

City of San Diego Recycled Water Master Plan Update 2005

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City of San Diego



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City of San Diego Recycled Water Master Plan Update 2005

September 2005

This Master Plan Update documents the Reuse Study's evaluation of opportunities to expand the City's existing recycled water distribution system of additional non-potable uses. Previous drafts of this document have been reviewed by the City of San Diego and the Reuse Study's Independent Advisory Panel. This final Master Plan Update includes revisions made in response to their review comments.

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ABBREVIATIONS AND ACRONYMS

AF	acre-feet
AFY	acre feet per year
BOD	Biochemical Oxygen Demand
Cal-American	California American Water Company
Caltrans	California Department of Transportation
CCSD	City Customer Support Division
CDHS	California Department of Health Services
CSA	Central Service Area
CWA	Clean Water Act
DEH	San Diego County Department of Environmental Health
EDR	Electrodialysis Reversal
EPA	United States Environmental Protection Agency
ft	Feet
GAPS	Grove Avenue Pump Station
GIS	Geographic Information System
gpm	gallons per minute
HARRF	Hale Avenue Resource Recovery Facility
HCF	hundred cubic feet
HOAs	Homeowner's Associations
IBWC	International Boundary and Water Commission
LMDs	Landscape Maintenance Districts
MADs	Maintenance Assessment Districts
MBC	Metro Biosolids Center
MBR	Membrane Bioreactor
MCAS	Marine Corp Air Station
MG	million gallons
mg/L	milligrams per liter – equivalent to parts per million
MGD	million gallons per day
MRO	Mandatory Reuse Ordinance
MWWD	Metropolitan Wastewater Department
NCWRP	North City Water Reclamation Plant
NRC	National Research Council
NSA	Northern Service Area
O&M	Operation and Maintenance

Abbreviations and Acronyms

OMWD	Olivenhain Municipal Water District
OPRA	Ocean Pollution Reduction Act
OWD	Otay Water District
PF	peaking factor
psi	pounds per square inch
PUAC	Public Utilities Advisory Commission
PUSD	Poway Unified School District
PVC	polyvinyl chloride
RAS	Return Activated Sludge
RW	Recycled Water
RWQCB	Regional Water Quality Control Board
SBWRP	South Bay Water Reclamation Plant
SDCWA	San Diego County Water Authority
SDDPC	San Diego Data Processing Corporation
SPSA	San Pasqual Service Area
SR-52, SR-56	State Route 52, State Route 56
SSA	Southern Service Area
SWA	Sweetwater Authority
TDS	Total Dissolved Solids
UCSD	University of California San Diego

1.0 INTRODUCTION

Currently, the 1.3 million people of San Diego use approximately 235,000 acre-feet per year (AFY), which is equivalent to 210 million gallons per day (MGD), of potable water. The City's population is projected to increase 50 percent in the next 25 years. Even with additional water conservation efforts, the City projects that their population increases will increase demands for potable water by approximately 25 percent, or approximately an additional 50 MGD.

In 1999, the San Diego County Grand Jury reviewed the status of the City's water supply and expressed their opinion as follows:

“Water is a scarce commodity in the rapidly growing San Diego region. In the face of increased demand for water from other geographical areas, imported water and water from transfers are not reliable sources of water for the future. Many decisions about water supply for San Diego are made by the state and federal governments and thus out of local control. In order to increase the reliability of its overall water supply, the City of San Diego must expand its supply of local water. Long-term focus is absolutely necessary in planning for future water needs.

Exacerbating this situation, the San Diego region is a desert, dependent on imported water for 80 to 90 percent of its water supply. The imported water is unreliable since years of ample rainfall and plentiful water can be followed by years of drought and water scarcity. Also, in times of earthquake or other emergency and, in view of projected population increases, adequate imported water may not be available. Therefore, increasing locally controlled water supplies is vital to the region.”

1.1 RECYCLED WATER AS A LOCAL WATER RESOURCE

Most of the City's existing water supply is imported water from the Colorado River and the California State Water Project. Because of this, the City has long recognized the need to develop local water supplies to balance and reduce the dependence on imported water. A diversified water “portfolio” would provide the City needed reliability and local control of its water supply. In 1997, the City prepared the *Strategic Plan for Water Supply*, a significant initial effort at documenting the diversification needed to address water supply needs through 2015. This report was updated with the more detailed *Long-Range Water Resources Plan (Long-Range Plan)*, completed in 2002, outlining a phased approach to satisfy water supply needs through 2030.

The Long-Range Plan recommended that the City develop and use of 15,000 AFY of recycled water by 2010 (approximately 6 percent of the City's 2010 water demand) and up to 33,000 AFY by 2030 (approximately 11 percent of the City's 2030 water demand).

The need for local water supply development is echoed by the San Diego County Water Authority (SDCWA) in their *2004 Annual Water Supply Report*, subtitled *Supply Reliability through Diversification*. This report states, “A critical component of future reliability is development and management of local supplies and conservation programs by the SDCWA’s member agencies.” It also addresses water reuse by saying, “implementation of water recycling is essential to using the region’s water supplies efficiently”, and specifically references the City’s Water Reuse Study 2005 as an example of what is needed.

1.2 HISTORY OF WATER REUSE IN SAN DIEGO

The City has been a pioneer in the field of water recycling. In 1981, the 25,000-gallon per day Aqua I pilot aquaculture plant began operation in Mission Valley, with the water produced used to irrigate a sod farm adjacent to Jack Murphy Stadium (now Qualcomm Stadium). In 1984, the Aqua II Water Reclamation Facility, a second, larger pilot research installation, began treating 180,000 gallons per day of wastewater. This water was sold to the California Department of Transportation (Caltrans) for use in irrigating freeway landscaping beginning in 1987. In 1991, the Aqua III Water Reclamation Facility and Aqua 2000 Research Center were located in the San Pasqual Valley, north of the community of Rancho Bernardo, where the Aqua III plant continued to use aquaculture treatment to reclaim wastewater. This facility had the capacity to treat 1 MGD for agricultural use and irrigation. The Research Center continued to study the concept of advanced water treatment and potable reuse using a variety of treatment methods until 2001 when the project was discontinued. Since the completion of the North City Water Reclamation Plant (NCWRP) in 1997, the City has been delivering recycled water to customers for irrigation and industrial use on a larger scale. The amount of water reused has reached the current total of approximately 6 MGD. In 2002, the South Bay Water Reclamation Plant (SBWRP) was completed to deliver recycled water to the southern portion of the City.

The following discussion briefly recounts some of the key historical events that spurred the recycled water program, and describes the main features of the existing recycled water system and planned expansions.

In addition to a critical water supply need, wastewater management also drives the need to maximize local water recycling. Since 1963 the City has treated its wastewater at the Point Loma Wastewater Treatment Plant, which provides advanced primary treatment before disposal in an ocean outfall. In 1972, the federal Clean Water Act (CWA) was adopted which requires that wastewater plants provide a minimum of secondary treatment. Section 301(h) of the CWA allowed facilities that discharge to certain marine waters to apply for a waiver from secondary treatment standards by 1982. The City originally applied for the waiver, but then withdrew it. In 1987, the U.S. Environmental Protection Agency (EPA) and environmental groups sued the City for not meeting the provisions of the CWA. The Ocean Pollution Reduction Act (OPRA) was passed in 1994 to allow San Diego to reapply for the Section 301(h) waiver. The lawsuit was resolved later that year when the waiver was granted, saving the City an estimated \$3 billion in avoided capital costs for additional facilities.

As part of the Section 301(h) application, the City committed to implementing a water reclamation program that would create a system capacity to treat 45 MGD by 2010. The City has fulfilled the treatment capacity requirement with the completion of the 30 MGD NCWRP in 1997 and the 15 MGD SBWRP in 2002. A 1995 federal court order further required the City to construct an “optimized recycled water distribution system” in conjunction with building the NCWRP. The majority of the distribution facilities that comprise the optimized system were installed between 1995 and 1998 to enable delivery of recycled water upon completion of the reclamation plant.

The EPA provided a grant that helped fund the construction of the NCWRP. Conditions of the grant award are quoted as follows:

Upon certification of the NCWRP, flows into the plant will constitute a minimum of 75 percent of the plant’s design capacity (i.e. at least 22.5 MGD). Of these flows the City will beneficially reuse at least 10 percent upon certification and shall attempt to meet the following goals:

- a. Beneficial reuse of 25 percent of the flows treated at the NCWRP by December 31, 2003.*
- b. Beneficial reuse of 50 percent of the flows treated at the NCWRP by December 31, 2010.*

Based on anticipated flows, the City established reuse goals of 6 MGD by the end of 2003 and 12 MGD by the end of 2010 to fulfill the EPA grant goals.

Presently, NCWRP treats 22.5 MGD (75 percent of capacity) of wastewater to secondary standards. The requirement to reuse 10 percent of the treated flows was achieved in 1998, when about 2.4 MGD of recycled water was distributed. Currently, approximately 6 MGD of recycled water is beneficially reused. Through the retrofit program for existing water customers and by requiring developers in the NCWRP service area to construct recycled water conveyance systems to new developments, the City has diligently pursued the fulfillment of the water reuse goals.

Regarding the City’s 301(h) waiver application in 2000, disagreements arose as to the interpretation of OPRA, primarily over the quantity of suspended solids that could be discharged from the Point Loma Wastewater Treatment Plant into the Pacific Ocean. These disagreements were the subject of two administrative appeals to the Environmental Appeals Board and a lawsuit. The City appealed the EPA’s application of OPRA to the new waiver, which would require the City to continue to reduce the quantity of suspended solids each waiver period and continue to attain at least 58 percent removal of the biochemical oxygen demand (BOD). Three environmental groups also appealed the new waiver on a number of issues, including that the quantity of suspended solids should be reduced further. In addition, an environmental group filed an action in Superior Court of San Diego County challenging the State Board’s reinstatement of the 15,000 metric tons per year limit of suspended solids. The Superior Court challenge was dismissed and all appeals were stayed as the parties agreed to discuss possible alternative solutions to the OPRA issues. The parties met regularly from January 2003 to March 2004 and agreed on a Settlement Agreement and Joint Stipulation for Withdrawal of Appeals. The Settlement Agreement commits the City to (a) evaluate improved ocean monitoring, (b) pilot test

biological aerated filters as a form of technology to increase solids removal, and (c) study increased water reuse.

The Water Reuse Study 2005 is intended to fulfill the City's commitment to study increased water reuse. This Master Plan Update was developed as a component of the Water Reuse Study to address expansion of the recycled water distribution system for non-potable uses.

1.3 EXISTING NORTHERN RECYCLED WATER SYSTEM

NCWRP is operated by the City's Metropolitan Wastewater Department (MWWD) and currently treats 22.5 MGD of wastewater (75 percent of its inflow capacity). Of this amount, approximately 6 MGD of tertiary-treated recycled water is produced and beneficially reused. The remaining flow is treated to a secondary level and conveyed to the Point Loma Wastewater Treatment Plant for disposal through the ocean outfall.

Figure 1-1 illustrates the distribution facilities that comprise the "optimized system" for the Northern Service Area (NSA) (the area served by NCWRP). The optimized system includes the 9 million gallon (MG) Miramar Reservoir, 2 pump stations and about 66 miles of pipeline, including a large backbone main in Miramar Road. These facilities extend from the coast to the City of Poway and serve customers in four pressure zones.

Existing Northern Service Area Recycled Water Customers

As of April 2005, the City provides approximately 6 MGD of recycled water to 348 metered customers, including a single connection with the City of Poway, for distribution to an additional 191 customers. Most of these customers use recycled water for irrigation. A few customers use recycled water for industrial purposes. In addition to the City of Poway, other large customers include the NCWRP; the City's Metropolitan Biosolids Center; Caltrans; City Parks and Recreation Department; General Atomics; Miramar Landfill; Mitchell International; Motorola; Nissan Design; Pacific Retail Trust; San Diego California Temple; Superior Readymix; Timberland II; University of California, San Diego; and the Torrey Pines and Miramar Marine Corps Air Station golf courses. Infill opportunities still exist for perhaps 150 to 200 additional, relatively smaller customers to connect to the NSA system, including public parks, freeway medians, and private customers as explained and evaluated in Section 4.0.

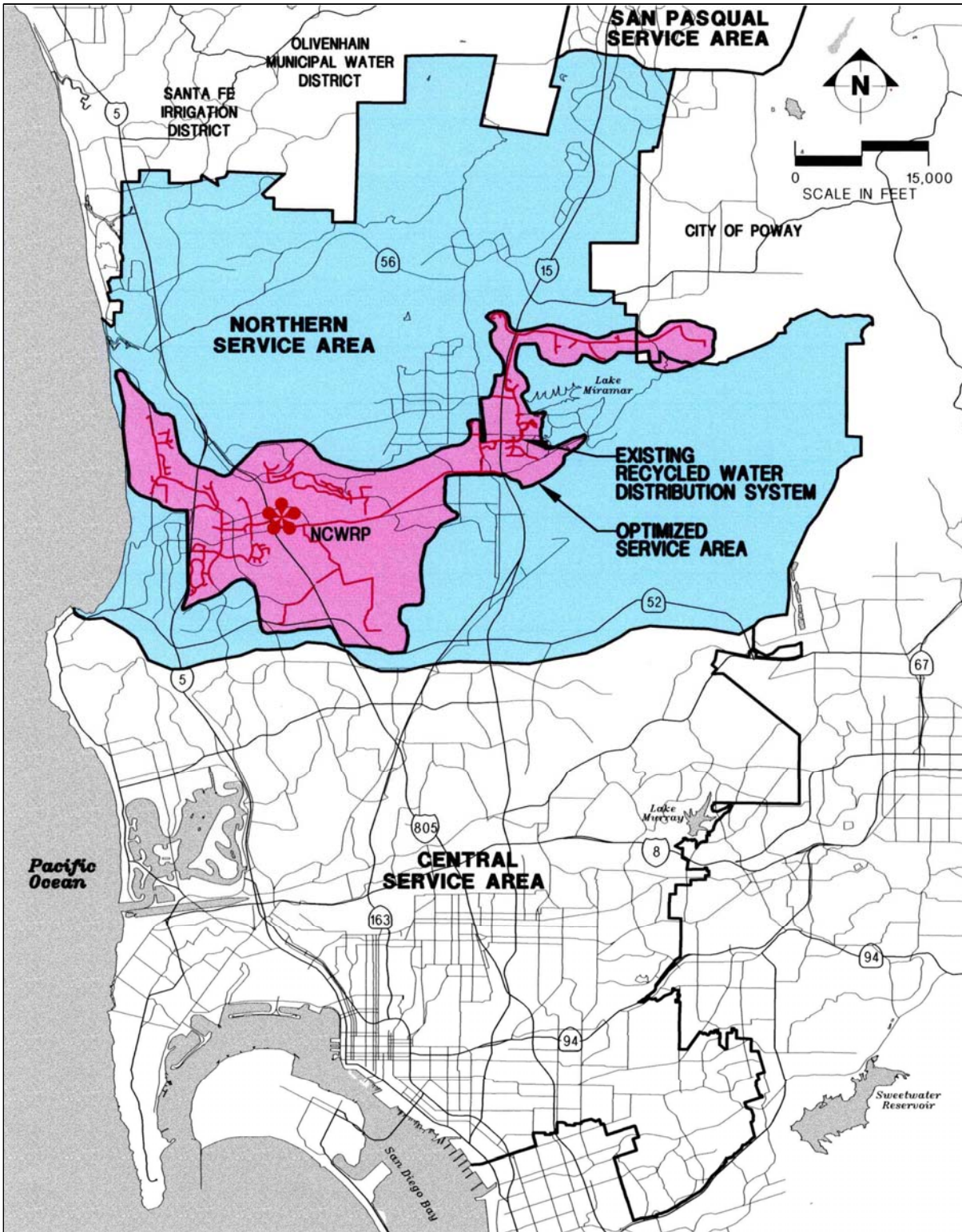


Figure 1-1 – San Diego Northern “Optimized” Service Area

Planned Expansion of the Northern Service Area

In 2000, an Updated Water Reclamation Master Plan was developed to meet the goal of beneficially reusing 12 MGD by 2010. It was anticipated that the full 30 MGD NCWRP treatment capacity would be utilized after 2010 as the service area became built-out and flows to the NCWRP increased. The subsequent February 2003 report entitled *Draft Accelerated Implementation of Beneficial Reuse* refined the non-potable approach to expansion of the recycled water system.

Plans are being implemented to extend the optimized system to new areas in phases, as shown in Figure 1-2. In the initial phases of expansion, the City sought to take advantage of new development by installing recycled water pipelines as roads were constructed.

Phase I of the recycled water system expansion will be completed in 2005. New customers will include the Black Mountain Ranch golf courses and parks, and the Olivenhain Municipal Water District (OMWD). Thirteen miles of pipeline have been installed through the Rancho Penasquitos community to the Black Mountain Ranch area and a pump station has been constructed. In addition, to further serve the area, the 3 MG Black Mountain Reservoir will be completed by 2006. Phase I customers are anticipated to generate an initial recycled water demand of approximately 2,000 AFY (1.8 MGD) with the 2004 improvements and a total of 3,300 AFY (2.9 MGD) after 2006.

Service to Carmel Valley and the State Route 56 corridor comprises Phase II of the system expansion. The 16 miles of pipeline needed to implement this phase are under various stages of design or construction and is dependent on the timing of construction of the associated new development in the area. This area would be served by branching off of the Black Mountain Road recycled water main at Canyonside Park in Los Penasquitos Canyon, and merging with the SR-56 alignment at Camino Ruiz. The terminal point is the Del Mar National Golf Club (formerly Meadows Del Mar) in Carmel Valley. Other significant customers will be served along the way, including Caltrans, Pacific Highlands Ranch, and the Palacio Del Mar Golf Course. Recycled water use along this corridor is anticipated to generate a recycled water demand of approximately 1,000 AFY (0.9 MGD) when the entire length of pipeline is completed.

The Phase III service area identified in the *2000 Updated Water Reclamation Master Plan* includes the Rancho Bernardo/Interstate 15 corridor. This area is densely populated and built out, but has numerous parks and golf courses that would benefit from recycled water service. The recycled water demand in this service area, including two golf courses in Poway, is estimated to be approximately 1,800 AFY (1.6 MGD). Providing service to this area would require investment in 17 miles of pipeline, a pump station, and the siting of at least one large storage reservoir. These facilities are in the planning stage and their implementation may be subject to a comparison of costs and benefits associated with the opportunities developed as part of the Master Plan 2005.

Collectively, if implemented as described, the phased system expansions outlined above will allow the City to meet the 12 MGD water reuse goal by 2010.

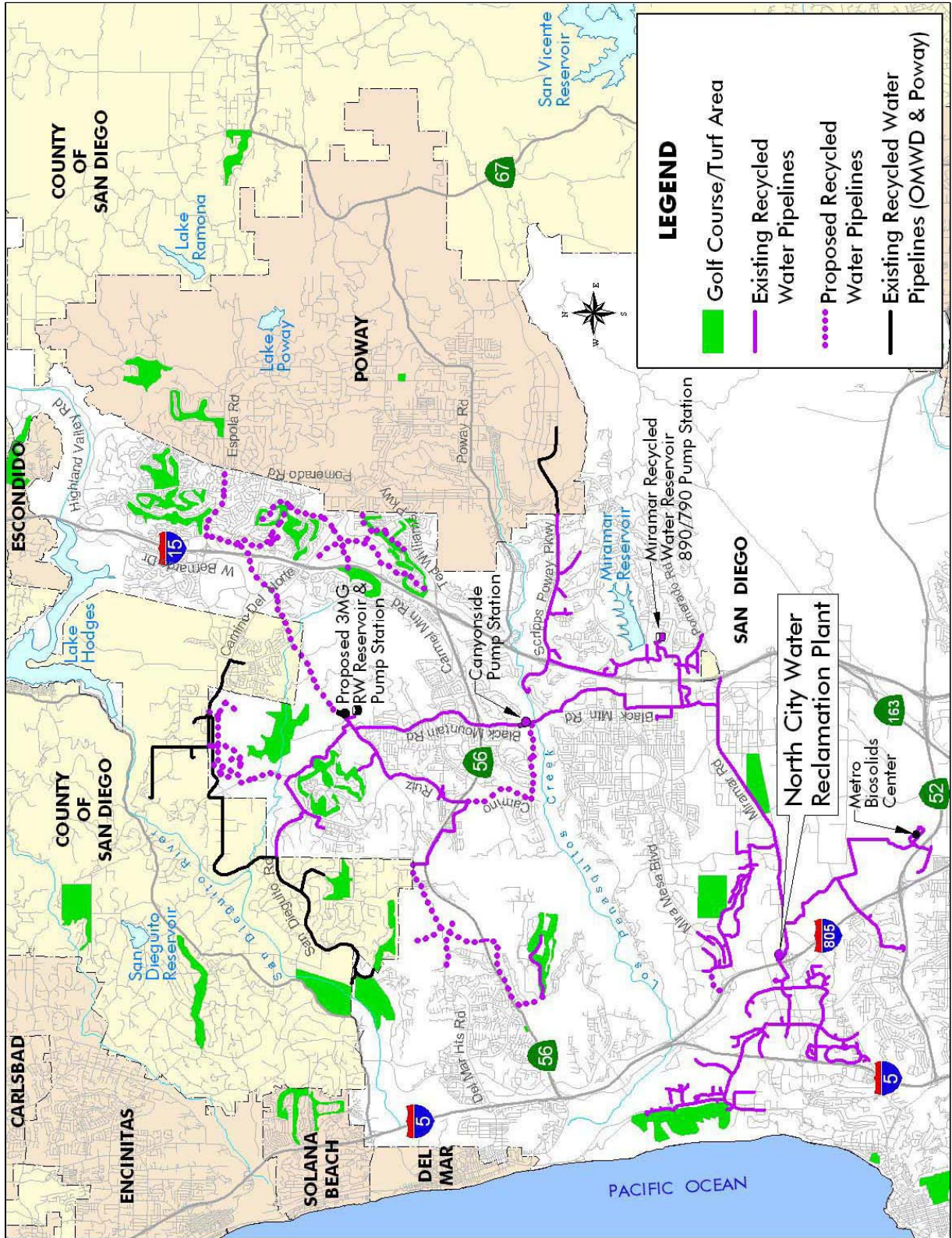


Figure 1-2 – North City Recycled Water Distribution System

1.4 SOUTH BAY SYSTEM AND SERVICE AREA

The 15 MGD SBWRP became operational in the summer of 2002. It currently produces almost 9 MGD of secondary treated wastewater that is disposed of via an ocean outfall. Certification of the tertiary treatment facilities by the Regional Water Quality Control Board (RWQCB) was granted in 2004. On October 16, 2003, the San Diego City Council executed an agreement to sell 6 MGD of recycled water to the Otay Water District (OWD). OWD will have infrastructure in place to take this water by January 1, 2007. Construction of facilities was recently completed to deliver 0.7 MGD of recycled water to the adjacent International Boundary and Water Commission (IBWC) Wastewater Treatment Plant. In addition, Caltrans has expressed interest in using recycled water for freeway landscape irrigation at the southern ends of Interstates 5 and 805, and the 905 interchange. Other potential users are being identified; however, the City's recycled water service area in the South Bay is small and surrounded by other water agencies. Figure 1-3 illustrates the facilities that comprise the distribution system for the Southern Service Area (SSA).

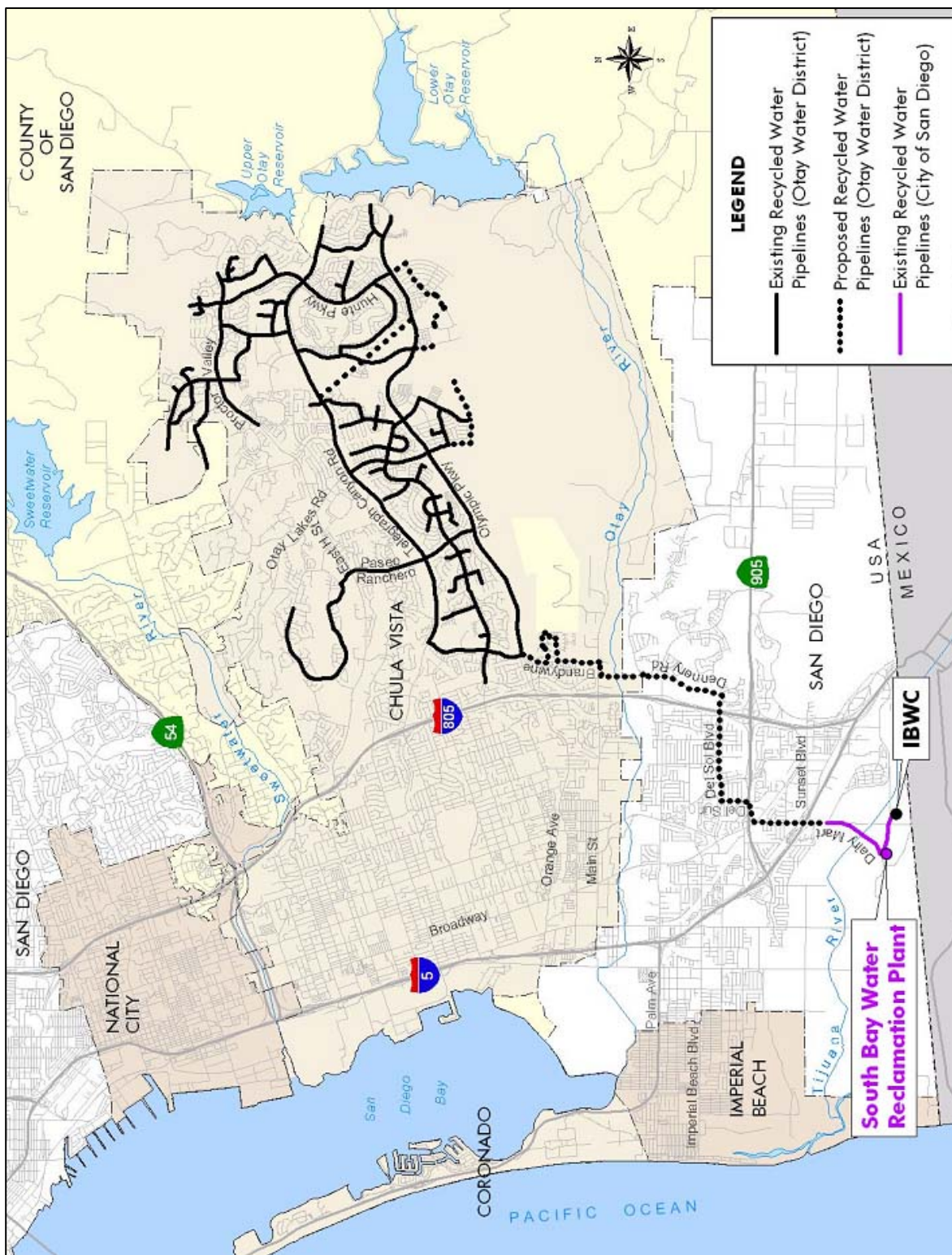


Figure 1-3 – South Bay Recycled Water Distribution System

1.5 WATER REUSE STUDY OBJECTIVES, GOALS AND APPROACH

On January 13, 2004, the San Diego City Council adopted Resolution R-298781, provided as Appendix A, directing the City Manager to conduct a study evaluating all aspects of a viable increased water reuse program. The study would include evaluations of the following opportunities to expand the City's use of recycled water:

- Groundwater storage,
- Expansion of the distribution system,
- Reservoirs for recycled water,
- Live stream discharge,
- Wetlands development,
- Reservoir augmentation and
- Gray water use.

For each of the above opportunities, the study would provide an assessment of public health, public acceptance, costs, reliability, and current science and technology issues.

As part of the planning process the study team, consisting of consultant engineers, scientists, public relations specialists and City Water Department staff, developed an objective, a mission statement and goals for the project:

Objective

To conduct an impartial, balanced, comprehensive and science-based study of all recycled water opportunities so the City of San Diego can meet current and future water needs.

Mission

To pursue opportunities to increase local water supply and reliability, and optimize local water assets, through a comprehensive study of recycled water.

This mission statement is intended to guide the study team to achieve their objective. Coupled with the mission are the three primary goals, which were established by the study team. The goals are aligned with the City Council Resolution R-298781 and are listed below.

Goals

- To develop opportunities for recycled water that are safe, economically viable, environmentally sustainable, protect human health, and reflect public values through a fair and unbiased evaluation of recycled water uses.
- To partner with residents, businesses, agencies and government to help policy makers make informed decisions on how to best use recycled water.
- To provide tools to expand the public's awareness, knowledge and involvement, and present information in a way that is understandable and accessible to all San Diegans.

The overall study goal is to develop viable choices for policy makers seeking to optimize water reuse. The opportunities would be vetted through public involvement sessions, and an Independent Advisory Panel of experts was enlisted to provide insight, critique, and recommendations on study efforts.

Approach

In preparing the Water Reuse Study 2005, a series of technical memoranda were written to provide an in-depth review of various topics pertinent to the study. The technical memoranda produced are listed below:

- Master Plan Update (Master Plan 2005)
- Groundwater Opportunities
- Wetland Opportunities
- Graywater Opportunities
- Reservoir Augmentation Opportunities
- Science, Technology, and Regulatory Issues
- Cost Analysis
- Public Outreach and Involvement

This technical memorandum represents the Master Plan 2005 for the City of San Diego's Recycled Water System. This document reviews the available supply of recycled water, an updated market assessment, and recycled water system expansion opportunities in the City of San Diego.

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2.0 RECYCLED WATER SUPPLY

The City of San Diego currently operates two water reclamation plants – one in North City and one in South Bay. The location of these facilities and their respective service areas were shown in figures in the previous section. Each of these reclamation plants is described below.

The Aqua III Plant in San Pasqual Valley was constructed as a research facility and had the capacity to treat 1 MGD for agricultural use and irrigation until 2001 when the project was discontinued. The City has no plans to recommission the San Pasqual treatment facility at this time and therefore this facility is not considered as a source of recycled water in this study.

Additional potential sources of recycled water include the construction of a reclamation plant in the Mission Valley area to capture wastewater flows in the North and South Mission Valley Trunk Sewers. A brief discussion of site-specific recycled water systems and recycled water storage is also provided in this section.

2.1 NCWRP SUPPLY

The North City Water Reclamation Plant (NCWRP) is located in the vicinity of Interstate 805 and Miramar Road. The NCWRP has a design capacity to treat 30 MGD and has been in operation since September 1997. The plant is operated by the City's Metropolitan Wastewater Department (MWW) and currently treats 22.5 MGD of wastewater to secondary standards. The NCWRP receives wastewater flows from the communities of Del Mar, Sorrento Valley, Rancho Penasquitos, and the City of Poway through diversion structures located at the Penasquitos Pump Station and Pump Station 64. The undiverted flows from these communities are pumped to the Point Loma Wastewater Treatment Plant for treatment and disposal. A schematic of this wastewater collection system is shown in Figure 2-1.

A schematic of the NCWRP treatment process is shown in Figure 2-2. Untreated wastewater (influent) enters the plant through an 84-inch pipeline beneath the I-805 and flows into the NCWRP Influent Pump Station. Four pumps at the influent pump station pump the wastewater up a 90-foot rise to the Headworks. From the Headworks, through the remaining treatment process, the majority operates through gravity flow. At the Headworks wastewater passes through large rake-like bar screens to remove solid debris and floating material called rags. Rags are comprised of cloth, wood, plastic and vegetable matter. Once the rags have been removed from the wastewater they are dewatered and trucked to the landfill. The screened wastewater then passes through aerated grit chambers where heavier solids such as sand, gravel, coffee grounds and eggshells are settled out and removed. The grit is then dewatered and taken to the landfill.

2.0 Recycled Water Supply

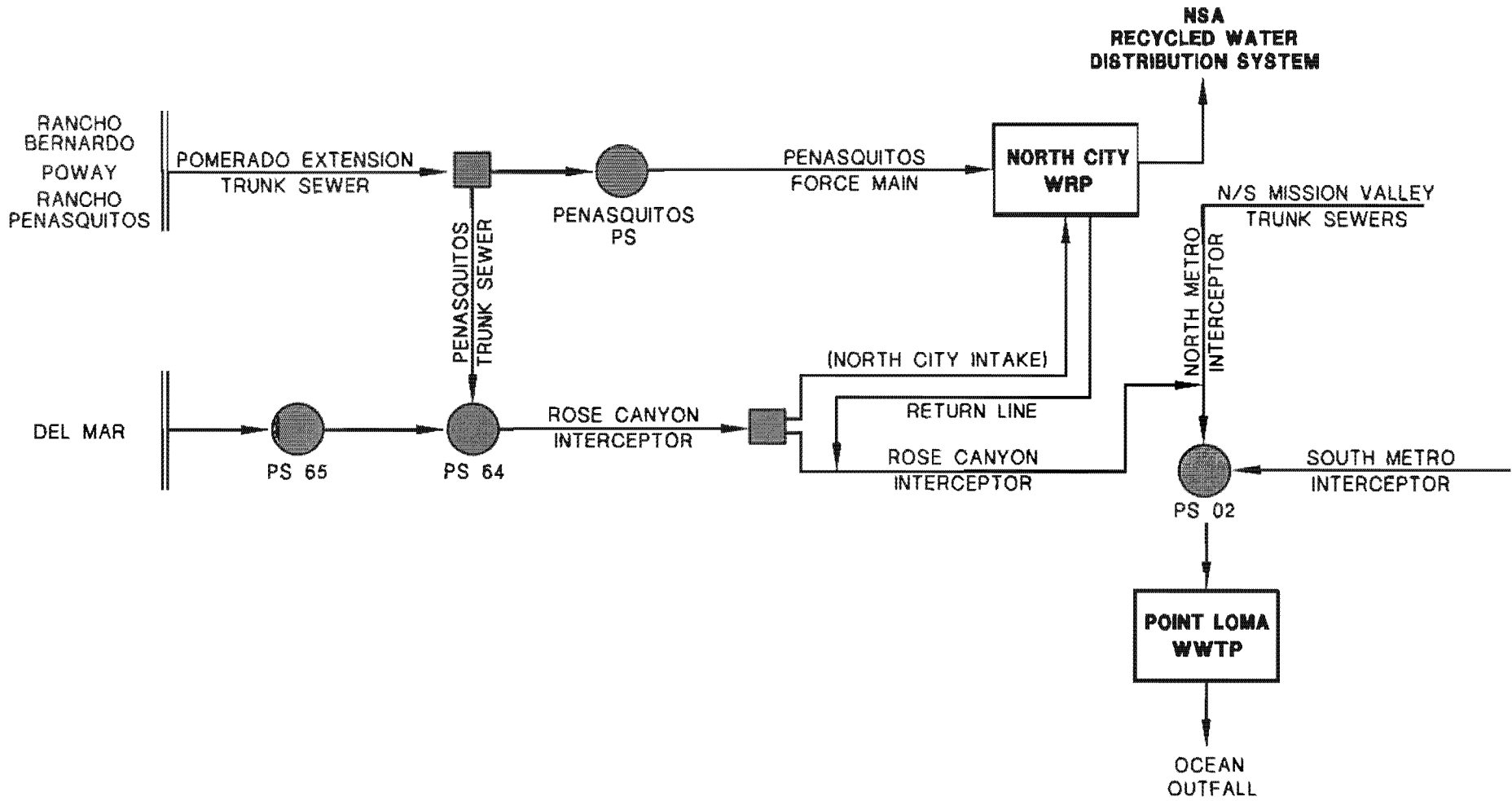
Primary Sedimentation occurs when solids sink to the bottom of the tanks and "scum" (grease and cooking oil) float to the surface. "Raw Sludge" that has settled to the bottom of the basins is collected by a chain and flight system then pumped to the Blended Sludge Pump Station. Similarly, the scum is removed from the surface of the sedimentation tanks, dewatered and taken off site for disposal. Primary Sedimentation takes approximately 90 minutes removing 99 percent of the settleable solids, 50 percent of the suspended solids and 25 percent of the biochemical oxygen demand (BOD).

Aeration is found in two different zones: anoxic zones where oxygen is depleted and aerobic zones where oxygen is consumed. Both zones have beneficial bacteria that eat soluble BOD. The anoxic zone is designed to control filaments while the aerobic zone is designed for the organisms to ingest and digest the organic solids while increasing in number and density. The organisms are called mixed liquor.

Odor Control is an important part of the influent, headworks and primary wastewater treatment process. Odor is caused primarily by hydrogen sulfide gas. Throughout the plant, Odor Control "Scrubbers" draw the foul air (and odors) off the flow of wastewater. The foul air is drawn into the "scrubbers" where it passes through a bleach solution spray at a pH of 9.0, which neutralizes odor-causing sulfide compounds. The "scrubbed" air then passes through carbon filters that remove any additional foul odors before releasing the air into the atmosphere.

Secondary Clarification occurs when the mixed liquid settles to the bottom of the basins and is collected by a chain and flight system. The solids (return activated sludge (RAS)) are then pumped to the aeration basin influent channel. A small portion of the RAS is also sent to the blended sludge pump station through the low capacity waste pumps. The water has now been treated to secondary effluent quality. The secondary effluent can either be returned to the sewer system, Point Loma Wastewater Treatment Plant or to Tertiary Treatment for recycled water applications. The Blended Sludge Pump Station sends the combined primary sludge, secondary scum and low capacity waste to the Metro Biosolids Center (MBC) for further processing.

The NCWRP produces high quality recycled water, exceeding California's strict Title 22 criteria for water recycling. In Tertiary Treatment, secondary effluent flows into anthracite coal beds where it is filtered of remaining solids. Filtered Effluent is then chlorinated in chlorine contact tanks for a minimum of 90 minutes for proper disinfection. At this stage the water is ready to use for plant irrigation and equipment operations. A portion of the filtered effluent is sent to the Demineralization Facility, which uses an electro-dialysis reversal (EDR) process to reduce the salinity of the recycled water. Salinity is typically measured as total dissolved solids (TDS) and the City has committed to providing recycled water not to exceed 1000 mg/l. Filtered effluent is blended with demineralized water then chlorinated in chlorine contact tanks for a minimum of 90 minutes for proper disinfection. The demineralized recycled water is then available for industrial, irrigation or agricultural purposes.



LEGEND

■ DIVERSION STRUCTURE WITH GATE CONTROL

NORTH CITY WASTEWATER COLLECTION SYSTEM SCHEMATIC

FIGURE 2-1

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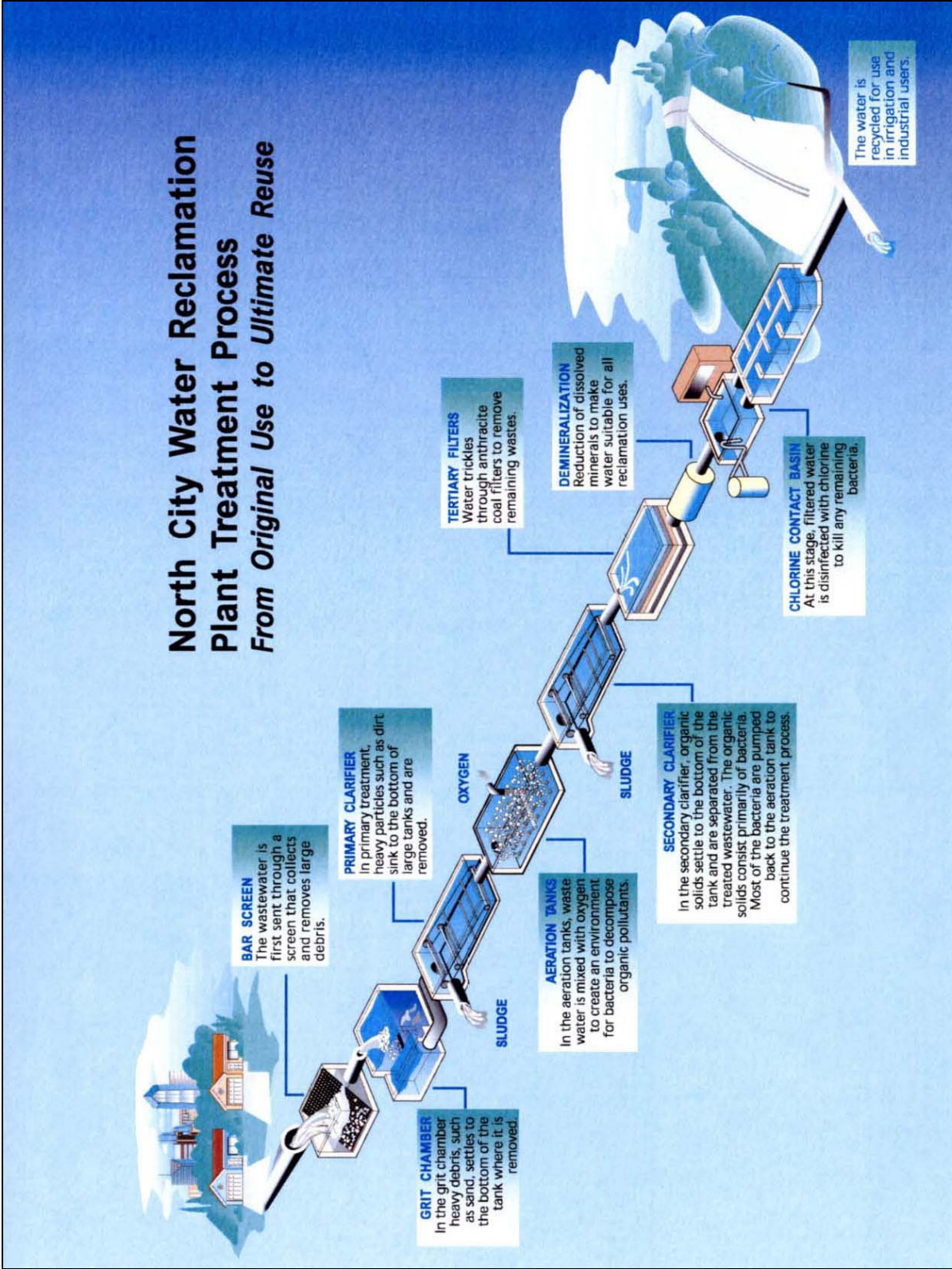


Figure 2-2 – North City Water Reclamation Plant Treatment Process

2.0 Recycled Water Supply

Currently, nearly 6 MGD is processed through a tertiary treatment process (anthracite coal filters) of which 1 MGD remains on-site for irrigation and process water. One-third of the remaining flow is further treated through an electro dialysis reversal (EDR) demineralization treatment process, which includes three units that have a capacity to treat 1 MGD each. This is then blended with tertiary treated water at a 2:1 ratio, which effectively produces 3 MGD of recycled water per EDR unit. Maintenance of the units is rotated such that one of these three units is always out of service, thus there is EDR capacity to produce up to 6 MGD of recycled water. Expansion of the EDR facilities by 2 additional EDR units in 2005 (a total of 4 EDR units operating) will allow up to 12 MGD of recycled water to be available for customers. Additional demineralization capacity will be needed to enable delivery of recycled water beyond 12 MGD.

All the power required to operate the NCWRP is provided by an on-site Cogeneration Facility operated by Minnesota Methane. The cogeneration plant is powered by methane piped from the Miramar Landfill and MBC digesters. Approximately 75 percent of the power produced is used for plant electrical needs with the remainder of the power sold to the local electric grid.

Figure 2-3 shows the anticipated availability of recycled water from the NCWRP from 2005 to 2030, based on the City’s projected sewer flow provided by MWWD. The difference between the sewer inflow to the plant and the available recycled water is the amount of treated water that is used in the treatment process for backwashing filters and other process-related water uses. It is estimated that there is a 7 percent loss in volume that occurs in the primary and secondary treatment processes and 2.5 percent in the tertiary treatment process. The EDR process typically experiences a loss of approximately 15 percent of flow. As shown in Figure 2-3, demands of 6 MGD in 2005 and 12 MGD in 2010 will easily be met by the available supply. The maximum recycled water available from the NCWRP will be 12 MGD until more EDR units are added to the treatment train. With a total of 8 EDR units operating the maximum recycled water available is 24 MGD.

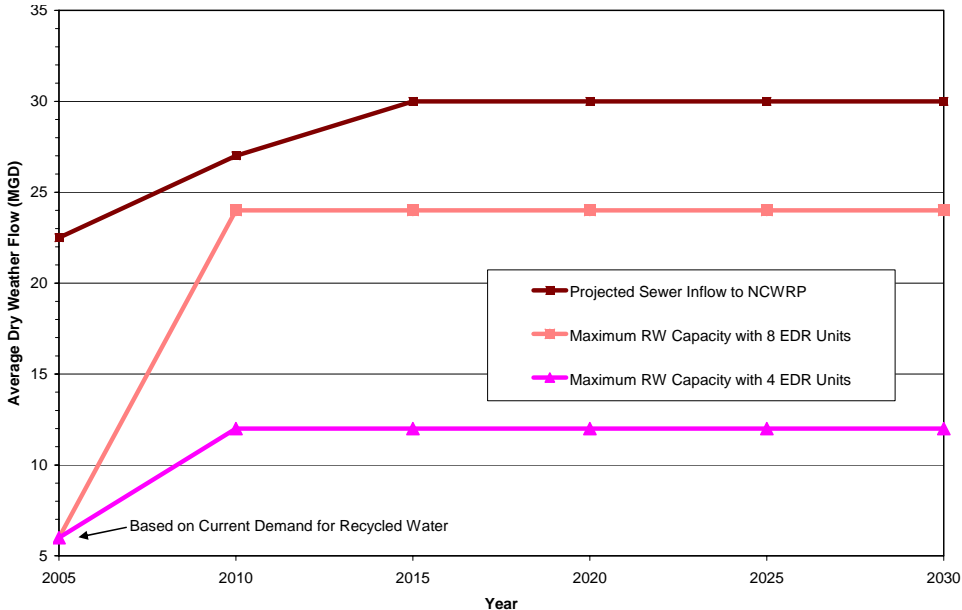


Figure 2-3 – NCWRP Flow Projections

2.2 SBWRP SUPPLY

The SBWRP is located in the vicinity of the U.S./Mexican border and west of Interstate 5 at the intersection of Dairy Mart and Monument Roads. This plant was completed in September 2002.

The SBWRP receives wastewater flows from the Grove Avenue Pump Station (GAPS). A diversion structure in the wet well at GAPS diverts 9 MGD of wastewater to be pumped to SBWRP. Excess flow spills over the diversion weir and back into the San Ysidro Trunk Sewer. The GAPS uses sodium hypochlorite injection and odor control and has a peak capacity of 18 MGD. A portion of the flows from the City of Chula Vista are also diverted to the Otay River Pump Station and pumped to the GAPS. The future Otay Mesa Pump Station (OMPS) and Trunk Sewer will also deliver wastewater to SBWRP from Otay Mesa via the San Ysidro Trunk Sewer and GAPS. A schematic of the South Bay wastewater collection system is shown on Figure 2-4.

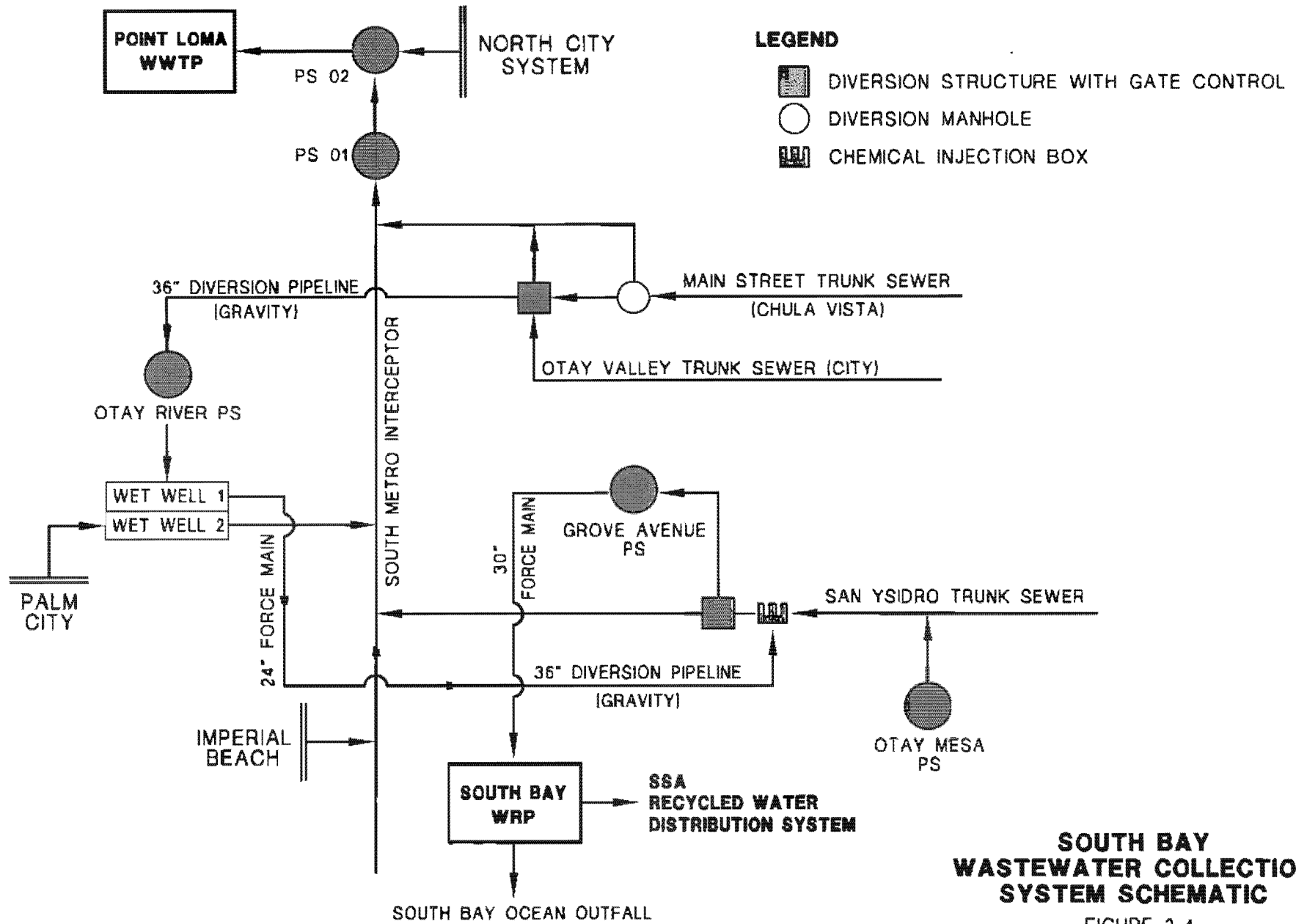
Untreated influent enters the SBWRP at Dairy Mart Road and undergoes the same preliminary, primary, secondary and odor control processes as the NCWRP, described above. Effluent from the Secondary Treatment process can either be discharged into the ocean through the South Bay Ocean Outfall or moved on to Tertiary Treatment for recycled water applications.

In Tertiary Treatment, the treated wastewater (effluent) flows into anthracite coal beds where it is filtered of remaining solids as it passes through the coal medium. The filtered water then passes through chambers where it is disinfected through exposure to ultraviolet light. At this stage the recycled water meets State of California Title 22 recycled water requirements allowing full body contact.

Growth projections for the South Bay area show that the area will generate almost 15 MGD of wastewater by 2020. The SBWRP is designed to ultimately treat up to 15 MGD of wastewater and will use approximately 10 percent or 1.5 MGD for backwashing filters and processing. Therefore a maximum of 13.5 MGD is available for tertiary treatment.

Currently the TDS levels in the wastewater produced in the South Bay area are lower than the City's 1000 mg/L quality commitment. It is anticipated that as long as the wastewater quality for the region remains lower than 1,000 mg/L TDS, additional treatment, such as the EDR units utilized at the NCWRP, will not be required. One approach being used to keep salinity levels in the wastewater low is diverting high salt content wastewater from Palm City and Imperial Beach to the South Metro Interceptor and continuing to Point Loma Wastewater Treatment Plant for treatment and disposal.

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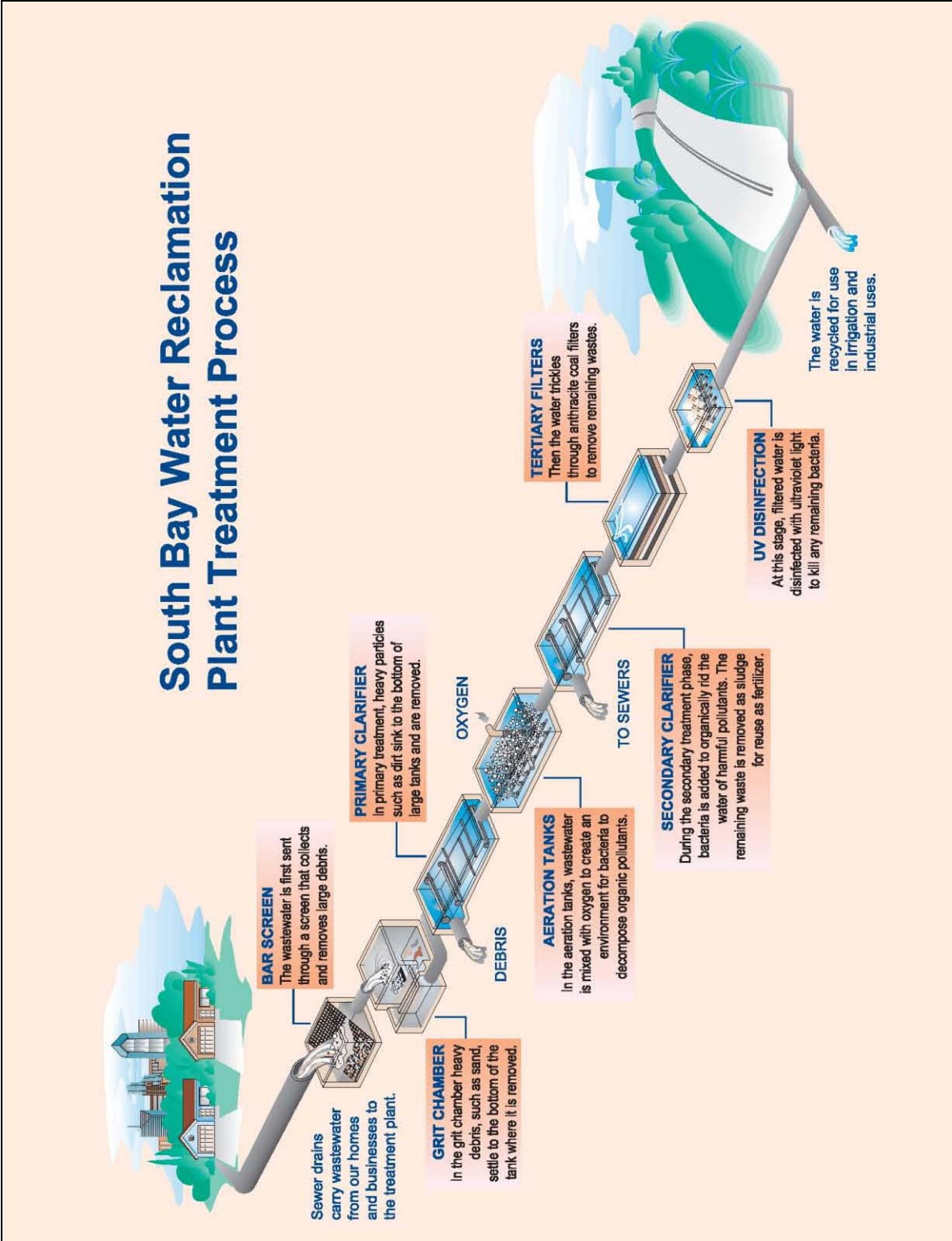


Figure 2-5 – South Bay Water Reclamation Plant Treatment Process

2.0 Recycled Water Supply

Figure 2-6 shows the anticipated availability of recycled water from the SBWRP from 2005 to 2030, based on the City’s projected sewer flows, provided by MWWD. The difference between the total sewer inflow and the available recycled water is the amount of treated water that is used in the treatment process for backwashing filters and other process-related water uses. A smaller percentage of flow is lost at SBWRP than at the NCWRP because this treatment process does not require EDRs. The inflow to the SBWRP is anticipated to gradually increase by 1 to 2 MGD every five years, from 9 to 10 MGD in 2005 to maximum plant capacity of 15 MGD by 2025. Assuming process losses of approximately 10 percent, the maximum recycled water supply available from the SBWRP is project to be 13.5 MGD in 2025.

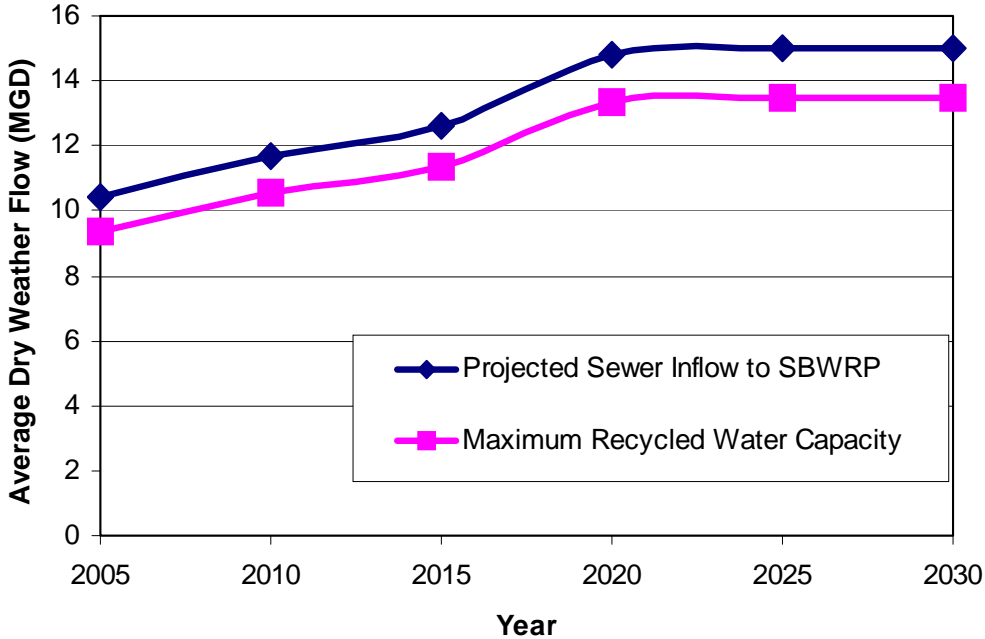


Figure 2-6 – SBWRP Flow Projections

2.3 NEW SOURCES OF SUPPLY

A future Mission Valley Water Reclamation Plant was originally conceived in previous planning efforts. In 1990, the *Mission Valley Water Reclamation System Study* evaluated 11 potential sites for a 15 MGD reclamation plant in the Mission Valley/Mission Gorge area and recommended a site located between the San Diego River channel and Camino Del Rio North, east of Mission City Parkway and south of Qualcomm Stadium (Assessor's Parcel Number 43325005). The 18-acre parcel, owned by the City, was once occupied by the City's experimental wastewater treatment facility, the Aquaculture Plant and is currently vacant. Although the site is in the proximity of commercial development, has visual prominence (from Interstate 8), requires pipeline river crossings and has limited space for expansion beyond 15 MGD, the advantages to this site include good access and proximity to an adequate supply of wastewater.

The plant would receive flows from the North Mission Valley Trunk Sewer, which currently transports 28 MGD of wastewater from the Central Service Area (CSA) to the Point Loma Wastewater Treatment Plant. A *Mission Valley Reclamation Plant Capacity Evaluation Report* was conducted in 1992. At that time, a conventional treatment process was envisioned, including primary sedimentation, secondary clarification, and tertiary filtration. Phasing would allow the plant to be constructed in 7.5 MGD increments and would provide tertiary-treated (Title 22) recycled water. Projected costs for a Mission Valley reclamation plant were estimated at \$46.3 to \$47.5 million for the first phase of construction depending on the chosen alternative (1992 dollars). Ultimate costs for the 15 MGD and 22.5 MGD plants were estimated at nearly \$110 million and \$195 million, respectively.

MWWD does not project a need for a wastewater treatment facility in the Mission Valley area until 2030. However, a smaller, satellite reclamation facility could be constructed in Mission Valley. Because there have been advances in membrane treatment and ultraviolet disinfection technology, a more compact membrane bioreactor treatment facility may offer an alternative for serving recycled water in the CSA.

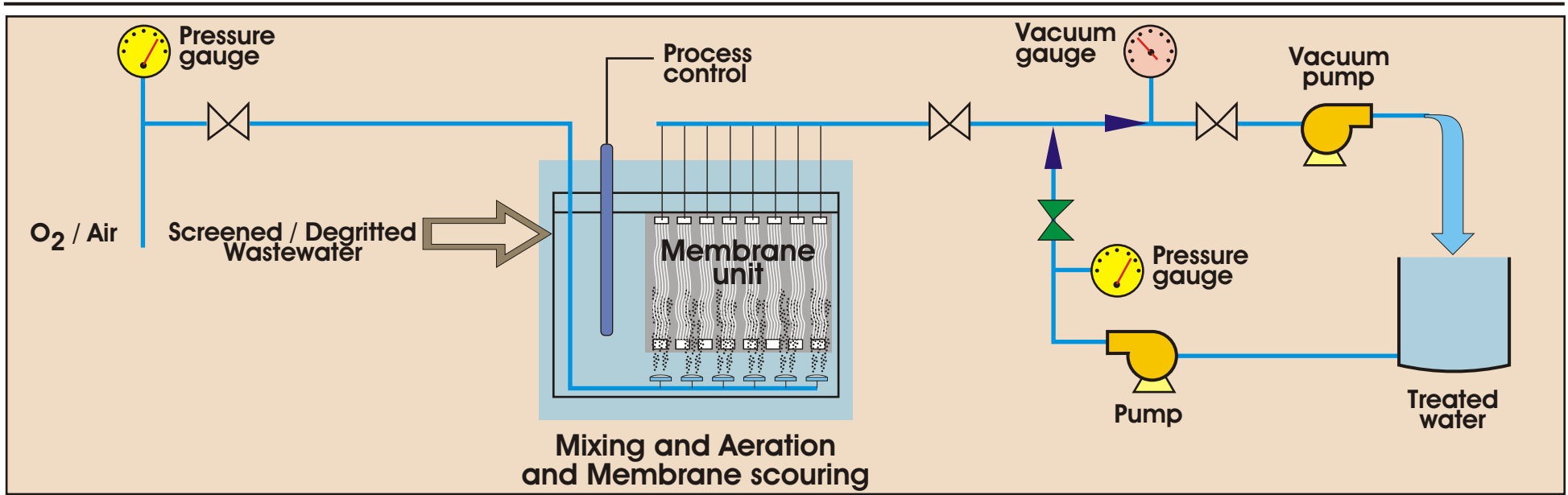
Membrane Bioreactors (MBRs) are systems that integrate biological degradation of waste with membrane filtration. The MBR is a combination of the activated sludge process with a micro- or ultra-filtration membrane system. The membrane system replaces the traditional gravity sedimentation unit (clarifier) in the activated sludge process. Turbidity and suspended solids concentration of the effluent is far lower than in conventional treatment. MBRs require less space and are more automated than conventional treatment facilities, ideal for decentralized treatment. Advantages to decentralized systems include less major infrastructure needed and more opportunities for local reuse. The typical treatment trains associated with MBRs are shown in Figure 2-7.

As shown in Figure 2-7, membranes can be submerged directly in the aeration tank or pumped to external membrane units. The EPA's *Guidelines to Water Reuse*, September 2004, outline several advantages attributable to MBRs:

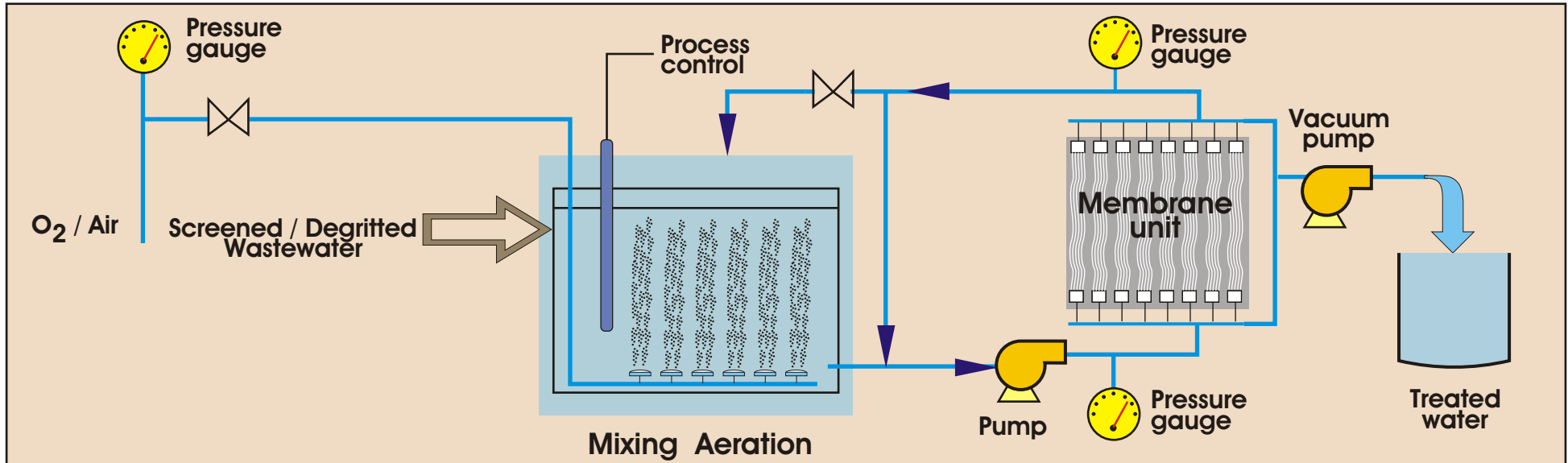
- ◆ *Sludge settling characteristics do not affect final effluent quality. Biological processes can be operated at much higher suspended solids concentrations and thereby provide greater treatment capacity per unit volume*
- ◆ *Micro-filtration and ultra-filtration membranes provide nearly complete removal of protozoan cysts, suspended solids and bacteria, as well as partial removal of viruses. In addition to removing suspended solids, ultra-filtration membranes can retain large organic molecules, improving the biodegradation of otherwise resistant compounds such as grease and oils.*
- ◆ *Longer sludge ages are possible, improving biodegradation of resistant compounds and improving nitrification performance under adverse conditions*
- ◆ *Wasting occurs directly from the aeration basin, improving process control*
- ◆ *Submerged MBR systems are well suited to upgrade existing systems with minimum new construction required and low impact to ongoing operations.*

In April 2004, the City prepared a research report entitled *Optimization of Various MBR Systems for Water Reclamation, Phase III*. The main purpose of the study was to evaluate several leading manufacturers in an effort to encourage competition within the MBR industry and optimizing MBR operation for water reclamation. Four MBR systems were evaluated at a pilot scale level at the Point Loma Wastewater Treatment Plant. The systems were evaluated for their ability to produce high quality effluent and to operate with minimum fouling for a reasonable time between chemical cleanings. Operation was optimized by evaluating performance on two types of wastewater: 1) screened and degritted raw wastewater and 2) advanced primary treated wastewater. Overall the systems were capable of operating on both raw and advanced primary effluent with little fouling. In addition, each system successfully removed organic particulate and microbial contaminants. Each systems also consistently achieved nitrification throughout the testing period. Cost estimates were developed for full-scale MBR systems ranging from 2 to 10 MGD. These estimated included both capital and operational costs related to the MBR process. Results of the cost analysis revealed that the 1 MGD MBR water reclamation systems, designed to operate on raw wastewater, ranged from \$1.81 to \$2.23 per 1,000 gallons treated (\$590 to \$730 per acre-foot (AF)). Costs associated with the construction of a 10 MGD MBR system were estimated to be in the range of \$452 to \$540 per AF.

The use of MBRs could be applied in both the CSA and the San Pasqual area, if the City finds this alternative technology feasible and cost effective. In recent studies the City investigated the use of MBRs in both Balboa Park and San Pasqual Valley.



a. Schematic of Integrated (submerged) MBR



b. Schematic of Recirculated (external) MBR

**MEMBRANE BIO REACTOR
TREATMENT TRAINS**

FIGURE 2-7

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2.0 Recycled Water Supply

Balboa Park is located in the CSA and includes the San Diego Zoo and a municipal golf course. The average potable demand for these sites is approximately 1.5 MGD. Assuming approximately 80 percent of this is irrigation demand, an average of 1.2 MGD could be replaced with recycled water. Because recycled water service to Balboa Park from the NCWRP would require approximately 10 miles of pipeline construction, MBRs were considered as an alternative. The City determined that the Powerhouse Canyon Trunk Sewer, which flows along Florida Street through Balboa Park, had a dry weather flow ranging from 1 MGD to 5.7 MGD. Assuming that the TDS for this raw wastewater source is under 1,000 mg/L, no demineralization processes would be required. The MBR system would have a 1 MGD design capacity and a storage pond with a capacity of 0.7 million gallons would be constructed for operational storage. The pond would be constructed as a scenic feature in the park. Retrofitting of the existing irrigation systems would be required, and potable water would be used to supplement peak dry weather irrigation demands. The planning level cost of providing the MBR system, storage and pumping was estimated to be in the range of \$26 million, with annual operation costs of \$0.8 million.

In the San Pasqual/Rancho Bernardo area, the City estimated that there was a potential recycled water demand of almost 5 MGD. Approximately 3.8 MGD of wastewater flows from this area to PS 77 and Escondido's Hale Avenue Resource Recovery Facility for treatment. Because this area is known to have high salinity wastewater, demineralization facilities would be required. The planning level cost of a 2 MGD MBR facility was estimated to be \$22 million with annual operation and maintenance costs of \$0.6 million. The annualized cost to produce recycled water would therefore be in the range of \$900 per AF over 30 years. A five (5) MGD facility would require approximately \$48 million in capital costs and \$1.5 million annually in operation and maintenance (O&M) costs. This estimate did not include the cost of infrastructure to deliver the recycled water and to transport the sludge produced at the treatment site.

The City will continue to investigate the use of MBRs as a source of recycled water supply in San Diego. Although the technology has proven to be reliable in pilot tests, the cost to construct and operate the plant may be a constraint. Possible sites for MBR treatment include, but are not limited to Mission Valley, Balboa Park and San Pasqual/Rancho Bernardo. For the purposes of developing a conceptual project for an MBR plant in the CSA in Section 4.0, the Mission Valley site will be considered because of the availability of a larger volume of wastewater and the City's ownership of a site in the Mission Valley area that could accommodate a larger plant in the future.

2.4 SUPPLY RELIABILITY

Because a recycled water distribution system typically does not provide essential services such as fire protection or sanitary uses, the reliability of the recycled water system does not have to be as stringent as the potable water system. In fact, the potable water system is often used as a back up to the recycled water supply. However, reliability of the recycled water system in terms of delivery and quality are important to existing and potential customers.

2.4.1 Reliability Requirements for Water Quality

The successful marketing of recycled water is dependant on the reliability of its various constituents to meet the water quality requirements imposed by potential customers. Water quality requirements vary according to the intended use and specific site conditions, such as soil profile, sensitivity of existing vegetation, site drainage and climate.

Golf Courses

Water quality issues related to golf courses are discussed in *Wastewater Reuse of Golf Course Irrigation*. This textbook was prepared by the United States Golf Association in recognizing the benefits of using recycled water for golf course irrigation. Recycled water quality and constituents can effectively limit its application to some types of landscaping. Specifically, excessive salinity may damage some plants. Specific ions such as chloride, sodium and boron are toxic to some plants. Sodium may pose soil permeability problems.

The *2000 Master Plan* identified the NCWRP influent wastewater salinity levels as being of “marginal” quality in terms of limitations on reuse. It also notes that TDS, chloride and sodium concentrations have increased from nearly acceptable to mid-marginal levels over the years. It found that the levels of boron and several other water quality parameters (high sodium adsorption ratios, pH, bicarbonate) were within acceptable limits for most irrigation applications within the San Diego area, but had increased as well. As a result, the treatment process at the NCWRP includes a demineralization process to achieve a reduction in salts. The recycled water quality TDS levels are in the range of 800 milligrams per liter (mg/L) to 1,000 mg/L. (SDCWA raw water has an estimated TDS of 550-650 mg/L.) The levels are generally considered acceptable for the uses proposed in this assessment. Torrey Pines Golf Course has been successfully using recycled water from the NCWRP since 1998.

Because the source water in the South Bay has less TDS to start with, the SBWRP wastewater influent salinity levels are less than 1,000 mg/L and remain so through the treatment process. The recycled water produced at the SBWRP does not require a demineralization treatment step to reduce salinity levels. Currently, the City is committed to provide existing water reuse customers with recycled water having TDS levels of 1,000 mg/L or less. The TDS concentrations from the SBWRP and NCWRP are continually monitored along with various other constituents. The

average annual TDS levels from the two water reclamation plants are less than the City goal of 1,000 mg/L.

Other issues of significance to golf course maintenance include nutrients and residual chlorine. Nitrogen, phosphorus and potassium are essential nutrients for plant growth, and their presence normally enhances the value of recycled water for irrigation. When discharged to the aquatic environment, however, nitrogen and phosphorus can lead to the growth of undesirable aquatic life. Adequate phosphorus can lead to the growth of undesirable aquatic life. Adequate recirculation has generally been found to be an effective measure to prevent excessive algae growth in ponds. Excessive amounts of free available chlorine in the recycled water may cause leaf-tip burn and damage some sensitive plants.

Current golf course irrigation practices include using recycled water to irrigate fairways and the roughs along the fairway. Greens and tees are typically irrigated with potable water due to the sensitivity of the grasses and the desire to keep these areas in top condition. Golf course greens keepers also may use slightly higher volumes of recycled water than other water sources to facilitate leaching to flush salts from the soils.

Manufacturing Processes and Cooling Towers

Other water quality concerns, addressed by the City in a July 2004 City Manager's Report on the Mandatory Reuse Ordinance (MRO), included the effects of recycled water on manufacturing processes and the maintenance and operation of cooling towers.

The level of water quality required by manufacturing processes varies significantly depending on the product. It may not be cost effective for a treatment plant to maintain a specific water quality for each manufacturer. Additionally, the staff involvement required determining if a manufacturing facility should be converted to recycled water is extensive. As a result, the latest criteria in the MRO recommends that the feasibility and cost effectiveness of recycled water use for manufacturing processes should be determined on a case-by-case basis. New manufacturing facilities are required to submit a recycled water use study to the City for review as a condition of development.

Potential customers also expressed concern on the maintenance and operation of recycled water in cooling towers. In response, the City performed an in-depth analysis addressing the health and safety concerns of recycled water usage for cooling towers as well as identifying the impact of its use on the overall maintenance costs of these units. Results of the analysis are provided in the April 2004 *Recycled Water in Cooling Towers* report. The study concluded that while operational and maintenance procedures would have to change, the resultant incremental costs associated with any modifications would present a life cycle cost savings for industries that switch to recycled water for their cooling tower applications.

2.4.2 Reliability Requirements for Uninterruptible Supply

Existing and potential recycled water customers also have concerns regarding the availability of supply to meet their demands. Typically, recycled water is represented as an uninterruptible source of water to irrigation customers that might otherwise be shut off from a potable water system in the event of a drought. The City operates a 9 MG reservoir that provides storage to meet daily peaking demands. This reservoir can also be supplemented with raw water in the event of a plant shutdown and continue service to the City recycled water customers.

Operationally, the recycled water system must also function such that these customers receive water when it is needed. Irrigation demands are typically seasonal, with peaking occurring in dry summer months. The production and distribution of recycled water must be capable of providing the volume of water to meet demands during these peak periods. Service to these customers could typically be reduced or shut down for a few days during low-demand winter months without major impacts. Industrial and commercial customers, however, require year-round reliability and require a backup source of supply in the event of a plant shut down, to minimize or avoid disruption of service. This back up source of supply is typically the potable or raw water supply system, however it could also be drawn from seasonally stored recycled water, described further in Section 2.4.4.

2.4.3 Reliability of Recycled Water Facilities Operation

A high standard of reliability, similar to water treatment plants, is required at water reclamation facilities. These facilities must reliably and consistently produce and distribute recycled water of adequate quantity and quality. Therefore, reliability features in the design, construction and operation of the facility are essential. EPA Class I reliability criteria requires redundant facilities to prevent treatment upsets during power and equipment failures, peak loads and maintenance shutdowns. Operator certifications, instrumental and control systems, quality assurance programs, emergency storage, and back up supply provisions. The City has incorporated these design elements and systems into both the NCWRP and SBWRP facilities. In addition, the City has developed *Rules and Regulations for Recycled Water Use and Distribution within the City of San Diego* that establish procedures that meet regulatory standards for the protection of public health and preservation of the quality of the environment.

In San Diego County, the City's plan check and inspection of recycled water facilities is supplemented by both the California Department of Health Services (CDHS) and the County Department of Environmental Health (DEH). CDHS is responsible for the plan review of treatment processes, treatment plants, main conveyance systems and proposed new and unusual uses of recycled water. DEH is responsible for plan review and inspections of all recycled water use sites. The *Recycled Water Plan Check and Inspection Manual* (DEH, 2001) provides guidelines for health and safety monitoring of recycled water use. Cross-connection control shutdown testing is typically required upon connection at each recycled water customer site and repeated every four years thereafter. A site walk-through and record check occurs annually at each customer site. The shut down tests require the shutting down of the potable water system at

2.0 Recycled Water Supply

the site for 4 to 24 hours and pressure tests are applied to ensure that cross-connections between the potable and recycled water systems are not occurring.

Under certain conditions, it may be necessary to discontinue recycled water service to a customer. This temporary discontinuation of service may occur to protect the City's facilities, or to protect public health or property. Temporary discontinuation of recycled water service may occur due to construction or maintenance at the reclamation plants, cross-connection testing events or under emergency conditions.

In the event of a temporary shut down of the recycled water system, a backup source of supply may be made available at the discretion of the City. Potable or raw water connections, isolated by an air gap separation, may be approved as a temporary connection until recycled water service can be reestablished. Seasonal storage of recycled water could also provide a backup source of recycled water in the event of a temporary shut down of the system. However, the City currently does not have facilities that could provide seasonal storage of recycled water.

2.5 RECYCLED WATER SEASONAL STORAGE

As described in Section 1.4 of this study, the availability of wastewater flows and the subsequent supply of recycled water are relatively consistent year-round. Conversely, recycled water is used primarily for irrigation needs, so more water is used in the summer than in the winter. The typical maximum day demand is twice the average day demand (average daily use over a year), which results in only 50 percent of the recycled water produced being used every year. Seasonal storage of recycled water could increase the overall amount of recycled water used annually.

At the NCWRP, approximately 24 MGD of recycled water will be available for use in 2015. With no seasonal storage, average irrigation demands of 12 MGD can be supplied by the plant, which allows peak flows of 24 MGD to be met in the summer. However, if seasonal storage were available more demands could be met. Similarly, at the SBWRP, recycled water flows could increase from 10 MGD in 2010 to 13.5 MGD in 2025. Without seasonal storage, the plant could supply average irrigation demands of 5 MGD to 6.75 MGD. However, if seasonal storage were available or more constant year round uses were identified, more demands could be met.

This section examines the possibility of using surface storage reservoirs for seasonal storage of recycled water. The section examines the potential utility and benefits of seasonal storage, its application to different types of reuse scenarios, its costs, and other factors including environmental constraints, regulatory compliance, and water quality issues. This information is then used in Section 4.0 in developing alternative reuse opportunities.

2.5.1 Role of Seasonal Storage in Reuse Planning

Seasonal storage is a potential component of those reuse plans that include significant deliveries to irrigation customers. The potential utility of seasonal storage to these plans arises from two factors:

- demands by water irrigation customers are much higher in the summer than in the winter; and
- water production capacity is seasonally constant.

Therefore, in order for average annual reuse to increase to near plant capacity, the summertime peaks and winter valleys of the irrigation demand curve must be smoothed out. Seasonal storage does this by providing a holding space for winter production surpluses, which can then be withdrawn in the summer to meet peak season demands. This operation is illustrated in Figure 2-8.

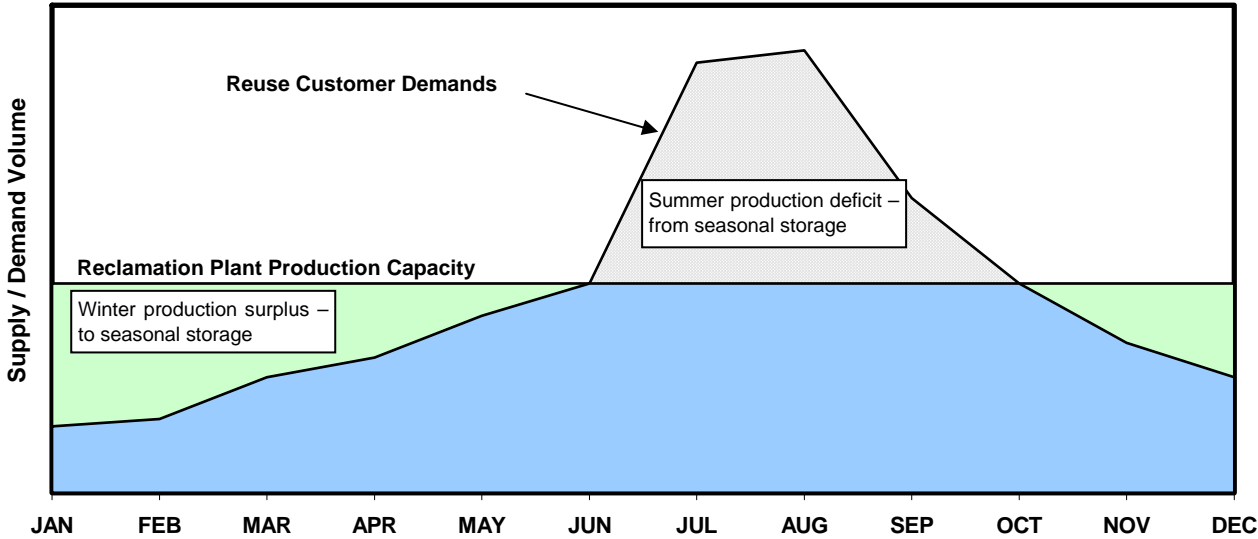


Figure 2-8 – Typical Seasonal Storage Operation

The seasonal nature of water irrigation demands can result in summertime production deficits and winter production surpluses. Seasonal storage allows the winter surpluses to be stored for subsequent use in meeting peak summertime demands.

In the case of the City, current water summertime demands are significantly below the production capacity of the City’s Water Reclamation Plants, and consequently there is no current need for recycled water seasonal storage. However, as the City continues to develop additional recycled water customers and uses, peak summertime demands will approach and then exceed reclamation plant capacity. The City’s options in this case are threefold:

- 1. **Limit reuse connections so as to not exceed plant production capacity:** The City could limit recycled water customer connections to maintain summertime peak demands at levels equal to or below reclamation plant production capacity. This limits average annual reuse to approximately 50 percent of plant production capacity, as illustrated in Figure 2-9.

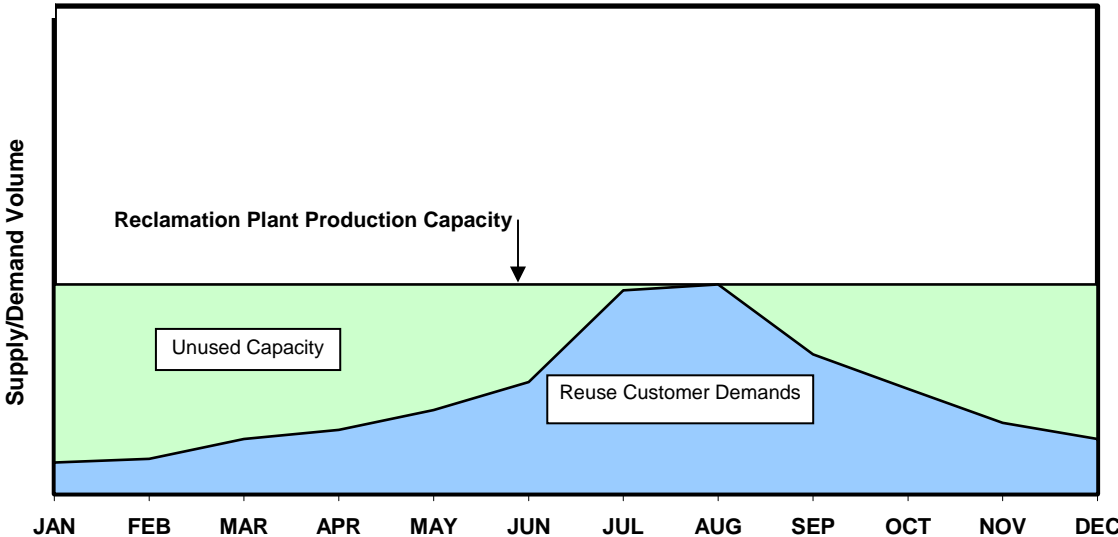


Figure 2-9 – Reuse Customer Connections Limited so as to not Exceed Plant Production Capacity

Because customer demands approach plant capacity only in the peak summer months, the average annual reuse volume is limited to approximately 50 percent of plant production capacity.

- 2. Supplement summer peaks with potable water:** The City could supplement summertime water supplies with potable water. This option, illustrated in Figure 2-10, allows for higher levels of reuse than in option 1, but less than in option 3. In the example depicted in the figure, the supplementation of summertime demands allows for additional beneficial reuse at approximately a two for one rate, with two acre-feet of additional reuse for every acre-foot of summer supplement. At lower levels of additional demand, this return ratio would be even higher. At higher levels of additional demand, this ratio will diminish until the curve approaches that of Figure 2-8, at which point the ratio would be one to one.

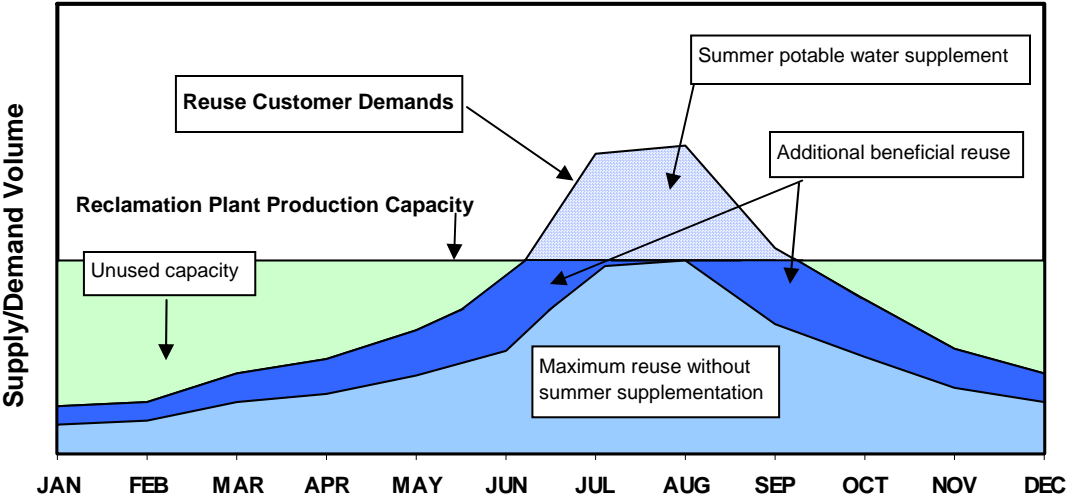


Figure 2-10 – Supplementing Summer Peaks With Potable Water

In lieu of developing seasonal storage, the City could supplement summertime water supplies with potable water. This option allows for higher levels of reuse than in option 1, but less than in option 3.

3. Develop seasonal storage: This option, previously illustrated in Figure 2-8, allows the greatest potential utilization of recycled water.

These three options allow for different levels of reuse development, at different levels of cost. In evaluating water reuse implementation alternatives, the City will weigh the benefits and costs of the seasonal storage options against the benefits and costs of the other two options.

Reliability Issues

A possible secondary advantage of seasonal storage is its ability to provide supply continuity during periods when the recycled water supply from the water reclamation plant is interrupted due to plant outage or other cause. However, because the recycled water distribution systems already include tanks for operational storage, and because plant outages are rare events, and because potable water backups already exist for such situations, the value of additional reliability storage is diminished.

2.5.2 Seasonal Storage Volume Ranges

The volume of seasonal storage that the City requires varies depending on the following factors:

- **Customer Type / Seasonal Variability of Demands:** Reuse plans focusing on serving irrigation demands (such as those in Figure 2-8) will have the greatest seasonal variation in demands and the largest potential seasonal storage volume requirements. Reuse plans focusing on industrial uses, wetlands, or other year round uses will have the least seasonal variation in demands and the smallest potential seasonal storage volume requirements.
- **Average Annual Reuse Relative to Plant Capacity:** The City's current recycled water summertime demands are significantly below the production capacity of the City's Water Reclamation Plants, and consequently there is no current need for recycled water seasonal storage. However, as the City develops additional recycled water customers and increased summertime demands exceed plant capacity, then the City will either need to supplement summer recycled water supplies with potable water, or develop recycled water seasonal storage.

The maximum volume of seasonal storage required would be that needed to meet demands that exceed the plant production capacity. Based on the typical reuse seasonal demand variations, this volume equates to approximately 3.3 months of average demand. The resulting maximum seasonal storage requirements for the NCWRP and SBWRP are shown in Table 2-1 below.

**Table 2-1
Maximum Seasonal Storage Volumes Required**

Reclamation Plant	Plant Capacity	Seasonal Storage @ 3.3 months	Seasonal Storage Planning Volume
NCWRP	24 MGD	7,360 AF	7,500 AF
SBWRP	13.5 MGD	4,140 AF	5,000 AF

The planning volumes include allowances for unusable storage and for evaporative losses during the summer months.

The maximum numbers are for an all-irrigation demand. Commercial/Industrial uses tend to be more uniform seasonally and would attenuate the seasonal demand curve of Figure 2-8 in proportion to their percentage share of the average annual reuse demand. Likewise, wetlands, ground water, and reservoir augmentation uses would presumably be seasonally constant and would therefore have the same effect as commercial and industrial uses in attenuating the overall reuse demand curve, and in reducing the maximum seasonal storage required to utilize 100 percent of reclamation plant capacity.

Obviously, this vast amount of water could only be stored in a groundwater aquifer or surface water reservoir. Excess recycled water would be stored during the wet winter months and

extracted for use during summer months when irrigation demands peak. Currently there are no aquifers or reservoirs dedicated to seasonal storage of the City's recycled water. Potential sites for storage, however, do exist. The following sections identify surface water reservoir design considerations and potential sites that may be considered for recycled water seasonal storage. Groundwater aquifers as seasonal storage sites are addressed in a separate technical memorandum.

2.5.3 General Considerations in Siting Surface Storage

Surface storage in the volume ranges needed could be provided in one of three ways:

- 1. New Dams:** Dams are usually located in canyons, such that the surrounding terrain provides containment for a reservoir behind the dam. The storage capacity of a dam is limited only by the topography of the canyon and the height of the dam, and there are several existing dams in San Diego County equal to or larger in capacity than the maximum desired seasonal storage ranges being considered here. Dam projects usually face formidable environmental permitting challenges because they may involve inundation of canyon and riparian habitats. An example of a recent dam project in San Diego County is the Olivenhain Dam and Reservoir project, which has a capacity of 24,000 acre-feet (AF).
- 2. New Excavated Basins:** Excavated basins can be constructed on flat ground, with the excavated material used to form berms around an impoundment area. The storage capacity of an earthen basin is theoretically limited only by the area of land available for the excavation, but as a practical matter the economics of construction usually limit basin sizes to no more than a few thousand acre-feet. There are no existing excavated basins in San Diego County with a capacity approaching the seasonal storage volumes being considered here. In comparison to new dam projects, excavated earthen basins can potentially face fewer environmental permitting challenges because they can be sited to avoid inundation of sensitive habitats. An example of a recent excavated basin project in San Diego County is the 4S Ranch Wastewater Treatment Plant's storage pond, which has a capacity of 410 AF.
- 3. Conversion of Existing Storage:** Existing surface storage reservoirs could be converted to recycled water storage. This would require that the reservoirs not be critical components of their respective water systems. In comparison to new construction projects, conversion of existing storage may minimize environmental permitting challenges. Although there are no existing recycled water impoundments in San Diego that have been converted from water system uses, an example of a reservoir that others have previously considered for conversion is the San Dieguito Reservoir, which has a total capacity of approximately 800 AF.

Siting Considerations for surface storage reservoir include the following:

Favorable Topography and Geology: Favorable topography for a dam is a canyon area with a narrow spot that can be plugged with a dam. The canyon walls and foundation must be of competent rock so as to contain the reservoir and support the dam structure. Favorable topography for an excavated basin is a flat or depressed site. The underlying geology is less critical than for a dam because the basin can be lined to prevent seepage, and because there is not a large dam to support.

Environmental and Land Use Constraints: Favorable topography for a dam may not equal favorable environmental and land use conditions. For example, Peñasquitos Canyon may provide favorable topography, but as a designated preserve area is not available as a dam and reservoir site. More favorable sites may be found in the headwaters of minor side drainages, but even these are likely to pose challenging environmental permitting obstacles. Excavated basins can provide fewer environmental permitting challenges, and could conceivably be incorporated as an amenity into an open space or golf course area. For either type of storage, the facility would probably need to be designed or operated to prevent the spilling or release of recycled water to natural drainages. Local, state and federal agency permits would have to be obtained and their requirements observed.

Proximity To Recycled Water Transmission Backbone: Other things being equal, sites closer to the major recycled water transmission pipelines are preferred over those sites farther away.

Several previous studies have evaluated possible surface water storage sites for water and recycled water storage purposes. These studies include the following:

San Diego County Water Authority Emergency Storage Project: These studies only considered sites 25,000 AF and larger. Nevertheless, studies provide indication of costs and other constraints for building a dam. The site selection process for the SDCWA's Emergency Storage Project considered a long-list of alternatives that included 27 surface water storage sites. Of the new storage sites considered, none was within or adjacent to the City.

San Diego County Water Authority Regional Recycled Water System Study (RBF, March 2002): These studies briefly considered and rejected several alternatives for seasonal storage using either surface or groundwater storage. The alternatives were rejected due to high costs and other factors. None of the sites considered were within or adjacent to the City.

2.0 Recycled Water Supply

Costs associated with surface storage reservoirs are characterized as follows:

Dams: The SDCWA Emergency Storage Project provides a current local cost reference for constructing new dams and connecting facilities. The comparison is inexact in that the Emergency Storage Project facilities are all larger than the volume ranges being considered here, and therefore may reflect economies of scale not available to the City's reclamation infrastructure. Nevertheless, these costs provide a useful order-of-magnitude comparison. The Emergency Storage Project is developing a total of approximately 90,000 AF of accessible storage capacity at an average cost of approximately \$10,000 per AF of capacity. At an interest rate of six percent per year, this amortizes to approximately \$700 per AF of capacity per year, exclusive of operating costs.

Earthen Basins: The Olivenhain Municipal Water District (OMWD) owns and operates a 410 AF storage pond adjacent to its 4S Wastewater Treatment Plant. The plant is not connected to an ocean outfall, and relies on recycled water use and seasonal storage for disposal of its effluent. Also, under the regulations of the San Diego Regional Water Quality Control Board (RWQCB), OMWD is required to provide 84 days of failsafe storage capacity available to accept plant effluent during wet weather conditions or other outages of the recycled water system, and so a portion of the pond capacity is dedicated to this use. OMWD constructed the pond in 2001 at a total cost of approximately \$5 million, not including land. This works out to an average cost of approximately \$12,000 per AF of capacity. At an interest rate of six percent per year, this amortizes to approximately \$900 per AF of capacity per year, exclusive of operating costs. These costs are exclusive of land costs. The 4S pond occupies approximately 17 acres of land, which was provided at no cost to OMWD through a development services agreement. Had OMWD needed to purchase the land, it is not unreasonable to assume that the costs sited previously would be increased by a factor of two or greater.

The long-term storage of recycled water poses special water quality management challenges due to recycled water's higher nutrient concentrations, as compared to conventional water storage operations. High nutrient concentrations combined with sunlight and warm temperatures can promote the growth of algae, including clump-forming filamentous algae that could clog outlet screens and irrigation system components. The design of any recycled water surface storage facility will need to account for these concerns. Algae will also attract ducks and other birds, and aquatic insects such as mosquitoes. Possible design elements to address these concerns include the ability to filter the water withdrawn from storage, reservoir circulation and aeration systems to promote healthy levels of dissolved oxygen in the stored water, and the introduction of favorable fish species (e.g., mosquito fish) to control insects.

2.5.4 North City Service Area Surface Storage Alternatives

Existing recycled water uses in the North City service area are predominantly irrigation based, such that the service area might benefit from seasonal storage as discussed previously. Possible storage sites are summarized in Table 2-2.

**Table 2-2
North City Service Area Surface Storage Alternatives Considered**

Site	Concept	Values / Constraints
San Dieguito Reservoir	Convert the existing reservoir, owned by the Santa Fe Irrigation District and the San Dieguito Water District, to recycled water storage. Reservoir would connect to Olivenhain MWD's reclamation system, which in turn is planned to connect to City's reclamation system.	<ul style="list-style-type: none"> • Use of existing facility may reduce environmental constraints • Use of existing facility minimizes costs • Operable storage capacity may be less than 200 acre-feet • Facility not under the jurisdiction of the City • Use of the facility to increase beneficial reuse within the City would require wheeling agreements with Olivenhain, Santa Fe, and San Dieguito districts
Black Mountain area excavated basin	Purchase 40 acres of vacant land in the developing Black Mountain area of the City and construct an excavated basin with a capacity of approximately 1,000 to 2,000 acre-feet.	<ul style="list-style-type: none"> • Use of excavated basin may reduce environmental constraints in comparison to a new dam project however, location of site within Multi-Habitat Planning Area and location of wildlife corridors and sensitive upland habitat in the area are indicative of remaining environmental constraints. • Expensive, especially if the City has to purchase the land. Cost per acre-foot of new beneficial reuse developed by the project may not compare favorably with other options for increasing reuse
East Elliott – New Dam and Reservoir	Work with the Marine Corps to gain permission to construct a new dam and reservoir in the East Elliott area of the Miramar air base, east of I-15 and north of Highway 52. Target capacity is 5,000 to 10,000 acre-feet.	<ul style="list-style-type: none"> • Marine Corps uses may not be compatible with the reservoir • Inundation of canyon habitat areas may pose significant environmental permitting challenges • Expensive. Cost per acre-foot of new beneficial reuse developed by the project may not compare favorably with other options for increasing reuse

2.5.5 South Bay Service Area Surface Storage Alternatives

Existing and projected recycled water uses in the South Bay service area are a mix of irrigation and industrial uses, such that the service area might benefit from seasonal storage but possibly to a lesser degree than for the North City service area. Possible South Bay storage sites are summarized in Table 2-3 below.

**Table 2-3
South Bay Service Area Surface Storage Alternatives Considered**

Site	Concept	Values / Constraints
Upper Otay Reservoir	Develop conveyance facilities to connect the existing Upper Otay Reservoir to the City's reclamation system. The Upper Reservoir has a capacity of approximately 800 acre-feet.	<ul style="list-style-type: none"> • Use of existing facility may minimize costs, although seismic stability of existing notched dam may need review • Prevention of wet weather releases to Lower Otay Reservoir may be significant constraint. May require runoff to be diverted around the reservoir. California Department of Health Services approval would be required. • Reservoir is designated in California Fish and Game code as a spawning ground for Florida Bass. Recycled water storage could increase average pool volumes and benefit the fishery. • Maximum operable storage, after accounting for minimum fishery pools and freeboard for spill prevention, may only be half or less of total storage volume.
Otay Mesa area or OWD Service Area excavated basin	Purchase 40 acres of vacant land in the developing Otay Mesa area of the City or OWD Service Area in County and construct an excavated basin with a capacity of approximately 1,000 acre-feet.	<ul style="list-style-type: none"> • Use of excavated basin may reduce environmental constraints in comparison to a new dam project, however location of wildlife corridors and sensitive species may remain constraints. • Expensive, especially if the City has to purchase the land. Cost per acre-foot of new beneficial reuse developed by the project may not compare favorably with other options for increasing reuse
Otay Mesa – New Dam and Reservoir	Construct a new dam and reservoir in the head of one of the westerly Otay Mesa canyons. Target capacity is 2,000 to 5,000 acre-feet.	<ul style="list-style-type: none"> • Inundation of canyon habitat areas may pose significant environmental permitting challenges • Expensive. Cost per acre-foot of new beneficial reuse developed by the project may not compare favorably with other options for increasing reuse

2.5.6 Recommended Surface Seasonal Storage Alternatives

Based on the above, the Reuse Study team recommends that the following surface seasonal storage options carry forward to the evaluation of alternative water reuse development plans for both the North City and South Bay service areas if seasonal storage is deemed necessary:

North City Service Area

1. **No Seasonal Storage:** Given the potential constraints and costs of surface seasonal storage, consider foregoing seasonal storage and supplementing peak summer supplies with potable water as needed.
2. **Black Mountain Area Excavated Basin:** Consider the possible development of a 1,000 to 2,000 AF excavated basin in the developing Black Mountain area of the City.

South Bay Service Area

1. **No Seasonal Storage:** Given the potential constraints and costs of surface seasonal storage, consider foregoing seasonal storage and supplementing peak summer supplies with potable water as needed.
2. **Upper Otay Reservoir Conversion:** Consider the possible conversion of Upper Otay Reservoir for seasonal storage of recycled water, with a total operating storage volume of approximately 400 AF.

The need for seasonal storage will be dependent on the alternative water reuse development plan that is implemented by the City. Seasonal storage is only necessary if the peak (summer-time) non-potable recycled water demands significantly exceed the maximum capacity of the reclamation plant.

3.0 RECYCLED WATER MARKET ASSESSMENT

The Recycled Water Market Assessment was developed as part of the City of San Diego Master Plan 2005. The purpose of this assessment is to update previous efforts and document current recycled water market studies that have been prepared for the City of San Diego's existing and proposed recycled water service areas and to identify new potential customers to assist the City in meeting the reclamation system capacity goal of the Ocean Pollution Reduction Act (OPRA) and beneficial reuse goals of the United States EPA grant.

The City's recycled water service areas are shown in Figure 3-1 and include the Northern Service Area (NSA), the San Pasqual Service Area (SPSA), the Central Service Area (CSA), and the Southern Service Area (SSA). The City operates two water reclamation facilities: the NCWRP which serves the NSA and the SBWRP which is new and the distribution system is limited to the immediate vicinity of the plant. There are currently no reclamation plants within the SPSA or CSA; however it is possible that the distribution systems from either the NCWRP or the SBWRP could be expanded to include these areas. Thus the potential recycled water markets in these areas were included in this assessment.

The recycled water market assessment was performed using the following approach:

- Update the list of existing recycled water customers, using recent City water meter data.
- Refine and update findings of the draft *2003 Draft Accelerated Beneficial Reuse Study* for NSA and SSA
- Review infill potential in NSA using water meter data provided by City and identifying smaller customers within a reasonable proximity to existing infrastructure.
- Determine if there are sufficient potential infill customers along the existing recycled water system that could substitute for the markets that would be served by expanding the recycled water system north to meet the City's 2010 reuse goals.
- Review past reports and water meter data and coordinate with City to summarize findings of markets in the SPSA and CSA.

3.1 RECYCLED WATER SERVICE AREAS

The City's recycled water service areas, shown in Figure 3-1, include the NSA, SPSA, CSA, and SSA. The service area boundaries represent the general limits of the recycled water market assessment and distribution system planning.

3.0 Recycled Water Market Assessment

The NSA is located within the northern portion of the City and is served by the existing NCWRP distribution system. The NSA includes the area north of State Route 52 (SR-52) to the City's northern boundary and north of the Rancho Bernardo Inn and Oaks North Golf Courses at I-15 and from the coast to the City's eastern boundary with the City of Poway. The NSA includes areas undergoing development in the North City Future Urbanized Area. Some of the new developments within this area have already constructed recycled water pipelines and installed irrigation systems for future connection to the North City recycled water distribution system. The NSA is a largely suburban, residential area with some commercial and light industrial park areas.

The SPSA is located in the northeast corner of the City of San Diego, near Lake Hodges and north of the NSA. It is bounded by the northern limits of the Rancho Bernardo Inn and Oaks North Golf Courses to the south extending north to the San Pasqual Valley and Lake Hodges. San Diego County property served by the OMWD is located to the west of the SPSA and the City of Poway is located to the east. The SPSA is primarily residential with a number of Homeowner's Associations (HOAs) and golf courses with high irrigation demands. Prior to June 2003, the City considered reconstructing the San Pasqual Water Reclamation Plant located in the vicinity of Interstate 15 and Pomerado Road, just south of Escondido. However, the City later determined that it would be more economically feasible to serve this area with alternative water sources.

The northern boundary of the CSA coincides with the southern boundary of the NSA. The study area is bounded to the west by the Pacific Ocean. The remaining CSA boundary coincides with the City limits boundary to the east with the City of La Mesa and to the south with National City. The land use of the CSA is characterized by a predominately developed area comprised of residential, neighborhood commercial and industrial, major commercial and office buildings, numerous schools and parks in addition to the military along the waterfront of San Diego Bay. A very small fraction of the remaining land in the CSA can be considered developable. Currently, a reclamation facility is not located within this service area.

The SSA is located in the City of San Diego and bounded on the north by the City of Chula Vista, on the east by OWD, on the south by Mexico and on the west by the Pacific Ocean and the City of Imperial Beach. Potential recycled water customers located outside of the City's SSA were also considered such as the City of Imperial Beach, City of Chula Vista that is served by the Sweetwater Authority (SWA) in the western area and OWD in the eastern area, and portions of Otay Mesa area served by OWD. The SSA is served by the recently constructed SBWRP.

3.0 Recycled Water Market Assessment

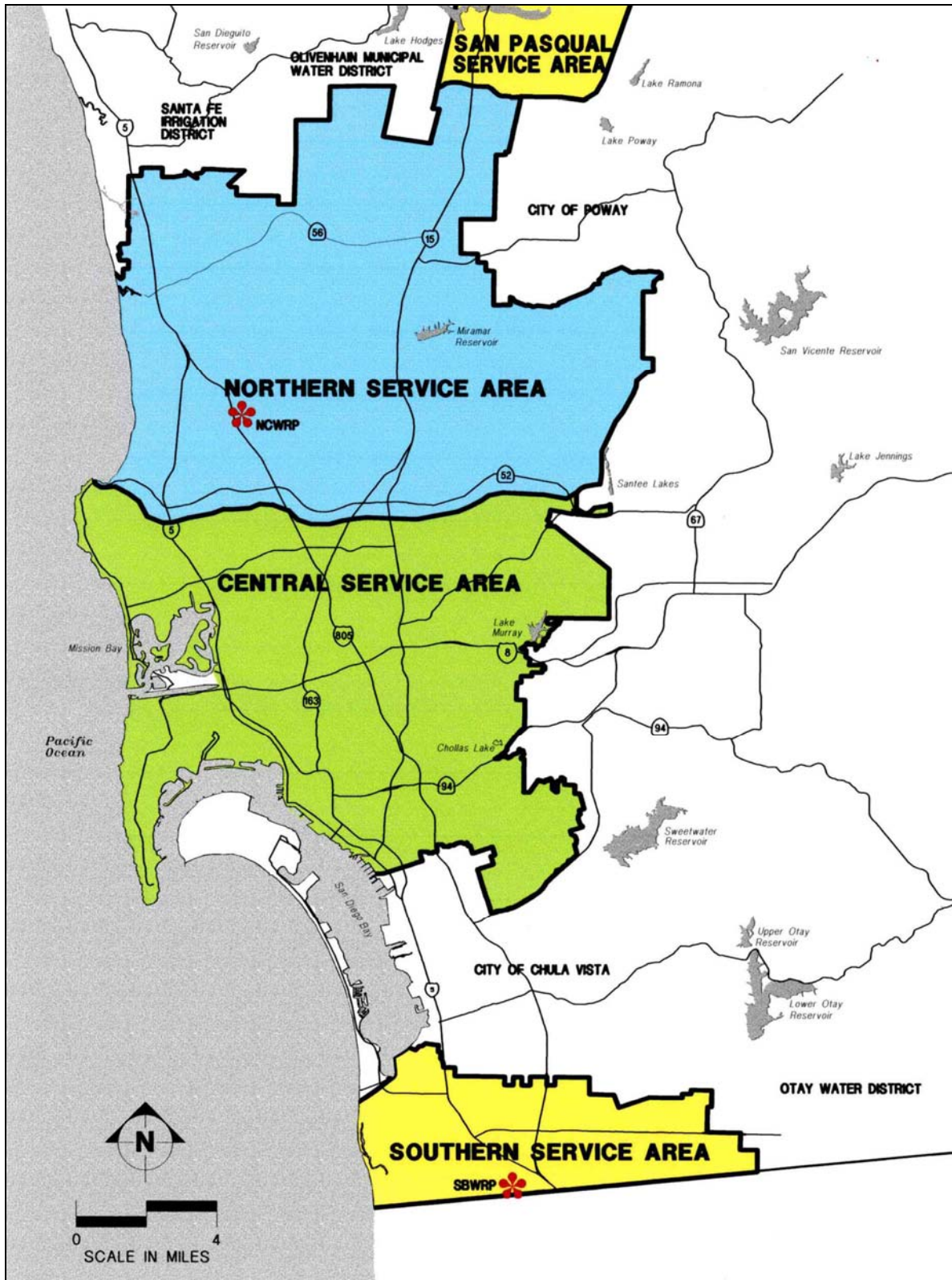


Figure 3-1 – Existing and Proposed San Diego Recycled Water Service Areas

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3.2 PREVIOUS MARKET ANALYSIS

The assessment of the recycled water market has been an ongoing effort in the planning of the City's recycled water system. The following paragraphs provide a brief review of previous recycled water market assessments for the existing and proposed recycled water system.

Recycled Water Distribution System Master Plan for the Northern Service Area, October 1992 – A Recycled Water Distribution Master Plan for the NSA of the City of San Diego was prepared in October 1992. This study identified potential recycled water customers north of La Jolla Village Drive and SR-52, but did not include Rancho Bernardo. One hundred thirty-eight (138) existing potential recycled water markets expected to use over 12 AFY were identified, with a total annual demand of 10,811 AFY. Future demands were estimated based on undeveloped acreage and land use designations. The total recycled water demand for this service area was estimated to be 17,916 AFY in 1992, 28,029 AFY in 2003, 29,637 AFY in 2010, and 34,314 AFY in 2050.

Recycled Water Distribution System Master Plan for the Central Service Area, October 1992 – A Recycled Water Distribution Master Plan for the CSA of the City of San Diego was prepared in October 1992. This study identified potential recycled water markets south of La Jolla Village Drive extending from the Pacific Ocean to Interstate 805 and south to the City limits boundary along La Mesa and National City. Eighty-four (84) potential recycled water markets expected to use over 50 AFY were identified, with a total annual demand of 12,040 AFY. A total of 1,477 potential recycled water customers with a possible demand of up to 20,650 AFY were identified. Of the 20,650 AFY of potential recycled water use, only 1,640 AFY was attributable to future use as this area is essentially builtout.

Update of Reclaimed Water Market Assessment for the Northern Reuse Area, November 1994 – This report provided an update to previous recycled water market assessments prepared for the City of San Diego's "Optimized Reclaimed Water Distribution System" (Optimized system) supplied by the NCWRP. The Optimized system was the first phase of a series of projects which involved construction of an extensive recycled water distribution network extending from Torrey Pines on the coast inland to the San Diego-Poway city limits. During this time, the City was undergoing a detailed water reuse strategy, the Water Repurification Project, which led to the development of the Optimized system. To accommodate this strategy, the Optimized system reduced the planned service area of the NCWRP. It was comprised of backbone pipes, ranging from 6-inches to 48-inches in diameter. In November 1994 developments within the NSA, but outside of the Optimized system's service area, were no longer required as a condition of the tentative map approval process, to install facilities for the use of recycled water.

The primary objective of the study was to confirm and update, by identification of new potential sites, the compiled list of potential users and their anticipated non-potable demands. Approximately 139 Type 1 (12 AFY or greater) and 189 Type 1A (4 to 12 AFY) users were identified through update of the market analysis. This represented an annual recycled water

3.0 Recycled Water Market Assessment

demand of 7,637 AFY for Type 1 users and 1,481 AFY for Type 1A users. The potential annual demand within the optimized area was determined to be 9,118 AFY. An additional future incidental demand of 885 AFY situated within the reuse service area of the Optimized system was also identified.

Update of the Reclaimed Water Market Assessment for the Southern Service Area, March 1995 – This report was prepared by Metropolitan Wastewater Department in March 1995 to update previous recycled water market assessments in the SSA. Approximately 49 large and 274 smaller existing user sites were identified within the entire service area presenting an existing non-potable water demand of 5,520 AFY. External markets, primarily located in Chula Vista and the OWD areas presented an additional 9,550 AFY of demand. The updated present demand estimate was 2,600 AFY greater than the previous estimate presented in the *1992 Recycled Water Distribution System Master Plan for the Southern Service Area* (1992 Master Plan - SSA). The future demand updated estimate, however, was 5,800 AFY lower than presented in the 1992 Master Plan - SSA due to revised land use forecasts within both the City of San Diego and Eastern Chula Vista (Otay Ranch Development) area.

Water Reclamation Master Plan Update, December 1997 – This report was prepared for the City of San Diego with the intent to document water reclamation activities which had occurred since the preparation for the *Reclaimed Water Distribution Master Plan* reports in 1992, and identified anticipated key changes to the Master Plan over the next decade. The study summarized the findings from past studies for the NSA, SSA and CSA. The previous studies referenced in the 1997 Master Plan on the market assessment in each service area were the *1994 Update of Reclaimed Water Market Assessment for the Northern Reuse Area*, *1995 Update of the Reclaimed Water Market Assessment for the Southern Service Area* and the *1992 Reclaimed Water Distribution System Master Plan*. Reclaimed market potential within the CSA has not been updated since the 1992 Master Plan was prepared because existing user sites and associated demand, comprising nearly all of the potential non-potable market, have undergone very little change. The estimated CSA demand including the City of Coronado and the North Island is 15,000 AFY and is comprised of over 200 large and 800 smaller user sites.

South Bay Reclaimed Water Business Plan, November 1998 – The *1998 South Bay Reclaimed Water Business Plan (Business Plan)* identified a possible pipeline route from the SBWRP to both Sweetwater Authority (SWA) and Otay Water District (OWD). The study was funded by the California American Water Company, the City of San Diego MWWD and Water Departments, the OWD, the San Diego CWA and the SWA. The *Business Plan* included expansion of potential recycled water use by outside agencies and possible use of recycled water for injection and subsequent extraction in the lower Sweetwater River Basin to supply the SWA's proposed demineralization plant. The *Business Plan* estimated an initial average annual demand of 3,000 AFY (2.7 MGD) to 4,000 AFY (3.6 MGD) by 2005. It also addressed a possible use of up to 3,600 AFY (3.2 MGD) of recycled water as a salt-water barrier within the groundwater basin and discussed the use of recycled water as a source of supply for recharge in the Tijuana River Valley at an initial demand of 1,000 AFY (0.9 MGD) to 3,000 AFY (2.7 MGD).

3.0 Recycled Water Market Assessment

The *Business Plan* included South Bay industrial markets for recycled water, such as, Kelco (now CP Kelco and ISP Alginates), US Navy (32nd Street shipyard operations and golf course) the San Diego Marriott, Angelica Health Care Services, Duke Energy (South Bay Power Plant), Rohr Industries and NASSCO (Shipyard Operations). The South Bay Power Plant currently uses bay water for cooling. Duke Energy was also considering a new plant with an estimated recycled water demand of 3,700 AFY (5 MGD) for cooling tower use. However due to the uncertainty of the energy market and lack of a dedicated site for the new plant, it was not considered in the City's plans for recycled water use at the time.

The largest water user with a City irrigation meter was identified as the South Bay Union Emory Elementary School on Coronado Avenue that used 80 AFY (0.07 MGD) between 2001 and 2002. Within the Cal-American service area, Southwest High School in the Sweetwater Union School District is estimated to use 125 AFY (0.11 MGD). The study also identified previous recycled water markets from the *1995 Update of Reclaimed Water Market Assessment Southern Service Area* which included agricultural users in the Tijuana River Valley and additional park and school sites. These larger users included Am Sod, Egger, Yamamoto, Southwest High School, Montgomery High School and Montgomery-Waller Park. The *Business Plan* noted that these demand projections from previous assessments and market studies have been proven aggressive and should therefore be scrutinized in future evaluations.

San Pasqual Water Reclamation Program Master Plan, December 1998 – This report was prepared for the City of San Diego with the purpose of compiling all issues related to wastewater collection, treatment, reuse and disposal relative to the Rancho Bernardo area. Feasible recycled water users were identified in four geographic areas: North of Espola Road/Rancho Bernardo Road; south of Espola Road/Rancho Bernardo Road; agricultural markets in the San Pasqual Valley and Poway. This report included wastewater flow projections for Rancho Bernardo and Poway areas tributary to the now defunct San Pasqual Water Reclamation Plant (SPWRP).

Updated Water Reclamation Master Plan (Northern and Central Service Areas), December 2000 – In December 2000, the *Updated Water Reclamation Master Plan (2000 Master Plan)* identified potential recycled water customers that could be served by the NCWRP, primarily in the NSA and CSA, that would use sufficient quantities of recycled water to warrant expansion of the recycled water system and meet the EPA reuse goals. Outside agency customers, such as, the City of Poway and OMWD were also identified as potential customers for recycled water from the City. The market assessment update anticipated a demand of 8,400 AFY that could be captured by 2003 and an increase to 12,600 AFY to 14,800 AFY (depending on the ability to use recycled water to recharge groundwater in the San Dieguito basin) in 2010. The study targeted large potential recycled water users with demands greater than 50 AFY. Smaller users were identified only if they were in close proximity to the system and cost effective.

Single meter recycled water customers beyond the Optimized System were identified in relation to the initial phases of the system expansion. Phase I was defined as the Black Mountain Ranch/OMWD corridor. The recommended markets included Black Mountain Ranch development,

3.0 Recycled Water Market Assessment

supplemental recycled water service to OMWD and recharge of the San Dieguito Groundwater Basin representing an additional 4,100 AFY in recycled water demand and an additional 2,260 AFY in groundwater uses.

Phase II was along the new SR-56 corridor and recommended markets included Caltrans, the existing Meadows at Del Mar Golf Course, the residential developments adjacent to SR-56 including Pacific Highlands Ranch and Torrey Highlands representing an additional demand of approximately 1,500 AFY.

Phase III was along the I-15 corridor from Carmel Mountain Road to Rancho Bernardo. Recycled water markets included Bernardo Heights Golf Course, Carmel Highlands (Mass Mutual) Golf Course, Carmel Mountain Ranch Golf Course, AETNA Life Insurance, TRW Military Electronics, Lomas Bernardo HOAs, Northern Division of the City's Park & Recreation Department and Rancho Bernardo High School. These customers represented an additional demand of approximately 1,100 AFY.

Southern San Diego Recycled Water Market Assessment Update (Southern Service Area), April 2001 – The *Southern San Diego Recycled Water Market Assessment Update* identified approximately 132 potential customers that could be served by the SBWRP, having a total annual demand of 1,900 AFY in 2001 and a projected future demand of 5,950 AFY. Major potential recycled water customers included Marshall Field, the Sweetwater Union School District and Southwest High School. Future potential recycled water customers identified included various Tijuana Valley County Water District (TJVCWD) customers for injection well purposes; Am Sod, Egger, Farmland Yamamoto and Jackson Ranch for agricultural uses; and the U.S. Navy and City of Coronado for irrigation use.

The study also updated recycled water demands from other agencies previously identified in the *1992 Recycled Water Distribution System Master Plan for the SSA*, which make up the majority of the potential recycled water demand in the South Bay. These agencies include OWD, TJVCWD and SWA. OWD was the largest potential user of the recycled water in South Bay. At the time, OWD was undergoing negotiations with the City to possibly commit to purchasing 13,440 AFY (12 MGD) of the recycled water supplied from the 15 MGD SBWRP. The TJVCWD is located between Imperial Beach and the US-Mexico border and includes the Tijuana River Valley from the coast east to the City boundary. The potential recycled water demand of 2,500 AFY (2.2 MGD) would primarily be for a proposed groundwater recharge facility. The SWA intends to use the recycled water demand primarily for groundwater injection and extraction projects for a projected demand of approximately 8,000 AFY (7 MGD) by 2010.

Draft Accelerated Implementation of Beneficial Reuse (Northern, Central and Southern Service Areas), February 2003 – Subsequent to the *2000 Master Plan* was the *Draft Accelerated Implementation of Beneficial Reuse* study (*2003 Draft Accelerated Beneficial Reuse Study*) dated February 2003. The study identified opportunities above and beyond the planned 2010 system to accelerate and maximize recycled water use served by the NCWRP and SBWRP.

3.0 Recycled Water Market Assessment

City water meter records for irrigation meters and previous market assessments were reviewed to identify additional customers on a conceptual level.

Expanded service within the NSA included extending the distribution system to target new development in the Sorrento Mesa area, Caltrans, park districts and portions of the CSA such as the Mission Bay Golf Course and Campground, DeAnza, Playa Pacifica, Tecolote, South Shores Parklands, Sea World, Caltrans, University of San Diego, golf courses, parks, and Homeowner's Association for a total potential average annual demand of 15,700 AFY from the NCWRP. Seasonal storage of excess plant supply of up to 7,500 AFY via groundwater basins would augment peak irrigation demands in the summer.

The projected demand for the SSA was estimated to be approximately 12,300 AFY (11 MGD) by the year 2010. Large recycled water markets included OWD, International Boundary and Water Commission (IBWC), agricultural users in the Tijuana River Valley, and additional park and school sites, groundwater recharge, the SWA and Caltrans.

Beneficial Reuse - Phase 3 Recycled Water System (Rancho Bernardo/North Poway/San Pasqual), June 2003 – Concurrent with this study, the City was investigating whether it should enlarge and reactivate the SPWRP or permanently decommission the plant and provide recycled water to San Pasqual Valley and northern Rancho Bernardo from the NCWRP. The study included an alignment study to evaluate the ability to serve the Rancho Bernardo and Poway customers, and subsequently, the San Pasqual customers, via the Carmel Valley Road alignment in the North City recycled water system. Recycled water markets within these areas estimated a projected 2010 recycled water demand of 1,112 AFY (1.00 MGD) for Rancho Bernardo, 1,428 AFY (1.26 MGD) for the San Pasqual and 942 AFY (0.84 MGD) for Poway. The average annual demand totaled 3,482 AFY (3.10 MGD). Major customers included golf courses, HOAs and Caltrans. The study concluded that the Carmel Valley Road alignment was a viable alternative to the Sabre Springs alignment that was proposed in the *2000 Master Plan*. The Rancho Bernardo and Poway golf courses can be served from North City without installing the Canyonside Pipeline. However, the SPSA would require this pipeline to be in place to adequately serve its customers. Additionally, substantial storage would be required to meet the estimated recycled water demands from Rancho Bernardo and San Pasqual areas.

Beneficial Reuse - Phase 3 Recycled Water Alignment and Reservoir Site Alternatives (Northern Service Area), April 2004 – Alternative Phase 3 alignments were evaluated to serve northern Rancho Bernardo and Poway golf courses. The *Phase 3 Recycled Water Alignment and Reservoir Site Alternatives Study* addressed this by comparing the *2000 Master Plan* proposed Phase 3 corridor consisting of the Ted Williams Parkway and the Sabre Springs Parkway alignments to the extension of the Phase 2 Carmel Valley Road alignment based on feasibility and cost. Results of the study indicated the extension of the Carmel Valley Road alignment including construction of the 2 million gallon (MG) Pomerado Park Reservoir and an additional 2 MG of storage located south of Ted Williams Parkway was the most feasible and economical alternative to meet Phase 3 recycled water demands. The results of this analysis also refined the Phase 3 targeted customers.

3.3 MANDATORY REUSE ORDINANCE

The Mandatory Reuse Ordinance (MRO) provides regulation of recycled water use in San Diego. Excerpts from the City Manager's Report dated July 28, 2004 below summarizes the major aspects of the ordinance and the status of establishing criteria that specifies the required use and application of recycled water for new and existing properties.

On July 24, 1989, the San Diego City Council approved Ordinance 0-17327 (Mandatory Reuse Ordinance) which specified that "recycled water shall be used within the City where feasible and consistent with the legal requirements, preservation of public health, safety and welfare, and the environment." On December 9, 2002 San Diego City Council passed Resolution R-297487 authorizing City staff to work in conjunction with the Public Utilities Advisory Commission (PUAC) to develop specific criteria to be applied in determining which particular properties would be required to use recycled water for suitable and approved purposes.

In order to develop specific reuse criteria for both new development and "retrofit" situations, City staff met with the PUAC Subcommittee on Water & Wastewater Service Delivery in early 2003. As a result, an initial draft of proposed criteria was developed which balanced the following elements in determining specific properties and facilities that would be required to use recycled water:

- 1. Type of approved use (e.g. landscape irrigation, sanitary purpose, etc.)*
- 2. Proximity of the property to existing recycled water pipelines*
- 3. Construction costs; and*
- 4. Amount of potable water savings anticipated as a result of conversion to recycled water use.*

In general, the draft criteria mandated customers whose existing developed property was immediately adjacent to a recycled water pipeline, and which used 5 acre feet per year (AFY) or more of potable water for landscape irrigation purposes, be required to retrofit their property to use recycled water for this purpose. For all "new" property in development adjacent to an existing pipeline, the draft criteria required recycled water use for irrigation purposes regardless of amount of projected consumption. In addition, the draft criteria recommended that all new buildings and facilities be required to use recycled water for cooling tower and sanitary uses if the property was immediately adjacent to the pipeline and if specific building size or water consumption thresholds were met.

Subsequently, City staff presented the recycled water draft criteria to community groups, stakeholders and other interested parties to obtain feedback on their preliminary concerns with regard to their application. As a result, a primary change was made to the criteria to increase the usage threshold for retrofit properties. It was raised from 5 AFY to 20 AFY to provide a 4 to 5 year payback period that would be consistent with the business planning cycle, based on the

3.0 Recycled Water Market Assessment

current price difference between potable and recycled water. The revised criteria was approved by the PUAC on November 17, 2003.

Since the PUAC approval of the revised criteria, City staff has continued to provide follow-up presentations to targeted stakeholders to listen to their concerns on the impact of the criteria on specific businesses and operations and to identify potential mitigation measures for these concerns. Based on feedback from the stakeholders and the City's extensive efforts in conducting research, cost analyses and studies to evaluate their concerns, the recycled water use criteria was revised once again. The major aspects to the proposed criteria are listed as follows:

1. Dual plumbing for recycled water in new buildings with height greater than 55 feet or occupancy of 800 or more people will remain as stated in previous criteria as a condition of development. Staff recommended that the criteria also include buildings over 80,000 square feet.
2. Manufacturers with usage levels greater than 5 AFY are no longer mandated to use recycled water, instead manufacturing facilities must submit a recycled water use study to the City detailing the degree of feasibility associated with recycled water use.
3. Previous criteria that all new buildings utilizing 300 tons of cooling or greater be required to use recycled water for such purposes will remain in place.
4. Staff recommends establishment of a 20 AFY usage threshold to mandate retrofits. The threshold was previously approved by the PUAC and recently reaffirmed on July 19, 2004.

City staff also performed a customer development analysis to identify an approach that will effectively coordinate with customers subject to the MRO and increase awareness to potential customers that do not meet the mandatory reuse criteria. City staff recommended the following potential initiatives to implement for Fiscal Year 2005:

1. *Create an informational program targeted to customers who will be mandated to use recycled water.*
2. *Implement a prospect nurturing program to boost prospect-to-customer conversion rate.*
3. *Develop a public awareness program for the area served by the North City Water Reclamation Plant that is integrated with the County Water Authority's region-wide approach.*

On August 4, 2004, the Natural Resources and Culture Committee recommended Council action associated with enforcing a provision of the Mandatory Reuse Ordinance that would require customers using potable water to switch to recycled water. Presentation to City Council is pending, based on the completion of the Water Reuse Study 2005. Tables 3-1 and 3-2 are taken from the July 2004 City Manager's Report No. 04-172 which summarizes the proposed criteria for retrofit markets and for new development markets, respectively.

3.0 Recycled Water Market Assessment

**Table 3-1
Proposed Recycled Water Mandatory Use in San Diego Retrofit Market**

Title 22 Uses of 2.2 Disinfected Tertiary Recycled Water	Retrofit Market (Where property line is contiguous to RW line ¹)				
	Residential		Schools, Commercial, Industrial, Governmental	Parks and Cemeteries	Golf Courses
	Single Family Dwelling	Multi- Family/HOA			
Irrigation	Not Required	Required if = or > 20 AFY usage for irrigation	Required if = or > 20 AFY usage for irrigation	Required	Required
Dual Plumbing – Sanitary Uses	Not allowed per Title 22	Not allowed per Title 22	Not required. Voluntary	Not Required	Not Required
HVAC – Cooling Tower	Not Applicable	Not Required	Not required. Voluntary	Not Applicable	Not Applicable
Manufacturing Processes ²	Not Applicable	Not Applicable	Not required. Voluntary	Not Applicable	Not Applicable
Other Uses ³	May be required, on a case-by-case basis.				

Source: Attachment 2 in Recycled Water Mandatory Reuse Ordinance Criteria, City Manager's Report No. 04-172 issued on July 28, 2004.

¹ Proposed retrofit criteria are in effect when a pipeline capable of serving recycled water is contiguous to the customer's property or will be contiguous within one year.

² For manufacturing that uses potable water as part of manufacturing process.

³ Refer to Title 22 Water Recycling Criteria in California (cost recovery of < or = 5 years will be used).

3.0 Recycled Water Market Assessment

**Table 3-2
Proposed Recycled Water Mandatory Use in San Diego New Development Market**

Title 22 Uses of 2.2 Disinfected Tertiary Recycled Water	New Development Market (Where property line is contiguous to RW line ¹)				
	Residential		Schools, Commercial, Industrial, Governmental	Parks and Cemeteries	Golf Courses
	Single Family Dwelling	Multi- Family/HOA			
Irrigation	Not Required	Required	Required	Required	Required
Dual Plumbing – Sanitary Uses	Not allowed per Title 22	Not allowed per Title 22	Required, if recycled water is available or will be available based on City of San Diego current Master Plan and building is 55 ft in height, projected to have at least 800 occupants, or encompasses 80k sq.ft.	Not Required	Not Required
HVAC – Cooling Tower	Not Applicable	Not Required	Required if > or = 300 Tons capacity or 5 AFY recycled water usage.	Not Applicable	Not Applicable
Manufacturing Processes ²	Not Applicable	Not Applicable	Recycled Water Use Study submitted as a condition of development.	Not Applicable	Not Applicable
Other Uses ³	May be required, on a case-by-case basis.				

Source: Attachment 2 in Recycled Water Mandatory Reuse Ordinance Criteria, City Manager’s Report No. 04-172 issued on July 28, 2004.

¹ For manufacturing that proposes to use potable water as part of manufacturing process

² Refer to Title 22 Water Recycling Criteria in California.

³ New development projects are required to install recycled water facilities for approved uses within an existing or proposed recycled water service area in accordance with Subdivision Map Act and the City of San Diego Municipal Code.

Proposed criteria will be finalized for approval upon the City Council’s decision to move forward with a water reuse development plan.

3.4 MARKET ASSESSMENT APPROACH

The market assessment first updated the list of existing recycled water customers based on information provided by the City Customer Support Division (CCSD). Additionally, a search of potable water meter data based on zip codes was performed by the San Diego Data Processing Corporation (SDDPC) for the NSA, CSA, and SSA. Table 3-3 identifies the list of zip codes used to obtain potable water meter demand from each service area.

**Table 3-3
SDDPC Data Search by Service Area and Zip Code**

Service Area	Zip Code
Northern/Central	92014, 92025, 92027, 92037, 92065, 92093, 92106, 92107, 92108, 92109, 92110, 92111, 92115, 92116, 92117, 92119, 92120, 92121, 92122, 92123, 92124, 92126, 92127, 92128, 92129, 92130, 92131, 92133, 92140, 92145, 92161, 92166, 92182
Central	92101, 92102, 92103, 92104, 92105, 92134
Southern	91911, 92113, 92114, 92134, 92136, 92139, 92154, 92173, 91902, 91910, 91913, 91914, 91915, 91932, 91945, 91950, 91977, 92118

It should be noted that a portion of the zip codes listed in the NSA are actually located within the CSA. These zip codes were incorporated into the NSA database to effectively identify potential recycled water markets in the event that expansion of the distribution system to the northern portion of the CSA is necessary for the City to meet their 2010 water reuse goal. The demand data was also provided on two levels; consumers with total water demands from 7 to 14 AFY and consumers with total demands greater than 14 AFY.

The data fields provided by SDDPC for the market analysis included:

- Premise Code
- Quantity of Water Billed/Used (June 1, 2003 to May 31, 2004)
- Customer Name, Address & Phone Number
- Meter Rate Code
- Meter Address
- Site Address
- Total Customer Water Demand
- Total Single Water Meter Demand
- Zip Code

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The irrigation demand was extracted from the database of each service area based on the premise and rate codes provided. The premise code describes the type of dwelling or government agency to which water and sewer service is provided. The rate code indicates the rate schedule to be used for computing a consumer's bill. A billing description for each rate code defines the general usage of the meter and type of billing for the account. Sample descriptions include "Regular Water/Regular Sewer," "Recycled Water/Special Rate Sewer," and "Recycled Water/ Irrigation Only." A listing of premise codes and rate codes with descriptions obtained from City of San Diego Water Utilities Consumer Information System (December 1997) are provided in Appendix B.

Potable water customers with a premise code of 80, defined as "Irrigation Only," were initially identified as a potential recycled water customer. The remaining consumers were then sorted by rate code to capture additional potential recycled water customers that were not classified as "Irrigation Only" based on the premise code. For instance, potable water customers with rate code descriptions "Regular Water/Irrigation Only" (i.e. 15, 25, 35, or 45) were added to the list of potential recycled water customers even though some of their use is not solely for irrigation. For these customers, the premise code typically describes the government agency associated with the site and the rate code defines the water use.

Data collected also included recycled water customers. Rate codes specifically defined as "Recycled Water/Irrigation or Special Process" and "Recycled Water/Special Rate Sewer" were extracted from the list of water customers and compared to the list of existing recycled water customers provided by the City CCSD. The rate code definition "Recycled Water/Irrigation or Special Processes" includes recycled water use for irrigation, manufacturing processes or cooling tower purposes. Currently, the City does not have a separate meter code to differentiate recycled water for irrigation or cooling tower use. Recycled water demands for sites without a full year's worth of water use data were estimated based on previous market assessment studies or updated projections obtained from the City.

After the initial list of potential recycled water customers was generated, the data was reconciled for incomplete or inconsistent data, such as, missing monthly water use data, outdated customer name, meter or site addresses, and type of water use. To avoid double counting of potential recycled water use, the potential customers list was then compared to the list of sites undergoing retrofits obtained from the CCSD and list of customers that have installed recycled water facilities but are receiving potable water until the recycled water system is connected.

Once the list of potential recycled water customers was reconciled, each customer was classified by land use category based on their premise or rate code. The meter addresses were then geocoded using Geographic Information System (GIS) technology. A specialized geocoding service called EZ-Locate Version 1.61 by Tele Atlas North America, Inc. was utilized to locate potential customers based on meter or site addresses provided by the City. By geocoding the meter data and using GIS, these customers were plotted graphically based on their site location and land use to pinpoint customers immediately adjacent to the existing and proposed recycled water system. Results from geocoding are approximately accurate to within a block of the actual

3.0 Recycled Water Market Assessment

addresses. Mapping of potential customers in GIS was used for the NSA. The market assessment for the CSA and SPSA were evaluated using recent water meter data and previous studies.

Beyond the general market assessment, the possibility of connecting additional users along the existing recycled water system and the Phase I and II facilities under construction that could replace the markets targeted in the Phase III (Rancho Bernardo) in meeting and possibly exceeding the City's reuse goals was investigated. To accomplish this, customers were plotted graphically along with the existing recycled water distribution system, as well as, the recycled water pipelines under design and construction in the Phase I and II service corridors. Potential customers were identified based on their proximity to the distribution system and then classified into four separate tiers.

- **Tier 1** – Large potable water customers throughout the City above 20 AFY (0.018 MGD) adjacent to the existing and Phase I and II recycled water distribution systems and subject to the City's MRO. These customers are typically golf courses, large parks, school fields, cemeteries, and some HOAs or commercial landscape areas.
- **Tier 2** – Smaller usage customers with demands ranging from 7 AFY (0.006 MGD) to 20 AFY (0.018 MGD) and fronting the existing and Phase I and II recycled water distribution systems. These users are typically small to medium-sized parks, schools, larger industrial users, and HOA or commercial landscaping connections. Consideration should be given to accelerating smaller usage connections when: the potential customer is motivated to obtain recycled water and the customer-funded retrofit is straightforward.
- **Tier 3** – Large potable water customers above 20 AFY (0.018 MGD) within 1,320 feet (one-quarter mile) of the existing and Phase I and II recycled water distribution systems, but not adjacent to the pipeline. If it is cost effective for the City to construct a recycled water pipeline in this street, then existing potable water customers with high irrigation demands would be required to convert to recycled water per the draft MRO criteria. Additionally, the City may pursue marketing efforts to customers with demands less than 20 AFY (0.018 MGD) situated immediately adjacent to the proposed pipeline extension.
- **Tier 4** – Smaller usage customers with demands ranging from 7 AFY (0.006 MGD) to 20 AFY (0.018 MGD) and within 1,320 feet (one-quarter mile) of the existing and Phase I and II recycled water distribution system, but not fronting the pipeline. Consideration to encourage smaller usage connection is similar to criteria described in Tier 2.

It should be noted that a distance of 200 feet from an existing or planned recycled waterline was assumed to define customers "adjacent to" the recycled waterline. A distance of 200 feet was assumed to account for any meters that were setback from the property line of a potential site. Identified customer sites were then verified to determine if in fact the meter address was situated adjacent to a recycled waterline.

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The City Water Department also provided a list of school and park districts located within the NSA to compare estimated demands with meter data obtained from SDDPC. The initial list of sites had limited information that did not coincide with the meter data. A majority of this data was reconciled as part of this planning effort. The City is currently working on reconciling the remaining sites using the Computer Information System available to City staff.

Schools and parks with less than 7 AFY of irrigation demand were evaluated independently. New customers in proximity to the existing and Phase I and II recycled water distribution systems were added to the list of potential customers provided in this assessment.

The City Water Department also requested a separate market assessment be performed on car washes and laundromats in the NSA and a portion of the CSA. A list of commercial establishments was compiled using the telephone directory and an internet search by zip code. The City reviewed the potential customer sites and provided demand data to be included as part of this study. Most of the customers represented a potential recycled water demand less than 7 AFY each; therefore, they did not appear in the water meter data provided by SDDPC, but are included in this market assessment.

The City continues to obtain new potential users through the Water Reuse Study 2005 public involvement efforts and promoting public awareness of recycle water issues within the community. Since the *Draft Accelerated Beneficial Reuse Study* in February 2003, new customers expressing an interest in utilizing recycled water for irrigation or industrial purposes have contacted the City. They are also included in this recycled water demand market assessment.

3.5 NORTHERN SERVICE AREA

The recycled water distribution system within the NSA has been progressing rapidly. Phases I and II of the *2000 Master Plan* are well underway. A majority of the Phase I system became operational in mid-2004 and the remaining Phase I and II systems are in design or construction phases. This ability to quickly implement the plan and to engage private developers in the process is a notable achievement for the City.

As previously mentioned, the City requested that a detailed study of the infill potential within the existing and planned service areas be performed to replace the targeted markets in Phase III (Rancho Bernardo area) to meet their 2010 water reuse goal. Figure 3-2 illustrates the existing as well as the Phase I, II, and III recycled water distribution systems within the NSA.

The strategic market assessment approach for the NSA entailed updating the existing recycled water demand based on retrofit data provided by the CCSD including potential customers currently in the design and construction process to convert to recycled water. Projected recycled water demands for newly developed areas such as Black Mountain Ranch, Pacific Highlands Ranch, Torrey Highlands and OMWD golf courses were obtained from previous studies and confirmed by the City. The latest criteria for the MRO were also used to identify additional

3.0 Recycled Water Market Assessment

users. Potential customers that fall into the different Tiers described previously were used to augment the recycled water demand in the existing, Phase I and Phase II distribution systems. The total updated demand was then compared to the 12 MGD 2010 water reuse goal.

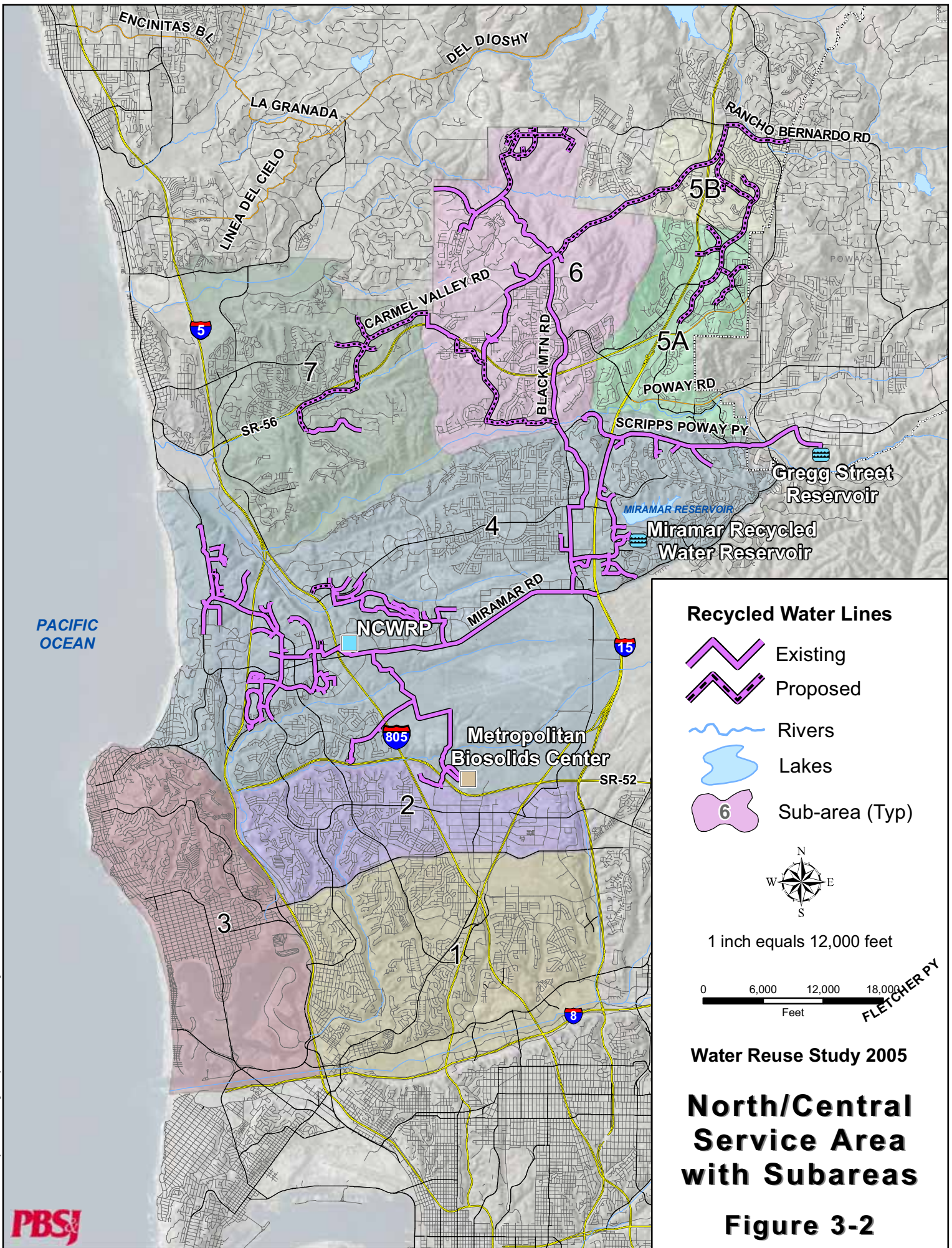
Opportunities to maximize the infill potential within the vicinity of the existing, Phase I and Phase II distribution systems were evaluated by dividing the NSA into sub-areas to identify locations where potential customers were densely populated and exhibited high water demands near the existing recycled distribution system. Limits of sub-area boundaries in Figure 3-2 were delineated with the intent to encompass an area that is feasibly expandable by the recycled water system. This may be due to hydraulic limitations or permitting issues, such as crossing Caltrans right-of-ways. As a result, the boundaries do not coincide exactly with the service area boundaries.

The findings of the recycled water market assessment in the NSA and a portion of the CSA are presented in the following sections. Each potential recycled water customer shown in the map in Appendix C is identified with a customer identification number. A listing of the existing recycled water customers, potential recycled water customers, and retrofits in progress illustrated in the map is also provided in Appendices C-1 through C-3 and sorted in order by the customer identification number. The existing recycled water demand was updated based on past studies and current water meter data. In addition, projected demands from future developments were verified with the City Water Department. The total projected and existing recycled water demand formed a basis for the market assessment.






3.5.1 Existing 2005 Recycled Water Demands

The existing recycled water demand was updated based on recent water meter data from beginning of June 2003 to end of May 2004 from SDDPC for customers with demands greater than 7 AFY. The meter data was also compared to a list of existing customers from the CCSD with recycled water demands for the fiscal year 2003 and customers with demands less than 7 AFY were incorporated to the list. Figure 3-3 identifies each customer with a number, which corresponds to the customer identification number in Appendix C-2. Appendix C-2 provides a current list of existing recycled water customers and their associated demands. In summary, 327 customers used approximately 5,700 AF (averaging over 5 MGD) of recycled water in 2003.

Since the *2000 Master Plan*, most of the high-use customers previously identified as potential customers within the NSA have connected to the existing distribution system. High-use customers that have been connected since 2000, include the Marine Corp Air Station Miramar (MCAS Miramar) Golf Course, Torrey Pines Golf Course and Caltrans. Other major customers already on line include the NCWRP and Metropolitan Biosolids Center.

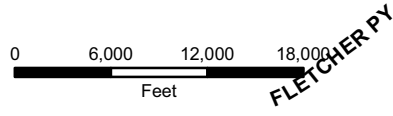


Recycled Water Lines

-  Existing
-  Proposed
-  Rivers
-  Lakes
-  Sub-area (Typ)



1 inch equals 12,000 feet

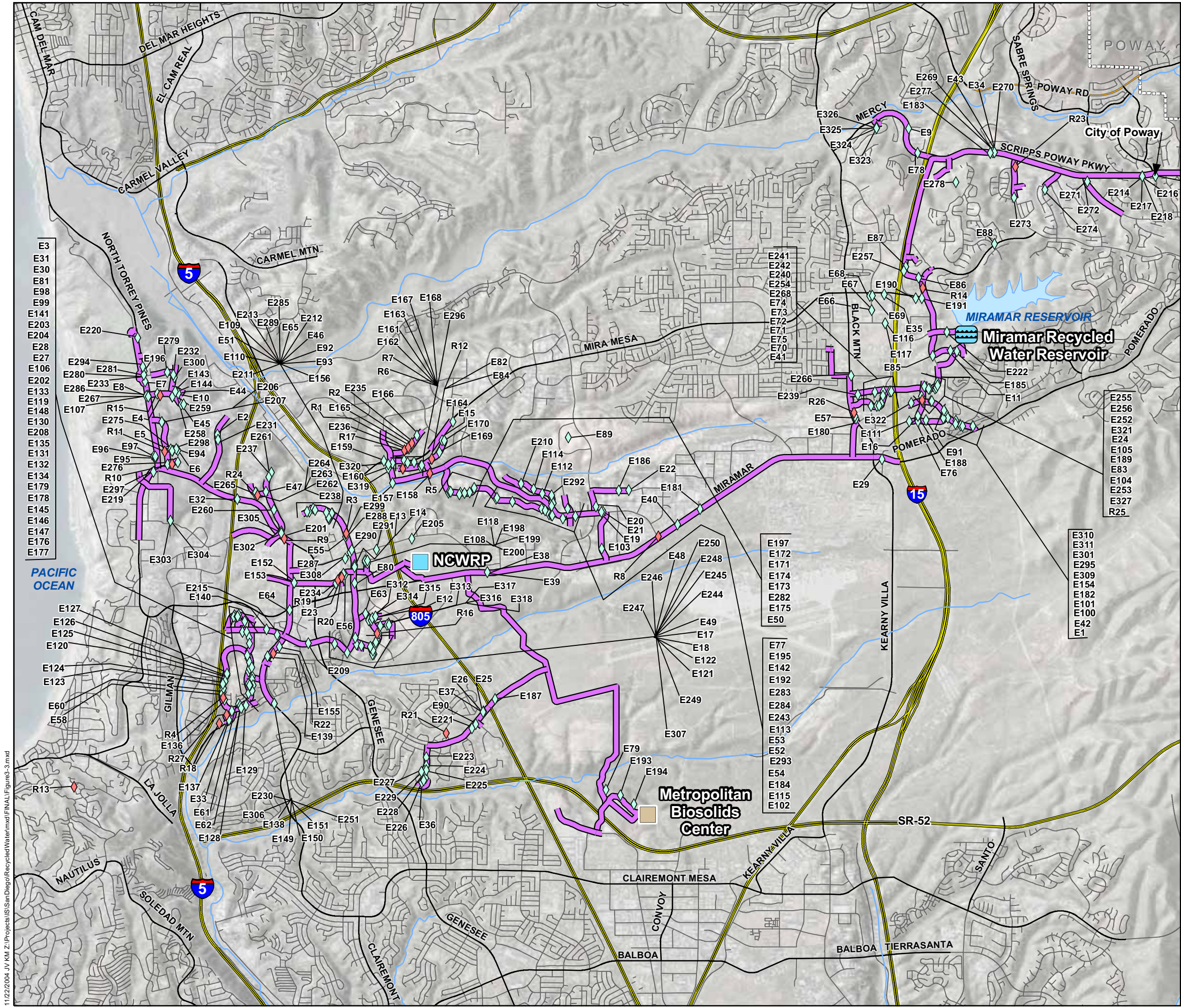


Water Reuse Study 2005

**North/Central
Service Area
with Subareas**

Figure 3-2

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LEGEND

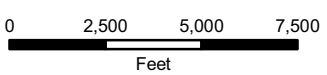
Recycled Water Customers
 E100 Existing Customer
 *See Appendix C-2 for Customer ID Number

R10 Retrofit In Progress
 *See Appendix C-3 and Table 3-4 for Customer ID Number

Recycled Water Lines
 Existing
 Rivers
 Lakes



1 inch equals 5,000 feet



Water Reuse Study 2005

Existing Recycled Water System with Existing Customers & Retrofits in Progress

Figure 3-3

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3.5.2 Retrofits in Progress

Converting existing potable water users to recycled water requires retrofitting their on-site systems. In September 2004, the CCSD provided an updated list of recycled water customers who are in the process of retrofitting their sites. The list included 17 customers currently undergoing testing or construction and 10 customers in the retrofit design process. It is estimated that these retrofit customers will have a recycled water demand of approximately 325 AFY (0.3 MGD). The list of the City's recycled water customers with retrofits in progress, as of September 2004, is included in Table 3-4 and the locations of these customers are shown in Figure 3-3.

**Table 3-4
Recycled Water Retrofits in Progress**

No.	Cust ID No.	Customer Name	Site Address	Zip Code	Meter (HCF)	Actual 2003 Water Demand (AFY)	Actual 2003 Water Demand (MGD)
Retrofits in Construction Process							
1	R17	ARDEN REALTY 01	5510 MOREHOUSE DR.	92121	871	2	0.002
2	R1	ARDEN REALTY 02	5550 MOREHOUSE DR.	92121	436	1	0.001
3	R2	ARDEN REALTY 03	5590 MOREHOUSE DR.	92121	2,178	5	0.004
4	R3	CLINICOMP/D.W.C.G., INC	9655 TOWNE CENTERE DR.	92121	1,307	3	0.003
5	R4	LBK L.P. C/O LAS FLORES	7013-85 CHARMANT DR.	92122	871	2	0.002
6	R5	LOUIS V. SCHOOLER	5186 CARROLL CANYON	92121	1,307	3	0.003
7	R6	PACIFIC REALTY ADVISO	5502 OBERLIN DR.	92121	436	1	0.001
8	R7	PACIFIC REALTY ADVISO	5502 OBERLIN DR.	92121	436	1	0.001
9	R8	PARS SORRENTO VALLEY	7310 MIRAMAR RD.	92126	871	2	0.002
10	R9	SCRIPPS MEMORIAL HOSPITAL	9880 GENESSEE AVE.	92121	17,860	41	0.037
11	R10	SCRIPPS RESEARCH INSTITUTE	3545 JOHN HOPKINS CT. C	92121	14,375	33	0.029
12	R11	SCRIPPS RESEARCH INSTITUTE	10582 JOHN JAY HOPKINS	92121	871	2	0.002
13	R12	SCRIPPS RESEARCH INSTITUTE	1062 JOHN JAY HOPKINS	92121	871	2	0.002
14	R13	SCRIPPS RESEARCH INSTITUTE	10466 NORTH TORREY PINES	92037	14,375	33	0.029
15	R14	SCRIPPS TERRACE APT	10940 SCRIPPS RANCH BLV.	92131	5,227	12	0.011
16	R15	TITAN CORPORATION	3033 SCIENCE PARK RD.	92121	2,614	6	0.005
17	R16	TOSCANA AT RENAISSAN	5301-5499 RENAISSANCE AVE.	92122	3,049	7	0.006
			Subtotal		67,954	156	0.14

3.0 Recycled Water Market Assessment

Table 3-4 Continued

No.	Cust ID No.	Customer Name	Site Address	Zip Code	Meter (HCF)	Actual 2003 Water Demand (AFY)	Actual 2003 Water Demand (MGD)
Retrofits in Design Process							
1	R27	COLONY LA PAZ CONDO	4002 PORTE LA PAZ	92122	10,019	23	0.021
2	R18	COLONY LA PAZ CONDO	4000 ROSENDA CT.	92122	0	0	0.000
3	R19	CRESCENT PROPERTIES/F	4504 EXECUTIVE DR.	92037	3,485	8	0.007
4	R20	CRESCENT PROPERTIES/F	4527 EXECUTIVE DR.	92037	871	2	0.002
5	R21	PARK & REC 09-UNIVERSITY	6341 GULLSTRAND ST.	92122	9,583	22	0.020
6	R22	PARK & REC 10 DOYLE COMM	8175 REGENTS RD.	92122	16,553	38	0.034
7	R23	PARK & REC 11-SPRING CANYON RD	10448 SPRING CANYON RD.	92131	5,227	12	0.011
8	R24	SCRIPPS HEALTH 01	4275 CAMPUS POINT DR.	92121	4,356	10	0.009
9	R25	SCRIPPS RANCH BUSINESS	9988 WILLOW CREEK RD.	92121	1,742	4	0.004
10	R26	VULCAN MATERIALS CO	10097 BLACK MOUNTAIN RD.	92127	21,780	50	0.045
			Subtotal		73,616	169	0.15
			TOTAL		141,570	325	0.29

Source: Actual water demands are based on potable water meter data and obtained from City of San Diego Customer Service Department on September 9, 2004.
HCF = Hundred Cubic Feet

3.5.3 2005 Recycled Water Markets

Recycled water markets in the NSA were provided in Table 3-2 of the *2003 Draft Accelerated Beneficial Reuse Study*. Recent water demands obtained from the Water Department, CCSD and SDDPC, were used to update the annual recycled water demands for previously identified markets. Table 3-5 summarizes the actual or projected water demands for existing customers, retrofits in progress and new residential developments in the existing, Phase I (Black Mountain Ranch and OMWD) and Phase II (Carmel Valley and SR-56) distribution systems. New customers in Phase I and II are anticipated to come on line in 2005 when the connection to the City's existing recycled water system is made and as development of these areas is completed. Much of the distribution system within these areas has already been constructed.

The total projected recycled water demand in the NSA is approximately 9,400 AFY (8.43 MGD). This is short of the City's 2010 reuse goal of 12 MGD by 4,000 AFY (3.57 MGD).

3.0 Recycled Water Market Assessment

**Table 3-5
2005 Recycled Water Markets**

Region	Customer	Service Zone	Average Annual Demand			Max Day Demand	
			AFY	GPM	MGD	Peak Factor	MGD
Existing System ¹	Recycled Demand	550/640/790	5,685	3,525	5.08	2	10.15
	City of Poway ⁷	890	500	310	0.45	2	0.89
	TOTAL		6,185	3,835	5.52		11.04
	Retrofit in Progress	550/640	325	202	0.29	2	0.58
	TOTAL		325	202	0.29		0.58
Phase I System ² (Black Mountain Ranch / OMWD)	Santaluz GC, South Pond ⁶	825	276	171	0.25	2	0.49
	Santaluz GC, North Pond	825	354	219	0.32	2	0.63
	BMR I - Parks, Schools, Misc	640	36	22	0.03	2	0.06
	BMR I - Park	825	103	64	0.09	2	0.18
	BMR - North GC	825	525	326	0.47	2	0.94
	BMR II - North Village	825	133	82	0.12	2	0.24
	OMWD West GCs ³	825	500	310	0.45	2	0.89
	TOTAL		1,927	1,195	1.72		3.44
Future Phase II System (Carmel Valley / SR-56)	Caltrans/SR-56	500/640	260	161	0.23	2	0.46
	Canyonside Park	640	12	7	0.01	2	0.02
	Penasquitos Creek Park	640	14	9	0.01	2	0.03
	SA IV - Torrey Highlands	640	114	71	0.10	2	0.20
	SA III-Pacific Highlands Ranch ⁴	500	233	144	0.21	2	0.42
	Palacio Del Mar GC (Carmel Village HOA)	500	70	43	0.06	2	0.13
	Meadows Del Mar GC	500	303	188	0.27	2	0.54
	TOTAL		1,006	624	0.90		1.80
TOTAL ALL MARKETS			9,443	5,855	8.43		16.86
			AFY	GPM	MGD		MGD

Source: Accelerated Beneficial Reuse Study, February 2003, PBS&J

¹ Based on City of San Diego water and recycled water records from Water Department Customer Support Division, December 2003. Demands were projected for customers with less than one year of meter data.

² Anticipated completion at end of 2005.

³ Based on Reclaimed Water Sale Agreement with City & OMWD dated December 7, 2004. Demand is based on average annual demand 500 AFY for calendar years 2005 to 2007 per City Water Department.

⁴ Based on 2003 planning data provided by Pacific Highlands Ranch (183 AFY), including offsite schools (50 AFY).

⁵ Based on Accelerated Beneficial Reuse Study (February 2003), Table 2 Projected 2010 Recycled Water Demands

⁶ Based on 2003-2004 water and recycled water records from Water Department Customer Support Division.

⁷ Based on direction from City staff.

3.5.4 Projected Recycled Water Demands

Additional recycled water demands were identified using recent water meter data, data management, geocoding and GIS mapping. As described in the previous section, these potential customers have irrigation demands equal to or greater than 7 AFY. In order to analyze the infill potential at different locations within the distribution system, the NSA was divided into 7 sub-areas as illustrated in Figure 3-2. The boundaries of these areas are described below:

- **Sub-area 1** – Bounded by I-8 to the south, Balboa Avenue to the north, I-5 to the west and I-15 to the east. This area is part of the CSA and may potentially be serviceable via expansion of the Northern Recycled Water Distribution System. (Zip codes 92108, 92110, 92111, 92117, and 92123)
- **Sub-area 2** – Bounded by Balboa Avenue to the south, SR-52 to the north, I-5 to the west and I-15 to the east. This area is part of the CSA and may potentially be serviceable via expansion of the Northern Recycled Water Distribution System. (Zip codes 92111, 92117 and 92123)
- **Sub-area 3** – Bounded by SR-52 to the north, I-8 to the south, Pacific Ocean to the west and I-5 to the east. This area is primarily the CSA with a small portion within the NSA and is potentially be serviceable via expansion of the Northern Recycled Water Distribution System. (Zip codes 92107, 92109, 92110, and 92037)
- **Sub-area 4** – Bounded primarily by Los Penasquitos Canyon Preserve to the north, SR-52 to the south, Kearny Villa Road and Pomerado Road to the east in the section situated north of Miramar Road and I-5 and the Pacific Ocean to the west. (Zip codes 92121, 92122, 92123, 92126, 92128, 92129, 92145, and 92161)
- **Sub-area 5** – Bounded by City of San Diego north limits to north, Los Penasquitos Canyon Preserve to the south, the Black Mountain Ranch future development to the west and Pomerado Road to the east. This area includes the northern Rancho Bernardo area and Poway golf courses. This area was further divided into sub-areas 5A and 5B to differentiate between the NSA and SPSA. (Zip codes 92127, 92128, and 92129)
- **Sub-area 6** – Bounded by Camino Del Sur to the north, Los Penasquitos Canyon Preserve to the south, Area 5 to the east and Pacific Highland Ranch development to west. This area includes the Black Mountain Ranch future development. (Zip codes 92101, 92127, 92129, and 92130)
- **Sub-area 7** – Bounded by Los Penasquitos Canyon Preserve to the north, Sorrento Valley Boulevard to the south, the future Black Mountain Ranch development to the east and I-5 to the west. This area includes the future Torrey Highlands and Pacific Highlands Ranch developments. (Zip codes 92130)

3.0 Recycled Water Market Assessment

The list of potential infill customers within the seven target sub-areas based on private irrigation meter demands are provided in Appendices D-1 to D-7 of this report. The total actual annual demand for each of the sub-areas is summarized in Table 3-6 below. Water records were obtained from SDDPC for the period between June 1, 2003 and May 31, 2004. The maximum potential recycled water demand from these areas is approximately 12,200 AFY (10.89 MGD). Because the water meter data used does not allow identification of industrial uses, these potential customers do not include cooling tower uses or processing uses that may be potential candidates for recycled water use.

**Table 3-6
Summary of Potential Recycled Water Demands by Sub-areas**

Sub-area No.	Annual Water Demand			
	HCF	AFY	GPM	MGD
1	633,714	1,455	902	1.30
2	295,596	679	421	0.61
3	328,158	753	467	0.67
4	1,829,894	4,201	2,604	3.75
5A	577,606	1,326	822	1.18
5B	548,001	1,258	780	1.12
6	243,404	559	346	0.50
7	855,390	1,964	1,217	1.75
TOTAL	5,311,763	12,194	7,559	10.89

Source: City of San Diego Data Processing Corp Potable Water Records from June 1, 2003 to May 31, 2004.

Notes: See Figure 3-2 for sub-area locations.

HCF = Hundred Cubic Feet

GPM = Gallons per Minute

Customers listed in Appendices D-1 to D-7 without a designated rate or premise code were incorporated into the market assessment based on City's discussion with the potential customer. These recycled water demands were projected and may include cooling tower or industrial users.

As previously described, the irrigation demands were extracted from the composite list of potable water demand data using the premise code and rate code. These codes were also used to classify each customer by land use or government agency. Classifications for potential customers included the following categories:

- Caltrans
- City of San Diego
- County of San Diego
- Commercial
- Industrial
- U.S. Navy
- Other Domestic (HOAs)
- Park & Recreation
- School District
- Single Family

3.0 Recycled Water Market Assessment

A unique symbol was assigned to each category for illustration on the GIS mapping. It should be noted that a few customers designated with a single family code and representing a water demand greater than 7 AFY were possibly mislabeled in the Computer Information System (CIS) maintained by SDDPC. These customers appeared to be associated with an apartment complex or HOA and are included in the list in Appendices D-1 to D-7.

Although the seven sub-areas were delineated in the GIS mapping and illustrated in Figure 3-2, only four of them are potentially feasible areas to target infill customers. These areas are identified as Sub-areas 2, 4, 6 and 7. Sub-area 1 may be a possible consideration to extend the system further south into CSA, depending on capital costs and the amount of additional water demand available. Sub-area 3 may present hydraulic operation issues and Caltrans right-of-way conflicts if the system were to expand west into this area. Sub-area 5A and 5B include the Rancho Bernardo and San Pasqual areas that has been previously studied.

The total potential infill demand in these four sub-areas is three times the demand required to meet the City's 2010 water reuse goal. However, only a portion of these customers would be required under the proposed 20 AFY MRO criteria to convert to recycled water. The site location with respect to the distribution system will need to be considered to determine if it is economically feasible to connect these customers. As a result, the list of potential customers obtained from potable water irrigation meters was further analyzed and categorized using the Tier approach to supplement the 2005 demand of 9,400 AFY (8.43 MGD). The level of effort and cost to connect customers to the existing recycled water system is anticipated to increase with each Tier.

Tier 1 – Recycled Water Markets

In order to obtain a relatively realistic demand estimate, potential customers subject to the City's MRO criteria were identified. The criteria would mandate existing developed properties with potable water demands for irrigation purposes of 20 AFY or greater and located immediately adjacent to an existing or planned (Phase I and II) pipeline to retrofit their property to use recycled water. Enforcement of these criteria would generate additional demand without expanding the recycled water distribution system. The list of potential customers by area is provided in Table 3-7 and shown in Figure 3-4. The number next to each land use symbol in the Figure corresponds to the customer identification number in the Table. This designation is typical for each Tier approach analyzed. It should be noted that potential recycled water customers subject to the MRO were only found in Sub-areas 4, 6 and 7 within the NSA.

Approximately 23 Tier 1 customers were identified in Sub-areas 4, 6 and 7. These customers would increase the projected 2010 demand by 1,627 AFY (1.45 MGD) as shown in Table 3-7, assuming all of the customers converted to recycled water. Although MCAS Miramar (miscellaneous retrofits) and Westview High School meet the Tier 1 criteria, because these facilities are under the jurisdiction of the federal government and local school district, respectively, they are not required to comply with the MRO currently under consideration by City Council. However, the City will continue to coordinate with these customers on converting

3.0 Recycled Water Market Assessment

to recycled water. The high-use customers include MCAS Miramar (miscellaneous retrofits), Qualcomm, Hanson Aggregates, El Camino Memorial Park and Westview High School.

Two Tier 1 recycled water potential customers were identified directly by City staff. These include the MCAS Miramar (miscellaneous retrofits) and Qualcomm. The City provided projected recycled water demands for these customers; references are available in Appendices E and F. Brief descriptions of these customers are provided below:

- **MCAS Miramar** – The MCAS Miramar (miscellaneous retrofits) represents potential recycled demand from miscellaneous base uses that were previously assessed at over 1,000 AFY. This does not include the annual demand of 450 AFY from the MCAS Golf Course that is already connected to the existing recycled water system. The military base would require construction of a substantial on-site distribution system to capture the 1,000 AFY of miscellaneous use. The City has stated their desire to reevaluate the on-site distribution systems and the complexity of infrastructure at the military base to capture a portion of this demand to a minimum of 500 AFY and maximum of 1,000 AFY. City staff recommended that an estimated annual demand of 500 AFY (0.45 MGD) be used for this study, as shown in Appendix E. It is recommended that further analysis and evaluation be performed on the MCAS Miramar site to determine which additional base facilities would benefit from conversion to recycled water and to quantify the infrastructure required to serve the site.
- **QUALCOMM** – Based on discussions with the CCSD, Qualcomm is expected to expand their offices in Sorrento Valley. Development is expected to include new buildings in the area. Estimated recycled water usage for cooling tower and irrigation purposes prepared by Qualcomm was provided for six buildings in the area. Documentation of this information provided by CCSD is available in Appendix F. Due to the location of the buildings relative to an existing recycled water pipeline; two of the sites are identified in Tier 1 and four in Tier 3. All the buildings represent recycled water demands greater than 20 AFY. Table 3-7 includes only the cooling tower demand for Qualcomm Building BB, since the irrigation system may already be connected to the system and accounted for in the existing recycled water demand. The projected potential recycled water demand for the six buildings is estimated to be 400 AFY (0.35 MGD).

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**Table 3-7
Tier 1 – NSA Recycled Water Markets (>20 AFY)
Potential Infill Customers Fronting Recycled Waterlines**

No.	Cust ID No.	Customer Name	Meter/Site Address	Zip Code	Annual Water Demand			
					HCF	AFY	GPM	MGD
Sub-area 4								
1	1105	AMYLIN PHARMACEUTICALS ¹	9360 TOWNE CENTER DR #110	92121	13,070	30	19	0.03
2	150	CHEVRON LAND AND DEV	10385 SCIENCE CENTER DR	92121	9,144	21	13	0.02
3	1106	EL CAMINO MEMORIAL PARK ¹	5600 CARROLL CANYON RD	92121	72,745	167	104	0.15
4	228	HANSON AGGREGATES	7406 TRADE ST	92121	124,510	286	177	0.26
5	1104	L J COUNTRY DAY SCHOOL ⁵	9490 GENESEE AV	92121	8,242	19	12	0.02
6	1107	MCAS MIRAMAR (Misc Retrofits) ^{1,2}	7900 MIRAMAR ROAD	92126	217,800	500	310	0.45
7	1108	MESA VILLAGE HOA ¹	10540 CAMINITO BAYWOOD AV	92126	15,246	35	22	0.03
8	957	PARK & REC/COMM PARK I	9993 SCRIPPS LAKE DR	92131	14,413	33	21	0.03
9	1048	PARK & REC/OPEN SPACE	11069 SCRIPPS POWAY PY	92131	9,818	23	14	0.02
10	1049	PARK & REC/OPEN SPACE	11383 SCRIPPS POWAY PY	92131	9,598	22	14	0.02
11	391	QUALCOMM BLDG BB ^{1,3}	4243 CAMPUS POINT CT	92121	12,032	28	17	0.02
12	386	QUALCOMM MOREHOUSE CAMPUS ^{1,3}	5775 MOREHOUSE DR	92121	41,742	96	59	0.09
13	442	SAN DIEGO TECH CNTR	9605 SCRANTON RD	92121	9,172	21	13	0.02
14	844	SCRIPPS WESTVIEW HOA ¹	9895 SCRIPPS WESTVIEW WY	92131	9,583	22	14	0.02
15	630	SORRENTO GATEWAY	4970 DIRECTORS PL	92121	10,975	25	16	0.02
16	618	SUMMERHILL COMMUNITIES	5605 CARROLL CANYON RD	92121	9,093	21	13	0.02
17	1111	SCRIPPS RANCH HIGH SCHOOL ⁶	10410 TREENA ST	92131	12,589	29	18	0.03
18	1110	WALKER ELEMENTARY SCHOOL ⁶	9225 HILLERY DRIVE	92126	11,805	27	17	0.02
Subtotal					611,577	1,404	870	1.25
Sub-area 6								
19	1109	BLACK MTN MIDDLE SCHOOL (PUSD) ^{4,6}	9253 OVIEDO ST	92129	18,731	43	27	0.04
20	1074	WESTVIEW HIGH SCHOOL (PUSD) ⁴	13512 CAMINO DEL SUR	92129	29,009	67	41	0.06
21	1075	WESTVIEW HIGH SCHOOL (PUSD) ⁴	13510 CAMINO DEL SUR	92129	28,086	64	40	0.06
Subtotal					75,826	174	108	0.16
Sub-area 7								
22	11	CALTRANS	11653 CARMEL COUNTRY RD	92130	10,289	24	15	0.02
23	201	EVERGREEN DISTRIBUTORS	6858 BLACK MTN RD	92130	10,818	25	15	0.02
Subtotal					21,107	48	30	0.04
Total Demand					708,509	1,627	1,008	1.45

Source: Recent water meter data from June 1, 2003 to May 31, 2004 obtained from San Diego Data Processing Corp, unless otherwise indicated.

¹ Projected demands obtained from City of San Diego Customer Support Division.

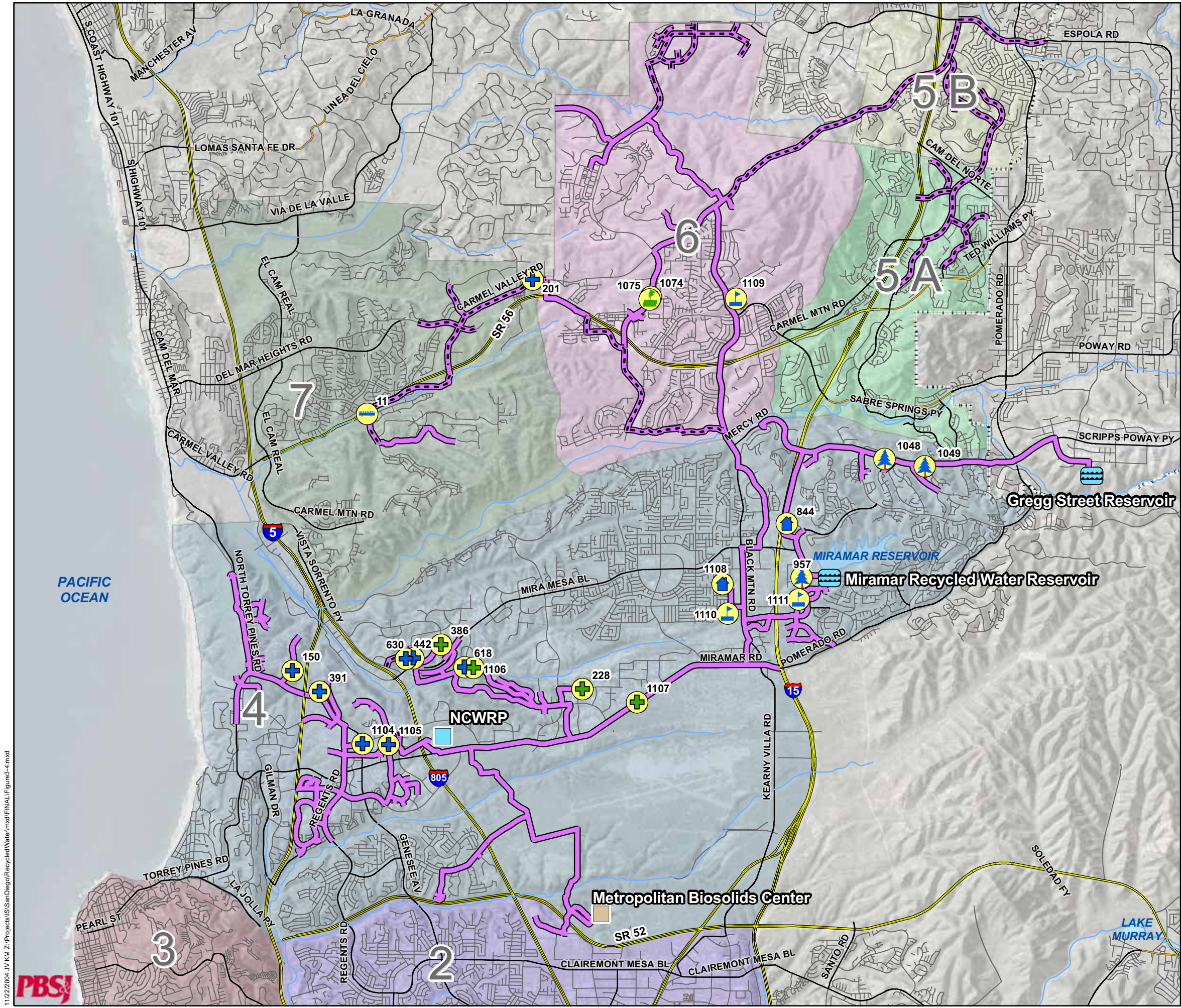
² MCAS is not under City Council jurisdiction. They are not subject to comply with MRO.

³ Qualcomm estimated recycled water demand is for irrigation and cooling tower purposes per data provided by Customer Service Department.

⁴ PUSD - Poway Unified School District; school districts are not required to comply with MRO.

⁵ La Jolla Country Day School is included in Tier 1 approach since their demand is close to 20 AFY, as per City request.

⁶ School irrigation demands provided by Water Department survey.



LEGEND

Potential Customers

- Caltrans
- Commercial
- Other Domestic
- Park & Rec
- School

1234 <= 201 feet from Recycled Water Lines *

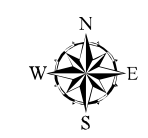
*See Table 3-7 for Customer ID Number

Demand Range

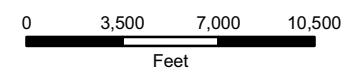
- >46 AFY
- 20 to 46 AFY

Recycled Water Lines

- Existing
- Proposed
- Rivers
- Lakes
- Sub-area (Typ)



1 inch equals 7,000 feet



Water Reuse Study 2005

**North Service Area
Recycled Water Markets
Tier 1**

Figure 3-4

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3.0 Recycled Water Market Assessment

Tier 2 – Recycled Water Markets

Approximately 82 Tier 2 customers were identified in Sub-areas 2, 4, 6 and 7, as shown in Figure 3-5. Tier 2 customers with demands less than 20 AFY and fronting a recycled water pipeline would contribute an additional potential infill demand of approximately 750 AFY (0.67 MGD), as shown in Table 3-8. The recycled water markets for this category consist of HOAs, commercial development and park and recreational districts. The MRO would not apply to these potential customers, since their estimated demands are less than 20 AFY. It should be noted that there are three potential customers identified in Sub-area 2 located in the CSA. These customers are located at the northernmost part of Sub-area 2 and are immediately adjacent to the existing recycled water distribution system.

**Table 3-8
Tier 2 – NSA Recycled Water Markets (<20 AFY)
Potential Infill Customers Fronting Recycled Waterlines**

No.	Cust ID No.	Customer Name	Meter/Site Address	Zip Code	Annual Water Demand			
					HCF	AFY	GPM	MGD
Sub-area 2¹								
1	169	COX COMMUNICATIONS	5651 COPLEY DR	92111	3,155	7	4	0.006
2	351	PACIFICA COPLEY CENTER	5855 COPLEY DR	92111	1,436	3	2	0.003
3	530	TELECOM CENTER POA	5781 COPLEY DR	92111	3,921	9	6	0.008
Subtotal					8,512	20	12	0.017
Sub-area 4								
4	59	AFFINITY H O A	11320 AFFINITY CT	92131	4,345	10	6	0.009
5	60	AFFINITY H O A	11371 AFFINITY CT	92131	3,936	9	6	0.008
6	643	AFFINITY LTD	11117 AFFINITY CT	92131	4,564	10	6	0.009
7	62	AGOURON PHARMACEUTICALS	10770 SCIENCE CENTER DR	92121	2,308	5	3	0.005
8	63	AGOURON PHARMACEUTICALS	10777 SCIENCE CENTER DR	92121	1,551	4	2	0.003
9	64	AGOURON PHARMACEUTICALS	10724 SCIENCE CENTER DR	92121	868	2	1	0.002
10	65	AGRRI SCRIPPS LLC	9840 CARROLL CANYON RD	92131	4,260	10	6	0.009
11	85	ARENA PHARMACEUTICALS INC	6166 NANCY RIDGE DR	92121	919	2	1	0.002
12	115	BROOKTREE CORP	9808 SCRANTON RD	92121	3,606	8	5	0.007
13	1102	CANJI INC ²	3525 JOHN HOPKINS CT	92121	871	2	1	0.002
14	688	CORAL POINT APARTMENTS	3971 NOBEL DR	92122	3,427	8	5	0.007
15	164	CORTINA H O A	11607 WESTVIEW PY	92126	5,353	12	8	0.011
16	633	D I P:7UP/RC BOTTLING CO	5770 MOREHOUSE DR	92121	3,059	7	4	0.006
17	195	EL CAM TECHNOLOGY CENTER	6223 FERRIS SQ	92121	8,763	20	12	0.018
18	217	GENSIA INC	9362 TOWNE CENTRE DR	92121	4,825	11	7	0.010
19	218	GENSIA INC	9390 TOWNE CENTRE DR	92121	2,269	5	3	0.005
20	222	GOV PARK PLAZA BLDG 1490	6365 GREENWICH DR	92122	3,074	7	4	0.006
21	727	HOA:WESTVIEW NEIGHBORHOOD	11503 WESTVIEW PY	92126	8,623	20	12	0.018
22	235	HUB PROPERTIES TRUST	5615 OBERLIN DR	92121	3,740	9	5	0.008
23	234	HUB PROPERTIES TRUST	3030 SCIENCE PARK RD	92121	252	1	0	0.001

3.0 Recycled Water Market Assessment

Table 3-8 Continued

No.	Cust ID No.	Customer Name	Meter/Site Address	Zip Code	Annual Water Demand			
					HCF	AFY	GPM	MGD
24	238	INTEL CORPORATION	10239 MEANLEY DR	92131	4,304	10	6	0.009
25	245	J L ELDER COMPANY	9888 MERCY RD	92129	4,609	11	7	0.009
26	258	L J INSTITUTE	10355 SCIENCE CENTER DR	92121	1,016	2	1	0.002
27	262	LA JOLLA GATEWAY LTD	9193 TOWNE CENTRE DR	92122	3,294	8	5	0.007
28	282	LOMAS SANTA FE INC	4130 LA JOLLA VILLAGE DR	92122	2,117	5	3	0.004
29	289	MARRIOTT CORPORATION	9652 SCRANTON RD	92121	4,896	11	7	0.010
30	296	MERCK & COMPANY	3550 JOHN HOPKINS CT	92121	144	0	0	0.000
31	740	MIRADA APTS	7504 CHARMANT DR	92122	6,423	15	9	0.013
32	52	MWWD/OPERATIONS & MAINT	10150 SCRIPPS POWAY PY	92131	445	1	1	0.001
33	314	NEUROCRINE BIOSCIENCES	10555 SCIENCE CENTER DR	92121	1,957	4	3	0.004
34	748	NOBEL COURT LTD	3717 NOBEL DR	92122	1,727	4	2	0.004
35	746	NOBEL COURT LTD	3550 LEBON DR	92122	1,092	3	2	0.002
36	747	NOBEL COURT LTD	3420 LEBON DR	92122	955	2	1	0.002
37	764	OAKWOOD-LA JOLLA COLONY	7295 CHARMANT DR	92122	4,446	10	6	0.009
38	1070	PARK & REC/COMM PARK I	11774 CYPRESS CANYON RD	92131	7,509	17	11	0.015
39	940	PARK & REC/COMM PARK I	11771 CYPRESS CANYON RD	92131	6,639	15	9	0.014
40	962	PARK & REC/COMM PARK I	10448 SPRING CANYON RD	92131	6,146	14	9	0.013
41	964	PARK & REC/COMM PARK I	7403 TOSCANA DR	92122	3,234	7	5	0.007
42	933	PARK & REC/COMM PARK I	3952 BERINO CT	92122	3,095	7	4	0.006
43	958	PARK & REC/COMM PARK I	11011 SCRIPPS POWAY PY	92131	6,964	16	10	0.014
44	959	PARK & REC/COMM PARK I	11067 SCRIPPS POWAY PY	92131	4,145	10	6	0.008
45	1050	PARK & REC/OPEN SPACE	10623 SCRIPPS POWAY PY	92131	8,047	18	11	0.016
46	1051	PARK & REC/OPEN SPACE	11491 SCRIPPS POWAY PY	92131	4,792	11	7	0.010
47	1064	PARK & REC/OPEN SPACE	9651 TOWNE CENTRE DR	92121	3,921	9	6	0.008
48	1052	PARK & REC/OPEN SPACE	10533 SCRIPPS POWAY PY	92131	3,222	7	5	0.007
49	361	PARS ASSETS LLC	7482 MIRAMAR RD	92126	3,645	8	5	0.007
50	364	PETCO ANIMAL SUPPLIES	8927 REHCO RD	92121	4,096	9	6	0.008
51	406	REGENT GARDEN ASSOCIATES	7681 PALMILLA DR	92122	5,559	13	8	0.011
52	788	RENAISSANCE LA JOLLA HOA	5298 RENAISSANCE AV	92122	7,447	17	11	0.015
53	1103	SBC ²	7337 TRADE ST	92121	5,445	13	8	0.011
54	800	SCRIPPS NOB HILL HOA	10791 SCRIPPS RANCH BL	92131	6,338	15	9	0.013
55	454	SCRIPPS RANCH BUSINESS PK	10328 MEANLEY DR	92131	4,146	10	6	0.008
56	455	SCRIPPS RANCH BUSINESS PK	10329 MEANLEY DR	92131	3,990	9	6	0.008
57	456	SCRIPPS RANCH BUSINESS PK	10499 SCRIPPS RANCH BL	92131	3,403	8	5	0.007
58	457	SCRIPPS RANCH MARKETPLACE	10657 SCRIPPS POWAY PY	92131	4,205	10	6	0.009
59	458	SCRIPPS RANCH MARKETPLACE	10607 SCRIPPS POWAY PY	92131	3,049	7	4	0.006
60	462	SCRIPPS RESEARCH	3050 SCIENCE PARK RD	92121	1,404	3	2	0.003
61	801	SCRIPPS WESTVIEW H O A	9895 SCRIPPS WESTVIEW WY	92131	4,574	11	7	0.009
62	485	SI VI LLC	11778 WESTVIEW PY	92126	5,277	12	8	0.011
63	629	SORRENTO GATEWAY	4907 DIRECTORS PL	92121	8,794	20	13	0.018

3.0 Recycled Water Market Assessment

Table 3-8 Continued

No.	Cust ID No.	Customer Name	Meter/Site Address	Zip Code	Annual Water Demand			
					HCF	AFY	GPM	MGD
64	628	SORRENTO GATEWAY	4941 DIRECTORS PL	92121	8,515	20	12	0.017
65	500	SPIEKER PRPERTIES	9571 JUDICIAL DR	92121	4,988	11	7	0.010
66	502	SRV NORTH HOA	11208 VILLAGE RIDGE RD	92131	3,115	7	4	0.006
67	525	TAMPICO COMMUNITY ASSOTN	11751 WESTVIEW PY	92126	3,820	9	5	0.008
68	526	TAMPICO COMMUNITY ASSOTN	11759 WESTVIEW PY	92126	3,547	8	5	0.007
69	536	THE BURNHAM INSTITUTE	10901 NORTH TORREY PINES RD	92121	2,957	7	4	0.006
70	537	THE IRVINE COMPANY	6920 CARROLL RD	92121	3,441	8	5	0.007
71	565	UNIVERSITY TOWN CTR ASSOC	8870 TOWNE CENTRE DR	92122	3,685	8	5	0.008
72	576	VISTA LJ TOWNHOMES III	8852 VIA ANDAR	92122	3,167	7	5	0.006
73	578	W9/PC LIMITED PARTNERSHIP	3030 CALLAN RD	92121	2,449	6	3	0.005
74	1114	WAGENHEIM MIDDLE SCHOOL ³	9230 GOLD COAST DRIVE	92126	653	2	1	0.001
75	1112	HAGE ELEMENTARY SCHOOL ³	9750 GALVIN AVE	92126	1,525	4	2	0.003
76	1113	WESTVIEW PARK ³	WESTVIEW PARKWAY	92126	4,835	11	7	0.010
Subtotal					283,821	652	404	0.582
Sub-area 6								
77	44	CALTRANS	12941 BLACK MTN RD	92129	6,426	15	9	0.013
78	46	CALTRANS	12881 BLACK MTN RD	92129	5,086	12	7	0.010
79	400	RANCHO PENASQUITOS TOWN	13287 BLACK MTN RD	92129	7,987	18	11	0.016
80	816	TAYLOR WOODROW HOMES	14582 CARMEL VALLEY RD	92129	4,436	10	6	0.009
81	843	WESTERN PACIFIC HOUSING	13550 TORREY MEADOWS DR	92129	7,257	17	10	0.015
Subtotal					31,192	72	44	0.064
Sub-area 7								
82	765	PARDEE CONSTRUCTION CO	5478 DEL MAR HEIGHTS RD	92130	3,115	7	4	0.006
Subtotal					3,115	7	4	0.006
Total Demand					326,640	750	465	0.670

Source: Recent water meter data from June 1, 2003 to May 31, 2004 obtained from San Diego Data Processing Corp, unless otherwise indicated.

¹ Potential customers identified in sub-area 2 are located in northernmost part of CSA and are adjacent to the existing recycled water system.

² Projected demands obtained from City of San Diego Customer Support Division.

³ School and Park irrigation demands provided by Water Department survey.

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3.0 Recycled Water Market Assessment

Tier 3 – Recycled Water Markets

After evaluating potential customers immediately adjacent to the recycled water pipeline, the market assessment was expanded to identify potential customers with a demand greater than 20 AFY and within a one-quarter mile or 1,320 feet from an existing or planned (Phase I and II) recycled waterline. Figure 3-6 illustrates the locations of the twelve potential customers classified under Tier 3 in Sub-areas 4, 6 and 7. Construction of a new recycled water pipeline within their frontage road would require these customers to comply with the latest MRO and convert to recycled water. The actual annual demand for Tier 3 customers is 977 AFY (0.87 MGD) as shown in Table 3-9.

One potential customer identified in Table 3-9 contacted City staff expressing strong interest in using recycled water on site. The future site is a concrete batch plant located at 5696 Eastgate Drive. Their projected recycled water demand is estimated to be approximately 22 AFY (0.02 MGD) based on an email correspondence from the City dated September 2, 2004 in Appendix G. Currently, a recycled waterline does not exist in Eastgate Drive. In order to connect, the recycled water main in Eastgate Mall a pipeline from the NCWRP will need to be extended north to Eastgate Drive to serve this customer.

**Table 3-9
Tier 3 – NSA Recycled Water Markets (>20 AFY)
Potential Infill Customers Within 200 ft to 1320 ft from Recycled Waterlines**

No.	Cust ID No.	Customer Name	Meter/Site Address	Zip Code	Annual Water Demand			
					HCF	AFY	GPM	MGD
Sub-area 2								
1	528	TELECOM CENTER POA ¹	5451 COPLEY DR	92111	53,796	123	77	0.11
2	938	PARK AND REC COMM PARK I (HICKMAN FIELD) ¹	6610 CONVOY CT	92111	27,969	64	40	0.06
3	16	CALTRANS ¹	6565 CONVOY CT	92111	11,056	25	16	0.02
Subtotal					92,821	212	133	0.19
Sub-area 4								
4	631	BATCH PLANT ²	5696 EASTGATE DR	92121	9,700	22	14	0.02
5	389	QUALCOMM BLDG AA ³	10290 CAMPUS POINT DR	92121	9,091	21	13	0.02
6	611	ZML-LA JOLLA LIMITED	4330 LA JOLLA VILLAGE DR	92122	11,640	27	17	0.02
7	385	QUALCOMM BLDG W	5751 PACIFIC CENTER BLVD	92121	62,166	143	89	0.13
8	387	QUALCOMM BLDG Q	6455 LUSK BLVD	92121	30,749	71	44	0.06
9	388	QUALCOMM BLDG R	10185 MCKELLAR CT	92121	16,711	38	24	0.03
Subtotal					140,057	322	201	0.28

3.0 Recycled Water Market Assessment

Table 3-9 Continued

No.	Cust ID No.	Customer Name	Meter/Site Address	Zip Code	Annual Water Demand			
					HCF	AFY	GPM	MGD
Sub-area 6								
10	1076	MESA VERDE MIDDLE SCHOOL (PUSD) ⁴	8375 ENTREKEN WY	92129	15,643	36	22	0.03
11	527	TAYLOR WOODROW HOMES, INC	8111 DOUG HILL	92127	11,576	27	16	0.02
Subtotal					27,219	62	39	0.06
Sub-area 7								
12	597	WESTSHAW ASSOCIATES LLC	11189 CARMEL COUNTRY RD	92130	166,169	381	236	0.34
Subtotal					166,169	381	236	0.34
Total Demand					277,615	977	609	0.87

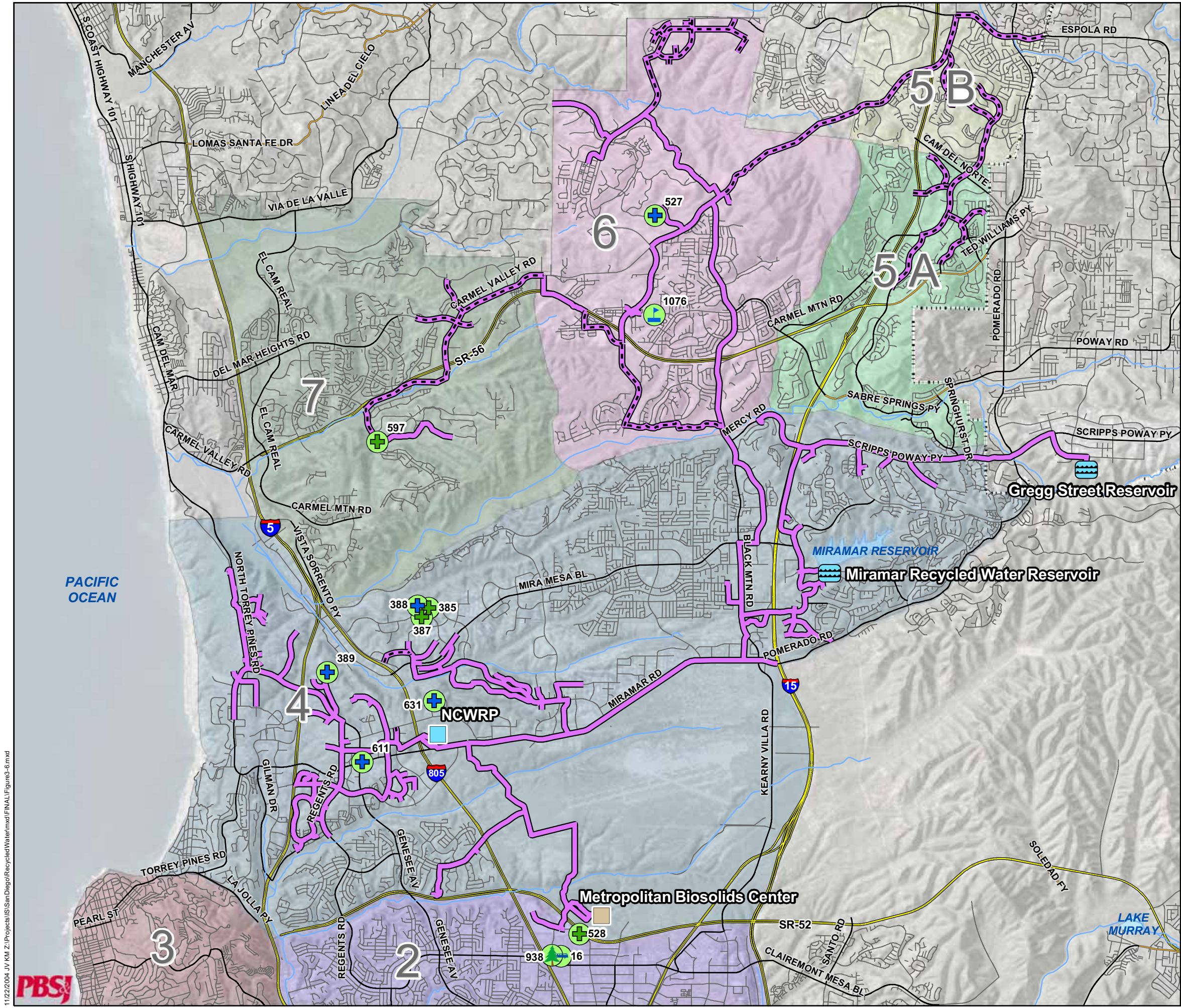
Source: Recent water meter data from June 1, 2003 to May 31, 2004 obtained from San Diego Data Processing Corp, unless otherwise indicated.

¹ Potential customers identified in Sub-area 2 are located in northernmost part of CSA and are adjacent to the existing recycled water system.

² Projected annual water demand obtained from City Water Department. See Appendix F.

³ Projected annual water demand obtained from City Customer Support Division. See Appendix E.

⁴ PUSD - Poway Unified School District; school districts are not required to comply with MRO.



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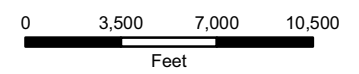
- Potential Customers**
- Caltrans
 - Park & Rec
 - Commercial
 - School District
 - 201 to 1,320 feet from Recycled Water Lines *
- *See Table 3-9 for Customer ID Number

- Demand Range**
- >46 AFY
 - 20 to 46 AFY

- Recycled Water Lines**
- Existing
 - Proposed
 - Rivers
 - Lakes
 - Sub-area (Typ)



1 inch equals 7,000 feet



Water Reuse Study 2005

**North Service Area
Recycled Water Markets
Tier 3**

Figure 3-6

11/22/2004 JV KM Z:\Projects\IS\SanDiego\RecycledWater\md\FINAL\Figure3-6.mxd



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3.0 Recycled Water Market Assessment

Tier 4 – Recycled Water Markets

Customers with less than 20 AFY demand but within 1,320 feet from the existing or planned (Phase I or II) recycled water pipelines were also identified, as shown in Figure 3-7. The corresponding customer identification number, name and site addresses along with their associated annual demand are provided in Table 3-10 as Tier 4 recycled water markets. There are 76 potential sites identified with a total demand of 690 AFY (0.62 MGD). However, the number of retrofits has significantly increased and their demand range is below that of the City’s MRO criteria. As a result, it is assumed that only about 50 percent of the total annual demand would transfer to recycled water. The total potential demand from the 30 highest Tier 4 customers is estimated to be 358 AFY (0.32 MGD).

**Table 3-10
Tier 4 – NSA Recycled Water Markets (<20 AFY)
Potential Infill Customers Within 200 feet to 1,320 feet from Recycled Waterlines**

No.	Cust ID No.	Customer Name	Meter/Site Address	Zip Code	Annual Water Demand			
					HCF	AFY	GPM	MGD
Sub-area 2¹								
1	532	TELECOM CENTER POA	5451 COPLEY DR	92111	3,114	7	4	0.01
Subtotal					3,114	7	4	0.01
Sub-area 4								
2	86	ARROWHEAD GENERAL INC.	6055 LUSK BL	92121	3,597	8	5	0.01
3	88	ASPIRE AT SCRIPPS RANCH	11085 CAMTO ARCADA	92131	4,108	9	6	0.01
4	161	COLONY LA PAZ CONDO ASSOC	4053 ROSENDA CT	92122	5,001	11	7	0.01
5	686	COMPASS POINTE APTS	11600 COMPASS POINT N DR	92126	4,009	9	6	0.01
6	165	CORTINA HOA	9543 QUESTA PE	92126	5,190	12	7	0.01
7	166	CORTINA HOA	9405 QUESTA PE	92126	3,279	8	5	0.01
8	692	D I P:LJ VILLAGE TWRS 500	8515 COSTA VERDE BL	92122	2,168	5	3	0.00
9	693	D I P:LJ VILLAGE TWRS 500	8515 COSTA VERDE BL	92122	513	1	1	0.00
10	179	DIOCESE OF SAN DIEGO	11451 BLUE CYPRESS DR	92131	3,214	7	5	0.01
11	184	DONOVAN'S STEAKHOUSE	4340 LA JOLLA VILLAGE DR	92122	1,826	4	3	0.00
12	197	EMBASSY SUITES	4550 LA JOLLA VILLAGE DR	92121	3,057	7	4	0.01
13	208	FIRST EDITION	6201 LUSK BL	92121	3,616	8	5	0.01
14	241	INTUIT	6220 GREENWICH DR	92122	3,291	8	5	0.01
15	242	INVESTCAL REALTY CORP	9496 PADGETT ST	92126	3,297	8	5	0.01
16	731	IVY CREST @ SCRIPPS RANCH	10870 IVY HILL DR	92131	6,108	14	9	0.01
17	243	IVY HILL HOA	10958 IVY HILL DR	92131	3,693	8	5	0.01
18	248	KB HOMES COASTAL INC.	11448 ASPENDELL DR	92131	4,906	11	7	0.01
19	276	LMIP-2&3	8935 ACTIVITY RD	92126	4,613	11	7	0.01
20	288	MARRIOTT CORP	4240 LA JOLLA VILLAGE DR	92122	808	2	1	0.00
21	319	NOKIA MOBILE PHONES INC	12278 SCRIPPS SUMMIT DR	92131	4,958	11	7	0.01
22	320	NOKIA MOBILE PHONES INC	12220 SCRIPPS SUMMIT DR	92131	1,520	3	2	0.00
23	345	PACIFIC CORP CENTER N	10012 PACIFIC HEIGHTS BL	92121	7,327	17	10	0.02
24	354	PARDEE CONSTRUCTION CO	11607 BLACK MTN RD	92126	3,215	7	5	0.01

3.0 Recycled Water Market Assessment

Table 3-10 Continued

No.	Cust ID No.	Customer Name	Meter/Site Address	Zip Code	Annual Water Demand			
					HCF	AFY	GPM	MGD
25	1069	PARK & REC/COMM PARK I - HOURGLASS FIELD COMM PK	9210 FLANDERS DR	92126	8,829	20	13	0.02
26	945	PARK & REC/COMM PARK I	9267 HILLERY DR	92126	5,055	12	7	0.01
27	1026	PARK & REC/OPEN SPACE	11341 BLUE CYPRESS DR	92131	3,723	9	5	0.01
28	775	PLAYMOR TERRACE HOA	8043 CAM TRANQUILO	92122	7,934	18	11	0.02
29	776	PLAYMOR TERRACE WEST	3932 CAM CALMA	92122	3,608	8	5	0.01
30	777	PLAYMOR TERRACE WEST	3969 CAM LINDO	92122	3,006	7	4	0.01
31	383	QUALCOMM INC	10290 CAMPUS POINT DR	92121	5,418	12	8	0.01
32	421	S D RANCHO LA CRESTA HOA	11661 ANGELIQUE ST	92131	3,585	8	5	0.01
33	426	SABRE SPRG SO NHBD 14/15	11923 SPRINGBROOK DR	92128	3,224	7	5	0.01
34	428	SABRE SPRING SOUTH	11895 CANERIDGE RD	92128	5,258	12	7	0.01
35	797	SCRIPPS HIGHLAND HOA	11925 TRAIL CREST DR	92131	3,088	7	4	0.01
36	798	SCRIPPS HIGHLANDS HOA	11556 ASPENDELL DR	92131	3,218	7	5	0.01
37	453	SCRIPPS NTHRIDGE COR PK A	10603 SCRIPPS SUMMIT CT	92131	4,049	9	6	0.01
38	459	SCRIPPS RANCH VILLAGE	10646 SOUTH BROOKVILLE DR	92131	6,086	14	9	0.01
39	460	SCRIPPS RANCH VILLAGES	10645 SOUTH BROOKVILLE DR	92131	4,661	11	7	0.01
40	484	SHOREHAM BLDG 1495	5120 SHOREHAM PL	92122	2,595	6	4	0.01
41	496	SORRENTO WTRRIDGE PRT LP	10421 WATERIDGE CR	92121	3,964	9	6	0.01
42	498	SPIEKER PROPERTIES	4810 EASTGATE ML	92121	3,054	7	4	0.01
43	499	SPIEKER PROPERTIES INC	9926 PACIFIC HEIGHTS BL	92121	3,473	8	5	0.01
44	510	SUDBERRY PROPERTIES INC	8978 ACTIVITY RD	92126	3,938	9	6	0.01
45	517	SUNROAD CORPORATE CTR	4445 EASTGATE ML	92121	3,212	7	5	0.01
46	539	THE REALTY ASSOC FUND 1V	8928 ACTIVITY RD	92126	3,495	8	5	0.01
47	560	UNIVERSITY TOWN CTR	4545 LA JOLLA VILLAGE DR	92122	5,011	12	7	0.01
48	561	UNIVERSITY TOWN CTR	4545 LA JOLLA VILLAGE DR	92122	986	2	1	0.00
49	562	UNIVERSITY TOWN CTR ASSOC	4543 LA JOLLA VILLAGE DR	92122	5,547	13	8	0.01
50	563	UNIVERSITY TOWN CTR ASSOC	4407 LA JOLLA VILLAGE DR	92122	4,664	11	7	0.01
51	564	UNIVERSITY TOWN CTR ASSOC	4337 LA JOLLA VILLAGE DR	92122	4,057	9	6	0.01
52	833	VMS NATIONAL PROPERTIES	9505 GOLD COAST DR	92126	865	2	1	0.00
53	580	WATERIDGE OWNERS ASSOC	10326 WATERIDGE CR	92121	4,472	10	6	0.01
54	598	WESTVIEW NEIGHBOR HOA	9412 COMPASS POINT S DR	92126	3,160	7	4	0.01
55	604	WILLMARK COMMUNITIES	5850 KANTOR ST	92122	6,313	14	9	0.01
56	841	WOODCREST HILLS HOA	12194 BRANICOLE LN	92129	3,754	9	5	0.01
57	609	WYNDHAM GARDEN HOTEL	5975 LUSK BL	92121	3,839	9	5	0.01
58	610	WYNDHAM GARDEN HOTEL	5975 LUSK BL	92121	0	0	0	0.00
Subtotal					220,455	506	314	0.45
Sub-area 6								
59	770	PENASQUITOS CASABLANCA	9372 TWIN TRAILS DR	92129	4,768	11	7	0.01
60	375	CANYON VIEW ELEM SCHOOL (PUSD) ²	9225 ADOLPHIA ST	92129	4,450	10	6	0.01
61	482	SHEA HOMES	7151 PRIMROSE LN	92129	3,707	9	5	0.01

3.0 Recycled Water Market Assessment

Table 3-10 Continued

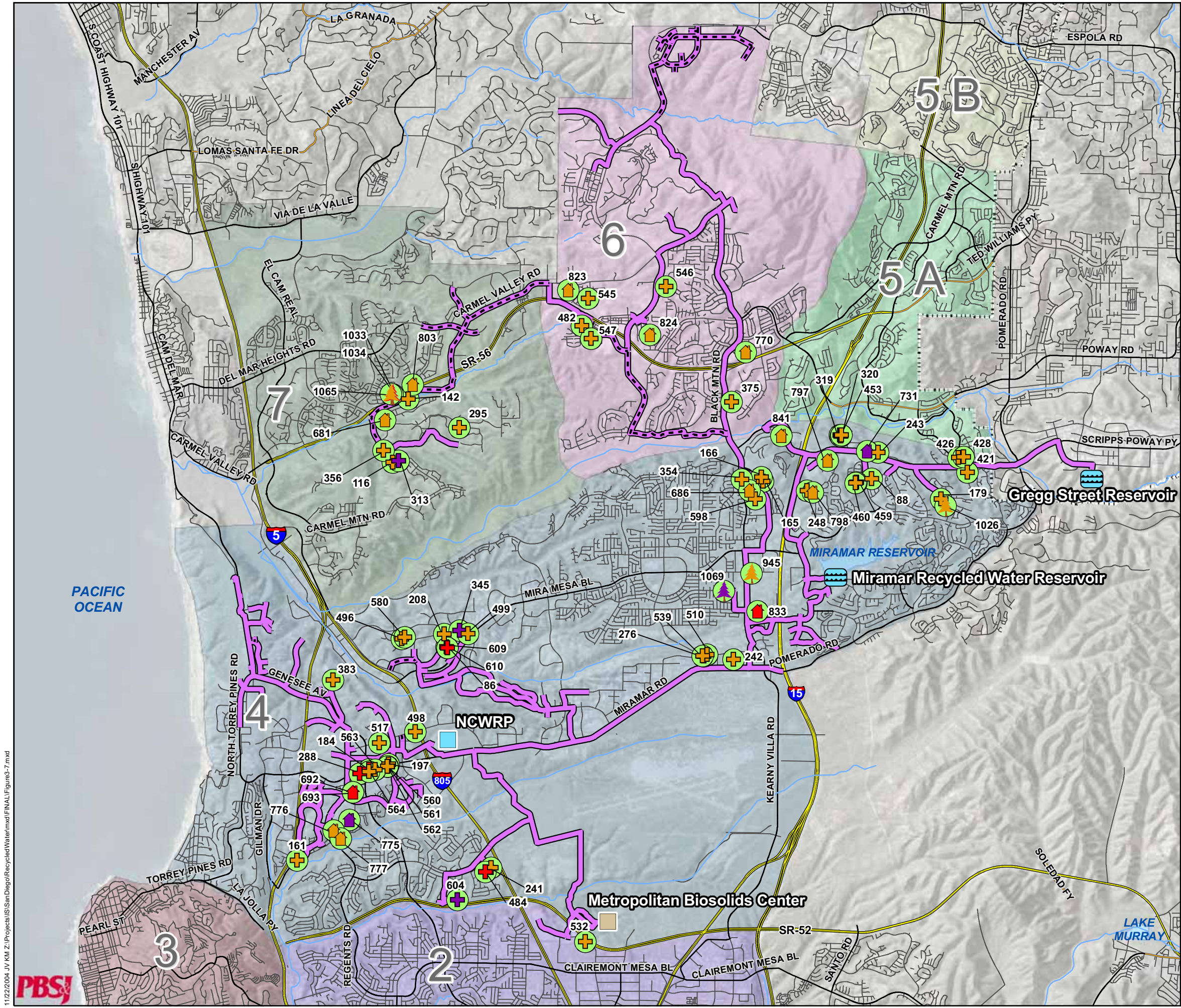
No.	Cust ID No.	Customer Name	Meter/Site Address	Zip Code	Annual Water Demand			
					HCF	AFY	GPM	MGD
62	823	TORREY DEL MAR HOA	7475 MONA LN	92130	4,994	11	7	0.01
63	545	TORREY DEL MAR HOA	7695 MCGONIGLE TR	92130	4,311	10	6	0.01
64	546	TORREY GLENN HOA	8382 WATSON RANCH RD	92129	3,048	7	4	0.01
65	824	TORREY HIGHLANDS	8297 STAGE COACH PL	92129	5,618	13	8	0.01
66	547	TORREY SANTA FE HOA	7297 ARROYO GRANDE RD	92129	4,316	10	6	0.01
Subtotal					35,212	81	50	0.07
Sub-area 7								
67	116	C/V NEIGHBORHOOD 10 N HOA	11098 CARMEL COUNTRY RD	92130	3,249	7	5	0.01
68	142	CARMEL VALLEY VILLAGE HOA	4942 RUETTE DE MER	92130	5,891	14	8	0.01
69	681	CARMEL VALLEY VILLAGE I	4978 CAMTO VISTA LUJO	92130	5,258	12	7	0.01
70	295	MEADOWS DEL MAR HOA	5514 MEADOWS DEL MAR DY	92130	5,915	14	8	0.01
71	313	NCW NEIGHBORHOOD 10 HOA	11041 CARMEL COUNTRY RD	92130	6,399	15	9	0.01
72	356	PARDEE CONSTRUCTION CO	11183 CARMEL COUNTRY RD	92130	3,325	8	5	0.01
73	1033	PARK & REC/OPEN SPACE	5002 CARMEL KNOLLS DR	92130	4,027	9	6	0.01
74	1065	PARK & REC/OPEN SPACE	4984 CARMEL KNOLLS DR	92130	3,234	7	5	0.01
75	1034	PARK & REC/OPEN SPACE	5002 CARMEL KNOLLS DR	92130	1,005	2	1	0.00
76	803	SEABREEZE FARMS HOA	12726 SEABREEZE FARMS DR	92130	3,359	8	5	0.01
Subtotal					41,662	96	59	0.09
Total Demand					300,443	690	428	0.62

Source: Recent water meter data from June 1, 2003 to May 31, 2004 obtained from San Diego Data Processing Corp, unless otherwise indicated.

¹ Potential customer identified in sub-area 2 is located in northernmost part of CSA and are adjacent to the existing recycled water system.

² PUSD - Poway Unified School District; school districts are not required to comply with MRO.

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- Potential Customers**
- Commercial
 - Other Domestic
 - Park & Rec
 - 201 to 1,320 feet from Recycled Water Lines *
- *See Table 3-10 for Customer ID Number

- Demand Range**
- 14 to 20 AFY
 - 7 to 14 AFY
 - <= 7 AFY

- Recycled Water Lines**
- Existing
 - Proposed
 - Rivers
 - Lakes
 - Sub-area (Typ)



1 inch equals 7,000 feet

Water Reuse Study 2005

**North Service Area
Recycled Water Markets
Tier 4**

Figure 3-7

11/22/2004 JV KM Z:\Projects\GIS\SanDiego\RecycledWater\md\FINAL\Figure3-7.mxd



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3.5.6 Other Potential Recycled Water Customers

Other potential recycled water markets that were not captured in a review of potable water use data, but were of interest to the City, include the University of California in San Diego, Maintenance Assessment Districts (MADs), HOAs, car washes and laundromats. Brief descriptions of these potential customers are provided below:

- **University of California in San Diego** –The City is currently conducting a study with the University of California San Diego (UCSD) to assess additional recycled water demand usage. It is anticipated that 400 AFY (0.35 MGD) more recycled water could be used on campus for landscape irrigation and cooling towers.
- **Maintenance Assessment Districts** – Maintenance Assessment Districts (MADs) and Landscape Maintenance Districts (LMDs) potentially offer opportunities for use of recycled water. However, these districts typically have numerous meters and retrofits may be complicated. The City Water Department staff are coordinating with the Park and Recreation Department staff, who are involved with managing the districts, to identify potential locations suitable for retrofit. In October 2004, the City Water Department staff reported an annual average irrigation demand of 30 AFY (0.03 MGD) from 31 meters in the Mira Mesa area and 17 AFY (0.02 MGD) from 17 meters in East Rancho Penasquitos. Appendix H provides the monthly irrigation demands taken from January 2003 to August 2004 to estimate the annual average demands, which total 47 AFY (0.05 MGD) for the two areas. Further investigation will be required to determine if these areas are suitable for connection to the recycled water distribution system and subsequent retrofits.
- **Homeowner’s Associations** – HOAs with potable water meters that share domestic and irrigation water use through the use of backflow preventers were also included as part of this study. A conceptual level analysis was used to evaluate these customers and assumptions were made regarding the feasibility of converting these HOAs to recycled water.

Based on water meter data provided by SDDPC and guidance from City staff, potable water customers categorized with rate code 21 as “Other Domestic – Regular Water/Regular Sewer” or rate code 23 as “Other Domestic – Regular Water/Special Rate Sewer” were assumed to be primarily HOAs and identified as a potential recycled water customer.

According to SDDPC, a rate code of 21 assumes approximately 95 percent of the water used for domestic purposes is returned to the sewer. The remaining 5 percent is attributed to losses within the system. A rate code of 23 is assigned to customers that use the same potable water meter for domestic and irrigation purposes. These customers have received a variance on their sewer rates since the portion of the water demand will not be returned

3.0 Recycled Water Market Assessment

to the sewer. The estimated percentage of irrigation demand that is not returned to the sewer would effectively reduce the percentage of sewer rate return.

In this study, approximately 148 potential HOA customers were identified using potable water meter data, representing a total annual water demand of approximately 3,730 AFY (3.33 MGD). The list of potential customers is provided in Appendix I. An assumption was made that 50 percent of the potable water demand would be used for irrigation purposes.

However, it was assumed that HOAs in this rate category may represent a more difficult retrofit and some of these potable water users will not be located such that it is cost effective to supply them with recycled water. Therefore, the potential recycled water demand associated with these HOAs was conservatively assumed to be approximately 10 percent of the estimated irrigation demand. Based on the assumptions described above, the recycled water demand from HOAs is estimated to be 190 AFY (0.17 MGD).

If the City desires to investigate HOAs as potential customers in further detail, additional research on the sewer flow code and GIS proximity mapping may provide a more realistic way to estimate recycled water demand than the conceptual analysis used in this study. The Sewer Flow Code, provided in Appendix J, is defined with a letter that is associated with an estimated percent range of water returned to sewer. Additionally, the GIS mapping can be used to pinpoint the customers located immediately adjacent to an existing recycled water pipeline to prioritize potential customers.

- **Car Washes and Laundromats** – Use of recycled water to serve carwashes and laundromats is common in many parts of California and could be instituted in San Diego. A preliminary review of potential sites was undertaken and identified approximately 90 car washes or auto detailing businesses and 24 commercial laundromats within the city. Of these businesses, 15 were identified as being in the vicinity of the existing recycled water distribution system in the NSA, and are listed in Table 3-11, below. None, however, fall under the purview of the Mandatory Reuse Ordinance. Use of recycled water at carwashes and laundromats represent a daytime use of recycled water. These customers are a benefit to the distribution system capacity because they apply off-peak demands to the system.

3.0 Recycled Water Market Assessment

**Table 3-11
Car Washes and Laundromats Recycled Water Demands
based on Potable Water Meter Data**

No.	Business Name	Site Address	Zip Code	Annual Water Demand		
				HCF	AFY	MGD
1	Car Salon	6620 Miramar Rd # B104	92121	1,462	3.4	0.003
2	Classic Auto Wash	5716 Miramar Rd	92121	3,142	7.2	0.006
3	Convoy Car Wash	3895 Convoy St	92111	2,972	6.8	0.006
4	Costa Verde Car Wash	8505 Costa Verde Blvd	92122	3,301	7.6	0.007
5	Lonargos Shop & Wash	4485 La Jolla Village Dr	92122	202	0.5	0.000
6	Miramar Shell	9840 Miramar Rd	92126	1,859	4.3	0.004
7	Mira Mesa Shell Car Wash	8345 Mira Mesa Blvd	92126	1,198	2.8	0.002
8	Scripps Miramar Car Wash	9650 Miramar Rd	92126	2,796	6.4	0.006
9	Black Forest Detail	4320 La Jolla Village Dr	92122	32	0.1	0.000
10	Pro Wax & Detail	4425 Convoy St # 103	92111	854	2.0	0.002
11	Rightlook Com	7616 Miramar Rd #5300	92126	62	0.1	0.000
12	Scripps Miramar Detail Center	9650 Miramar Rd	92126	2,796	6.4	0.006
13	Steve's Detailing of San Diego	9191 Towne Centre Dr	92122	3,153	7.3	0.006
14	Fletcher's Genesee Coin Laundry	4433 Genesee Ave	92117	1,788	4.1	0.004
15	University Square Laundromat	4027 Governor Dr	92122	1,822	4.2	0.004
Total Demand				27,439	63.1	0.06

Note: Water meter data provided by City Water Department from fiscal year 2003.

- Private Residential Lots** – Although residential lot irrigation is permitted in other parts of California, the San Diego County Department of Environmental Health has not approved such use due to concerns regarding cross connections with potable water systems and the homeowner's ability to manage this resource. Because irrigation of large lot residential landscapes in San Diego may represent a significant opportunity for recycled water use, this study investigated potable water use by single family dwelling units with lot sizes of ½ acre or greater. The investigation identified approximately 4,000 single-family residential lots in the City of San Diego with lots sizes of ½ acre or greater.

The data was reviewed for representative neighborhoods with significant numbers of large lots that were also in the vicinity of the recycled water distribution system from the NCWRP. These relatively new neighborhoods included the Santaluz and Fairbanks Highlands developments off of Black Mountain and Carmel Valley Roads and a smaller community located just south of Fairbanks Highlands on Caminito Vistana Road.

3.0 Recycled Water Market Assessment

Table 3-12 below summarizes the number of homes, total demand and average household demand. It should be noted that the meter data provided is based on a single meter that combines domestic and irrigation use. The total annual potable water demand for the three developments is 303 AFY.

**Table 3-12
Single Family Residences of 1/2 Acre or Greater Potable Water Demands
in Recently Developed San Diego Neighborhoods**

Neighborhood	Street Name	Zip Code	Rate Code ¹	Number of Homes	Annual Water Demand		
					HCF	AFY	MGD
Santaluz	Caminito Santaluz North	92127	11		1,692	4	0.003
	Caminito Santaluz West	92127	11		4,562	10	0.009
	Doug Hill	92127	11		2,975	7	0.006
	Doug Hill Court	92127	11		5,594	13	0.011
	Entrada De Luz East	92127	11		2,660	6	0.005
	Entrada De Luz West	92127	11		9,290	21	0.019
	Las Haciendas	92127	11		785	2	0.002
	Run of the Knolls Court	92127	11		858	2	0.002
	Santaluz Village Green North	92127	11		129	0.3	0.0003
	Sendero Angelica	92127	11		2,985	7	0.006
	Sendero De Oro	92127	11		2,859	7	0.006
	Subtotal			50	34,389	79	0.070
Fairbanks Highlands	Caminito Lazanja	92127	11		127	0.3	0.0003
	Entrada Angelica	92127	11		202	0.5	0.0004
	Garden Trails	92127	11		176	0.4	0.0004
	Iluminado	92127	11		1,967	5	0.004
	La Mantanza	92127	11		1,877	4	0.004
		Subtotal			8	4,349	10
South of Fairbanks Highlands	Caminito Vistana	92130	11		93,034	214	0.191
	Subtotal			91	93,034	214	0.191
	Total Potable Water Demand				131,772	303	0.270
	Estimated Irrigation Demand (50%)²				65,886	151	0.135
	Estimated Recycled Water Demand Captured (50%)³				32,943	76	0.068

¹ The rate code is based on City of San Diego Water Utilities Customer Information System codes to compute consumer's bill. Rate Code 11 is defined as regular water/regular sewer.

² Estimated irrigation demand is assumed to be 50% of potable water demand.

³ Estimated recycled water demand captured is assumed to be 50% of irrigation demand.

The estimated irrigation demand is assumed to be 50 percent of the potable water demand. The irrigation demand for the neighborhoods above is estimated to be 151 AFY. It is likely that only a percentage of this demand would be captured for recycled water use. Assuming half of this demand is captured; the average annual recycled water demand would be approximately 76 AFY (0.07 MGD).

3.0 Recycled Water Market Assessment

- Schools and Parks** – Schools and parks that were not captured in the market assessment meter data search were identified by City staff for inclusion in the study. The list, included in Table 3-13 below, includes 24 parks and over 30 school sites that are within the vicinity of the NSA recycled water distribution system. Of those sites, two areas were identified that provided potential to expand the existing system such that a number of sites could be served. Those sites were highlighted within the table. The first area is in the vicinity of Genessee and Governor Drive, requiring an extension of the pipeline in Governor Drive west past Genessee to serve a number of schools and parks there, and north on Genessee to serve University High School. The total recycled water demand captured in this area would be approximately 67 AFY (0.06 MGD). The second area is Mira Mesa Boulevard and Camino Ruiz, requiring an extension of the existing system from the east to serve Mira Mesa High School and the adjacent park. The total recycled water demand captured in this area would be approximately 54 AFY (0.05 MGD).

**Table 3-13
Parks and Schools Recycled Water Demands
Outside of Tier Market Assessment Approach**

No.	Site Name	Address	Zip Code	Irrigation Demand	
				(AFY)	(MGD)
Parks					
P2	CLAIREMONT P&RC 420	CLAIREMONT DR & RAPPAHANCOCK	92117	22.1	0.020
P5	E CLAIREMONT ATHL AR 432	MT ACADIA BLVD & MT ABBEY	92111	9.5	0.008
P6	GERSHWIN PARK	3508 CONRAD AVE	92117	4.3	0.004
P7	KELLY STREET PARK	6640 KELLY STREET	92111	9.0	0.008
P9	LINDA VISTA P&RC 400	GENESEE AV SLY PARK MESA WY	92126	12.0	0.011
P10	LINDA VISTA P&RC 400	LEVANT ST & PLACER ST	92111		
P11	LINDBERGH PARK 433	MARLESTA & ASHFORD STS	92111	17.7	0.016
P12	MAC DOWELL PARK 441	ARVINELS AVE & PEYTON PL	92117	4.1	0.004
P13	MADDOX PARK 211	FLANDERS DR & FLANDERS COVE	92126	12.8	0.011
P16	MARCY PARK 471	STRESEMANN ST & BRAGG ST	92122	8.2	0.007
P17	MESA VIKING PARK 222	WESTONHILL DR NLY CAPRICORN	92126	10.4	0.009
P18	MIRA MESA P&RC 220	MIRA MESA BLVD & NEW SALEM ST	92126	39.3	0.035
P19	MISSION HEIGHTS PARK	1716 WESTINGHOUSE ST	92111	11.8	0.011
P20	MT ACADIA PARK 432	MT ACADIA NLY MT ARARAT	92111	19.7	0.018
P21	MT ETNA PARK 452	MT ETNA ELY MT HERBERT	92117	8.9	0.008
P22	N CLAIREMONT P&RC 450	GENESEE AVE @ BANNOCK	92117	8.4	0.007
P25	OLIVE GROVE P&RC 440	MT ABERNATHY & PRINTWOOD WY	92117	16.3	0.015
P26	SANDBURG PARK 221	AVENIDA DEL GATO & ZAPATA AVE	92126	6.0	0.005
P29	STANDLEY P&RC 470	GOVERNOR DR & MERCER ST	92122	5.5	0.005
P30	STANDLEY P&RC 470	SYRACUSE AVE WLY SYRACUSE WAY	92122		
P32	UNIVERSITY VILLAGE	7150 FLOEY STREET	92122	6.1	0.005
P33	WESTERN HILLS PARK	4910 KANE STREET	92110	7.4	0.007
P35	WINTERWOOD COM PARK	WINTERWOOD LANE WLY END OF	92126	8.9	0.008
P36	WINTERWOOD COM PARK	SLY SORRENTO VLY BLVD ELY I-805	92126		
Subtotal				248.3	0.222

3.0 Recycled Water Market Assessment

Table 3-13 Continued

No.	Site Name	Address	Zip Code	Irrigation Demand	
				(AFY)	(MGD)
Schools					
S2	BAY PARK ELEM	2433 DENVER ST	92110	2.1	0.002
S4	CARSON ELEM	6905 KRAMER ST	92111	1.4	0.001
S5	CHALLENGER MIDDLE	10810 PARKDALE AVE	92126	4.8	0.004
S6	CHESTERTON ELEM	7335 WHEATLEY ST	92111	8.7	0.008
S7	CLAIREMONT H.S.	4150 UTE DR	92117	51.9	0.046
S8	CURIE ELEM.	4080 GOVERNOR DR	92122	2.0	0.002
S10	ERICSON ELEM.	11174 WESTONHILL DR	92126	29.4	0.026
S11	FIELD ELEM.	4375 BANNOCK AVE	92117	2.2	0.002
S13	HAWTHORNE ELEM.	4750 LEHRER DR	92117	1.6	0.001
S14	HICKMAN ELEM.	10850 MONTONGO ST	92126	4.0	0.004
S15	KEARNY SR. H.S.	7651 WELLINGTON ST	92111	18.2	0.016
S16	KROC MIDDLE	5050 CONRAD AVE	92117	3.5	0.003
S17	LAFAYETTE	6125 PRINTWOOD WAY	92117	1.8	0.002
S18	LINDA VISTA ELEM.	2772 ULRIC ST	92111	2.7	0.002
S19	LINDBERGH ELEM.	4133 MT. ALBERTINE AVE	92111	2.6	0.002
S21	MADISON H.S.	4833 DOLIVA DR	92117	26.1	0.023
S23	MARSTON MIDDLE	3799 CLAIREMONT DR	92117	8.2	0.007
S24	MASON ELEM	10340 SAN RAMON DR	92126	1.7	0.002
S25	MIRA MESA SR. H. S.	10510 REAGAN RD	92126	14.9	0.013
S26	MONTGOMERY JR. H.S.	2470 ULRIC ST	92111	2.5	0.002
S27	MUIR ALTERNATIVE	3390 ARMSTRONG ST	92111	1.3	0.001
S29	ROSS ELEM	7470 BAGDAD ST	92111	1.6	0.001
S30	SANDBURG ELEM	11230 AVENIDA DEL GATO	92126	7.4	0.007
S33	SEQUOIA ELEM	4690 LIMERICK AVE	92117	1.1	0.001
S34	SPRECKLES ELEM	6033 STADIUM ST	92122	13.9	0.012
S35	STANDLEY JR H. S.	6298 RADCLIFFE DR	92122	10.0	0.009
S36	TWAIN HS	6402 LINDA VISTA ROAD	92111	1.4	0.001
S37	UNIVERSITY H.S.	6949 GENESSEE AVE	92122	29.6	0.026
S40	WHITMAN ELEM	4050 APPLETON	92117	1.6	0.001
Total Demand				255	0.23
Genesee & Governor Drive Pipeline Extension Total Demand				54	0.05
Mira Mesa Blvd & Camino Ruiz Pipeline Extension Total Demand				67	0.06

3.5.7 Summary of NSA Market Assessment

The recommended target markets for NCWRP recycled water are summarized in Table 3-14. Recommended customers were chosen based on their estimated demand per connection point, their proximity to an existing or planned recycled waterline, type of use (athletic fields, parks, golf courses, HOAs, commercial) and the potential to connect to other agencies with infrastructure to deliver the recycled water.

**Table 3-14
Summary of Potential NSA Recycled Water Markets Infill Demand**

Recycled Water Markets	Annual Water Demand		
	AFY	GPM	MGD
Previously Identified Markets¹			
Existing System	6,510	4,036	5.81
Phase I System - Black Mtn Ranch/OMWD	1,927	1,195	1.72
Phase II System - Carmel Valley/SR-56	1,006	624	0.90
Subtotal	9,443	5,855	8.43
Potential Customers by Tier			
Tier 1	1,627	1,009	1.45
Tier 2	750	465	0.67
Tier 3	977	606	0.87
Tier 4 ²	358	222	0.32
Subtotal	3,712	2,302	3.31
Other Potential Customers			
UCSD	400	248	0.36
MADs ³	47	29	0.04
HOAs ⁴	187	116	0.17
Car Washes & Laundromats	63	39	0.06
Large Lot Residential ⁵	76	47	0.07
Schools and Parks ⁶	121	75	0.11
Subtotal	894	554	0.80
Total Demand	14,049	8,711	12.54

¹ Recycled water demands obtained from Table 3-5 of this report.

² Assumes 30 potential customers in Tier 4 would convert to recycled water, which comprises approximately 50% of the total annual demand in Tier 4.

³ Average annual demands for MADs were provided for Mira Mesa and east Rancho Penasquitos areas from City Water Department.

⁴ Assumes 50% of total annual potable water demand is for irrigation purposes. Of that, 10% is assumed to be willing to convert to recycled water and be situated immediately adjacent to an existing or planned recycled waterline.

⁵ Assumes 50% of irrigation demand for large lot residential neighborhoods in Sub-area 6 could be converted to recycled water.

⁶ School and park irrigation demands provided by Water Department survey. Assumes extension of existing system on Governor Drive and Mira Mesa Blvd.

3.0 Recycled Water Market Assessment

To meet the 2010 beneficial reuse goal of 13,500 AFY (12 MGD), it is anticipated that an additional 4,000 AFY (3.57 MGD) of demand is needed above and beyond currently contracted retrofit customers, the Black Mountain Ranch/OMWD development and Carmel Valley/SR-56 development. This goal could be met by potential customers identified using the Tier approach, continued communication and public outreach to gain interest in industrial users, and targeting HOAs and maintenance and landscape districts.

A cost analysis will be an important factor in determining the recommended location and number of potential infill sites serviceable through expansion of the system in the NSA and is included in Section 4.0.

At this time, it is not anticipated that customers in Sub-area 5A and 5B (Phase III service area) will be needed to fulfill the 2010 reuse goal. The total projected annual demand for the NSA, excluding the Phase III service area, is projected to be 14,000 AFY (12.54 MGD). This provides a small buffer between the 2010 reuse goal and the projected demand. This buffer is important because, based on experience, the capture rate of the proposed recycled water customers will not be 100 percent. To secure enough demand to meet the 2010 goal, the City must achieve a capture rate of 85 percent of the projected demands of over 300 identified customers. This is an aggressive goal and will require significant effort on the part of the City.

Potential use of recycled water markets in the Phase III service area will need to be reevaluated, if:

- development plans in Carmel Valley or Black Mountain Ranch change, or
- if the City is unable to get all of the Tier 2 customers to convert to recycled water, or
- if system expansions to Tier 3 customers are not constructed, or
- if less than 10 percent of the total recycled water demand for Tier 4 is converted, or
- if plans to convert other potential customers such as the MCAS Miramar (misc retrofits), the Eastgate Drive batch plant, Qualcomm, UCSD, or HOAs are not feasible.
- if customers utilize less RW than was projected based on historic potable water use.

To go beyond the 2010 goal to beneficially reuse 12 MGD, the City could continue to branch off of their existing system at greater distances to markets identified in Appendix C-1.

3.6 PHASE III AND SAN PASQUAL SERVICE AREA

The purpose of this market assessment is to update previous recycled water market assessments that have been prepared for the SPSA. The objective is to confirm and update the list of potential users and their demands based on recent water meter data.

Past studies reviewed included the *Beneficial Reuse Study – Phase 3 Recycled Water System (Rancho Bernardo/North Poway/San Pasqual)* prepared in June 2003, *Beneficial Reuse Study – Phase 3 Recycled Water Alignment and Reservoir Site Alternatives* (April 2004) and *Draft Accelerated Beneficial Reuse Study* (February 2003) to obtain information on previous market assessments. Recent meter data obtained from the SDDPC from June 1, 2003 to May 31, 2004 was used to update the potential recycled water demand. Additional potential customers identified from the meter data were graphically located using GIS mapping and geocoding. Meetings and correspondences with the City Water Department and Metropolitan Wastewater Department contributed updated information on the future planning of recycled water facilities in this service area.

Table 3-15 shows the Phase III recycled water markets and demands previously identified in the *Beneficial Reuse Study - Phase 3 Recycled Water System*. The total average annual recycled water demand for the proposed Phase III system was projected to be 2,800 AFY (2.5 MGD).

Projected Recycled Water Demand

The SPSA is situated north of the Rancho Bernardo Inn and Oaks North Golf Courses and extends north to Lake Hodges along the I-15 corridor. In June 2003, the *Beneficial Reuse Study - Phase 3 Recycled Water System* evaluated the adequacy and limitations of the existing infrastructure to provide service to proposed recycled water markets in the Rancho Bernardo, Poway and San Pasqual areas through an eastern extension of the Carmel Valley Road alignment and a proposed reservoir. During that time, the City of San Diego was investigating whether it should enlarge and reactivate the SPWRP, or permanently decommission the SPWRP and provide recycled water to the San Pasqual Valley and northern Rancho Bernardo and Poway from the NCWRP. Since June 2003, the City has determined that it is not feasible to rebuild the SPWRP, and therefore an integrated system will not be constructed and the northernmost San Pasqual markets were omitted from the Phase III service area. The total demand generated from the seven potential customers identified in the SPSA, defined as Sub-area 5B in this study, is estimated at 420 AFY (0.38 MGD).

In addition to the previously identified customers, an analysis of the recent potable water meter data obtained from SDDPC included an additional 76 potential customers based on irrigation demands. If the Phase III system is implemented, further data and market analysis on these customers would need to be investigated to determine which customers would be most cost effective for the City to target and to assess the customer's willingness to convert to recycled water. The total annual demand for these additional customers and the seven previously identified customers is 1,680 AFY (1.50 MGD). Table 3-16 summarizes the recycled water markets in the SPSA and their anticipated recycled water demands.

3.0 Recycled Water Market Assessment

**Table 3-15
Phase III Recycled Water Markets
2010 Recycled Water Demands**

No.	Customer	Avg Annual Demand		Max Day Demand			Usage Period (hrs)	Peak Hour Demand	
		AFY	MGD	PF ⁽¹⁾	gpm	MGD		PF	gpm
Rancho Bernardo (Phase III)									
1	Carmel Mtn Ranch GC	45	0.040	2	56	0.08	6	6	167
2	Carmel Mtn Ranch GC	253	0.226	2	314	0.45	6	6	941
3	Park & Rec Northern	86	0.077	2	107	0.15	8	6	320
4	Mass Mutual (Carmel Highlands GC)	153	0.137	2	190	0.27	6	6	569
5	TRW Military Electronics	45	0.040	2	56	0.08	8	6	167
6	Bernardo Hts CC	157	0.140	2	195	0.28	6	6	584
7	Rancho Bernardo HS	102	0.091	2	126	0.18	8	6	379
8	Lomas Bernardo HOA	102	0.091	2	126	0.18	8	6	379
9	Aetna Life Insurance	169	0.151	2	210	0.30	8	6	629
	Subtotal	1,112	0.993		1,379	1.99			4,137
Poway (Phase III)									
10	Stone Ridge/Maderas GCs	700	0.625	2	868	1.25	24	2	868
	Subtotal	700	0.625		868	1.25			868
Northern Rancho Bernardo (Phase III)									
11	Bernardo Hts 12 HOA	31	0.028	2	38	0.06	8	6	115
12	Community Assoc of Bernardo Hts	59	0.053	2	73	0.11	8	6	219
13	CalTrans at Bernardo Ctr. Dr.	78	0.070	2	97	0.14	8	6	290
14	RB Car Wash	9	0.008	2	11	0.02	24	2	11
15	Doubletree Club Hotel	4	0.004	2	5	0.01	8	6	15
16	Marriott's Remington Club	1	0.001	2	1	0.00	8	6	4
17	Remington Club	40	0.036	2	50	0.07	8	6	149
18	7 Oaks/Elite Management	2	0.002	2	2	0.00	8	6	7
19	Oaks North GC	280	0.250	2	347	0.50	24	2	347
20	Rancho Bernardo GC	250	0.223	2	310	0.45	24	2	310
21	Rancho Bernardo Inn GC	250	0.223	2	310	0.45	24	2	310
	Subtotal	1,004	0.896		1,245	1.79			1,778
	Total Phase III	2,816	2.514		3,492	5.03			6,783

⁽¹⁾ Peaking Factor (PF) is a multiple of Average Day Demand.

Source: Rancho Bernardo and Poway Customers: February 2003 *Accelerated Implementation of Beneficial Reuse*, Tables 2 and 6. San Pasqual Customers: March 2003 *Basis of Design Report San Pasqual Recycled Water Distribution System*, Table 3-2.

3.0 Recycled Water Market Assessment

**Table 3-16
SPSA Recycled Water Markets Based on Private Irrigation Meter Demands**

No.	Customer Name	Site Address	Zip Code	Actual Annual Irrigation Demand			
				HCF	AFY	GPM	MGD
Previously Identified Customers ¹							
1	MONTELENA HOA	CLOUDESLEY DR & LANCASHIRE WY	92128	1,742	4	2	0.004
2	CARLYLE MONTELENA HOA	CLOUDESLEY DR & ESCALA DR	92128	4,792	11	7	0.010
3	CALTRANS AT POMERADO RD	POMERADO RD & I-15	92128	47,045	108	67	0.096
4	BERNARDO VISTA DEL LAGO MAST DEV	18825 CAMINITO CANTILENA	92128	40,946	94	58	0.084
5	RB RECREATION PARK	18448 W BERNARDO DR	92127	39,204	90	56	0.080
6	CASA DE LAS CAMPANAS	18655 W BERNARDO DR	92128	47,916	110	68	0.098
7	PUMP STATION 77A	RANCHO BERNARDO COMM	92128	2,178	5	3	0.004
Subtotal				183,823	422	262	0.38
Private Irrigation Meter Accounts ²							
1	AETNA LIFE INSURANCE CO	15981 AVNDA VENUSTO	92128	6,962	16	10	0.014
2	AETNA LIFE INSURANCE CO	15887 AVNDA VENUSTO	92128	5,370	12	8	0.011
3	AETNA LIFE INSURANCE CO	15837 AVNDA VENUSTO	92128	4,247	10	6	0.009
4	BB&K/BERNARDO HILLS	15391 MATURIN DR	92127	3,801	9	5	0.008
5	BB&K/BERNARDO HILLS	15269 MATURIN DR	92127	3,235	7	5	0.007
6	BAE SYSTEMS	16250 TECHNOLOGY DR	92127	5,341	12	8	0.011
7	BERNARDO GREENS POA	12274 CTE SABIO	92128	7,108	16	10	0.015
8	BERNARDO HEIGHTS #14 HOA	12565 ALCACER DEL SOL	92128	4,207	10	6	0.009
9	BERNARDO HTS COMMUNITY ASN	15930 BERNARDO HEIGHTS PY	92127	5,308	12	8	0.011
10	BERNARDO HTS COMMUNITY ASN	16116 BERNARDO HEIGHTS PY	92128	3,809	9	5	0.008
11	BERNARDO HTS COMMUNITY ASN	15118 AVNDA VENUSTO	92128	3,059	7	4	0.006
12	BERNARDO HTS COMMUNITY ASN	15900 BERNARDO HEIGHTS PY	92127	3,043	7	4	0.006
13	BERNARDO HTS COMMUNITY ASN	16116 BERNARDO HEIGHTS PY	92128	211	0	0	0.000
14	BERNARDO HTS COUNTRY CLUB	15965 BERNARDO HEIGHTS PY	92127	62,979	145	90	0.129
15	BERNARDO HTS COUNTRY CLUB	15966 BERNARDO HEIGHTS PY	92127	34,087	78	49	0.070
16	BERNARDO HTS COUNTRY CLUB	12214 CALLE SAUCILLO	92128	31,485	72	45	0.065
17	BERNARDO HTS COUNTRY CLUB	15715 AVNDA VENUSTO	92128	28,677	66	41	0.059
18	BERNARDO HTS COUNTRY CLUB	12394 PASEO LUCIDO	92128	16,886	39	24	0.035
19	BERNARDO TOWN CNTR	16822 BERNARDO CENTER DR	92128	10,085	23	14	0.021
20	BERNARDO/THREE FLAGS INC	16837 WEST BERNARDO DR	92127	4,601	11	7	0.009
21	BRE PROPERTIES	11826 PASEO LUCIDO	92128	5,151	12	7	0.011
22	BRE PROPERTIES	11832 PASEO LUCIDO	92128	4,374	10	6	0.009
23	COA OF BERNARDO HEIGHTS	12998 PASEO LUCIDO	92128	4,864	11	7	0.010
24	CALTRANS	16353 BERNARDO CENTER DR	92128	6,255	14	9	0.013
25	CAM BERNARDO OWNERS ASSOC	11005 PASEO MONTANOSO	92127	4,407	10	6	0.009
26	CAMINO BERNARDO HOA	11058 CAM ABROJO	92127	5,100	12	7	0.010
27	CAMINO BERNARDO HOA	10832 TRZA FLORACION	92127	3,624	8	5	0.007
28	CAMINO BERNARDO HOA	15702 CAM CRISALIDA	92127	4,264	10	6	0.009

3.0 Recycled Water Market Assessment

Table 3-16 Continued

No.	Customer Name	Site Address	Zip Code	Actual Annual Irrigation Demand			
				HCF	AFY	GPM	MGD
29	CAMINO BERNARDO VILLAS	11299 PASEO MONTANOSO	92127	7,673	18	11	0.016
30	CAMINO BERNARDO VILLAS	11211 PASEO MONTANOSO	92127	6,181	14	9	0.013
31	CARMEL MTN RANCH -RCA	11591 TED WILLIAMS PY	92128	5,022	12	7	0.010
32	CHRCH OF JESUS CHRIST LDS	15673 CALLE PUEBLITO	92128	5,083	12	7	0.010
33	COLLINS TECH R B	10906 TECHNOLOGY PL	92127	3,158	7	4	0.006
34	COMM ASSOC OF BERNARDO HT	12202 AVNDA CONSENTIDO	92128	4,852	11	7	0.010
35	CYMER INC	16730 VIA DEL CAMPO CT	92127	3,773	9	5	0.008
36	EQR DEERWOOD VISTAS INC	15614 BERNARDO CENTER DR	92127	4,221	10	6	0.009
37	EQR DEERWOOD VISTAS INC	15694 BERNARDO CENTER DR	92127	4,158	10	6	0.009
38	EQR DEERWOOD VISTAS INC	15672 BERNARDO CENTER DR	92127	3,979	9	6	0.008
39	EQUITY RESIDENTIAL	12103 SABRE SPRINGS PY	92128	8,295	19	12	0.017
40	EVENING CREEK LLC	13335 SABRE SPRINGS PY	92128	5,903	14	8	0.012
41	FAIRWAY POINTE HOA	12307 KINGSGATE SQ	92128	4,400	10	6	0.009
42	GRANUM PARTNERS	11095 RANCHO BERNARDO RD	92127	6,018	14	9	0.012
43	HEWLETT-PACKARD CO	16397 WEST BERNARDO DR	92127	10,254	24	15	0.021
44	HIGH COUNTRY WEST POA	10514 EARTHSTAR CT	92127	3,673	8	5	0.008
45	HIGH COUNTRY WEST POA	15871 BIG SPRINGS WY	92127	3,174	7	5	0.007
46	HIGH COUNTRY WEST POA	15971 TURTLEBACK RD	92127	3,503	8	5	0.007
47	LEGACY SABRE SPRINGS,LLC	13498 EVENING CREEK N DR	92128	6,217	14	9	0.013
48	LINCOLN PROPERTY COMPANY	16745 WEST BERNARDO DR	92127	7,575	17	11	0.016
49	LOMAS BERNARDO HOA	11818 PASEO LUCIDO	92128	3,598	8	5	0.007
50	MASTERS HILL HOA	12034 ROYAL BIRKDALE RW	92128	3,967	9	6	0.008
51	MIRA LA PAZ HOA	16240 AVNDA VENUSTO	92128	3,931	9	6	0.008
52	NCR	17099 VIA DEL CAMPO	92127	11,278	26	16	0.023
53	NCR	17099 VIA DEL CAMPO	92127	5,131	12	7	0.011
54	PACIFIC ENTERPRISE	10975 TECHNOLOGY PL	92127	3,078	7	4	0.006
55	PARK & REC/COMM PARK I	12815 SABRE SPRINGS PY	92128	10,997	25	16	0.023
56	PARK & REC/OPEN SPACE	12945 SABRE SPRINGS PY	92128	3,034	7	4	0.006
57	POWAY UNIFIED SCHOOL DIST	13001 PASEO LUCIDO	92128	35,307	81	50	0.072
58	POWAY UNIFIED SCHOOL DIST	15855 TURTLEBACK RD	92127	4,267	10	6	0.009
59	RANCHO BERNARDO CORP CTR	16866 VIA DEL CAMPO CT	92127	3,373	8	5	0.007
60	RANCHO BERNARDO CORP CTR	16910 VIA DEL CAMPO	92127	3,189	7	5	0.007
61	REMINGTON CLUB	16918 HIERBA DR	92128	6,615	15	9	0.014
62	REMINGTON CLUB	17096 ACENA DR	92128	3,120	7	4	0.006
63	SABRE SPRINGS BUSINESS PK	13432 EVENING CREEK N DR	92128	5,800	13	8	0.012
64	SABRE SPRINGS HOA	13115 SABRE SPRINGS PY	92128	4,069	9	6	0.008
65	SABRE SPRINGS SOUTH HOA	12410 VERANDA CT	92128	4,195	10	6	0.009
66	SEVEN OAKS COMM CENTER	16845 BERNARDO OAKS DR	92128	3,314	8	5	0.007
67	SEVEN OAKS MGT GROUP	16405 CAMTO VECINOS	92128	3,868	9	6	0.008

3.0 Recycled Water Market Assessment

Table 3-16 Continued

No.	Customer Name	Site Address	Zip Code	Actual Annual Irrigation Demand			
				HCF	AFY	GPM	MGD
68	SEVEN OAKS MGT GROUP #5	16513 CAMTO VECINOS	92128	3,609	8	5	0.007
69	SEVEN OAKS MGT GROUP #5	16577 CAMTO VECINOS	92128	2,536	6	4	0.005
70	SHARP HEALTH CARE FAC	16950 VIA TAZON	92127	1,056	2	2	0.002
71	SONY CORP OF AMERICA	16530 VIA ESPRILLO	92127	5,093	12	7	0.010
72	SONY CORP OF AMERICA	16632 VIA DEL CAMPO	92127	4,364	10	6	0.009
73	SONY MANUFACTURING CO	16550 VIA ESPRILLO	92127	6,650	15	9	0.014
74	STARWOOD-HUNTINGTON PRTN	11611 BERNARDO PLAZA CT	92128	1,497	3	2	0.003
75	THE FALLS AT CAM BERNARDO	11281 AVNDA DE LOS LOBOS	92127	5,472	13	8	0.011
76	UNISYS CORP	10850 VIA FRONTERA	92127	5,941	14	8	0.012
Subtotal				548,001	1,258	780	1.12
Total Irrigation Demand				731,824	1,680	1,041	1.50

¹ Recycled water markets based on customers located in 640 Pressure Zone in Table 1 of *Beneficial Reuse Study - Phase 3 Recycled Water System (June 2003)*.

² Potable water demand data obtained from City of San Diego Data Processing Corporation from June 1, 2003 to May 31, 2004.

3.7 CENTRAL SERVICE AREA

In order to update the recycled water demand for this CSA analysis, previous market assessments were reviewed and water meter data for irrigation meters currently using potable water in the service area were obtained. Past studies reviewed included the *2000 Master Plan* and the *2003 Draft Accelerated Beneficial Reuse Study* to obtain information on previous market assessments. Meter data obtained from SDDPC from June 1, 2003 to May 31, 2004 was used to update the potential recycled water demand.

Potential Recycled Water Demand

The CSA lies south of the NSA from approximately SR-52 to National City. However, the area evaluated in this study was primarily limited to north of Interstate 8. The largest potential recycled water users in this service area are Balboa Park and Mission Bay Park. From a strategic planning approach, these markets are likely to be targeted for conversion to recycled water service first due to large demands.

The *2003 Draft Accelerated Beneficial Reuse Study* estimated the average annual recycled water use for Balboa Park, based on irrigation water meter data provided by City staff. The estimate generated a total demand of 1,240 AFY (1.1 MGD) including the San Diego Zoo (640 AFY), the golf course (470 AFY) and recreational areas (130 AFY).

3.0 Recycled Water Market Assessment

Estimates of average annual irrigation water use at Mission Bay Park, east of Mission Bay Drive, in the *2000 Master Plan*, total 860 AFY (0.77 MGD) and include service to the Mission Bay Golf Course and Campground, DeAnza, Playa Pacifica, Tecolote, and South Shores Parklands and Sea World.

Review of the City's water meter records of private irrigation meters in the CSA over the past year, included in Table 3-17, indicate that there are some additional potential recycled water markets in the vicinity of Balboa Park and Mission Bay Park. The potential markets are categorized by sub-area as shown in Figure 3-2. The areas evaluated for the CSA include Sub-areas 1, 2 and 3 in addition to a section south of I-8. Sub-area 1 included I-8 north to Balboa Avenue. Sub-area 2 included SR-52 south to Balboa Avenue. Sub-area 3 included the area west of I-5. These markets were identified based on the City premise and rate codes that classified the meter data as irrigation accounts. Since there are no existing recycled water mains in this area, the Tier approach was not used to determine the customer's relative distance to an existing pipeline. Depending on the route of a proposed transmission main from the Northern Distribution System to Balboa and Mission Bay Parks and Linda Vista, the list of potential customers in Table 3-17 can be further evaluated and scrutinized. Currently, the total annual irrigation demand for the CSA is approximately 3,460 AFY (3.09 MGD), not including the demands obtained from the *2003 Draft Accelerated Beneficial Reuse Study* for Balboa and Mission Bay Parks and neighboring sites.

If the City elects to expand the distribution system supplied by the NCWRP south into the CSA, the *2003 Draft Accelerated Beneficial Reuse Study* suggested evaluation of a possible longitudinal encroachment/joint pipeline with Caltrans. As noted in the study, such a permit would be difficult to obtain, as Caltrans does not desire such facilities within their right-of-way. Additionally, the City's recent correspondence with Caltrans indicated shared usage of recycled water pipeline between the City and Caltrans would be difficult to manage due to different metering facilities between agencies and existing recycled waterlines already constructed in I-5 and I-15 limits the amount of additional capacity available to the City for potential recycled water markets. The City continues to coordinate with Caltrans to identify any future collaboration efforts to capture additional potential reuse customers.

3.0 Recycled Water Market Assessment

**Table 3-17
CSA Recycled Water Markets Based on Private Irrigation Meter Demands**

No.	Customer Name	Meter Address	Zip Code	Actual Annual Irrigation Demand			
				HCF	AFY	GPM	MGD
Sub-area 1							
1	7510 HAZARD,LLC	7610 HAZARD CENTER DR	92108	4,539	10	6	0.01
2	8954 RIO SAN DIEGO, LP	2297 RIO BONITO WY	92108	4,874	11	7	0.01
3	AERO DRIVE ASSOC L P	3311 DALEY CENTER DR	92123	3,772	9	5	0.01
4	AERO DRIVE ASSOC L P	9885 STONECREST BL	92123	4,078	9	6	0.01
5	AMERICAN GOLF CORP	2757 SNEAD AV	92111	44,138	101	63	0.09
6	AMERICAN GOLF INC	1150 FASHION VALLEY RD	92108	8,857	20	13	0.02
7	AMERICAN GOLF INC	1150 FASHION VALLEY RD	92108	8,554	20	12	0.02
8	AMERICAN GOLF INC	1150 FASHION VALLEY RD	92108	6,443	15	9	0.01
9	AMERICAN GOLF INC	1150 FASHION VALLEY RD	92108	4,601	11	7	0.01
10	AMERICAN GOLF INC	6455 FRIARS RD	92108	13,895	32	20	0.03
11	ARCHSTONE COMMUNITIES	2160 FENTON PY	92108	9,866	23	14	0.02
12	AREA 8 LLC	2020 CAM DEL RIO NORTH	92108	1,622	4	2	0.00
13	BEYLER,GARY J	8989 RIO SAN DIEGO DR	92108	1,746	4	2	0.00
14	BLUFFS I CONDO ASSOC,THE	6450 FRIARS RD	92108	6,906	16	10	0.01
15	BRE PROPERTIES	3394 DALEY CENTER DR	92123	9,264	21	13	0.02
16	CABRILLO ASSOC	8078 DONZEE ST	92123	3,362	8	5	0.01
17	CALMAT CO	1902 AINSLEY RD	92123	3,026	7	4	0.01
18	CALMAT CO	8751 FRIARS RD	92108	4,807	11	7	0.01
19	CALTRANS	1391 CAM DEL RIO NORTH	92108	7,541	17	11	0.02
20	CALTRANS	2212 HOTEL CIRCLE NORTH	92108	3,508	8	5	0.01
21	CALTRANS	298 HOTEL CIRCLE NORTH	92108	6,576	15	9	0.01
22	CALTRANS	3710 CONVOY ST	92111	12,265	28	17	0.03
23	CALTRANS	7548 FULTON ST	92111	4,051	9	6	0.01
24	CALTRANS	7680 MOCKING BIRD DR	92123	3,282	8	5	0.01
25	CALTRANS	8080 LINDA VISTA RD	92111	8,857	20	13	0.02
26	CALTRANS	8191 ARMOUR ST	92111	15,017	34	21	0.03
27	CENTERSIDE ASSOCIATES;LP	3133 CAM DEL RIO NORTH	92108	5,898	14	8	0.01
28	CHARGERS FOOTBALL CO	4020 MURPHY CANYON RD	92123	18,475	42	26	0.04
29	CHARGERS FOOTBALL CO	4020 MURPHY CANYON RD	92123	26	0	0	0.00
30	CHILDRENS HOSPITAL	3004 CHILDREN S WY	92123	3,956	9	6	0.01
31	CLAIREMONT APTS LLC	3125 CLAIREMONT DR	92117	3,965	9	6	0.01
32	CLAIREMONT APTS LLC	3128 COWLEY WY	92117	4,097	9	6	0.01
33	COVE & ASSOCIATES	9067 FRIARS RD	92108	3,178	7	5	0.01
34	CP KELCO	8225 AERO DR	92123	4,294	10	6	0.01
35	D I P:MONTGOMERY AIRPORT	8110 AERO DR	92123	13,645	31	19	0.03
36	D I P:MONTGOMERY AIRPORT	8110 AERO DR	92123	7,340	17	10	0.02
37	DAVE AND BUSTERS INC	3025 CAM DEL RIO NORTH	92108	1,759	4	3	0.00
38	DL PACIFIC CENTER LP	1455 FRAZEE RD	92108	1,499	3	2	0.00
39	DL PACIFIC CENTER LP	1615 MURRAY CANYON RD	92108	1,334	3	2	0.00
40	EDUCATIONAL ENRICHMENTS	2360 EAST JEWETT ST	92111	1,138	3	2	0.00
41	FASHION VALLEY CENTER	274 FASHION VALLEY RD	92108	4,548	10	6	0.01
42	FIFTH STREET PROPERTIES	2355 NORTHSIDE DR	92108	3,443	8	5	0.01
43	FIFTH STREET PROPERTIES	2371 NORTHSIDE DR	92108	3,230	7	5	0.01
44	FIFTH STREET PROPERTIES	2373 NORTHSIDE DR	92108	5,032	12	7	0.01
45	FMP LLC	2151 FENTON PY	92108	10,133	23	14	0.02

3.0 Recycled Water Market Assessment

Table 3-17 Continued

No.	Customer Name	Meter Address	Zip Code	Actual Annual Irrigation Demand			
				HCF	AFY	GPM	MGD
46	FORTRESS GSA SAN DIEGO LLC	8808 RIO SAN DIEGO DR	92108	3,843	9	5	0.01
47	FRANCIS PARKER SCHOOL	6503 LINDA VISTA RD	92111	4,664	11	7	0.01
48	FRY'S ELECTRONICS CORP	9825 STONECREST BL	92123	3,397	8	5	0.01
49	H G FENTON	10073 RIO SAN DIEGO DR	92108	3,585	8	5	0.01
50	H G FENTON	9905 RIO SAN DIEGO DR	92108	5,696	13	8	0.01
51	HAMPTON PLACE HOA	9612 BRIAR CT	92123	4,210	10	6	0.01
52	HCPI INC.	3444 KEARNY VILLA RD	92123	1,593	4	2	0.00
53	HESS, JEROME & HELEN	3771 BOYD AV	92111	4,075	9	6	0.01
54	HORTON CONTINENTAL	2770 BELLEZZA DR	92108	3,213	7	5	0.01
55	HORTON CONTINENTAL	9151 CITTA WY	92108	4,559	10	6	0.01
56	MABIE AND MINTZ CL #116	7575 LINDA VISTA RD	92111	2,230	5	3	0.00
57	MISSIONS AT RIO VISTA	8214 STATION VILLAGE LN	92108	3,628	8	5	0.01
58	NEWMAN PROPERTIES	5499 BALBOA AV	92111	3,390	8	5	0.01
59	NICHOLS INSTITUTE	7470 MISSION VALLEY RD	92108	2,026	5	3	0.00
60	NORTHSIDE DRIVE LLC	2507 OLD QUARRY RD	92108	6,498	15	9	0.01
61	NORTHSIDE DRIVE LLC	2507 OLD QUARRY RD	92108	4,706	11	7	0.01
62	NORTHSIDE DRIVE LLC	2507 OLD QUARRY RD	92108	3,797	9	5	0.01
63	NORTHSIDE DRIVE LLC	2507 OLD QUARRY RD	92108	2,129	5	3	0.00
64	NORTHSIDE DRIVE LLC	2507 OLD QUARRY RD	92108	1,493	3	2	0.00
65	NORTHSIDE DRIVE LLC	2507 OLD QUARRY RD	92108	1,000	2	1	0.00
66	OLYMPIA PLAZA LLC	3804 MURPHY CANYON RD	92123	4,033	9	6	0.01
67	OUTLOOK PROPERTIES INC	2655 CAM DEL RIO NORTH	92108	1,948	4	3	0.00
68	PACIFIC RETAIL TRUST	5696 MISSION CENTER RD	92108	6,665	15	9	0.01
69	PARK & REC/COMM PARK I	1716 WESTINGHOUSE ST	92111	5,004	11	7	0.01
70	PARK & REC/COMM PARK I	2149 WHINCHAT ST	92123	3,428	8	5	0.01
71	PARK & REC/COMM PARK I	2505 HOTEL CIRCLE PL	92108	5,938	14	8	0.01
72	PARK & REC/COMM PARK I	3020 ARMSTRONG ST	92111	17,987	41	26	0.04
73	PARK & REC/COMM PARK I	3606 WACO ST	92117	6,302	14	9	0.01
74	PARK & REC/COMM PARK I	4810 KANE ST	92110	3,434	8	5	0.01
75	PARK & REC/COMM PARK I	8310 HURLBUT ST	92123	6,078	14	9	0.01
76	PARK & REC/DVLPD REG PRK	4190 MIDWAY DR	92110	4,306	10	6	0.01
77	PARK & REC/OPEN SPACE	3102 DALEY CENTER DR	92123	6,753	16	10	0.01
78	PARK & REC/OPEN SPACE	5201 MISSION CENTER RD	92108	4,342	10	6	0.01
79	PARK & REC/OPEN SPACE	5301 MISSION CENTER RD	92108	3,980	9	6	0.01
80	PARK & REC/OPEN SPACES	7905 FRIARS RD	92108	3,135	7	4	0.01
81	PARK MESA	6902 PARK MESA WY	92111	4,790	11	7	0.01
82	PARK MESA H O A	7081 PARK MESA WY	92111	5,718	13	8	0.01
83	PARK PLACE ESTATES H O A	5961 RILEY ST	92110	11,924	27	17	0.02
84	PARK VILLAS NORTH H O A	7998 MISSION CENTER CT	92108	3,576	8	5	0.01
85	PRESIDIO PLACE H O A	5603 FRIARS RD	92110	6,703	15	10	0.01
86	PRESIDIO PLACE H O A	5707 FRIARS RD	92110	7,540	17	11	0.02
87	PRIME PROP CAPITAL INC	3408 WACO ST	92117	2,686	6	4	0.01
88	PRIME PROP CAPITAL INC	3429 WACO ST	92117	1,875	4	3	0.00
89	S D CNTY-DEPT OF GEN SVCS	5480 GAINES ST	92110	3,133	7	4	0.01
90	S D GAS & ELEC CO	7580 MISSION VALLEY RD	92108	3,661	8	5	0.01
91	S D GAS & ELEC CO	9060 FRIARS RD	92108	753	2	1	0.00
92	S D HOUSING COMMISSION	2099 VIA LAS CUMBRES	92111	6,466	15	9	0.01

3.0 Recycled Water Market Assessment

Table 3-17 Continued

No.	Customer Name	Meter Address	Zip Code	Actual Annual Irrigation Demand			
				HCF	AFY	GPM	MGD
93	S D UNIF SCH DIST	7335 WHEATLEY ST	92111	3,633	8	5	0.01
94	S D UNIF SCH DIST	7650 WELLINGTON ST	92111	5,764	13	8	0.01
95	SAN DIEGO MARRIOTT	2150 QUALCOMM WY	92108	4,327	10	6	0.01
96	SAN DIEGO NOB HILL CONDO	8623 CONVERSE AV	92123	2,577	6	4	0.01
97	SARATOGA HOA	9641 WEST CANYON TR	92123	3,042	7	4	0.01
98	SHARP MEMORIAL HOSPITAL	3001 HEALTH CENTER DR	92123	4,535	10	6	0.01
99	SHOOSHANI, SAID	3067 CLAIREMONT DR	92117	3,234	7	5	0.01
100	SKB-RIO VISTA, LLC	8885 RIO SAN DIEGO DR	92108	2,083	5	3	0.00
101	STATE OF CALIF	7575 METROPOLITAN DR	92108	3,970	9	6	0.01
102	STONECREST VILLAGE HOA	3110 WEST CANYON AV	92123	3,555	8	5	0.01
103	STRAFORD PLACE H O A	2797 WEST CANYON AV	92123	2,939	7	4	0.01
104	SUDBERRY PROPERTIES	2275 GILL VILLAGE WY	92108	8,632	20	12	0.02
105	SUNBELT MANAGEMENT CO	1674 CAM DE LA REINA	92108	5,875	13	8	0.01
106	SUNRISE ASSOC	3860 CONVOY ST	92111	1,490	3	2	0.00
107	SUNROAD OFFICE PRTRNS LP	3672 KEARNY VILLA RD	92123	3,045	7	4	0.01
108	SUNSTONE HOTEL PROP INC	3805 MURPHY CANYON RD	92123	2,512	6	4	0.01
109	THE ARC OF SAN DIEGO	9575 AERO DR	92123	4,266	10	6	0.01
110	THE BLUFFS OF FOX RUN HOA	3099 OLD BRIDGEPORT WY	92111	3,207	7	5	0.01
111	THE COURTYARDS H O A	5805 FRIARS RD	92110	7,626	18	11	0.02
112	TRST CENTERSIDE	3115 CAM DEL RIO NORTH	92108	5,316	12	8	0.01
113	UNION-TRIBUNE	350 CAM DE LA REINA	92108	4,930	11	7	0.01
114	UNIV OF SAN DIEGO	1501 SANTA ANA DR	92111	3,655	8	5	0.01
115	UNIV OF SAN DIEGO	1502 VIA LAS CUMBRES	92111	6,224	14	9	0.01
116	UNIV OF SAN DIEGO	1502 VIA LAS CUMBRES	92111	2,365	5	3	0.00
117	UNIV OF SAN DIEGO	5695 MARIAN WY	92110	4,306	10	6	0.01
118	UNIV OF SAN DIEGO	5945 MARIAN WY	92110	2,242	5	3	0.00
119	UNIVERISTY OF SAN DIEGO	1820 VIA LAS CUMBRES	92111	4,511	10	6	0.01
120	UNIVERSITY OF SAN DIEGO	1620 VIA LAS CUMBRES	92111	3,081	7	4	0.01
121	WAWANESA MUTUAL INSURANCE	9054 FRIARS RD	92108	6,445	15	9	0.01
Subtotal				633,714	1,455	902	1.30
Sub-area 2							
1	AGBRI SEVILLE LLC	5475 KEARNY VILLA RD	92123	3,674	8	5	0.01
2	ALLIANCE INVESTMENT CORP.	5252 BALBOA ARMS DR	92117	1,136	3	2	0.00
3	AVION APARTMENTS INC	8811 SPECTRUM CENTER BL	92123	5,892	14	8	0.01
4	AVION APARTMENTS INC	8847 SPECTRUM CENTER BL	92123	4,782	11	7	0.01
5	CALIFORNIA COAST C U	9201 SPECTRUM CENTER BL	92123	2,424	6	3	0.00
6	CALTRANS	5160 CONVOY ST	92111	3,120	7	4	0.01
7	CALTRANS	5251 KEARNY MESA RD	92111	8,859	20	13	0.02
8	CALTRANS	5430 REGENTS RD	92117	12,466	29	18	0.03
9	CALTRANS	6565 CONVOY CT	92117	11,056	25	16	0.02
10	CALTRANS	7610 BALBOA AV	92111	6,832	16	10	0.01
11	CANYON RIM H O A	2756 ARIANE DR	92117	8,449	19	12	0.02
12	CHAN, ALLEN	4611 CONVOY ST	92111	299	1	0	0.00
13	COMPUTER SCIENCES CORP	9305 LIGHTWAVE AV	92123	2,320	5	3	0.00
14	HUB PROPERTIES TRUST	4560 VIEWRIDGE AV	92123	3,530	8	5	0.01
15	KEARNY MESA TOYOTA	4910 KEARNY MESA RD	92111	574	1	1	0.00
16	KEARNY VILLA HOTEL	8651 SPECTRUM CENTER BL	92123	1,824	4	3	0.00

3.0 Recycled Water Market Assessment

Table 3-17 Continued

No.	Customer Name	Meter Address	Zip Code	Actual Annual Irrigation Demand			
				HCF	AFY	GPM	MGD
17	LEXUS KEARNY MESA	4970 KEARNY MESA RD	92111	627	1	1	0.00
18	LNR KEARNY MESA	8540 TECH WY	92123	5,462	13	8	0.01
19	LNR KEARNY MESA INC	8802 LIGHTWAVE AV	92123	4,780	11	7	0.01
20	LNR KEARNY MESA INC	9288 LIGHTWAVE AV	92123	4,021	9	6	0.01
21	LNR KEARNY MESA INC	9388 LIGHTWAVE AV	92123	5,427	12	8	0.01
22	MCGRATH DEVELOPMENT INC	4863 SHAWLINE ST	92111	4,010	9	6	0.01
23	MCGRATH DEVELOPMENT INC	4992 SHAWLINE ST	92111	6,160	14	9	0.01
24	MOTEL 6 INC OLP 1020	5598 CLAIREMONT MESA BL	92117	3,346	8	5	0.01
25	NAS CONVOY PARTNERSHIP	7798 COPLEY PARK PL	92111	4,264	10	6	0.01
26	NATIONAL UNIVERSITY	9388 LIGHTWAVE AV	92123	2,703	6	4	0.01
27	OTR-CLAIREMONT SQUARE	4641 CLAIREMONT DR	92117	4,137	9	6	0.01
28	OTR-CLAIREMONT SQUARE	4737 CLAIREMONT DR	92117	3,496	8	5	0.01
29	OTR-CLAIREMONT SQUARE	4931 CLAIREMONT DR	92117	5,007	11	7	0.01
30	PACIFIC RACQUET CLUB HOA	3743 BALBOA TR	92117	4,544	10	6	0.01
31	PARK & REC/COMM PARK I	3369 MORAGA CT	92117	6,692	15	10	0.01
32	PARK & REC/COMM PARK I	4664 HIDALGO AV	92117	5,962	14	8	0.01
33	RALPH'S GROCERY CO	4239 GENESEE AV	92117	441	1	1	0.00
34	ROMAN CATHOLIC BISHOP SD	3888 PADUCAH DR	92117	3,429	8	5	0.01
35	RREEF FUNDS	5474 COMPLEX ST	92123	940	2	1	0.00
36	RT SD DENVER LP	5412 KEARNY MESA RD	92111	3,264	7	5	0.01
37	S D CNTY-DEPT OF GEN SVCS	5252 VIEWRIDGE CT	92123	3,727	9	5	0.01
38	S D UNIF SCH DIST	4710 CARDIN ST	92111	680	2	1	0.00
39	S D UNIF SCH DIST	4833 DOLIVA DR	92117	8,859	20	13	0.02
40	STONE HAVEN HOA	4407 CAMTO CUARZO	92117	4,852	11	7	0.01
41	TELECOM CENTER POA	4988 HICKMAN FIELD DR	92117	4,788	11	7	0.01
42	TELECOM CENTER POA	4998 HICKMAN FIELD DR	92117	3,674	8	5	0.01
43	THE RREEF FUNDS	5727 ROSCOE CT	92123	4,136	9	6	0.01
44	THE RREEF FUNDS	7285 ENGINEER RD	92111	3,096	7	4	0.01
45	THE RREEF FUNDS	7345 RONSON RD	92111	3,147	7	4	0.01
46	THE RREEF FUNDS	9480 CHESAPEAKE DR	92123	3,964	9	6	0.01
47	TRAMMEL CROW COMPANY	8656 BALBOA AV	92123	5,333	12	8	0.01
Subtotal				202,205	464	288	0.41
Sub-area 3							
1	ASSOC FOR RETARDED CHILDR	3937 SHASTA ST	92109	3,001	7	4	0.01
2	BARTELL HOTEL	610 DIAMOND ST	92109	943	2	1	0.00
3	BELLA PACIFIC APARTMENTS	4853 BELLA PACIFIC RW	92109	4,696	11	7	0.01
4	CALTRANS	1695 EAST MISSION BAY DR	92109	6,800	16	10	0.01
5	CALTRANS	2081 EAST MISSION BAY DR	92109	9,147	21	13	0.02
6	CALTRANS	2675 EAST MISSION BAY DR	92109	7,324	17	10	0.02
7	CALTRANS	3553 DEL REY ST	92109	5,571	13	8	0.01
8	CALTRANS	4095 MISSION BAY DR	92109	4,861	11	7	0.01
9	CALTRANS	4890 PACIFIC HY	92110	5,779	13	8	0.01
10	CITY LIBRARY DEPT	4275 CASS ST	92109	3,250	7	5	0.01
11	L J ALTA COMMON COUNCIL#1	5901 CAMTO CARDELINA	92037	3,340	8	5	0.01
12	L J BEACH & TENNIS CLUB	2087 AVNDA DE LA PLAYA	92037	9,260	21	13	0.02
13	LA JOLLA COUNTRY CLUB	1252 WEST MUIRLANDS DR	92037	29,682	68	42	0.06

3.0 Recycled Water Market Assessment

Table 3-17 Continued

No.	Customer Name	Meter Address	Zip Code	Actual Annual Irrigation Demand			
				HCF	AFY	GPM	MGD
14	MOUNT LA JOLLA ASSOC	5420 CAMTO AGUA	92037	4,787	11	7	0.01
15	MOUNT LA JOLLA ASSOC	5565 CAMTO HERMINIA	92037	4,722	11	7	0.01
16	PARK & REC/COMM PARK I - KATE SESSIONS MEMORIAL PK	4999 SOLEDAD RD	92109	11,173	26	16	0.02
17	PARK & REC/COMM PARK I - KATE SESSIONS MEMORIAL PK	5115 SOLEDAD RD	92109	4,020	9	6	0.01
18	PARK & REC/COMM PARK I - SOLEDAD NATURAL PK	8818 TORREY PINES RD	92037	6,296	14	9	0.01
19	PARK & REC/DVLPD REG PRK - ELLEN BROWNING SCRIPPS PK	1168 COAST BL	92037	4,774	11	7	0.01
20	S D UNIF SCH DIST	1025 WEST MUIRLANDS DR	92037	3,236	7	5	0.01
21	S D UNIF SCH DIST	2475 GRAND AV	92109	14,075	32	20	0.03
22	SAN DIEGO HILTON	1771 EAST MISSION BAY DR	92109	14,450	33	21	0.03
23	SEAFORTH SPRTFSHNG	1717 QUIVIRA RD	92109	3,254	7	5	0.01
24	THE BISHOP'S SCHOOL	2150 BERYL ST	92109	4,809	11	7	0.01
25	WINDEMERE MGT CORP #2	6540 CAMTO SCIOTO	92037	3,360	8	5	0.01
26	WINDEMERE MGT CORP #2	6542 CAMTO CATALAN	92037	3,736	9	5	0.01
Subtotal				176,346	405	251	0.36
Outside of Sub-areas							
1	CALTRANS	1097 42ND ST	92105	20,387	47	29	0.04
2	CALTRANS	1249 44TH ST	92102-3615	15,794	36	22	0.03
3	CALTRANS	4330 HILLTOP DR	92102-3649	11,941	27	17	0.02
4	CALTRANS	4234 STANTON RD	92105-5211	11,816	27	17	0.02
5	CALTRANS	2275 RALENE ST	92105-5139	11,475	26	16	0.02
6	CALTRANS	1359 11TH AV	92101-4705	10,124	23	14	0.02
7	CALTRANS	CAB FWY&ONEID	92103	9,741	22	14	0.02
8	CALTRANS	4350 FEDERAL BL	92102	8,804	20	13	0.02
9	CALTRANS	3553 WILSON AV	92104-4428	8,370	19	12	0.02
10	CALTRANS	609 28TH ST	92102-3112	7,995	18	11	0.02
11	CALTRANS	3150 F ST	92102-3218	7,704	18	11	0.02
12	CALTRANS	559 CARLOS ST	92105	7,700	18	11	0.02
13	CALTRANS	3595 38TH ST	92105-2412	6,892	16	10	0.01
14	CALTRANS	3635 QUINCE ST	92104-4821	6,891	16	10	0.01
15	CALTRANS	1880 B ST	92102	6,707	15	10	0.01
16	CALTRANS	2978 38TH ST	92105-4011	6,690	15	10	0.01
17	CALTRANS	1401 EUCLID AV	92105-5425	6,378	15	9	0.01
18	CALTRANS	3702 CENTRAL AV	92105-2506	5,511	13	8	0.01
19	CALTRANS	4302 MARKET ST	92102	5,492	13	8	0.01
20	CALTRANS	3409 LANDIS ST	92104-3908	5,143	12	7	0.01
	CALTRANS	2298 G ST	92102	4,797	11	7	0.01
1	CALTRANS	0 UPAS&CABRILLO	92103	3,516	8	5	0.01
2	CALTRANS	1027 27TH ST	92102-1012	3,290	8	5	0.01
3	CALTRANS	1999 G ST	92103-1619	3,282	8	5	0.01
4	CALTRANS	4310 BOUNDARY ST	92104-1337	3,034	7	4	0.01
5	CITY LIBRARY DEPT	4375 WIGHTMAN ST	92105	8,110	19	12	0.02
6	CITY MT HOPE CEMETERY	3751 MARKET ST	92102	38,609	89	55	0.08

3.0 Recycled Water Market Assessment

Table 3-17 Continued

No.	Customer Name	Meter Address	Zip Code	Actual Annual Irrigation Demand			
				HCF	AFY	GPM	MGD
7	DOWNTOWN SD PARTNERSHIP	101 ISLAND AV	92101-6703	8,016	18	11	0.02
8	FRIEDRICK MANOR HOA	1831 WHALEY AV	92104-5755	3,049	7	4	0.01
9	HARBOR VISTA CONDO H O A	1667 PENTECOST WY	92105-5772	4,663	11	7	0.01
10	MARINA PARK CONDO ASSOC	748 STATE ST	92101-6019	3,684	8	5	0.01
11	MERCY HOSPITAL & MED CNTR	4081 05TH AV	92103-2105	3,185	7	5	0.01
12	PACIFIC LANDMARK HOTELS	391 HARBOR DR	92101-7709	22,966	53	33	0.05
13	PARK & REC/COMM PARK II	4388 THORN ST	92105	4,496	10	6	0.01
14	PARK & REC/COMM PARK II - CHOLLAS COMM PK	3250 JUANITA ST	92105-3807	4,587	11	7	0.01
15	PARK & REC/COMM PARK II - HOLLYWOOD PK	2301 SHAMROCK ST	92105	8,247	19	12	0.02
16	PARK & REC/COMM PARK II - CHOLLAS COMM PK	6350 COLLEGE GROVE DR	92105	72,898	167	104	0.15
17	PARK & REC/COMM PARK II - CHOLLAS COMM PK	6350 COLLEGE GROVE DR	92105	2,123	5	3	0.00
18	PARK & REC/COMM PARK II - DENNIS V ALLEN PK	800 BOUNDARY ST	92102	5,501	13	8	0.01
19	PARK & REC/COMM PARK II - PARK DE LA CRUZ	3603 38TH ST	92105-2413	3,724	9	5	0.01
20	PARK & REC/COMM PARK II - TERALTA NEIGHBORHD PK	4100 CENTRAL AV	92105-1404	3,453	8	5	0.01
21	PARK & REC/OPEN SPACE	3411 CAM DE LA PLAZA	92101	3,581	8	5	0.01
22	PARK & REC/OPEN SPACE - DENNIS V ALLEN PK	796 GATEWAY CENTER DR	92102-4532	3,282	8	5	0.01
23	PARK & REC/OPEN SPACE - NEAR MT HOPE CEM	207 36TH ST	92102-4403	3,488	8	5	0.01
24	PARK ROW COMMUNITY ASSOC	795 KETTNER BL	92101-5921	10,890	25	15	0.02
25	PRES JOHN ADAMS MANOR	5468 BAYVIEW HEIGHTS PL	92105-5859	4,544	10	6	0.01
26	PRES JOHN ADAMS MANOR	5405 BAYVIEW HEIGHTS PL	92105-5843	3,511	8	5	0.01
27	S D HOUSING COMMISSION	4285 JUNIPER ST	92105-4640	3,269	8	5	0.01
28	S D UNIF SCH DIST	1501 PARK BL	92101	3,092	7	4	0.01
29	S D UNIFD PORT DIST	1100 HARBOR ISLAND DR	92101-1042	4,401	10	6	0.01
30	S D UNIFD PORT DIST	490 EAST HARBOR DR	92101-7710	4,394	10	6	0.01
31	S D UNIFD PORT DIST	2601 NORTH HARBOR DR	92101	3,146	7	4	0.01
32	S D UNIFD PORT DIST	2602 NORTH HARBOR DR	92101	3,115	7	4	0.01
33	SAN DIEGO PADRES	100 PARK BL	92101-7405	4,929	11	7	0.01
34	SD CNTY REG AIRPORT AUTH	3675 NORTH HARBOR DR	92101-1022	7,816	18	11	0.02
35	SD CNTY REG AIRPORT AUTH	3498 NORTH HARBOR DR	92101	6,693	15	10	0.01
36	SD FAMILY HOUSING LLC	4043 HOME AV	92105-5611	7,865	18	11	0.02
37	SD FAMILY HOUSING LLC	4023 HOME AV	92105-5611	6,153	14	9	0.01
38	SD FAMILY HOUSING LLC	3415 BEECH ST	92102-1653	3,680	8	5	0.01
39	SHERATON HARBOR ISLAND	1378 HARBOR ISLAND DR	92101-1007	5,507	13	8	0.01
40	SHERATON HARBOR ISLAND	1590 HARBOR ISLAND DR	92101-1009	3,106	7	4	0.01
41	UPTOWN DISTRICT H O A	1258 CLEVELAND AV	92103-3302	3,451	8	5	0.01
Subtotal				496,698	1,140	707	1.02
Total Demand				1,508,963	3,464	2,147	3.09

Source: City of San Diego Data Processing Corp Potable Water Records from June 1, 2003 to May 31, 2004.

3.0 Recycled Water Market Assessment

The 2003 Draft Accelerated Beneficial Reuse Study identified additional markets in the CSA, which includes the following miscellaneous sites:

- University of San Diego 144 AFY (0.13 MGD)
- River Walk Golf Course 130 AFY (0.12 MGD)
- Tecolote Golf Course 109 AFY (0.10 MGD)
- Mercy Hospital 67 AFY (0.06 MGD)
- Kearny Mesa Community Park 50 AFY (0.04 MGD)
- Cal Mat 18 AFY (0.02 MGD)
- Friars Village HOA 15 AFY (0.01 MGD)

The estimated demand for CalMat was increased from 16 to 18 AY based on updated data from City Water Department. The seven potential customers above total an annual use of 533 AFY (0.50 MGD).

The total estimated annual demands for recycled water markets including NSA infill and additional customers in CSA are displayed in Table 3-18. The additional CSA (Balboa Park, Mission Bay Park, and miscellaneous sites) average day demand is 2,600 AFY (2.35 MGD). With the estimated “infill” in the NSA of 4,600 AFY (4.11 MGD), the total average annual demands are estimated at approximately 16,700 AFY (14.91 MGD). It should be noted that usage demands and additional customers from Table 3-17 are not incorporated into this total demand, since a proposed alignment is not established.

In 2010, the NCWRP sewer inflows are anticipated to reach 27 MGD and the maximum volume of recycled water produced would be 21 MGD. The total potential maximum day recycled water demand for the NSA and CSA is approximately 29 MGD. As a result, potential recycled water market demands identified within the NSA and CSA would exceed the NCWRP capacity in 2010 during peak irrigation periods.

**Table 3-18
Summary of Potential Recycled Water Demand
by Expansion of North City System to CSA**

Recycled Water Markets	Average Annual Demand		
	AFY	GPM	MGD
Previous Identified NSA Markets ¹	9,443	5,854	8.43
NSA Infill ²	4,606	2,855	4.11
Balboa Park ³	1,240	769	1.11
Mission Bay Park ⁴	860	533	0.77
Miscellaneous CSA Sites	533	330	0.48
Total Demand⁵	16,682	10,341	14.89

¹ Water demand estimate obtained from Table 3-5

² Water demand estimate obtained from Table 3-14

³ Balboa Park includes San Diego Zoo, golf course and recreational areas.

⁴ Mission Bay Park includes Mission Bay Golf Course and Campground, DeAnza, Playa Pacifica, Tecolote, and South Shores Parklands and Sea World

⁵ Demands shown are not total demand potential. Additional potential customers exist, as shown in Table 3-17.

3.0 Recycled Water Market Assessment

3.8 SOUTHERN SERVICE AREA

In order to update the recycled water demand for this analysis, previous market assessments were reviewed and water meter data for irrigation meters currently using potable water in the service area were obtained.

Past studies and recent water meter data obtained from SDDPC from June 1, 2003 to May 31, 2004 (included in Table 3-19) were used to update the potential recycled water demand. A recycled water planning study within the SSA is being prepared by Kimley-Horn & Associates concurrently with this market assessment study. The City has requested that the results of this initial market assessment for the SSA be further developed as part of the Kimley-Horn study.

**Table 3-19
SSA Recycled Water Markets Based on Private Irrigation Meter Demands**

No.	Customer Name	Meter Address	Zip Code	Actual Annual Irrigation Demand			
				HCF	AFY	GPM	MGD
1	CA PARK & REC 935-617618	2115 MONUMENT RD	92154-4128	16,371	38	23	0.034
2	CAL WEST ENT.	6963 ALCONA ST	92139-1214	4,942	11	7	0.010
3	CALIFORNIA TERRACES HOA	4870 SEA WATER LN	92154-6415	3,634	8	5	0.007
4	CALTRANS	3052 ALTA VIEW DR	92139-3312	13,423	31	19	0.028
5	CALTRANS	1304 BRIARWOOD RD	92139	8,874	20	13	0.018
6	CALTRANS	5999 TONAWANDA DR	92139-3640	8,809	20	13	0.018
7	CALTRANS	1489 PICADOR BL	92154	7,873	18	11	0.016
8	CALTRANS	202 CALLE PRIMERA	92173-2811	7,256	17	10	0.015
9	CALTRANS	3052 ALTA VIEW DR	92139-3312	7,186	16	10	0.015
10	CALTRANS	1729 ALAQUINAS DR	92173-1513	3,508	8	5	0.007
11	CANDLELIGHT APTS	1519 SATELLITE BL	92154-2737	3,357	8	5	0.007
12	CENTEX HOMES	4846 CARBINE WY	92154-4836	12,998	30	18	0.027
13	CINNAMON WOODS LLC	1371 27TH ST	92154-3287	4,048	9	6	0.008
14	CITY OF SAN DIEGO	2915 PALM AV	92154	11,966	27	17	0.025
15	CITY OF SAN DIEGO	2915 PALM AV	92154	11,836	27	17	0.024
16	CITY OF SAN DIEGO	2423 GROVE AV	92154-3148	4,236	10	6	0.009
17	CITY OF SD/MWWD	2411 DAIRY MART RD	92173	62,761	144	89	0.129
18	CITY OF SD/MWWD	2411 DAIRY MART RD	92173	54,853	126	78	0.112
19	CNTY OF S.D DPT GERN	2300 HOLLISTER ST	92154-4305	3,465	8	5	0.007
20	COMNAVBASE HSG CODE N73	1848 CORAL SEA RD	92139-1167	5,474	13	8	0.011
21	COMNAVBASE HSG CODE N73	1808 SEA STAR WY	92139-1176	5,018	12	7	0.010
22	COMNAVBASE HSG CODE N73	1797 ROCKY SHORE RD	92139-1016	4,476	10	6	0.009
23	COMNAVBASE HSG CODE N73	6032 SANDY SHORE CT	92139-1014	3,776	9	5	0.008
24	COMNAVBASE HSG CODE N73	6032 WAVE CT	92139-1006	3,709	9	5	0.008
25	COMNAVBASE HSG CODE N73	1796 PINE BLUFF LN	92139-1173	3,504	8	5	0.007
26	COMNAVBASE HSG CODE N73	2002 PELICAN HILL RD	92139-1151	3,219	7	5	0.007

3.0 Recycled Water Market Assessment

Table 3-19 Continued

No.	Customer Name	Meter Address	Zip Code	Actual Annual Irrigation Demand			
				HCF	AFY	GPM	MGD
27	COMNAVBASE HSG CODE N732	2034 MUNDA RD	92139	3,565	8	5	0.007
28	COR TER HOMEOWNER AN	2599 CAMTO ESPINO	92154-3251	3,364	8	5	0.007
29	DOLPHIN COVE MAINTENANCE	1291 RIVIERA SUMMIT RD	92154-4816	4,497	10	6	0.009
30	HILLSBOROUGH GREENS HOA	1581 MANZANA WY	92139-4023	3,616	8	5	0.007
31	HILLSBOROUGH GREENS HOA	2099 MANZANA WY	92139-4053	3,217	7	5	0.007
32	HILLSBOROUGH GREENS HOA	1910 MANZANA WY	92139-4026	3,062	7	4	0.006
33	HILLSBOROUGH MEADOWS HOA	2231 MANZANA WY	92139-4019	4,983	11	7	0.010
34	HILLSBOROUGH MEADOWS HOA	1323 MANZANA WY	92139-4045	4,967	11	7	0.010
35	HOME DEPOT #1034	950 DENNERY RD	92154-8471	1,480	3	2	0.003
36	HOME DEPOT #1034	950 DENNERY RD	92154-8471	210	0	0	0.000
37	IMPERIAL PALMS	802 HOLLISTER ST	92154-1334	3,052	7	4	0.006
38	IMPERIAL VILLA PROP	1435 ELDER AV	92154-1820	3,480	8	5	0.007
39	JR SOUTH BAY GOLF,INC	540 HOLLISTER ST	92154-4724	3,729	9	5	0.008
40	KAISER FOUNDATION HEALTH	4650 PALM (SB) AV	92154-8404	3,624	8	5	0.007
41	LEHBROS LIMITED FOR	555 SAN YSIDRO BL	92173-2356	4,029	9	6	0.008
42	MARINERS INVESTORS INC	6843 POTOMAC ST	92139-1143	3,242	7	5	0.007
43	MARION HIGH SCHOOL	1002 18TH ST	92154-1903	3,232	7	5	0.007
44	MERCEDES HILL HOA	1129 CAM REGALADO	92154-4641	3,294	8	5	0.007
45	PARDEE CONSTRUCTION	5043 OCEAN VIEW HILLS PY	92173	3,911	9	6	0.008
46	PARDEE CONSTRUCTION CO	306 DENNERY RD	92154	11,165	26	16	0.023
47	PARDEE CONSTRUCTION CO	256 DENNERY RD	92154	7,695	18	11	0.016
48	PARDEE CONSTRUCTION CO	1591 CORPORATE CENTER DR	92154	3,466	8	5	0.007
49	PARDEE CONSTRUCTION CO	452 BLACK CORAL WY	92154	3,259	7	5	0.007
50	PARK & REC/COMM PARK I	11454 BLUE CYPRESS DR	92134	10,949	25	16	0.022
51	PARK & REC/COMM PARK II	7449 TOOMA ST	92139	11,049	25	16	0.023
52	PARK & REC/COMM PARK II	751 FIRETHORN ST	92154-2634	6,923	16	10	0.014
53	PARK & REC/COMM PARK II	825 LYNDBURST TR	92154	5,219	12	7	0.011
54	PARK & REC/COMM PARK II	6531 OMEGA DR	92139	3,355	8	5	0.007
55	PARK & REC/COMM PARK II	3279 ANELLA RD	92173-5910	3,152	7	4	0.006
56	PARK & REC/OPEN SPACE	4895 OCEAN VIEW HILLS PY	92173	5,895	14	8	0.012
57	PATEL,MAYANK S	230 VIA DE SAN YSIDRO	92173-2909	176	0	0	0.000
58	PEERLESS CONSTRUCTION	1335 WOODMAN ST	92139-1281	2,796	6	4	0.006
59	R BWY DEV CO	850 BEYER WY	92154-2265	5,250	12	7	0.011
60	RANCHO DEL RIO	204 CALLE PRIMERA	92173-2822	15,853	36	23	0.032
61	REMINGTON HILLS HOA	1634 MASTERSON LN	92154-4803	7,830	18	11	0.016
62	REMINGTON HILLS HOA	4870 WYATT PL	92154-4831	3,274	8	5	0.007
63	RJ SOUTH BAY GOLF	540 HOLLISTER ST	92154-4724	3,660	8	5	0.008
64	ROBINHOOD RIDGE MASTER	5720 AVNDA DE LAS VISTAS	92154	4,846	11	7	0.010
65	ROBINHOOD RIDGE MASTER	5391 AVNDA DE LAS VISTAS	92154	3,964	9	6	0.008
66	ROBINHOOD RIDGE MASTER	6197 AVNDA DE LAS VISTAS	92173	3,881	9	6	0.008
67	ROBINHOOD RIDGE MASTER	6010 AVNDA DE LAS VISTAS	92154	3,110	7	4	0.006
68	ROBINHOOD RIDGE MASTER	6220 AVNDA DE LAS VISTAS	92154-5696	3,048	7	4	0.006

3.0 Recycled Water Market Assessment

Table 3-19 Continued

No.	Customer Name	Meter Address	Zip Code	Actual Annual Irrigation Demand			
				HCF	AFY	GPM	MGD
69	RVIP CA/WA/OR PROTFLO LLC	4476 CAM DE LA PLAZA	92173-3003	3,111	7	4	0.006
70	S D UNIF SCH DIST	2655 CASEY ST	92139-2989	1,249	3	2	0.003
71	S D UNIF SCH DIST	2655 CASEY ST	92139-2989	1,025	2	1	0.002
72	SAN YSIDRO SCHOOL DIST	4919 DEL SOL BL	92154-8488	4,631	11	7	0.009
73	SD PARK & REC. DEPT	2560 ELM AV	92154-1414	4,074	9	6	0.008
74	SO BAY UNION SCH DIS	2050 CORONADO AV	92154-2034	7,488	17	11	0.015
75	SO BAY UNION SCH DST	877 VIA TONGA CT	92154-2256	3,833	9	5	0.008
76	SUMMER BROOK	1571 ORO VISTA RD	92154-4005	5,387	12	8	0.011
77	SUNSET VILLAGE	3550 SUNSET LN	92173-4504	1,790	4	3	0.004
78	SWEETWATER UNION HIGH SCH	5353 AIRWAY RD	92154-4806	29,890	69	43	0.061
79	TERRACE GREEN I HOA	6950 APPIAN DR	92139-3304	3,461	8	5	0.007
80	THE LANDING LP	485 DENNERY RD	92154-8534	6,147	14	9	0.013
81	THE VILLAGE	2356 SERVANDO AV	92154-4430	2,178	5	3	0.004
82	TYNAN,VIRGINIA D	2220 MONUMENT RD	92154-4129	5,054	12	7	0.010
83	VALLEY BREEZE II	1370 ORO VISTA RD	92154-3191	3,762	9	5	0.008
84	WIMBLEDOM RAC CB APT	2988 ALTA VIEW DR	92139-3310	8,125	19	12	0.017
Total Water Demand				566,146	1,300	806	1.16

Source: Potable water demand data obtained from City of San Diego Data Processing Corporation from June 1, 2003 to May 31, 2004.

Potential Recycled Water Demand

The SSA lies south of the CSA from approximately City of Chula Vista to Mexico. The City of San Diego has a limited area within the South Bay where it is responsible for water service. California American Water Company (Cal-American) provides water service to the Imperial Beach and Coronado communities, the OWD provides water service to the eastern portion of the City of Chula Vista, the Otay Mesa area within the City of San Diego and parts of the County of San Diego and SWA provides water service to National City and the western portion of Chula Vista.

A review of water meter records identified the largest potable water users in this service area to be Cal-American, IBWC, SBWRP, US Naval Hospital and Caltrans. The total irrigation demand based on City water meter data by premise/rate code is approximately 1,300 AFY (1.16 MGD). Based on the codes for irrigation meters, the irrigation demand does not include Cal-American, IBWC and US Naval Hospital. In order to prioritize which customers are best suited for the City to target, further analysis of the list of potential recycled water customers with respect to their proximity to a proposed recycled water pipeline, infrastructure costs and retrofit costs should be evaluated.

Outside Agency Recycled Water Demands

In addition to the water meter data, OWD has signed a Reclaimed Water Sales Agreement, dated October 20, 2003, with the City of San Diego to purchase up to 5,847 AFY (5.2 MGD). Based on the OWD draft Water Resources Master Plan in July 2002, an ultimate demand of 7,100 AFY (6.34 MGD) was anticipated for the SSA and 2,100 AFY (1.89 MGD) in the Otay Mesa Service Area. The recycled water demands were projected by OWD in three phases: Phase I is a five-year period from now to 2006, Phase II is a ten-year period from 2007 to 2017 and Phase III is from 2017 to ultimate buildout. OWD currently operates a 1 MGD reclamation plant and needs supplemental recycled water from the SBWRP to meet these demands. The anticipated phasing of the demands is provided in Table 3-20 below.

**Table 3-20
OWD Recycled Water Average Annual Demands**

Phase	Central/680 Zone (MGD)	Central/944 Zone (MGD)	Otay Mesa/860 Zone (MGD)	Total (MGD)	Total (AFY)
Existing	0.65	1.68	0.11	2.44	2,735
2006	0.86	2.11	0.35	3.32	3,722
2017	1.33	2.89	0.83	5.05	5,661
Ultimate	2.28	4.06	1.89	8.23	9,226

The October 2003 Reclaimed Water Sales Agreement between the City and OWD states that OWD will accept recycled water by January 2007, unless parties agree that there has been an unforeseen construction delay. The Agreement stipulates that the City will provide an annual amount of recycled water up to 6 MGD to OWD, and may sell any of Otay’s unused capacity to other customers. OWD agrees to allow the City to utilize 1 MGD transmission capacity in the Otay’s transmission system to serve recycled water customers within the City.

Strategically, the City can reap benefits from promoting OWD’s plans to extend recycled water infrastructure through Otay Mesa, which lies within the City of San Diego and OWD’s service area. Otay Mesa is anticipated to have high growth over the coming years. Infrastructure located along the Mesa to supply OWD would provide the transmission facilities needed to maximize recycled use in the City’s portion of Otay Mesa. Coupled with the City’s draft mandatory reuse criteria, new development would be required to install the distribution infrastructure required to maximize the use of recycled water throughout Otay Mesa. Otay Mesa could thus become the City’s most comprehensive recycled water distribution system.

Sweetwater Authority (SWA) provides water service to National City and the western portions of Chula Vista. Currently they have no reclamation facilities but have expressed interest in purchasing recycled water from the City of San Diego. Duke Energy is in the planning stage to

3.0 Recycled Water Market Assessment

relocate and build a new plant that is located within the SWA service area and recycled water could be used as a source of process and cooling water at the new facility. In addition, SWA is also investigating the use of recycled water for irrigation and industrial uses. It is assumed that the SWA recycled water demands would be approximately 5.25 MGD, approximately 3.5 MGD of which would be non-seasonal, year-round demands associated with industrial use for Duke Energy.

The IBWC Wastewater Treatment Plant has requested use of recycled water from the SBWRP for process water. It is anticipated that the IBWC plant will require approximately 840 AFY (0.75 MGD). This demand will not be subject to seasonal fluctuation.

Caltrans has expressed interest in using recycled water for freeway landscape irrigation at the southern ends of I-5 and I-805 and the I-905 interchange.

Summary of SSA Market Assessment

The potential recycled water markets for the SBWRP are summarized in Table 3-21. Although subject to further refinement upon completion of the Kimley-Horn study, these demands were used to develop distribution system expansion opportunities in Section 4 of this report.

**Table 3-21
Summary of SSA Demands**

Recycled Water Market	Annual Demand	
	AFY	MGD
SBWRP	560	0.50
IBWC	840	0.75
OWD	5,847	6.00
SWA	5,880	5.25
Total	13,127	12.5

4.0 DISTRIBUTION EXPANSION OPPORTUNITIES

Based on the supply and market assessments provided in the previous sections, the opportunities to expand the City's recycled water distribution system were analyzed. This section provides a brief description of the City's current recycled water design criteria and planning level analysis of facilities required to extend the existing system within the NSA, CSA, and SSA.

4.1 DESIGN CRITERIA

The City of San Diego Water Department has issued CIP Guidelines and Standards for planning and design of water systems. These guidelines are issued as a series of Books. Recycled Water System Guidelines are included in Book 7 and were most recently updated in June 2001. The purpose of the guidelines is to ensure uniformity in design concepts, format, methodology, procedures, construction materials and quality of work products on recycled water improvement projects.

The City's requirements for off-site recycled water distribution facilities are provided in Chapter 2 of Book 7 and are summarized in Table 4-1 below. Design criteria in Book 7 was supplemented with Book 2 of CIP Guidelines and Standards, and Chapter 3D1 Reclaimed Water Transmission and Distribution System Guidelines.

In addition to Book 7, the City also requires that the off-site and on-site recycled water facilities conform to the requirements of the *Guidelines for Distribution of Nonpotable Water* developed by the AWWA California-Nevada Section, and the California Department of Health Services (CDHS) *Guidelines for Use of Reclaimed Water*. In June 2001, CDHS published the "Purple Book", a compendium of California Health Laws related to recycled water. The Purple Book contains excerpts from the Health and Safety Code, Water Code and Titles 22 and 17 of the California Code of Regulations.

4.0 Distribution Expansion Opportunities

**Table 4-1
Summary of Recycled Water Hydraulic Design Criteria**

Recycled Water Criteria	
Irrigation Time ⁽¹⁾	10 pm to 6 am (8 hours)
Pressure:	
Maximum Static (psi) ⁽¹⁾	125
Minimum Static (psi) ⁽²⁾	65
Minimum Operating (psi) ⁽¹⁾	50
Maximum Operating (psi) ⁽¹⁾	100
Typical Service Pressure Range (psi) ⁽³⁾	60 to 80
Pipelines:	
Maximum Velocity (fps) ⁽¹⁾	8 to 10
Desirable Velocity (fps) ⁽¹⁾	3 to 5
Maximum Allowable Headloss (ft/1000 ft) ⁽¹⁾	10
Hazen Williams Coefficient (C) ⁽¹⁾	120
Acceptable Materials ⁽³⁾	PVC colored purple by using Pantone 522 Alternative Pipe must be installed with warning tape secured to top of pipe
Minimum Horizontal Separation ⁽³⁾	10 feet from potable water or sewer pipeline CDHS Approval required for distances < 10ft Less than 4 ft is not allowed
Minimum Vertical Separation ⁽³⁾	1 foot below potable water pipeline 1 foot above sewer pipeline
Minimum Depth of Cover ⁽³⁾	3 ft
Operational Reservoir Storage: ⁽³⁾	Typically stores 2/3 Peak Day Demand May have potable water connections for emergency supply with approved air gap separation or CDHS-approved swivel ell connection
Pump Station – Minimum No. of Pumps: ⁽³⁾	3

⁽¹⁾ Recycled water design criteria are based on Chapter 3D1, Reclaimed Water Transmission and Distribution Guidelines.

⁽²⁾ Minimum Static Pressure of 65 psi is based on Book 2 of CIP Guidelines and Standards (June 2001)

⁽³⁾ Denotes design criteria based on Recycled Water Systems Guidelines in Book 7 of CIP Guidelines and Standards (June 2001)

4.2 PROPOSED DISTRIBUTION SYSTEM EXPANSIONS

The City successfully operates a recycled water program that currently reaches over 300 customers in the NCWRP service area. These customers use about 5 MGD of recycled water for non-potable purposes and more customers are scheduled to come on line in the near future as their on-site retrofits are completed. With the goal of reusing 12 MGD by 2010 from NCWRP, the City has several projects in various stages of development that would expand its distribution system beyond the “optimized” service area. As shown in Table 3-12, the existing demands and the Phase I and II projected demands total approximately 8.4 MGD. The deficit associated with meeting the 12 MGD goal is therefore approximately 3.6 MGD. Alternatives to extend the NSA system beyond the current Phase I and II expansions to meet the 2010 goal include:

- Smaller and more numerous extensions to meet the “infill” markets identified in Section 3.0 of this study,
- The Phase III pipeline, to serve large golf course demands in Rancho Bernardo and North Poway, and/or
- Extension of the pipelines into the CSA to serve larger users such as Mission Bay and Balboa Parks.

Another alternative includes the concept of building a water reclamation plant in Mission Valley to facilitate an independent recycled water distribution system in the City’s CSA.

In the South Bay, the City has negotiated to sell OWD up to 6 MGD of recycled water beginning with an estimated demand of 2.1 MGD in 2007. Design of the pipeline connection to OWD facilities is underway. Proposed expansion of this proposed pipeline to serve additional City customers in the SSA are also being considered.

Each of these alternatives are shown conceptually on Figure 4-1. An opinion of probable construction costs was completed for each alternative and provided in Appendix K. The unit cost curves used to develop unit prices for various recycled water facilities are also provided in Appendix K. It should be noted that the pipeline expansion costs include imported sand bedding and backfill, compaction, pavement removal, hauling, shoring, trench excavation, testing and disinfection plus engineering and administration, construction management and contingencies. Pavement replacement of half the street width, assumed to be 6-inches thick and 40 feet wide, is also included. In addition, it is estimated that to oversee the retrofits, City administration and processing costs would be approximately \$25,000 per site. An overview of each recycled water expansion alternative is provided at the end of this section in Table 4-7.

4.2.1 Expanded Service within the Existing NSA (infill)

Approaching infill customers within the NSA could allow the City to meet its 2010 goal of 12 MGD of recycled water beneficially used. In the NSA market assessment, over 400 potential customers were identified, of which, realistically, only a percentage will actually convert to recycled water. As shown in Table 4-2, approximately 148 sites within a quarter mile of the

4.0 Distribution Expansion Opportunities

existing and Phase I and II recycled water pipelines were targeted. These sites would have an estimated water demand (primarily for irrigation) of 3.7 MGD. There are numerous assumptions associated with this approach to reaching the 2010 goal, including the City's ability and resources to market and bring these potential customers on line. Less than 20 of these customers are subject to the City's proposed enforcement criteria for the MRO. The proposed criteria requires that water customers whose property lines are contiguous with the City's recycled water pipeline alignments and use 20 AFY or more for irrigation will be required to retrofit their sites for recycled water use.

**Table 4-2
NSA Potential Infill Customers**

Tier	Number of Potential Customers	Average Annual Demand		Maximum Day Demand		
		AFY	MGD	Peaking Factor	gpm	MGD
1	23 (see Table 3-7)	1,627	1.45	2	2,018	2.91
2	82 (see Table 3-8)	750	0.67	2	930	1.34
3	12 (see Table 3-9)	977	0.87	2	1,212	1.74
4	30 (see Table 3-10)	358	0.32	2	444	0.64
	UCSD (see Section 3.5.6)	400	0.36	2	496	0.71
	Subtotal	4,112	3.67		5,099	7.34

1. Tier 1 Markets are generally subject to the City's MRO, however, two Tier 1 customers (Miramar Air Station and Westview High School (Poway Unified School District)) are not.
2. Approximately 76 Tier 4 potential customers were identified, but it was assumed that only 50 percent of that demand would be captured. It was assumed that 30 customers (with a total average demand of 0.32 MGD) would be served.
3. This list of customers does not include Maintenance Assessment Districts (MADs), HOAs with special water rate codes, carwashes and laundromats, some schools and parks, and single-family residences. These customers may be located outside the distances associated with the Tiers, or do not represent very large demands. They are, however, addressed in the Market Assessment, Section 3.0 of this report.

The infrastructure associated with serving these potential customers that are within a quarter mile of existing and Phase I and II infrastructure is relatively minor. It was assumed that Tier 1 and Tier 2 customers and UCSD, who are directly adjacent, would tie into the recycled water distribution system as part of their on-site retrofit conversion. Tier 3 and Tier 4 customers are at most 1,320 feet from the recycled water distribution system, so the maximum distance was assumed for these 42 potential customers. It was also assumed that each customer would be served with an 8-inch PVC pipeline at a cost of \$189 per foot (\$23.6/inch-diameter/foot) for construction in paved public right of way. Costs include installation of materials including pipe, valves, blow off, and air and vacuum assemblies. Some of these potential customers are located along an existing pipeline that is only 6-inch in diameter and may require a parallel pipeline be installed to serve them. On-site retrofit costs for the proposed sites are estimated to be \$70,000 to \$80,000 per site, which would be borne by the customer. As provided in Appendix K, the opinion of cost estimated to serve Tier 1 through Tier 4 customers is anticipated to be approximately \$27 million not including on-site retrofit costs. The cost estimated to serve only Tier 1 and Tier 2 customers is \$6 million.

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4.2.2 Expanded Service to Rancho Bernardo (Phase III)

In December 2000, PBS&J prepared the *2000 Master Plan* for the City of San Diego. This Master Plan recommended a three-phase expansion of the North City distribution system. Phase I and Phase II included expansion of the system north on Black Mountain Road and then west into Carmel Valley. Phase III included recycled water service to the Rancho Bernardo area. Infrastructure in Phases I and II are currently under construction, in design phases, or completed.

To serve Phase III, the *2000 Master Plan* proposed an alignment paralleling the east side of I-15, then continuing north through Sabre Springs Parkway and the Carmel Mountain Ranch community to Rancho Bernardo. Concurrent with the *2000 Master Plan* preparation, the City also investigated the feasibility of redesigning the San Pasqual Reclamation Facility to service recycled water markets in the San Pasqual Valley and northern Rancho Bernardo and the Poway golf courses and to possibly integrate this system with the City's Phase III recycled water expansion project.

In June 2003, PBS&J prepared the *Phase 3 Recycled Water System Report* for the City. This analysis evaluated two alternative scenarios for providing recycled water to the Phase III service area via a new Carmel Valley Road alignment. Carmel Valley Road will be extended east from Black Mountain Road, to a connection with Camino del Norte and Bernardo Heights Road, both of which continue east to Rancho Bernardo. Scenario A provided service to just Rancho Bernardo and Poway, primarily to the golf courses. Scenario B included expanded service to the San Pasqual markets. A reservoir site adjacent to an existing potable water reservoir above Bernardo Heights Country Club, at an elevation of 920 feet, was determined to be able to accommodate a new recycled water reservoir with a maximum capacity of 2 million gallons (MG), however an estimated 3 to 4 MG of storage is needed to serve Phase III demands. Since June 2003, the City has determined that it is not feasible to rebuild the San Pasqual Water Reclamation Plant, and therefore an integrated system will not be constructed and the northernmost San Pasqual markets will not be included in the Phase III service area.

Prior to proceeding with design of the Carmel Valley Road alignment to serve Phase III, the City requested a comparison evaluation of three alignments:

- the original Master Plan Sabre Springs alignment;
- the proposed Carmel Valley Road alignment; and
- the Ted Williams Parkway (SR-56) alignment.

The April 2004 *Phase 3 Recycled Water Alignment and Reservoir Site Alternatives* study concluded that neither of these proposed alignments were superior to the Carmel Valley Road alignment (Alignment A Alternative). Alignment A, along Carmel Valley Road, would serve Phase III from the 825 Black Mountain Reservoir through a new pump station located adjacent to the reservoir which will boost the water up to the proposed 920 Zone reservoir at one (or possibly two) of the identified sites. The transmission main would follow Carmel Valley Road between Black Mountain Road and Bernardo Center Drive. This alignment offered the best

4.0 Distribution Expansion Opportunities

hydraulic operation within the Phase III system, although redundancy issues at the 825 Pump Station will continue to be of concern.

The markets served by the proposed Phase III facilities are listed in Table 4-3. These 21 potential customers have a total estimated recycled water demand of 2.5 MGD. To meet the 3.6 MGD needed to reach the 2010 goal of 12 MGD, another 1.1 MGD of demand is needed. This can be accomplished by implementing connections to the 23 Tier 1 customers (1.5 MGD) identified in the previous section. If Phase III were implemented following infill improvements, 870 AF of seasonal storage would be required to meet peak demands in the summer.

**Table 4-3
Phase III Recycled Water Customers**

No.	Customer	Avg Annual Demand		Max Day Demand		
		AFY	MGD	PF ⁽¹⁾	gpm	MGD
Rancho Bernardo (Phase III)						
1	Carmel Mtn Ranch GC	45	0.04	2	56	0.08
2	Carmel Mtn Ranch GC	253	0.23	2	314	0.45
3	Park & Rec Northern	86	0.08	2	107	0.15
4	Mass Mutual (Carmel Highlands GC)	153	0.14	2	190	0.27
5	TRW Military Electronics	45	0.04	2	56	0.08
6	Bernardo Hts CC	157	0.14	2	195	0.28
7	Rancho Bernardo HS	102	0.09	2	126	0.18
8	Lomas Bernardo HOA	102	0.09	2	126	0.18
9	Aetna Life Insurance	169	0.15	2	210	0.30
	Subtotal	1,112	1.0		1,379	1.99
Poway (Phase III)						
10	Stone Ridge/Maderas GCs	700	0.62	2	868	1.25
	Subtotal	700	0.6		868	1.25
Northern Rancho Bernardo (Phase III)						
11	Bernardo Hts 12 HOA	31	0.03	2	38	0.06
12	Community Assoc of Bernardo Hts	59	0.05	2	73	0.11
13	Caltrans at Bernardo Ctr. Dr.	78	0.07	2	97	0.14
14	RB Car Wash	9	0.01	2	11	0.02
15	Doubletree Club Hotel	4	0.00	2	5	0.01
16	Marriott's Remington Club	1	0.00	2	1	0.00
17	Remington Club	40	0.04	2	50	0.07
18	7 Oaks/Elite Management	2	0.00	2	2	0.00
19	Oaks North GC	280	0.25	2	347	0.50
20	Rancho Bernardo GC	250	0.22	2	310	0.45
21	Rancho Bernardo Inn GC	250	0.22	2	310	0.45
	Subtotal	1,004	0.9		1,245	1.79
	Total Phase III	2,816	2.5		3,492	5.0

⁽¹⁾ Peaking Factor (PF) is a multiple of Average Day Demand.

Source: Draft Beneficial Reuse Phase 3 Recycled Water Alignment and Reservoir Site Alternatives, April 2004

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Planning level costs for Phase III facilities were estimated to be in the range of \$50 million but may be reduced if pipeline improvements could be constructed in concert with road improvements to Carmel Valley Road. This alignment also appeared to have less of an impact on traffic and the environment than the other two alternatives. On-site retrofit costs for the 21 proposed sites were estimated to be \$70,000 to \$80,000 per site for a total retrofit cost of \$550,000.

4.2.3 Expanded Service to CSA

The CSA lies south of the NSA from approximately SR-52 to National City. The largest potential recycled water users in this service area are Balboa Park and Mission Bay Park. From a strategic planning approach, these markets would be targeted for conversion to recycled water service first due to the large demands associated with these City-owned parks.

The *2000 Master Plan* included an estimate of average annual recycled water use for Balboa Park of 1.2 MGD (1,300 AFY). City staff provided a more recent estimate, included as Attachment B, with a total demand of 1.1 MGD (1,240 AFY) and customer locations slightly different than previous efforts. This total demand includes the San Diego Zoo (640 AFY), the Balboa Park Municipal Golf Course (470 AFY) and recreational areas (130 AFY).

Estimates of average annual irrigation water use at Mission Bay Park, east of Mission Bay Drive, total 0.8 MGD (860 AFY) and include service to the Mission Bay Golf Course and Campground, DeAnza, Playa Pacifica, Tecolote, and South Shores Parklands and Sea World.

Review of the City's water meter records for irrigation meters in the CSA in 2003, included in Table 3-17, indicated that there are some additional potential recycled water markets in the vicinity of Balboa Park and Mission Bay Park. Additional markets could also be accessed depending on the route of the transmission main from SR-52 at Convoy Street to Balboa and Mission Bay Parks. The conceptual Balboa/Mission Bay Park infrastructure was aligned in local City streets. One potential concept worth further evaluation (provided this alternative warrants additional evaluation) is a longitudinal encroachment/joint pipeline with Caltrans. Obtaining the permit is difficult, as Caltrans does not encourage such facilities within their right-of-way. However, Caltrans does benefit from having recycled pipelines available to serve their landscaping needs. These 9 potential customers, listed in Table 4-4, have a total estimated recycled water demand of 2.4 MGD. To meet the 3.7 MGD needed to reach the 2010 goal of 12 MGD, another 1.2 MGD of demand is needed. This can be accomplished by implementing connections to the 23 Tier 1 customers (1.5 MGD) within the NSA or smaller infill customers may be captured within the CSA.

4.0 Distribution Expansion Opportunities

**Table 4-4
CSA Potential Recycled Water Customers**

No.	Customer	Avg Annual Demand		Max Day Demand		
		AFY	MGD	PF	gpm	MGD
1	Balboa Park	1,240	1.11	2	1,538	2.21
2	Mission Bay Park	860	0.77	2	1,066	1.54
3	University of San Diego	144	0.13	2	179	0.26
4	River Walk Golf Course	130	0.12	2	161	0.23
5	Tecolote Golf Course	109	0.10	2	135	0.19
6	Mercy Hospital	67	0.06	2	83	0.12
7	Kearny Mesa Community Park	50	0.04	2	62	0.09
8	Cal Mat	18	0.02	2	22	0.03
9	Friars Village HOA	15	0.01	2	19	0.03
10	Caltrans	150	0.13	2	186	0.27
	Subtotal	2,633	2.35		3,265	4.70

To serve the CSA from the NSA, a 10-mile extension of the 24-inch pipeline is proposed along Convoy Street to Linda Vista Road to Friars Road, west on Friars Road to Mission Bay Park, and east on Friars Road to Qualcomm Way. The pipeline would continue south on Texas, tunneling beneath the San Diego River and Interstate 8, to Balboa Park. Fortunately, these areas would conceptually be served by a 450 Balboa Park Zone and a 300 Mission Bay Zone, which could be served without pumping via the North City 640 Zone. Storage of recycled water for maximum day service in each of the new pressure zones will require a 2 million gallon reservoir in the vicinity of Balboa Park, and a 1 million gallon reservoir near Mission Bay Park.

If CSA expansion were to occur following infill and Phase III improvements, approximately 2,400 AF of seasonal storage would be required to meet peak demands.

A preliminary opinion of cost, included in Appendix K, for this NSA expansion to CSA concept was estimated to be approximately \$65 million. It is also assumed that reservoir locations would be located on existing City property within the Mission Bay and/or Balboa Parks. On-site retrofit costs for 8 of the 10 proposed sites were estimated to be \$70,000 to \$80,000 per site; however, Balboa Park and Mission Bay Park could be in the range of \$1 million each.

4.2.4 Independent Systems

The possibility of locating a new reclamation facility in the vicinity of potential customers was reviewed in Section 2.3, New Sources of Supply. This section discussed the use of an MBR plant to serve potential recycled water markets in the Central and San Pasqual Service Areas, where no supply of recycled water currently exists. An independent plant was considered to be located in Balboa Park, Mission Valley and the San Pasqual area. These plants are expensive to

4.0 Distribution Expansion Opportunities

construct and operate and thus are not economically feasible unless driven by the need to treat wastewater from these areas.

As presented in Section 2.3, MWWD is considering the future need for a 15 MGD recycled water facility located in Mission Valley by 2030. Based on discussions with MWWD staff, the need for this plant could be triggered by the City's need to meet mass emission reduction requirements at the regional Point Loma Wastewater Treatment Plant. Although a conventional reclamation treatment plant at the Camino Del Rio site was considered in 1990, technological advances in treatment processes indicate that a MBR plant may be more suitable. Information on MBR technology was briefly presented in Section 2.3. Further advances between now and 2030 may also dictate a change in design of the treatment process for this plant.

For the purposes of developing a conceptual project for an MBR plant in the CSA, the Mission Valley Camino del Rio North site was considered because of the availability of a large volume of wastewater via the North Mission Valley Trunk Sewer and the City's ownership of a site in the Mission Valley area that could accommodate a phased plant. To serve the CSA markets identified in Table 4-4 above, this Mission Valley Plant would have a capacity of 5 MGD, with opportunities to serve smaller customers along the pipeline route. Excess recycled water could be returned to the North Mission Valley Trunk Sewer or to the adjacent San Diego River as part of a live stream discharge/wetlands creation project. The planning level estimate of cost of this independent Mission Valley project would be approximately \$98 million of which approximately \$40 million is attributable to the treatment facility.

4.2.5 South Bay Expansion

Expansion of the distribution system in the SSA is primarily focused on regional opportunities with Otay Water District (OWD) and Sweetwater Authority (SWA). These opportunities are discussed in Section 4.2.6. However, there are opportunities to serve recycled water to nearby City customers and Caltrans. The City has contracted with the consulting firm Kimley-Horn to identify appropriate expansion opportunities in the South Bay area.

4.2.6 Regional Opportunities

In March 2002, the SDCWA published the *Regional Recycled Water System Study* that was considered to be the first step in identifying recycled water system alternatives that potentially utilized SDCWA and/or local agency facilities to provide a balance between recycled water demand and supply in San Diego County. As a result of the analysis, nine project strategies were developed. Two of the proposed strategies involved the City of San Diego.

The Escondido/Padre Dam/Helix/San Diego/Sweetwater Strategy included the utilization of the SDCWA First Aqueduct to send recycled water flows south from Escondido's Hale Avenue Resource Recovery Facility (HARRF) to Helix Water District, serving Padre Dam and the City of San Diego demands by converting the East Mission Gorge Interceptor for recycled water use. This strategy would yield over 14,000 AFY of recycled water use, at a cost of over \$74 million.

4.0 Distribution Expansion Opportunities

This report also considered service to the Tijuana Valley/Mexico area with 2.32 MGD of recycled water from either Padre Dam or Escondido. (It was assumed that OWD would be using all of the available supply from the SBWRP, thus none would be available to Tijuana Valley or Mexico.) This strategy would yield approximately 1,300 AFY of recycled water use at a cost of \$7.6 million. Neither of these strategies has been pursued by SDCWA.

The City of San Diego has also investigated regional opportunities and has secured agreements with the City of Poway, OMWD and OWD for the sale of recycled water. The following paragraphs discuss those agreements and additional opportunities.

North City Regional Opportunities

Since 1998, the City of San Diego has had an agreement with the City of Poway to provide recycled water via a metered connection at Scripps Poway Parkway. Based on that agreement, the City of San Diego would provide up to 750 AFY of recycled water to the City of Poway. Upon Poway's request, the City of San Diego would be obligated to expand its pumping capacity to provide an additional 450 AFY, however, Poway to date has not made that request. Typically, Poway has purchased approximately 700 AFY of recycled water from the City of San Diego to provide irrigation within the South Poway Business Park. Additional service to two golf courses in northern Poway would be available if Phase III facilities providing service to Rancho Bernardo were constructed.

In December 2004, the City approved an agreement with OMWD to provide recycled water via a metered connection at San Dieguito Road (part of the City's Phase I recycled water expanded facilities). The agreement allows OMWD to reserve 400 AFY of capacity in the City's NSA distribution system for a period of 20 years. As part of this agreement, the City has authorized OMWD to provide recycled water to a portion of Fairbanks Ranch Country Club that is in the City's service area, but is more conveniently served through OMWD's facilities. There may be additional possibilities to increase recycled water service to OMWD as well as the adjoining Santa Fe Irrigation District.

South Bay Regional Opportunities

The Otay Water District (OWD) provides water and wastewater service in south San Diego, including the City of Chula Vista, City of San Diego and unincorporated areas within San Diego County. Wastewater is conveyed to the City of San Diego facilities or the 1.3 MGD Ralph W. Chapman Water Recycling Facility. As previously mentioned in this study, in 2003 OWD agreed to purchase up to 6 MGD of recycled water from the City of San Diego's South Bay WRF by 2007. This recycled water will be used to supplement the District's existing recycled water supply to serve demands within the OWD service area. OWD is constructing portions of their master planned recycled water system as new subdivision projects are developed, as well as a pipeline connection to the City's SSA distribution system at Dairy Mart Road.

4.0 Distribution Expansion Opportunities

Sweetwater Authority (SWA) provides water service to National City and the western portions of Chula Vista. Currently they have no reclamation facilities but have expressed interest in purchasing recycled water from the City of San Diego. Duke Energy is in the process of replacing their plant that is located within the SWA service area and recycled water could be used as a source of process and cooling water at the new facility. In addition, SWA is also investigating the use of recycled water for irrigation and industrial uses.

4.2.7 Use of Seasonal Storage to Expand System

Use of seasonal storage for recycled water is not required until the peak demands on the system exceed the available supply. As discussed in Section 2.0 and shown in Figure 2-3, the maximum available supply of recycled water from the NCWRP is dependent on the availability of wastewater flows and number of EDR units available at the site. By 2010, it is assumed that there will be 27 MGD in wastewater flows to the plant and enough additional EDR units to produce a maximum of 24 MGD of recycled water (approximately 720 million gallons per month).

The recycled water demands were estimated in Section 2.0 and proposed alternative projects were described in the previous paragraphs of this Section 4.2. For the NSA, it was proposed that the City attempt to reach the infill customers to meet the 2010 goal of 12 MGD. These demands are shown in Table 4-5, below. With a maximum day demand of 24 MGD and a maximum supply of 24 MGD, no seasonal storage would be required. However, if the City attempts to expand the system into the Rancho Bernardo area (Phase III) and the CSA (Balboa and Mission Bay Parks) then the maximum day demand will exceed the 24 MGD of supply.

**Table 4-5
Projected Recycled Water Demands**

RW Demands	2005	2010	2015
Existing System	5.81	5.81	5.81
Phase I		1.72	1.72
Phase II		0.90	0.90
Infill Tier 1		1.45	1.45
Infill Tier 2		0.67	0.67
Infill Tier 3		0.87	0.87
Infill Tier 4		0.32	0.32
UCSD		0.36	0.36
Phase III			2.5
CSA			2.4
Total (MGD)	5.81	12	17
Max Day Demand (MGD)	11.62	24	34

4.0 Distribution Expansion Opportunities

To supplement the supply needed to meet maximum day demands, the City has two choices:

- Supplement supply with imported water
- Supplement supply with recycled water that was stored during winter months when there was excess recycled water supply (seasonal storage).

Figure 4-2, below, illustrates the need for supplementing water during the peak summer irrigation demands for recycled water. In 2010, the supply of recycled water meets the peak demand during the month of July. However, if the City expanded their customer base by 2015, increasing the average demand on the system to 17 MGD, there would be a need to supplement the recycled water supply in the summer months. Approximately 2,000 AF of seasonal storage or supplemental potable water would be required.

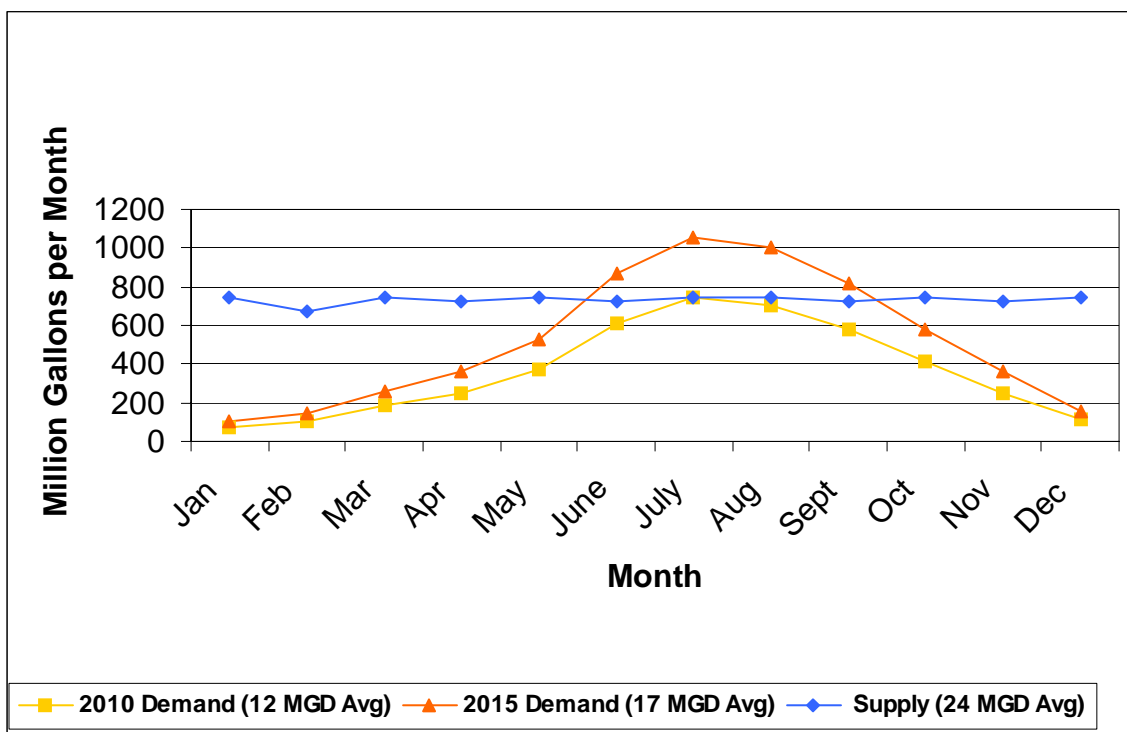


Figure 4-2 – Projected Recycled Water Supply and Demand

The benefit to expanding the system beyond the 12 MGD demand is that more recycled water is used during the rest of the year, thus increasing annual revenues from recycled water. The cost effectiveness of seasonal storage of recycled water versus supplementing with potable water is dependent on many factors: the type of seasonal storage used (surface water vs. groundwater), the annualized cost of constructing and operating seasonal storage facilities, as well as the current and future costs of potable water. In Section 2.5.3, it was estimated that construction of seasonal storage would cost in the range of \$900 per AF. Current potable water costs are in the range of \$700 per AF.

4.0 Distribution Expansion Opportunities

4.3 EVALUATION CRITERIA

This section provides a general evaluation of the use of recycled water through expansion of existing facilities, based on the water reuse values identified for the City's Water Reuse Study 2005. These values are presented in Table 4-6.

**Table 4-6
Evaluation Criteria for Assessment of Reuse Options**

Criterion	Objective	Performance Measure
Health and Safety	To protect human health and safety with regard to recycled water use	Meets or exceeds federal, state and local regulatory criteria for recycled water uses.
Social Value	To maximize beneficial use of recycled water with regard to quality of life and equal service to all socioeconomic groups	Comparison of beneficial uses and their effect on human needs and aesthetics, as well as public perception.
Environmental Value	To enhance, create or improve local habitat or ecosystems and avoid or minimize negative environmental impacts	Comparison of environmental impacts and/or enhancements, environmental impacts avoided, and permits required.
Local Water Reliability	To substantially increase the percentage of water supply that comes from water reuse, thereby offsetting the need for imported water	Increases percent of water recycling and improves local reliability.
Water Quality	Meets or exceeds level of quality required for the intended use and customer needs	To meet all customer quality requirements.
Operational Reliability	To maximize ability of facilities to perform under a range of future conditions	Level of demand met and opportunities for system interconnections and operational flexibility are addressed.
Cost	To minimize total cost to the community	Comparison of estimated capital improvement costs, operational costs, and revenues for each reuse opportunity, as well as comparison of estimated avoided costs such as future regional water and wastewater infrastructure costs and costs to develop alternative water supplies (e.g. desalination).
Ability to Implement	To evaluate viability or fatal flaws and assess political and public acceptability	Level of difficulty in physical, social or regulatory implementation.

4.3.1 Health and Safety

Human health and safety issues associated with human exposures to recycled water are discussed in a separate technical memorandum under the San Diego Water Reuse Study 2005. Generally, expansion of the City's existing recycled water system will be to serve Title 22 quality water to additional irrigation and industrial customers. Safeguards are in place to minimize human contact for this type of recycled water use and the City has safely delivered recycled water to irrigation and industrial customers since 1998. Expansion of the recycled water distribution system within any of the service areas will not entail any additional risk to human health and safety.

4.3.2 Social Value

Recycled water in San Diego has an impact on our quality of life through aesthetic enhancement of our environment even during times of drought. Non-potable water reuse generally enjoys widespread public acceptance in communities where it is practiced. Recycled water is also perceived as having value as a form of conservation of imported water to San Diego. Expansion of the existing recycled water system to customers currently not served will improve the social value as more of the San Diego community experiences the benefits of using this resource.

4.3.3 Environmental Value

Use of recycled water in San Diego brings environmental value to the community by reducing wastewater discharges to the ocean. As mentioned above, beneficial reuse of recycled water is also a form of conservation that improves the environment. Expansion of the existing recycled water system will maximize the use of recycled water available and, therefore, additionally reduces the discharge of wastewater to the ocean and maximizes the City's ability to conserve water.

4.3.4 Local Water Reliability

Use of recycled water for non-potable irrigation and industrial uses offsets the need to draw on the limited potable water supplies and thus decreases San Diego use of imported water. As more recycled water is beneficially used to offset potable water uses, the more local water reliability increases in San Diego. Expansion of the existing recycled water system to additional customers will provide additional local water reliability. It is the City's goal to be reusing 12 MGD of recycled water from the NCWRP by 2010. Implementing the Infill alternative will increase the use of recycled water from the NCWRP by 3.6 MGD up to a total of 12 MGD. The Phase III and CSA expansion alternatives, however, only add 2.5 MGD each to the demands. If either of these projects were implemented independently, additional demands would be required for these alternatives to meet the 12 MGD goal. This could be accomplished by adding the Tier 1 Infill demands (those subject to the MRO criteria) to the project alternatives. Maximizing use of recycled water available beyond 12 MGD and finding means of storing recycled water during

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off-peak demand or year round customers will also reduce San Diego's dependence on imported water and increase local water reliability.

4.3.5 Water Quality

To optimize recycled water use in San Diego, water quality regulations, as well as customer needs must be met. California Code of Regulations, Title 22 requirements prescribe levels of treatment required for health protection. Beyond those water quality requirements, certain uses have specific water quality needs. Since the existing system is currently in compliance with Title 22 regulations, expansion of the system will not affect the water quality required. Expansion of the existing recycled water system is also not anticipated to require additional treatment to meet potential customer needs.

4.3.6 Operational Reliability

For any reuse opportunity there are hydraulic considerations for the conveyance of recycled water to the point of use. In expanding the existing recycled water distribution system within the City of San Diego, hydraulic reliability is primarily associated with adherence to City recycled water design guidelines and the needs of the customer. Reliability in service and water quality are important. Adequate storage and service pressures to maintain service are integral with the design of the system. The location of the reservoirs and pump stations such that there is flexibility for future expansion should also be considered. Availability of a backup supply of water is critical in meeting customer needs. It is assumed that all expansion projects discussed in this section will be designed to meet City guidelines and provide operational reliability needed to meet the customer's needs.

4.3.7 Cost

Costs associated with expanding the recycled water system are primarily associated with the infrastructure needed to provide recycled water to new customers. Minimal additional infrastructure is required to provide service to "infill" customers, those customers that are already in close proximity to the existing system. However, those customers are generally small and numerous and significant costs may be associated with City staffing and resources to bring these customers on line. Alternatively, expansion of the system to reach large users such as golf courses would require a greater expenditure for infrastructure, but less on City resources to develop relationships with these larger, more knowledgeable customers. Costs associated with new treatment facilities are also significant and would likely involve cost sharing with MWW for the component of the plant that provides wastewater treatment. These facilities would also have much larger on-going operation and maintenance costs than a distribution system. Table 4-7 below provides a conceptual planning level opinion of cost for the alternatives discussed in this section and the approximate volume of recycled water to be used (yield) associated with the infrastructure proposed.

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**Table 4-7
Overview of Alternatives for Expansion of Recycled Water Facilities**

Criteria	Alternative		
	NSA Infill	Phase III to Rancho Bernardo plus Tier 1 Infill	Expansion to CSA plus Tier 1 Infill
Local Water Reliability Additional Demand Total Demand	3.7 MGD (4,144 AFY) 12.1 MGD Meets City goal of 12 MGD of reuse by 2010	4.0 MGD (4,424 AFY) 12.4 MGD Meets City goal of 12 MGD of reuse by 2010	3.9 MGD (4,312 AFY) 12.3 MGD Meets City goal of 12 MGD of reuse by 2010
Operational Reliability Add. Storage Required Add. Pumping Capacity Required Ability to Phase Project Additional Infill Markets Available Ability to Expand Infrastructure in Future	No No No, maximizes use of existing infrastructure No No	Yes, 3 MGD Yes No, large Markets are located at end of pipeline Yes, including large lot residential use Yes, to San Pasqual or Regional System use of First Aqueduct	Yes, 3 MGD No Yes, could construct infrastructure to Balboa Park separate from infrastructure to Mission Bay Park Yes Yes, could link to South Bay System or supplement system with new Mission Valley WRF
Ability to Implement Number of New Customers Congestion Impact on City Staff User Acceptability	148 Significant Requires significant staffing to support additional 148 customers Less than 20 customers subject to draft MRO criteria; may be difficult to sign up smaller customers	44 Significant Requires less support to add 44 additional customers 35 of 44 customers draft MRO criteria	33 Significant Requires least support to add 30 additional customers, including 2 significant City park customers 26 of 33 customers draft MRO criteria
Opinion of Cost Infrastructure Costs Retrofit Administration Costs Land/ROW Costs	\$27 million	\$52 million	\$67 million

4.3.8 Ability to Implement

Generally, expansion of the existing system will be relatively easy to implement, as there is precedent in the use of recycled water for non-potable uses in San Diego. Regulatory approvals will be minimal and public perception and acceptance should be optimal. Among the alternatives for expansion, however, some will be easier to implement than others due to geographical constraints. Certainly expanding recycled water use within the NSA to reach “infill” customers will require the least amount of infrastructure construction; however, extensive marketing and working with potential customers will be required to get them connected to the system. In contrast, expansion of the system in the NSA into Rancho Bernardo or south into the CSA requires significant infrastructure but targets large users, thus reducing the impact on the

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City's customer service staff. Any of these three opportunities could be implemented prior to 2010 for the City to meet its goal of 12 MGD of reuse.

Given that the City has established contractual relationships already with OMWD and OWD additional service to these neighboring water districts would require little additional effort. But a new, independent treatment facility in Mission Valley would require extensive permitting and infrastructure costs that may not be justified unless the City requires assistance in meeting its MER requirements at the Point Loma Wastewater Treatment Plant.

4.4 CONCLUSIONS

In order to meet the 2010 reuse goal, the City would need to implement one of the three alternatives listed on the previous page. In terms of the evaluation criteria discussed above, the proposed non-potable use, system expansion alternatives are generally equivalent in terms of Health and Safety, Social Value, Environmental Value and Water Quality. The remaining four criteria, Local Water Reliability, Operational Reliability, Cost and Ability to Implement for each alternative are summarized and compared in Table 4-7 on the previous page.

Expansion beyond the 2010 goal will be dependent on the City's ability to provide supplemental supply (either potable water or seasonally stored recycled water) or if the City pursues an indirect potable project that would use the excess recycled water available during winter months to supplement raw water drinking supplies within the City. These alternatives will be evaluated as part of the Water Reuse Study 2005.

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REFERENCES

- California Department of Health Services, The Purple Book: California Health Laws Related to Recycled Water, June 2001.
- California Department of Water Resources, Water Recycling 2030, 2003.
- Clean Water Program, Balboa Park Recycled Water Facilities Siting Analysis and Preliminary Design Report, December 1992.
- City of San Diego Recycled Water System Guidelines, December 2002.
- City of San Diego and MWH, Optimization of Various MBR Systems for Water Reclamation, Phase III, April 2004.
- Earth Tech, Recycled Water in Cooling Towers Final Report, April 2004.
- HYA Consulting Engineers, Mission Valley Water Reclamation Plant Evaluation Report, April 1992.
- Metropolitan Wastewater Department Engineering and Water Reclamation Division, Water Reclamation Master Plan Update, December 1997.
- Montgomery Watson, Update of the Reclaimed Water Market Assessment for the Southern Service Area, March 1995.
- Nolte and Associates, Recycled Water Distribution System Master Plan for the Northern Service Area, October 1992.
- Olson Communications, Recycled Water Customer Development Plan, December 2003.
- PBS&J, Draft Accelerated Implementation of Beneficial Reuse (Northern, Central and Southern Service Areas), February 2003.
- PBS&J, Beneficial Reuse - Phase 3 Recycled Water Alignment and Reservoir Site Alternatives (Northern Service Area), April 2004.
- PBS&J, Beneficial Reuse - Phase 3 Recycled Water System (Rancho Bernardo/North Poway/San Pasqual), June 2003.
- Powell & Associates, City of San Diego Updated Water Reclamation Master Plan, December 2000.

References

- Powell & Associates, Recycled Water Distribution System Master Plan for the Central Service Area, October 1992.
- Powell & Associates, Updated Water Reclamation Master Plan (Northern and Central Service Areas), December 2000.
- RBF Consulting, San Diego County Water Authority Regional Recycled Water System Study, March 2002.
- San Diego City Manager's Report No. 04-172, Recycled Water Mandatory Reuse Ordinance Criteria, July 28, 2004.
- San Pasqual Water Reclamation Program Master Plan, December 1998
- South Bay Agencies, Industries and Stakeholders, South Bay Reclaimed Water Business Plan, November 1998.
- Update of Reclaimed Water Market Assessment for the Northern Reuse Area, November 1994
- Water 3 Engineering, Inc., Southern San Diego Recycled Water Market Assessment Update, April 2001.