Section 4: Water Supply

Since its formation in 1955, the Vallecitos Water District (VWD) has received 100 percent of its water supply from the San Diego County Water Authority (SDCWA), of which it is one of 24 member agencies. The SDCWA, in turn, obtains most of its water from the Metropolitan Water District of Southern California (MWD), which obtains its water from the Sacramento-San Joaquin Delta in Northern California via the State Water Project, and from the Colorado River via the Colorado River Aqueduct. VWD is fully aware how uncertain these water supplies have become in the last few years and has investigated opportunities to develop local resources. VWD's 2007 Integrated Water Resources Plan (IRP) analyzed several local water supply alternatives to supplement its existing SDCWA water supply, including seawater desalination, recycled water purchasing, treated water purchases from other agencies and groundwater feasibility.

This section describes MWD and the SDCWA and their respective water supply resources. VWD's own potable water and recycled water distribution systems are also discussed. And finally, this section discusses local water supply alternatives that VWD's IRP recommended for further study.

Colorado River

(Photo courtesy of the Metropolitan Water District of Southern California)

4.1 Metropolitan Water District of Southern California Supplies

4.1.1 MWD Description

MWD was formed in 1928 to develop, store, and distribute supplemental water to Southern California for domestic and municipal use. It serves approximately 19 million people in Ventura, Los Angeles, Orange, San Bernardino, Riverside and San Diego counties. In terms of area, MWD's service area boundary encompasses a 70-mile strip of the Southern California coastal plain, extending from Oxnard south to the Mexican border. Close to half of the water used in this 5,200-square-mile region is supplied by MWD, and about 90 percent of the population receives at least some water from MWD. VWD receives this water via the SDCWA.

Section 135 of the Metropolitan Act grants member agencies preferential rights to MWD water. The rights are determined by each agency's total historic payments to MWD from property taxes, readiness-to-serve charges and other minor revenue. However, revenue resulting from the purchase of MWD water is excluded. SDCWA has a preferential right to purchase 17.47 percent of MWD's water based on historic payments, although it purchased about 21 percent of MWD's available supply in fiscal year 2010.

MWD's 2010 Regional Urban Water Management Plan (UWMP) presented its supply availability at the regional level. This report stated that reliable water supplies could be provided to the SDCWA in normal years and a single dry year. In multiple dry years, however, the SDCWA could experience shortages.

4.1.2 MWD Supplies

MWD supplies Southern California from two sources: the 224-mile Colorado River Aqueduct and the 444-mile California Aqueduct. In order to meet challenges such as dry weather patterns and regulatory pumping restrictions that may limit these supplies, MWD's strategy also includes utilizing its various storage programs that save excess water during wet years for dry-year use.

Colorado River

MWD was originally formed to import water from the Colorado River. During the 1930s, MWD built the Colorado River Aqueduct, and member agencies first received this water in 1941. The structure, running from Lake Havasu on the Arizona/California border to Lake Mathews in Riverside County, has the capacity to deliver up to 1.25 million acre-feet per year (AFY).

Colorado River Aqueduct

MWD currently receives a Colorado River supply of 550,000 AFY of California's apportionment of 4.4 million AFY. Through the 2003 Quantification Settlement Agreement and related agreements among Imperial Irrigation District, the Coachella Valley Water District, State of California, Department of Interior, MWD, and the SDCWA, a plan was formalized on how California will implement water transfers and supply programs that allow California to live within the state's 4.4 million AFY apportionment of Colorado River water. This agreement, which is in effect for 45 years (and up to 75 years), resolved longstanding disputes regarding Colorado River water use among the agencies, and established a baseline water use for the Coachella Valley Water District, Imperial Irrigation District, and MWD. This permitted the implementation of a variety of water conservation and transfer agreements, including the SDCWA's transfer agreement with the Imperial Irrigation District.

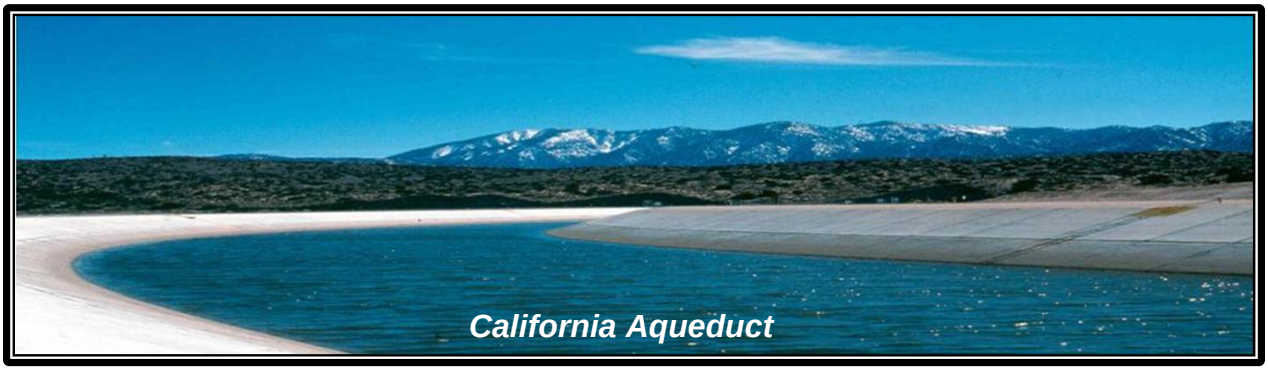
MWD has relied on cooperative transfer programs and storage programs to increase its Colorado River water deliveries beyond its basic apportionment. More information regarding reliability issues, environmental considerations, and the Quantification Settlement Agreement's potential to affect VWD supplies can be found in the Water Supply sections of MWD's 2010 Regional UWMP and SDCWA's 2010 UWMP.

State Water Project

The State Water Project is owned by the State of California and is operated by the Department of Water Resources (DWR). MWD is entitled to take about 48 percent of available State Water Project through its Long-Term State Water Project Supply Contract. The project stretches more than 600 miles, from Lake Oroville in the north to Lake Perris in the south. Water is stored at Lake Oroville and released when needed into the Feather River, which flows into the Sacramento River and to the Sacramento-San Joaquin River Delta. The Delta is the largest estuary on the United States' west coast and is home to an agricultural industry, recreation and fishing, and provides the means by which to deliver water from Northern California to the south. In the south Delta, water is diverted into the State Water Project's Banks Pumping Plant, where it is lifted into the 444-mile-long California Aqueduct. Some of this water flows into the South Bay Aqueduct to serve areas in Alameda and Santa Clara counties. The remainder flows southward to cities and farms in Central and Southern California. In the winter, when demands are lower, water is stored at the San Luis Reservoir located south of the Delta. State Water Project facilities provide drinking water to 23 million Californians and 755,000 acres of irrigated farmland.

Sacramento-San Joaquin River Delta

In recent years, actions taken to protect the ecosystem of the Bay-Delta have placed additional restrictions on State Water Project operations. These actions may affect water delivery projections from the State Water Project.



California Aqueduct

MWD State Water Project supply projections are based on DWR's *Draft 2009 State Water Project Delivery Reliability Report* for current and future conditions, taking into consideration restrictions on State Water Project and Central Valley Project operations. Under the reliability report, delivery estimates for current conditions are 7 percent under a single dry-year condition, which is the equivalent of 134,000 AFY, and 60 percent under long-term average conditions, which is equivalent to 1.15 million AFY. For dry hydrologic conditions and regulatory restrictions, MWD developed additional supplies from Central Valley storage and transfer programs.

MWD's future projections indicate the State Water Project target for a dry year (based on 1977 hydrology) is 522,000 AFY in 2015, 601,000 AFY in 2020 and 651,000 AFY in 2025. Projections from MWD's 2010 Regional Urban Water Management Plan estimate a State Water Project supply range of between 609,000 and 610,000 AFY for the 2030-2035 period.

More information regarding reliability issues, environmental considerations, and any other potential challenges possibly affecting the VWD supplies from the State Water Project can be found in the Water Supply sections of MWD's 2010 Regional Urban Water Management Plan and SDCWA's 2010 Urban Water Management Plan.

4.2 San Diego County Water Authority Supplies

4.2.1 SDCWA Description

The SDCWA was established pursuant to legislation adopted by the California State Legislature in 1943 to provide a supplemental supply of water as the region's civilian and military population expanded and local resources became insufficient to meet the region's water-supply needs. Before 1947, the San Diego region relied on local surface water runoff in normal and wet weather years and on groundwater pumped from local aquifers during dry years when stream flows were reduced. In 1947, water began to be imported from the Colorado River via a single pipeline that connected to MWD's Colorado River Aqueduct.

Since 1950, the SDCWA became more reliant on imported water supplies from MWD to meet the needs of its member agencies. After experiencing severe shortages from MWD during the 1987-1992 drought, the SDCWA began aggressively pursuing actions to diversify the region's supply sources. These include the Water Conservation and

Transfer Agreement with the Imperial Irrigation District in 1998, the lining of the All-American and Coachella Canals, the purchase of a water supply from the Carlsbad Desalination Project, planning efforts for a new regional desalination project located on Camp Pendleton, and feasibility evaluation of a bi-national seawater desalination project in Rosarito, Mexico.

4.2.2 SDCWA Supplies

Imported water supplies are delivered to the SDCWA member agencies through a system of large-diameter pipelines, pumping stations, and reservoirs. The pipelines that deliver supplies from MWD are divided into two aqueduct alignments, both of which originate at Lake Skinner in southern Riverside County and run in a north to south direction through the SDCWA service area. MWD's ownership of these pipelines extends to a "delivery point" six miles into San Diego County. From there, Pipelines 1 and 2 comprise the First Aqueduct, which reaches from the delivery point to the San Vicente Reservoir. These two pipelines share five common tunnels and operate as a single unit to provide 180 cubic feet per second (cfs) of conveyance capacity. Pipelines 3, 4, and 5 form the Second Aqueduct. These pipelines, which are located several miles to the west of the First Aqueduct, have delivery point capacities as follows: Pipeline 3 provides 280 cfs; Pipeline 4 provides 470 cfs; and Pipeline 5 provides 500 cfs.

The SDCWA has also focused on developing local and alternate water supplies. In 1993, the SDCWA completed a Water Resources Plan and updated it in 1997 to emphasize the development of local supplies and core water transfers. The SDCWA's 2010 UWMP identified additional water supply strategies. These projects are discussed in further detail below.

SDCWA-Imperial Irrigation District Water Conservation and Transfer Agreement

From 1998 to 2003, the SDCWA entered into a series of agreements to obtain a portion of the Imperial Irrigation District's allocation of Colorado River water.

- On April 29, 1998, the SDCWA entered into a Water Conservation and Transfer Agreement with the Imperial Irrigation District for the long-term transfer of conserved Colorado River water to San Diego County.
- On October 10, 2003, this agreement was amended to lessen environmental impacts due to the water transfer and to be consistent with the terms and conditions of the 2003 Quantification Settlement Agreement.

- Also on October 10, 2003, SDCWA entered into a water exchange agreement with MWD to transport this water from the Colorado River to San Diego County. Under the agreement, MWD takes delivery of the transfer water though the Colorado River Aqueduct. In exchange, MWD delivers to the SDCWA a like quantity and quality of water.

The series of agreements resulted in the SDCWA initially receiving 10,000 AFY of water from the Imperial Irrigation District in 2003, with the volume increasing annually until it reaches 200,000 AFY in 2021. In 2010, the SDCWA received 70,000 acre-feet (AF) of water. The initial term of the transfer agreement is 45 years, with a provision that either agency may extend the agreement for an additional 30-year term.

More information regarding the project's cost and financing, the Quantification Settlement Agreement or other related contracts can be found in the Water Supply sections of MWD's 2010 Regional Urban Water Management Plan and SDCWA's 2010 Urban Water Management Plan.

All-American Canal and Coachella Canal Lining Projects

As part of the 2003 Quantification Settlement Agreement, the SDCWA contracted for 77,700 AFY of conserved water from projects that lined portions of the All-American and Coachella Canals. Deliveries of conserved water from the Coachella Canal reached the region in 2007 and deliveries from the All-American Canal reached the region in 2010.

Coachella Canal lining project

The project reduced the loss of water that occurred through seepage, and the conserved water is now delivered to the SDCWA.

The Coachella Canal project constructed a 37-mile long parallel canal adjacent to the existing Coachella Canal. The lining of the All-American Canal project constructed a concrete-lined canal parallel to the 24 miles of the existing All-American Canal. The combined conserved water from both projects will provide the San Diego region with an additional 8.5 million acre-feet over the 110-year life of the agreement.

The October 10, 2003 exchange agreement between the SDCWA and MWD provides for the delivery of conserved water from the canal lining projects. SDCWA pays MWD

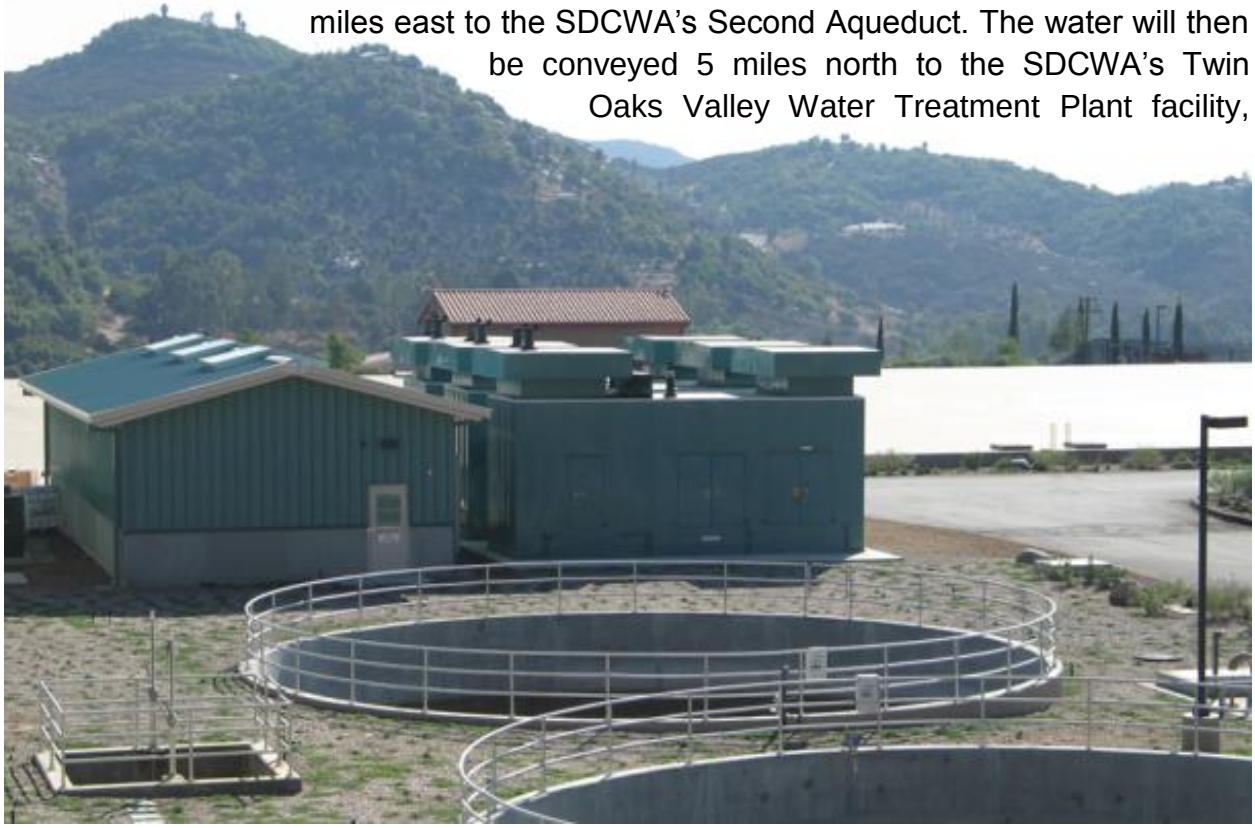
applicable wheeling rates. In the exchange agreement, MWD will deliver the canal lining water for the entire 110-year term of the Allocation Agreement.

More information on the cost and financing, contracts and other information related to All-American Canal and Coachella Canal Lining Projects can be found in the Water Supply sections of MWD's 2010 Regional Urban Water Management Plan and SDCWA's 2010 Urban Water Management Plan.

Carlsbad Seawater Desalination Facility

To continue to diversify its future water resource portfolio, the SDCWA identified seawater desalination as a potential supply for meeting future demands. The SDCWA is pursuing the purchase of water supply from the Carlsbad Desalination Facility; a fully-permitted, private desalination project at the Encina Power Station site in the City of Carlsbad. The project is being proposed to be constructed and fully-funded by a private company known as Poseidon Resources Corporation.

When complete, the project will provide a highly reliable local supply of 56,000 AFY of supply for the region, available in both normal and dry hydrologic conditions. A 54-inch pipeline will be constructed to convey product water from the desalination plant 10.5 miles east to the SDCWA's Second Aqueduct. The water will then be conveyed 5 miles north to the SDCWA's Twin Oaks Valley Water Treatment Plant facility,



SDCWA's Twin Oaks Valley Water Treatment Plant

where it will be blended with treated imported water and subsequently distributed into SDCWA's existing aqueduct system.

Under the terms and conditions of the draft agreement between the SDCWA and Poseidon Resources Corporation, the SDCWA would purchase the entire output of 56,000 AFY from the project at a price based on the cost of production. A preliminary September 2010 unit cost estimate was $1,600 per AF. The project is expected to be completed and online by early 2016.

More information on cost and financing, contracts, and other information related to the Carlsbad Seawater Desalination Facility can be found in the Section 4 of the SDCWA's 2010 UWMP.

Other Seawater Desalination Efforts

In June 2009, the SDCWA, in collaboration with the Marine Corps Base at Camp Pendleton, completed a feasibility study for a potential 50 to 150 MGD seawater desalination project on Camp Pendleton. The feasibility study provided an analysis on new facilities, environmental and permitting requirements, cost estimates, and implementation issues.

At a special meeting in May 2009, the SDCWA Board approved funding in the amount of $5.72 million to conduct further planning work for this project, including seawater intake analysis, hydrogeological and marine environment studies, and studies on product water conveyance and integration for the Camp Pendleton project. These studies are expected to be underway by early 2011 and completed by the end of 2012. Results from the studies will be incorporated into the SDCWA's 2012 Regional Water Facilities Optimization and Master Plan Update. The earliest online date of a potential Camp Pendleton desalination project is 2020.

The SDCWA is also participating with U.S. and Mexican agencies in a bi-national review of potential water management and water supply programs that could benefit Colorado River water users of both countries. As part of this effort, a bi-national workgroup formed to study potential new water supplies, recommended the evaluation and preliminary design of an initial 25 MGD (expandable to 50 MGD) seawater desalination plant that would be located at Rosarito Beach in Baja California, Mexico. U.S. water agencies, including the SDCWA, MWD, Southern Nevada Water Authority, and the Central Arizona Water Conservation District, have collaborated to fund a feasibility evaluation and preliminary design of the plant. The SDCWA agreed to administer the consultant selection process and serve as project manager for the project.

Currently, the Rosarito Beach Desalination Project is considered a conceptual-level project. If built, product water from the plant would be available to both U.S. and Mexican water users. For U.S. water users, the water could be delivered either directly to the San Diego region, using a cross-border pipeline, or possibly by exchange, with Mexican users taking delivery of the product water and leaving an equivalent amount of Colorado River water available for U.S. users.

4.3 Vallecitos Water District Supplies

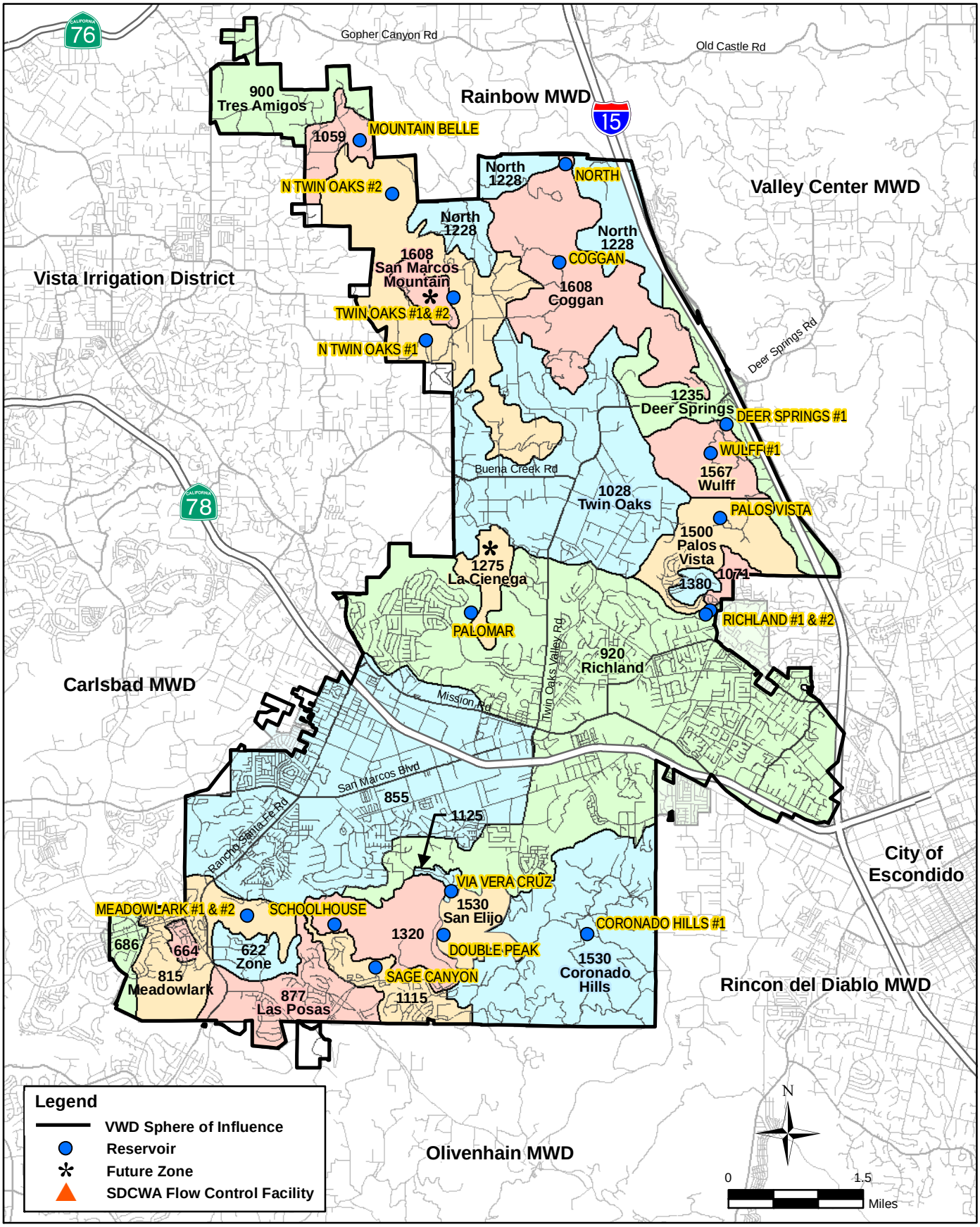
VWD is committed to providing a reliable and fiscally sound water supply to its customers. VWD forecasts that continued growth in population and economic activity within its service area will lead to increased water demands relative to current conditions, and the need for additional water supplies to serve these demands.

4.3.1 Current Sources of Supply

VWD obtains 100 percent of its water supply from the SDCWA, of which it is one of 24 member agencies. VWD anticipates relying on the SDCWA for 100 percent of its water supply in the foreseeable future, as shown in Table 4-1. VWD receives water from the SDCWA through five potable water connections (turnouts) to the SDCWA aqueduct system as shown in Figure 4-1. Table 4-2 lists the location, capacity, and the average annual delivery to VWD for each connection.

Table 4-1: VWD Water Supply – Existing and Planned Sources of Water

Wholesale Sources	Contracted Volume (2010)[1]	2015[1]	2020[1]	2025[1]	2030[1]
San Diego County Water Authority	16,308	27,109	30,134	32,598	34,951
[1] *In units of acre-feet per year*					



SOURCE: LAFCO SOI - Affirmed 08-06-2007
VWD GIS Data - 07-17-2008, provided by District

EXISTING WATER SYSTEM

FIGURE 4-1

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Table 4-2: VWD Water Supply Connections

Connection	Location	Capacity		2010 Average Delivery to VWD	
		(cfs)[1]	(MGD)[2]	(gpm)[3]	(MGD)
VAL 2	First Aqueduct	12	8	200	0.3
VAL 7	Second Aqueduct, south edge of VWD	40	26	1,800	2.5
VAL 8	Second Aqueduct, off North County Distribution Pipeline, northwest corner of VWD	11	7	200	0.3
VAL 9	Second Aqueduct, center of VWD, south of Twin Oaks Diversion Structure	30	19	1,400	2.0
VAL 10	Second Aqueduct, north-center of VWD, north of Twin Oaks Diversion Structure	60	39	6,100	8.8
Total				**9,700**	**13.9**

Source: VWD 2010 Monthly Operations Report
[1] cfs = cubic feet per second
[2] MGD = million gallons per day
[3] gpm = gallons per minute

4.3.2 Vallecitos Water District's Water System

Today, VWD serves a 45-square mile potable water service area with a population of approximately 87,700 people. VWD has approximately 21,500 meters that deliver over 15,500 acre-feet per year of potable water to a mix of residential, commercial, industrial, and agricultural customers.

VWD operates and maintains 26 pressure zones to serve customers with appropriate system pressures. The varied topography of VWD dictates a wide range of pressure zones ranging from a 622-foot hydraulic grade to a 1608-foot hydraulic grade. Their approximate boundaries are shown in Figure 4-1. These pressure zones are supplied from the SDCWA connections through a network of pump stations, reservoirs, and pressure reducing stations. Pressure zones within VWD are named by the downstream valve setting or base elevation of the tank. The Northern Pressure Zones primarily receive water from the VAL 8 and VAL 10 connections. The Central Pressure Zones primarily receive water from the 1028 Twin Oaks Reservoirs via VAL 10 and two large pressure reducing stations, and can also receive water from the VAL 9 and VAL 2 connections. The Southern Pressure Zones primarily receive water from the VAL 7 connection.

Pump Stations

VWD currently operates nine pump stations (including the Meadowlark Hydropneumatic Pump Station), which all feed directly to storage tanks in the system. Table 4-3 summarizes the hydraulic grade line and operational capacity at each existing pump station. The operational capacity is defined as the capacity of the pump station with the largest pump out of service.

Table 4-3: VWD Existing Pump Station Summary

Pump Station	Hydraulic Grade (ft)		Operational Capacity	
	From	To	gpm	MGD
Northern Pump Stations				
Deer Springs	1028	1235	1,550	2.23
North Twin Oaks	1028	1330	2,000	2.88
Wulff	1235	1567	1,000	1.44
Coggan	1028	1608	4,000	5.76
Central Pump Stations				
Palos Vista	920	1500	3,375	4.86
South Lake	920	1530	2,200	3.17
Southern Pump Stations				
Meadowlark Hydro	815	930	470	0.68
Schoolhouse	877	1115	2,100	3.02
Double Peak	1115	1530	1,050	1.51

Source: VWD 2008 Water, Wastewater, and Recycled Water Master Plan

Reservoirs

Reservoirs serve four critical water storage needs: operational storage for daily use; fire flow storage; and both in-zone emergency storage and storage during aqueduct shutdowns. VWD operates and maintains 20 potable water reservoirs, which are listed in Table 4-4. This table includes the size, age, and floor elevation for each reservoir. The total existing storage capacity for VWD's potable water system is 121.6 million gallons (MG).

VWD's Double Peak Reservoir

Table 4-4: VWD Existing Reservoir Summary

Pressure Zone		Facility ID (Name)	Year Built	Height (ft)	Diameter (ft)	Capacity (MG)
Elevation	**Name**					
Northern Reservoirs						
900	Tres Amigos	Mountain Belle	1996	24	134	2.5
1028	Twin Oaks	Twin Oaks Reservoir #1	2000	38	388	33.0
		Twin Oaks Reservoir #2	2007	38	432	40.0
1228	North 1228	North	1977	40	74	1.3
1235	Deer Springs	Deer Spring	1961	32	55	0.6
1330	North Twin Oaks	North Twin Oaks Reservoir #1	1961	32	55	0.6
		North Twin Oaks Reservoir #2	2007	32	138	3.6
1567	Wulff	Wulff	1961	24	26	0.1
1608	Coggan	Coggan	1977	40	74	1.3
					Total North	**82.9**
Central Reservoirs						
920	Richland	Richland #1	1961	32	82	1.3
		Richland #2	1981	30	200	7.0
		Palomar	1989	32	120	2.7
		Via Vera Cruz	1987	30	200	7.0
1500	Palos Vista	Palos Vista	1991	33	143	4.0
					Total Central	**22.0**
Southern Reservoirs						
815	Meadowlark	Meadowlark #1	1961	32	82	1.3
		Meadowlark #2	1979	32	120	2.7
877	Las Posas	Sage Canyon	2001	38	129	3.7
1115	1115	Schoolhouse	2001	32	116	2.5
1530	Coronado Hills	Coronado Hills	1981	36	110	2.6
		Double Peak	2006	36	135	3.9
					Total South	**16.6**
					Total	**121.6**

Source: VWD 2008 Water, Wastewater, and Recycled Water Master Plan

Distribution System Pipelines

VWD maintains over 323 miles of water pipelines ranging in size from 4-inches to 48-inches in diameter. Table 4-5 includes an inventory of material types, sizes and range of age by material. In general, the pipelines are predominantly asbestos cement pipe (ACP) and ductile iron pipe (DIP), and the majority of VWD's system has been installed since the 1960s and thus should have many years of remaining functionality based on the expected useful life of the pipe materials.

Table 4-5: VWD Water Distribution Pipeline Inventory

Pipe Type	Lineal	Diameter		Pipe Length by Decade						
	Feet	Min	Max	Unknown	1950s	1960s	1970s	1980s	1990s	2000s
ACP	937,084	4	30	44	118,082	151,781	190,154	232,625	241,487	2,913
DIP	500,546	4	48	18,540	0	58	0	43	23,701	458,204
Steel, Cement Mortar Lined and Coated	380,841	4	48	0	32,804	59,675	49,615	62,752	119,450	56,545
Steel, Cement spiral-wrapped	6,306	8	14	0	6,153	0	0	0	0	154
Total	**1,824,778**	**--**	**--**	**18,584**	**157,039**	**211,514**	**239,769**	**295,420**	**384,638**	**517,815**

Source: VWD 2008 Water, Wastewater, and Recycled Water Master Plan

Interagency Service Agreements

VWD provides potable water to the Olivenhain Municipal Water District (OMWD) and the Carlsbad Municipal Water District (CMWD) from its SDCWA connection at VAL 7. This service is provided through an interagency service agreement entitled, "Construction of a Water Transmission and Storage System – Questhaven Pipeline", dated July 1, 1978 and its supplement dated September 1979, in which VWD is designated as the lead agency. The locations of these interconnections are numbered 1 and 4, as shown on Figure 4-2.

By agreement, the OMWD capacity is limited to 6.47 MGD and the CMWD connection capacity is limited to 8.61 MGD.

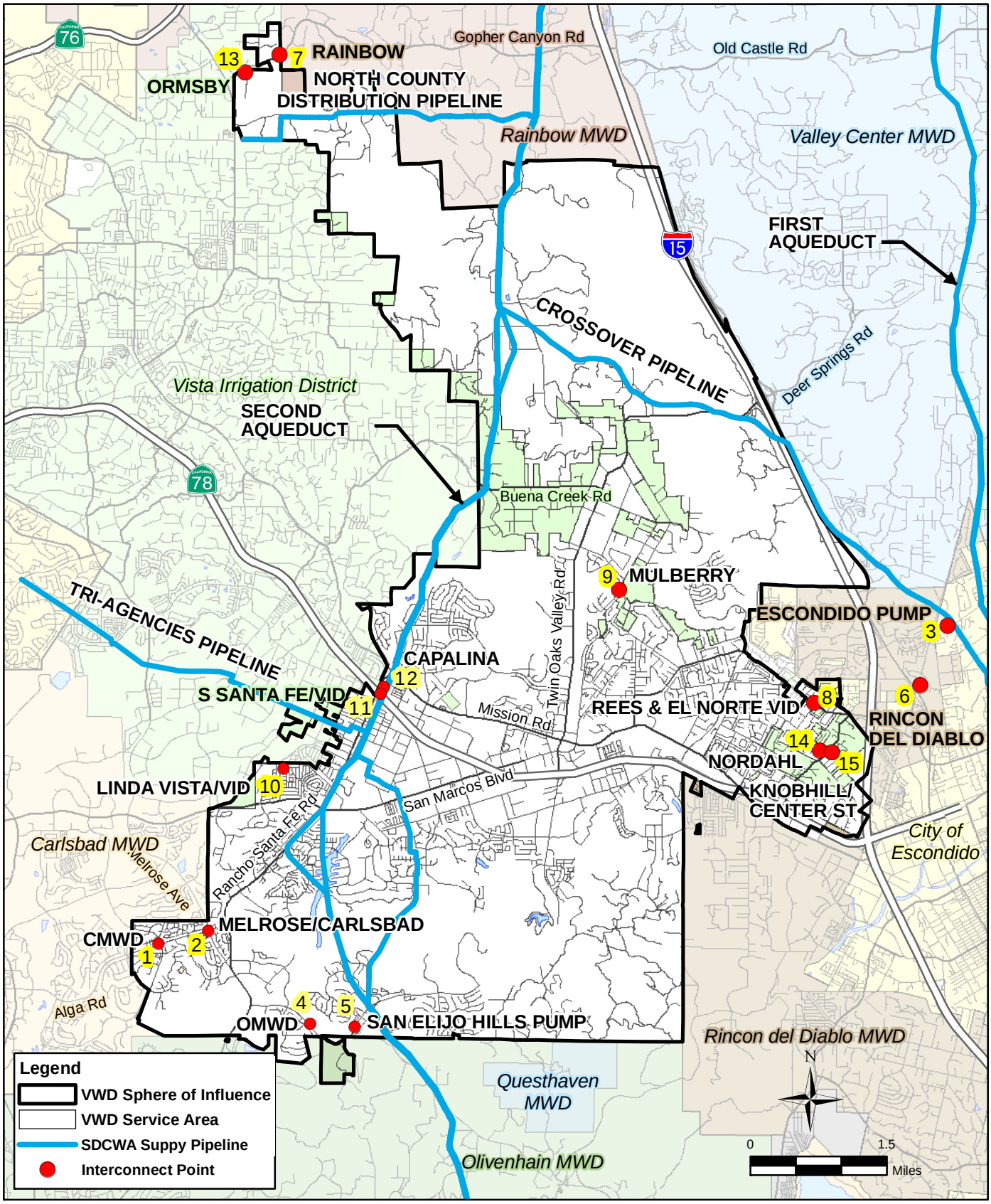
Emergency Connections

VWD has a total of 15 inter-agency service connections to neighboring water districts, including the interagency service connections to OMWD and CMWD as previously discussed. The remaining 13 are available to VWD only under emergency conditions. VWD has emergency connections with the CMWD (1), Vista Irrigation District (8), the City of Escondido (1), Rincon del Diablo Municipal Water District (1), Rainbow Water District (1), and OMWD (1), as shown on Figure 4-2. These connections, listed below in Table 4-6, are limited in their ability to deliver flows, and would be used for short term outages within VWD or the neighboring agency.

Table 4-6: Emergency Interagency Connections

Reference & Location (see Figure 4-2)	Name	Size (in)	Service to		Pressure Zone	Approx. Flow Rate (gpm)
			System	Connecting Agency		
2	Melrose/Carlsbad Crosstie	8	VWD	CMWD	815	900
3	Escondido Pump Connection	8	EWD	VWD	920	1,000
5	San Elijo Hills Pump Connection	8	OMWD	VWD	877	2,000
6	Rincon del Diablo Crosstie	8	VWD	Rincon	920	900
7	Rainbow Crosstie	8	VWD	RMWD	900	1,800
8	Rees & El Norte VID Crosstie	8	VWD/VID	VID/VWD	920	450
9	Mulberry Crosstie	6	VWD	VID	920	900
10	Linda Vista/VID Crosstie (Stone Gate PRV)	6	VWD	VID	920	450
11	S. Santa Fe Crosstie	8	VWD	VID	920	450
12	Capalina Crosstie	8	VWD	VID	920	450
13	Ormsby Crosstie	8	VWD	VID	900	450
14	Nordahl Crosstie	12	VWD	VID	920	N/A
15	Knobhill/Center St Crosstie	N/A	VWD	VID	920	N/A

Source: VWD 2008 Water, Wastewater, and Recycled Water Master Plan



SOURCE: LAFCO SOI - Affirmed 08-06-2007
VWD GIS Data - 07-17-2008, provided by District

INTER-AGENCY AND EMERGENCY SERVICE CONNECTIONS

FIGURE 4-2

6/20/2011 KC SD Z:\Projects\IS\VallecitosWaterDistrict\UWMP\mxd\20411_Interconnects_Fig4-2.mxd

4.3.3 Recycled Water

Although VWD produces up to 5 MGD of recycled water at the Meadowlark Water Reclamation Facility (MRF) and maintains the 54 million-gallon (MG) Mahr Reservoir, VWD does not maintain a recycled water service area within its sphere of influence. All of the recycled water produced at MRF is sold to the CMWD and the OMWD. CMWD originally contracted for up to 2.0 MGD during peak summer months, and in 2003, increased that amount to 3.0 MGD. As part of that agreement, VWD also provides CMWD with 32 MG of recycled water storage in the Mahr Reservoir. Also in 2003, the OMWD contracted for up to 1.5 MGD of recycled water and 16 MG of recycled water storage in the Mahr Reservoir. Excess recycled water produced at MRF is disposed of through a failsafe pipeline that connects to the ocean outfall at the Encina Water Pollution Control Facility (EWPCF).

4.3.4 Supply Alternatives

VWD's IRP identified several water supply alternatives. This section details those improvements that the IRP recommended for further study, including:

1. Seawater Desalination
2. Recycled Water Purchases from the City of Escondido
3. Expanded Transmission Capacity from VAL 2 Connection
4. Treated Water Purchases from the Escondido-Vista Water Treatment Plant
5. Treated Water Purchases from the Olivenhain Water Treatment Plant
6. Treated Water Purchases from the City of Oceanside's Weese Water Treatment Plant

Table 4-7 summarizes the water supplies that could be realized from each of these alternatives and possible constraints. It is important to note that all of these alternatives are considered concept-phase only and are not required to meet VWD's demands discussed in Section 2.

Table 4-7: Concept Future Water Supply Projects

Project Name	Projected Start Date	Projected Completion Date	Potential Project Constraints	Normal-Year Supply[1]	Single-Dry Year Supply[1]	Multiple-Dry Year Supply[1]
Seawater Desalination[2]	11/13/09	2016	Private financing issues; Likely to be acquired by the SDCWA	7,500	7,500	7,500
Recycled Water Purchases from Escondido	Not Specified	Not Specified	Not cost-effective and low water yield	477	477	477
Expanded Capacity from VAL 2	Not Specified	Not Specified	Not likely to occur due to cost; Would not produce a new local water supply	8,000	Not Determined	Not Determined
Water Purchases from Escondido-Vista Treatment Plant	Not Specified	Not Specified	Not likely to occur due to cost; Would not produce a new local water supply	3,500 to 8,500	Not Determined	Not Determined
Water Purchases from Olivenhain Treatment Plant	Not Specified	Not Specified	Not likely to occur due to cost; Would not produce a new local water supply	3,550 to 5,500	Not Determined	Not Determined
Water Purchases from Oceanside's Treatment Plant	Not Specified	Not Specified	Not likely to occur due to cost; Would not produce a new local water supply	325 to 9,800	Not Determined	Not Determined

[1] *In units of acre-feet per year*
[2] *Also being considered for acquisition by the SDCWA (see page 4-8)*

Seawater Desalination

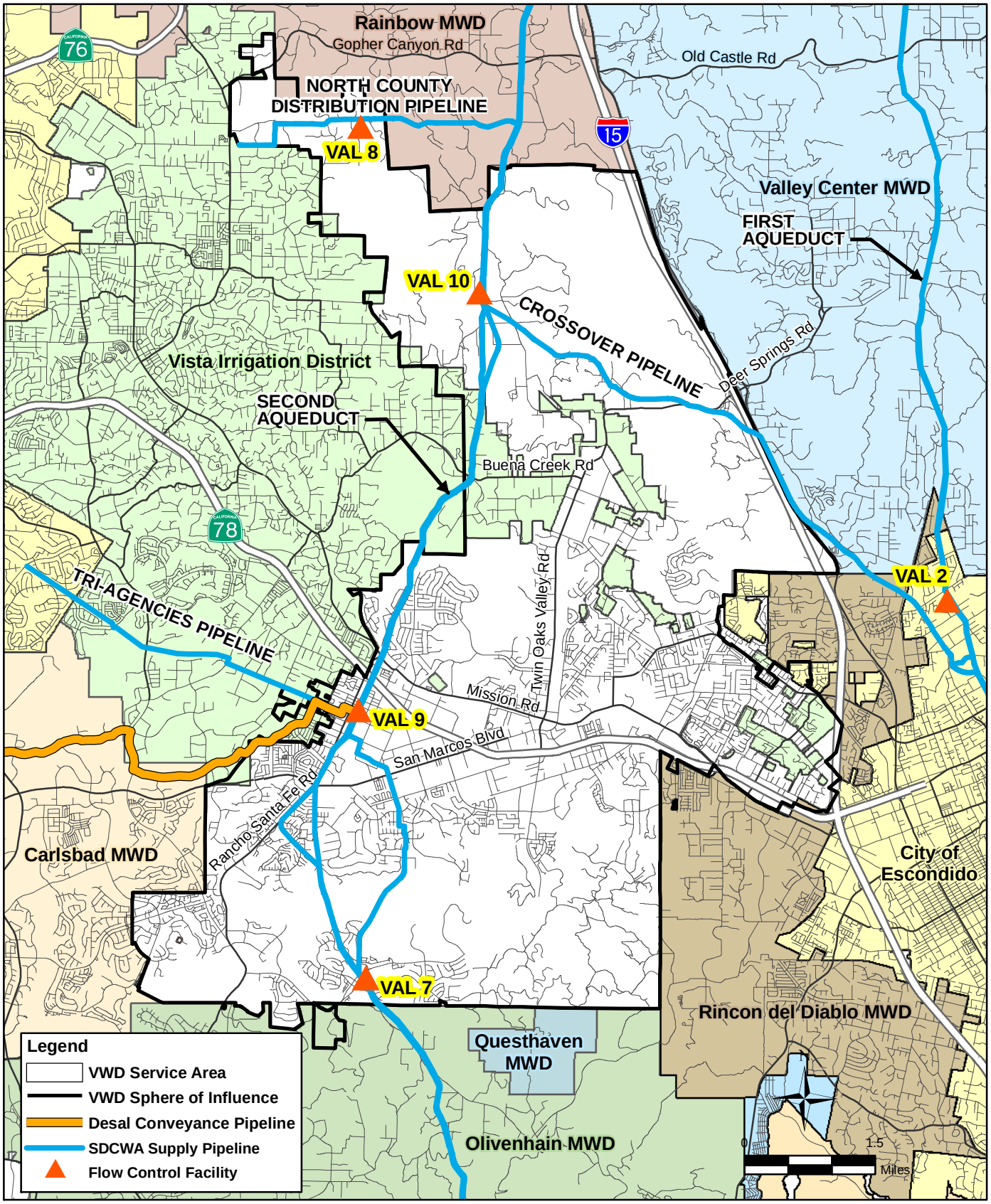
VWD has signed a water purchase agreement with Poseidon Resources Corporation to obtain up to 7,500 AFY of treated water from the proposed Carlsbad Seawater Desalination Facility, and may be interested in increasing this amount if possible. At 7,500 AFY, desalinated water would make up approximately 35 percent of VWD's supply at current demand levels. VWD anticipates receiving delivery of this supply at its existing VAL 9 connection, as shown in Figure 4-3.

The purchase price for the desalinated water would be set at or below the purchase price of treated water from the SDCWA. As a new local water supply independent of the imported water delivery system, seawater desalination would provide a highly reliable addition to VWD's supply portfolio. This supply would be available during droughts, during an emergency event that may lead to the failure of the SDCWA

aqueduct pipelines, or during other prolonged reductions in imported water deliveries. This would increase VWD's supply reliability during drought and emergency conditions.

As stated in Section 4.2.2, the SDCWA is considering purchase of the entire 56,000 AFY desalinated water supply from the Carlsbad Seawater Desalination Facility. VWD has requested a direct connection to the desalinated water distribution main next to its VAL 9 turnout if this were to occur. This could allow VWD to take water from the desalination plant directly as an alternative water supply. Seawater desalination offers the advantage of being a highly reliable supply and immune from the effects of prolonged drought and SDCWA aqueduct shutdowns.

Carlsbad State Beach -
Located adjacent to the proposed
Carlsbad Seawater Desalination Facility



SOURCE: LAFCO SOI - Affirmed 08-06-2007
VWD GIS Data - 07-17-2008, provided by District

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CARLSBAD
SEAWATER DESALINATED
WATER CONVEYANCE
FIGURE 4-3

Recycled Water Purchases from the City of Escondido

To offset potable water use, VWD could potentially purchase recycled water from the City of Escondido's Hale Avenue Resource Recovery Facility (HARRF), an 18.0-MGD treatment facility located in the southwest section of Escondido, and construct facilities to deliver this water to customers within the VWD service area. HARRF currently produces 4.0 MGD of tertiary treated recycled water for landscape and industrial use. There are sufficient potential uses and customers within Escondido and the Rincon del Diablo Municipal Water District service areas for the recycled water.

Escondido's 2005 Urban Water Management Plan states: *"The City's inland location and accessibility to both agriculture and urban users provides an excellent opportunity to expand recycled water deliveries to customers adjacent to Escondido as well as downstream."* Escondido plans to expand the plant incrementally to increase production as customer demand increases in future years and is currently conducting a pilot study to improve the dissolved mineral quality of the recycled water.

Escondido's recycled water distribution system extends from a 16-inch pipeline in North Broadway, to a 12-inch pipeline in Country Club Lane. The 12-inch line extends west under Interstate 15 to just north of El Norte Parkway, and to the VWD boundary. Pumping and additional storage may be required to distribute the recycled water within the VWD service area, depending on the location of the customers and volume of recycled water served. Figure 4-4 illustrates possible routes for extending recycled water service to portions of VWD's service area. Several parks and schools could be served by extending the recycled water system along Borden Road and south on Woodland Parkway. Approximately 500 AFY of recycled water demand was identified.

Recycled water purchases from Escondido offer the advantage of being a highly reliable supply and immune from the effects of prolonged drought and SDCWA aqueduct shutdowns.

East La Cienaga Road
Twin Oaks County Club
North Twin Oaks Valley Road
Escondido Highlands
Woodland Heights Glen
North County Cemetery District
Rose Ranch Road
San Marcos Unified School District
Borden Road
Country Club Lane
El Norte Parkway
San Marcos Unified School District
Woodland Parkway
Woodland Park
Community Church
East Mission Road
San Marcos Unified School District
15
78
76

Irrigation Meters

- <10 AFY (2007/2008)
- 10-20 AFY (2007/2008)
- >20 AFY (2007/2008)
- Existing Recycled Water Main
- Recycled Segment A (3.38 Miles)
- Recycled Segment B (2.75 Miles)
- Recycled Segment C (2.74 Miles)
- VWD Sphere of Influence Boundary

N

0 1,500

SCALE IN FEET

ESCONDIDO RECYCLED WATER CONVEYANCE ALTERNATIVES

FIGURE 4-4

5/09/2011 Z:\Projects\IS\VallecitosWaterDistrict\uwmp\20411_Meters4RecycledWater_F4-4.mxd

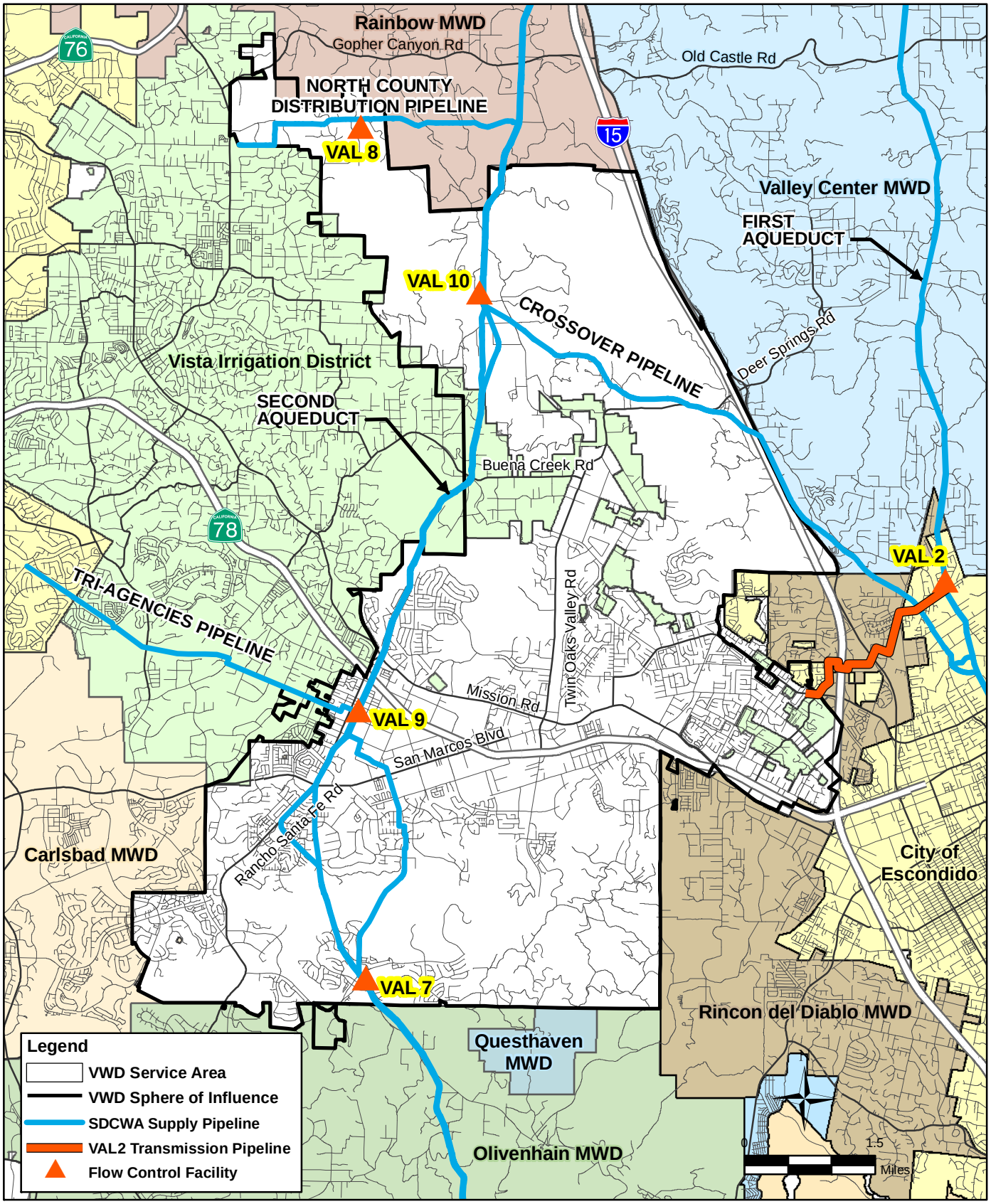
ATKINS

Expanded Transmission Capacity from VAL 2 Connection

Under this alternative, VWD would expand its transmission capacity from its VAL 2 connection, which is its lone connection to the SDCWA First Aqueduct. This project would not provide new supply to VWD, but could help improve operational flexibility and reliability during SDCWA Second Aqueduct service outages.

The existing transmission pipeline has a diameter of 18-inches and extends approximately 12,500 feet from the VAL 2 connection in the City of Escondido to the eastern portion of VWD's 920 Zone. The pipeline diameter and hydraulic conditions result in a delivery capacity to the 920 Zone of approximately 10 to 11 cfs (4,500 to 5,000 gpm). The facility is shown in Figure 4-5.

Replacing the 18-inch diameter pipeline with a new 24-inch diameter pipeline would double the transmission capacity to approximately 22 cfs (10,000 gpm). The current VAL 2 connection, rated at 12 cfs (5,500 gpm), would need to be expanded to 22 cfs (10,000 gpm) to match the delivery capacity of the new 24-inch transmission pipeline. Absorbing this much flow into the 920 Zone would likely require VWD to construct a pumping station facility to transfer water from the 920 Zone to the 1028 Zone. The combination of the expanded transmission capacity from the SDCWA First Aqueduct and the ability to move water out of the 920 Zone into the 1028 Zone would allow VWD to operate independent of the SDCWA Second Aqueduct for days or weeks at a time, depending on seasonal demand conditions.



SOURCE: LAFCO SOI - Affirmed 08-06-2007
VWD GIS Data - 07-17-2008, provided by District

5/09/2011 KC SD Z:\Projects\IS\VallecitosWaterDistrict\UWMP\mxd\20411_VAL2_TransPL_F4-5.mxd

VAL 2 TRANSMISSION PIPELINE

FIGURE 4-5

Treated Water Purchases from the Escondido-Vista Water Treatment Plant

Under this alternative, VWD would arrange to purchase treated water from the Escondido-Vista Water Treatment Plant (WTP), for delivery to VWD via the Vista Flume. These facilities are owned and operated by the City of Escondido and the Vista Irrigation District. Within this alternative are scenarios relative to whether VWD obtains capacity rights in the treatment and delivery facilities, as described below:

- **Surplus Purchases without Capacity Rights:** The simplest scenario would be where VWD does not purchase capacity rights in either the Escondido-Vista WTP or the Vista Flume, but merely purchases surplus flows of treated water as may be available. VWD would construct permanent facilities to allow for delivery from the Vista Flume into its 920 Zone. Pumping may be required. This scenario would be of limited reliability benefit to VWD, in that absent capacity rights it could not count on water being available when needed, such as during an aqueduct shutdown. This scenario might be considered simply on the merits of its costs in comparison to VWD's treated water purchases from the SDCWA.

- **Purchases with Capacity Rights in the Vista Flume or in both the Vista Flume and the Escondido-Vista WTP:** The other scenario would be where VWD worked with the Vista Irrigation District or with both the Vista Irrigation District and the City of Escondido to obtain capacity rights in the Vista Flume or in both the Vista Flume and the Escondido-Vista WTP. This would provide VWD with the assurance of a reliable supply as long as raw imported water remained available to the Escondido-Vista WTP.

A logical third variation would be where VWD also obtained capacity rights to the City of Escondido and Vista Irrigation District's raw water storage at Lake Henshaw, Lake Wolford, and Lake Dixon, and possibly to their associated water rights for diversion, storage, and use of local waters of the San Luis Rey River. These water rights and storage reservoirs provide their owners with the additional reliability benefit of being available to deliver water to the Escondido-Vista WTP even during a total interruption of imported water deliveries from the SDCWA. However, the City of Escondido and Vista Irrigation District have advised VWD that they are not interested in considering making these rights available to entities outside their service areas.

This alternative would not provide a new local water supply, but would provide for an increment of treated water supply independent of the SDCWA's treated water aqueducts.

Treated Water Purchases from the Olivenhain Water Treatment Plant

Under this alternative, VWD would arrange to purchase treated water from the Olivenhain WTP for delivery via the existing Vallecitos-Carlsbad-Olivenhain Tri-Agencies Pipeline. This capacity could help improve operational flexibility and reliability during SDCWA First and Second Aqueduct service outages. The Olivenhain WTP is owned and operated by the OMWD. Within this alternative are two scenarios relative to whether VWD obtains capacity rights in the treatment plant, as described below:

- **Surplus Purchases without Capacity Rights:** The simplest variation would be where VWD does not purchase capacity rights in the Olivenhain WTP, but merely purchases surplus flows of treated water as may be available. This variation would be of limited reliability benefit to VWD in that absent capacity rights, it could not count on water being available when needed, such as during an aqueduct shutdown. This project variation might be considered simply on the merits of its costs in comparison to VWD's treated water purchases from the SDCWA.

- **Purchases with Capacity Rights in the Olivenhain WTP:** This variation would be where VWD worked with OMWD to obtain capacity rights in the Olivenhain WTP. This would provide VWD with the assurance of reliable supply as long as raw imported water remained available to the Olivenhain WTP.

This alternative would not provide a new local water supply, but would provide for an increment of treated water supply independent of the SDCWA's treated water aqueducts.

Treated Water Purchases from the City of Oceanside's Weese Water Treatment Plant

Under this alternative, VWD would arrange to purchase treated water from the City of Oceanside's Weese WTP, for delivery via VWD's existing VAL 8 connection on the North County Distribution Pipeline. Within this alternative are two scenarios relative to whether VWD obtains capacity rights in the treatment plant.

- **Surplus Purchases without Capacity Rights:** The simplest variation would be where VWD does not purchase capacity rights in the Weese WTP, but merely purchases surplus flows of treated water as may be available. Existing interconnect facilities allow for a maximum delivery at VWD's VAL 8 connection of up to 11 cfs (5,000 gpm), but in practice deliveries are limited to the approximately 0.3 MGD (200 gpm) average daily demand of the 900 Zone. VWD

would need to construct a pump station to allow additional deliveries at the VAL 8 connection. This variation would be of limited reliability benefit to VWD, in that absent capacity rights in the Weese WTP it could not count on water being available when needed, such as during an aqueduct shutdown. This project variation might be considered simply on the merits of its costs in comparison to VWD's treated water purchases from the SDCWA.

- **Purchases with Capacity Rights in Weese WTP:** The next variation would be where VWD worked with the City of Oceanside to obtain capacity rights in the Weese WTP. This would provide VWD with the assurance of reliable supply as long as raw imported water remained available to the Weese WTP.

This alternative would not provide a new local water supply, but would provide for an increment of treated water supply independent of the SDCWA's treated water aqueducts.

4.3.5 Groundwater Feasibility

Historically, local groundwater supplies have not been used by VWD due to questionable quantity and relatively poor quality. In 1996, a draft groundwater feasibility analysis was performed for VWD to determine the quantity and quality of groundwater potentially available for use as a local groundwater supply source.

The draft groundwater feasibility analysis determined that the volume of water stored in the fractured bedrock aquifer beneath the VWD service area likely ranges between 97,000 and 389,000 acre-feet. The estimated volume of water stored in the combined alluvium and residuum units likely ranges between 9,700 and 38,600 acre-feet. Groundwater yields for wells would likely be small, averaging about 114 gallons per minute.

Groundwater quality in the aquifer is characterized by moderately high levels of total dissolved solids and occurrences of relatively high concentrations of bicarbonate, sodium, chloride and nitrate. The groundwater would require treatment prior to introduction into VWD's potable water distribution system.

The draft groundwater feasibility analysis concluded that the storage capacity of the alluvium and residuum is too small to be considered as a long-term source, although the fractured bedrock aquifer may be considered further as a possible source. However, the expected yields from wells in the VWD service area, combined with the water quality issues that would need to be resolved, would not be likely to produce groundwater at an

economically viable rate even in the short-term. Therefore, groundwater is not a planned source of water available to VWD.