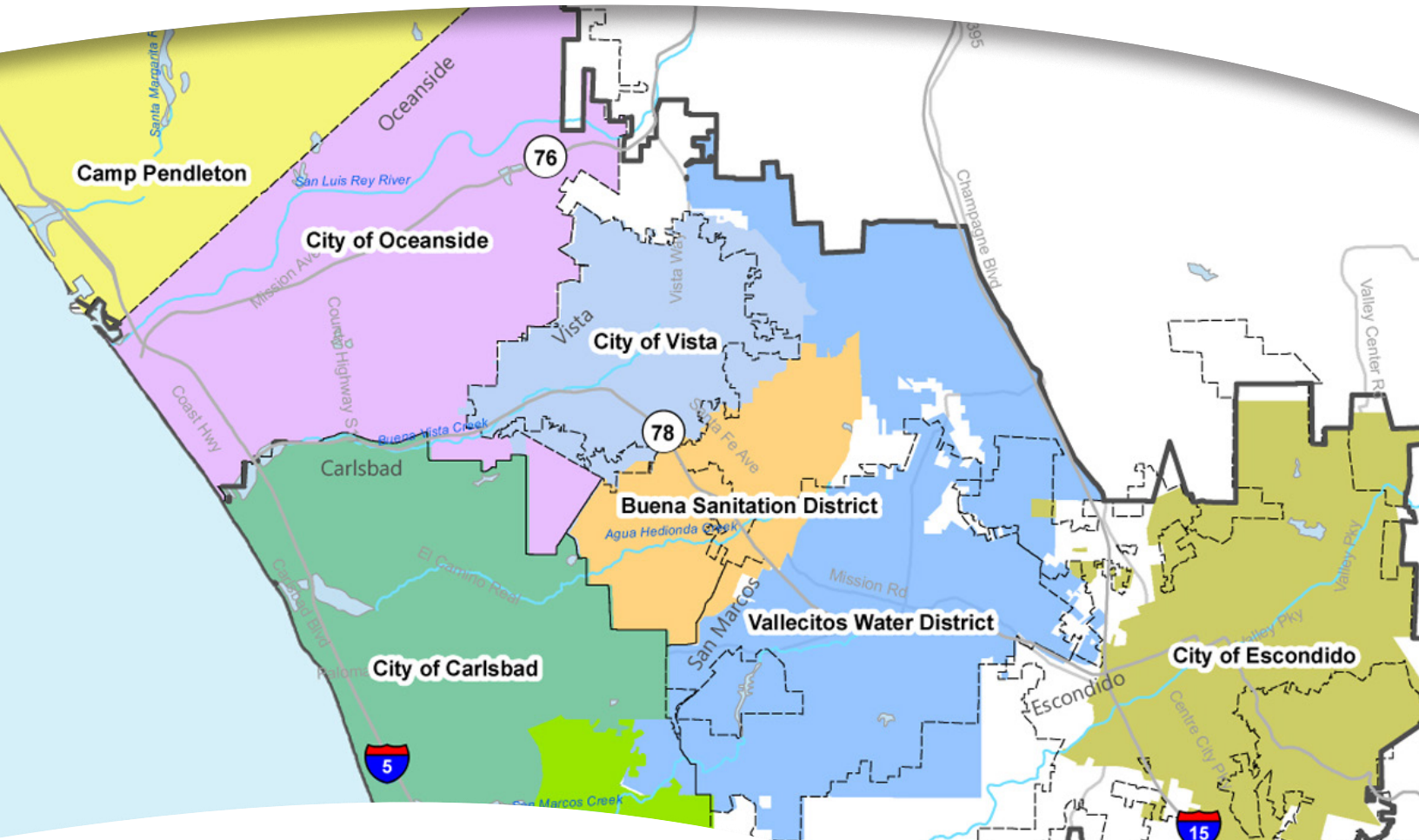
North San Diego County

Regional Recycled Water Project

May 2012

(Revised February 6, 2013)



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RMC
Water and Environment

North San Diego County Regional Recycled Water Project

Regional Recycled Water Facilities Plan

Prepared by:

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Water and Environment

May 2012
(REVISED FEBRUARY 6, 2013)

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Revisions

February 6, 2013:

- Page 3-5: Added missing description of the Gafner WRP

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Appendices

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List of Abbreviations

af	acre feet
afy	acre feet per year
AWWA	American Water Works Association
BPA	Basin Plan Amendment
BOD	biochemical oxygen demand
CDPH	California Department of Public Health
CIP	Capital Improvement Program
CIPP	Cured-in-place pipe
ft	feet
FY	fiscal year
GIS	Geographic Information System
gpm	gallons per minute
GMZ	Groundwater Management Zones
HDPE	high-density polyethylene
hp	horsepower
kWh/af	kilowatt-hours per acre-foot
IPR	Indirect Potable Reuse
LF	linear feet
MG	million gallons
mgd	million gallons per day
MND	Mitigated Negative Declaration
NEPA	National Environmental Policy Act
NPDES	National Pollutant Discharge Elimination System
NPR	Non-Potable reuse
psi	pounds per square inch
PVC	polyvinyl chloride
RWC	recycled water contribution
SRF	State Revolving Fund
SWRCB	California State Water Resources Control Board
TDS	total dissolved solids
TIN	total inorganic nitrogen
TSS	total suspended solids
USBR	United States Bureau of Reclamation
UV	ultraviolet
UWMP	Urban Water Master Plan
WDR	Waste Discharge Requirements
WRF	Water Reclamation Facility

Chapter 1 Introduction

1.1 Introduction

Southern California faces many water supply challenges. Droughts, climate change, population growth, and legal and environmental constraints combine to reduce or strain water supply reliability. Recycled water offers a reliable, drought-proof approach for augmenting local and imported supplies. Twelve agencies, which consist of the Olivenhain Municipal Water District (OMWD), Carlsbad Municipal Water District (Carlsbad MWD), San Elijo Joint Powers Authority (San Elijo JPA), Leucadia Wastewater District, City of Oceanside, City of Vista/Buena Sanitation District, Vista Irrigation District (VID), Vallecitos Water District, City of Escondido, Rincon del Diablo Municipal Water District, Santa Fe Irrigation District (SFID), and the United States Marine Corps Base Camp Pendleton, have joined together to develop this Regional Recycled Water Facilities Plan. This plan analyzes the recycled water facilities and demands for each agency to develop a regional project consisting of several different components.

1.2 Purpose of Report

This study is intended to assist the North San Diego County water and wastewater agencies in identifying the benefits of regionalization of existing and planned recycled water systems to further maximize the use of recycled water. Regionalization of facilities will allow recycled water to play an even more significant role in meeting the future water needs in the north San Diego County area. In 1998, four agencies, Olivenhain MWD, Carlsbad MWD, San Elijo JPA and the Leucadia Wastewater District received USBR Title XVI grant funds for the construction of various recycled water facilities within each of the north county agencies. The facilities that were included in that original regional effort have been constructed and are in use. As a result of these previous successes, a larger group consisting of twelve North County Agencies (Group) has been formed to investigate expanded use of recycled water within north San Diego County. The intent of this study is to identify new local and regional recycled water projects that will provide additional recycled water supplies to the local water agencies beyond what they could utilize individually.

1.3 Background and Previous Studies

In preparation of this study, the Group supplied many reports, drawings, data, and other documents. During progress meetings, the study team reviewed and discussed the existing system and facilities, previously studied projects, and current agency plans. Pertinent documents reviewed during the planning process include:

Camp Pendleton:

- Draft Urban Water Management Plan, August, 2010
- Camp Pendleton Water Resource Plan, April, 2011
- Recycled Water Master Plan, January, 2012
- Pilot Test – Recycled Water Injection to Control Against Sal Water Intrusion Lower Ysidora Sub-basin

Carlsbad Municipal Water District:

- Phase II Recycled Water Project Implementation Plan, April 2004
- Reclaimed Water Master Plan Update, October 1997
- Sewer Master Plan Update, March 2003
- Draft Sewer Master Plan Update, October 2009
- Phase II Recycled Water Project Implementation Plan, April 2004
- Encina JPA Phase II As-Built Drawings, 2005

City of Escondido:

- Hale Avenue Resource Recovery Facility, Recycled Water Quality, Production, Distribution Data

Leucadia Wastewater District (for Gafner Water Recycling Plant):

- North County Water Reclamation Project Phase II Master Plan, April 1997
- Initial Study for the North County Water Reclamation Project, June 1997
- Reclaimed Water Facilities Plan, May 1999
- Recycled Water Facilities Improvement Project, December 1999
- Recycled Water Production Evaluation (Draft), July 2010

City of Oceanside:

- Recycled Water Master Plan, October 2005
- Recycled Water Quality Reports, July 2010

San Elijo Joint Powers Authority:

- Recycled Water Optimization and Expansion Study, July 2005
- San Elijo Water Reclamation Facility Master Plan, December 2007

Santa Fe Irrigation District:

- Final Asset Management Master Plan, March 2009
- Recycled Water Master Plan, August 2005

Vallecitos Water District:

- Meadowlark WRP Tech Memo 3, Chapter 7 (2008 Master Plan Update), August 2009

Vista Irrigation District:

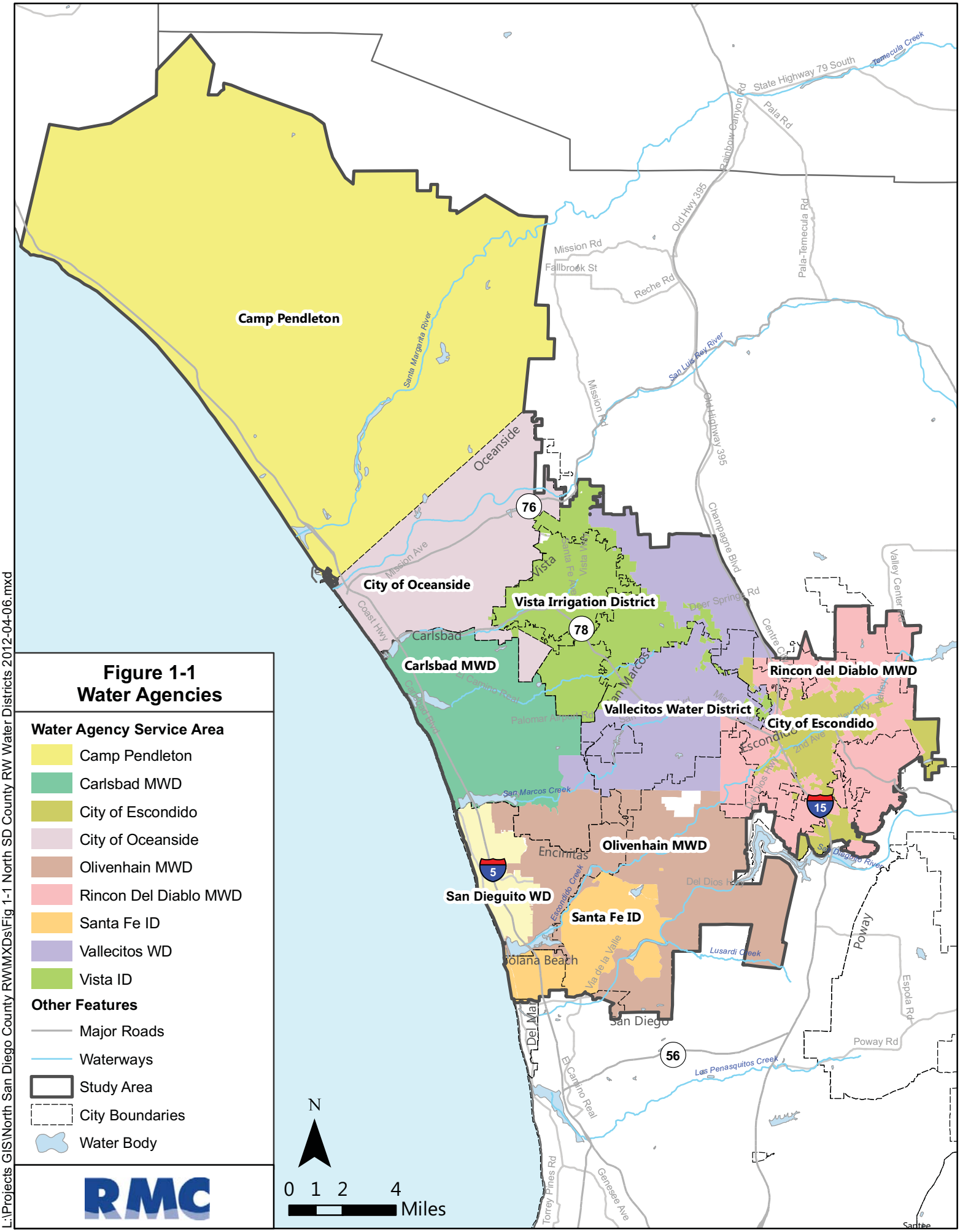
- Water Reclamation Master Plan, August, 1993

Appendix A contains a complete list of the documents and data collected as part of this review effort.

1.4 Study Area Description

North San Diego County is located along the Pacific Ocean in Southern California. The study area for this project, Phase II, consists of nine water agencies, as shown in **Figure 1-1.** The study area includes eight wastewater collection agencies as shown in **Figure 1-2**. The study area also includes seven cities and unincorporated areas of San Diego County as shown in both figures.

With respect to water resources, north San Diego County contains a number of regional agencies founded for the purpose of implementing regional wastewater systems and managing groundwater uses. These agencies include California Department of Public Health (CDPH), the San Diego Regional Water Quality Control Board (RWQCB – Region 9), and the San Diego County Water Authority. Additionally, there are several agencies that currently distribute and serve recycled water in the study area: Carlsbad Municipal Water District, City of Escondido, Leucadia Wastewater District, City of Oceanside, Olivenhain MWD, San Elijo JPA, Vallecitos WD, and Camp Pendleton. The Vista Irrigation District has not distributed any reclaimed water since the Shadowridge Reclamation Plant has been shut down.


Camp Pendleton
City of Oceanside
Vista Irrigation District
Carlsbad MWD
Rincon del Diablo MWD
Vallecitos Water District
City of Escondido
Olivenhain MWD
San Dieguito WD
Santa Fe ID
Oceanside
Vista
Carlsbad
Encinitas
Solana Beach
San Diego
Escondido
Poway
Santee
Santa Margarita River
San Luis Rey River
San Marcos Creek
Escondido Creek
Lusardi Creek
Los Penasquitos Creek
Temecula Creek
State Highway 79 South
Pala Rd
Rainbow Canyon Rd
Old Hwy 395
Pala-Temecula Rd
Mission Rd
Fallbrook St
Reche Rd
Mission Ave
Coast Hwy
El Camino Real
Palomar Airport Rd
Deer Springs Rd
Champagne Blvd
Centre City Pkwy
Valley Center Rd
2nd Ave
Del Dios Hwy
San Dieguito River
Via de la Valle
Del Mar
Poway Rd
Espola Rd
Torrey Pines Rd
Genesee Ave
76
78
5
15
56
Figure 1-1
Water Agencies
Water Agency Service Area
Camp Pendleton
Carlsbad MWD
City of Escondido
City of Oceanside
Olivenhain MWD
Rincon Del Diablo MWD
Santa Fe ID
Vallecitos WD
Vista ID
Other Features
Major Roads
Waterways
Study Area
City Boundaries
Water Body
RMC
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Miles
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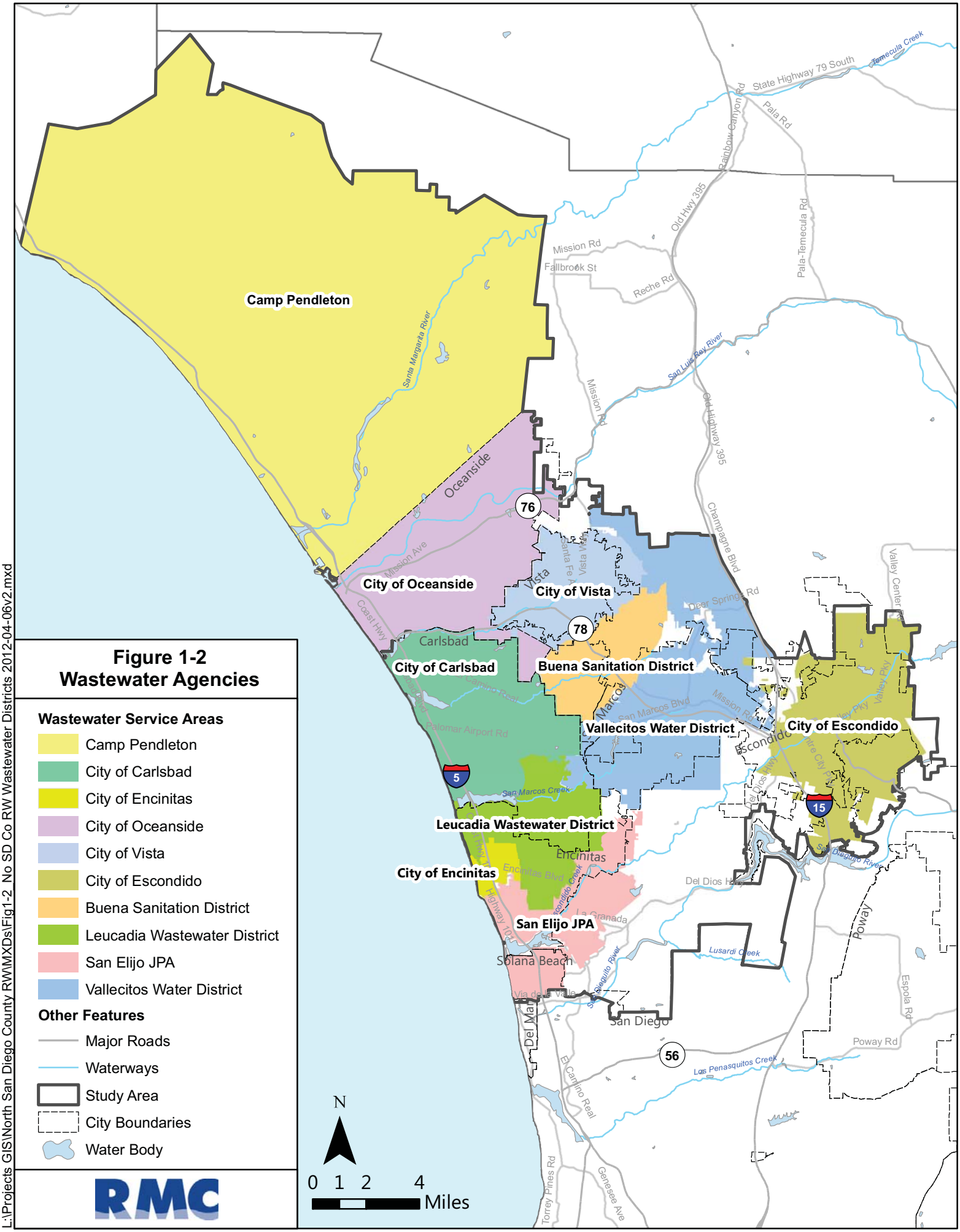
Camp Pendleton
City of Oceanside
City of Vista
City of Carlsbad
Buena Sanitation District
Vallecitos Water District
City of Escondido
Leucadia Wastewater District
City of Encinitas
San Elijo JPA
Oceanside
Vista
Carlsbad
Marcos
Escondido
Encinitas
Solana Beach
San Diego
Poway
Santa Margarita River
San Luis Rey River
San Marcos Creek
Escondido Creek
San Dieguito River
Lusardi Creek
Las Penasquitos Creek
Temecula Creek
State Highway 79 South
Pala Rd
Rainbow Canyon Rd
Old Hwy 395
Pala-Temecula Rd
Mission Rd
Fallbrook St
Reche Rd
Old Highway 395
Champagne Blvd
Deer Springs Rd
Valley Center Rd
Valley Pkwy
Mission Ave
Coast Hwy
Palomar Airport Rd
San Marcos Blvd
Encinitas Blvd
La Granada
Del Dios Hwy
Del Mar
El Camino Real
Torrey Pines Rd
Genesee Ave
Poway Rd
Espola Rd
76
78
5
15
56
Figure 1-2
Wastewater Agencies
Wastewater Service Areas
Camp Pendleton
City of Carlsbad
City of Encinitas
City of Oceanside
City of Vista
City of Escondido
Buena Sanitation District
Leucadia Wastewater District
San Elijo JPA
Vallecitos Water District
Other Features
Major Roads
Waterways
Study Area
City Boundaries
Water Body
RMC
N
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L:\Projects GIS\North San Diego County RW\MXDs\Fig1-2_No SD Co RW Wastewater Districts 2012-04-06v2.mxd

The following is a brief listing of the water and wastewater agencies located within the study area. These agencies can be categorized as water and wastewater agencies, although some agencies provide both services.

1.4.1 Water Agencies

Water agencies are institutional bodies whose functions include providing potable water for various uses. Water agencies also develop and maintain the recycled water systems to supply non-potable demands that help offset potable water needs. The following agencies, shown in **Figure 1-1**, provide water service within the overall study area:

- Camp Pendleton
- Carlsbad Municipal Water District
- City of Escondido
- City of Oceanside
- Olivenhain Municipal Water District
- Rincon del Diablo Municipal Water District
- San Dieguito Water District (represented by San Elijo JPA in the study)
- Santa Fe Irrigation District
- Vallecitos Water District
- Vista Irrigation District

1.4.2 Wastewater Agencies

Wastewater agencies are institutional bodies whose functions include providing and maintaining wastewater collection, treatment, and recycling or disposal of treated effluent. The following agencies, shown in **Figure 1-2**, provide wastewater management services within the overall study area:

- City of Vista / Buena Sanitation District
- Camp Pendleton
- City of Carlsbad
- City of Encinitas (represented by San Elijo JPA in the study)
- City of Escondido
- Leucadia Wastewater District
- City of Oceanside
- San Elijo Joint Powers Authority
- Vallecitos Water District

Chapter 2 Regulatory Considerations

2.1 Introduction

Recycled water quality must meet the standards set by the regulatory agencies as well as the requirements of the potential users. The State agencies with primary responsibility for regulating recycled water are the CDPH and the Regional Water Quality Control Boards (RWCQBs). CDPH requirements are focused on protecting public health, while the RWCQBs' requirements are to prevent degradation of surface waters and ground waters and protect their beneficial uses.

2.2 Basin Plans

The San Diego RWQCB (Region 9) has jurisdiction of water use within the study area. This RWQCB has adopted a Basin Plan that contains water quality objectives and designated beneficial uses for individual ground and surface water bodies. The Basin Plan reflects regional differences in existing water quality, the beneficial uses of the region's ground and surface waters and local water quality conditions and problems. The water quality objectives in the Basin Plans are implemented in the permits issued by the RWQCB for water reclamation and water reuse projects.

2.3 Reclamation and Discharge Permits

Permits containing water recycling requirements are issued by the RWQCB in consultation with CDPH for specific reuse projects. In some cases the water recycling permits are appended by the RWQCB to the waste discharge requirements of the facility's National Pollutant Discharge Elimination System (NPDES) permit. In the past, the RWQCB has issued permits with water recycling requirements to individual recycling facilities as well as individual users of recycled water. Now, the RWQCBs are issuing so-called "producer/user requirements" that regulate a single recycling facility and all of its users. Furthermore, in some cases a "master reclamation permit" is issued that applies to several reclamation facilities that are part of an interconnected regional system along with all of the users of that system.

Recycled water and discharge permits for treatment plants that serve this region are listed below in **Table 2-1**. **Table 2-2** summarizes the recycled water permit requirements for each of the water reclamation plants being considered in the study area.

Table 2-1: Discharge Permits in the Region

Agency	Treatment Plant	Waste Discharge Permit No.	Master Recycled Water Permit No.
Camp Pendleton	South Regional Tertiary Treatment Plant	R9-2008-0096	R9-2009-0021
Carlsbad MWD	Carlsbad Water Recycling Facility	2001-352	2001-352
City of Escondido	Hale Avenue Resource Recovery Facility	R9-2010-0032	R9-2010-0032
Leucadia Wastewater District	Gafner Water Reclamation Plant	R9-2004-0223	N/A
San Elijo JPA	San Elijo Water Reclamation Facility	R9-2010-0087	2000-10

Table 2-1: Discharge Permits in the Region

Agency	Treatment Plant	Waste Discharge Permit No.	Master Recycled Water Permit No.
City of Oceanside	San Luis Rey Wastewater Treatment Plant	93-07	N/A
City of Oceanside	La Salina Wastewater Treatment Plant	R9-2011-0016	N/A
Vallecitos Water District	Meadowlark Water Reclamation Plant	R9-2007-0018	N/A
Buena Sanitation District	Shadowridge Water Reclamation Facility[1]	93-82	N/A
City of San Diego	North City Water Reclamation Plant	97-03	N/A
Fairbanks Ranch Community Services District (CSD)	Fairbanks Ranch Water Pollution Control Facility (WPCF)	93-05	N/A
Ranch Santa Fe CSD	Rancho Santa Fe WPCF	92-04	N/A
Whispering Palms CSD	Whispering Palms WPCF	94-80	N/A
Fallbrook Public Utility District	Plant No. 1 and 2	91-39	N/A

Note: [1] Plant has since been shut down and may require new permit if it is restarted.

2.4 Hydrologic Units and Subunits

The north San Diego County study area generally drains to the west toward the Pacific Ocean. This area is located within four major hydrologic units. These hydrologic units include portions of the Santa Margarita, San Luis Rey, Carlsbad and San Dieguito Hydrologic Units. All three hydrologic units are the responsibility of the San Diego RWQCB (Region 9) and are shown in **Figure 2-1**.

Camp Pendleton overlies the Santa Margarita Hydrologic and San Juan Units. The City of Oceanside, Vista Irrigation District and Vallecitos Water District overlie the San Luis Rey Hydrologic Unit. This unit is further divided into hydrologic areas, with the Lower San Luis Rey Hydrologic Area being overlain by the three agencies.

All the agencies, except Camp Pendleton, overlie the Carlsbad Hydrologic Unit (904.00). The unit is further subdivided into nine hydrologic areas, with each being overlain by at least one agency.

The Santa Fe Irrigation District, San Elijo JPA, Olivenhain MWD, City of Escondido and Rincon del Diablo MWD overlie the San Dieguito Hydrologic Unit (905.00). This unit is further divided into hydrologic areas, with the Solana Beach, Hodges and San Pasqual hydrologic areas being overlain by the five agencies.

Table 2-2: Summary of Permit Requirements

Agency	Treatment Plant	Daily Maximum (mg/l)								
		TDS	Cl	SO4	%Na	Fe	Mn	NO3	Boron	Fl.
Camp Pendleton	Southern Regional TTP	N/A	325	325		0.30	0.05	N/A	0.60	0.7
Carlsbad	Carlsbad WRF	1,200	400	400		0.40	0.06		0.75	
Escondido	Hale Avenue RRF				60					
Leucadia WWD	Gafner WRP	1,200	500			0.40	0.06		0.06	
San Elijo JPA	San Elijo WRF	1,300	450	450						
Oceanside	San Luis Rey WWTP	1,300	400	400				50		
Vallecitos MWD	Meadowlark WRP	1,500	500			0.40	0.06		0.60	
Buena Sanitation	Shadowridge WRP	1,200	350	400		0.40			0.60	
San Diego	North City WRP									
Community SD	Fairbanks Ranch WRP	1,500	600	600	65	1.00	0.20		0.60	1.2
Community SD	Rancho Santa Fe WRP	1,500	500	500	65	1.00	0.20		0.60	1.2
Community SD	Whispering Palms WRP	1,200	500	500		1.00	0.20	50	0.60	1.2
Fallbrook PUD	Fallbrook WRP	1,500	500	500	60	1.00	0.20		0.60	1.0

Agency	Treatment Plant	30-day Average (mg/l)								
		TDS	Cl	SO4	%Na	Fe	Mn	NO3	Boron	Fl.
Camp Pendleton	Southern Regional TTP	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Carlsbad	Carlsbad WRF		350			0.30			0.75	
Escondido	Hale Avenue RRF									
Leucadia WWD	Gafner WRP	1,200	500			0.40	0.06		0.06	
San Elijo JPA	San Elijo WRF									
Oceanside	San Luis Rey WWTP							45		
Vallecitos MWD	Meadowlark WRP									
Buena Sanitation	Shadowridge WRP									
San Diego	North City WRP									
Community SD	Fairbanks Ranch WRP	1,300	500	500	65	0.85	0.15		0.50	1.0
Community SD	Rancho Santa Fe WRP				65	0.85	0.15		0.50	1.0
Community SD	Whispering Palms WRP	1,100	350	350		0.85	0.15	45	0.50	1.0
Fallbrook PUD	Fallbrook WRP				60	0.85	0.15		0.60	1.2

Agency	Treatment Plant	12-Month Average (mg/l)								
		TDS	Cl	SO4	%Na	Fe	Mn	NO3	Boron	Fl.
Camp Pendleton	Southern Regional TTP	750	300	300		0.30	0.05	10.00	0.75	1.0
Carlsbad	Carlsbad WRF	1,100		350		0.30	0.05		0.75	1.0
Escondido	Hale Avenue RRF	1,000	300	350	60	0.50	0.20		0.75	2.0
Leucadia WWD	Gafner WRP	1,200	500			0.40	0.06		0.06	
San Elijo JPA	San Elijo WRF	1,200	400	400		0.30	0.15		0.75	1.0
Oceanside	San Luis Rey WWTP	1,200	350	350		0.30	0.15		0.50	1.0
Vallecitos MWD	Meadowlark WRP	1,100	400			0.30	0.05		0.50	
Buena Sanitation	Shadowridge WRP		300	350		0.30	0.07		0.50	1.0
San Diego	North City WRP	1,200	300	300		0.30	0.05		0.70	
Community SD	Fairbanks Ranch WRP									
Community SD	Rancho Santa Fe WRP									
Community SD	Whispering Palms WRP									
Fallbrook PUD	Fallbrook WRP									

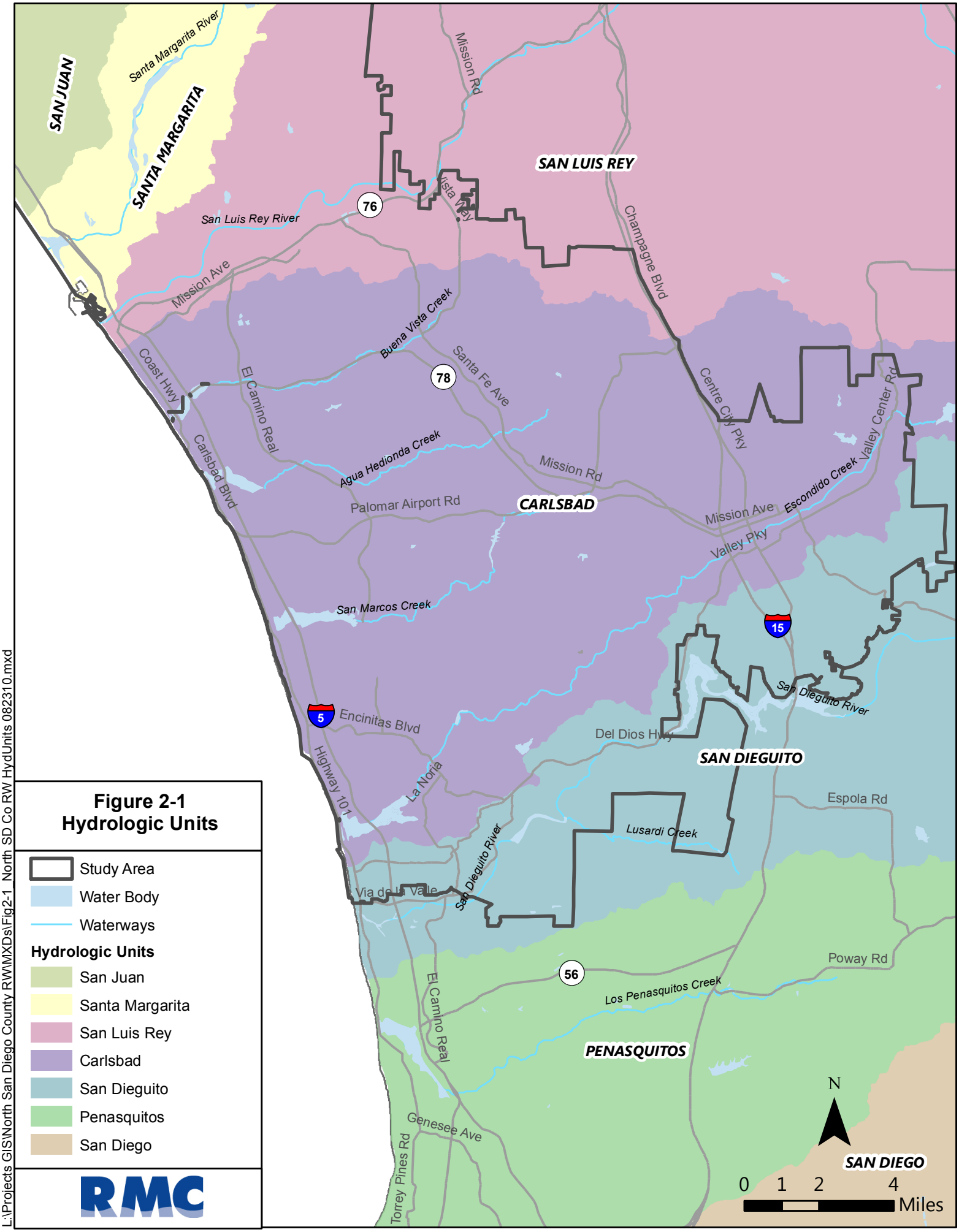

Figure 2-1
Hydrologic Units

- Study Area
- Water Body
- Waterways

Hydrologic Units

- San Juan
- Santa Margarita
- San Luis Rey
- Carlsbad
- San Dieguito
- Penasquitos
- San Diego

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2.5 Groundwater Quality Objectives

Water quality objectives for surface and ground waters are adopted by the RWQCBs for specific drainage basins. The following discussion focuses on the objectives set to protect groundwater quality, since these objectives typically dictate recycled water quality requirements. Surface water was not addressed as part of this study as none of the wastewater plants currently discharge or serve recycled water to surface water bodies.

Each sub unit of each of the four hydrologic units has individual water quality objectives. **Table 2-3** lists the groundwater quality objectives from the basin plans for each of the subunits. The groundwater quality objective for total dissolved solids (TDS) is of primary concern with regard to reclamation because conventional treatment does not remove TDS. TDS levels in recycled water are most impacted by the TDS concentration of the potable water used in the area. For most irrigation uses, it is desirable to have a TDS concentration under 900 mg/l. However, concentration limits below 1,000 mg/l for TDS can be difficult to achieve for those agencies largely dependent on water imported from the Colorado River. **Figure 2-2** shows the hydrologic sub units and the TDS objectives of each of their underlying groundwater basins within the study area.

Table 2-3: Groundwater Quality Objectives

Hydrologic (Sub) Area	Basin Unit No.	Water Quality Objective (mg/l)								
		TDS	Cl	SO4	%Na	Fe	Mn	NO3	Boron	Fl.
Ysidora HA	**902.10**	**750**	**300**	**300**	**60**	**0.03**	**0.05**	**10**	**0.75**	**1.0**
Lower San Luis HA	**903.10**	**800**	**300**	**400**	**60**	**0.03**	**0.05**	**10**	**0.75**	**1.0**
Mission HSA	903.11	1,500	500	500	60	0.85	0.15	45	0.75	1.0
Bonsall HSA	903.12	1,500	500	500	60	0.85	0.15	45	0.75	1.0
Buena Vista Creek HA	**904.20**									
El Salto HSA	904.21	3,500	800	500	60	0.30	0.05	45	2.00	1.0
Vista HSA	904.22	1,000	400	500	60	0.30	0.05	10	0.75	1.0
Agua Hedionda HA	**904.30**	**1,200**	**500**	**500**	**60**	**0.30**	**0.05**	**10**	**0.75**	**1.0**
Los Monos HSA	904.31	3,500	800	500	60	0.30	0.05	45	2.00	1.0
Buena HAS	904.32	1,200	500	500	60	0.30	0.05	10	0.75	1.0
San Marcos HA	**904.50**	**1,000**	**400**	**500**	**60**	**0.30**	**0.05**	**10**	**0.75**	**1.0**
Batiquitos HSA	904.51	3,500	800	500	60	0.30	0.05	45	2.00	1.0
Richland HSA	904.52	1,000	400	500	60	0.30	0.05	10	0.75	1.0
Twin Oaks HSA	904.53	1,000	400	500	60	0.30	0.05	10	0.75	1.0
Escondido Creek HA	**904.60**	**750**	**300**	**300**	**60**	**0.30**	**0.05**	**10**	**0.75**	**1.0**
San Elijo HSA	904.61	2,800	700	600	60	0.30	0.05	45	1.00	1.0
Escondido HSA	904.62	1,000	300	400	60	0.30	0.05	10	0.75	1.0
Solana Beach HA	**905.10**	**1,500**	**500**	**500**	**60**	**0.85**	**0.15**	**45**	**0.75**	**1.0**
San Marcos HA	**904.50**	**1,000**	**400**	**500**	**60**	**0.30**	**0.05**	**10**	**0.75**	**1.0**

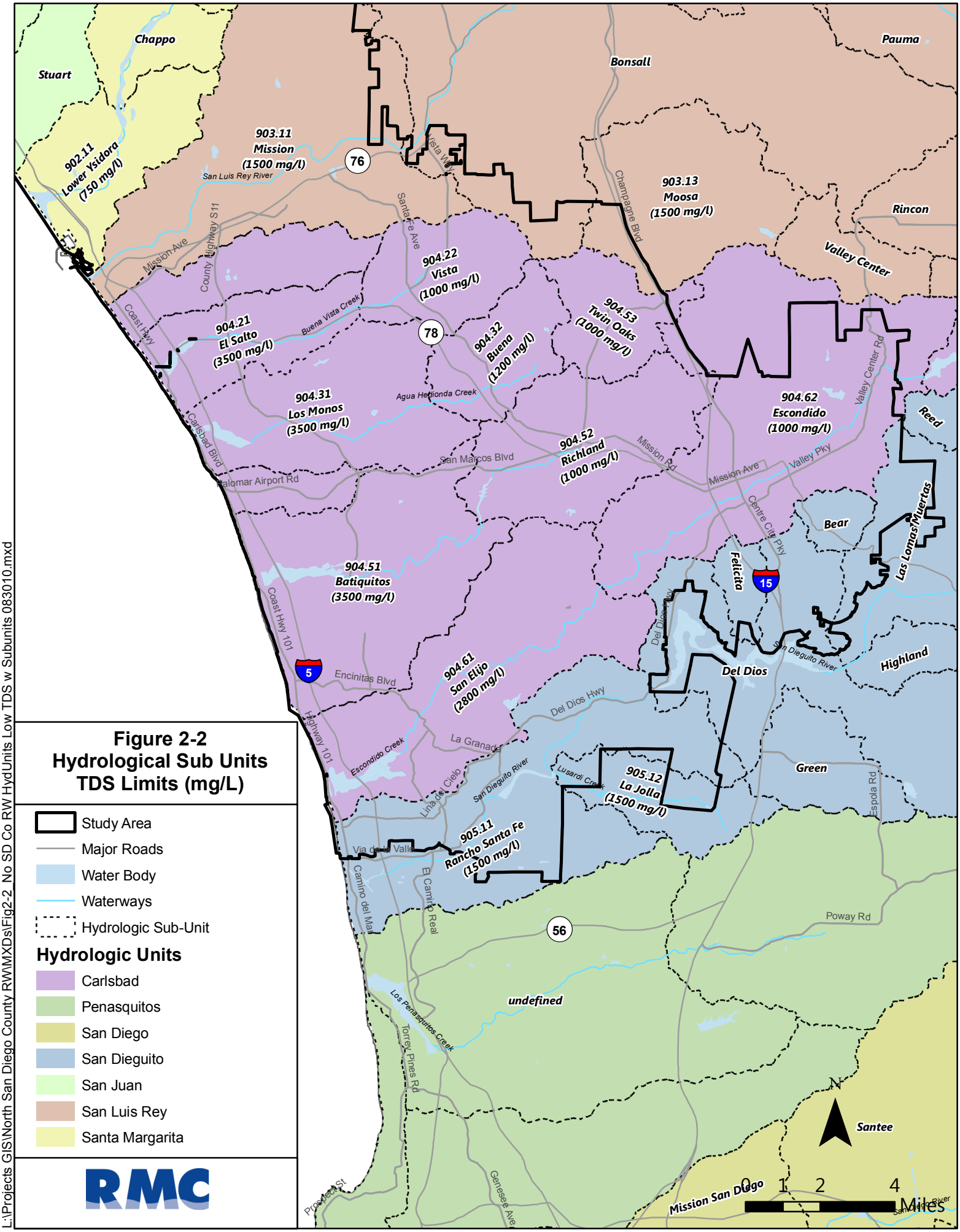

Figure 2-2
Hydrological Sub Units
TDS Limits (mg/L)

- Study Area
- Major Roads
- Water Body
- Waterways
- Hydrologic Sub-Unit

Hydrologic Units

- Carlsbad
- Penasquitos
- San Diego
- San Dieguito
- San Juan
- San Luis Rey
- Santa Margarita

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2.6 Comparison of Groundwater Objectives, Permit Conditions and Water Quality

Table 2-4 shows a comparison of the current recycled water permits, recycled water quality, and groundwater objectives for each sub-basin by treatment plant within the study area. Only the 12-month average permit requirement is shown for each treatment plant as it is typically the most restrictive water quality requirement and is typically the basis for treatment process considerations. This table will be used during the development of alternatives as the basis for examining any potential water quality concerns of inter-agency or regional projects. Where differences in plant effluent or recycled water permit qualities differ from basin plan objectives, potential additional treatment or permit adjustments will be considered.

As reflected in this table, distribution of recycled water from some sources to agency or sub-basin areas may exceed the basin plan objectives for TDS and manganese. For example, the current TDS levels of the recycled water from the Gafner WRP (1,076 mg/l), San Elijo WRF (1,132 mg/l), and San Luis Rey WWTP (1,009 mg/l) exceed the basin plan objectives of 1,000 mg/l for the Vista and San Marcos sub-basins. The Carlsbad WRP currently serves recycled water in both of these sub-basins. Similarly, the manganese levels of the recycled water from the Gafner WRP and San Elijo WRF exceed those for sub-basins currently being served recycled water by Carlsbad, Vallecitos and Buena Sanitation. If recycled water is to be distributed regionally to sub-basins with basin plan objectives below current recycled water qualities, then permit adjustments, additional treatment, or blending options would need to be considered.

Table 2-4: Comparison of Recycled Water Quality, Permit Requirements, and Groundwater Quality Objectives

Agency	Treatment Plant	Current Water Quality Vs. Permit and Basin Limits	Water Quality Parameter								
			TDS	Cl	SO4	%Na	NO3	Fe	Mn	Boron	Fl.
			Average Annual Water Quality								
			Permit: 12-Month Average (mg/l)								
Camp Pendleton[1]	**Southern Regional TTP**	**Average Annual Water Quality**	**808**	**165**	**210**	**115**	**2**	**< 0.1**	**< 0.02**	**-**	**0.36**
		Permit (Ysidora listed)	**750**	**300**	**300**	**60**	**10**	**0.30**	**0.05**	**0.75**	**1.0**
		Ysidora HAS (902.10)	750	300	300	60	10	0.30	0.05	0.75	1.0
		Mission HSA (903.11)	1,500	500	500	60	45	0.85	0.15	0.75	1.0
Carlsbad	**Carlsbad WRP**	**Average Annual Water Quality**	**965**	**265**	**-**	**-**	**-**	**-**	**-**	**0.40**	**-**
		Permit	**1,100**		**350**			**0.30**	**0.05**	**0.75**	**1.0**
		El Salto HSA (904.21)	3,500	800	500	60	45	0.30	0.05	2.00	1.0
		Los Monos HSA (904.31)	3,500	800	500	60	45	0.30	0.05	2.00	1.0
		Encinas HA (904.40)	3,500	800	500	60	45	0.30	0.05	2.00	1.0
		San Marcos HA (904.50)	1,000	400	500	60	10	0.30	0.05	0.75	1.0
		Batiquitos HSA (904.51)	3,500	800	500	60	45	0.30	0.05	2.00	1.0
Escondido	**Hale Avenue RRF**	**Average Annual Water Quality**	**933**	**206**	**245**	**-**	**-**	**0.08**	**0.06**	**0.36**	**0.73**
		Permit	**1,000**	**300**	**350**	**60**		**0.50**	**0.20**	**0.75**	**2.0**
		Richland HSA (904.52)	1,000	400	500	60	10	0.03	0.05	0.75	1.0
		Escondido HSA (904.62)	1,000	300	400	60	10	0.03	0.05	0.75	1.0
		Del Dios HSA (905.21)	1,000	400	500	60	10	0.30	0.05	0.75	1.0
		Felicita HSA (905.23)	1,000	400	500	60	10	0.30	0.05	0.75	1.0
Leucadia WWD	**Gafner WRP**	**Average Annual Water Quality**	**1,076**	**278**	**233**	**-**	**-**	**0.10**	**0.07**	**0.41**	**0.69**
		Permit	**1,200**	**500**				**0.40**	**0.06**	**0.06**	
		El Salto HSA (904.21)	3,500	800	500	60	45	0.30	0.05	2.00	1.0
		Los Monos HSA (904.31)	3,500	800	500	60	45	0.30	0.05	2.00	1.0
		Encinas HA (904.40)	3,500	800	500	60	45	0.30	0.05	2.00	1.0
		Batiquitos HSA (904.51)	3,500	800	500	60	45	0.30	0.05	2.00	1.0
		Richland HSA (904.52)	1,000	400	500	60	10	0.03	0.05	0.75	1.0
San Elijo JPA	**San Elijo WRF**	**Average Annual Water Quality**	**1,132**	**324**	**278**	**-**	**-**	**0.17**	**0.09**	**0.44**	**0.32**
		Permit	**1,200**	**400**	**400**			**0.30**	**0.15**	**0.75**	**1.0**
		Batiquitos HSA (904.51)	3,500	800	500	60	45	0.30	0.05	2.00	1.0
		San Elijo HSA (904.61)	2,800	700	600	60	45	0.30	0.05	1.00	1.0
		Solana Beach HA (905.10)	1,500	500	500	60	45	0.85	0.15	0.75	1.0
Oceanside	**San Luis Rey WWTP**	**Average Annual Water Quality**	**1,009**	**256**	**344**	**-**	**-**	**0.10**	**0.05**	**0.42**	**0.05**
		Permit	**1,200**	**350**	**350**			**0.30**	**0.15**	**0.50**	**1.0**
		Mission HSA (903.11)	1,500	500	500	60	45	0.85	0.15	0.75	1.0

Table 2-4: Comparison of Recycled Water Quality, Permit Requirements, and Groundwater Quality Objectives

Agency	Treatment Plant	Current Water Quality Vs. Permit and Basin Limits	Water Quality Parameter								
			TDS	Cl	SO4	%Na	NO3	Fe	Mn	Boron	Fl.
			Average Annual Water Quality								
			Permit: 12-Month Average (mg/l)								
Vallecitos WD	**Meadowlark WRP**	**Average Annual Water Quality**	**991**	**236**		**-**	**-**			**0.37**	
		Permit	**1,100**	**400**				**0.30**	**0.05**	**0.50**	
		El Salto HSA (904.21)	3,500	800	500	60	45	0.30	0.05	2.00	1.0
		Los Monos HSA (904.31)	3,500	800	500	60	45	0.30	0.05	2.00	1.0
		Encinas HA (904.40)	3,500	800	500	60	45	0.30	0.05	2.00	1.0
		Batiquitos HSA (904.51)	3,500	800	500	60	45	0.30	0.05	2.00	1.0
		Richland HSA (904.52)	1,000	400	500	60	10	0.03	0.05	0.75	1.0
		San Elijo HSA (904.61)	2,800	700	600	60	45	0.30	0.05	1.00	1.0
Buena Sanitation	**Shadowridge WRP**	**Average Annual Water Quality**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**
		Permit		**300**	**350**			**0.30**	**0.07**	**0.50**	**1.0**
		El Salto HSA (904.21)	3,500	800	500	60	45	0.30	0.05	2.00	1.0
		Los Monos HSA (904.31)	3,500	800	500	60	45	0.30	0.05	2.00	1.0
		Buena HSA (904.32)	1,200	500	500	60	10	0.30	0.05	0.75	1.0
		Encinas HA (904.40)	3,500	800	500	60	45	0.30	0.05	2.00	1.0
		Batiquitos HSA (904.51)	3,500	800	500	60	45	0.30	0.05	2.00	1.0
		Richland HSA (904.52)	1,000	400	500	60	10	0.03	0.05	0.75	1.0
San Diego	**North City WRP**	**Average Annual Water Quality**	**914**	**239**	**226**	**-**	**-**	**0.09**	**0.07**	**0.36**	**0.40**
		Permit	**1,200**	**300**	**300**			**0.30**	**0.05**	**0.70**	
		San Elijo HAS (904.61)	2,800	700	600	60	45	0.30	0.05	1.00	1.0
		Solana Beach HA (905.10)	1,500	500	500	60	45	0.85	0.15	0.75	1.0
Community SD	**Fairbanks Ranch WPCF**	**Average Annual Water Quality**	**944**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
		Permit									
		Solana Beach HA (905.10)	1,500	500	500	60	45	0.85	0.15	0.75	1.0
Community SD	**Rancho Santa Fe WRP**	**Average Annual Water Quality**	**1,295**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
		Permit									
		San Elijo HSA (904.61)	2,800	700	600	60	45	0.30	0.05	1.00	1.0
		Solana Beach HA (905.10)	1,500	500	500	60	45	0.85	0.15	0.75	1.0
Community SD	**Whispering Palms WPCF**	**Average Annual Water Quality**	**1,083**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
		Permit									
		Solana Beach HA (905.10)	1,500	500	500	60	45	0.85	0.15	0.75	1.0
Fallbrook PUD	**Fallbrook WRP**	**Average Annual Water Quality**	**775**	**-**	**-**	**-**	**-**	**-**	**-**	**0.30**	**-**
		Permit									
		Upper Ysidora HSA (902.13)	750	300	300	60	10	0.30	0.05	0.75	1.0
		Mission HSA (903.11)	1,500	500	500	60	45	0.85	0.15	0.75	1.0
		Bonsall HSA (903.12)	1,500	500	500	60	45	0.85	0.15	0.75	1.0

[1] Camp Pendleton's Master Reclamation Permit includes separate permit limits for both the Ysidora and Mission Basins. Only Ysidora listed here.
Average annual water quality data is average of four recorded monthly data from 2011.

Chapter 3 Current Recycled Water Setting

3.1 Introduction

This chapter presents the current recycled water setting for the study area, including the existing recycled water systems, sources of recycled water and existing recycled water demands. Additionally, this chapter includes a discussion of currently planned reuse system expansions by the agencies participating in this study.

3.2 Recycled Water Systems

There are ten water agencies participating in this study, eight of which currently serve recycled water customers in their service areas. Vallecitos Water District (Vallecitos WD) and Vista Irrigation District (VID) currently do not retail recycled water to their customers. Vallecitos WD owns and operates the Meadowlark WRP and wholesales recycled water to other agencies for retail distribution. VID is collaborating with Buena Sanitation District to investigate the possibility of renovating the mothballed Shadowridge WRP. This section provides a brief overview of the existing recycled water systems in North San Diego by water agency. Subsequent sections provide more detailed information on supply and demand.

Camp Pendleton: Recycled water is produced at the Southern Regional Tertiary Treatment Plant (SRTTP) and is supplied through a recycled water distribution system to irrigate four sites in the southern part of the Base. Excess treated effluent that is not recycled is disposed to the Pacific Ocean via the City of Oceanside's ocean outfall. Camp Pendleton is also adding Title 22 treatment in the San Mateo and San Onofre watersheds in the 2012-2014 timeframe.

Carlsbad Municipal Water District: Carlsbad MWD has the most extensive recycled water system in the region. They distribute recycled water from their own Carlsbad WRP, as well as recycled water purchased from the Leucadia Wastewater District (Gafner WRP) and the Vallecitos WD (Meadowlark WRP). The majority of the recycled water is delivered to local customers for irrigation within their service area. The District also serves some recycled water to customers in Vallecitos WD that are within the City of Carlsbad city limits.

City of Escondido: The City of Escondido owns and operates the Hale Avenue Resource Recovery Facility (HARRF) that produces recycled water for local distribution. The City retails recycled water to City customers primarily for irrigation and wholesales to the Rincon Del Diablo Municipal Water District.

City of Oceanside: The City of Oceanside owns and operates two Wastewater Treatment Plants (WWTP): La Salina WWTP and the San Luis Rey WWTP. Currently only a small amount of recycled water from the San Luis Rey WWTP is recycled at a local golf course. There are some previously constructed recycled water pipelines that will ultimately serve existing users and future development.

Olivenhain Municipal Water District: The majority of the recycled water use in the OMWD service area is in the northwestern quadrant of their service area. Recycled water served in this area is produced at the Meadowlark WRP and is used primarily for irrigation.

Rincon Del Diablo Municipal Water District: Rincon Del Diablo MWD distributes recycled water produced at the City of Escondido's HARRF to local customers for irrigation and industrial uses. The largest customer is the Palomar Energy Center that uses 2 to 3 MGD for cooling.

San Dieguito Water District: San Dieguito WD purchases water from the San Elijo WRF and retails to its local customers for irrigation.

Santa Fe Irrigation District: Santa Fe ID receives their recycled water from the San Elijo WRF. SFID distributes recycled water to customers within Solana Beach in the western portion of the District.

Currently the District does not serve any customers in the eastern part of its service area but is currently investigating options to do so. Service to the eastern service area may involve use of recycled water from one or more of the small WWTPs owned by local community service districts located in the area and/or from the San Elijo WRF.

The existing recycled water systems operated by the local agencies in the study area are shown in **Figure 3-1**. The pressure zones for these existing recycled water systems are shown on **Figure 3-2**.

3.3 Supplies

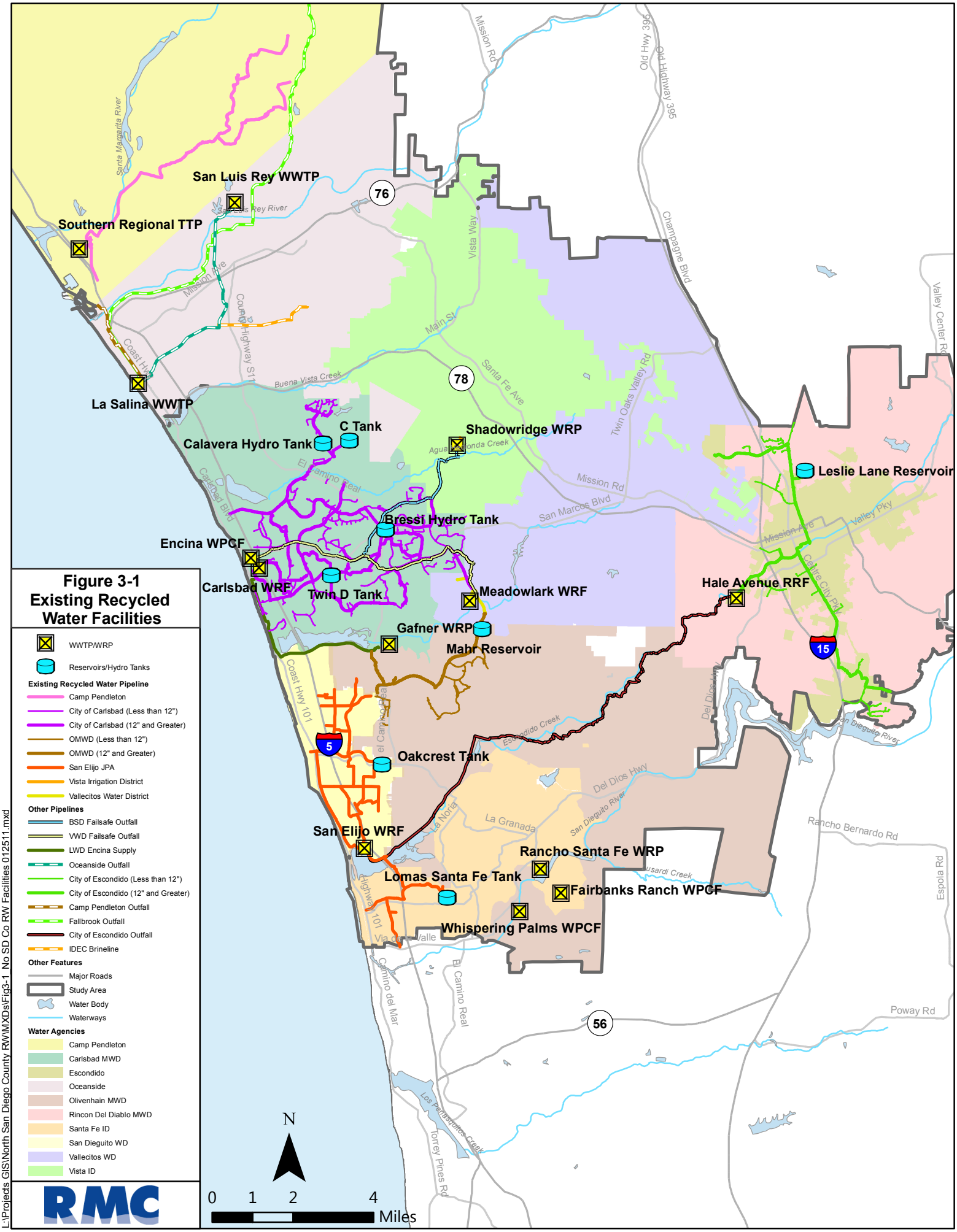
This section provides an overview of the existing and potential recycled water supplies available to the region that are owned and operated by the agencies participating in this study. **Table 3-1** provides a summary of the existing and potential future secondary and tertiary capacities, along with average daily flows for each treatment plant. Each plant is discussed individually, with information on the cost to expand if provided by the participating agency. The existing capacities and projected flows were provided by each agency.

South Regional TTP (Camp Pendleton): The SRTTP currently treats an annual average flow of about 2.4 mgd to a level suitable for non-potable reuse. The SRTTP came on line in August 2006 and at that time only from STP 13 was diverted to it. Flows from STP 1, 2, and 3 were diverted to the SRTTP in late 2088 to early 2009. The design capacity of the SRTTP is 5 mgd. However, the permitted capacity is limited to Camp Pendleton's capacity in the Oceanside Ocean Outfall, which is 3.6 mgd. Based on the potential expansion plans for the Base, the SRTTP is projected to expand to a capacity of 7.5 mgd and an average annual flow of 5.0 mgd. There is no current timetable for when the Base, and therefore the plant, would be expanded.

Carlsbad WRP: The Carlsbad WRP has a current tertiary capacity of 4.0 MGD. The plant receives secondary effluent flow from the adjacent Encina WPCF. Carlsbad MWD is currently completing its recycled water master plan and the draft plan is projecting a total plant size of 9 MGD being needed by 2020 and 16 MGD by 2030. The City of Carlsbad's capacity ownership at the Encina WPCF is 10.26 MGD, so it is likely that some institutional arrangement might be needed to expand the Carlsbad WRP beyond that flow. Per Carlsbad's draft master plan, the estimated capital cost to expand the Carlsbad WRP by 12 MGD to a total capacity of 16 MGD is approximately $51.2M.

Community CSDs: The Fairbanks Ranch WPCF, Rancho Santa Fe WRP, and Whispering Palms WPCF are privately owned facilities built by developers as part of the development of these communities. These are small plants that together have 0.95 MGD of secondary treatment capacity. All three plants currently discharge to percolation ponds. The Santa Fe ID is currently studying the feasibility of routing the effluent from all three plants to a new tertiary treatment facility that would be located adjacent to one of the CSD plants.

Encina WPCF: The Encina WPCF only treats wastewater to secondary levels, except for some in-plant uses. The secondary effluent is currently pumped to both the Carlsbad WRP and the Gafner WRP for further treatment. Remaining secondary effluent flows are discharged through an ocean outfall. There are currently no plans to upgrade the treatment levels at the WPCF beyond secondary.


San Luis Rey WWTP
Southern Regional TTP
La Salina WWTP
C Tank
Calavera Hydro Tank
Shadowridge WRP
Leslie Lane Reservoir
Bressi Hydro Tank
Encina WPCF
Carlsbad WRF
Twin D Tank
Meadowlark WRF
Hale Avenue RRF
Gafner WRP
Mahr Reservoir
Oakcrest Tank
San Elijo WRF
Rancho Santa Fe WRP
Lomas Santa Fe Tank
Fairbanks Ranch WPCF
Whispering Palms WPCF
Figure 3-1
Existing Recycled Water Facilities
WWTP/WRP
Reservoirs/Hydro Tanks
Existing Recycled Water Pipeline
Camp Pendleton
City of Carlsbad (Less than 12")
City of Carlsbad (12" and Greater)
OMWD (Less than 12")
OMWD (12" and Greater)
San Elijo JPA
Vista Irrigation District
Vallecitos Water District
Other Pipelines
BSD Failsafe Outfall
VWD Failsafe Outfall
LWD Encina Supply
Oceanside Outfall
City of Escondido (Less than 12")
City of Escondido (12" and Greater)
Camp Pendleton Outfall
Fallbrook Outfall
City of Escondido Outfall
IDEC Brineline
Other Features
Major Roads
Study Area
Water Body
Waterways
Water Agencies
Camp Pendleton
Carlsbad MWD
Escondido
Oceanside
Olivenhain MWD
Rincon Del Diablo MWD
Santa Fe ID
San Dieguito WD
Vallecitos WD
Vista ID
RMC
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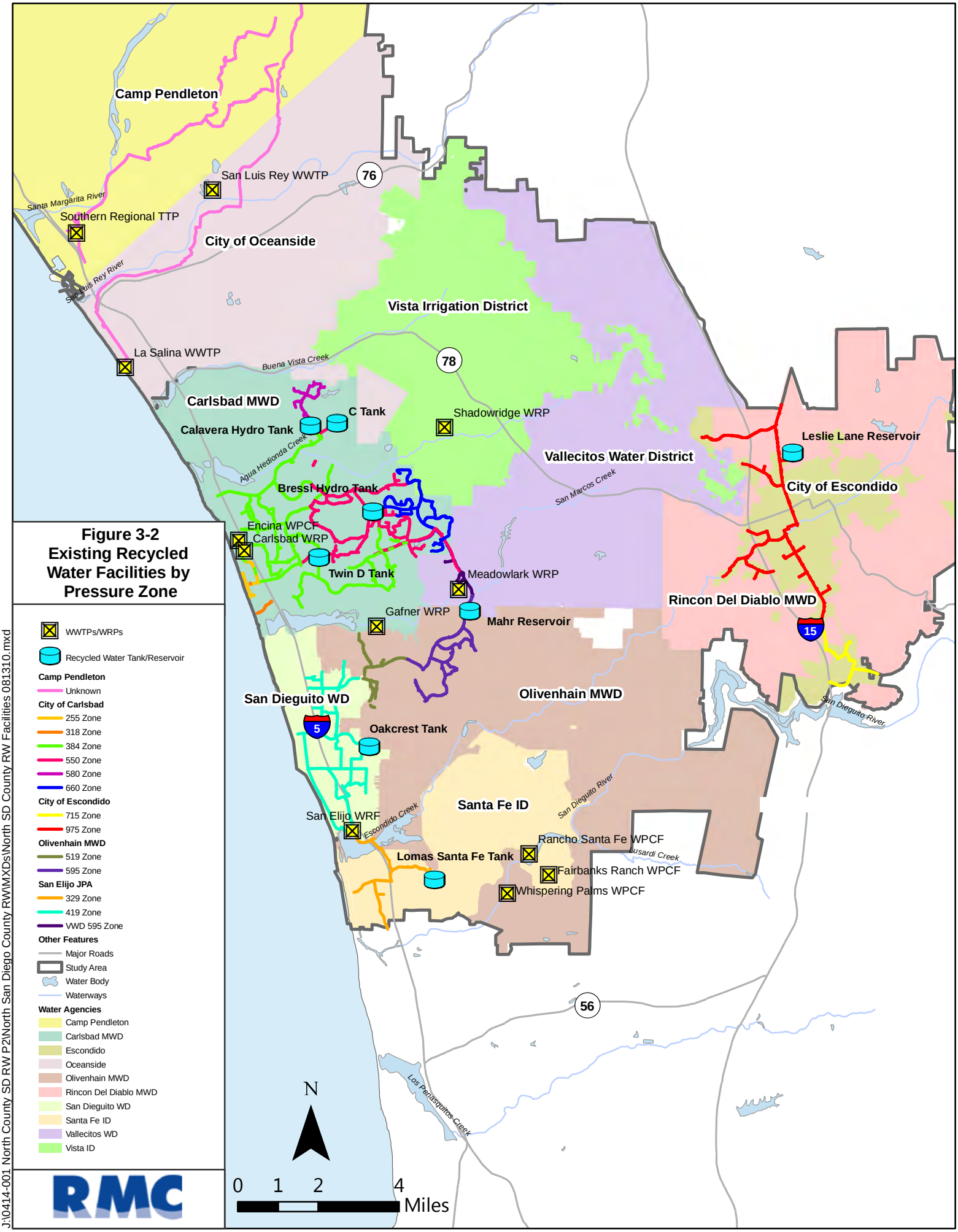

Figure 3-2
Existing Recycled Water Facilities by Pressure Zone

WWTPs/WRPs
Recycled Water Tank/Reservoir

Camp Pendleton
- Unknown

City of Carlsbad
- 255 Zone
- 318 Zone
- 384 Zone
- 550 Zone
- 580 Zone
- 660 Zone

City of Escondido
- 715 Zone
- 975 Zone

Olivenhain MWD
- 519 Zone
- 595 Zone

San Elijo JPA
- 329 Zone
- 419 Zone
- VWD 595 Zone

Other Features
- Major Roads
- Study Area
- Water Body
- Waterways

Water Agencies
- Camp Pendleton
- Carlsbad MWD
- Escondido
- Oceanside
- Olivenhain MWD
- Rincon Del Diablo MWD
- San Dieguito WD
- Santa Fe ID
- Vallecitos WD
- Vista ID

RMC

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Table 3-1: Existing and Future Recycled Water Supplies

Wastewater Treatment Plant	Planning Year 2010 (Existing Condition)				Planning Year 2020 (Short Term)				Planning Year 2030 (Long Term)			
	Treatment Capacity (MGD)		Average Daily Flow (MGD)		Treatment Capacity (MGD)		Average Daily Flow (MGD)		Treatment Capacity (MGD)		Average Daily Flow (MGD)	
	Secondary	Tertiary	Secondary	Tertiary	Secondary	Tertiary	Secondary	Tertiary	Secondary	Tertiary	Secondary	Tertiary
South Regional TTP (Camp Pendleton)	3.6	3.6	2.4	2.4	7.5	7.5	5.0	5.0	7.5	7.5	5.0	5.0
Carlsbad WRP	--	4.0	--	3.0	--	9.0	--	8.4	--	12.0	--	11.0
Encina WPCF	40.5	--	25.0	--	40.5	--	34.0	--	43.0	--	40.0	--
Gafner WRP	--	1.0	--	0.23	--	2.0	--	1.1	--	3.7	--	2.0
Hale Avenue RRF	18.0	9.0	13.0	4.26	21.0	18.0	21.0	15.0	27.5	20.0	25.0	18.0
Harmony Grove WRP	--	--	--	--	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
La Salina WWTP	5.5	--	3.0	--	5.5	--	3.0	--	5.5	--	3.0	--
Meadowlark WRP	5.0	5.0	3.74	3.74	5.0	5.0	4.5	4.5	5.0	5.0	4.5	4.5
San Elijo WRF	5.5	2.5	3.1	2.0	5.5	3.0	3.5	2.4	5.5	3.5	4.5	3.5
San Luis Rey WWTP	13.5	0.7	9.7	0.35	13.5	3.15	9.7	1.58	17.4	7.5	12.5	5.0
Shadowridge WRP	--	--	--	--	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Sub-Totals	**91.6**	**25.8**	**59.9**	**16.0**	**100.7**	**49.9**	**82.9**	**40.2**	**113.6**	**61.4**	**96.7**	**51.2**
Community CSDs[1]	0.95	--	0.95	--	0.95	--	0.95	--	0.95	--	0.95	--
Totals	92.6	25.8	60.9	16.0	101.7	49.9	83.9	40.2	114.6	61.4	97.7	51.2

[1] Community CSDs include the Fairbanks Ranch, Rancho Santa Fe, and Whispering Palms plants. The plants are not operated by any of the participating agencies but are being considered as potential supply sources for the eastern portion of Santa Fe ID's service area.

Gafner WRP: The Gafner WRP is owned and operated by the Leucadia Wastewater District and has an existing tertiary capacity of 1.0 MGD. Secondary effluent is pumped from the Encina WPCF to the Gafner WRP for further treatment. The La Costa Golf Course is the only existing customer and due to seasonal irrigation demands, the WRP only operates at capacity a few months a year. A Technical Memorandum (TM) was provided by the Leucadia Water District in October 2010 that provided a phasing plan for the WRP and estimates of capital costs. The TM indicates a five (5) phase approach to expanding the WRP to an ultimate tertiary capacity of 3.7 MGD at a total capital cost of approximately $35.8M. This includes improvements at the WRP as well as replacement of the existing secondary effluent return pipeline from the Encina WPCF.

Hale Avenue Resource Recovery Facility: The Hale Avenue RRF currently produces up to 9.0 MGD of recycled water for use in the City of Escondido and Rincon Del Diablo MWD. Currently, the HARRF discharges secondary effluent to the ocean via a land and ocean outfall. Due to capacity limitations in the land outfall the City has identified a significant avoided wastewater disposal cost of nearly $300M if they develop year-round uses for recycled water from HARRF. The City would prefer to invest in expanded treatment capacity at HARRF and increase the use of recycled water rather than increase the capacity of the land outfall. For the long term, the City is planning to expand the tertiary treatment facilities at the HARRF by 11.0 MGD, to bring the total tertiary capacity of the plant to 20.0 MGD.

Harmony Grove WRP: The Harmony Grove WRP is a new 0.2 MGD plant proposed to provide wastewater service for 750 new homes planned as part of the Harmony Grove Village development project within the Rincon Del Diablo MWD service area. The WRP will consist of two components. The first component will be owned and operated by the County of San Diego to treat wastewater and produce recycled water for irrigation and possibly industrial uses as part of the development project. The second component includes advanced treatment for a groundwater IPR project in the Harmony Grove area and would be supplied with recycled water from either HARRF or Vallecitos Water District. Rincon Del Diablo MWD will own and operate the advanced treatment component.

La Salina WWTP: The City of Oceanside's La Salina WWTP currently has a secondary capacity of 5.5 MGD. Due to limited space at the WWTP there is limited ability to add tertiary treatment facilities. The City has estimated about 1.0 MGD of tertiary treatment capacity could be constructed at the site. However, this has not yet been incorporated into the City's plans for this facility.

Meadowlark WRP: The Meadowlark WRP is owned and operated by the Vallecitos WD and was recently expanded to a capacity of 5.0 MGD. However, wastewater flows currently limit production of recycled water to just under 4 MGD on an average daily basis. The Vallecitos Water District projects that the average daily flow will increase to approximately 4.5 MGD in the future.

San Elijo WRF: The San Elijo Joint Powers Authority (SEJPA) owns and operates the San Elijo WRF and approximately 19 miles of recycled water distribution pipelines and two covered reservoirs. The WRF has a design capacity of 5.5 MGD through secondary treatment and a tertiary treatment capacity of 2.48 MGD. SEJPA is currently constructing an Advanced Water Treatment (AWT) facility that will provide highly treated recycled water using microfiltration and reverse osmosis processes. The AWT facility is designed to operate in parallel to the existing sand filtration system thus providing operational flexibility and treatment redundancy. Upon completion of the AWT facility, the San Elijo WRF will have new rated capacity of 3.03 MGD of tertiary treated water and the expected annual average TDS concentration will be 900 mg/l or less.

San Luis Rey WWTP: The San Luis Rey WWTP provides secondary treatment for most of the wastewater generated within the City's service area. The rated secondary treatment capacity of the existing WWTP is 13.5 MGD, while the tertiary capacity is only 0.7 MGD. Secondary effluent is discharged through a land and ocean outfall. By agreement, the Fallbrook Public Utility District can discharge up to 2.4 MGD through Oceanside's outfall. The City's 2005 Recycled Water Master Plan identified an expansion of the tertiary facilities to a capacity of 7.5 MGD to produce recycled water to serve the northern portion of the City as well as other development projects. It was estimated that an initial tertiary expansion of 3.5 MGD would cost approximately $7.6M (adjusted to 2010 dollars). The ultimate secondary treatment capacity of the WWTP is 17.4 MGD.

Shadowridge WRP: The Shadowridge WRP is owned by the Buena Sanitation District and is currently mothballed. A study prepared by PBS&J in August 2010 estimated that the capital cost to renovate, expand to 2.0 MGD and make the plant operational is approximately $17.9 M.

3.4 Existing Recycled Water Demands

A survey of the agency participants in this study was performed to identify current recycled water levels as well as the potential for future recycled water use in the study area. Chapter 4 discusses the potential future demands projected by the agencies. For purposes of this study, a baseline of existing reuse levels was established and includes both existing reuse level as well as near-term planned or committed recycled water projects. Committed plans are considered to be those projects that agencies are currently implementing and are expected to be completed within the next few years. A summary of the average annual existing demands and commitments for recycled water use by agency is presented in **Table 3-2**. Total existing recycled water usage in the planning area is approximately 10,600 afy currently with another 740 afy in near-term committed projects.

3.5 Previously Identified Reuse System Expansions

Already planned expansions of existing recycled water systems within the study area were identified based on previous studies and participating agency input. The major system expansions include recycled water distribution lines located in the Carlsbad MWD, City of Oceanside, the City of Escondido, the Santa Fe Irrigation District, and Camp Pendleton. Carlsbad MWD is considering use of the two failsafe outfalls as potential recycled water conveyance options. These two failsafe outfalls are for the Shadowridge WRP and the Meadowlark WRP. Carlsbad MWD's Recycled Water Master Plan Update is expected to be completed in late 2011 and will identify additional expansion areas and alignments for serving recycled water to irrigation and industrial customers.

The City of Oceanside is considering diverting tertiary flow from Fallbrook PUD's land outfall to irrigate the Morro Hills area of Oceanside during certain times of the year. The Fallbrook PUD land outfall currently serves recycled water to Arrowwood Golf Course and Caltrans in Oceanside's service area. The City is also considering obtaining up to 1 MGD of recycled water from Camp Pendleton to serve users in the Morro Hills area as well.

Camp Pendleton recently completed its recycled water master plan, which includes several options for expanding its existing recycled water system. Camp Pendleton is currently pursuing funding for one of the master plan's option, which would expand Camp Pendleton's system to the San Luis Rey Gate area. The City of Oceanside and Camp Pendleton are currently exploring this option which would allow the City to serve recycled water from Camp Pendleton to the downtown Oceanside area.

In February, 2012, Camp Pendleton completed a pilot test for providing recycled water via injection to control against salt water intrusion in the Lower Ysidora Sub-basin. While not providing indirect potable recycled water to the potable groundwater supplies, this project will help to protect the basin from a loss of its beneficial uses. Camp Pendleton is currently seeking funding to implement this project in the near future.

Where practical, these local distribution system expansions have been incorporated into the regional system planning.

Table 3-2: Recycled Water Demand Summary by Agency

Agency	Average Annual Non-Potable Demand (afy)		
	Existing	Committed Plans	Total
Camp Pendleton	385	--	**385**
Carlsbad MWD	4,350	587	**4,937**
City of Escondido	771	--	**771**
City of Oceanside	119	--	**119**
Olivenhain MWD	1,000	--	**1,000**
Rincon Del Diablo MWD	3,279	--	**3,279**
San Dieguito Water District	548	152	**700**
Santa Fe Irrigation District	510	--	**510**
Vallecitos Water District	--	--	**--**
Vista Irrigation District	--	--	**--**
Totals	**10,962**	**739**	**11,701**

Chapter 4 Long-Term Project Options

4.1 Introduction

This chapter presents the development and analysis of the long-term project options for a regional recycled project. Options developed included conventional Title 22 reuse sites as well as examining the potential locations for seasonal storage and indirect potable reuse sites. The project options were developed at a regional level only.

4.2 Project Options Formation Methodology

As part of this regional planning effort, the participating agencies want to formulate a short-term regional project that could be implemented over the next ten years by 2020. However, they also want to build a system that had the flexibility to be expanded in the future. Hence, two timeframes, short-term and long-term, were developed as part of this planning effort. The long-term planning year of 2030 was selected based on the agencies' best projections and represents nearly build-out conditions.

The approach used to develop the regional project was to first identify the long-term regional project and then to scale the system back to meet only the short-term demands. Necessary treatment plant upgrades or expansions along with pump station needs were scaled down to satisfy only the short-term demands. However, identified pipelines needed to meet short-term demands were sized adequately to meet the projected long-term demands. Pipelines only needed for the long-term were not included in the short-term. This approach helped to minimize the cost for the short-term project, while still providing for the long-term.

4.2.1 Projected Recycled Water Demands

Recycled water demand projections were developed based on previous agency studies as well as updates provided by the participating agencies. Potential recycled water demands were projected for both the short- and long-term periods. The amount of demand projected between the short- and long-terms was determined by each agency and was based on the potential to convert current potable users to recycled water, future developments, and each agency's forecast as to how much and how soon their recycled water systems could be expanded or implemented.

Table 4-1 provides a summary of the existing demands discussed in Chapter 3 along with the projected demands for the short- and long-term planning periods. As shown in the table, the Carlsbad MWD, Olivenhain MWD, and Santa Fe ID are all planning to complete or nearly complete build-out of their recycled water systems within the next ten years. Most of the other agencies are planning to fully build-out or expand their recycled water systems in either the short- or long-term planning horizons. It should be noted that two agencies, Rincon Del Diablo MWD and the City of Escondido, are both planning Indirect Potable Reuse (IPR) projects in addition to expansion of their non-potable recycled water systems. These planned IPR projects are being included in the long-term scenario as part of this regional project because each agency is currently pursuing an IPR project. The Rincon Del Diablo MWD IPR projects is also included in the short-term scenario as this project could be implemented within the next ten years as part of a proposed development. Other opportunities for IPR projects are only considered for the long-term and are discussed later in this chapter.

For the short-term (2020), an estimated average annual demand of 17,054 afy of new recycled water use is projected by the agencies. Another 14,994 afy of new demand is being projected to be implemented between the short- and long-term planning periods. Overall, along with the existing/committed projects the total estimated annual recycled water use in the region could be 43,749 afy by around 2030.

Table 4-1: Summary of Demands by Retail Water Agency

Agency	Average Annual Recycled Water Demand (afy)						
	Existing/ Committed	Additional Short Term		Total (Existing + Short Term)	Additional Long Term		Total (Existing + Short + Long Term)
		Non-Potable	Indirect Potable		Non-Potable	Indirect Potable	
Camp Pendleton[1]	385	870	--	1,255	545	--	1,800
Carlsbad MWD	4,937	3,040	--	7,977	760	--	8,737
City of Escondido	771	3,250	--	4,021	--	8,000	12,021
City of Oceanside	119	2,080	--	2,199	1,557	--	3,756
Olivenhain MWD	1,000	600	--	1,600	--	--	1,600
Rincon Del Diablo MWD	3,279	2,000	2,000	7,279	--	2,000	9,279
San Dieguito WD	700	--	--	700	--	--	700
Santa Fe ID	510	800	--	1,310	--	--	1,310
Vallecitos WD	--	1,444	--	1,444	922	--	2,366
Vista ID	--	1,840	--	1,840	1,210	--	3,050
Total	**11,701**	**15,924**	**2,000**	**29,625**	**4,994**	**10,000**	**44,619**

[1] In the short-term, the non-potable demand for Camp Pendleton includes the Lower Ysidora Salt Water Intrusion project, which will indirectly help to increase the yield of the groundwater basin.

Figure 4-1 shows the locations of the projected long-term recycled water demands. Potential future demands are represented by red dots that are scaled in size to the projected average annual recycled water demand. To simplify the analysis of options for the regional study, many of the smaller projected demands were grouped to represent a number of potential users. By grouping potential recycled water users based on their geographic locations, regional options were more easily developed and analyzed. Serving several users who are in close proximity to one another is typically more cost effective as recycled water transmission lines can be aligned to maximize the number of users that can be connected by the regional system. A smaller local distribution system will also need to be constructed to connect to individual users.

Grouping of potential users was done for several agencies, including Camp Pendleton, Carlsbad MWD, Vista ID, Vallecitos WD, Rincon Del Diablo, and Rancho Santa Fe ID. In such cases, the names for these grouped users were based on either the largest demand in the cluster, the geographic area, or a simple agency-numeric ID number. A listing of the demands shown in **Figure 4-1** is provided in **Table 4-2** below. The table also shows the amount of recycled water projected for the short- and long-term periods for each demand grouping.

Figure 4-1
Potential Long-Term Future Recycled Water Demand

Potential Recycled Water Demand
- 0 - 100 AFY
- 101 - 500 AFY
- 501 - 1000 AFY
- > 1000 AFY

Existing Recycled Water Pipeline
- Less than 12"
- 12" and Greater

Potential Future Pipelines
- Oceanside
- Escondido
- Santa Fe Irrigation District

WWTP/WRP
Reservoirs/Hydro Tanks

Other Features
- Major Roads
- Study Area
- Water Body
- Waterways

Water Agencies
- Camp Pendleton
- Carlsbad MWD
- Escondido
- Oceanside
- Olivenhain MWD
- Rincon Del Diablo MWD
- Santa Fe ID
- San Dieguito WD
- Vallecitos WD
- Vista ID

RMC

N

0 1 2 4 Miles

14 Area (20 AFY)
Mainside Parade Grounds Expansion (5 AFY)
MCAS (153 AFY)
16 Area (3 AFY)
22 Area (11 AFY)
17 Area (96 AFY)
Horse Pasture Expansion (120 AFY)
Wilshire Road (489 AFY)
Marine Memorial Golf Course Expansion (112 AFY)
Morro Hills Development (1083 AFY)
Oceanside Municipal Golf Course (695 AFY)
Lower Ysidora Saltwater Intrusion Injection (870 AFY)
San Luis Rey WWTP
Southern Regional TTP
El Corazon (440 AFY)
Front Gate Expansion (25 AFY)
Rancho Del Oro Development (130 AFY)
VID 3 (100 AFY)
VID 1 (620 AFY)
Mira Costa College (200 AFY)
Lake Wohlford - IPR (8,000 AFY)
Shadowridge Golf Course (450 AFY)
La Salina WWTP
VWD 9 (63 AFY)
Leisure Village (600 AFY)
VID 5 (440 AFY)
VWD 2 (305 AFY)
C Tank
VWD 5 (150 AFY)
North Carlsbad Users (730 AFY)
Calavera Hydro Tank
VID 4 (490 AFY)
Escondido Country Club (200 AFY)
Shadowridge WRP
Leslie Lane Reservoir
Northeast Carlsbad Users (1200 AFY)
VWD 4 (257 AFY)
VID 2 (950 AFY)
VWD 1 (274 AFY)
Escondido Users North (562 AFY)
NRC West Coast LLC/
Cabrillo Power (800 AFY)
East Carlsbad Users (520 AFY)
Legoland Area Users (250 AFY)
VWD 3 (454 AFY)
Rincon Business Park (1300 AFY)
Bressi Hydro Tank
VWD 8 (147 AFY)
Encina WPCF
VWD Future Development (300 AFY)
Ag Users (2,000 AFY)
Carlsbad WRF
Twin D Tank
Meadowlark WRF
Eagle Crest Golf Course (338 AFY)
VWD 6 (220 AFY)
Hale Avenue RRF
Southwest Carlsbad Users (100 AFY)
VWD 7 (196 AFY)
Harmony Grove (500 AFY)
Harmony Grove - IPR (4,000 AFY)
Harmony Grove WRP
Mahr Reservoir
Wild Animal Park (250 AFY)
La Costa Resort Group (200 AFY)
Gafner WRP
Escondido Users - South (100 AFY)
Village Park (300 AFY)
Bridges Golf Course/
Cielo Development (300 AFY)
Oakcrest Tank
Private Residence (150 AFY)
Rancho Santa Fe Golf Course (325 AFY)
Private Residence (120 AFY)
Private Users (105 AFY)
San Elijo WRF
San Dieguito Park (60 AFY)
Lomas Santa Fe Tank
Rancho Santa Fe WRP
Fairbanks Ranch WPCF
Whispering Palms WPCF
SFID HOAs (40 AFY)

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Table 4-2: Grouped Projected Demands by Retail Water Agency

Demand or Demand Group Name	Agency	Total Annual Demand (afy)	
		Short-Term	Long-Term
14 Area	Camp Pendleton	0	20
16 Area		0	3
17 Area		0	96
22 Area		0	11
Front Gate Expansion		0	25
Horse Pasture Expansion		0	120
Lower Ysidora Salt Water Barrier		870	870
MCAS		0	153
Mainside Parade Grounds Expansion		0	5
Marine Memorial Golf Course Expansion		0	112
Subtotal for Camp Pendleton		870	1,415
East Carlsbad Users	Carlsbad MWD	400	520
La Costa Resort Group		180	200
Legoland Area Users		220	250
North Carlsbad Users		560	730
Northeast Carlsbad Users		900	1,200
NRC West Coast LLC/Cabrillo Power		700	800
Southwest Carlsbad Users		80	100
Subtotal for Carlsbad MWD		3,040	3,800
Ag Users	City of Escondido	2,000	2,000
Eagle Crest Golf Course		338	338
Escondido Users - South		100	100
Escondido Users North		562	562
Lake Wohlford – IPR		0	8,000
Wild Animal Park		250	250
Subtotal for City of Escondido		3,250	11,250
El Corazon	City of Oceanside	285	440
Leisure Village		600	600
Mira Costa College		0	200
Morro Hills Development		500	1,083
Oceanside Municipal Golf Course		695	695
Rancho Del Oro Development		0	130
Wilshire Road		0	489
Subtotal for City of Oceanside		2,080	3,637
Bridges Golf Course	Olivenhain MWD	300	300
Village Park		300	300
Subtotal for Olivenhain MWD		600	600
Escondido Country Club	Rincon Del Diablo MWD	200	200
Harmony Grove		500	500
Harmony Grove – IPR		2,000	4,000
Rincon Business Park		1,300	1,300
Subtotal for Rincon Del Diablo MWD		4,000	6,000

Table 4-2: Grouped Projected Demands by Retail Water Agency

Demand or Demand Group Name	Agency	Total Annual Demand (afy)	
		Short-Term	Long-Term
Private Residence (N)	Santa Fe ID	150	150
Private Residence (S)		120	120
Private Users		105	105
Rancho Santa Fe Golf Course		325	325
San Dieguito Park		60	60
SFID HOAs		40	40
Subtotal for Santa Fe ID		800	800
Shadowridge Golf Course	Vista ID	450	450
VID 1		0	620
VID 2		950	950
VID 3		0	100
VID 4		0	490
VID 5		440	440
Subtotal for Vista ID		1,840	3,050
VWD 1	Vallecitos WD	274	274
VWD 2		0	305
VWD 3		454	454
VWD 4		0	257
VWD 5		0	150
VWD 6		220	220
VWD 7		196	196
VWD 8		0	147
VWD 9		0	63
VWD Future Development		300	300
Subtotal for Vallecitos WD		1,444	2,366
Total (Projected Demand)		**17,924**	**32,918**

4.2.2 Projected Recycled Water Supplies

As discussed in Chapter 3, each agency provided background information and updates on the existing and planned capacities of each of the wastewater and water recycled plants in the study area. In addition, the projected available average daily flow to each plant by 2030 was identified. For planning purposes the projected flow was reduced by 10 percent to account for miscellaneous losses through the treatment process to determine the available supply. This potential future available supply represents the maximum supply to either the short- or long-term planning periods based on agency projections. In addition, existing recycled water demands satisfied from each plant were accounted for in development of the potential available future supply. **Table 4-3** summarizes the projected available supplies for new recycled water projects.

Since none of the existing recycled water systems have a significant amount of seasonal storage, it is necessary to account for seasonal peaking of irrigation demands. Development of maximum day to average annual demand peaking factors for each supply source assisted with determining the available supply. As the supplies vary greatly in size and amount of reuse, a range of peaking factors were developed for purposes of this study. These peaking factors were based on observed peaking factors from

historical use patterns for the plants that currently serve recycled water. The assumed maximum day to average annual peaking factors used in this planning effort are:

- Max Day to Avg. Annual Peaking Factor = 2.0 if demand < 1,000 afy
- Max Day to Avg. Annual Peaking Factor = 1.8 if demand 1,000 - 5,000 afy
- Max Day to Avg. Annual Peaking Factor = 1.6 if demand > 5,000 afy

Table 4-3: Maximum Potential Recycled Water Supplies

Plant	Projected Average Daily Wastewater Flow (MGD)	Maximum Potentially Available New Recycled Water Supply (MGD) [1]
South Regional TTP (Camp Pendleton)	5.0	3.5
Carlsbad WRP (includes Encina WPCF)	40.0	32.00
Community CSDs[2]	0.95	0.95
Gafner WRP	NA	2.70
Hale Avenue RRF	25	18.00
Harmony Grove WRP	0.2	0.20
La Salina WWTP	3.0	1.00
Meadowlark WRP	4.5	2.00
San Elijo WRF	4.5	3.5
San Luis Rey WWTP	12.5	11.00
Shadowridge WRP	2.0	2.00
Total	**97.65**	**76.85**

[1] Maximum potentially available supply is based on the projected wastewater flow minus existing recycled water demands and the estimated peaking factor for each plant.

[2] Community CSDs include the Fairbanks Ranch, Rancho Santa Fe, and Whispering Palms plants. The plants are not operated by any of the participating agencies but are being considered as potential supply sources for the eastern portion of Santa Fe ID's service area.

4.2.3 Long-Term Regional Options

For the long-term planning period, two basic options were considered by the participating agencies. Since the North San Diego County region contains several smaller potential recycled water plants and eight water agencies, the first long-term option was based on the concept of serving recycled from all of the potential identified supply sources in a decentralized approach. This Option A could potentially result in smaller local distribution systems and shorter pipelines. It would also likely result in reduced pumping and lower energy costs since wastewater would be treated at higher elevations and at locations closer to the identified demands. Finally, this option might be an advantage to some agencies that have already invested in distributions systems based on an existing treatment plant's anticipated expansion.

The second long-term option considered focused on serving recycled water primarily from the larger treatment plants in a centralized approach. The advantage of this Option B would be to focus on the larger or more regional supply sources and to obtain some economy of scale compared to some of the smaller plants. However, this option would require longer regional pipelines and additional pumping to serve identified demands located farther from these regional supply sources.

In addition to these two base options, two other factors were considered for the long-term recycled water potential in the region. The first consideration was the use of seasonal storage of recycled water to reduce or eliminate the need to construct tertiary treatment capacity to satisfy summer peak irrigation demands. Several potential sites were identified and considered by the participating agencies. These storage opportunities are not exclusive to either Option A or B and are thus examined separately. Another add-on option is the inclusion of additional Indirect Potable Reuse (IPR) sites that had not yet been considered in the plans of the participating agencies for the short- or long-term planning periods. Several potential groundwater and surface storage sites have been considered by the agencies but have not yet resulted in detailed planning. As discussed below, most of these sites would require a more extensive examination as to their potential implementation and feasibility than allowed for in this study.

4.3 Long-Term Project Option A

As discussed above, Option A is based on a decentralized supply source approach. To allocate available supply to the potential demands, a matrix was developed showing the demand by retail water agency and the available supply by wastewater treatment plant. Recycled water supplies were then allocated based on projected peak demands. **Tables 4-4** and **4-5** show a summary of the allocated supplies and recycled to each water agency from each wastewater treatment plant. Note that in several cases, multiple treatment plants were necessary to satisfy the identified demand. **Figure 4-2** shows the resulting Regional System for Option A. A few project specific aspects of Option A are noted here:

- In addition to the construction of new regional pipelines, Option A also includes the conversion of a portion of the existing Buena Sanitation District failsafe outfall from the Shadowridge WRP. Carlsbad MWD is already in discussions with BSD regarding the conversion of a portion of this line. Under Option A, this would allow for additional flow from the Carlsbad WRP to serve several demands in the Vista ID service area, which is needed since the demand exceeds the identified capacity of the Shadowridge WRP.
- As noted in Chapter 3, Camp Pendleton and the City of Oceanside have discussed the potential for Camp Pendleton to deliver recycled water to the City for service to customers in the Morro Hills area of the City. The City of Oceanside is also considering diverting tertiary flow from the Fallbrook PUD land outfall to irrigate the Morro Hills area of Oceanside during certain times of the year. This can be accomplished via a tie-in to the recycled water line serving the Morro Hills area.
- As shown in **Figure 4-2**, the Wanket Tank in the Olivenhain MWD's service area is an existing potable water tank that could be converted to recycled water. Olivenhain MWD is currently discussing conversion of this tank with the San Dieguito Water District. There may be additional opportunities within the study area to convert potable facilities to regional or local recycled water distribution systems.
- As shown in **Figure 4-2**, two Indirect Potable Reuse (IPR) lines are proposed to serve the Lake Wohlford IPR and the groundwater recharge IPR near Harmony Grove. These lines would be separate from the non-potable reuse (NPR) or tertiary treated lines as the water qualities would differ.

This study did not develop more detailed local distribution systems that will be required to connect every individual user. For several agencies, such plans will require integration with the agencies' existing systems. For the regional pipelines identified in Option A, new pipelines were connected to the existing system where larger pipelines (typically 12 inch or greater) were identified, such that available capacity to serve future demand was assumed. The existing hydraulic grade lines (see Chapter 3) were used to establish a pressure basis for the new pipelines such that new pump stations could be sized accordingly. Agencies where existing lines were utilized include Camp Pendleton, Carlsbad MWD, City of Escondido, Rincon Del Diablo MWD, and Olivenhain MWD. Hence, **Figure 4-2**, shows several locations where new pipelines are proposed that originate from existing systems.

Table 4-4: Long-Term Option A: Supply Capacity Needs

Agency	Treatment Capacity Needed to Meet Demand[1] (MGD)	Peak Flow Capacity Needed by Plant (MGD)										
		SRTTP	San Luis Rey	La Salina	Shadowridge	Carlsbad	HARRF	Gafner	Meadowlark	San Elijo	Harmony Grove	CSDs[2]
Camp Pendleton	1.3	1.3										
Carlsbad MWD	5.4					4.0		0.9	0.5			
City of Escondido	12.1						12.1					
City of Oceanside	5.8	1.6	3.2			1.0						
Olivenhain MWD	1.0							0.3		0.2		0.5
Rincon Del Diablo MWD	6.4						6.2				0.2	
San Dieguito WD	0.0											
Santa Fe ID	1.3									0.8		0.5
Vallecitos WD	3.9						2.4		1.5			
Vista ID	5.0		1.2		2.0	1.8						
Total Treatment Capacity Needed	**42.2**	**2.9**	**4.4**	**0.0**	**2.0**	**6.8**	**20.7**	**1.2**	**2.0**	**1.0**	**0.2**	**1.0**

[1] Treatment capacity needed is based on peaking factors specific to each system/plant. For some plants, this additional flow or peak capacity need may already be available within the plant's current capacity and available flows. For other pants, this additional capacity need may require expansion or addition of tertiary and other processes to meet the additional demand needs.

[2] Community CSDs include the Fairbanks Ranch, Rancho Santa Fe, and Whispering Palms plants.

Table 4-5: Long-Term Option A: Additional Recycled Water Demand by Plant

Agency	Recycled Water Demand (afy)	Avg. Annual Recycled Water Demand by Supply (afy)										
		SRTTP	San Luis Rey	La Salina	Shadowridge	Carlsbad	HARRF	Gafner	Meadowlark	San Elijo	Harmony Grove	CSDs[1]
Camp Pendleton	1,400	1,400										
Carlsbad MWD	3,800					2,800		600	400			
City of Escondido	11,300						11,300					
City of Oceanside	3,600	1,000	2,000			600						
Olivenhain MWD	600							200		100		300
Rincon Del Diablo MWD	6,000						5,800				200	
San Dieguito WD	0											
Santa Fe ID	800									500		300
Vallecitos WD	2,400						1,500		900			
Vista ID	3,100		800		1,200	1,100						
Total Recycled Water Demand	**33,000**	**2,400**	**2,800**	**0**	**1,200**	**4,500**	**18,600**	**800**	**1,300**	**600**	**200**	**600**

[1] Community CSDs include the Fairbanks Ranch, Rancho Santa Fe, and Whispering Palms plants.

Figure 4-2
Long-Term Project - Option A

WWTP/WRP
- Reservoirs/Hydro Tanks
- Potential RW Tank

Potential Recycled Water Demand
- 0 - 100 AFY
- 101 - 500 AFY
- 501 - 1000 AFY
- > 1000 AFY

Conceptual Future Pipelines
- Option A (NPR)
- Option A (IPR)

Existing Recycled Water Pipeline
- Less than 12"
- 12" and Greater

Other Features
- Major Roads
- Study Area
- Water Body
- Waterways

Other Pipelines
- Camp Pendleton Outfall
- Fallbrook Outfall
- City of Encondido Outfall
- LWD Encina Supply
- Oceanside Outfall
- BSD Failsafe Outfall
- VWD Failsafe Outfall

Water Agencies
- Camp Pendleton
- Carlsbad MWD
- Escondido
- Oceanside
- Olivenhain MWD
- Rincon Del Diablo MWD
- Santa Fe ID
- San Dieguito WD
- Vallecitos WD
- Vista ID

RMC

N

0 1 2 4 Miles

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Mainside Parade Grounds Expansion (5 AFY)
14 Area (20 AFY)
16 Area (3 AFY)
MCAS (153 AFY)
17 Area (96 AFY)
22 Area (11 AFY)
Horse Pasture Expansion (120 AFY)
Wilshire Road (489 AFY)
Marine Memorial Golf Course Expansion (112 AFY)
Morro Hills Development (1083 AFY)
Oceanside Municipal Golf Course (695 AFY)
Lower Ysidora Saltwater Intrusion Injection (870 AFY)
San Luis Rey WWTP
Southern Regional TTP
Front Gate Expansion (25 AFY)
El Corazon (440 AFY)
Rancho Del Oro Development (130 AFY)
VID 3 (100 AFY)
VID 1 (620 AFY)
Mira Costa College (200 AFY)
La Salina WWTP
Shadowridge Golf Course (450 AFY)
Leisure Village (600 AFY)
VID 5 (440 AFY)
VWD 9 (63 AFY)
VWD 2 (305 AFY)
VWD 5 (150 AFY)
Escondido Country Club (200 AFY)
North Carlsbad Users (730 AFY)
C Tank
Calavera Hydro Tank
VID 4 (490 AFY)
Shadowridge WRP
Leslie Lane Reservoir
Northeast Carlsbad Users (1200 AFY)
VID 2 (950 AFY)
VWD 4 (257 AFY)
VWD 1 (274 AFY)
Escondido Users North (562 AFY)
NRC West Coast LLC/
Cabrillo Power (800 AFY)
East Carlsbad Users (520 AFY)
Legoland Area Users (250 AFY)
Bressi Hydro Tank
VWD 3 (454 AFY)
VWD 8 (147 AFY)
Rincon Business Park (1300 AFY)
VWD Future Development (300 AFY)
Encina WPCF
Carlsbad WRF
Twin D Tank
Meadowlark WRF
VWD 6 (220 AFY)
Ag Users (2,000 AFY)
Eagle Crest Golf Course (338 AFY)
Hale Avenue RRF
Harmony Grove (500 AFY)
Harmony Grove - IPR (4,000 AFY)
Harmony Grove WRP
Wild Animal Park (250 AFY)
Southwest Carlsbad Users (100 AFY)
VWD 7 (196 AFY)
Mahr Reservoir
La Costa Resort Group (200 AFY)
Gafner WRP
Wanket Tank
Escondido Users - South (100 AFY)
Village Park (300 AFY)
Bridges Golf Course/
Cielo Development (300 AFY)
Oakcrest Tank
Private Residence (150 AFY)
Rancho Santa Fe Golf Course (325 AFY)
Private Residence (120 AFY)
Private Users (105 AFY)
San Elijo WRF
San Dieguito Park (60 AFY)
Lomas Santa Fe Tank
Rancho Santa Fe WRP
Fairbanks Ranch WPCF
Whispering Palms WPCF
SFID HOAs (40 AFY)
Lake Wohlford - IPR (8,000 AFY)

4.4 Long-Term Project Option B

Tables 4-6 and **4-7** show a summary of the allocated supplies and recycled water demands to each agency from each wastewater treatment plant for Option B. As in Option A, multiple plants were necessary to satisfy the demand of some agencies whose demand exceeds the nearest treatment plant's available supply. **Figure 4-3** shows the resulting Option B Regional System.

Option B also includes the use and conversion of a portion of the Buena Sanitation District's failsafe outfall from the Shadowridge WRP so that the Carlsbad WRP can serve some of the Vista ID users. As shown in **Figure 4-3**, two Indirect Potable Reuse (IPR) lines are also proposed to serve the Lake Wohlford IPR and the groundwater recharge IPR near Harmony Grove. Existing recycled water lines are also utilized under this Option. However, because there are less treatment plants being used, in several locations more recycled water is being conveyed through these existing lines, especially within the Carlsbad MWD system. Therefore, it is more likely the existing systems may not have the available capacity to convey these additional flows under Option B than under Option A. A hydraulic analysis of the existing systems was not within the scope of this study to confirm these capacity needs.

4.5 Evaluation of Options A and B

To evaluate the regional systems developed under Options A and B, several qualitative criteria were developed:

- **Maximize Reuse**: Ability of option to serve all identified future demands
- **System Reliability**: Ability to provide recycled water from multiple supply sources, pumping stations, or pipelines if there was a disruption of service
- **Adaptability**: Proposed option provides flexibility for adjustments in the future as it is anticipated that each agency will have an independent implementation schedule
- **Institutional Complexity**: Option minimizes the number of institutional arrangements needed between water and wastewater agencies for both supply and sharing of distribution systems for conveying flow through existing systems
- **Proximity of Supplies and Demands:** Demands are located closer to supply sources such that pipelines are reduced in size and length and less pumping is required

Table 4-8 summarizes the results of a comparison of Options A and B under these criteria. Under both options, there is enough supply to serve all the identified long-term demands. Because Option A will have more treatment plant supplies for the same demands, it scores higher in the System Reliability criteria. Under Option B, the majority of the demand is met from only three treatment plants: San Luis Rey WWTP, Carlsbad WRP, and Hale Avenue RRF (HARRF). As such, Option B is not seen as providing much adaptability to be able to adjust plans over time based on the varying levels and speed of implementation that might result. Therefore, Option A is scored much higher than Option B as it provides several agencies with the ability to adjust the long-term plan and to meet demands from different supply sources while building out their systems. Option B has less Institutional Complexity than Option A as three treatment plants are not proposed for future expansion/implementation. Lastly, Option A scores higher than Option B in the Proximity of Supplies and Demands criteria because there are more treatment plants being used to serve local demands.

Table 4-6: Long-Term Option B: Supply Capacity Needs

Agency	Treatment Capacity Needed to Meet Demand[1] (MGD)	Peak Flow Capacity Needed by Plant (MGD)										
		SRTTP	San Luis Rey	La Salina	Shadowridge	Carlsbad	HARRF	Gafner	Meadowlark	San Elijo	Harmony Grove	CSDs[2]
Camp Pendleton	1.3	1.3										
Carlsbad MWD	5.4					5.4						
City of Escondido	12.1						12.1					
City of Oceanside	5.8	1.6	4.2									
Olivenhain MWD	1.0					0.8				0.2		
Rincon Del Diablo MWD	6.4						6.2				0.2	
San Dieguito WD	0.0											
Santa Fe ID	1.3									1.3		
Vallecitos WD	3.9						3.9					
Vista ID	5.0		1.2			3.8						
Total Treatment Capacity Needed	**42.2**	**2.9**	**5.4**	**0.0**	**0.0**	**10.0**	**22.2**	**0.0**	**0.0**	**1.5**	**0.2**	**0.0**

[1] Treatment capacity needed is based on peaking factors specific to each system/plant. For some plants, this additional flow or peak capacity need may already be available within the plant's current capacity and available flows. For other pants, this additional capacity need may require expansion or addition of tertiary and other processes to meet the additional demand needs.

[2] Community CSDs include the Fairbanks Ranch, Rancho Santa Fe, and Whispering Palms plants.

Table 4-7: Long-Term Option B: Additional Recycled Water Demand by Plant

Agency	Recycled Water Demand (afy)	Avg. Annual Recycled Water Demand by Supply (afy)										
		SRTTP	San Luis Rey	La Salina	Shadowridge	Carlsbad	HARRF	Gafner	Meadowlark	San Elijo	Harmony Grove	CSDs[1]
Camp Pendleton	1,400	1,400										
Carlsbad MWD	3,800					3,800						
City of Escondido	11,300						11,300					
City of Oceanside	3,600	1,000	2,600									
Olivenhain MWD	600					500				100		
Rincon Del Diablo MWD	6,000						5,800				200	
San Dieguito WD	0											
Santa Fe ID	800									800		
Vallecitos WD	2,400						2,400					
Vista ID	3,100		700			2,400						
Total Recycled Water Demand	**33,000**	**2,400**	**3,300**	**0**	**0**	**6,700**	**19,500**	**0**	**0**	**900**	**200**	**0**

[1] Community CSDs include the Fairbanks Ranch, Rancho Santa Fe, and Whispering Palms plants.

Figure 4-3
Long-Term Project - Option B

WWTP/WRP
Reservoirs/Hydro Tanks
Potential RW Tank

Potential Recycled Water Demand
- 0 - 100 AFY
- 101 - 500 AFY
- 501 - 1000 AFY
- > 1000 AFY

Conceptual Future Pipelines
- Option B (NPR)
- Option B (IPR)

Existing Recycled Water Pipeline
- Less than 12"
- 12" and Greater

Other Features
- Major Roads
- Study Area
- Water Body
- Waterways

Other Pipelines
- Camp Pendleton Outfall
- Fallbrook Outfall
- City of Encondido Outfall
- LWD Encina Supply
- Oceanside Outfall
- BSD Failsafe Outfall
- VWD Failsafe Outfall
- IDEC Brine Line

Water Agencies
- Camp Pendleton
- Carlsbad MWD
- Escondido
- Oceanside
- Olivenhain MWD
- Rincon Del Diablo MWD
- Santa Fe ID
- San Dieguito WD
- Vallecitos WD
- Vista ID

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N

0 1 2 4 Miles

Mainside Parade Grounds Expansion (5 AFY)
14 Area (20 AFY)
MCAS (153 AFY)
16 Area (3 AFY)
17 Area (96 AFY)
22 Area (11 AFY)
Horse Pasture Expansion (120 AFY)
Wilshire Road (489 AFY)
Marine Memorial Golf Course Expansion (112 AFY)
Morro Hills Development (500 AFY)
Oceanside Municipal Golf Course (695 AFY)
Lower Ysidora Saltwater Intrusion Injection (870 AFY)
San Luis Rey WWTP
Southern Regional TTP
Front Gate Expansion (25 AFY)
El Corazon (440 AFY)
Rancho Del Oro Development (130 AFY)
VID 3 (100 AFY)
VID 1 (620 AFY)
Mira Costa College (200 AFY)
La Salina WWTP
Shadowridge Golf Course (450 AFY)
Leisure Village (600 AFY)
VID 5 (440 AFY)
VWD 9 (63 AFY)
Lake Wohlford - IPR (8,000 AFY)
North Carlsbad Users (730 AFY)
C Tank
Calavera Hydro Tank
VID 4 (490 AFY)
VWD 2 (305 AFY)
VWD 5 (150 AFY)
Escondido Country Club (200 AFY)
Shadowridge WRP
Leslie Lane Reservoir
Northeast Carlsbad Users (1200 AFY)
VID 2 (950 AFY)
VWD 4 (257 AFY)
VWD 1 (274 AFY)
NRC West Coast LLC/
Cabrillo Power (800 AFY)
East Carlsbad Users (520 AFY)
Escondido Users North (562 AFY)
Legoland Area Users (250 AFY)
Bressi Hydro Tank
VWD 3 (454 AFY)
VWD 8 (147 AFY)
Rincon Business Park (1300 AFY)
Encina WPCF
Carlsbad WRF
VWD Future Development (300 AFY)
Ag Users (2,000 AFY)
Twin D Tank
Meadowlark WRF
VWD 6 (220 AFY)
Eagle Crest Golf Course (338 AFY)
Hale Avenue RRF
Southwest Carlsbad Users (100 AFY)
VWD 7 (196 AFY)
Harmony Grove (500 AFY)
Harmony Grove - IPR (4,000 AFY)
Harmony Grove WRP
Mahr Reservoir
Wild Animal Park (250 AFY)
La Costa Resort Group (200 AFY)
Gafner WRP
Wanket Tank
Escondido Users - South (100 AFY)
Village Park (300 AFY)
Bridges Golf Course/
Cielo Development (300 AFY)
Oakcrest Tank
Private Residence (150 AFY)
Rancho Santa Fe Golf Course (325 AFY)
Private Residence (120 AFY)
Private Users (105 AFY)
San Elijo WRF
San Dieguito Park (60 AFY)
Lomas Santa Fe Tank
Rancho Santa Fe WRP
Fairbanks Ranch WPCF
Whispering Palms WPCF
SFID HOAs (40 AFY)

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Table 4-8: Long-Term Option Evaluation Criteria

Criteria	Option A	Option B
Maximize Reuse	●	●
System Reliability	●	◘
Adaptability	●	❍
Institutional Complexity	◘	●
Proximity of Supplies and Demands	●	◘

Legend:
- ● = Meets criteria
- ◘ = Partially meets criteria
- ❍ = Does not meet criteria

Overall, Option A is preferred because of the flexibility and adaptability that the decentralized system provides to the water agencies. The greater number of treatment plants will allow for greater flexibility in implementing the long-term system over time. This Option allows for extensions of recycled water systems based on each treatment plants' available supply and ability to serve recycled water over time. Option A also allows for systems to be developed as the different agencies are able to secure funding and financial arrangements to implement these projects. Overall, Option A provides agencies with more choices of supply and hence, the flexibility to expand systems under varying future conditions.

The estimated regional distribution and treatment costs for Option A are shown in **Table 4-9**. Nearly all the treatment plants will require some level of expansion and/or process upgrades, the treatment costs are greater than the regional distribution costs. However, as noted previously, local distribution costs were not estimated in this study and would require local pipelines to connect users, local distribution storage, and possibly additional pumping or pressure regulating stations. Also, pumping costs are based on the ground elevations and the existing system's HGLs as discussed in Chapter 3. **Appendix B** contains a list of the unit cost assumptions for both capital and O&M used to develop the regional cost estimate.

Note that these costs do not include any avoided costs that could be realized through implementation of the long-term project. These avoided costs can include operational and maintenance costs for ocean disposal, deferred expansion or rehabilitation of ocean disposal systems, reduction of imported water supply purchases, costs or benefits to comply with meeting the 20x2020 conservation requirements, avoided potable water distribution costs (treatment, storage, pumping, etc.), and avoided environmental costs due to reduced discharges. The City of Escondido is projecting that their potential avoided cost to implement a regional recycled water project could be as high as $300,000,000.

4.6 Long-Term Seasonal Storage Options

During the study, the participating agencies developed a list of potential sites (See **Figure 4-4**) that could be used for seasonal storage of non-potable recycled water. While implementation of seasonal storage recycled water sites can be difficult, there are several advantages, including:

- Reducing treatment capacity needs by storing off-peak supplies for use during peak summer demand periods
- Avoiding wastewater discharge capacity improvements by reducing winter time discharges
- Providing water for environmental habitat
- If developed in conjunction with a development project, such features can enhance the proposed development

Table 4-9: Estimated Costs for Long-Term Option A

Item	Cost[1]	
Capital Costs (Total)[2]		
Distribution	**$223,000,000**	
Regional Pipelines[3]		$175,200,000
Local Distribution		TBD
Pumping Stations/Storage		$47,800,000
Treatment	**$429,200,000**	
South Regional TTP		$-
San Luis Rey WWTP		$31,700,000
Shadowridge WRP		$23,300,000
Carlsbad WRP		$66,600,000
Hale Avenue RRF		$220,900,000
Gafner WRP		$24,800,000
Meadowlark WRP		$19,600,000
San Elijo WRF		$5,900,000
Harmony Grove WRP[4]		$26,000,000
CSDs		$10,400,000
Total Capital Costs	**$652,200,000**	
O&M Costs (Annual)[5]		
Distribution	**$ 7,187,000**	
Regional Pipelines		$1,528,000
Local Distribution		TBD
Pumping Stations		$5,659,000
Treatment Plants	**$ 7,281,000**	
South Regional TTP		$169,000
San Luis Rey WWTP		$676,000
Shadowridge WRP		$260,000
Carlsbad WRP		$884,000
Hale Avenue RRF		$4,306,000
Gafner WRP		$435,000
Meadowlark WRP		$260,000
San Elijo WRF		$130,000
Harmony Grove WRP		$31,000
CSDs		$130,000
Total O&M Costs	**$ 14,468,000**	
Yield (afy)	**32,918**	
Unit Cost ($/AF)	**$1,450**	

Notes

[1] Costs are based on Year 2011.

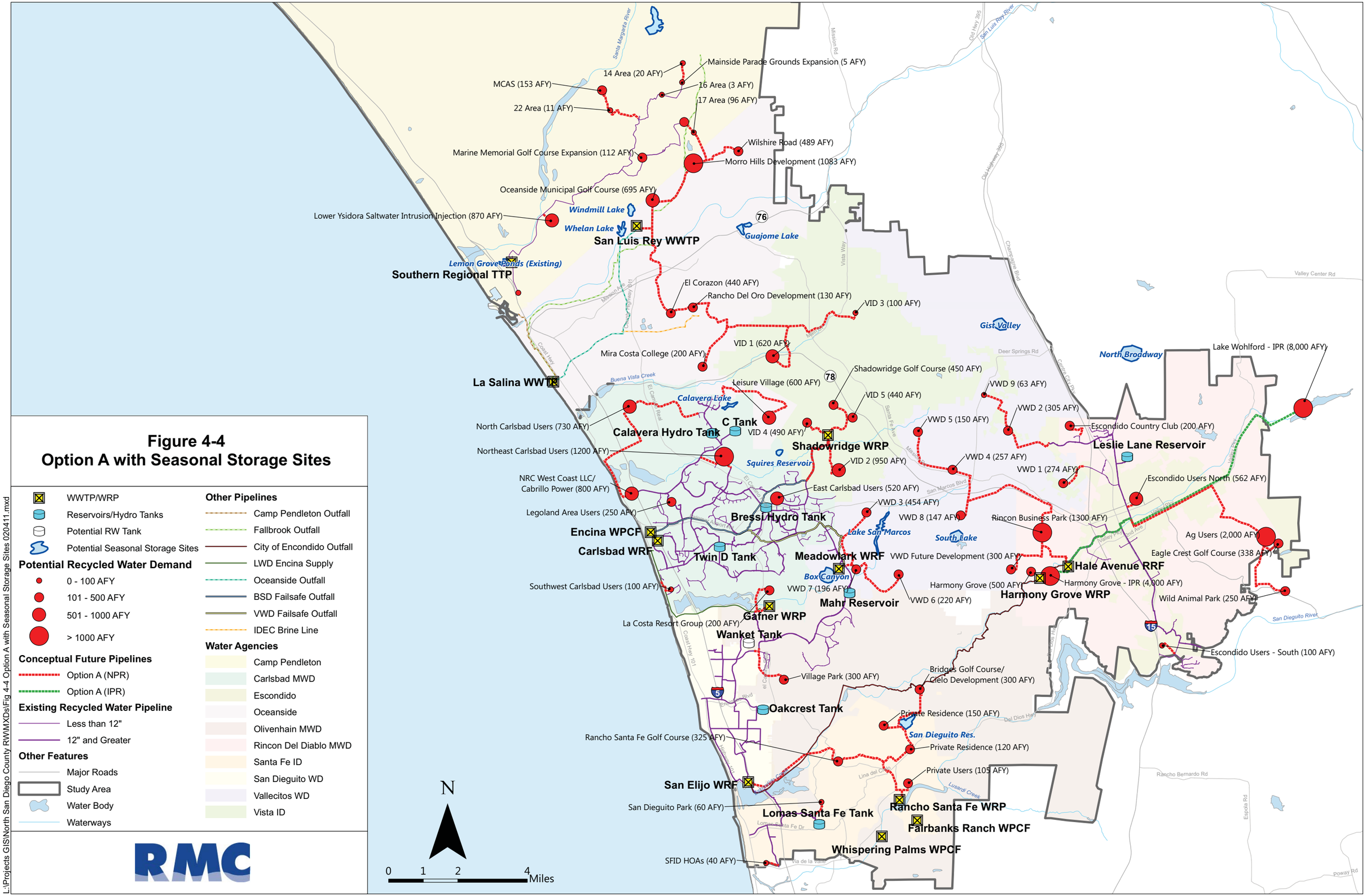
[2] Capital costs include an implementation factor of 25% for engineering, environmental, etc. and an overall project contingency factor of 30%.

[3] Includes facility costs for the Lower Ysidora Salt Water Intrusion project.

[4] Assumes secondary treated wastewater will be available for advanced treatment.

[5] O&M costs include a project contingency factor of 30%.

Figure 4-4
Option A with Seasonal Storage Sites



WWTP/WRP
- Reservoirs/Hydro Tanks
- Potential RW Tank
- Potential Seasonal Storage Sites

Potential Recycled Water Demand
- 0 - 100 AFY
- 101 - 500 AFY
- 501 - 1000 AFY
- > 1000 AFY

Conceptual Future Pipelines
- Option A (NPR)
- Option A (IPR)

Existing Recycled Water Pipeline
- Less than 12"
- 12" and Greater

Other Features
- Major Roads
- Study Area
- Water Body
- Waterways

Other Pipelines
- Camp Pendleton Outfall
- Fallbrook Outfall
- City of Encondido Outfall
- LWD Encina Supply
- Oceanside Outfall
- BSD Failsafe Outfall
- VWD Failsafe Outfall
- IDEC Brine Line

Water Agencies
- Camp Pendleton
- Carlsbad MWD
- Escondido
- Oceanside
- Olivenhain MWD
- Rincon Del Diablo MWD
- Santa Fe ID
- San Dieguito WD
- Vallecitos WD
- Vista ID

RMC

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Figure 4-4 shows the identified potential seasonal storage sites. An estimated 70 MGD of tertiary treatment capacity is needed to supply 44,619 afy of total recycled water demand (existing plus new users) without seasonal storage. To completely balance supply and demand, and eliminate the need for peak tertiary treatment capacity, roughly 9,500 acre-feet of seasonal storage would be required. **Figure** 4-5 shows the total regional non-potable reuse demand of 32,600 afy on an estimated monthly basis and the approximate 9,5000 acre-foot of seasonal storage that would be necessary to balance supply and demand over an annual timeframe. Note that this seasonal storage demands includes Camp Pendleton, which already has some seasonal storage capacity at its Lemon Grove Ponds.

With seasonal storage offsetting the peak seasonal demands on the treatment plants, the total tertiary capacity needs, including both the NPR and IPR demands, could be reduced to about 42 MGD. Thus the 9,500 acre-feet of seasonal storage would offset nearly 28 mgd (70.0 - 42.0) of tertiary treatment upgrades or expansions. The benefits and cost trade-offs of these two approaches should be further explored in subsequent studies.

A limited amount of information was available for many of the identified potential seasonal storage sites. **Table 4-10** summarizes the potential seasonal storage sites, key information collected, and a quick assessment of the potential for these sites to be used for seasonal storage of recycled water.

These sites and their potential advantages and treatment plant cost offsets should be examined more thoroughly in future studies. Most sites could easily be incorporated into the Long-Term Option A plan by adding some additional pipeline and in most cases, an intake pumping station at the site to convey water back into the recycled water system. Preferred sites will have the ability to serve the multiple agencies such that their benefits can be realized by several agencies in the region.

Figure 4-5: Seasonal Non-Potable Recycled Water Demand Balanced with Wastewater Supply

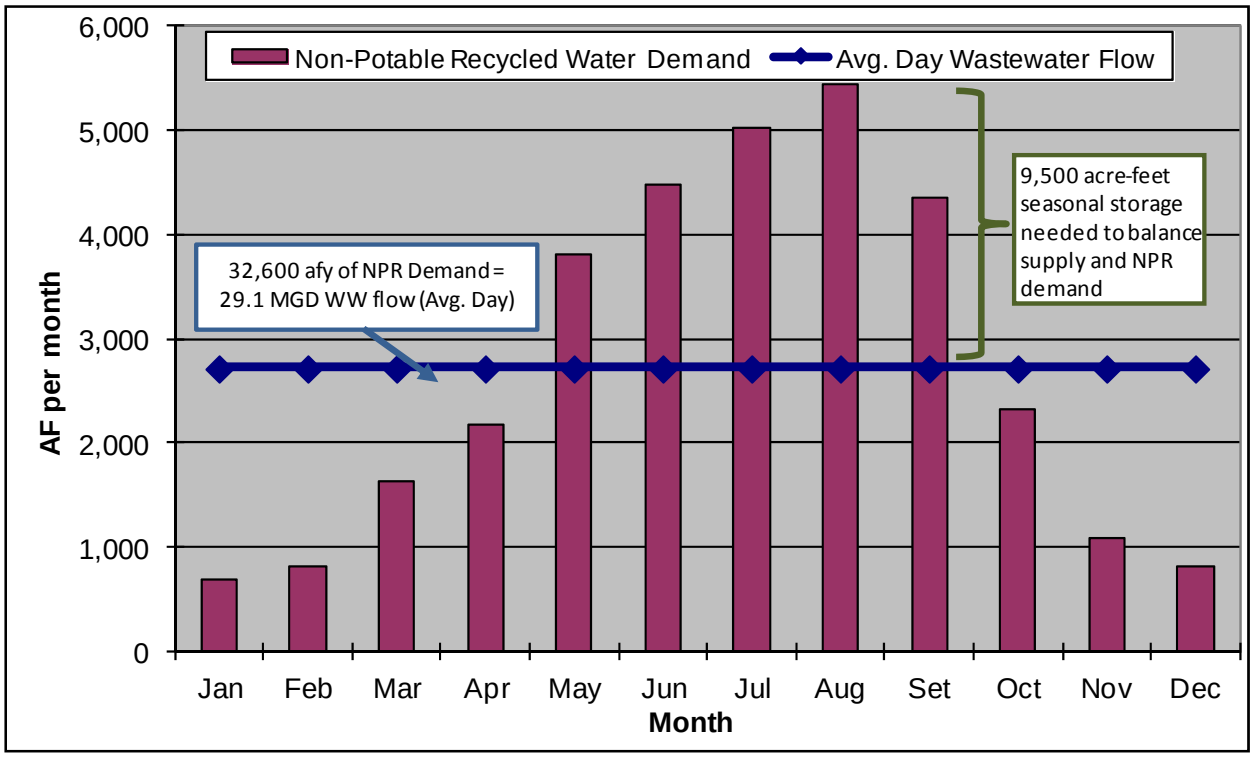

Table 4-10: Potential Long-Term Seasonal Storage Sites

Site	Estimated Storage Capacity	Implementation Challenges
Whelan Lake	500 acre-feet	• Currently within Bird Sanctuary • Served recycled water from the City of Oceanside • Could be environmentally sensitive.
Windmill Lake	500 acre-feet	• Owned by Camp Pendleton • Portion of the lake within City of Oceanside • Overflows spill into Whelan Lake • Inability to meet Basin Plan with tertiary flows
Lemon Grove Ponds	200 acre-feet	• Existing ponds (100 MG over 30 acres) • Owned/operated by Camp Pendleton for wet weather storage • Provides 30 days of storage • Space constrained, so no ability to expand
Guajome Lake	500 acre-feet	• Currently used by County for flood control
Gist Valley	Unknown	• Far from regional system • Previous study by Vallecitos WD for potable storage • Area identified for future development
North Broadway	2,200 acre-feet	• Far from regional system • Just outside City of Escondido, property owned by County of San Diego • Few residential properties around site
Calavera Lake	500 acre-feet	• Primarily used for flood protection • Need to balance flood protection use versus winter time storage
Squires Reservoir	1,100 acre-feet	• Area previously identified by City for potable water storage • Property owned by City
Lake San Marcos	Unknown	• Limited water level variation possible due to residential area • Water quality issues
South Lake	500 acre-feet	• Site owned by Vallecitos Water District • Previously identified for recycled water storage
Box Canyon	Unknown	• Little known about site
San Dieguito Reservoir	Unknown	• Currently used by SFID for potable water storage • Capacity is 800 acre-feet

4.7 Long-Term Indirect Potable Reuse (IPR) Options

In addition to the two planned IPR projects by the City of Escondido and Rincon Del Diablo MWD, several other potential IPR sites were identified by the participating agencies. These sites include both groundwater recharge and surface reservoir augmentation opportunities as shown in **Figure 4-6**. IPR options can also provide the same benefits and the same avoided costs as discussed for seasonal storage projects. In addition, IPR sites can provide direct water supply benefits by augmenting the groundwater or surface reservoir supplies. This can further reduce imported water supplies for the region and will improve water supply reliability to the entire County by providing a local water supply source. IPR options provide the ability to use the remaining 60,000 afy of wastewater still available after the identified 42,800 afy of non-potable demands have been satisfied.

Based on current California regulations, IPR projects in this North San Diego region would likely require some or all of the recycled water to be treated through an RO membrane type process. While producing high quality water, such processes also produce a brine-concentrate flow that must be disposed. The most common and cost-effective disposal option for brine-concentrate flows in southern California is via ocean discharge. Other options such as evaporation ponds, deep well injection, and zero liquid discharge tend to be much higher in cost, more complex, or environmentally unsuitable. The appropriate disposal options for each IPR project will need to be assessed individually due to the complexities and high costs.

Table 4-11 summarizes the potential IPR sites identified in the region, their type, and a quick assessment of their potential for implementation. Implementation of the most suitable sites and their potential advantages and avoided costs should be examined more thoroughly in future studies. Sites with regional or multi-agency benefits and with feasible brine-concentrate disposal options available will often have the highest benefits.

Figure 4-6
Option A with Seasonal Storage and Additional IPR Sites

- WWTP/WRP
- Reservoirs/Hydro Tanks
- Potential RW Tank
- Potential Seasonal Storage Sites
- Potential IPR - Surface
- Potential IPR - Groundwater

Potential Recycled Water Demand

- 0 - 100 AFY
- 101 - 500 AFY
- 501 - 1000 AFY
- > 1,000 AFY

Conceptual Future Pipelines

- Option A (NPR)
- Option A (IPR)

Existing Recycled Water Pipeline

- Less than 12"
- 12" and Greater

Other Features

- Major Roads
- Study Area
- Water Body
- Waterways

Other Pipelines

- Camp Pendleton Outfall
- Fallbrook Outfall
- City of Encondido Outfall
- LWD Encina Supply
- Oceanside Outfall
- BSD Failsafe Outfall
- VWD Failsafe Outfall
- IDEC Brine Line

Water Agencies

- Camp Pendleton
- Carlsbad MWD
- Escondido
- Oceanside
- Olivenhain MWD
- Rincon Del Diablo MWD
- Santa Fe ID
- San Dieguito WD
- Vallecitos WD
- Vista ID

RMC

N

0 1 2 4 Miles

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Table 4-11: Potential Long-Term Indirect Potable Reuse Sites

Site	Type	Notes/Implementation Challenges
Lower Ysidora Saltwater Barrier	Salt water barrier	• Site located within Camp Pendleton • Concept plans include 12 injection wells to contain potential salt barrier and allow for increased groundwater production • Project is beginning implementation in 2012/2013 • Maximum recycled water storage/production is 870 afy, assuming same quantity is extracted upgradient for treatment and potable use • If there is no offsetting extraction of GW upgradient, the injected amount would be reduced to 435 afy
Lake O'Neill	Groundwater recharge	• Lake is currently used to divert streamflows and releases water to nearby groundwater infiltration area • Fallbrook PUD and Camp Pendleton are currently exploring increasing recharge and yield of basin using recycled water flows • Capacity of aquifer accepting recycled water may be limited during winter months of very wet seasons due to groundwater mounding
Mission Basin	Groundwater recharge	• Total storage capacity of 90,000 acre-feet • Groundwater TDS concentrations up to 2,000 mg/l • Existing City of Oceanside groundwater desalter limited in production to about 6,000 afy • Recharge with recycled water would allow increased use of the basin
Daley Ranch	Surface reservoir augmentation	• Over 3,000-acre site owned and managed by the City of Escondido. • Home to variety of sensitive, threatened, and endangered plant and animal species • Study by City indicates potential storage capacity of 17,000 acre-feet • Could be mixed with imported water and local water at Lake Wohlford and Lake Dixon
Lake Wohlford	Surface reservoir augmentation	• Storage for local runoff with a volume of 6,940 acre-feet • Difficulty in satisfying minimum retention time currently required by California Department of Public Health
Lake Dixon	Surface reservoir augmentation	• Storage for imported water with a volume of 2,610 acre-feet • Difficulty in satisfying minimum retention time currently required by California Department of Public Health
San Marcos Basin	Groundwater recharge	• Total storage capacity between 39,000 and 78,000 acre-feet • Groundwater quality in the area generally poor with high levels of TDS and nitrates • Estimated groundwater recharge capacity of 4,600 afy • Vallecitos Water District considering implementation of AB 3030 groundwater management plan

Table 4-11: Potential Long-Term Indirect Potable Reuse Sites

Site	Type	Notes/Implementation Challenges
Harmony Grove IPR	Groundwater recharge	• Rincon Del Diablo MWD has developed concept for IPR project • Estimated initial production of 2,000 afy and ultimate production of 4,000 afy • Involves cleanup of existing groundwater basin with elevated nitrates
San Dieguito Basin	Groundwater recharge	• Total storage capacity 50,000 acre-feet • TDS concentration in the upper and middle portions of the basin up to 3,000 mg/l • TDS concentrations in the lower portion of the basin are as high as 10,000 mg/l. • Estimated production of the groundwater basin with recharge of recycled water is 4,500 afy

Chapter 5 Short-Term Project

5.1 Introduction

This chapter presents the development and implementation considerations for the proposed short-term regional project that could be implemented by 2020, which was developed from the preferred long-term project Option A. Implementation issues discussed below include technical, institutional, and phasing considerations. A rough cost estimate developed for the regional project and recommendations regarding future efforts are summarized at the end of this chapter.

5.2 Short-Term Project Components

The approach used to develop the short-term regional project was to identify the long-term (2030) regional project (Option A) and scale the system back to meet only the short-term demands. Necessary treatment plant upgrades or expansions along with pump station needs were reduced in capacity to satisfy only the short-term demands. However, identified pipelines needed to meet short-term demands were sized adequately to meet the projected long-term demands. Pipelines only needed for the long-term were not included in the short-term. This approach helped to minimize the cost for the short-term project, while still providing capacity for the long-term.

The short-term regional project is shown on **Figure 5-1**, and includes the locations of the projected short-term recycled water demands (red dots). Demands projected to be served only in the long term are shown in grey. As discussed in Chapter 4, many of the smaller projected demands were grouped to represent a number of potential uses. A smaller local distribution system will also need to be constructed to connect to individual users.

Grouping of potential users was done for several agencies, including Carlsbad MWD, Vista ID, Vallecitos WD, Rincon Del Diablo, and Rancho Santa Fe ID. In such cases, the names for these grouped users were based on either the largest demand in the cluster, the geographic area, or a simple agency-numeric ID number. A listing of the demands shown in **Figure 5-1** is provided in **Table 5-1** below.

This study did not develop more detailed local distribution systems that will be required to connect every individual user. For several agencies, such plans will require integration with the agencies' existing systems. For the regional pipelines identified in the short-term project, new pipelines were connected to the existing system where larger pipelines (typically 12-inch or greater) were identified, such that available capacity to serve future demand was assumed. The existing hydraulic grade lines (see Chapter 3) were used to establish a pressure basis for the new pipelines such that new pump stations could be sized accordingly. Agencies where existing lines were utilized include the Camp Pendleton, Carlsbad MWD, City of Escondido, Rincon Del Diablo MWD, and Olivenhain MWD. Hence, **Figure 5-1**, shows several locations where new pipelines are proposed that originate from existing systems.

Figure 5-1
Short-Term Project

WWTP/WRP
Reservoirs/Hydro Tank
Potential RW Tank

Potential Recycled Water Demand
0 - 100 AFY
101 - 500 AFY
501 - 1000 AFY
> 1000 AFY

Potential Recycled Water Demand
0 - 100 AFY
101 - 500 AFY
501 - 1000 AFY
> 1000 AFY

Short-Term Project Components
Eastern
Northern
Southern
Western

Conceptual Future Pipelines
Short-Term (NPR)
Short-Term (IPR)
Long-Term

Existing Recycled Water Pipeline
Less than 12"
12" and Greater

Other Pipelines
Camp Pendleton Outfall
Fallbrook Outfall
City of Encondido Outfall
LWD Encina Supply
Oceanside Outfall
BSD Failsafe Outfall
VWD Failsafe Outfall
IDEC Brine Line

Water Agencies
Camp Pendleton
Carlsbad MWD
Escondido
Oceanside
Olivenhain MWD
Rincon Del Diablo MWD
Santa Fe ID
San Dieguito WD
Vallecitos WD
Vista ID

Other Features
Major Roads
Study Area
Water Body
Waterways

RMC

N

0 1 2 4 Miles

Mainside Parade Grounds Expansion (5 AFY)
14 Area (20 AFY)
MCAS (153 AFY)
16 Area (3 AFY)
17 Area (96 AFY)
22 Area (11 AFY)
Horse Pasture Expansion (120 AFY)
Wilshire Road (489 AFY)
Marine Memorial Golf Course Expansion (112 AFY)
Morro Hills Development (500 AFY)
Oceanside Municipal Golf Course (695 AFY)
Lower Ysidora Saltwater Intrusion Injection (870 AFY)
San Luis Rey WWTP
Southern Regional TTP
Front Gate Expansion (25 AFY)
El Corazon (285 AFY)
Rancho Del Oro Development (130 AFY)
VID 3 (100 AFY)
VID 1 (620 AFY)
Mira Costa College (200 AFY)
La Salina WWTP
Shadowridge Golf Course (450 AFY)
Leisure Village (600 AFY)
VID 5 (440 AFY)
VWD 9 (63 AFY)
VWD 2 (305 AFY)
VWD 5 (150 AFY)
Escondido Country Club (200 AFY)
Lake Wohlford - IPR (8,000 AFY)
Leslie Lane Reservoir
North Carlsbad Users (560 AFY)
Calavera Hydro Tank
C Tank
VID 4 (490 AFY)
Shadowridge WRP
Northeast Carlsbad Users (900 AFY)
VID 2 (950 AFY)
VWD 4 (257 AFY)
VWD 1 (274 AFY)
Escondido Users North (562 AFY)
NRC West Coast LLC/
Cabrillo Power (700 AFY)
East Carlsbad Users (400 AFY)
Legoland Area Users (220 AFY)
Bressi Hydro Tank
VWD 3 (454 AFY)
VWD 8 (147 AFY)
VWD Future Development (300 AFY)
Rincon Business Park (1300 AFY)
Ag Users (2,000 AFY)
Encina WPCF
Carlsbad WRF
Twin D Tank
Meadowlark WRF
VWD 6 (220 AFY)
Eagle Crest Golf Course (338 AFY)
Hale Avenue RRF
Harmony Grove (500 AFY)
Harmony Grove - IPR (2,000 AFY)
Harmony Grove WRP
VWD 7 (196 AFY)
Southwest Carlsbad Users (80 AFY)
Mahr Reservoir
Wild Animal Park (250 AFY)
La Costa Resort Group (180 AFY)
Gafner WRP
Wanket Tank
Escondido Users - South (100 AFY)
Village Park (300 AFY)
Bridges Golf Course/
Cielo Development (300 AFY)
Oakcrest Tank
Private Residence (150 AFY)
Rancho Santa Fe Golf Course (325 AFY)
Private Residence (120 AFY)
Private Users (105 AFY)
San Elijo WRF
San Dieguito Park (60 AFY)
Lomas Santa Fe Tank
Rancho Santa Fe WRP
Fairbanks Ranch WPCF
Whispering Palms WPCF
SFID HOAs (40 AFY)

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Table 5-1: Grouped Projected Short-Term Demands by Retail Water Agency

Demand or Demand Group Name	Agency	Total Annual Short-Term Demand (afy)
Lower Ysidora Salt Water Barrier	Camp Pendleton	870
Subtotal for Camp Pendleton		870
East Carlsbad Users	Carlsbad MWD	400
La Costa Resort Group		180
Legoland Area Users		220
North Carlsbad Users		560
Northeast Carlsbad Users		900
NRC West Coast LLC/Cabrillo Power		700
Southwest Carlsbad Users		80
Subtotal for Carlsbad MWD		3,040
Ag Users	City of Escondido	2,000
Eagle Crest Golf Course		338
Escondido Users - South		100
Escondido Users - North		562
Wild Animal Park		250
Subtotal for City of Escondido		3,250
El Corazon	City of Oceanside	285
Leisure Village		600
Morro Hills Development		500
Oceanside Municipal Golf Course		695
Subtotal for City of Oceanside		2,080
Bridges Golf Course	Olivenhain MWD	300
Village Park		300
Subtotal for Olivenhain MWD		600
Escondido Country Club	Rincon Del Diablo MWD	200
Harmony Grove		500
Harmony Grove – IPR		2,000
Rincon Business Park		1,300
Subtotal for Rincon Del Diablo MWD		4,000
Private Residence (N)	Santa Fe ID	150
Private Residence (S)		120
Private Users		105
Rancho Santa Fe Golf Course		325
San Dieguito Park		60
SFID HOAs		40
Subtotal for Santa Fe ID		800
Shadowridge Golf Course	Vista ID	450
VID 2		950
VID 5		440
Subtotal for Vista ID		1,840

Table 5-1: Grouped Projected Short-Term Demands by Retail Water Agency

Demand or Demand Group Name	Agency	Total Annual Short-Term Demand (afy)
VWD 1	Vallecitos WD	274
VWD 3		454
VWD 6		220
VWD 7		196
VWD Future Development		300
Subtotal for Vallecitos WD		1,444
Total (Additional Projected Demand)		**17,924**

Also shown in **Figure 5-1** are four overlapping project component areas entitled: Northern, Western, Eastern, and Southern. These project component areas were created to reflect the inter-agency linkages that are likely to be necessary to develop the regional project. The project component areas overlap in several areas due to the sharing of the treatment and transmission facilities in both the short-term and/or the long-term. The project component areas also build upon many of the existing and on-going inter-agency agreements and planned expansions of several agencies' recycled water systems. In addition, they represent what is considered to be the most feasible and cost-effective approach for expanding the existing systems to meet the short-term projected demands. **Table 5-2** shows the water and wastewater agencies that would likely be involved in a regional project for each area.

As in Option A, to allocate available supply to the potential demands, a matrix was developed showing the demand by retail water agency and the anticipated supply by wastewater treatment plant. Recycled water supplies were allocated based on satisfying projected peak demands without any additional seasonal storage. **Tables 5-3** and **5-4** show a summary of the allocated supplies and demand to each water agency from each wastewater treatment plant. Note that in several cases, multiple treatment plants were necessary to satisfy the identified regional demand.

Table 5-2: Potential Agencies by Project Component

Project Component	Water Agency	Wastewater Agency (Treatment Plant)
Northern	Camp Pendleton Carlsbad MWD City of Oceanside Vista ID Vallecitos WD	South Regional Tertiary Treatment Plant (SRTTP) Buena Sanitation District (Shadowridge WRP) Carlsbad MWD (Carlsbad WRP) City of Oceanside (San Luis Rey WWTP) Leucadia Wastewater District (Gafner WRP) Vallecitos WD (Meadowlark WRP)
Western	Carlsbad MWD Olivenhain WD San Dieguito WD Santa Fe ID Vista ID Vallecitos WD	Buena Sanitation District (Shadowridge WRP) Carlsbad MWD (Carlsbad WRP) Leucadia Wastewater District (Gafner WRP) San Elijo Joint Powers Authority (San Elijo WRF) Vallecitos WD (Meadowlark WRP)
Eastern	City of Escondido Rincon Del Diablo MWD Vallecitos WD	City of Escondido (Hale Avenue RRF) Rincon Del Diablo MWD (Harmony Grove WRP) Vallecitos WD

Table 5-2: Potential Agencies by Project Component

Project Component	Water Agency	Wastewater Agency (Treatment Plant)
Southern	Olivenhain WD San Dieguito WD Santa Fe ID	Community Services Districts (Fairbanks Ranch WPCF, Rancho Santa Fe WRP, Whispering Palms WPCF) San Elijo Joint Powers Authority (San Elijo WRF)

Table 5-3: Short-Term Project: Supply Capacity Needs

Agency	Treatment Capacity Needed to Meet Demand[1] (MGD)	Peak Flow Capacity Needed by Plant (MGD)										
		SRTTP	San Luis Rey	La Salina	Shadowridge	Carlsbad	HARRF	Gafner	Meadowlark	San Elijo	Har. Grove	CSDs[2]
Camp Pendleton	0.8	0.8										
Carlsbad MWD	4.3					4.0		0.3				
City of Escondido	5.3						5.3					
City of Oceanside	3.4	0.8	1.6			1.0						
Olivenhain MWD	1.0							0.3		0.2		0.5
Rincon Del Diablo MWD	4.4						4.2				0.2	
San Dieguito WD	0.0											
Santa Fe ID	1.3									0.8		0.5
Vallecitos WD	2.2						0.9		1.3			
Vista ID	2.9				1.1	1.8						
Total Treatment Capacity Needed	**25.6**	**1.6**	**1.6**	**0.0**	**1.1**	**6.8**	**10.4**	**0.6**	**1.3**	**1.0**	**0.2**	**1.0**

[1] Additional capacity needed is based on peaking factors specific to each system/plant.
[2] Community CSDs include the Fairbanks Ranch, Rancho Santa Fe, and Whispering Palms plants.

Table 5-4: Short-Term Project: Additional Recycled Water Demand by Plant

Agency	Recycled Water Demand (afy)	Avg. Annual Recycled Water Demand by Supply (afy)										
		SRTTP	San Luis Rey	La Salina	Shadowridge	Carlsbad	HARRF	Gafner	Meadowlark	San Elijo	Har. Grove	CSDs[1]
Camp Pendleton	900	900										
Carlsbad MWD	3,000					2,800		200				
City of Escondido	3,300						3,300					
City of Oceanside	2,100	500	1,000			600						
Olivenhain MWD	600							200		100		300
Rincon Del Diablo MWD	4,000						3,800				200	
San Dieguito WD	0											
Santa Fe ID	800									500		300
Vallecitos WD	1,400						600		800			
Vista ID	1,800				700	1,100						
Total Treatment Capacity Needed	**17,900**	**1,400**	**1,000**	**0**	**700**	**4,500**	**7,700**	**400**	**800**	**600**	**200**	**600**

[1] Community CSDs include the Fairbanks Ranch, Rancho Santa Fe, and Whispering Palms plants.

5.3 Technical Considerations

Development of the short-term project requires consideration of several technical issues identified during the study. Several of these issues are also relevant to the long-term project. Specific technical considerations include the following:

- In addition to the construction of new regional pipelines, the short-term project also includes the conversion of a portion of the existing Buena Sanitation District failsafe outfall from the currently decommissioned Shadowridge WRP. Carlsbad MWD is in discussions with BSD regarding the conversion of a portion of this line. This would allow for additional flow in both the short- and long-term planning periods from the Carlsbad WRP to serve several demands in the Vista ID service area, which is needed since the demand exceeds the identified capacity of the Shadowridge WRP.

- As shown in **Figure 5-1**, the Wanket Tank in the Olivenhain MWD's service area is an existing potable water tank that could be converted to recycled water. Olivenhain MWD is currently discussing conversion of this tank with the San Dieguito Water District. There may be additional opportunities to convert potable facilities to regional or local recycled water distribution systems.
- It is assumed that new or upgraded pumping stations will be required at all the plants supplying recycled water to the regional system. In addition, due to topography as well as the several longer regional pipelines, booster pumping stations are also assumed along the system in several locations. Existing local system pressures (see **Figure 3-2**) were also taken into account wherever new recycled water lines were proposed for connection to the existing systems. Based on this information and the estimated flows in the proposed pipelines, the following locations along the regional transmission system were identified for potential pumping stations:
    - Pipeline leading to the El Corazon Development in Oceanside
    - Pipeline from the existing Carlsbad MWD system up to the Leisure Village area in Oceanside
    - Pipeline from the existing Carlsbad MWD system (or converted BSD Failsafe outfall) up to VID2 user area in Vista ID
    - Pipeline from the existing Escondido/Rincon Del Diablo system to the Escondido County Club
    - Pipeline from the VWD7 user to the VWD6 user in the Vallecitos WD area
    - Pipeline up to the Bridges Golf Course/Cielo Development Area in Olivenhain WD
    - Pumping station improvements to Camp Pendleton's system at Gooseneck RWPS No.1 and at a proposed storage tank near Whelan Lake as identified in their Recycled Water Master Plan
- As shown in **Tables 5-3** and **5-4**, nine treatment plants are being proposed to serve the regional short-term project. At each plant, upgrades or expansions of tertiary treatment facilities will be required. For some plants, additional work, such as sewer diversions or other facility improvements, may be necessary as well to ensure sufficient wastewater flow. See Chapter 3 for more detailed discussion regarding each treatment plant.
- As discussed in Chapter 2, there is a wide range of regulatory basin objectives, permitted water qualities for each treatment plant, and the average and maximum water qualities of each plant. Supply of recycled water from existing treatment plants to areas outside of the currently permitted service areas will require an in-depth review to determine potential water quality issues. Such issues may need to be addressed with the San Diego Regional Water Quality Control Board (RWQCB). In some cases, the RWQCB may be willing to grant waivers or permit water qualities above current basin objectives to help foster the expansion of the regional recycled water project. However, in other cases, agencies may need to address the water quality concerns through additional treatment, operational changes, blending, or other strategies. In reviewing the current recycled water qualities, permit limits, and basin objectives from Chapter 2, the following water quality challenges were identified based on the proposed short-term regional project:
    - **Manganese Limits**: The Hale Avenue RRF (0.06 mg/l), Gafner WRP (0.07 mg/l), and the San Elijo WRF (0.09 mg/l) all produce recycled water with 12-month average manganese levels that exceed the basin objectives (0.05 mg/l) of most sub-basins in the region. Although average levels for the Carlsbad WRP were not reported, Carlsbad MWD has expressed concern over this issue as well.
    - **Total Dissolved Solids (TDS) Limits**: Most of the WRPs in the region produce recycled water with TDS levels that are below 1,000 mg/l and meet the basin objectives of their current or potential expanded service areas. San Elijo WRF's current annual average TDS is 1,132 mg/l, but the San Elijo JPA is currently looking to implement a project that will produce recycled water with a TDS below 1,000 mg/l. The City of Oceanside's San

Luis Rey WWTP average annual TDS is 1,009 mg/l, which is well below the plant's permit limit of 1,200 mg/l. However, in the proposed short-term project, the San Luis Rey WWTP would serve recycled water to Vista ID users in the Vista sub-basin area, which has a basin objective of 1,000 mg/l. This difference could easily be addressed in several ways, including blending with some potable water or recycled water from the Fallbrook PUD's plant. However, if the TDS level in Oceanside's recycled water were to rise, meeting the 1,000 mg/l limit could be more difficult. Santa Fe ID is currently looking at using the three Community Service Districts' plants in its eastern service area. These plants average more than 1,000 mg/l in TDS, so this may need to be addressed with additional treatment.

5.4 Institutional Agreements

Several inter-agency agreements will be necessary to complete the short-term regional project components as identified. These include agreements between the wastewater providers and the water agencies, as well as between water agencies where recycled water may be conveyed through one local system to another agency's local system.

Many similar agreements were established as the existing recycled water systems were developed. In some cases, these existing agreements already have provisions for future expansion. Where new agreements are necessary, agencies should address not only the short-term project, but where practical, address the long-term regional project as well.

Agreements may be necessary for a variety of infrastructure sharing and cost/pricing situations. Cost considerations can include both capital improvement and operation and maintenance costs. Potential infrastructure that may need to be included in such agreements include:

- Wastewater supplies
- Shared pipelines and pump stations
- Wheeling of recycled water through existing local systems
- Shared recycled water storage facilities
- Conversion of potable water facilities to recycled water systems
- Water quality controls

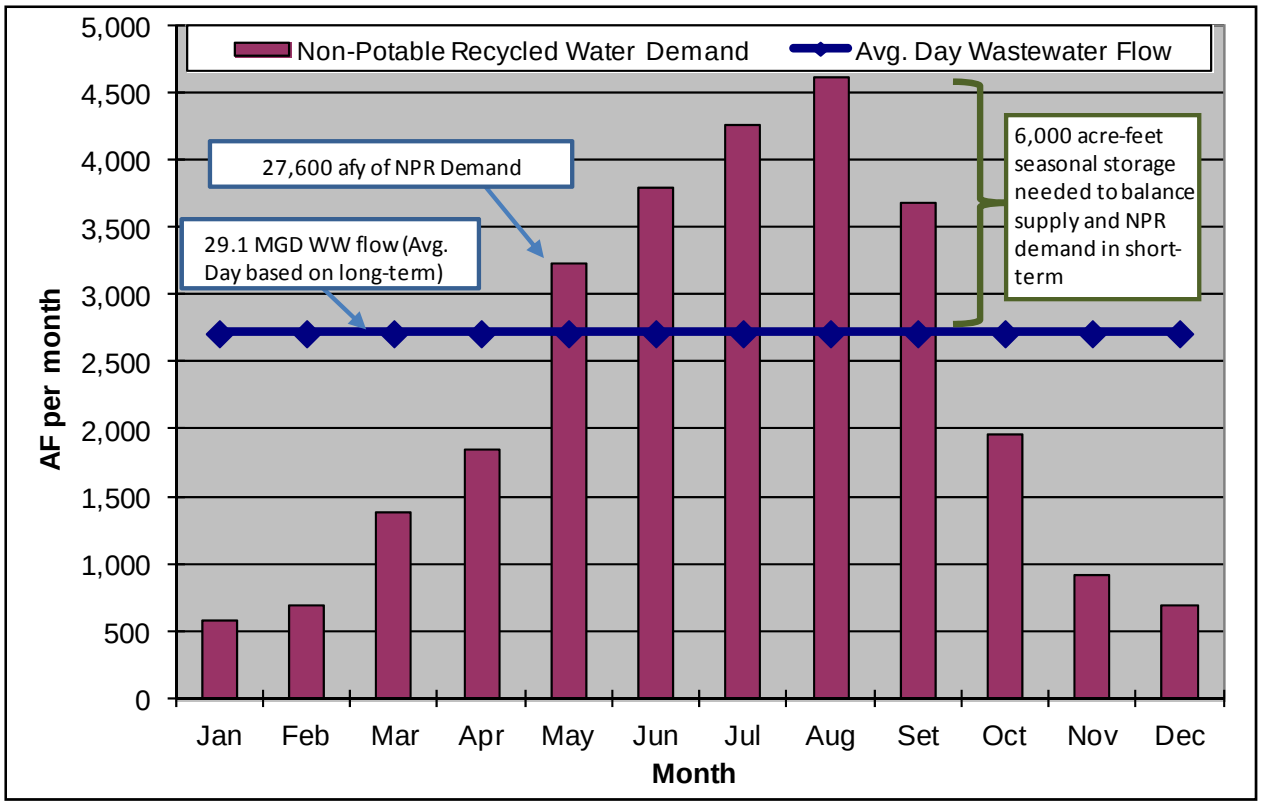
5.5 Phasing

As noted previously, the short-term project was derived from the preferred long-term project, Option A. Within in each time period, there is flexibility for agencies in how and when they implement the expansion of their specific systems. However, there are several factors that will need to be considered at a regional level as they can have impacts to an individual agency's needs and timing of system expansions. These include factors such as:

- **Timing or priority of project components**: In several cases, the timing of a treatment plant's expansion or upgrade will need to be coordinated with a water agency's distribution expansion. In addition, some agencies may rely on another agency to develop their distribution system prior to constructing their own. Identification of these critical predecessor projects, timing, and coordination amongst impacted agencies will be important to the success of the regional projects.
- **Seasonal storage sites**: As discussed in Chapter 4, several potential seasonal storage sites were identified, each of which could benefit multiple agencies, if not the entire region. The timing of commitment and implementation to such projects is important as they will likely reduce the expansion or upgrades necessary at one or more wastewater treatment plants. As shown in **Figure 5-2**, approximately 6,000 acre-feet of seasonal storage would be needed to balance supply

and demand while keeping the total tertiary treatment capacity needs for existing and short-term recycled water demands at 29.1 mgd, which is the projected treatment capacity needed for the long-term project. As noted above, the total seasonal storage need for the long-term is 9,500 acre-feet to achieve a complete balance of supply and storage on an average annual basis. Seasonal storage projects are likely to take several years to develop and implement, so it is important for agencies to consider these early in their planning process for the short-term regional project. In addition, several potential sites may be part of future development plans, so agencies will need to consider and commit to any such projects early in the process to avoid losing a potential site to a City or developer's zoning or development plans.

Figure 5-2: Seasonal Non-Potable Recycled Water Demand Balanced with Wastewater Supply



- **Indirect Potable Reuse (IPR) sites:** As noted in Chapter 4, several long-term IPR groundwater and surface water augmentation sites were identified as suitable. Many of these sites can accommodate a significant amount of recycled water, which provides a greater opportunity than NPR alone as they use a higher percentage of available wastewater for beneficial purposes, thus further reducing the region's need for imported water. IPR projects can often be very cost effective because of their size and reduced need for facilities compared to a non-potable system that can have dozen or even hundreds of users spread out over a vast area.

The estimated regional distribution and treatment costs the short-term project are shown in **Table 5-5**. As in the long-term project, nearly all the treatment plants will require some level of expansion and/or process upgrades, the treatment costs are greater than the regional distribution costs. However, as noted previously, local distribution costs were not estimated in this study and would require local pipelines to connect users, local distribution storage, and possibly additional pumping or pressure regulating stations.

Note that these costs do not include any avoided costs that could be realized through implementation of the long-term project. **Appendix B** contains a list of the unit cost assumptions for both capital and O&M used to develop the regional cost estimate.

Table 5-5: Estimated Costs for Short-Term Regional Project

Item	Cost[1]	
Capital Costs (Total)[2]		
Distribution	**$123,200,000**	
Regional Pipelines[3]		$107,900,000
Local Distribution		TBD
Pumping Stations/Storage		$15,300,000
Treatment	**$235,100,000**	
South Regional TTP		$-
San Luis Rey WWTP		$9,800,000
Shadowridge WRP		$23,300,000
Carlsbad WRP		$66,600,000
Hale Avenue RRF		$71,400,000
Gafner WRP		$11,800,000
Meadowlark WRP		$19,600,000
San Elijo WRF		$5,900,000
Harmony Grove WRP[4]		$16,300,000
CSDs		$10,400,000
Total Capital Costs	**$358,300,000**	
O&M Costs (Annual)[5]		
Distribution	**$2,491,000**	
Regional Pipelines		$1,019,000
Local Distribution		TBD
Pumping Stations		$1,472,000
Treatment Plants	**$3,390,000**	
South Regional TTP		$104,000
San Luis Rey WWTP		$208,000
Shadowridge WRP		$143,000
Carlsbad WRP		$884,000
Hale Avenue RRF		$1,352,000
Gafner WRP		$239,000
Meadowlark WRP		$169,000
San Elijo WRF		$130,000
Harmony Grove WRP		$31,000
CSDs		$130,000
Total O&M Costs	**$5,881,000**	
Yield (afy)	**17,924**	
Unit Cost ($/AF)	**$1,350**	

Notes

[1] Costs are based on Year 2011.

[2] Capital costs include an implementation factor of 25% for engineering, environmental, etc. and an overall project contingency factor of 30%.

[3] Includes facility costs for the Lower Ysidora Salt Water Intrusion project.

[4] Assumes secondary treated wastewater will be available for advanced treatment.

[5] O&M costs include a project contingency factor of 30%.

5.6 Recommendations

This study is intended to assist the North San Diego County water and wastewater agencies in identifying the benefits of regionalization of existing and planned recycled water systems. To fully implement the short-term project, more detailed studies and planning will be necessary. As noted previously, several agencies have already begun conducting detailed system studies or master plans that will integrate into this regional study. In addition to the follow-on planning efforts, implementation of the regional project will require institutional arrangements, environmental documentation, and the design and construction of necessary infrastructure. The following is a list of preliminary recommendations for the participating agencies to consider in the near-term (next 1 to 3 years) for implementation of the short-term project by 2020:

- **Seasonal storage sites**: Evaluate in more depth the top potential sites for consideration to incorporate into the short- and/or long-term project.
- **Indirect Potable Reuse (IPR) sites**: As previously discussed, the potential demand size and benefits of utilizing IPR sites should be considered early in the planning process as such projects could more fully utilize available wastewater flow versus non-potable systems. Such sites should be considered carefully by agencies and realize that such projects typically take several years to implement. If deemed feasible, the timing of such a project will need to be considered in context to the short-term and long-term regional project.
- **Update agency specific recycled water plans**: Agencies considering participating in the short-term regional project should ensure that their current plans are up to date and integrated with the regional short-term and long-term projects. Agencies without current plans should consider updating previous plans to ensure compatibility with this regional approach.
- **Hydraulic analysis**: More detailed hydraulic analyses should be conducted by agencies as part of their recycled water master plans or other follow-on planning studies. These analyses should consider both the agency's individual system needs as well as the short- and long-term regional projects. In some cases, agencies may need to work in collaboration to analyze the regional components. Such hydraulic analyses should better define the pipeline sizes, available capacities of existing recycled water systems that are proposed to be extended, diurnal storage needs, pump station locations and sizing, and seasonal storage impacts.
- **Public information campaign**: Participating agencies in the regional project may want to create a unified message and/or plan that can be used throughout the implementation of the short-term and even long-term project. This can be important if the long-term project involves major regional pipelines, regional seasonal storage projects, or regional or multiple IPR elements.
- **Develop or refine inter-agency agreements**: Agencies looking to implement their systems in the next few years may need to create new institutional agreements to implement their projects. In addition, several agencies have different options as to how they can obtain their future wastewater supplies. In these cases, the water and wastewater agencies may need to more fully develop their concept plans so that they can consider in more detail the actual projects costs, cost-benefit trade-offs, and financial arrangements.
- **Environmental documentation**: Some components of the regional systems may require significant environmental documentation in the next few years as part of their project implementation schedule. A more regional programmatic type of environmental document may help to streamline the process for environmental clearance on future regional components.

Appendix A

Document/Data Summary

North San Diego County Recycled Water Project

Report/Data Summary

Agency	Document Name/Description	Contents	Document Release Date	Author	File Name	Type of File
Buena SD	Shadowridge WRF Cost-Benefit Analysis (DRAFT)	Report	Aug-2010	PBS&J	rev Shadowridge Cost Benefit Analysis_Draft 08-30-10	pdf
Camp Pendleton	Existing Recycled Water System	GIS Data		N/A	All_RW_Pipes	dbf, prj, sbn, sbx, shp, shx
Camp Pendleton	Camp Pendleton Boundary	GIS Data	Mar-2012	N/A	CPEN_Boundary	dbf, prj, sbn, sbx, shp, shx
Camp Pendleton	Recycled Water Master Plan (Draft)	Master Plan	Sep-2011	Brown & Caldwell	Recycled Water Master Plan	pdf
Camp Pendleton	P-1046 Distribution of Reclaimed Water	Tech Memo/Figures	Oct-2011	Public Works Department	P-1046 Distribution of Reclaimed Water	pdf
Camp Pendleton	Camp Pendleton Water Resource Plan	Report	Apr-2011	Stetson Engineers, Inc.	Water Resources Plan-April 2011	PDF
Camp Pendleton	Urban Water Management Plan (Draft)	Report	Aug-2010	Stetson Engineers, Inc.	Draft UWMP 08 04 2010	PDF
Camp Pendleton	Pilot Test – Recycled Water Injection to Control Against Salt Water Intrusion Lower Ysidora Sub-basin	Report	Feb-2012	Stetson Engineers, Inc.	FINAL Pilot Test LY Injection Study Report.pdf	pdf
Camp Pendleton	Pilot Test -Recycled Water Injenction to Control Against Salt Water Intrusion Lower Ysidora Sub-basin	Report	Feb-2012	Stetson Engineers, Inc.	FINAL Pilot Test LY Injection Study Report	pdf
Carlsbad	Billing Data-2004 to 2009	Data	2004-2009	N/A	Billing_Data-2004_to2009	xlsx
Carlsbad	Billing Data-Monthly-2004 to 2009-Non/Residential	Data	2004-2009	N/A	Billing_Data-Monthly-2004_to_2009-NoN/Residential	xls
Carlsbad	Carlsbad Mains Carollo 9 15 09	GIS Data		N/A	Carlsbad_Mains_Carollo_9_15_09.sbn	dbf, prj, sbn, sbx, shp, shx
Carlsbad	Gafner - Reclaimed Water Pipelines			N/A	Gafner - Reclaimed Water Pipelines	pdf
Carlsbad	Boundary-City	GIS Data		N/A	Boundary-City	dbf, prj, sbn, sbx, shp, shp.xml, shx
Carlsbad	Boundary-Sewer Districts	GIS Data		N/A	Boundary-Sewer_Districts	dbf, prj, sbn, sbx, shp, shp.xml, shx
Carlsbad	Boundary-Water Districts	GIS Data		N/A	Boundary-Water_Districts.dbf	dbf, prj, sbn, sbx, shp, shp.xml, shx
Carlsbad	Carlsbad Meters carollo 9 1 09	GIS Data	Sep-2009	N/A	Carlsbad_Meters_carollo_9_1_09	dbf, shp, shp.xml, shx

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Agency	Document Name/Description	Contents	Document Release Date	Author	File Name	Type of File
Carlsbad	Elev-Contour-2 ft-2005	GIS Data	2005	N/A	Elev-Contour-2_ft-2005.dbf	dbf, prj, sbn, sbx, shp, shp.xml, shx
Carlsbad	treatment plant and storage reservoir locations	GIS Data		N/A	TREATMENT PLANT AND STORAGE RESERVOIR LOCATIONS.DBF	dbf
Carlsbad	treatment plant and storage reservoir locations	GIS Data		N/A	treatment plant and storage reservoir locations	shp, shx
Carlsbad	Draft 2010 RWMP-Figure 2.4-Abandoned Pipelines Ver B	Figure	2010	N/A	Draft_2010_RWMP-Figure_2_4-Abandoned_Pipelines_Ver_B	pdf
Carlsbad	CMWD Draft 2010 RWMP Report (Aggregate)	Master Plan	2010	Carollo	Pages from Draft 2010 RWMP Chapter 2	pdf
Carlsbad	Carlsbad WRF - Operating Costs	Data		N/A	Carlsbad WRF - Operating Costs	pdf
Carlsbad	Cost info for Gafner WRP	Data		N/A	Cost info for Gafner WRP	pdf
Carlsbad	San Diego Basin Plan	Amendment		N/A	San Diego Basin Plan	pdf
Carlsbad	Carlsbad WRF - Supply Report for Feb 2009	Quarterly Report	Feb-2009	N/A	Carlsbad WRF - Supply Report for Feb 2009 (Manganese Issue)	pdf
Carlsbad	Corrosion Study Final Report	Study Report	May-2006	N/A	Corrosion Study Final Report 050206.pdf	pdf
Carlsbad	CWRF - Secondary Nitrogen for CMWD 2009	Data		N/A	CWRF - Secondary_Nitrogen_for_CMWD_2009	xls
Carlsbad	CWRF- NARATIO	Data		N/A	CWRF- NARATIO	xls
Carlsbad	CWRF	Data		N/A	CWRF	xls
Carlsbad	CWRF August 2009	Data		N/A	CWRF_August_2009	pdf
Carlsbad	Gafner Data	Data		N/A	Gafner_Data	xls
Carlsbad	CWRF- NARATIO	Data		N/A	CWRF- NARATIO	xls
Carlsbad	Garner-Meadowlark-NARATIO	Data		N/A	Garner-Meadowlark-NARATIO	xls
Carlsbad	Relevant RWQCB Correspondence (MEAD)	Data		N/A	MEAD	xls
Carlsbad	Waste Discharge Permits, 1993 0023	Permit	1993	N/A	1993_0023	pdf
Carlsbad	Waste Discharge Permits, 1993 0041	Permit	1993	N/A	1993_0041	pdf
Carlsbad	Waste Discharge Permits, 2000 0036	Permit	2000	N/A	2000_0036	pdf
Carlsbad	Waste Discharge Permits, 2001 0352	Permit	2001	N/A	2001_0352	pdf
Carlsbad	Waste Discharge Permits, 2004 0223	Permit	2004	N/A	2004_0223	pdf
Carlsbad	Waste Discharge Permits, 2007 0018	Permit	2007	N/A	2007_0018	pdf
Carlsbad	Annual Supply Report - 2002 to 2003	Supply Data	2002-2003	MWD	Annual Supply Report - 2002 to 2003	pdf
Carlsbad	Annual Supply Report - 2005 to 2006	Supply Data	2005-2006	MWD	Annual Supply Report - 2005 to 2006	pdf

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Carlsbad	Annual Supply Report - 2006 to 2007	Supply Data	2006-2007	MWD	Annual Supply Report - 2006 to 2007	pdf
Carlsbad	Annual Supply Report - 2007 to 2008	Supply Data	2007-2008	MWD	Annual Supply Report - 2007 to 2008	pdf
Carlsbad	Annual Supply Report - 2008 to 2009	Supply Data	2008-2009	MWD	Annual Supply Report - 2008 to 2009	pdf
Carlsbad	Recycled Water Historical Seasonal Use	Data		N/A	Recycled Water Historical Seasonal Use	xlsx
Carlsbad	Carlsbad WRF - Phase II Improvement Plans	Plans		N/A	Carlsbad WRF - Phase II Improvement Plans	pdf
Carlsbad	City of Carlsbad Preliminary Pumping and Equalization Design Report	PDR	Sep-2001	N/A	City of Carlsbad Preliminary Pumping and Equalization Design Report	pdf
Carlsbad	Encina Equalization Basin and Carlsbad WRF Joint Facilities	Plans	2003	N/A	Encino Equalization Basin and Carlsbad WRF Joint Facilities	pdf
Carlsbad	Meadowlark WRF 2005 Expansion Final Design Drawings	Plans	2005	N/A	Meadowlark WRF - 2005 Expansion - Final Design Drawings	pdf
Carlsbad	Draft 2010 Recycled Water Master Plan	Master Plan	2010	Carollo	CMWD Draft 2010 RWMP Report (Aggregate)	pdf
Carlsbad	Existing and Potential Recycled Water Treatment Facilities	Figure		Carollo	Draft 2010 RWMP Figure_4_07-Existing_System_Treatment_Facilities	pdf
Carlsbad	2003 SMP maps	Figure		Dudek & Associates, Inc	2003 SMP maps	pdf
Carlsbad	2003 SMP maps	Figure		Dudek & Associates, Inc	2003 SMP maps	pdf
Carlsbad	2003 Water Master Plan Update	Master Plan	Mar-2003	Dudek & Associates, Inc	Water Master Plan Update	pdf
Carlsbad	1997 Reclaimed Water Master Plan Update	Master Plan	Oct-1997	Carollo	Carlsbad_ReclaimedWaterMPUpdate_Oct1997	pdf
Carlsbad	2003 Sewer Master Plan Update	Master Plan	Mar-2003	Dudek & Associates, Inc	2003 Carlsbad_Sewer_Master_Plan_Update_FinalRpt	pdf
Carlsbad	2009 Sewer Master Plan Update	Master Plan	Oct-2009	Dudek & Associates, Inc	2009 City of Carlsbad Draft Sewer Master Plan Update	pdf
Carlsbad	PhaseII Recycled Water Project Implementation Plan	Implementation Plan	2004	City of Carlsbad	PhaseII Recycled Water Project Implementation Plan	pdf

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Carlsbad	2000 Encina Basin Recycled Water Distribution System Study	Study Report	May-2000	John Powell, Cathcard Garcia von Langen Engineers	2000 Encina Basin Recycled Water Distribution System Study	pdf
Carlsbad	Bressi Ranch Master Plan	Master Plan	May-2002	Hofman Planning Calthorpe Associates	Bressi Ranch MP	pdf
Carlsbad	Carlsbad Oaks North Specific Plan 211	Specific Plan	Aug-2002	City of Carlsbad	Carlsbad Oaks North SP211	pdf
Carlsbad	Carlsbad Ranch Specific Plan 207E	Specific Plan	1995-1999	Hofman Planning Associates	Carlsbad Ranch SP 207E	pdf
Carlsbad	Robertson Ranch Master Plan - Part 1	Master Plan	Nov-2006	City of Carlsbad	Robertson Ranch 1 MP	pdf
Carlsbad	Robertson Ranch Master Plan - Part 2	Master Plan	Nov-2006	City of Carlsbad	Robertson Ranch 2 MP	pdf
Carlsbad	Robertson Ranch Master Plan - Part 3	Master Plan	Nov-2006	City of Carlsbad	Robertson Ranch 3 MP	pdf
Carlsbad	Robertson Ranch Master Plan - Part 4	Master Plan	Nov-2006	City of Carlsbad	Robertson Ranch 4 MP	pdf
Carlsbad	Villages of La Costa Master Plan	Master Plan	Dec-2000	MORROW DEVELOPMENT	Villages of La Costa MP	pdf
Carlsbad	Boron Study Final Report, Evaluation of Proposed Irrigation Water Quality on Carlsbad Landscapes, Poseidon Resources/Carlsbad Desalination Project	Study Report	Dec-2005	Poseidon Resources Corp.	Boron Study Final Report	pdf
Carlsbad	CMWD 2005 Urban Water Master Plan	Master Plan	Dec-2005	Carlsbad Municipal Water District	CMWD 2005 UWMP	pdf
Carlsbad	Squires Reservoir Needs Study	Study Report	Nov-1987	Costa Real MWD/ Luke-Dudek Civil Engs.	Squires Reservoir 1987	pdf
City of Oceanside	City of Oceanside - Recycled Water Master Plan 2005	Master Plan	Oct-2005	Carollo	City of Oceanside - Recycled Water Master Plan 2005	pdf
City of Oceanside	Background Info	Data		N/A	Background Info.	doc
City of Oceanside	NPDES Oceanside R9-2005-0136 Final	Permit		N/A	NPDES Oceanside R9-2005-0136 Final	pdf
City of Oceanside	Recycled Water Quality	Data		N/A	Recycled Water Quality	xls
City of Oceanside	SLR Waste Discharge Permit	Permit		N/A	SLR Waste Discharge Permit	pdf

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Agency	Document Name/Description	Contents	Document Release Date	Author	File Name	Type of File
City of Oceanside	Disclaimer and Limited Use Agreement	Data		N/A	Disclaimer and Limited Use Agreement CD	doc
City of Oceanside	Database, Oceanside	GIS Data		N/A	Oceanside	mdb
City of Oceanside	Database, Oceanside Topo	GIS Data		N/A	Oceanside_Topo	mdb
City of Oceanside	Database, Source Countour2009	Data		N/A	Source_Countour2009	doc
City of Oceanside	GIS Data, Oceanside	GIS Data		N/A	Oceanside	ldb, mdb
City of San Diego	North City WRP 2009 annual monitoring report	Data		City of San Diego	2009annual monitoring report	pdf
City of San Diego	2005 Urban Water Management Plan	Management Plan		City of San Diego	2005 Urban Water Management Plan	pdf
Escondido	R9-2010-0032	Permit		N/A	R9-2010-0032	pdf
Escondido	12 month avg-10	Data		N/A	12 month avg-10	xls
Escondido	Escondido Map & more	Permit		N/A	Escondido Map & more	pdf
Escondido	HARRF- Order R9-2010-0032	Permit		N/A	HARRF- Order R9-2010-0032	pdf
Escondido	NSDRWP	Data		N/A	NSDRWP	xls
Escondido	Production 2009-10	Data		N/A	Production 2009-10	xls
Escondido	Recycle Production & Distribution	Data		N/A	Recycle Production & Distribution	xls
Escondido	Facility Info	Data		N/A	Facility Info	xls
Escondido	Summary Discharge Report 2009	Data		N/A	Summary Discharge Report 2009	xls
Escondido	Recycled Water Self-Monitoring Report 2009	Data		City of Escondido	Dec09Annual	pdf
Leucadia	Gafner RW Summary (2010 update)	Data		N/A	Gafner RW Summary (2010 update)	xls
Leucadia	Preliminary Recycled Water Production Evaluation	Study Report	Aug-2010	Dexter Wilson Engineering, Inc	Recycled Water Production Eval - Draft (JUL10)	pdf
Leucadia	Initial Study for the North County Water Reclamation Project Phase II, Stage 2	Study Report	Jun-1997	CDM	Initial Study for the N. County Water Reclamation Proj.	pdf
Leucadia	North County Water Reclamation Project Phase II Master Plan	Master Plan	Apr-1997	CDM, San Diego County Water Authority	LCWD N. County Water Reclamation Proj. Phase II Master Plan	pdf
Leucadia	Reclaimed Water Facilities Plan	Facility Plan	May-1999	Dudek & Associates, Inc	Reclaimed Water Facilities Plan	pdf
Leucadia	Recycled Water Facilities Improvement Project Preliminary Design Report	PDR	Dec-1999	Dudek & Associates, Inc	LCWD Preliminary Design Report	pdf
Leucadia	Gafner Permit	Permit	N/A	N/A	Gafner Permit 1993_0041	pdf
Leucadia	NSDCRRWP Recycled Water Planning Technical Memorandum	Tech Memo	Oct-2010	Steve Deering	102710 LWD Gafner Phases	pdf
Leucadia	NSDCRRWP Recycled Water Planning Technical Memorandum	Tech Memo	Nov-2010	Steve Deering	102710 LWD Memo Update 102710 LWD Gafner Phases Update	docx pdf

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Agency	Document Name/Description	Contents	Document Release Date	Author	File Name	Type of File
Olivenhain MWD	Northwest Quadrant Recycled Water Study	Study Report	Jun-2010	Boyle		
Olivenhain MWD	Village Park water account log	Data		OMWD	Village Park water account log	xls
Olivenhain MWD	RW Lines	GIS Data		OMWD	RWLines	dbf, prj, sbn, sbx, shp, shp.xml, shx
Olivenhain MWD	NWQ usage FYE 2009 & 2010	Data	N/A	OMWD	NWQ usage FYE 2009 NWQ usage FYE 2010	xlsx
Rincon	District Boundary	GIS Data	N/A	N/A	Boundary Data	dbf, prj, sbn, sbx, shp, shp.xml, shx
Rincon	Recycled Agreements, 1999	Agreements	N/A	N/A	02091999 Recycled Agreement.pdf	pdf
Rincon	Recycled Agreements, 2005	Agreements	N/A	N/A	09132005 Recycled Agreement.pdf	pdf
Rincon	Recycled Agreements, 2004	Agreements	N/A	N/A	10062004 Recycled Agreement.pdf	pdf
Rincon	Recycled Agreements, 2001	Agreements	N/A	N/A	10152001 Recycled Agreement.pdf	pdf
Rincon	Recycled Agreements, 2001	Agreements	N/A	N/A	11162001 Recycled Agreement.pdf	pdf
Rincon	Palomar-Escondido-Rincon Recycled Letter	Agreements	N/A	N/A	Palomar-Escondido-Rincon Recycled Letter.pdf	pdf
Rincon	Recycled Rules-Regulations	Permit	N/A	N/A	Recycled Rules-Regulations.pdf	pdf
Rincon	Waste Discharge Requirements	Permit	N/A	N/A	Waste Discharge Requirements.pdf	pdf
Rincon	Water Discharge Requirements ADD	Permit	N/A	N/A	Water Discharge Requirements ADD 1.pdf	pdf
Rincon	5 Year consumption (Meter Records)	Data	N/A	N/A	5 Year consumption (Meter Records).xls	xls
Rincon	CADD Drawings, ID1	CADD	N/A	N/A	ID1-2-14-07.dwg	dwg
Rincon	CADD Drawings, IDA	CADD	N/A	N/A	IDA 2-14-07.dwg	dwg
Rincon	Site Specifics and Misc. Info Feb 2005	Data	N/A	N/A	Site Specifics and Misc. Info Feb 2005.xls	xls
Rincon	Site Specifics and Misc. Information 2	Data	N/A	N/A	Site Specifics and Misc. Information 2.xls	xls
Rincon	Site Specifics Update May 2006	Data	N/A	N/A	Site Specifics Update May 20062.xls	xls
Rincon	Harmony Grove Village Vesting Tentative Map - North	Figure	N/A	N/A	01 VTM 5365 North.pdf	pdf
Rincon	2006 Harmony Grove Village Environmental Impact Report (Draft)	Report	Aug-2006	N/A	02 CH 0-S Summary.pdf	pdf
Rincon	Harmony Grove Village Vesting Tentative Map - South	Figure	N/A	N/A	02 VTM 5365 South.pdf	pdf

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Agency	Document Name/Description	Contents	Document Release Date	Author	File Name	Type of File
Rincon	Project Location - USGS Quadrangle Map	Figure	N/A	N/A	03 Project Location - USGS Quad.pdf	pdf
Rincon	Location Map, Photo Map, Water System Map	Figures	N/A	N/A	Harmony Grove Maps.pdf	pdf
Rincon	Escondido GW basin rough outline - Google Map	Google Image	N/A	N/A	Escondido GW basin rough outline.jpg	jpg
Rincon	Water Factory Basic Plan	Summary	N/A	N/A	Main components outline.doc	doc
Rincon	Rincon del Diablo MWD Groundwater Restoration Plan	Flow Diagram	N/A	N/A	Program Schematic 040910.pptx	ppt
Rincon	2009 Water Factory Conceptual Overview	Presentation	N/A	N/A	Water Factory 12 May09.ppt	ppt
Rincon	2009 Roadmap to Water Factory	Presentation	N/A	N/A	Water Factory Roadmap.ppt	ppt
SDCWA	2010 UWMP, San Diego Wastewater Treatment and Water Recycling Facilities Plant Capacity	Data	N/A	N/A	Revised Appendix F-3 Wastewater 2010	xlsx
SEJPA	Modeling Files	Data		N/A	Modeling Files	Various
SEJPA	Engineering Certification Report	Report	Sep-1999	HY A, A Dames & Moore Company	1999_09_00 SEWRF Engineering Report	pdf
SEJPA	2009 Financial Assessment Study	Study Report		Winzler & Kelly	2009 Financial Assessment Study	pdf
SEJPA	2009 RW Demineralization Final Preliminary Design Report	PDR	Dec-2009	Kennedy/Jenks	2009 RW Demineralization Final Preliminary Design Report	pdf
SEJPA	2009 San Elijo Ocean Outfall Capacity Study	Study Report	Dec-2009	SEJPA, City of Escondido	2009 San Elijo Ocean Outfall Capacity Study	pdf
SEJPA	2009 Conceptual Design Report for Flow Equalization Recycled Water Storage Facility	Design Report	Mar-2009	Infrastructure Engineering	2009-Conceptual Design Report for Flow Equalization Recycled Water Storage Facility	pdf
SEJPA	SEJPA Recycled Water System Expansion Projects - Figure	Figure		N/A	2010_07 SEJPA RW SYSTEM EXPANSION PROJECTS-Figure	pdf
SEJPA	SEJPA RW Optimization and Expansion Study	Study Report	Jul-2006	PBS&J	SEJPA RW Optimization and Expansion Study	pdf
SEJPA	San Elijo Mitigated Negative Declaration	Study Report	Dec-2009	Dudek & Associates, Inc	San Elijo Mitigated Negative Declaration	pdf
SEJPA	Master Recycled Water Permit	Permit		N/A	Master Recycled Water Permit	pdf
SEJPA	May 2010 RW Program Status Report	Status Report		N/A	May 2010 RW Program Status Report	xlsx
SEJPA	Ocean Discharge NPDES Permit CA0107999 - R9 2005 100	Permit		N/A	Ocean Discharge NPDES Permit CA0107999 - R9_2005_100	pdf
SEJPA	2007 March, June, September, December Monthly Self-Monitoring Reports	Data	2007	SEJPA	March, June, September, December	xls

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Agency	Document Name/Description	Contents	Document Release Date	Author	File Name	Type of File
SEJPA	2008 March, June, September, December Monthly Self-Monitoring Reports	Data	2008	SEJPA	March, June, September, December	xls
SEJPA	2009 March, June, September, December Monthly Self-Monitoring Reports	Data	2009	SEJPA	March, June, September, December	xls
SEJPA	2006 March, June, September, December Monthly Self-Monitoring Reports	Data	2006	SEJPA	March, June, September, December	xls
SFID	Asset Management Master Plan	Master Plan	Mar-2009	Dexter Wilson Engineering, Inc.	Asset Management Master Plan	pdf
SFID	CSD Treatment Info	Data	N/A	N/A	CSD Treatment Info	pdf
SFID	Existing and Proposed RW Alternatives	Figure	N/A	N/A	Existing and Proposed RW Alts	pdf
SFID	Figure7_03 Recycled Water Demand Option C	Figure	N/A	N/A	Figure7_03	pdf
SFID	FIGURE_9-1_RW Existing System and Service Area	Figure	N/A	N/A	FIGURE_9-1_No_TB	pdf
SFID	FIGURE_9-2_Existing and Potential RW User	Figure	N/A	N/A	FIGURE_9-2_No_TB	pdf
SFID	FIGURE_9-3_Western Service Area RW Improvements	Figure	N/A	N/A	FIGURE_9-3_No_TB	pdf
SFID	FIGURE_9-4_Eastern Service Area Potential RW Users	Figure	N/A	N/A	FIGURE_9-4_No_TB	pdf
SFID	SEJP SFID and Del Mar RW Master Permit	Permit	N/A	N/A	SEJP SFID and Del Mar RW Master Permit	pdf
SFID	SFID RW Master Plan	Master Plan	Aug-2005	Dudek & Associates, Inc	SFID RW Master Plan	pdf
SFID	RW_OPTIONS_300dpi	Figure	N/A	N/A	RW_OPTIONS_300dpi	pdf
Vallecitos	Meadowlark Permit Order	Permit		N/A	Meadowlark Permit Order	pdf
Vallecitos	Reclaimed Data, Lakes	GIS Data		N/A	Lakes	dbf, prj, sbn, sbx, shp, shp.xml, shx
Vallecitos	Reclaimed Data, Parcels	GIS Data		N/A	Parcels	dbf, prj, sbn, sbx, shp, shp.xml, shx
Vallecitos	Reclaimed Data, Reclaimed Water Lines	GIS Data		N/A	Reclaimed_Water_Lines	dbf, prj, sbn, sbx, shp, shp.xml, shx
Vallecitos	Reclaimed Data, Sewer Lines	GIS Data		N/A	Sewer_Lines	dbf, prj, sbn, sbx, shp, shp.xml, shx

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Vallecitos	Reclaimed Data, Topo	GIS Data		N/A	Topo	dbf, prj, sbn, sbx, shp, shp.xml, shx
Vallecitos	Reclaimed Data, VWD Boundary	GIS Data		N/A	VWD_Boundary	dbf, prj, sbn, sbx, shp, shp.xml, shx
Vallecitos	2002 Water, Wastewater, and Water Reclamation Master Plan Update	Master Plan	Aug-2005	Kennedy/Jenks	2002 Water, Wastewater, Water Rec. Master Plan Update-Aug05	pdf
Vallecitos	2005 Water, Wastewater, and Water Reclamation Master Plan Update, Final Supplemental Environmental Impact Report	Environmental Report	Jul-2005	Kennedy/Jenks	2005 Water,Wastewater,Water Rec. Master Plan Update Suppl. Envir. Impact Report	pdf
Vallecitos	Reclaimed Expansion	GIS Data			Reclaimed Expansion	mxd
Vallecitos	Initial Study-Mitigated Negative Declaration	Study Report	Aug-2004	Kennedy/Jenks	Initial Study-Mitigated Negative Declaration	pdf
Vallecitos	Tech Memo No. 3 Wastewater Chap. 7	Tech Memo	Aug-2009	PBS&J	Tech Memo No. 3 Wastewater Chap. 7	pdf
Vallecitos	VWD Reclamation Program Business Plan	Tech Memo	Dec-1992	CDM	Reclamation Program Business Plan	pdf
Vallecitos	Reclamation Facilities	Figure	Dec-1992	CDM	Reclamation Facilities	pdf
Vallecitos	South Lake GIS Files	GIS Data	Oct-2010	VWD	SouthLakeTopo	dbf, prj, sbn, sbx, shp, shx
VID	Water Reclamation Master Plan	Master Plan	Nov-1993	CDM	Water Reclamation Master Plan	pdf
VID	VID Reclaimed Study Area Map	Map	2008	VID	VID_Reclaimed_Study_Area_Map	pdf
VID	VID Reclaimed Study Area Meter Table	Data	2008	VID	VID_Reclaimed_Study_Area_Meter_Table	xls

Appendix B

Unit Cost Assumptions

North San Diego County
Regional Recycled Water Project
Planning Criteria and Unit Costs

Item		Unit Cost	Units/Notes
Capital Costs			
Pump Station		$6,500	HP (Based on peak flow)
Conveyance			
	Pipelines	$20	in-dia/LF
	High pressure pipelines	25%	Markup
	Peak flow velocity (for sizing)	5	feet per second
	Peaking Factors		
	All other Agencies	1.8	Mainly irrigation
	Carlsbad MWD	1.6	
	Rincon Del Diablo MWD	1.4	Includes large power plant user
Pressure Reducing Stations			
	PRV	$500,000	per station
O&M Annual Costs			
Pump Station		5.0%	of capital costs
Electrical		$0.18	per kWh (Q_{avg})
Pipelines		1.0%	of capital costs
Pressure Reducing Stations		1.0%	of capital costs
Contingencies			
Capital Implementation Costs		25%	for design, environmental, etc.
Capital Project Contingency		30%	for construction / O&M costs
O&M Cost Contingency		30%	of O&M Cost Subtotal
Financing Costs			
Interest Rate		3.0%	
Period		30	
Present Worth Factor (for annual O&M)		19.60	

North San Diego County Regional Recycled Water Project
Treatment Capital and O&M Unit Costs

Capital Costs[1]

Item	Capacity Increase (MGD)		Capital Costs		Source/Notes
	Short-Term	Long-Term	Short-Term	Long-Term	
South Regional TTP	0.8	1.3	$ -	$ -	Assume no capital costs for expanded reuse, but some O&M costs
San Luis Rey WWTP	1.6	5.2	$ 7,500,000	$ 24,400,000	2005 Oceanside MP through Phase 3, adjusted for ENR
Shadowridge WRP	1.1	2.0	$ 17,900,000	$ 17,900,000	PBSJ report for BS, cost for 2 mgd facility
Carlsbad WRP	6.8	6.8	$ 51,200,000	$ 51,200,000	Draft Carlsbad Master Plan, Chapter 4
Hale Avenue RRF	10.4	20.7	$ 54,900,000	$ 169,900,000	Based on unit cost of $6/gal, includes tertiary and MF-RO for long-term.
Gafner WRP	0.6	1.2	$ 9,076,923	$ 19,076,923	Leucadia study, through Phase 4, includes cost to rehab or replace SE pipeline
Meadowlark WRP	1.3	2.0	$ 15,090,000	$ 15,090,000	Based on unit cost of $11.60/gal
San Elijo WRP	1.0	1.0	$ 4,543,000	$ 4,543,000	SEJPA Prel Design report
Harmony Grove WRP	0.2	0.2	$ 12,500,000	$ 20,000,000	Based on $5M through tertiary treatment of 0.2 mgd and $7.5M for 2 MGD of AWT for GW Recharge. Assumes secondary treated wastewater will be available for advanced treatment.
CSDs	1.0	1.0	$ 8,000,000	$ 8,000,000	Based on unit cost of $8/gal
Total	**24.8**	**41.4**	**$ 180,709,923**	**$ 330,109,923**	

Notes:
1) All capital costs including 25% allowance for engineering/environmental, etc.
2) Costs shown do not include any contingency costs. These are added in total costs.

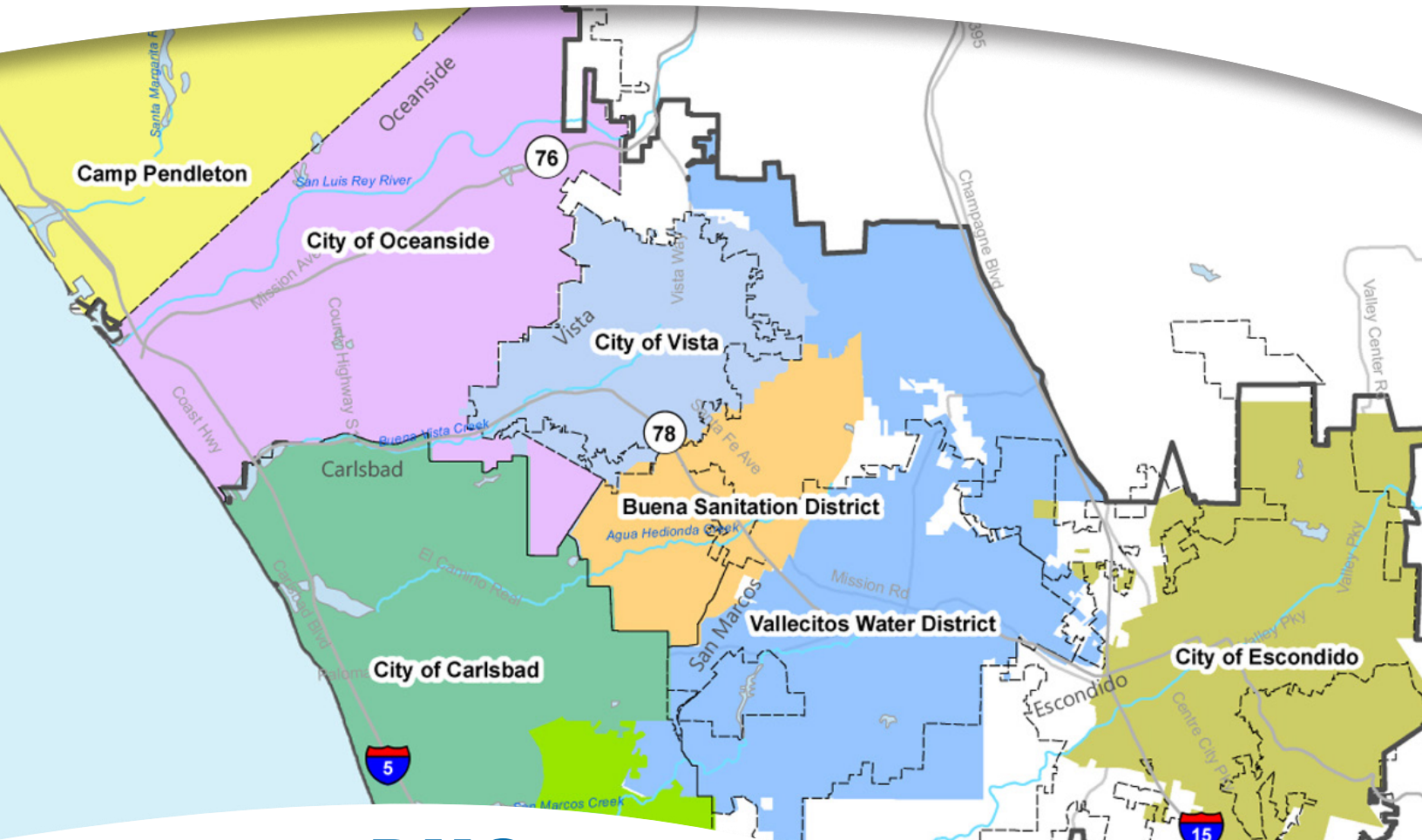
Annual O&M Costs

Plant	Unit Cost per MGD		Notes
	Short-Term	Long-Term	
South Regional TTP	$ 100,000	$ 100,000	
San Luis Rey WWTP	$ 100,000	$ 100,000	
Shadowridge WRP	$ 100,000	$ 100,000	
Carlsbad WRP	$ 100,000	$ 100,000	
Hale Avenue	$ 100,000	$ 160,000	Long-term costs based on blended amounts of NPR and IPR flows.
Gafner WRP	$ 306,410	$ 278,846	
Meadowlark WRF	$ 100,000	$ 100,000	
San Elijo	$ 100,000	$ 100,000	
Harmony Grove	$ 120,000	$ 120,000	Costs based full MF-RO
CSDs	$ 100,000	$ 100,000	
Total	**$ 2,607,846**	**$ 5,600,615**	

Note: Costs shown do not include any contingency costs. These are added in total costs.

Unit Cost Assumptions by Process

Process	Unit Cost	Units	Notes
Tertiary	$ 100,000	per MGD	Based on chlorination cost of $161,000 per MGD, but reduces by 40% for peaking and rounded to $100,000
MF-RO	$ 120,000	per MGD	No peaking



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