Northern Calleguas Creek Watershed
Regional Water Balance and Availability Determination

This report provides an overview of the Northern Calleguas Creek Watershed, defined herein as areas tributary to Arroyo Simi and Arroyo Las Posas. Specifically, this chapter focuses on the water supplies and water availability associated with the following water purveyors: City of Simi Valley (VCWWD No. 8), City of Moorpark (VCWWD No. 1), Somis Community (VCWWD No. 19), and the City of Camarillo (Camarillo). Historic and projected water information was obtained from each purveyor's 2005 Urban Water Management Plan (UWMP) and the Calleguas Municipal Water District's (CMWD) 2005 UWMP.

A. Background

Each of the water purveyors listed above receive imported water as well as operate groundwater wells. Water is imported into the region through the State Water Project's (SWP) network of reservoirs, aqueducts, and pump stations. The imported water is treated and disinfected at the Metropolitan Water District of Southern California's (MWD) Jensen Filtration Facility. Following treatment, water is conveyed by pipeline to the CMWD. From there, imported water is delivered to each purveyor for distribution.

The following sections provide a more detailed description of the water, wastewater, and recycled water operations of each purveyor.

1. City of Simi Valley (VCWWD No. 8)

VCWWD No. 8 currently uses imported SWP water to meet all of its customer demands. However, VCWWD No. 8 also operates five dewatering wells in the western portion of the City to lower the groundwater table and relieve nuisance water to houses and other occupied structures. This groundwater is discharged to the Arroyo Simi. Approximately 1 million gallons per day (mgd) of groundwater is pumped through this dewatering operation.

VCWWD No. 8 also operates the Simi Valley Water Quality Control Plant (WQCP), which has a tertiary treatment capacity of 12.5 mgd. The majority of the tertiary treated wastewater is discharged to the Arroyo Simi. A small portion (approximately 60 AFY) of treated effluent is used to irrigate landscaping around the WQCP and to clean sewer lines throughout Simi Valley.

DRAFT

Simi Valley's Sanitation Division completed its Wastewater Reclamation Facilities Plan Update in 1992. The Facilities Plan Update outlined a water reclamation distribution system that would ultimately deliver almost 2,000 AFY (1.8 mgd) of treated wastewater for existing and future uses.

2. VCWWD No. 1 (Moorpark)

VCWWD No. 1 currently uses a combination of SWP imported water and pumped groundwater to serve its customers. VCWWD No. 1 owns seven wells in the North Las Posas Basin: No. 5, No. 15, No. 95, No. 96, No. 97, No. 98, and No. 20. Well No. 5 was recently abandoned due to a recurring coliform problem. The total pumping capacity of these wells is 4,525 gallons per minute (gpm). VCWWD No. 1's total groundwater pumping allocation from the Fox Canyon Groundwater Management Agency (GMA) was limited to 2,329 acre-feet per year (AFY) in 2005 and will be limited to 2,183 AFY in 2010, if the next phase of pumping reductions are implemented by the Fox Canyon GMA and no additional allocations are acquired.

VCWWD No. 1 operates the Moorpark Wastewater Treatment Plant (WWTP) which has a tertiary treatment capacity of 3.0 mgd. Effluent from the Moorpark WWTP is treated to secondary standards and discharged to percolation ponds, discharged to the Arroyo Las Posas, or treated to tertiary levels and used for reclaimed purposes. Reclaimed water is supplied to the Moorpark Country Club Estate for golf course irrigation and to local agricultural interests.

3. VCWWD No. 19

VCWWD No. 19 also uses a combination of SWP imported water and pumped groundwater to meet water demands. In 2005, the VCWWD No. 19 total demand was approximately 2,850 acre-feet (AF), with 25 percent of that demand consumed by municipal customers and the remaining 75 percent by agricultural customers. In 2005, VCWWD No. 19 imported 475 AF of SWP water. VCWWD No. 19 does not provide wastewater treatment.

4. City of Camarillo

Camarillo currently uses a combination of SWP imported water and pumped groundwater to serve its customers. Camarillo owns three wells (Wells A, B and D) that draw water from the Fox Canyon Aquifer in the Pleasant Valley Basin. Each well has a pumping capacity of approximately 1,500 gpm. Of these wells, Well D operates year round, Well B is blended with imported water to meet drinking water standards due to

DRAFT

poor water quality, and Well A produces poor quality water and is consequently used as a standby well.

The Camarillo Sanitary District operates the Water Reclamation Plant (WRP), which has a secondary treatment capacity of 6.75 mgd. A portion of the treated effluent from the WRP is pumped to Smith Ranch for irrigation of non-food crops, and the remaining effluent is discharged into Conejo Creek. Following an upgrade of the WRP, recycled water produced by the Camarillo Sanitary District will be sold to the Camrosa Water District and the Pleasant Valley County Water District and will be beneficially used within the central and lower Pleasant Valley basin.

Currently, water levels near Camarillo Well D in the central Pleasant Valley Basin are depressed. Alternatively, water levels near Wells A and B are rising. However, as discussed above, water quality near Wells A and B is poor. To address this situation, Camarillo intends to construct a groundwater desalination facility that will allow Camarillo to halt pumping of Well D and utilize the poorer quality water available at Wells A and B. The Camarillo desalter will be located in the northeast Pleasant Valley Subbasin and will utilize RO treatment technology. Brine from the treatment process will be discharged to a Regional Salinity Management Pipeline (SMP) and the concentrated salts will be exported out of the watershed.

Camarillo's current groundwater pumping allocation from the Fox Canyon GMA is 4,500 AFY. This allocation could be decreased to 4,100 AFY by the year 2010 if further reductions in allocations are implemented by the Fox Canyon GMA. However, there are several anticipated regional benefits associated with Camarillo operating the groundwater desalter and Camarillo intends to request that the Fox Canyon GMA allow Camarillo to pump and treat 9,700 AFY from the northeast Pleasant Valley Subbasin (approximately 5,600 AFY in excess of allocation).

As shown in the water balance and availability analysis provided in the subsequent sections, the northeast Pleasant Valley Subbasin is currently realizing an estimated recharge rate of 13,000 AFY of non-native water, which exceeds the amount Camarillo is proposing to pump.

B. Water Balance Methodology

This section summarizes the methodology and assumptions associated with the water balance that was developed to determine the quantity of available non-native water in the Northern Calleguas Creek Watershed, as well as the impact of Camarillo operating groundwater wells to produce the target feed rate for the proposed groundwater desalter. The water balance was created in spreadsheet format using Microsoft Excel.

DRAFT

A water balance was created for three operating years: 2005, 2010, and 2015. Year 2005 was created as a baseline and based recent known conditions. Water availability was determined based on documented use of imported and local groundwater supplies for each of the purveyors. Reference values used to perform the water balance evaluation are shown in Table A-1. The following is a list of column names in Table A-1 and a description of the sources and derivation of the values in each column.

A. Total Imported Water – This column presents the total imported water for each of the listed purveyors. Data for this column were obtained from the purveyor's 2005 UWMPs.

B. Imported Water for M&I – This column presents the imported water used by each purveyor for municipal and industrial (M&I) purposes. Data for this column were obtained from the purveyor's 2005 UWMPs and the Calleguas Municipal Water District's 2005 UWMP.

C. Imported Water for Irrigation/Ag – This column presents the imported water used by each purveyor for irrigation or agricultural purposes. Data for this column were obtained from the purveyor's 2005 UWMPs and the Calleguas Municipal Water District's 2005 UWMP.

D. Total Groundwater Pumped – This column presents the total imported water for each of the listed purveyors. Data for this column were obtained from the purveyor's 2005 UWMPs.

E. M&I Groundwater – This column presents the groundwater used by each purveyor for M&I purposes. Data for this column were obtained from the purveyor's 2005 UWMPs and the Calleguas Municipal Water District's 2005 UWMP.

F. Average Wastewater Flow – This column presents the total wastewater for each of the purveyors' service areas. It is important to note that wastewater service is not necessarily provided by the purveyor, but may be provided by another entity. Data for this column were obtained from the purveyor's 2005 UWMPs and the Calleguas Municipal Water District's 2005 UWMP.

DRAFT

G. Imported Wastewater Contribution – This column presents the portion of the wastewater contribution to the watershed associated with imported water for each of the purveyors' service areas. The value in this column is calculated based on the ratio of imported M&I water to the sum of imported M&I water plus M&I groundwater, multiplied by the average wastewater flow, as shown by the following equation:

Column G = [Column B / (Column B + Column E)] * Column F

H. Reclaimed Wastewater – This column presents the portion of the average reclaimed wastewater to the watershed for each of the purveyors' service areas. Data for this column were obtained from the purveyor's 2005 UWMPs and the Calleguas Municipal Water District's 2005 UWMP.

I. Imported Reclaimed Contribution – This column presents the reclaimed wastewater contribution associated with imported water for each of the purveyors' service areas. The value in this column is calculated based on the ratio of imported M&I water to the sum of imported M&I water plus M&I groundwater, multiplied by the average reclaimed wastewater flow, as shown by the following equation:

Column I = [Column B / (Column B + Column E)] * Column H

J. Available Wastewater – This column presents the amount of wastewater generated in the Northern Calleguas Creek Watershed from imported water sources that is available to offset additional groundwater pumping for the proposed desalter. This value is calculated as the difference between the imported wastewater contribution and the imported reclaimed wastewater contribution, as shown by the following equation:

Column J = Column G – Column I

K. Return/Recharge for Imported/Reuse Water – This column presents the return flow and/or recharge contribution of imported water and reclaimed wastewater used for irrigation and agriculture in each of the purveyors'

DRAFT

service areas. Since this region is relatively efficient in regards to irrigation efficiency, a value of 20 percent of the imported water used for irrigation and agriculture was assumed. A value of 20 percent was also assumed for the return flow/recharge contribution from reclaimed wastewater, as shown by the following equation:

Column K = (Column C + Column I) * 0.2

C. Water Balance Results

Tables 1, 2, and 3 present the estimated amount of non-native water available within the Northern Calleguas Creek Watershed for years 2005, 2010, and 2015, respectively. In addition, Figures 1, 2, and 3 graphically depict the approach to these calculations. As shown, the amount of available non-native water is anticipated to increase as demands for imported water also increase.

Table 1
Year 2005 Water Balance

M&I Water Balance	
1. Imported Water for M&I Use [(1)]	25,178 AFY
2. Imported M&I Water Returned to Wastewater System [(2)]	12,435 AFY
3. Imported M&I Wastewater Delivered to the Recycled Water System	829 AFY
4. Amount of Recycled Water Returned to the Watershed [(3)]	166 AFY
5. Total Imported M&I Water Returned to Watershed (Line 2 - Line 3 + Line 4)	11,772 AFY
Agricultural & Irrigation Water Balance	
6. Imported Water for Agricultural/Irrigation Use [(1)]	7,408 AFY
7. Amount of Agricultural/Irrigation Water Returned to Watershed [(3)]	1,482 AFY
Total Imported Water Returned to Watershed (Line 5 + Line 7) [(4)]	13,254 AFY

[(1)] Based on VCWWD No. 8 and VCWWD No. 1 only. VCWWD No. 19 amount assumed to be negligible.
[(2)] Based on potable water demand to wastewater flow ratio of 49 percent.
[(3)] Based on 20 percent return rate.
[(4)] Note: Value equal to Column J plus Column K from Table A-1.

DRAFT

Table 2
Year 2010 Water Balance

M&I Water Balance	
1. Imported Water for M&I Use [1]	28,327 AFY
2. Imported M&I Water Returned to Wastewater System [2]	14,463 AFY
3. Imported M&I Wastewater Delivered to the Recycled Water System	1,714 AFY
4. Amount of Recycled Water Returned to the Watershed [3]	343 AFY
5. Total Imported M&I Water Returned to Watershed (Line 2 - Line 3 + Line 4)	13,092 AFY
Agricultural & Irrigation Water Balance	
6. Imported Water for Agricultural/Irrigation Use [1]	7,695 AFY
7. Amount of Agricultural/Irrigation Water Returned to Watershed [3]	1,539 AFY
Total Imported Water Returned to Watershed (Line 5 + Line 7) [4]	14,631 AFY

[1] Based on VCWWD No. 8 and VCWWD No. 1 only. VCWWD No. 19 amount assumed to be negligible.
[2] Based on potable water demand to wastewater flow ratio of 49 percent.
[3] Based on 20 percent return rate.
[4] Note: Value equal to Column J plus Column K from Table A-1.

Table 3
Year 2015 Water Balance

M&I Water Balance	
1. Imported Water for M&I Use [1]	30,495 AFY
2. Imported M&I Water Returned to Wastewater System [2]	16,615 AFY
3. Imported M&I Wastewater Delivered to the Recycled Water System	3,641 AFY
4. Amount of Recycled Water Returned to the Watershed [3]	728 AFY
5. Total Imported M&I Water Returned to Watershed (Line 2 - Line 3 + Line 4)	13,702 AFY
Agricultural & Irrigation Water Balance	
6. Imported Water for Agricultural/Irrigation Use [1]	8,021 AFY
7. Amount of Agricultural/Irrigation Water Returned to Watershed [3]	1,604 AFY
Total Imported Water Returned to Watershed (Line 5 + Line 7) [4]	15,306 AFY

[1] Based on VCWWD No. 8 and VCWWD No. 1 only. VCWWD No. 19 amount assumed to be negligible.
[2] Based on potable water demand to wastewater flow ratio of 49 percent.
[3] Based on 20 percent return rate.
[4] Note: Value equal to Column J plus Column K from Table A-1.

DRAFT

Table 4 provides a comparison between the amount of non-native water available and the amount of water Camarillo would pump in excess of allocation if approved by the Fox Canyon GMA.

Table 4
Summary of Water Availability for Camarillo Desalter

Parameter	Design Year 2010		Design Year 2015 [1]	
	mgd	AFY	mgd	AFY
1. Extractions for Camarillo Desalter	8.6	9,700	8.6	9,700
2. Camarillo's GMA Allocation	3.6	4,100	3.6	4,100
3. Amount Beyond Allocation (Line 1 – Line 2)	5.0	5,600	5.0	5,600
4. Available Non-Native Water	12.9	14,600	13.5	15,300
5. Water Surplus (Line 4 – Line 5)	7.9	8,850	8.5	9,520

[1] Considers future Simi Valley recycled water facility.

It is important to note that other desalter projects within the Northern Calleguas Creek Watershed have been envisioned. If implemented, these proposed projects would also need to consider the water balance findings herein and update these evaluations as required to confirm sufficient water is available for these potential subsequent projects.

DRAFT

2005 Water Balance	A		B		C		D		E		F		G		H		I		J		K	
Purveyor	Total Imported Water[1]		Imported Water for M&I		Imported Water for Irrigation/Ag		Total Groundwater Pumped[2]		M&I Groundwater		Average Wastewater Flow		Imported Wastewater Contribution		Reclaimed Wastewater		Imported Reclaimed Contribution		Available Wastewater		Return/Recharge from Imported & Reuse Water	
	AFY	mgd	AFY	mgd	AFY	mgd	AFY	mgd	AFY	mgd	AFY	mgd	AFY	mgd	AFY	mgd	AFY	mgd	AFY	mgd	AFY	mgd
City of Simi Valley (VCWWD No. 8)	22,374	19.7	17,699	15.6	4,675	4.1	0	0.0	0	0.0	10,300	9.1	10,300	9.1	60	0.1	60	0.1	10,240	9.0	947	0.8
VCWWD No. 1 (Moorpark)	10,212	9.0	7,479	6.6	2,733	2.4	2,329	2.0	2,329	2.0	2,800	2.5	2,135	1.9	1,008	0.9	769	0.7	1,366	1.2	700	0.6
VCWWD No. 19 (Somis)	472	0.4	472	0.4	0	0.0	2,374	2.1	388	0.3	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
City of Camarillo	5,500	4.8	5,500	4.8	0	0.0	3,800	3.3	3,610	3.2											0	0.0
Total	38,558	33.9	31,150	27.4	7,408	6.5	8,503	7.5	6,327	5.6	13,100	11.5	12,435	10.9	1,068	1.0	829	0.8	11,606	10.2	1,647	1.4

[1] City of Simi Valley total imported water is less wholesale to Las Virgines and VCWWD #17.

[2] Ignores Tapo Canyon dewatering wells because the water is removed from the groundwater table and discharged to the Arroyo Simi without any consumptive use. Therefore, the water available remains unchanged.

2010 Water Balance	A		B		C		D		E		F		G		H		I		J		K	
Purveyor	Total Imported Water[1]		Imported Water for M&I		Imported Water for Irrigation/Ag		Total Groundwater Pumped[2]		M&I Groundwater		Average Wastewater Flow		Imported Wastewater Contribution		Reclaimed Wastewater		Imported Reclaimed Contribution[3]		Available Wastewater		Return/Recharge from Imported/ Reuse Water	
	AFY	mgd	AFY	mgd	AFY	mgd	AFY	mgd	AFY	mgd	AFY	mgd	AFY	mgd	AFY	mgd	AFY	mgd	AFY	mgd	AFY	mgd
City of Simi Valley (VCWWD No. 8)	24,799	21.8	19,837	17.5	4,962	4.4	0	0.0	0	0.0	11,790	10.4	11,790	10.4	110	0.1	110	0.1	11,680	10.3	1,014	0.9
VCWWD No. 1 (Moorpark)	11,223	9.9	8,490	7.5	2,733	2.4	2,183	1.9	2,183	1.9	3,360	3.0	2,673	2.4	2,016	1.8	1,604	1.4	1,069	0.9	867	0.8
VCWWD No. 19 (Somis)	747	0.7	747	0.7	0	0.0	2,226	2.0	139	0.1	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
City of Camarillo	6,125	5.4	6,125	5.4	0	0.0	4,138	3.6	3,972	3.5											0	0.0
Total	42,894	37.7	35,199	31.0	7,695	6.8	8,547	7.5	6,294	5.5	15,150	13.3	14,463	12.7	2,126	1.9	1,714	1.5	12,749	11.2	1,882	1.7

[1] City of Simi Valley total imported water is less wholesale to Las Virgines and VCWWD #17.

[2] Ignores Tapo Canyon dewatering wells because the water is removed from the groundwater table and discharged to the Arroyo Simi without any consumptive use. Therefore, the water available remains unchanged.

2015 Water Balance	A		B		C		D		E		F		G		H		I		J		K	
Purveyor	Total Imported Water[1]		Imported Water for M&I		Imported Water for Irrigation/Ag		Total Groundwater Pumped[2]		M&I Groundwater		Average Wastewater Flow		Imported Wastewater Contribution		Reclaimed Wastewater		Imported Reclaimed Contribution[3]		Available Wastewater		Return/Recharge from Imported/ Reuse Water	
	AFY	mgd	AFY	mgd	AFY	mgd	AFY	mgd	AFY	mgd	AFY	mgd	AFY	mgd	AFY	mgd	AFY	mgd	AFY	mgd	AFY	mgd
City of Simi Valley (VCWWD No. 8)	26,244	23.1	20,956	18.4	5,288	4.7	0	0.0	0	0.0	13,270	11.7	13,270	11.7	2,000	1.8	2,000	1.8	11,270	9.9	1,468	1.3
VCWWD No. 1 (Moorpark)	12,272	10.8	9,539	8.4	2,733	2.4	2,183	1.9	2,183	1.9	4,110	3.6	3,346	2.9	2,016	1.8	1,641	1.4	1,704	1.5	875	0.8
VCWWD No. 19 (Somis)	774	0.7	774	0.7	0	0.0	2,226	2.0	139	0.1	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
City of Camarillo	6,779	6.0	6,779	6.0	0	0.0	4,138	3.6	3,972	3.5											0	0.0
Total	46,069	40.5	38,048	33.5	8,021	7.1	8,547	7.5	6,294	5.5	17,380	15.3	16,615	14.6	4,016	3.6	3,641	3.2	12,974	11.4	2,332	2.1

[1] City of Simi Valley total imported water is less wholesale to Las Virgines and VCWWD #17.

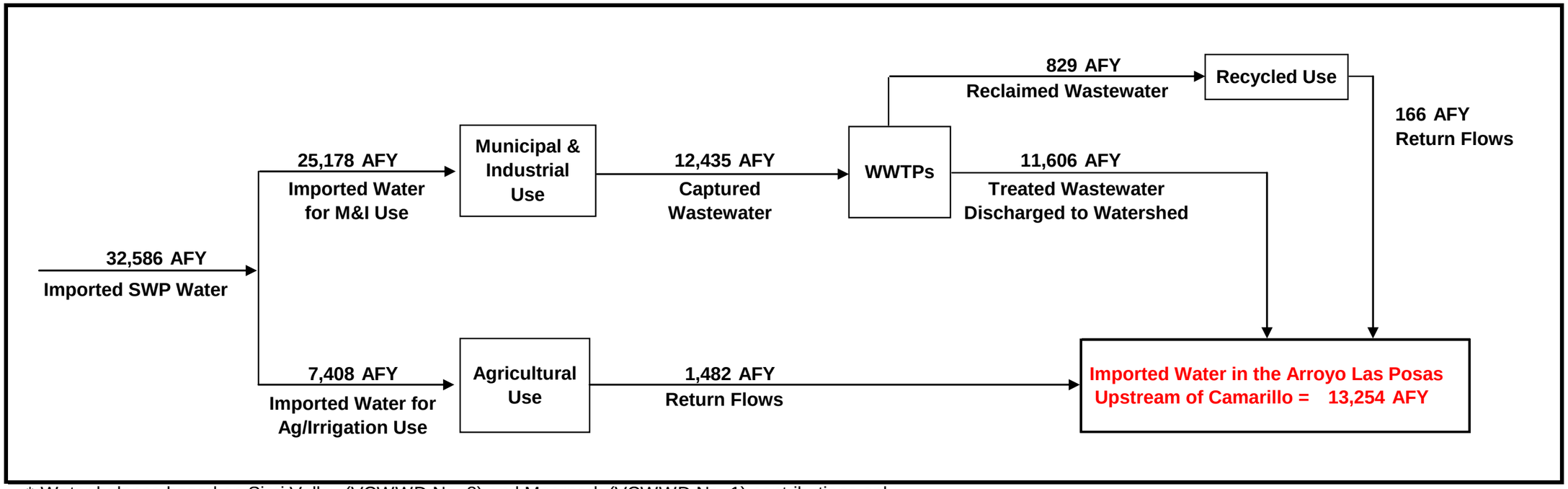
[2] Ignores Tapo Canyon dewatering wells because the water is removed from the groundwater table and discharged to the Arroyo Simi without any consumptive use. Therefore, the water available remains unchanged.

BLACK & VEATCH
building a world of difference™
ENERGY WATER INFORMATION GOVERNMENT

Northern Calleguas Creek Watershed
Regional Water Balance and Availability Determination

Water Balance Calculations and Values

Table A-1



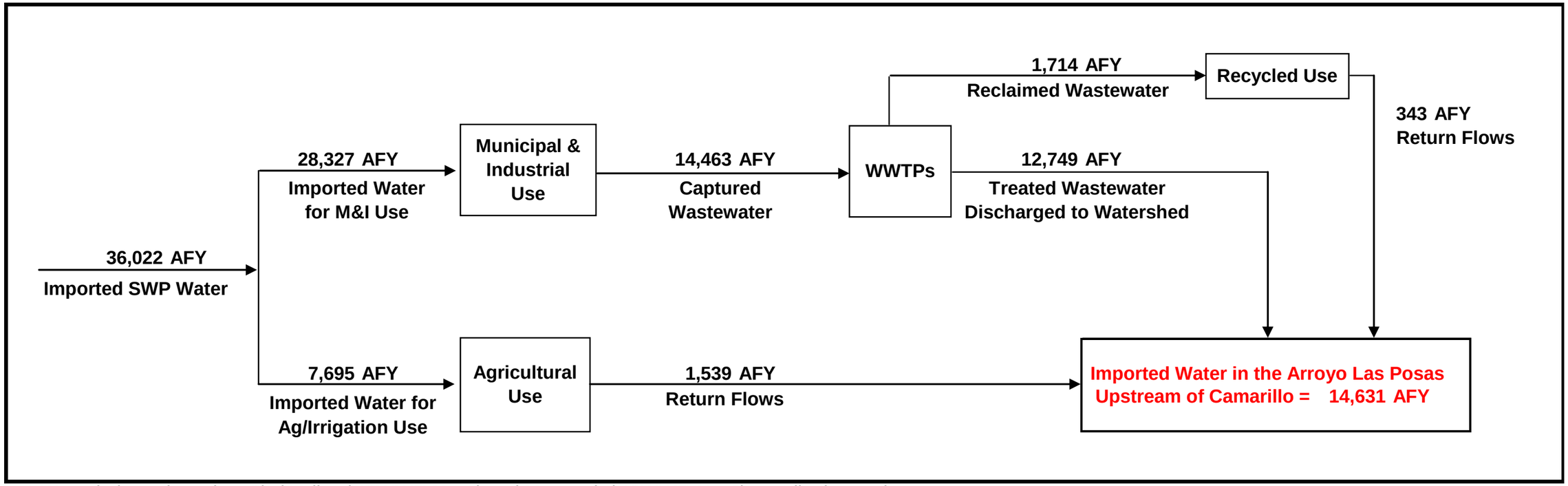
* Water balance based on Simi Valley (VCWWD No. 8) and Moorpark (VCWWD No. 1) contributions only.
Assumes that Somis (VCWWD No. 19) imported water returned to the watershed is negligible.
Assumes that 100% of Camarillo's return flows are reused by Camarillo, Camrosa Water District, and Pleasant Valley County Water District.

BLACK & VEATCH
building a world of difference™
ENERGY WATER INFORMATION GOVERNMENT

Northern Calleguas Creek Watershed
Regional Water Balance and Availability Determination

2005 Water Balance

Figure 1



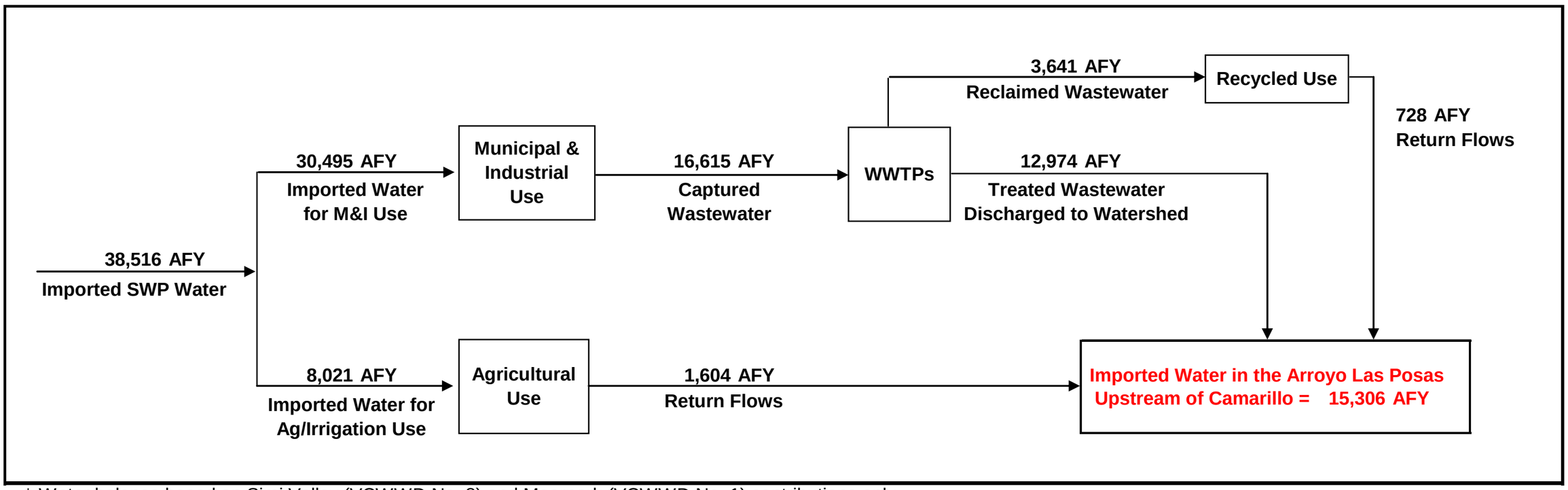
* Water balance based on Simi Valley (VCWWD No. 8) and Moorpark (VCWWD No. 1) contributions only.
Assumes that Somis (VCWWD No. 19) imported water returned to the watershed is negligible.
Assumes that 100% of Camarillo's return flows are reused by Camarillo, Camrosa Water District, and Pleasant Valley County Water District.

BLACK & VEATCH
building a world of difference™
ENERGY WATER INFORMATION GOVERNMENT

Northern Calleguas Creek Watershed
Regional Water Balance and Availability Determination

2010 Water Balance

Figure 2



* Water balance based on Simi Valley (VCWWD No. 8) and Moorpark (VCWWD No. 1) contributions only.
Assumes that Somis (VCWWD No. 19) imported water returned to the watershed is negligible.
Assumes that 100% of Camarillo's return flows are reused by Camarillo, Camrosa Water District, and Pleasant Valley County Water District.

BLACK & VEATCH
building a world of difference™
ENERGY WATER INFORMATION GOVERNMENT

Northern Calleguas Creek Watershed
Regional Water Balance and Availability Determination

2015 Water Balance

Figure 3