water District is a partner in this project

INSERT GRAPHIC WITH PROJECT LOCATION MAP

Priority Tier 3 Recycled Water Projects in the San Francisco Bay Region

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; these projects may be more costly in unit price and therefore should be delayed until the demand for non potable water increases; or they are not fully planned as yet due to public utilities resource constraints. Nevertheless, these Long-term Water Recycling Projects that are included in this plan have the potential to deliver mgd of non potable water to the San Francisco Bay Region, offsetting mgd potable water and providing mgd of 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 Full Scale 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	SF Bay water quality

			• Landscape irrigation	
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 Water District Recycled Water Project	Recycled Water	Coastside Half Moon Bay	• Water supply reliability	• Pollution reduction to Pacific Ocean in Monterey Bay Marine Sanctuary
Russell City Energy Center	Recycled Water	East Bay Hayward	• Water supply reliability	• SF Bay water quality • Energy development • Economic Sustainability
Millbrae Recycled Water Project	Recycled water	West Bay	• Water supply reliability	• SF Bay water quality • Landscape irrigation • Economic Sustainability
Regional Water Recycling	Recycled Water	West/South Bay Palo Alto	• Water supply reliability	• SF Bay water quality • Landscape irrigation • Economic Sustainability
SSF/San Bruno Recycled Water Feasibility Study	Recycled Water	West Bay	• Water supply reliability	• SF Bay water quality • Landscape irrigation • Economic Sustainability
Stanford University Local Recycled Water Project	Recycled Water	South Bay	• Water supply reliability	• SF Bay water quality • Landscape irrigation • Economic Sustainability
Sunnyvale Recycled Water	Recycled Water	South Bay	• Water supply reliability	• SF Bay water quality \ • Landscape irrigation • Economic Sustainability
South Bay Water Recycling Civic Center Schools	Recycled Water	South Bay	• Water supply reliability	• Landscape irrigation
South Bay Water Recycling High Tech A	Recycled Water	South Bay	• Water supply reliability	• Landscape irrigation
South Bay Water Recycling High Tech B	Recycled Water	South Bay	• Water supply reliability	• Landscape irrigation
South Bay Water Recycling Eastern Alignment	Recycled Water	South Bay	• Water supply reliability	• Landscape irrigation
South Bay Water Recycling SJ/ Milpitas Connector	Recycled Water	South Bay	• Water supply reliability	• Landscape irrigation
South Bay Water Recycling King	Recycled Water	South Bay	• Water supply reliability	• Landscape irrigation

Road/Ocala Ave Extension				
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

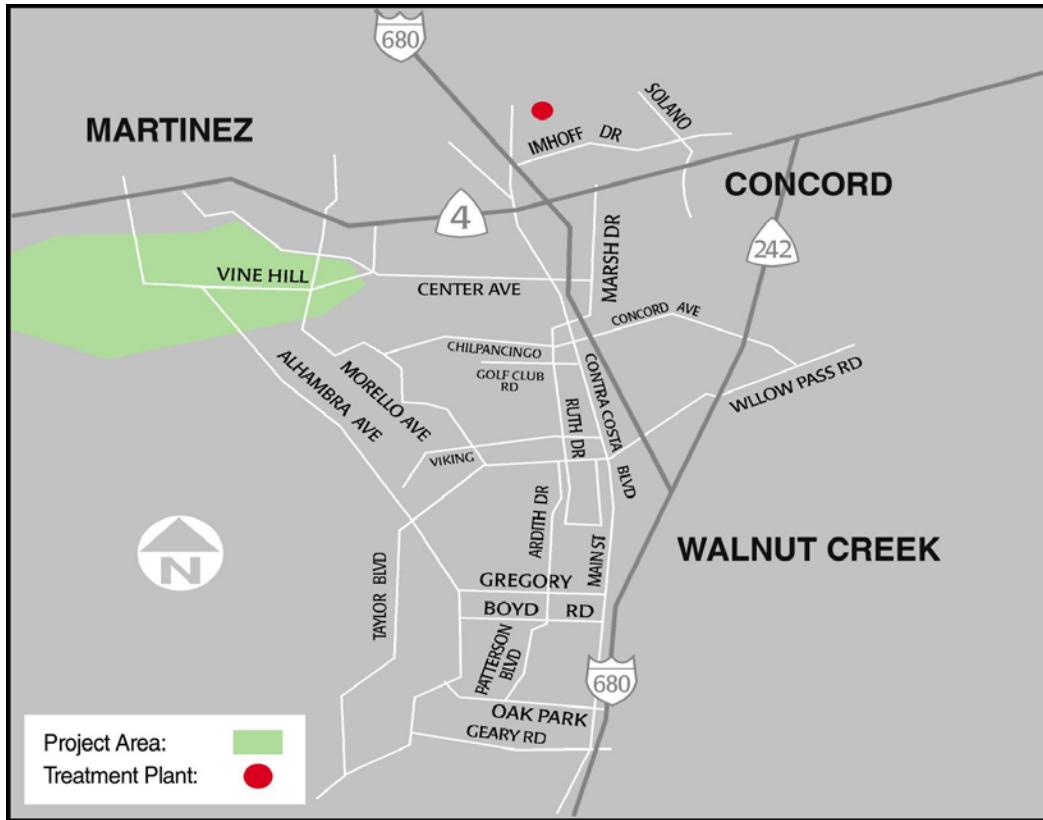
CCCSD Recycled Water Projects

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 as water supply augmentation projects and surface water quality projects to reduce the mass loading into the San Francisco Bay.

CCCSD Martinez 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.

CCCSD Martinez Zone Recycled Water Project	
Agency Sponsor:	CCCSD
Project Title:	Martinez Zone
Project Location:	Martinez – South of Highway 4
Project Description: - Project Process - Amount Delivered - Market Use - Offset to Potable	- 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:	\$5M



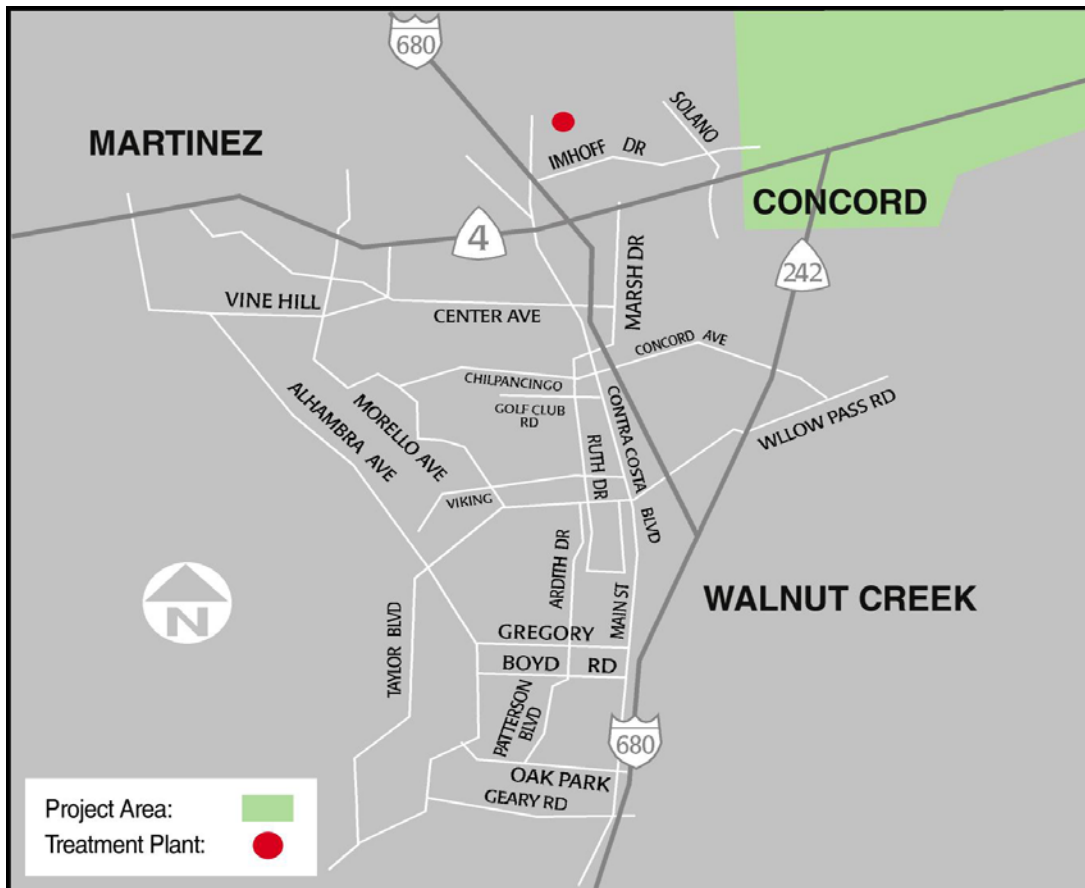
CCCSD North Concord Project

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.

CCCSD North Concord Recycled Water Project	
Agency Sponsor:	CCCSD
Project Title:	North Concord Zone
Project Location:	North Concord

Project Description: - Project Process - Amount Delivered - Market Use - Offset to Potable	- 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:	\$5M

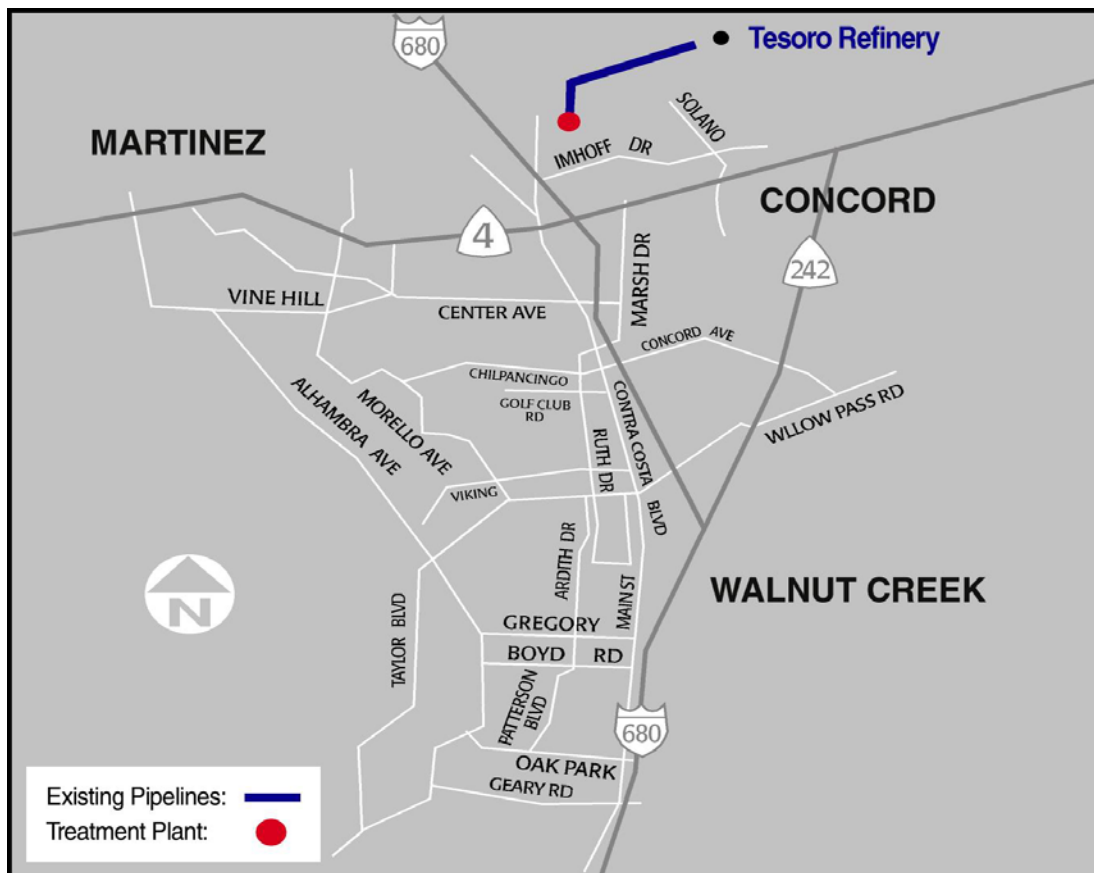


CCCSD Tesoro Refinery Recycled Water Project

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.

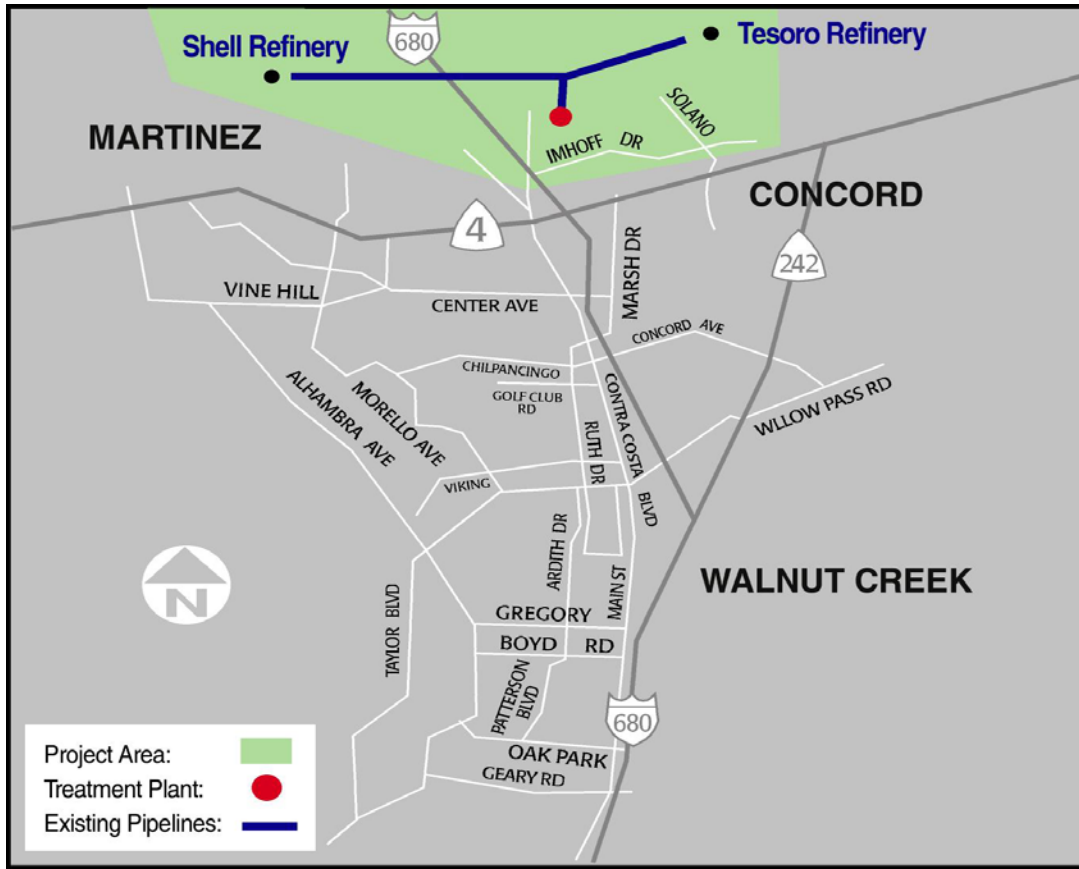
CCCSD Tesoro Refinery Recycled Water Project	
Agency Sponsor:	CCCSD
Project Title:	Tesoro Refinery
Project Location:	Tesoro Refinery, Martinez
Project Description: - Project Process - Amount Delivered - Market Use - Offset to Potable	- Disinfected tertiary recycled water with ammonia removal 9,000 AFY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



CCCSD Industrial Full Scale 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.

CCCSD Industrial Full Scale Recycled Water Project	
Agency Sponsor:	CCCSD
Project Title:	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	▪ 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

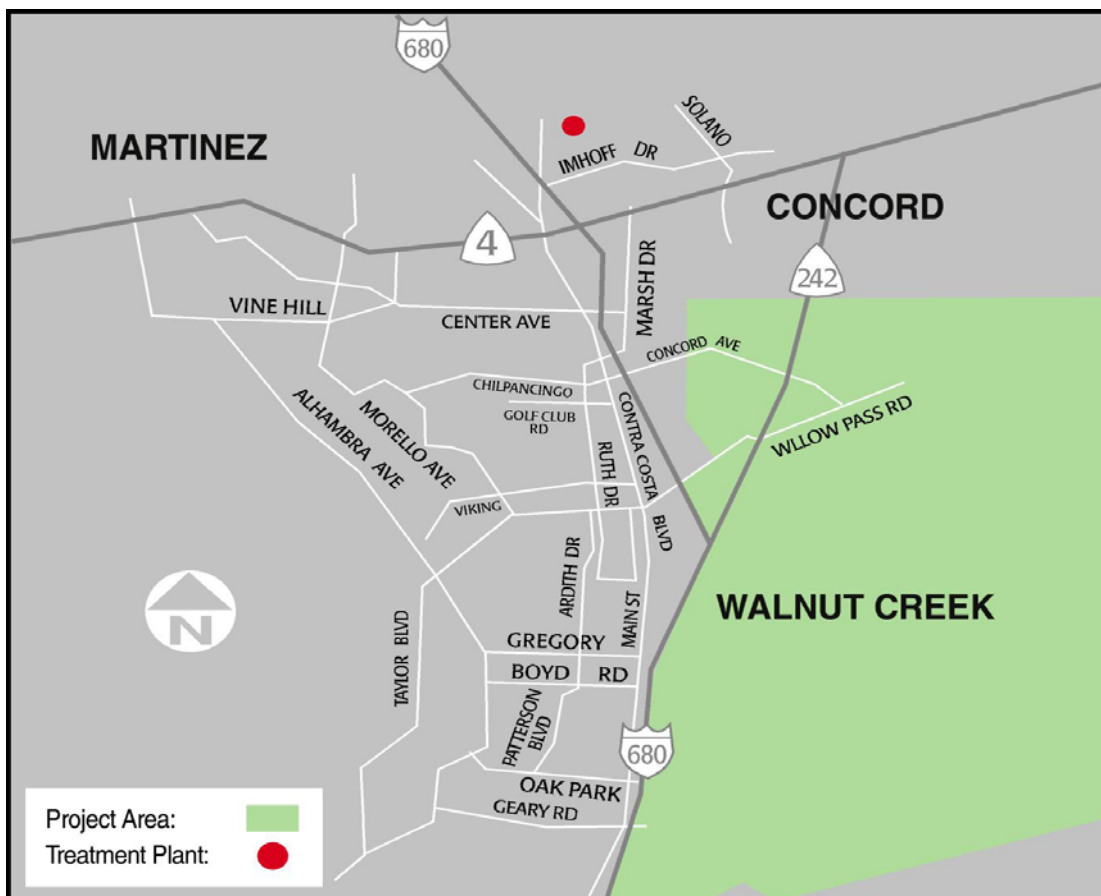


CCCSD Walnut Creek Zone

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.

CCCSD Walnut Creek Zone Recycled Water Project	
Agency Sponsor:	CCCSD
Project Title:	Walnut Creek Zone
Project Location:	North/Central Walnut Creek and South Concord
Project Description: - Project Process - Amount Delivered - Market Use - Offset to Potable	- Disinfected tertiary recycled water 2,000 AFY - Landscape irrigation 2,000 AFY

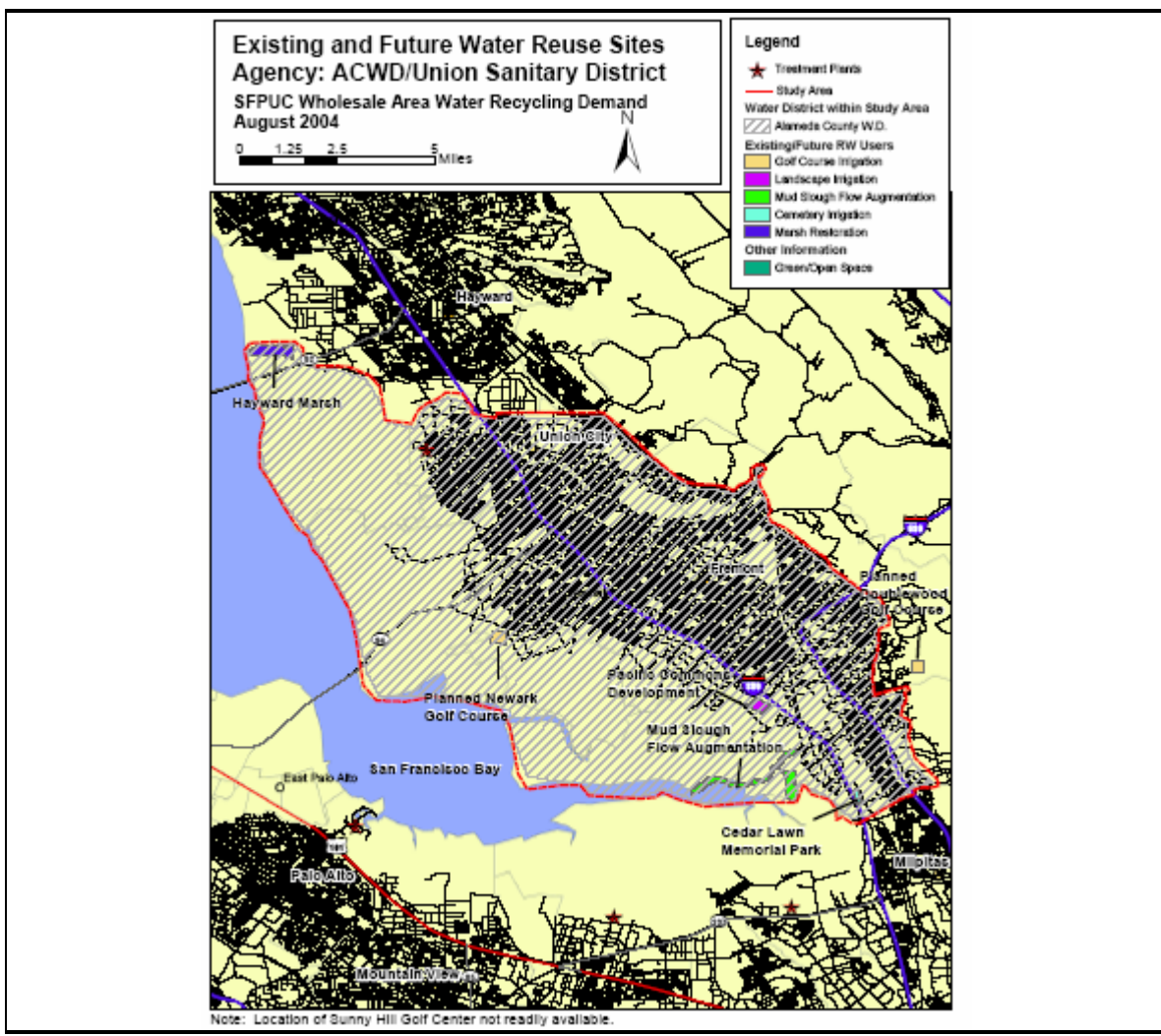
Project Schedule Milestones:	This project is master planned, but not currently scheduled since funding not available.
Project Costs:	\$20M



ACWD-USD Recycled Water Feasibility Study Project, Phase 1

Recycled Water Projects	
Agency Sponsor	Alameda County Water District and Union Sanitary District
Project Title	ACWD-USD Recycled Water Feasibility Study Project, Phase 1
Project Location	City of Fremont, City of Newark
Project Description	Disinfected Tertiary Treatment

- Amount Delivered - Market Use	1.5 mgd (average annual yield) - Irrigation - Golf Courses - Cemetery - Commercial Landscaping 1.5 mgd - NA
Project Schedule Milestones	None at this time
Project Costs	\$33.3 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



Burlingame Recycled Water Project

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 ▪ 3.9 mgd (average annual yield) ▪ Irrigation - o Commercial Landscaping - o Parks ▪ 3.9 mgd ▪ 3.9 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	\$18-20 M Capital/\$300-400 K Annual O&M
Footnotes/Comments	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



Coastside County Water District Recycled Water Project

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 - o Golf Course - o 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

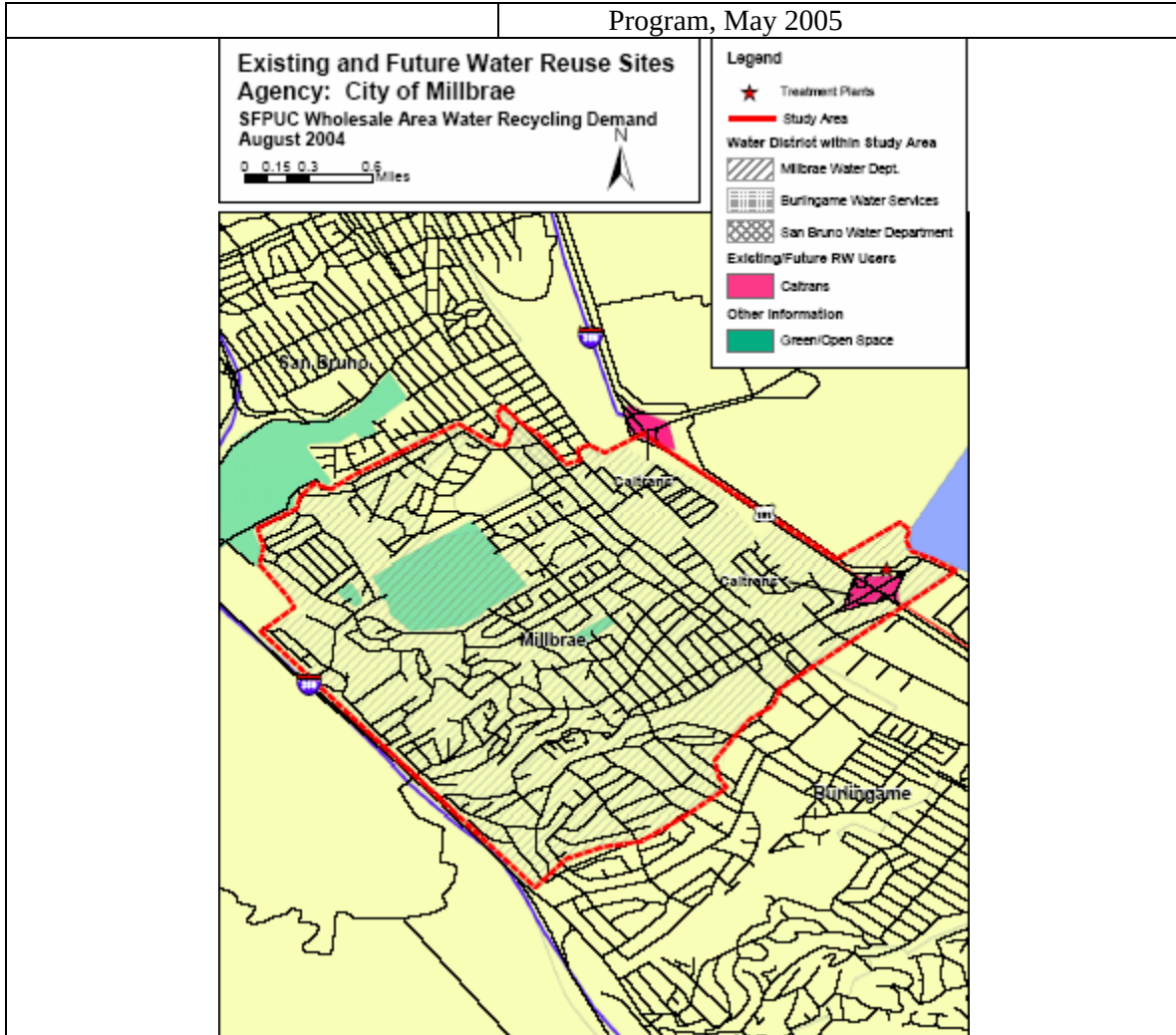


Russell City Energy Center and Other Commercial/Industrial Users

Agency Sponsor	City of Hayward
Project Title	Russell City Energy Center and Other Commercial/Industrial Users
Project Location	City of Hayward
Project Description ▪ Project Process ▪ Amount Delivered ▪ Market Use ▪ Offset to Potable ▪ Offset to Imported Water	▪ Disinfected Tertiary Treatment/Advanced Treatment ▪ 8.3-10.3 mgd (Average Annual Yield) ▪ Commercial/Industrial Uses including a combined cycled electric generating facility ▪ 3.3-5.3 mgd ▪ NA
Project Schedule Milestones	▪ 1993 Water Recycling Master Plan ▪ 2002 Approval for the proposed Russell City Energy Center by California Energy Commission
Project Costs	Unknown
Footnotes/Comments	Implementation of these projects is dependent upon securing funding. ▪ SFPUC Wholesale Customer Recycled Water Potential Technical Memo, December 2004
No Map Available	

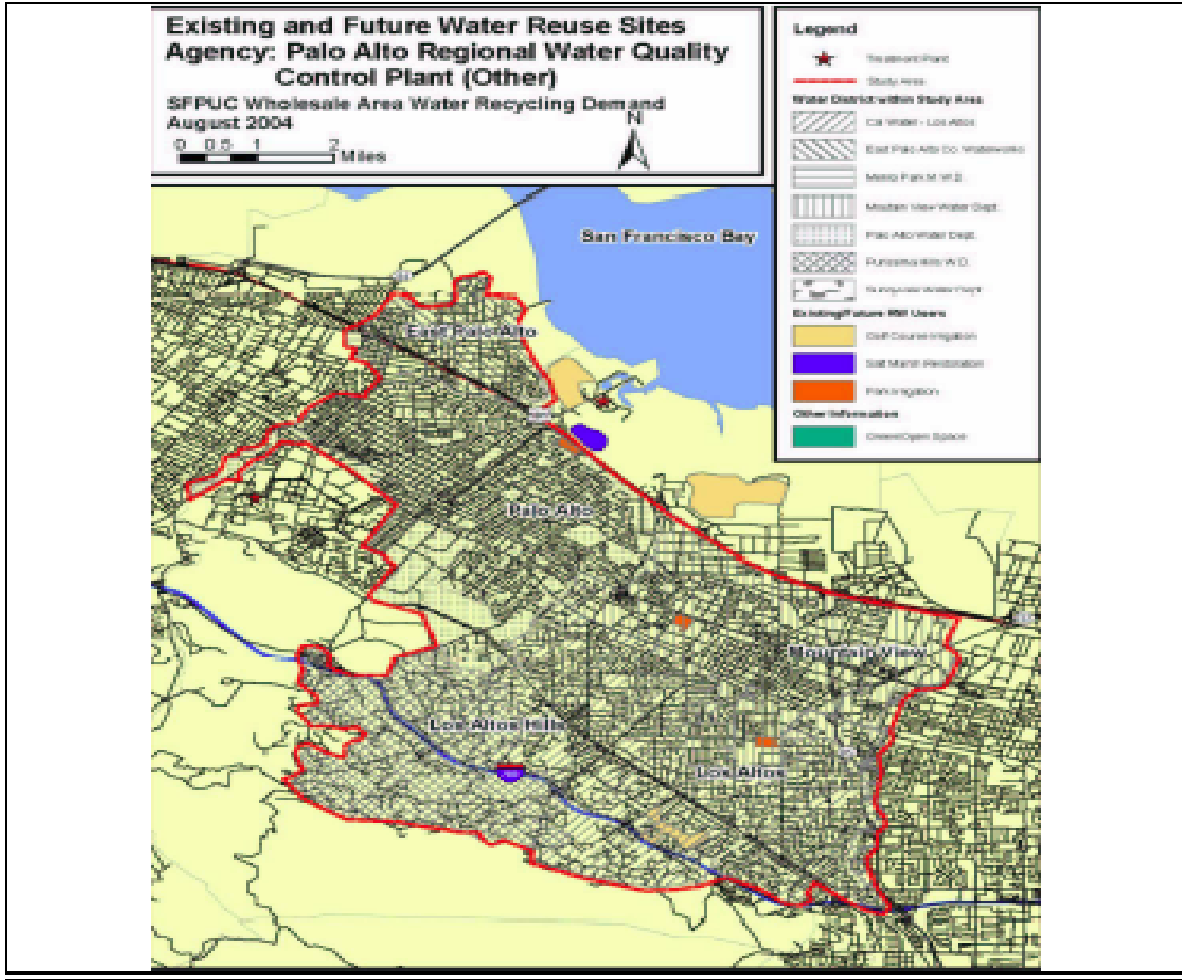
Millbrae Recycled Water Project

Agency Sponsor	City of Millbrae
Project Title	Millbrae Recycled Water Project
Project Location	Cities of Millbrae, San Bruno, Burlingame, and the San Francisco Airport
Project Description ▪ Project Process ▪ Amount Delivered ▪ Market Use ▪ Offset to Potable ▪ Offset to Imported Water	▪ Disinfected Tertiary Treatment ▪ 1 mgd (Average Annual Yield) ▪ Irrigation - o Parks and Medians - o Golf Course - o Commercial/Industrial Landscaping ▪ 1 mgd ▪ 1 mgd
Project Schedule Milestones	None at this time
Project Costs	Estimated \$14-16 M Capital/\$0.3-0.4 M Annual O&M
Footnotes/Comments	The cost for this project has not been evaluated. ▪ SFPUC Wholesale Customer Recycled Water Potential Technical Memo, December 2004 ▪ Bay Area Water Quality and Supply Reliability



Palo Alto Regional Water Recycling Project

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 ▪ 2.26-4.18 mgd (average annual yield) ▪ Irrigation - o Golf Course - o Parks and Medians - o Commercial Landscaping ▪ Commercial/Industrial Use ▪ 2.26-4.18 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	\$16-41 M Capital/\$0.4-1.2 M 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

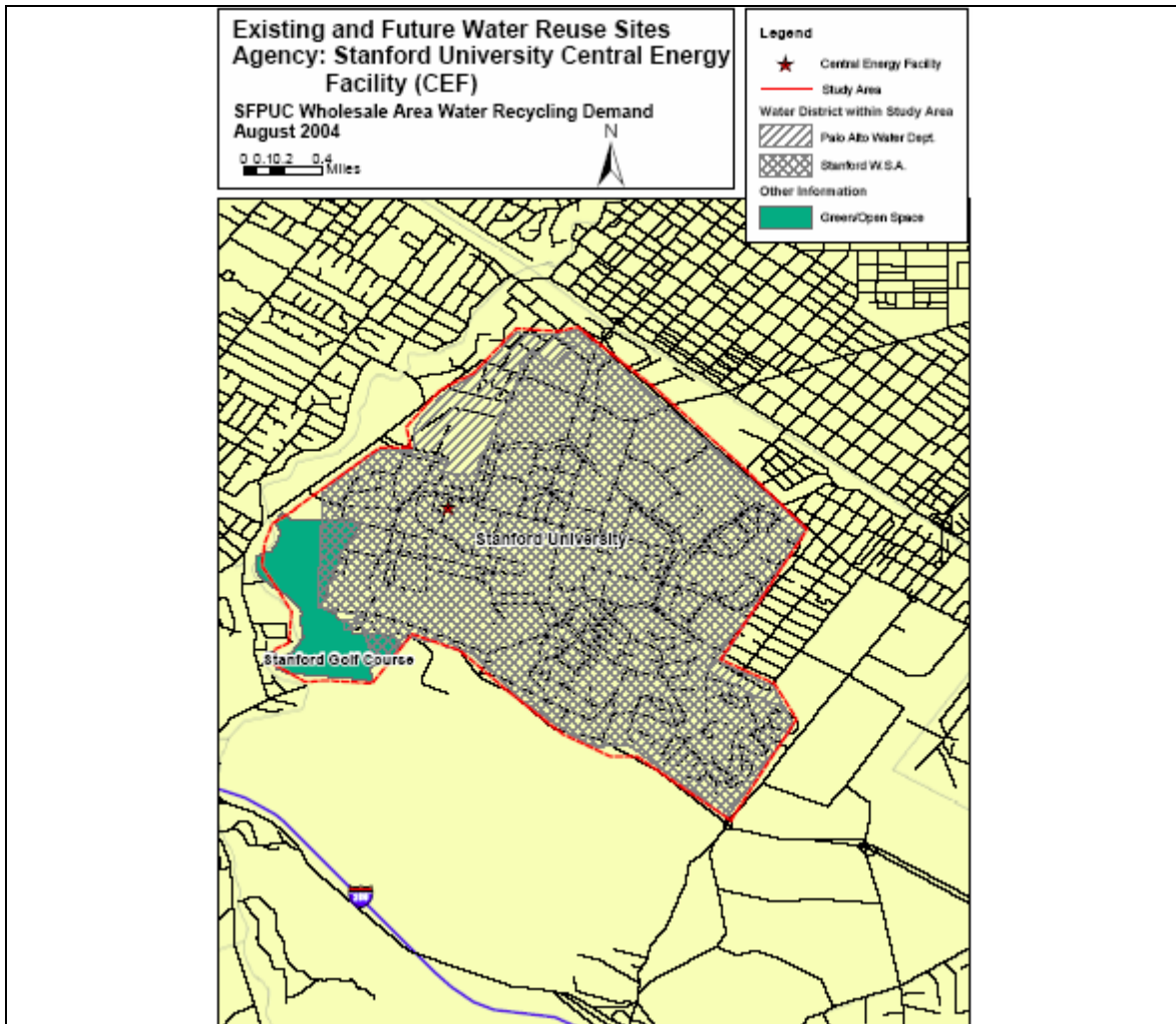


SSF/San Bruno Recycled Water Feasibility Study

Agency Sponsor	Cities of South San Francisco and San Bruno
Project Title	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
No Map Available	

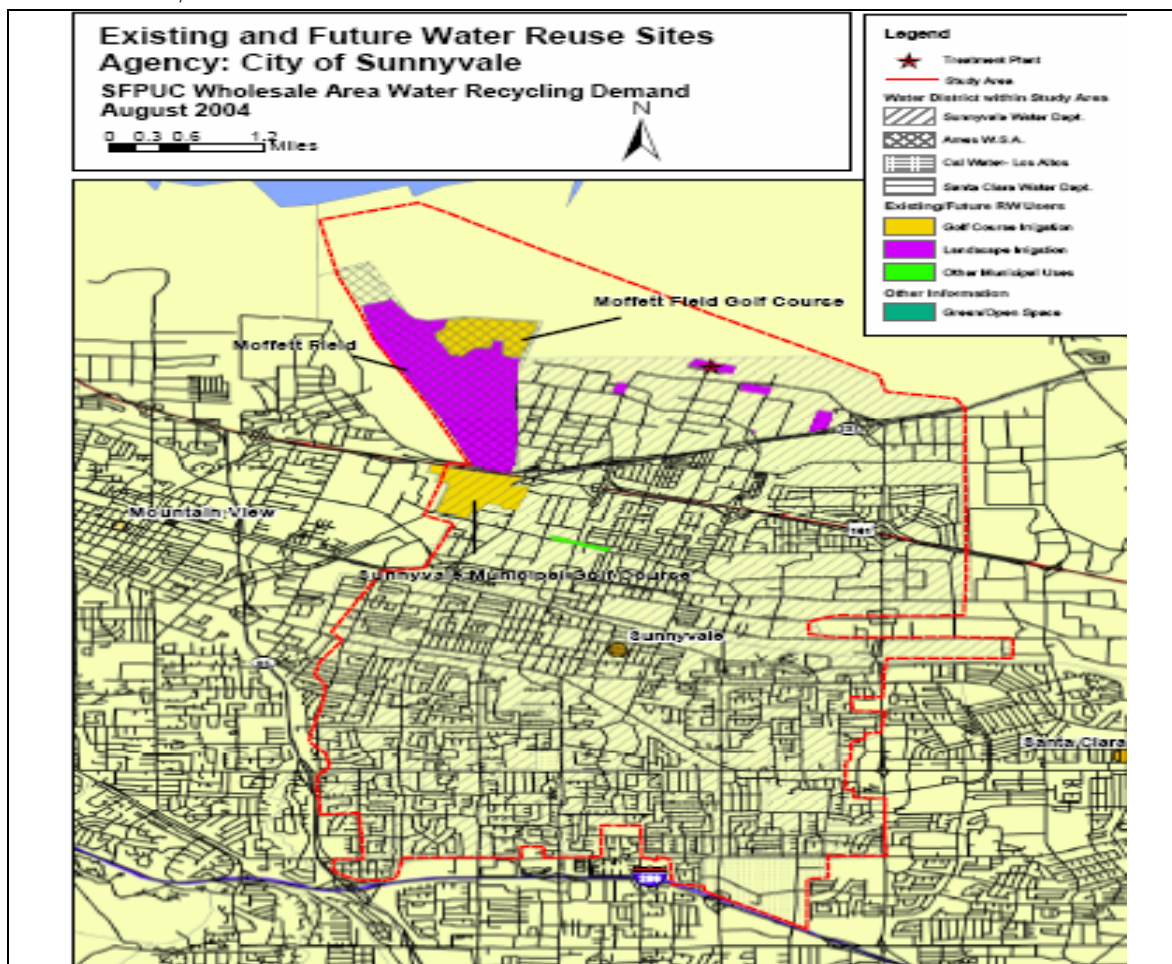
Stanford University Local Recycled Water Projects

Agency Sponsor	Stanford University
Project Title	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 ▪ 0.06-0.98 mgd (average annual yield) ▪ Irrigation ▪ 0.06-0.98 mgd ▪ NA
Project Schedule Milestones	▪ Water Conservation, Reuse and Recycling Master Plan, October 2003
Project Costs	\$2.6-15.7 Capital/\$0.224-1.7 M 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



Sunnyvale Recycled Water Project

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

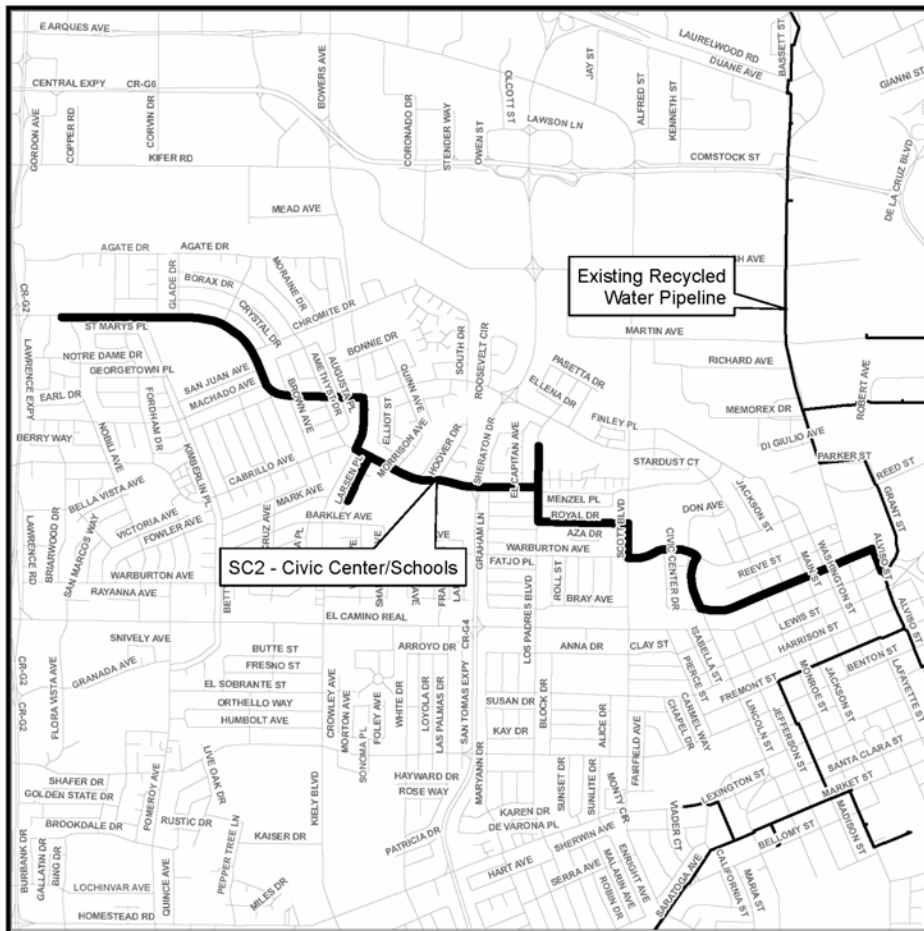


South Bay Water Recycling Santa Clara Civic Center Schools

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 towards the Lawrence Expressway for a total extension length of 20,305 linear feet. This pipeline is included in the Bay Area Regional Water Recycling Program (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.

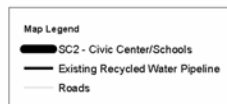
Recycled Water Projects	
Agency Sponsor and Project Title	SBWR Civic Center/Schools
Project Location	City of Santa Clara
Project Description	- Project Process - Amount Delivered
	- Recycled Water Pipeline .2 mgd

▪ Market Use ▪ Offset to Potable ▪ Offset to Imported Water	▪ Landscape irrigation ▪ .2 mgd ▪
Project Schedule Milestones	
Project Costs	\$9,900,000
Footnotes/Comments	



SC2 - Civic Center/Schools

**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

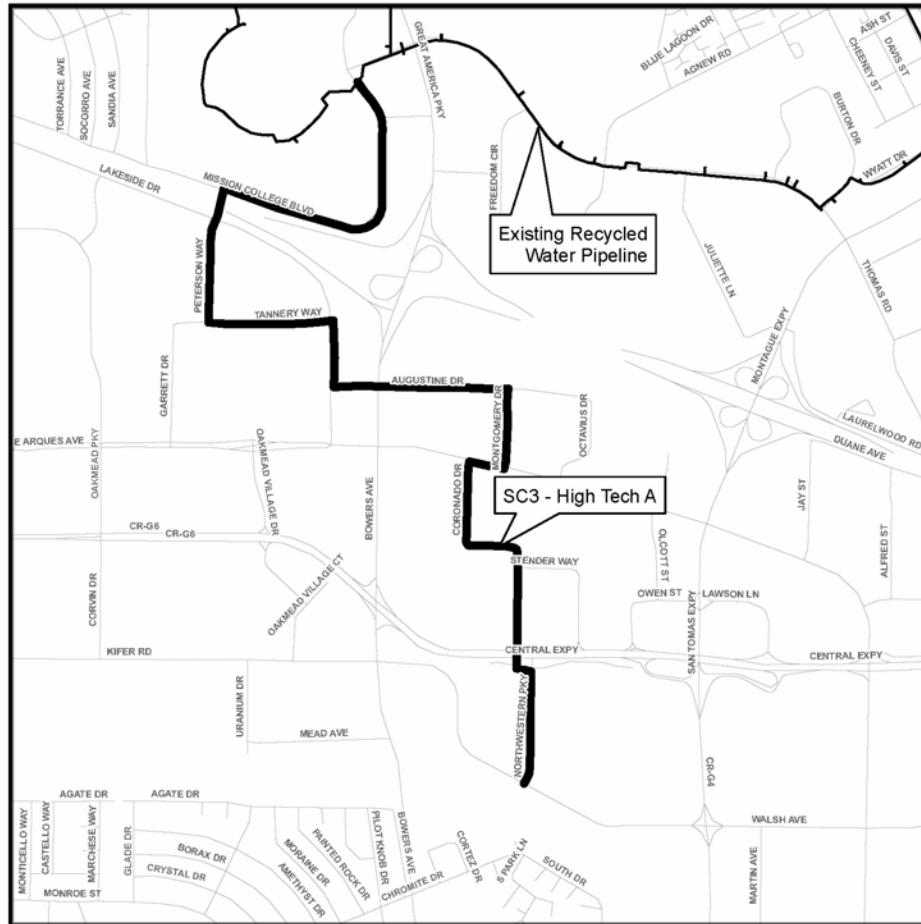
Coordinate System Used:
California State Plane 0403 NAD83 Feet

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 Bay Area Regional Water Recycling Program (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.

Santa Clara High Tech A

Recycled Water Projects	
Agency Sponsor and 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 ▪ .3 mgd ▪ Landscape irrigation and industrial ▪ .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

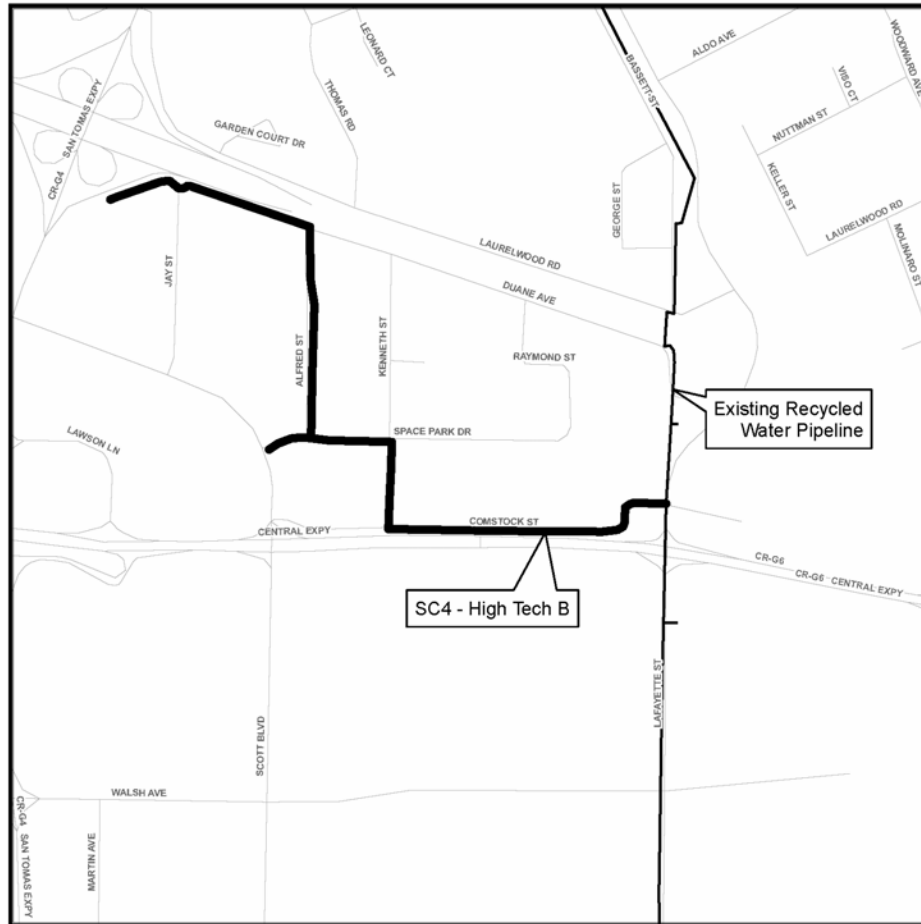
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Coordinate System Used:
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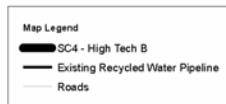
Santa Clara High Tech B

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 Bay Area Regional Water Recycling Program (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.

Recycled Water Projects	
Agency Sponsor and Project Title	SBWR 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 ▪ .1 mgd ▪ Landscape irrigation and industrial ▪ .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

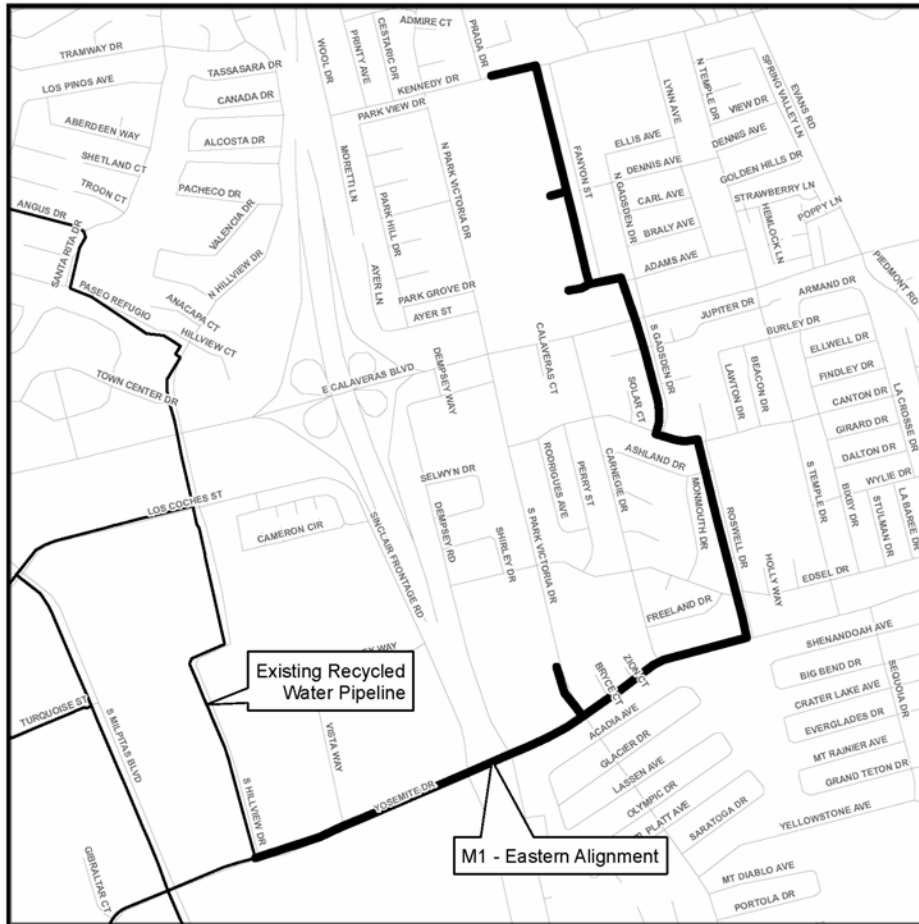


Source:
 Recycled Water Pipelines -
 City of San José Environmental Services
 Street Centerlines -
 City of San José Public Works
 Map Date:
 September 7, 2005
 Map By:
 City of San José
 Environmental Services Department
 Policy and Planning Program and
 South Bay Water Recycling Program
 ArcMap GIS Project Name:
 SBWR Grants Map.mxd
 Coordinate System Used:
 California State Plane 6403 NAD83 Feet

Eastern Alignment

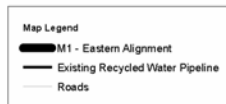
The Milpitas Eastern Alignment Pipeline will connect with the existing pipeline at the intersection of Hillview Drive and Yosemite Drive and proceed northeast towards Kennedy Drive for a total extension length of 11,886 linear feet. This pipeline is included in the Bay Area Regional Water Recycling Program (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.

Recycled Water Projects	
Agency Sponsor and 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 ▪ .1 mgd ▪ Landscape irrigation ▪ .1 mgd ▪
Project Schedule Milestones	
Project Costs	\$16,700,000
Footnotes/Comments	



M1 - Eastern Alignment

**South Bay Water Recycling Program
 Environmental Services
 City of San José**



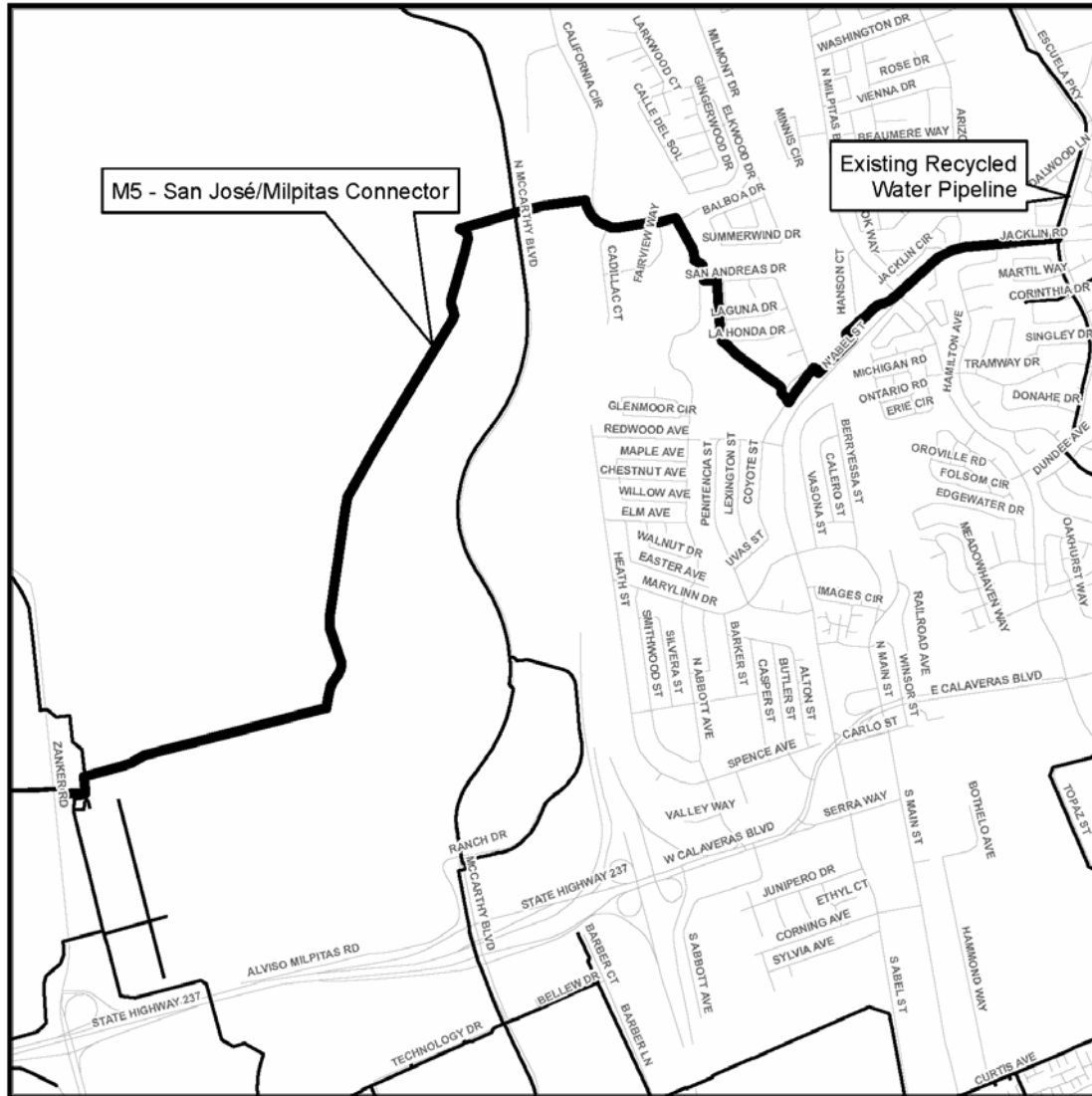
Source:
 Recycled Water Pipelines -
 City of San José Environmental Services
 Street Centerlines -
 City of San José Public Works
 Map Date:
 September 7, 2005
 Map By:
 City of San José
 Environmental Services Department
 Policy and Planning Program and
 South Bay Water Recycling Program
 ArcMap GIS Project Name:
 SBWR Grants Map.mxd
 Coordinate System Used:
 California State Plane 6403 NAD83 Feet

SAN JOSÉ

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 Bay Area Regional Water Recycling Program (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.

Recycled Water Projects	
Agency Sponsor and 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 ▪ .3 mgd ▪ Landscape irrigation ▪ .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



Map Legend

- M5 - San José/Milpitas Connector
- 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

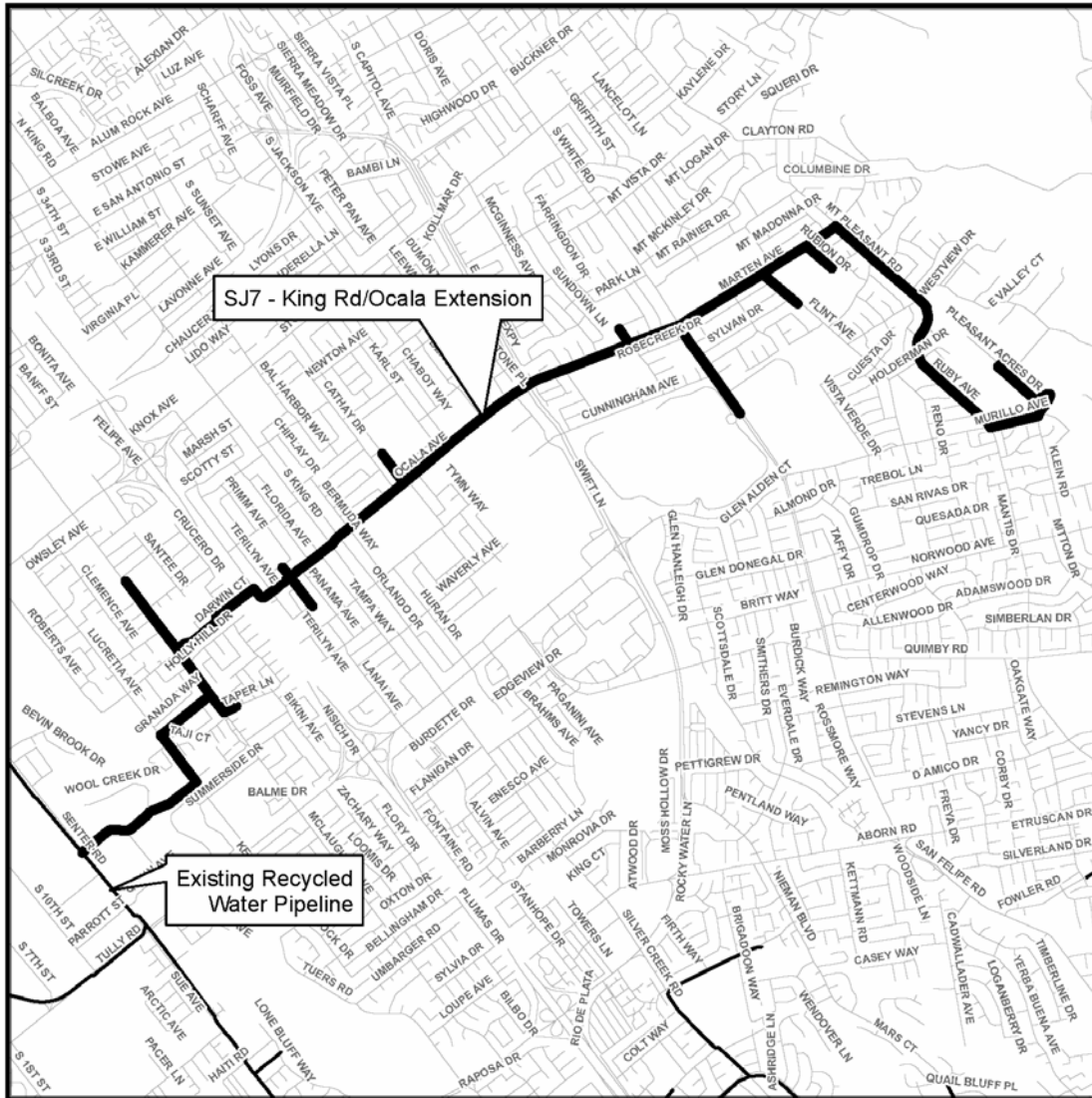
ArcMap GIS Project Name:
SBWR_Grants_Map.mxd

Coordinate System Used:
California State Plane 0403 NAD83 Feet

King Rd/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 Bay Area Regional Water Recycling Program (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.

Recycled Water Projects	
Agency Sponsor and 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



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 research and development (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 Bay Area Regional Water Recycling Program (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.

Recycled Water Projects	
Agency Sponsor and 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.

Recycled Water Projects	
Agency Sponsor and 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

If EBMUD's demonstration Satellite Recycled Water Treatment Plant project determines that it would be feasible and cost-effective to implement and operate satellite recycled water facilities, EBMUD will explore the potential to implement other larger 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 the Central Contra Costa Sanitary District. 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.

Conclusion of Wastewater and Water Recycling Chapter

The San Francisco Bay Region has a highly developed regional approach to wastewater issues and water recycling projects which are intended to provide benefits across the region and the state. At the heart of this regional approach is broad based protection of the natural resources including the drinking water, the surface waters and the public health, aquatic life and wildlife of the region which depend on these water resources. The quality of life and the sustainable economic vitality for 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 Chapter have been developed with these goals in mind and are essential to the maintenance to the sustainable, regional approach to integrated water resources management.