A Case Study in Infrastructure Planning:
South Bay Water Recycling Program, San Jose, California

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INTRODUCTION

When the booming high-technology economy of California's Silicon Valley began to take a toll on the ecological health of the South San Francisco Bay (South Bay), which receives the region's treated wastewater, a public call to preserve the sensitive wetlands sparked the development of a $140 million water works project. The protection of the salt marsh harvest mouse and the California clapper rail, both native to the salty marshes of the South Bay, helped galvanize this collaborative regional effort, led by the City of San Jose, to construct one of the world's largest urban water recycling systems.

Since 1991, the South Bay Water Recycling Program (SBWRP) has evolved into a multi-purpose, multi-jurisdictional infrastructure investment that should help the growing region meet future water supply and environmental needs. With the recent completion of Phase 1 of the project, the system now delivers up to 21 million gallons of recycled water per day to over 200 Silicon Valley customers. Planners have now begun to focus on Phase 2 and system expansion that could provide up to 100 million gallons of recycled water per day by 2020 (City of San Jose Environmental Services Department [ESD], What is SBWRP?, 10/1999).

The SBWRP is among a recent wave of physical and environmental infrastructure investments that seek to transcend the limited scope of traditional state and local public works planning and investment. A new focus on sustaining economic prosperity while enhancing the quality of life and the environment has begun to generate substantial changes at all levels of

infrastructure decision-making and planning processes, from forecasting to financing. The Center for Continuing Study of the California Economy (1999) recommends a number of such policy changes including: identifying investments which serve multiple purposes and provide multiple and long-term values for the economy, the environment, and quality of life; treating investments as partnership efforts between local, regional, federal, and private bodies; and focusing on return on investment with consideration of non-monetary benefits.

The SBWRP showcases a successful integration of these approaches. A regional, future-oriented perspective guided the decision-making throughout the planning and implementation of the innovative project. Enthusiasm for the program from the federal to the community level generated unique partnerships that overcame many of the traditional challenges in local infrastructure investment. Additionally, the program incorporates ongoing commitment to educating the public and large water consumers about water reuse, and to enlisting their participation in shifting regional water consumption to more sustainable levels.

BACKGROUND

San Jose's Wastewater and the South Bay

The San Jose-Santa Clara Water Pollution Control Plant, the largest advanced wastewater treatment facility in California, treats wastewater to near-potable quality at a capacity of 167 million gallons per day (mgd). The plant serves over 1.3 million people in addition to businesses and industries in the Santa Clara Valley Water District. The 300 square mile service area covers most of Santa Clara County and includes the cities of San Jose, Santa Clara, and Milpitas, and the West Valley Sanitary Districts of Los Gatos, Monte Sereno, Saratoga, Campbell, and Cupertino (ESD, San Jose's Sustainable Cities Programs, 1998, p. 38).

This region is the heart of the Silicon Valley, a world center for the high-technology industry that has witnessed dramatic population and economic growth over the past two decades. Silicon Valley's population increased by 300,000 between 1980 and 1990 and over 250,000 jobs were added to the region between 1992 and 1999 (Association of Bay Area Government, 2000). This boom has increased the San Jose-Santa Clara Water Pollution Control Plant's daily wastewater discharges to the South Bay from averages of around 90 mgd in the 1980s to between 110 and 135 mgd in the 1990s (Wong, 1998, p. 133).

While the San Francisco Bay receives over 600 mgd of treated wastewater from 40 municipal wastewater treatment plants, most of the plants discharge to deepwater areas of the Bay and do not significantly impact bayland habitats. The San Jose-Santa Clara Water Pollution Control Plant, however, discharges directly into the salty marshes of the Artesian Slough and Coyote Creek tributary at the southeast tip of the Bay (San Francisco Bay Area Wetlands Ecosystem Goals Project [Goals Project], 1999, p. 162). The increasing volume of high quality treated effluent converts the saltwater to fresher, more brackish water, causing salinity changes which adversely impact the wildlife dependent on this habitat (Goals Project, p. 131).

Development of the region over the past century has filled in and destroyed 150,000 acres of wetlands, leaving few of the tidal marsh communities that are the vital breeding grounds and homes of many rare plant and animal species (Goals Project). Since the late 1980s, the San Francisco Bay Region Water Quality Control Board (the Board), one of the nine regional entities responsible for protecting marine habitats and enforcing State water policy and pollution control programs, has imposed increasingly stringent wetland protection and restoration regulations on the wastewater facilities in the region.

In its 1986 Basin Plan for the Bay region, the Board established the hydrogeologic environment of the South Bay as unique, prohibited any new discharge facilities in the designated region, and stipulated that the San Jose-Santa Clara Water Pollution Control Plant mitigate for habitat degradation (San Francisco Estuary Institute, 1999). U.S. EPA Region 9 also designated the region of the Bay that receives the San Jose discharges as an impaired water body and pressured the Regional Board to more aggressively restrict the plant. Subsequently, in 1989, the Board directed the plant to reduce its flow and, in 1990, set a 120 mgd cap on the plant's average dry weather (May-October) discharge (Sweeney, 1997). The Board imposed the cap as a condition for approval of the plant's National Pollutant Discharge Elimination System (NPDES) permit, a requirement for all wastewater treatment plants under the Federal Clean Water Act (Sustainable City Programs, p. 42). The plant's failure to comply with the permit requirement could result in a moratorium on new sewer hook-ups and development plans in the rapidly growing region.

To meet this limit and avoid such penalties, San Jose submitted an Action Plan in 1991, which included proposals for a salt marsh conversion and habitat protection project, a water conservation initiative, and a non-potable water reclamation and recycling project. The Board approved the plan, exempted San Jose from prohibitions on development, and suspended the 120 mgd flow cap for the duration of the plan's implementation period (San Francisco Estuary Institute, 1999).

When a 1991 drought in Northern California compelled San Jose and the Santa Clara Valley Water District to implement conservation measures, the city was doubly motivated to begin a major water recycling program (Thompson, 1991). A stable water supply is critical not only to Silicon Valley's agricultural firms but also to its high-tech industries, which require

about 10 gallons of water to make one microchip (Rosenblum and Sheikh, 1998). The City of San Jose thus joined forces with a number of stakeholders and agencies, including the neighboring cities of Santa Clara and Milpitas, the Santa Clara Valley Water District, the five local sanitation districts, and the U.S. Bureau of Reclamation, to begin planning the 60-mile pipeline system which would be the product of Phase 1 of the SBWRP.

Water Reuse, In Brief

Cities throughout the U.S. have successfully implemented wastewater reclamation and reuse programs for over 50 years. Although not yet the standard policy for municipal water and wastewater management, such projects have garnered increasing attention and support in the last decade, especially in cities and regions with scarce or vulnerable water resources. Tampa-St. Petersburg, Florida, Orange County, California, and several cities in Colorado and Arizona have been especially innovative in water reclamation and recycling.

The majority of these reuse programs involve *non-potable* uses for recycled water, such as landscape and agricultural irrigation, industrial cooling processes, toilet flushing, and wetland enhancement and creation. As drinking water supplies shrink with increased demand and other environmental stresses, however, indirect *potable* reuse efforts are becoming more common. Recycled water is currently used in several U.S. cities, including Los Angeles, to replenish groundwater, protect aquifers from salt water intrusion, and augment drinking water reservoirs (EPA, 1991).

Water reuse in California has become an important means of meeting growing demands on the state's vulnerable water supplies and reducing the need for especially arid regions to import water. The State Legislature and the State Water Resources Control Board have actively promoted the development of water reclamation and reuse facilities since the 1970s (ESD, Why

water recycling?, 10/1999). The Irvine Ranch Water District's commercial reuse system and the Los Angeles County Sanitation Districts' groundwater recharge project are models for the state and the world and have encouraged ambitious new water recycling efforts throughout California. The amount of water recycled in California increased by 40 percent between 1987 and 1999, and continues to climb with projects like San Jose's (California water agencies, 1994). The State Department of Water Resources predicts that by 2020, California will recycle three times its current volume of 485,000 acre-feet of water per year (AFY)[1] (Vogel, 1999; Martin, 1999).

PHASE 1

Pre-construction planning of the SBWRP, which began in 1991, involved securing the support and collaboration of neighboring resource agencies and governments, attracting customers to receive the recycled water, designing a pipe and treatment system, and procuring resources and agreements for design, construction, and operation. The partnerships and mechanisms generated among stakeholders in the early stages of the project were critical to its timely completion and success.

Establishing Demand and Working With Customers

The Santa Clara Valley Water District provided a foundation for the SBWRP by extending a reuse system that had already been diverting up to 1 mgd of treated wastewater to a local park, a corporate campus, and the San Francisco 49ers training facility since 1991 (ESD, Why water recycling?, 1999). For the new project to achieve the higher reuse capacity of 21 mgd in Phase 1, the system required a substantial expansion, not only of the pumping and piping network, but also of the region's recycled water customer base.

[1] an AF refers to one acre covered by one foot of water, a volume equivalent to the annual water use of two households

The SBWR team first identified a long list of potential urban and agricultural customers based on their quantity and type of water use, proximity to a proposed pipeline, and predicted ease of pipeline construction and connection. Next, they interviewed potential customers to determine actual water use, interest in using recycled water, and expenses for the project and the customer.

The design phase of the project also helped focus customer marketing efforts. San Jose completely redesigned its original proposal for the system after receiving very similar reports from two independent review groups. Both reports recommended replacing a hub-and-spoke design, which would hook up the closest customers first, with a trunk or backbone design, which would connect the largest customers first. This latter design would extend to the southern edge of the service area to provide for future connections to large agricultural customers (Rosenblum, p. 151). The SBWR team thus determined that customer size, based on anticipated volume of recycled water use, was a more strategic criterion than plant proximity for identifying the first group of customers (Wong, p. 134).

To persuade potential customers, the marketing teams emphasized the benefits of using recycled water, such as a significant price discount on potable water and the availability of a reliable water supply for irrigation and other non-potable uses. In setting rates for its customers, the SBWRP established three customer classes based on type of use—landscape irrigation, industrial processes, and agricultural irrigation. The SBWRP discounted recycled water rates from the potable rates by 25 percent for landscape irrigation customers and by up to 92 percent for industrial and agricultural irrigation customers. This deeper discount reflected the higher costs associated with the use of reclaimed water for these customers (Wong, p. 135).

In recognition of customer concerns about the costs and complications of the necessary retrofitting of pipes and irrigation systems, the SBWRP staffed marketing teams with representatives from engineering firms to develop site-specific retrofit agreements (Wong, p. 136). Each retrofit involved mapping the customer's existing water distribution system, designing a modified hook-up to separate potable and recycled water, obtaining approval from local and state agencies for retrofit design, constructing the retrofit, and inspecting the work in progress and upon completion (Rosenblum, p. 153). To retain customers and meet construction scheduling goals, the teams offered a number of personalized customer incentives and funding arrangements. The program provided a grant of up to $500/AFY to large private customers who were willing to contract out for the retrofit construction. Some public agency customers, unable to prioritize the retrofit, preferred to have San Jose's contractors do the work. Other customers chose to do their own retrofit work in exchange for free water in an amount equivalent to their retrofit costs (Rosenblum, p. 154).

Due to such targeted efforts, the customer base grew to over 200 during Phase 1 and now includes school districts, universities, golf courses and country clubs, industrial parks, hotels, government facilities, and a variety of smaller businesses. Seventy percent of the recycled water is distributed to customers in San Jose and 30 percent to customers in Santa Clara and Milpitas (ESD, Questions & Answers, 10/1999).

Construction Requirements and Agreements

Phase 1 construction, which began in the spring of 1996 and continued through the fall of 1998, involved installing 60 miles of high performance pipeline and building two pumping stations and a reservoir to maintain sufficient levels of recycled water during peak demand periods (State Water Resources Control Board [SWRCB], 11/1997; ESD, What is SBWRP?,

10/1999). In addition, the SBWRP required updating the San Jose-Santa Clara Water Pollution Control Plant's treatment and monitoring systems to meet new 1996 EPA standards for recycled water quality.

Because the recycled water system diverts treated wastewater directly back into communities via irrigation and landscaping, public health considerations require that the quality of recycled water be higher than that of wastewater discharged to a water body for dilution. Recycled water in California is also subject to the standards of and monitoring (including spot-checking) by the Regional Water Quality Control Board and by state and local health departments (ESD, Why water recycling?, 10/1999). Thus, construction of the SBWRP included a new Diversion Facility at the plant to provide additional chlorination and disinfection of recycled water. The program also installed state-of-the-art computer systems to automate treatment and testing processes, as well as expanded lab facilities to support the new analysis and monitoring demands. In addition, valves and pipes in the recycled water network were color coded and marked to prevent confusion with domestic water supply systems (ESD, Facilities, 10/1999).

The SBWRP team divided the project into 12 design agreements and construction contracts, a structure that allowed for simultaneous work and timely completion. The team coordinated the work by establishing design standards to ensure uniform quality and engineering integrity, maintaining a master schedule, and holding regular meetings with individual project leaders and with the entire group (Rosenblum, p. 153).

A series of interagency agreements sought to ensure continued cooperation. A "Master Agreement" between the partner agencies—the three cities, the sanitation districts, and the water utilities in the service area—allocated project costs and responsibilities, with San Jose taking the

lead role (Rosenblum, p. 152). The three cities established another set of agreements to codify the provision of services such as right-of-way acquisition, permitting, construction, and inspection. These In-Kind Services agreements specified the services and pay rates for each city. Milpitas took on the task of plan review and Santa Clara agreed to oversee pipeline construction for the entire project (Rosenblum, p. 152).

Although the San Jose-Santa Clara Water Pollution Control Plant is responsible for the primary management and operation of the completed system, the SBWRP delegated additional responsibility for the system's pipelines to municipal water companies. In these Operation and Maintenance contracts, the municipal water companies agreed to maintain the recycling system pipes that run through their respective jurisdictions (Rosenblum, p. 152).

Stakeholder collaboration also yielded water retailing agreements. The service area for the SBWRP encompasses the jurisdiction of five retail water companies, including three municipal and two private utilities (Rosenblum, p. 152). Naturally, these retailers were concerned about losing revenues on the sale of potable water with the introduction of the lower priced recycled water. As SBWRP Director Eric Rosenblum states in his discussion of this issue (p. 151), California law holds that "regulated utilities are entitled to restitution for investment in infrastructure 'stranded' when existing customers are served by another source." To compensate retailers for lost revenues, San Jose and the water companies established Wholesaler-Retailer agreements that provided for San Jose to act as a wholesaler, thereby allowing retailers to continue to serve their customers directly and retain a retail mark-up (Rosenblum, p. 152). The SBWRP indexed its rates to the price of untreated water from the Santa Clara Valley Water District ($240/AF in 1997) and offered an additional discount to retailers who passed a discount on to consumers (Wong, p. 135). According to the Pacific Institute's report on this process in

Sustainable Use of Water: California Success Stories (1998, p. 135), negotiations on these agreements took longer with the private water retailers than with the municipal providers who were already motivated to support the program based on its multiple environmental and economic implications for the region.

Public Outreach and Community Involvement

The facility of the project's construction owes much to community support and concern over the region's growth and its wastewater and water supply problems. Because customer use of and community support for recycled water systems were likely to depend largely on perceptions of the safety of recycled water, the SBWRP made quality concerns a top priority by designing new treatment and monitoring facilities to surpass federal public health standards. The SBWRP management team provided significant public outreach and education efforts to address public concern about recycled water quality. Throughout Phase 1 and continuing today, the program's multi-media education campaign, focus groups, and tours of the Water Pollution Control Plant inform the public about the issues affecting the South Bay and the region's future water supply, the importance of increasing water efficiency, and the benefits and safety of the reuse system (Sustainable City Programs, p. 86; ESD, Clean Bay Strategy Report 2000, p. V-8). The program also established a Citizens' Advisory Committee during the design phase in 1994. The committee included over 25 community representatives from local school districts and environmental and neighborhood groups, and provided a useful means of information exchange between the program and the public (Wong, p. 136).

Outreach also extended to concerns about individual construction projects. According to SBWRP Director Rosenblum, "Neighborhood meetings continued throughout construction, and provided a forum for addressing both resident and project needs without costly or time-

consuming litigation or political intervention" (p. 153). Project engineers met with community leaders to give updates and discuss hours of construction, traffic, and noise control, while contractors employed techniques to minimize neighborhood disruption. New facilities were designed to be aesthetically pleasing and unobtrusive in their neighborhood settings (Rosenblum, p. 153). For example, a pump station and reservoir facility was built into a hillside, while another pump was built with a shingled roof and façade designed to blend into a residential neighborhood (ESD, Facilities, 10/1999).

The program also engaged the interest and support of business and environmental groups in the region. Clean South Bay, a coalition of local environmental groups, petitioned the Regional Water Quality Control Board to enforce the 120 mgd cap and to block additional sewer connections in Santa Clara County during construction (Sweeney, 1997). The City of San Jose responded by stating that a development moratorium would be irresponsible and that the recycling project was on schedule to ease the effluent flow by 1998 (Sweeney, 1997). Clean South Bay's message was clearly important, however, in the next stage of wastewater flow and regional water use management: plans for Phase 2 of the program now include substantial conservation measures in addition to recycling expansion.

In contrast to Clean South Bay, the Silicon Valley Manufacturing Group, representing 125 major regional employers, actively sought to prevent enforcement of the 120 mgd cap and any restrictions on development. In 1998, the recycling system was scheduled to become operational but would not yet meet the mandated discharge level, and penalties remained a real threat. Consequently, the group joined with the San Jose Silicon Valley Chamber of Commerce and the Santa Clara Valley Water District in a successful campaign to reduce wastewater

production through the installation of ultra-low-flush-toilets in businesses and homes (Sweeney, 1998).

Financing

As U.S. environmental policy has adopted more aggressive regulation over the past three decades, local governments have become increasingly responsible for bearing the rising costs of compliance with federal and state mandates. Unfunded mandates have been particularly common for drinking water and waste management providers. The SBWRP shows some exception to this trend as both the State of California and the U.S. Bureau of Reclamation provided financial assistance through policies that recognize the long-term benefits of water reclamation and reuse. The SBWRP successfully achieved a combination of loans and bonds to build Phase 1 at a total cost of $236 million: $141 million capital investment plus an additional $95 million in debt services (Sweeney, 1997).

San Jose's first main source of financing for the SBWRP was a 1995 revenue bond sale by the San Jose/Santa Clara Clean Water Financing Authority (San Jose sells sewer bonds, 1995). San Jose also took advantage of the State Water Resources Control Board's (SWRCB) Water Recycling/Reclamation Loan Program, begun in the 1980s, which provides low-interest loans for the design and construction of water recycling projects (Water Recycling Programs, 1999). The SWRCB also grants funds for water recycling programs through a State Revolving Fund (SRF) (SWRCB, Funding guidelines, 04/1997, p. 3). By November of 1997, the SWRCB had approved SRF loans totaling $95 million (separate loans in the amounts of $5, $50, and $40 million) to the City of San Jose for the SBWRP (SWRCB, Workshop session, 05/1997). On the federal level, the U.S. Bureau of Reclamation provided financial assistance under its Title XVI program, which offers reimbursement for up to 25% of costs for recycling programs that submit

to an appropriate Value Engineering Review. To cover other project costs that exceeded state and federal aid, San Jose raised sewer rate charges by more than 50% between 1989 and 1998 (Wong, p. 137).

In the short term, the revenue from recycled water is expected to cover operating and maintenance costs, but not annual debt service. Long-term expectations for the program, which consider the rising value of the drinking water supply, are optimistic that the SBWRP will provide significant return on investment (Wong, p. 137).

Performance Measurement

Because the water reuse project encompasses features of both water supply and wastewater treatment and disposal systems, it can be evaluated in terms of the traditional performance measures or engineering variables for these systems such as safety, condition, and efficiency of facilities. In addition, because the recycling effort was driven by both an environmental mandate and a desire to sustain the region's water supply, the system's performance can be measured in terms of how well it meets these goals and provides long-term water quality and water supply benefits to the region. The program's dependence on customer use and community support provides a third area for performance measurement.

By November of 1998, three-fourths of the first set of over 100 customers were connected to the system and receiving recycled water for irrigation and industrial use. November 1, 1998 also marked the first time that the San Jose-Santa Clara Water Pollution Control Plant had met the discharge goal of 120 mgd in over five years (Sweeney, 1998). Since then, more than 100 new customers have been added to the system, with a total of 222 connections by January, 2000 (Clean Bay Strategy Report, p. I-2). For example, high-tech giant Cisco Systems, one of the SBWRP's largest customers, uses recycled water to landscape over 1

million square feet and to replace the potable water in the toilets of its 19 buildings. The City of San Jose is also using recycled water to irrigate its parks and public lawns and expects this decrease in its potable demand to reduce the City's water bill by 23 percent (ESD, Why water recycling?, 10/1999).

The recycling program is the primary means by which San Jose and its partners hope to reduce flow to the salt marshes and meet the mandated 120 mgd cap. Although the system provides the capacity for diverting up to 21 mgd of wastewater to reuse, actual average monthly rates of recycled water use have ranged from 3 to 15 mgd since the fall of 1998, as cooler temperatures have reduced irrigation demands (ESD, Program status, 10/1999). The recycling system is expected to reach a maximum delivery rate during the six dry weather months of May through October; these months are also the most critical breeding period for the wildlife of the salt marsh habitat. Peak use of recycled water during the 1999 dry weather period was 8.8 mgd in October (Clean Bay Strategy Report, p. I-2). Performance assessment based on delivery rates should become more useful once the system has been operating with the current customer load through another dry weather season. In addition to the water treatment plant's discharge volume, relevant performance measurements will include: rate of use of potable water by customers connected to the recycled water system compared to their pre-SBWRP rate of water use; per-capita water use in the region before and after implementation of the system; the volume of drinking water supply reserves over time; and the price of potable water in the region.

In accordance with San Jose's original and revised (1997) Action Plans, the city has also initiated water conservation efforts to compliment reductions in wastewater flow. A "Slow the Flow" campaign offers rebates and vouchers to residents and businesses for ultra-low-flush toilets. According to San Jose's recent Clean Bay Strategy Report, the city processed over

100,000 rebates between 1992 and 2000 (p. I-7), while continued conservation efforts are expected to reduce wastewater flow by 5-8 mgd over the next five years (Sustainable City Programs, p. 44).

Long-term assessment of the impacts of the water reuse system and the supplementary conservation effort on the environment of the South Bay and on the region's water supply should consider the success of the reuse effort in meeting the 120 mgd wastewater flow cap, restoring the health of the salt marsh and its endangered species, and safeguarding water supply reserves.

PHASE 2

The SBWRP has moved to Phase 2 and has begun planning a long-term strategy for expansion of the system and coordination with other regional recycling programs. A public advisory committee for Phase 2 represents a spectrum of interests and includes the San Jose Superintendent of Schools, the head of the local Chamber of Commerce, the President of the County Medical Association, and other community representatives (Clean Bay Strategy Report, p. V-1).

The most recent $150 million plan, down from an initial $350 million expansion proposal, calls for extension of the pipeline to begin in late 2000 and the diversion of an additional 15 mgd of recycled water by 2002. In addition, the plan calls for more active conservation efforts to reduce the flow into the wastewater treatment plant (Clean Bay Strategy Report, I-3; Sweeney, 1997). The City of San Jose has also purchased several privately-owned portions of salt marsh land and will continue wetland recovery and restoration programs in the South Bay (Sustainable City Programs, p. 47).

As part of the Bay Area Regional Water Recycling Program, a group of 13 water and wastewater agencies, the SBWRP team is working to develop an integrated water reuse system,

including some potable reuse, for the five-county region. The $700 million regional program would be constructed over the next 40 years to market 1 million AFY of recycled water, a huge increase from the current five-county yield of around 20,000 AFY[2] (Sweeney, 1999; Martin, 1999).

CONCLUSION

In an era of fragmented management of and investment in natural resources and built infrastructure, the South Bay Water Recycling Program offers a model for future capital planning efforts. Although not of the same large-scale as many of the most challenging transportation, power, and water resource infrastructure projects, the program's success is based less on the numbers and more on the decision-making processes and collaboration that marked all phases of development, construction, and management.

As California State Treasurer Philip Angelides writes in his 1999 report, Smart Investments (p.9):

> "…public investments should be driven by a set of principles guiding California's future economic growth, not by a "magic" percentage of the State's budget or a compilation of capital projects desired by various agencies. To date, much of the discussion surrounding infrastructure investment has revolved around dollar needs versus dollar availability in the absence of a strategic investment plan."

This comment is valuable beyond its economic focus; Angelide advocates for the dire need, in all infrastructure planning and investment, for a strong foundation of principles and long-term strategy. The SBWRP confirms the potential for such a foundation to provide infrastructure that meets the needs of both a growing economy and a sensitive environment. Such an undertaking

[2] The SBWRP's current 21 mgd capacity is equivalent to about 10,000 AFY

can and should be considered public investment in accord with that much lauded but seldom realized environmental, economic, and social goal: sustainability.

Chronology of the South Bay Water Recycling Program

1986: The San Francisco Bay Region Water Quality Control Board's Basin Plan establishes the

sensitivity of the region of the South Bay into which the San Jose-Santa Clara Water Pollution Control plant discharges.

1987-1992: Drought conditions affect Santa Clara County and the region.

1989: The Regional Water Quality Control Board issues a Cease and Desist Order to the San Jose-Santa Clara Water Pollution Control Plant. The plant is ordered to reduce discharge or mitigate damage to the salt marsh.

1990: The State Water Resources Control Board directs the Regional Water Quality Control Board to adopt a plan to limit flows from the San Jose-Santa Clara plant to 120 mgd to protect endangered species.

1991: The Santa Clara Valley Water District builds a recycled water system which recycles 1 mgd of treated wastewater for landscape irrigation.

1991: San Jose submits an Action Plan for the South Bay which includes a wastewater recycling initiative. The Regional Water Quality Control Board accepts the plan and suspends restrictions on the wastewater plant.

1992: San Jose begins a two year survey to identify recycled water customers for the SBWRP.

The South Bay Water Recycling Program (SBWRP) begins the design and planning stages.

1994: The SBWRP Citizen's Advisory Committee forms.

1995: The San Jose/Santa Clara Clean Water Financing provides initial financing for construction of the SBWRP through sale of an $81 million sewer bond.

1996: In December, the Regional Water Quality Control Board gives San Jose six months to reduce its effluent flow which has hit a maximum of 135 mgd.

Construction of Phase 1 of the SBWR system begins in July.

1997: The Regional Water Quality Control Board approves a $95 million loan for the SBWRP.

By October, one-third of the pipeline for Phase 1 is complete.

San Jose dedicates the Transmission Pump Station and 20 miles of distribution line which begin delivering recycled water to 30 customers.

1998: By November, the SBWRP is serving about 75 customers.

1999: In July, the SBWRP joins the San Francisco Bay Area Regional Water Recycling Program to plan a long-term, regional water recycling network.

By September, Phase 1 construction is complete and SBWRP is serving over 200 customers at a 21 mgd capacity.

San Jose conducts planning workshops for Phase 2 and the City's 5-year capital program.

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