SCV WATER

June 2021

2020 Urban Water Management Plan for Santa Clarita Valley Water Agency

(Los Angeles County Waterworks District No. 36/Cooperating Agency)

VOLUME 2 FINAL

APPENDICES A THROUGH G

Kennedy Jenks

Appendix A: 2020 UWMP/WSCP Adoption Resolutions

RESOLUTION NO. SCV-217

RESOLUTION OF THE SANTA CLARITA VALLEY WATER AGENCY BOARD OF DIRECTORS ADOPTING THE 2020 URBAN WATER MANAGEMENT PLAN

WHEREAS, The California Urban Water Management Planning Act, (Wat. Code § 10610, et seq. (the Act)), mandates that every urban supplier of water providing water for municipal purposes to more than 3,000 customers or supplying more than 3,000 acre feet of water annually, prepare, and adopt an Urban Water Management Plan (Plan); and

WHEREAS, the Act generally requires that said Plan be updated and adopted at least once every five years on or before July 1, in years ending in six and one; and

WHEREAS, pursuant to recent amendments to the Act, urban water suppliers are required to update and electronically submit their 2020 Plans to the California Department of Water Resources (DWR) by July 1, 2021; and

WHEREAS, pursuant to Water Conservation Act of 2009, also referred to as SB X7-7 (Wat. Code § 10608 et seq.), an "urban retail water supplier" is defined as a water supplier that directly provides potable municipal water to more than 3,000 end users or that supplies more than 3,000 acre feet of potable water annually at retail for municipal purposes, and an "urban wholesale water supplier" is defined as a water supplier that provides more than 3,000 acre feet of water annually at wholesale for potable municipal purposes; and

WHEREAS, the Santa Clarita Valley Water Agency (SCV Water) meets the definition of an urban retail water supplier for purposes of the Act and SB X7-7; and

WHEREAS, SCV Water has prepared an 2020 Plan in accordance with the Act and SB X7-7, and in accordance with applicable legal requirements, has undertaken certain coordination, notice, public involvement, public comment, and other procedures in relation to its 2020 Plan; and

WHEREAS, in accordance with the Act and SB X7-7, SCV Water has prepared its 2020 Plan with its own staff, with the assistance of consulting professionals, and in cooperation with other governmental agencies, and has utilized and relied upon industry standards and the expertise of industry professionals in preparing its 2020 Plan, and has also utilized DWR's Urban Water Management Plan Guidebook 2020, including its related appendices, in preparing its 2020 Plan; and

WHEREAS, in accordance with applicable law, including Water Code sections 10608.26 and 10642, and Government Code section 6066, a Notice of a Public Hearing regarding SCV Water's 2020 Plan was published within the jurisdiction of SCV Water May 15, 2021 and May 22, 2021; and

WHEREAS, in accordance with applicable law, including but not limited to Water Code sections 10608.26 and 10642, a public hearing was held on May 27, 2021 at 6:00 p.m., or soon thereafter, via Zoom meeting as listed on the May 27, 2021 Board Agenda and on SCV Water's website https://yourscvwater.com, and a continuation of the public hearing was held on June 16, 2021 at 6:00 p.m., or soon thereafter, via Zoom meeting as listed on the June 16, 2021 Board Agenda and on SCV Water's website https://yourscvwater.com in order to provide members of

the public and other interested entities with the opportunity to be heard in connection with proposed adoption of the 2020 Plan and issues related thereto; and

WHEREAS, pursuant to said public hearing on SCV Water's 2020 Plan, SCV Water, among other things, encouraged the active involvement of diverse social, cultural, and economic members of the community within SCV Water's service area with regard to the 2020 Plan and encouraged community input regarding SCV Water's 2020 Plan; and

WHEREAS, the SCV Water Board of Directors has reviewed and considered the purposes and requirements of the Act and SB X7-7, the contents of the 2020 Plan, and the documentation contained in the administrative record in support of the 2020 Plan, and has determined that the factual analyses and conclusions set forth in the 2020 Plan are legally sufficient; and

WHEREAS, the SCV Water Board of Directors desires to adopt the 2020 Plan prior to July 1, 2021 in order to comply with the Act and SB X7-7; and

WHEREAS, Section 10652 of the California Water Code provides that the California Environmental Quality Act (Division 13 (commencing with Section 21000) of the Public Resources Code) (CEQA) does not apply to the preparation and adoption of the 2020 Plan pursuant to this part.

NOW THEREFORE BE IT RESOLVED, the Board of Directors of the Santa Clarita Valley Water Agency hereby resolves as follows:

1. The Santa Clarita Valley Water Agency's 2020 Plan is hereby adopted as amended by changes incorporated by the SCV Water Board of Directors as a result of input received (if any) at the public hearing and ordered filed with the Secretary of the SCV Water Board of Directors.

2. The General Manager is hereby authorized and directed to include a copy of this Resolution in SCV Water's 2020 Plan.

3. The General Manager is hereby authorized and directed, in accordance with Water Code sections 10621(d) and 10644(a)(1)-(2), to electronically submit a copy of the 2020 Plan to the DWR no later than July 1, 2021.

4. The General Manager is hereby authorized and directed, in accordance with Water Code section 10644(a), to submit a copy of the 2020 Plan to the California State Library, and any city of county within which SCV Water provides water supplies no later than thirty (30) days after this adoption date.

5. The General Manager is hereby authorized and directed, in accordance with Water Code section 10645, to make the 2020 Plan available for public review at SCV Water's offices during normal business hours or on SCV Water's website https://yourscvwater.com no later than thirty (30) days after filing a copy of the Plan with DWR.

6. The General Manager is hereby authorized and directed, in accordance with Water Code Section 10635(c), to provide that portion of the 2020 Plan prepared pursuant to Water Code Section 10635(a)-(b) to any city or county within which SCV Water provides water supplies no later than sixty (60) days after submitting a copy of the Plan with DWR.

7. The General Manager is hereby authorized and directed to implement the 2020 Plan in accordance with the Act and SB X7-7 and to provide recommendations to the SCV Water Board of Directors regarding the necessary budgets, procedures, rules, regulations, or further actions to carry out the effective and equitable implementation of the 2020 Plan.

8. The SCV Water Board of Directors finds and determines that this resolution is not subject to CEQA pursuant to Water Code Section 10652 because CEQA does not apply to the preparation and adoption, including addenda thereto, of an urban water management plan or to the implementation of the actions taken pursuant to such plans. Because this resolution comprises SCV Water Board of Director's adoption of its Addendum to the 2020 Plan and involves its implementation, no CEQA review is required.

9. Pursuant to CEQA, the SCV Water Board of Directors directs staff to file a Notice of Exemption with the Los Angeles and Ventura County Clerk's office within five (5) working days of adoption of this resolution.

10. The document and materials that constitute the record of proceedings on which this resolution and the above findings have been based are located at Los Angeles County, 12400 Imperial Highway, Norwalk, Ca 90650, and Ventura County, 800 South Victoria Avenue, Ventura, Ca 93009-1260. The custodian for these records is the Santa Clarita Valley Water Agency.

President

I, the undersigned, hereby certify: That I am the duly appointed and acting Secretary of the Santa Clarita Valley Water Agency, and that at a special meeting of the Board of Directors of said Agency held on June 16, 2021, the foregoing Resolution No. SCV-217 was duly and regularly adopted by said Board, and that said resolution has not been rescinded or amended since the date of its adoption, and that it is now in full force and effect.

DATED: June 16, 2021

Secretary

SANTA CLARITA VALLEY WATER AGENCY ESTABLISHED JANUARY 1, 2018 CALIFORNIA

RESOLUTION NO. SCV-215

RESOLUTION OF THE SANTA CLARITA VALLEY WATER AGENCY ADOPTING A WATER SHORTAGE CONTINGENCY PLAN (WSCP)

WHEREAS, The California Urban Water Management Planning Act, (Wat. Code §10610, et seq. (the Act)), mandates that every urban supplier of water providing water for municipal purposes to more than 3,000 customers or supplying more than 3,000 acre feet of water annually, prepare and adopt, in accordance with prescribed requirements, a Water Shortage Contingency Plan (WSCP) as part of its Urban Water Management Plan (Plan); and

WHEREAS, the Act specifies the requirements and procedures for adopting such WSCPs; and

WHEREAS, pursuant to recent amendments to the Act, urban water suppliers are required to adopt and electronically submit their WSCPs to the California Department of Water Resources (DWR) by July 1, 2021; and

WHEREAS, pursuant to the Act, "urban water supplier" means a supplier, either publicly or privately owned, providing water for municipal purposes either directly or indirectly to more than 3,000 customers or supplying more than 3,000 acre-feet of water annually. An urban water supplier includes a supplier or contractor for water, regardless of the basis of right, which distributes or sells for ultimate resale to customers; and

WHEREAS, the Santa Clarita Valley Water Agency (SCV Water) meets the definition of an urban water supplier for purposes of the Act and is required to prepare and adopt and WSCP as part of its 2020 Plan; and

WHEREAS, SCV Water has prepared a WSCP in accordance with the Act, and in accordance with applicable legal requirements, has undertaken certain coordination, notice, public involvement, public comment, and other procedures in relation to its WSCP; and

WHEREAS, in accordance with the Act, SCV Water has prepared its WSCP with its own staff, with the assistance of consulting professionals, and in cooperation with other governmental agencies, and has utilized and relied upon industry standards and the expertise of industry professionals in preparing its WSCP, and has also utilized DWR's Urban Water Management Plan Guidebook 2020, including its related appendices, in preparing its WSCP; and

WHEREAS, in accordance with applicable law, including Water Code section 10642, and Government Code section 6066, a Notice of a Public Hearing regarding SCVWA's WSCP was published within the jurisdiction of SCVWA on May 26, 2021 and June 4, 2021; and

WHEREAS, in accordance with applicable law, including but not limited to Water Code section 10642, a public hearing was held on Wednesday, June 9, 2021 at 6:00 PM (PST) or soon thereafter, in https://scvwa.zoomgov.com/j/1605774067, Call-In Number 1-(833)-568-8864, Webinar ID: 160 577 4067 in order to provide members of the public and other interested entities with the opportunity to be heard in connection with proposed adoption of the WSCP and issues related thereto; and

WHEREAS, pursuant to said public hearing on SCV Water's WSCP, SCVWA, among other things, encouraged the active involvement of diverse social, cultural, and economic members of the community within SCV Water's service area with regard to the WSCP, and encouraged community input regarding SCV Water's WSCP; and

WHEREAS, the SCV Water Board of Directors has reviewed and considered the purposes and requirements of the Act, the contents of the WSCP, and the documentation contained in the administrative record in support of the WSCP, and has determined that the factual analyses and conclusions set forth in the WSCP are legally sufficient; and

WHEREAS, the SCV Water Board of Directors desires to adopt the WSCP and to incorporate it as part of its 2020 Plan prior to July 1, 2021 in order to comply with the Act; and

WHEREAS, Section 10652 of the California Water Code provides that the California Environmental Quality Act (Division 13 (commencing with Section 21000) of the Public Resources Code) (CEQA) does not apply to the preparation and adoption of a WSCP as part of Plan pursuant to California Water Code section 10632.

NOW THEREFORE BE IT RESOLVED, the SCVWA Board of Directors of the Santa Clarita Valley Water Agency hereby resolves as follows:

1. The Water Shortage Contingency Plan (WSCP) is hereby adopted as amended by changes incorporated by the SCV Water Board of Directors as a result of input received (if any) at the public hearing and ordered filed with the Secretary of the SCV Water Board of Directors and shall be incorporated into SCV Water's 2020 Plan.

2. The General Manager is hereby authorized and directed to include a copy of this Resolution in SCV Water's WSCP and/or in SCV Water's 2020 Plan.

3. The General Manager is hereby authorized and directed, in accordance with Water Code sections 10621(d) and 10644(a)(1)-(2), to electronically submit a copy of the WSCP, as part of its 2020 Plan, to DWR no later than July 1, 2021.

4. The General Manager is hereby authorized and directed, in accordance with Water Code section 10644(a), to submit a copy of the WSCP, as part of its 2020 Plan, to the California State Library, and to any city or county within which SCV Water provides water supplies no later than thirty (30) days after this adoption date.

5. The General Manager hereby authorized and directed, in accordance with Water Code section 10645, to make the WSCP available for public review at SCV Water's offices during normal business hours and on its website at https://YourSCVwater.com no later than thirty (30) days after filing a copy of the WSCP, as part of its 2020 Plan, with DWR.

6. The General Manager is hereby authorized and directed to implement the WSCP in accordance with the Act and to provide recommendations to the SCV Water Board of Directors regarding the necessary budgets, procedures, rules, regulations, or further actions to carry out the effective and equitable implementation of the WSCP.

7. SCV Water Board of Directors finds and determines that this resolution is not subject to CEQA pursuant to Water Code Section 10652 because CEQA does not apply to the preparation and adoption of a WSCP or to the implementation of the actions taken pursuant to

such plans. Because this resolution comprises SCV Water Board of Director's adoption of its WSCP and involves its implementation, no CEQA review is required.

8. Pursuant to CEQA, the SCV Water Board of Directors directs staff to file a Notice of Exemption with the Los Angeles and Ventura County Clerk's office within five (5) working days of adoption of this resolution.

9. The document and materials that constitute the record of proceedings on which this resolution and the above findings have been based are located at Los Angeles County, 12400 Imperial Highway, Norwalk, Ca 90650, and Ventura County, 800 South Victoria Avenue, Ventura, Ca 93009-1260. The custodian for these records is the Santa Clarita Valley Water Agency.

ADOPTED, this 9th day of June 2021.

President

I, the undersigned, hereby certify: That I am the duly appointed and acting Secretary of the Santa Clarita Valley Water Agency, and that at a special meeting of the Board of Directors of said Agency held on June 9, 2021, the foregoing Resolution No. SCV-215 was duly and regularly adopted by said Board, and that said resolution has not been rescinded or amended since the date of its adoption, and that it is now in full force and effect.

DATED: June 9, 2021

Secretary

SANTA CLARITA VALLEY WATER AGENCY ESTABLISHED JANUARY 1, 2018 CALIFORNIA

RESOLUTION NO. SCV-218

RESOLUTION OF THE SANTA CLARITA VALLEY WATER AGENCY BOARD OF DIRECTORS ADOPTING AN ADDENDUM TO THE 2015 URBAN WATER MANAGEMENT PLAN

WHEREAS, The California Urban Water Management Planning Act, (Wat. Code §10610, et seq. (the Act)), mandates that every urban supplier of water providing water for municipal purposes to more than 3,000 customers or supplying more than 3,000 acre feet of water annually, prepare an Urban Water Management Plan (Plan); and

WHEREAS, the Act generally requires that said Plan be updated and adopted at least once every five years on or before July 1, in years ending in six and one; and

WHEREAS, pursuant to the Sacramento-San Joaquin Delta Reform Act of 2009 (Wat. Code § 85000, et seq.), the Delta Plan, and Water Code section 85021, which declares that the State's policy is to "reduce reliance on the Delta in meeting California's future water needs through a statewide strategy of investing in improved regional supplies, conservation, and water use efficiency," urban water suppliers are encouraged by the California Department of Resources (DWR) and the Delta Stewardship Council (DSC) to consider adopting an Addendum to their 2015 Plans to demonstrate consistency with the Delta Plan Policy WR P1 to Reduce Reliance on the Delta Through Improved Regional Water Self-Reliance (Cal. Code Regs. tit. 23, § 5003); and

WHEREAS, Santa Clarita Valley Water Agency (SCV Water) meets the definition of an urban retail water supplier for purposes of the Act; and

WHEREAS, SCV Water has prepared an Addendum to its 2015 Plan in accordance with Delta Plan Policy WR P1, and in accordance with applicable legal requirements, has undertaken certain coordination, notice, public involvement, public comment, and other procedures in relation to its Addendum; and

WHEREAS, in accordance with the Act and Delta Plan Policy WR P1, SCV Water has prepared its Addendum to the 2015 Plan with its own staff, with the assistance of consulting professionals, and in cooperation with other governmental agencies, and has utilized and relied upon industry standards and the expertise of industry professionals in preparing its Addendum to its 2015 Plan, and has also utilized DWR's Urban Water Management Plan Guidebook 2020, including its related appendices, in preparing its Addendum to the 2015 Plan; and

WHEREAS, in accordance with applicable law, including Water Code section 10642, and Government Code section 6066, a Notice of a Public Hearing regarding SCV Water's Addendum to the 2015 Plan was published within the jurisdiction of SCV Water on May 15, 2021 and May 22, 2021; and

WHEREAS, in accordance with applicable law, including but not limited to Water Code section 10642, a public hearing was held on May 27, 2021 at 6:00 p.m., or soon thereafter, via Zoom meeting as listed on the May 27, 2021 Board Agenda and on SCV Water's website https://yourscvwater.com, and a continuation of the public hearing was held on June 16, 2021 at 6:00 p.m., or soon thereafter, via Zoom meeting as listed on the June 16, 2021 Board Agenda and on SCV Water's website https://yourscvwater.com in order to provide members of the public

and other interested entities with the opportunity to be heard in connection with proposed adoption of the Addendum to the 2015 Plan and issues related thereto; and

WHEREAS, pursuant to said public hearing on SCV Water's Addendum to the 2015 Plan, SCV Water, among other things, encouraged the active involvement of diverse social, cultural, and economic members of the community within SCV Water's service area with regard to the Addendum to the 2015 Plan and encouraged community input regarding SCV Water's Addendum to the 2015 Plan; and

WHEREAS, the SCV Water Board of Directors has reviewed and considered the purposes and requirements of the Act and Delta Plan Policy WR P1, the contents of the Addendum to the 2015 Plan, and the documentation contained in the administrative record in support of the Addendum to the 2015 Plan, and has determined that the factual analyses and conclusions set forth in the Addendum to the 2015 Plan are legally sufficient; and

WHEREAS, the SCV Water Board of Directors desires to adopt the Addendum to the 2015 Plan prior to July 1, 2021 in order to comply with the Act and Delta Plan Policy WR P1, and

WHEREAS, Section 10652 of the California Water Code provides that the California Environmental Quality Act (Division 13 (commencing with Section 21000) of the Public Resources Code) (CEQA) does not apply to the preparation and adoption, including addenda thereto, of urban water management plans pursuant to this part.

NOW THEREFORE BE IT RESOLVED, the Board of Directors of the Santa Clarita Valley Water Agency hereby resolves as follows:

1. The Addendum to SCV Water's 2015 Urban Water Management Plan to demonstrate consistency with the Delta Plan Policy to Reduce Reliance on the Delta Through Improved Regional Water Self-Reliance is hereby adopted as amended by changes incorporated by the SCV Water Board of Directors as a result of input received (if any) at the public hearing and ordered filed with the Secretary of SCV Water.

2. The General Manager is hereby authorized and directed to include a copy of this Resolution in SCV Water's 2015 Plan Addendum.

3. The General Manager is hereby authorized and directed, in accordance with Water Code sections 10621(d) and 10644(a)(1)-(2), to electronically submit a copy of the Addendum to the 2015 Plan to DWR no later than July 1, 2021.

4. The General Manager is hereby authorized and directed, in accordance with Water Code section 10644(a), to submit a copy of the Addendum to the 2015 Plan to the California State Library, and to any city or county within which SCV Water provides water supplies no later than thirty (30) days after this adoption date.

5. The General Manager is hereby authorized and directed, in accordance with Water Code section 10645, to make the Addendum to the 2015 Plan available for public review at SCV Water's offices during normal business hours and on its website at https://yourscvwater.com no later than thirty (30) days after filing a copy of the Addendum to the 2015 Plan with DWR.

6. SCV Water Board of Directors finds and determines that this resolution is not subject to CEQA pursuant to Water Code Section 10652 because CEQA does not apply to the

preparation and adoption, including addenda thereto, of an urban water management plan or to the implementation of the actions taken pursuant to such plans. Because this resolution comprises SCV Water Board of Director's adoption of its Addendum to the 2015 Plan and involves its implementation, no CEQA review is required.

7. Pursuant to CEQA, the SCV Water Board of Directors directs staff to file a Notice of Exemption with the Los Angeles and Ventura County Clerk's office within five (5) working days of adoption of this resolution.

8. The document and materials that constitute the record of proceedings on which this resolution and the above findings have been based are located at Los Angeles County, 12400 Imperial Highway, Norwalk, Ca 90650, and Ventura County, 800 South Victoria Avenue, Ventura, Ca 93009-1260. The custodian for these records is the Santa Clarita Valley Water Agency.

President

I, the undersigned, hereby certify: That I am the duly appointed and acting Secretary of the Santa Clarita Valley Water Agency, and that at a special meeting of the Board of Directors of said Agency held on June 16, 2021, the foregoing Resolution No. SCV-218 was duly and regularly adopted by said Board, and that said resolution has not been rescinded or amended since the date of its adoption, and that it is now in full force and effect.

DATED: June 16, 2021

Secretary

SANTA CLARITA VALLEY WATER AGENCY ESTABLISHED JANUARY 1, 2018 CALIFORNIA

Appendix B: DWR 2020 UWMP Checklist

2020 Guidebook Location	Water Code Section	Summary as Applies to UWMP	Subject	2020 UWMP Location (Optional Column for Agency Review Use)
Chapter 1	10615	A plan shall describe and evaluate sources of supply, reasonable and practical efficient uses, reclamation and demand management activities.	Introduction and Overview	Section 4 and Section 8
Chapter 1	10630.5	Each plan shall include a simple description of the supplier's plan including water availability, future requirements, a strategy for meeting needs, and other pertinent information. Additionally, a supplier may also choose to include a simple description at the beginning of each chapter.	Summary	Section 1.8, Section 7.
Section 2.2	10620(b)	Every person that becomes an urban water supplier shall adopt an urban water management plan within one year after it has become an urban water supplier.	Plan Preparation	Section 1.4.5
Section 2.6	10620(d)(2)	Coordinate the preparation of its plan with other appropriate agencies in the area, including other water suppliers that share a common source, water management agencies, and relevant public agencies, to the extent practicable.	Plan Preparation	Section 1.4.4
Section 2.6.2	10642	Provide supporting documentation that the water supplier has encouraged active involvement of diverse social, cultural, and economic elements of the population within the service area prior to and during the preparation of the plan and contingency plan.	Plan Preparation	Section 1.4.6 and Section 2.2
Section 2.6, Section 6.1	10631(h)	Retail suppliers will include documentation that they have provided their wholesale supplier(s) - if any - with water use projections from that source.	System Supplies	Not applicable, no wholesale agency.
Section 3.1	10631(a)	Describe the water supplier service area.	System Description	Section 1.5
Section 3.3	10631(a)	Describe the climate of the service area of the supplier.	System Description	Section 1.6
Section 3.4	10631(a)	Provide population projections for 2025, 2030, 2035, 2040 and optionally 2045.	System Description	Section 2.4.2
Section 3.4.2	10631(a)	Describe other social, economic, and demographic factors affecting the supplier's water management planning.	System Description	Section 2.2
Sections 3.4 and5.4	10631(a)	Indicate the current population of the service area.	System Description and Baselines and Targets	Section 2.4.1 and Section 3.1.2
Section 3.5	10631(a)	Describe the land uses within the service area.	System Description	Section 2.3
Section 4.2	10631(d)(1)	Quantify past, current, and projected water use, identifying the uses among water use sectors.	System Water Use	Section 2.6
Section 4.2.4	10631(d)(3)(C)	Retail suppliers shall provide data to show the distribution loss standards were met.	System Water Use	Section 2.6.2; Appendix G
Section 4.2.6	10631(d)(4)(A)	In projected water use, include estimates of water savings from adopted codes, plans, and other policies or laws.	System Water Use	Section 2.7
Section 4.2.6	10631(d)(4)(B)	Provide citations of codes, standards, ordinances, or plans used to make water use projections.	System Water Use	Section 2.7.1
Section 4.3.2.4	10631(d)(3)(A)	Report the distribution system water loss for each of the 5 years preceding the plan update.	System Water Use	Section 2.6.2; Appendix G
Section 4.4	10631.1(a)	Include projected water use needed for lower income housing projected in the service area of the supplier.	System Water Use	Section 2.9
Section 4.5	10635(b)	Demands under climate change considerations must be included as part of the drought risk assessment.	System Water Use	Section 7.4.4
Chapter 5	10608.20(e)	Retail suppliers shall provide baseline daily per capita water use, urban water use target, interim urban water use target, and compliance daily per capita water use, along with the bases for determining those estimates, including references to supporting data.	Baselines and Targets	Section 3
Chapter 5	10608.24(a)	Retail suppliers shall meet their water use target by December 31, 2020.	Baselines and Targets	Section 3.1.2
Section 5.2	10608.24(d)(2)	If the retail supplier adjusts its compliance GPCD using weather normalization, economic adjustment, or extraordinary events, it shall provide the basis for, and data supporting the adjustment.	Baselines and Targets	N/A
Section 5.5	10608.22	Retail suppliers' per capita daily water use reduction shall be no less than 5 percent of base daily per capita water use of the 5-year baseline. This does not apply if the suppliers base GPCD is at or below 100.	Baselines and Targets	Section 3.1
Section 5.5 and Appendix E	10608.4	Retail suppliers shall report on their compliance in meeting their water use targets. The data shall be reported using a standardized form in the SBX7-7 2020 Compliance Form.	Baselines and Targets	Section 3.1.2 & Appendix D
Sections 6.1 and 6.2	10631(b)(1)	Provide a discussion of anticipated supply availability under a normal, single dry year, and a drought lasting five years, as well as more frequent and severe periods of drought.	System Supplies	Section 4.2.1.7, Section 4.3.3, Sections 7.3 and 7.4
Sections 6.1	10631(b)(1)	Provide a discussion of anticipated supply availability under a normal, single dry year, and a drought lasting five years, as well as more frequent and severe periods of drought, including changes in supply due to climate change.	System Supplies	Section 4.2.1, Sections 4.3.2 and 4.3.3, Sections 7.3 and 7.4
Section 6.1	10631(b)(2)	When multiple sources of water supply are identified, describe the management of each supply in relationship to other identified supplies.	System Supplies	Section 4.2.3, Section 4.4 and Section 4.5
Section 6.1.1	10631(b)(3)	Describe measures taken to acquire and develop planned sources of water.	System Supplies	Section 4.6

Section 6.2.8	10631(b)	Identify and quantify the existing and planned sources of water available for 2020, 2025, 2030,2035, 2040 and optionally 2045.	System Supplies	Section 4.1; Table 4-1
Section 6.2	10631(b)	Indicate whether groundwater is an existing or planned source of water available to the supplier.	System Supplies	Section 4.3
Section 6.2.2	10631(b)(4)(A)	Indicate whether a groundwater sustainability plan or groundwater management plan has been adopted by the water supplier or if there is any other specific authorization for groundwater management. Include a copy of the plan or authorization.	System Supplies	Section 4.3.2
Section 6.2.2	10631(b)(4)(B)	Describe the groundwater basin.	System Supplies	Section 4.3.1
Section 6.2.2	10631(b)(4)(B)	Indicate if the basin has been adjudicated and include a copy of the court order or decree and a description of the amount of water the supplier has the legal right to pump.	System Supplies	N/A
Section 6.2.2.1	10631(b)(4)(B)	For unadjudicated basins, indicate whether or not the department has identified the basin as a high or medium priority. Describe efforts by the supplier to coordinate with sustainability or groundwater agencies to achieve sustainable groundwater conditions.	System Supplies	Section 4.3
Section 6.2.2.4	10631(b)(4)(C)	Provide a detailed description and analysis of the location, amount, and sufficiency of groundwater pumped by the urban water supplier for the past five years	System Supplies	Section 4.3.2.3
Section 6.2.2	10631(b)(4)(D)	Provide a detailed description and analysis of the amount and location of groundwater that is projected to be pumped.	System Supplies	Section 4.3.2.3
Section 6.2.7	10631(c)	Describe the opportunities for exchanges or transfers of water on a short-term or long- term basis.	System Supplies	Section 4.4
Section 6.2.5	10633(b)	Describe the quantity of treated wastewater that meets recycled water standards, is being discharged, and is otherwise available for use in a recycled water project.	System Supplies (Recycled Water)	Section 5.3
Section 6.2.5	10633(c)	Describe the recycled water currently being used in the supplier's service area.	System Supplies (Recycled Water)	Section 5.2
Section 6.2.5	10633(d)	Describe and quantify the potential uses of recycled water and provide a determination of the technical and economic feasibility of those uses.	System Supplies (Recycled Water)	Section 5
Section 6.2.5	10633(e)	Describe the projected use of recycled water within the supplier's service area at the end of 5, 10, 15, and 20 years, and a description of the actual use of recycled water in comparison to uses previously projected.	System Supplies (Recycled Water)	Section 5
Section 6.2.5	10633(f)	Describe the actions which may be taken to encourage the use of recycled water and the projected results of these actions in terms of acre-feet of recycled water used per year.	System Supplies (Recycled Water)	Section 5.10
Section 6.2.5	10633(g)	Provide a plan for optimizing the use of recycled water in the supplier's service area.	System Supplies (Recycled Water)	Section 5.11
Section 6.2.6	10631(g)	Describe desalinated water project opportunities for long-term supply.	System Supplies	Section 4.7
Section 6.2.5	10633(a)	Describe the wastewater collection and treatment systems in the supplier's service area with quantified amount of collection and treatment and the disposal methods.	System Supplies (Recycled Water)	Section 5, DWR Tables 6-2, 6-3 (App B)
Section 6.2.8, Section 6.3.7	10631(f)	Describe the expected future water supply projects and programs that may be undertaken by the water supplier to address water supply reliability in average, single-dry, and for a period of drought lasting 5 consecutive water years.	System Supplies	Section 4.6
Section 6.4 and Appendix O	10631.2(a)	The UWMP must include energy information, as stated in the code, that a supplier can readily obtain.	System Suppliers, Energy Intensity	
Section 7.2	10634	Provide information on the quality of existing sources of water available to the supplier and the manner in which water quality affects water management strategies and supply reliability	Water Supply Reliability Assessment	Section 6
Section 7.2.4	10620(f)	Describe water management tools and options to maximize resources and minimize the need to import water from other regions.	Water Supply Reliability Assessment	Sections 4.3 to 4.7
Section 7.3	10635(a)	Service Reliability Assessment: Assess the water supply reliability during normal, dry, and a drought lasting five consecutive water years by comparing the total water supply sources available to the water supplier with the total projected water use over the next20 years.	Water Supply Reliability Assessment	Sections 7.2 to 7.4
Section 7.3	10635(b)	Provide a drought risk assessment as part of information considered in developing the demand management measures and water supply projects.	Water Supply Reliability Assessment	Section 7.4.4
Section 7.3	10635(b)(1)	Include a description of the data, methodology, and basis for one or more supply shortage conditions that are necessary to conduct a drought risk assessment for a drought period that lasts 5consecutive years.	Water Supply Reliability Assessment	Section 7
Section 7.3	10635(b)(2)	Include a determination of the reliability of each source of supply under a variety of water shortage conditions.	Water Supply Reliability Assessment	Sections 7.2 and 7.3
Section 7.3	10635(b)(3)	Include a comparison of the total water supply sources available to the water supplier with the total projected water use for the drought period.	Water Supply Reliability Assessment	Section 7.4
Section 7.3	10635(b)(4)	Include considerations of the historical drought hydrology, plausible changes on projected supplies and demands under climate change conditions, anticipated regulatory changes, and other locally applicable criteria.	Water Supply Reliability Assessment	Section 7

Sections 8.12 and10.4	10635(c)	Provide supporting documentation that Water Shortage Contingency Plan has been, or will be, provided to any city or county within which it provides water, no later than 30 days after the submission of the plan to DWR.	Plan Adoption, Submittal, and Implementation	Appendix J
Sections 9.2 and9.3	10631(e)(1)	Retail suppliers shall provide a description of the nature and extent of each demand management measure implemented over the past five years. The description will address specific measures listed in code.	Demand Management Measures	Section 8
Chapter 10	10608.26(a)	Retail suppliers shall conduct a public hearing to discuss adoption, implementation, and economic impact of water use targets (recommended to discuss compliance).	Plan Adoption, Submittal, and Implementation	Section 1.4.6
Section 10.2.1	10621(b)	Notify, at least 60 days prior to the public hearing, any city or county within which the supplier provides water that the urban water supplier will be reviewing the plan and considering amendments or changes to the plan. Reported in Table 10-1.	Plan Adoption, Submittal, and Implementation	Section 1.4.4, Appendix A
Section 10.4	10621(f)	Each urban water supplier shall update and submit its 2020 plan to the department by July 1, 2021.	Plan Adoption, Submittal, and Implementation	Section 1.4.5
Sections 10.2.2,10.3, and 10.5	10642	Provide supporting documentation that the urban water supplier made the plan and contingency plan available for public inspection, published notice of the public hearing, and held a public hearing about the plan and contingency plan.	Plan Adoption, Submittal, and Implementation	Section 1.4.6, Appendix H
Section 10.2.2	10642	The water supplier is to provide the time and place of the hearing to any city or county within which the supplier provides water.	Plan Adoption, Submittal, and Implementation	Section 1.4.6
Section 10.3.2	10642	Provide supporting documentation that the plan and contingency plan has been adopted as prepared or modified.	Plan Adoption, Submittal, and Implementation	Section 1.4.5
Section 10.4	10644(a)	Provide supporting documentation that the urban water supplier has submitted this UWMP to the California State Library.	Plan Adoption, Submittal, and Implementation	Pending
Section 10.4	10644(a)(1)	Provide supporting documentation that the urban water supplier has submitted this UWMP to any city or county within which the supplier provides water no later than 30 days after adoption.	Plan Adoption, Submittal, and Implementation	Section 1.4.6
Sections 10.4.1and 10.4.2	10644(a)(2)	The plan, or amendments to the plan, submitted to the department shall be submitted electronically.	Plan Adoption, Submittal, and Implementation	Pending
Section 10.5	10645(a)	Provide supporting documentation that, not later than 30 days after filing a copy of its plan with the department, the supplier has or will make the plan available for public review during normal business hours.	Plan Adoption, Submittal, and Implementation	Section 1.4.6
Section 10.5	10645(b)	Provide supporting documentation that, not later than 30 days after filing a copy of its water shortage contingency plan with the department, the supplier has or will make the plan available for public review during normal business hours.	Plan Adoption, Submittal, and Implementation	Section 1.4.6
Section 10.6	10621(c)	If supplier is regulated by the Public Utilities Commission, include its plan and contingency plan as part of its general rate case filings.	Plan Adoption, Submittal, and Implementation	N/A
Section 10.7.2	10644(b)	If revised, submit a copy of the water shortage contingency plan to DWR within 30 days of adoption.	Plan Adoption, Submittal, and Implementation	Section 1.2.1

2020 Guidebook Location	Water Code Section	Summary as Applies to WSCP	Subject	2020 WSCP Location (Optional Column for Agency Review Use)
Chapter 8	10632(a)	Provide a water shortage contingency plan (WSCP) with specified elements below.	Water Shortage Contingency Planning	2020 WSCP, Appendix J
Chapter 8	10632(a)(1)	Provide the analysis of water supply reliability (from Chapter 7 of Guidebook) in the WSCP	Water Shortage Contingency Planning	Appendix J, Section 1
Section 8.10	10632(a)(10)	Describe reevaluation and improvement procedures for monitoring and evaluation the water shortage contingency plan to ensure risk tolerance is adequate and appropriate water shortage mitigation strategies are implemented.	Water Shortage Contingency Planning	Appendix J, Section 10
Section 8.2	10632(a)(2)(A)	Provide the written decision- making process and other methods that the supplier will use each year to determine its water reliability.	Water Shortage Contingency Planning	Appendix J, Section 1
Section 8.2	10632(a)(2)(B)	Provide data and methodology to evaluate the supplier's water reliability for the current year and one dry year pursuant to factors in the code.	Water Shortage Contingency Planning	Appendix J, Section 1
Section 8.3	10632(a)(3)(A)	Define six standard water shortage levels of 10, 20, 30, 40, 50 percent shortage and greater than 50 percent shortage. These levels shall be based on supply conditions, including percent reductions in supply, changes in groundwater levels, changes in surface elevation, or other conditions. The shortage levels shall also apply to a catastrophic interruption of supply.	Water Shortage Contingency Planning	Appendix J, Section 3
Section 8.3	10632(a)(3)(B)	Suppliers with an existing water shortage contingency plan that uses different water shortage levels must cross reference their categories with the six standard categories.	Water Shortage Contingency Planning	Appendix J, Section 3
Section 8.4	10632(a)(4)(A)	Suppliers with water shortage contingency plans that align with the defined shortage levels must specify locally appropriate supply augmentation actions.	Water Shortage Contingency Planning	Appendix J, Section 4.1
Section 8.4	10632(a)(4)(B)	Specify locally appropriate demand reduction actions to adequately respond to shortages.	Water Shortage Contingency Planning	Appendix J, Section 4.2
Section 8.4	10632(a)(4)(C)	Specify locally appropriate operational changes.	Water Shortage Contingency Planning	Appendix J, Section 4.3
Section 8.4	10632(a)(4)(D)	Specify additional mandatory prohibitions against specific water use practices that are in addition to state-mandated prohibitions are appropriate to local conditions.	Water Shortage Contingency Planning	Appendix J, Section 4.4
Section 8.4	10632(a)(4)(E)	Estimate the extent to which the gap between supplies and demand will be reduced by implementation of the action.	Water Shortage Contingency Planning	Appendix J, Section 4.7
Section 8.4.6	10632.5	The plan shall include a seismic risk assessment and mitigation plan.	Water Shortage Contingency Plan	Appendix J, Section 4.6
Section 8.5	10632(a)(5)(A)	Suppliers must describe that they will inform customers, the public and others regarding any current or predicted water shortages.	Water Shortage Contingency Planning	Appendix J, Section 5
Section 8.5 and8.6	10632(a)(5)(B) 10632(a)(5)(C)	Suppliers must describe that they will inform customers, the public and others regarding any shortage response actions triggered or anticipated to be triggered and other relevant communications.	Water Shortage Contingency Planning	Appendix J, Section 5
Section 8.6	10632(a)(6)	Retail supplier must describe how it will ensure compliance with and enforce provisions of the WSCP.	Water Shortage Contingency Planning	Appendix J, Section 6
Section 8.7	10632(a)(7)(A)	Describe the legal authority that empowers the supplier to enforce shortage response actions.	Water Shortage Contingency Planning	Appendix J, Section 6 and Section 7
Section 8.7	10632(a)(7)(B)	Provide a statement that the supplier will declare a water shortage emergency Water Code Chapter 3.	Water Shortage Contingency Planning	Appendix J, Section 7
Section 8.7	10632(a)(7)(C)	Provide a statement that the supplier will coordinate with any city or county within which it provides water for the possible proclamation of a local emergency.	Water Shortage Contingency Planning	Appendix J, Section 5
Section 8.8	10632(a)(8)(A)	Describe the potential revenue reductions and expense increases associated with activated shortage response actions.	Water Shortage Contingency Planning	Appendix J, Section 8
Section 8.8	10632(a)(8)(B)	Provide a description of mitigation actions needed to address revenue reductions and expense increases associated with activated shortage response actions.	Water Shortage Contingency Planning	Appendix J, Section 8
Section 8.8	10632(a)(8)(C)	Retail suppliers must describe the cost of compliance with Water Code Chapter 3.3: Excessive Residential Water Use During Drought	Water Shortage Contingency Planning	Appendix J, Section 8
Section 8.9	10632(a)(9)	Retail suppliers must describe the monitoring and reporting requirements and procedures that ensure appropriate data is collected, tracked, and analyzed for purposes of monitoring customer compliance.	Water Shortage Contingency Planning	Appendix J, Section 9
Section 8.11	10632(b)	Analyze and define water features that are artificially supplied with water, including ponds, lakes, waterfalls, and fountains, separately from swimming pools and spas.	Water Shortage Contingency Planning	Appendix J, Section 11
Section 8.14	10632(c)	Make available the Water Shortage Contingency Plan to customers and any city or county where it provides water within 30 after adopted the plan.	Water Shortage Contingency Planning	Appendix J, Section 12

Appendix C: DWR Standardized Tables

Submittal Table 2-1 Retail Only: Public Water Systems			
Public Water System Number	Public Water System Name	Number of Municipal Connections 2020	Volume of Water Supplied 2020 *
Add additional rows as needed			
1910247	Castaic (NWD)	9,720	10,779
1910096	Newhall (NWD)		
1910250	Pinetree (NWD)		
1910255	Tesoro (NWD)		
1910017	SCWD	32,179	27,672
1910240	VWC(a)	30,271	26,283
1910185	LACWWD 36(b)	1,372	1,262
	TOTAL	73,542	65,996

**** Units of measure (AF, CCF, MG)*** *must remain consistent throughout the UWMP as reported in Table 2-3.*

NOTES: (a) Includes 468 AF of recycled water.
(b) LACWWD 36 is included for purposes of providing regional completeness; however, it is not required to prepare an UWMP.

Submittal Table 2-2: Plan Identification			
Select Only One	**Type of Plan**		**Name of RUWMP or Regional Alliance** *if applicable* (select from drop down list)
☑	**Individual UWMP**		
	☐	Water Supplier is also a member of a RUWMP	
	☐	Water Supplier is also a member of a Regional Alliance	
☐	**Regional Urban Water Management Plan (RUWMP)**		
NOTES:			

Submittal Table 2-3: Supplier Identification	
Type of Supplier (select one or both)	
☐	Supplier is a wholesaler
☑	Supplier is a retailer
Fiscal or Calendar Year (select one)	
☑	UWMP Tables are in calendar years
☐	UWMP Tables are in fiscal years
If using fiscal years provide month and date that the fiscal year begins (mm/dd)	
Units of measure used in UWMP * (select from drop down)	
Unit	AF
**** Units of measure (AF, CCF, MG)*** *must remain consistent throughout the UWMP as reported in Table 2-3.*	
NOTES:	

Submittal Table 2-4 Retail: Water Supplier Information Exchange
The retail Supplier has informed the following wholesale supplier(s) of projected water use in accordance with Water Code Section 10631.
Wholesale Water Supplier Name
Add additional rows as needed
Department of Water Resources (State Water Project)
BVWSD/RRBWSD
NOTES:

Submittal Table 3-1 Retail: Population - Current and Projected						
Population Served	2020	2025	2030	2035	2040	2045*(opt)*
	289,192	332,100	362,100	392,500	411,900	422,100
Notes: Valleywide population. 2020 population estimated using land use-based approach (MWM, 2021). LACWWD 36 included for purposes of providing regional completeness. Details in UWMP Section 2.4.						

Submittal Table 4-1 Retail: Demands for Potable and Non-Potable[1] Water - Actual			
Use Type	2020 Actual		
Drop down list May select each use multiple times These are the only Use Types that will be recognized by the WUEdata online submittal tool	Additional Description (as needed)	Level of Treatment When Delivered Drop down list	Volume[2]
Add additional rows as needed			
Single Family		Drinking Water	34,300
Multi-Family		Drinking Water	7,000
Commercial		Drinking Water	5,300
Industrial		Drinking Water	1,900
Institutional/Governmental		Drinking Water	2,400
Landscape		Drinking Water	12,100
Other	Miscellaneous water uses	Drinking Water	400
Losses	Non-revenue water	Drinking Water	900
Sales/Transfers/Exchanges to other Suppliers	Sales to LACWWD 26	Drinking Water	1,300
		TOTAL	65,600

[1] *Recycled water demands are NOT reported in this table. Recycled water demands are reported in Table 6-4.*

[2] *Units of measure (AF, CCF, MG) must remain consistent throughout the UWMP as reported in Table 2-3.*

NOTES: Values rounded to nearest hundred. See UWMP Tables 2-11 and 2-12.

Submittal Table 4-2 Retail: Use for Potable and Non-Potable[1] Water - Projected						
Use Type	Additional Description (as needed)	Projected Water Use[2] *Report To the Extent that Records are Available*				
Drop down list May select each use multiple times These are the only Use Types that will be recognized by the WUEdata online submittal tool		2025	2030	2035	2040	2045 (opt)
Add additional rows as needed						
Single Family		32,700	34,700	36,200	37,500	38,400
Multi-Family		8,300	8,900	10,500	11,000	11,200
Commercial		5,100	5,500	5,800	6,300	6,800
Industrial		1,800	1,800	2,100	2,300	2,500
Institutional/Governmental		1,800	2,100	2,100	2,000	2,000
Landscape		12,800	12,800	13,400	13,200	13,100
Other	Miscellaneous water uses	2,100	2,100	2,400	3,700	5,000
Other Potable	Recycled water demands anticipated to be met with potable supplies (makeup water)	2,300	2,400	2,900	2,200	1,500
Losses	Non-revenue water	6,000	5,800	6,200	6,600	7,000
Sales/Transfers/Exchanges to other Suppliers	Sales to LACWWD 26	1,300	1,400	1,600	1,800	2,000
TOTAL		74,200	77,500	83,200	86,600	89,500

[1] *Recycled water demands are NOT reported in this table. Recycled water demands are reported in Table 6-4.* [2] *Units of measure (AF, CCF, MG) must remain consistent throughout the UWMP as reported in Table 2-3.*

NOTES: Values rounded to nearest hundred. Values reflect demands with passive and active conservation. See UWMP Tables 2-11 and 2-12.

Submittal Table 4-3 Retail: Total Water Use (Potable and Non-Potable)						
	2020	2025	2030	2035	2040	2045 (opt)
Potable Water, Raw, Other Non-potable *From Tables 4-1R and 4-2 R*	65,600	74,200	77,500	83,200	86,600	89,500
Recycled Water Demand[1] *From Table 6-4*	468	2,299	4,146	5,541	6,948	7,949
Optional Deduction of Recycled Water Put Into Long-Term Storage[2]						
TOTAL WATER USE	66,068	76,499	81,646	88,741	93,548	97,449

[1] Recycled water demand fields will be blank until Table 6-4 is complete

*[2] Long term storage means water placed into groundwater or surface storage that is not removed from storage in the same year. Supplier **may** deduct recycled water placed in long-term storage from their reported demand. This value is manually entered into Table 4-3.*

NOTES:

Submittal Table 4-4 Retail: Last Five Years of Water Loss Audit Reporting	
Reporting Period Start Date (mm/yyyy)	Volume of Water Loss [1,2]
01/2015	606
01/2016	581
01/2017	1,650
07/2018	1,823
07/2019	2,314
[1] *Taken from the field "Water Losses" (a combination of apparent losses and real losses) from the AWWA worksheet.* [2] ***Units of measure (AF, CCF, MG)*** *must remain consistent throughout the UWMP as reported in Table 2-3.*	
NOTES: Water losses for SCV Water are currently still reported by Water division (VWD, NWD, and SCWD) until a consolidated permit has been obtained. Water loss volumes in this table are for the VWC system, now VWD.	

Submittal Table 4-4 Retail: Last Five Years of Water Loss	
Reporting Period Start Date (mm/yyyy)	Volume of Water Loss [1,2]
01/2015	655
07/2016	201
07/2017	294
07/2018	231
07/2019	274
[1] *Taken from the field "Water Losses" (a combination of apparent losses*	
NOTES: Water losses for SCV Water are currently still reported by Water division (VWD, NWD, and SCWD) until a consolidated permit has been obtained. Water loss volumes in this table are for the NWCD system, now NWD.	

Submittal Table 4-4 Retail: Last Five Years of Water Loss	
Reporting Period Start Date (mm/yyyy)	Volume of Water Loss [1,2]
07/2014	715
07/2016	2,201
07/2017	1,645
07/2018	2,785
07/2019	2,317
[1] *Taken from the field "Water Losses" (a combination of apparent losses*	
NOTES: Water losses for SCV Water are currently still reported by Water division (VWD, NWD, and SCWD) until a consolidated permit has been obtained. Water loss volumes in this table are for the SCWD system.	

Submittal Table 4-5 Retail Only: Inclusion in Water Use Projections	
Are Future Water Savings Included in Projections? (Refer to Appendix K of UWMP Guidebook) *Drop down list (y/n)*	Yes
If "Yes" to above, state the section or page number, in the cell to the right, where citations of the codes, ordinances, or otherwise are utilized in demand projections are found.	Section 2.7.1
Are Lower Income Residential Demands Included In Projections? *Drop down list (y/n)*	Yes
NOTES:	

Submittal Table 5-1 Baselines and Targets Summary
From SB X7-7 Verification Form
Retail Supplier or Regional Alliance Only

Baseline Period	Start Year *	End Year *	Average Baseline GPCD*	Confirmed 2020 Target*
10-15 year	*1999*	*2008*	*275*	*220*
5 Year	*2003*	*2007*	*270*	

**All cells in this table should be populated manually from the supplier's SBX7-7 Verification Form and reported in Gallons per Capita per Day (GPCD)*

NOTES:

Submittal Table 5-2: 2020 Compliance **From** **SB X7-7 2020 Compliance Form** *Retail Supplier or Regional Alliance Only*				
2020 GPCD				
Actual 2020 GPCD*	2020 TOTAL Adjustments*	Adjusted 2020 GPCD* *(Adjusted if applicable)*	2020 Confirmed Target GPCD*	Did Supplier Achieve Targeted Reduction for 2020? Y/N
205	*0*	*205*	*220*	*Yes*
**All cells in this table should be populated manually from the supplier's SBX7-7 2020 Compliance Form and reported in Gallons per Capita per Day (GPCD)*				
NOTES:				

Submittal Table 6-1 Retail: Groundwater Volume Pumped						
☐	Supplier does not pump groundwater. The supplier will not complete the table below.					
☐	All or part of the groundwater described below is desalinated.					
Groundwater Type ***Drop Down List*** *May use each category multiple times*	Location or Basin Name	2016*	2017*	2018*	2019*	2020*
Add additional rows as needed						
Alluvial Basin	Santa Clarita River Valley Groundwater Basin, East Subbasin - Alluvial Aquifer	15,244	9,424	14,030	9,049	7,571
Alluvial Basin	Santa Clarita River Valley Groundwater Basin, East Subbasin - Saugus Formation	11,085	6,979	8,839	8,498	9,761
TOTAL		26,329	16,403	22,869	17,547	17,332
**** Units of measure (AF, CCF, MG)*** *must remain consistent throughout the UWMP as reported in Table 2-3.*						
NOTES:						

Submittal Table 6-2 Retail: Wastewater Collected Within Service Area in 2020						
☐	There is no wastewater collection system. The supplier will not complete the table below.					
	Percentage of 2020 service area covered by wastewater collection system *(optional)*					
	Percentage of 2020 service area population covered by wastewater collection system *(optional)*					
Wastewater Collection			**Recipient of Collected Wastewater**			
Name of Wastewater Collection Agency	Wastewater Volume Metered or Estimated? *Drop Down List*	Volume of Wastewater Collected from UWMP Service Area 2020 *	Name of Wastewater Treatment Agency Receiving Collected Wastewater	Treatment Plant Name	Is WWTP Located Within UWMP Area? *Drop Down List*	Is WWTP Operation Contracted to a Third Party? *(optional)* *Drop Down List*
Santa Clarita Valley Sanitation District	Metered	15,312	Santa Clarita Valley Sanitation District	Valencia WRP	Yes	No
Santa Clarita Valley Sanitation District	Metered	6,631	Santa Clarita Valley Sanitation District	Saugus WRP	Yes	No
Total Wastewater Collected from Service Area in 2020:		21,944				
**** Units of measure (AF, CCF, MG)*** *must remain consistent throughout the UWMP as reported in Table 2-3* **.**						
NOTES:						

Submittal Table 6-3 Retail: Wastewater Treatment and Discharge Within Service Area in 2020

☐ **No wastewater is treated or disposed of within the UWMP service area.** The supplier will not complete the table below.

Wastewater Treatment Plant Name	Discharge Location Name or Identifier	Discharge Location Description	Wastewater Discharge ID Number *(optional)* [2]	Method of Disposal ***Drop down list***	Does This Plant Treat Wastewater Generated Outside the Service Area? ***Drop down list***	Treatment Level ***Drop down list***	2020 volumes [1]				
							Wastewater Treated	Discharged Treated Wastewater	Recycled Within Service Area	Recycled Outside of Service Area	Instream Flow Permit Requirement
Valencia WRP	Santa Clara	Santa Clara	4A190107023	River or creek	No	Tertiary	15,312	14,775	468	0	NA
Saugus WRP	Santa Clara	Bouquet	4A190107021	River or creek	No	Tertiary	6,631	5,153	0	0	NA
						Total	21,944	19,927	468	0	0

[1] **Units of measure (AF, CCF, MG)** must remain consistent throughout the UWMP as reported in Table 2-3.

[2] If the **Wastewater Discharge ID Number** is not available to the UWMP preparer, access the SWRCB CIWQS regulated facility website at https://ciwqs.waterboards.ca.gov/ciwqs/readOnly/CiwqsReportServlet?inCommand=reset&reportName=RegulatedFacility

NOTES:

Submittal Table 6-4 Retail: Recycled Water Direct Beneficial Uses Within Service Area

☐ Recycled water is not used and is not planned for use within the service area of the supplier.
The supplier will not complete the table below.

Name of Supplier Producing (Treating) the Recycled Water:	Santa Clarita Valley Sanitation District
Name of Supplier Operating the Recycled Water Distribution System:	Santa Clarita Valley Sanitation District
Supplemental Water Added in 2020 (volume) *Include units*	0
Source of 2020 Supplemental Water	n/a

Beneficial Use Type *Insert additional rows if needed.*	**Potential** Beneficial Uses of Recycled Water (Describe)	Amount of **Potential** Uses of Recycled Water (Quantity) *Include volume units* [1]	General Description of 2020 Uses	Level of Treatment *Drop down list*	2020 [1]	2025 [1]	2030 [1]	2035 [1]	2040 [1]	2045 [1] (opt)
Agricultural irrigation										
Landscape irrigation (exc golf courses)	Landscape, outdoor uses	Potential demands up to 8,476 AFY through 2045	Street median irrigation	Tertiary	93	1,306	3,153	4,548	5,955	6,956
Golf course irrigation	Golf courses	393 AFY for The Oaks and 600 AFY for Valencia	The Oaks Club	Tertiary	375	993	993	993	993	993
Commercial use										
Industrial use										
Geothermal and other energy production										
Seawater intrusion barrier										
Recreational impoundment										
Wetlands or wildlife habitat										
Groundwater recharge (IPR)										
Reservoir water augmentation (IPR)										
Direct potable reuse										
Other (Description Required)										
				Total:	468	2,299	4,146	5,541	6,948	7,949
				2020 Internal Reuse						

[1] ***Units of measure (AF, CCF, MG)*** *must remain consistent throughout the UWMP as reported in Table 2-3.*

NOTES: Additional details provided in UWMP Sections 5.7 and 5.8. 2020 totals for landscape irrigation differ from the Santa Clarita Valley Sanitation District Valencia WRP annual reuse report due to differences in recycled water accounting. (Valencia WRP report shows 71AF vs 93AF recorded by SCV Water.)

Submittal Table 6-5 Retail: 2015 UWMP Recycled Water Use Projection Compared to 2020 Actual

☐	Recycled water was not used in 2015 nor projected for use in 2020. The supplier will not complete the table below. If recycled water was not used in 2020, and was not predicted to be in 2015, then check the box and do not complete the table.

Beneficial Use Type	2015 Projection for 2020 [1]	2020 Actual Use[1]
Insert additional rows as needed.		
Agricultural irrigation		
Landscape irrigation (exc golf courses)	622	93
Golf course irrigation	393	375
Commercial use		
Industrial use		
Geothermal and other energy production		
Seawater intrusion barrier		
Recreational impoundment		
Wetlands or wildlife habitat		
Groundwater recharge (IPR)		
Reservoir water augmentation (IPR)		
Direct potable reuse		
Other (Description Required)		
Total	1,015	468

[1] **Units of measure (AF, CCF, MG)** must remain consistent throughout the UWMP as reported in Table 2-3.

NOTE: 2020 totals for landscape irrigation differ from the Santa Clarita Valley Sanitation District Valencia WRP annual reuse report due to differences in recycled water accounting. (Valencia WRP report shows 71AF vs 93AF recorded by SCV Water.)

Submittal Table 6-6 Retail: Methods to Expand Future Recycled Water Use			
☐	Supplier does not plan to expand recycled water use in the future. Supplier will not complete the table below but will provide narrative explanation.		
	Provide page location of narrative in UWMP		
Name of Action	Description	Planned Implementation Year	Expected Increase in Recycled Water Use *
Add additional rows as needed			
New Drop Program	Provides recycled water supplies from new development wastewater flows	2021-2050	8,511
		Total	8,511
***Units of measure (AF, CCF, MG)** must remain consistent throughout the UWMP as reported in Table 2-3.*			
NOTES: Volume of expected increase in recycled water use is based on projected recycled water supplies above existing recycled water use, by 2050. While other methods are also implemented to encourage recycled water use, such as pricing incentives, the New Drop Program is a critical component and determining factor for optimizing recycled water use by making additional recycled water supplies available. See UWMP section 5.			

Submittal Table 6-7 Retail: Expected Future Water Supply Projects or Programs						
☐	No expected future water supply projects or programs that provide a quantifiable increase to the agency's water supply. Supplier will not complete the table below.					
☑	Some or all of the supplier's future water supply projects or programs are not compatible with this table and are described in a narrative format.					
Section 4.5.4, 4.6	Provide page location of narrative in the UWMP					
Name of Future Projects or Programs	Joint Project with other suppliers?		Description (if needed)	Planned Implementation Year	Planned for Use in Year Type *Drop Down List*	Expected Increase in Water Supply to Supplier* *This may be a range*
	Drop Down List (y/n)	*If Yes, Supplier Name*				
Add additional rows as needed						
***Units of measure (AF, CCF, MG)** must remain consistent throughout the UWMP as reported in Table 2-3.*						
NOTES:						

Submittal Table 6-8 Retail: Water Supplies — Actual				
Water Supply	Additional Detail on Water Supply	2020		
Drop down list May use each category multiple times.These are the only water supply categories that will be recognized by the WUEdata online submittal tool		Actual Volume*	Water Quality Drop Down List	Total Right or Safe Yield* (optional)
Add additional rows as needed				
Groundwater (not desalinated)	Alluvial Aquifer	7,571	Drinking Water	
Groundwater (not desalinated)	Saugus Formation	9,761	Drinking Water	
Recycled Water		468	Recycled Water	
Purchased or Imported Water	State Water Project	14,587	Drinking Water	
Purchased or Imported Water	Buena Vista-Rosedale	11,000	Drinking Water	
Purchased or Imported Water	Yuba Accord Water	284	Drinking Water	
Exchanges	Rosedale Rio-Bravo Bank	1,600	Drinking Water	
Exchanges	Semitropic Bank	5,000	Drinking Water	
Exchanges	Rosedale Rio-Bravo Exchange	14,451	Drinking Water	
Exchanges	Antelope Valley West Kern Water Agency Exchange	1,406	Drinking Water	
Exchanges	West Kern Exchange	500	Drinking Water	
	Total	66,628		0
Units of measure (AF, CCF, MG) *must remain consistent throughout the UWMP as reported in Table 2-3.*				
NOTES: See UWMP Table 4-1.				

Submittal Table 6-9 Retail: Water Supplies — Projected

Water Supply	Additional Detail on Water Supply	Projected Water Supply * Report To the Extent Practicable									
Drop down list May use each category multiple times. These are the only water supply categories that will be recognized by the WUEdata online submittal tool		**2025**		**2030**		**2035**		**2040**		**2045** (opt)	
		Reasonably Available Volume	Total Right or Safe Yield (optional)	Reasonably Available Volume	Total Right or Safe Yield (optional)	Reasonably Available Volume	Total Right or Safe Yield (optional)	Reasonably Available Volume	Total Right or Safe Yield (optional)	Reasonably Available Volume	Total Right or Safe Yield (optional)
Add additional rows as needed											
Groundwater (not desalinated)	Alluvial Aquifer	8,900		8,180		7,300		7,300		7,300	
Groundwater (not desalinated)	Saugus Formation	14,440		7,110		7,110		7,110		7,110	
Recycled Water	Existing	450		450		450		450		450	
Purchased or Imported Water	State Water Project	55,220		53,310		51,410		49,500		49,500	
Purchased or Imported Water	Buena Vista-Rosedale	11,000		11,000		11,000		11,000		11,000	
Purchased or Imported Water	Nickel Water - Newhall Land	0		0		1,607		1,607		1,607	
Purchased or Imported Water	Yuba Accord Water	1,000		0		0		0		0	
Groundwater (not desalinated)	Alluvial Aquifer - Planned	12,530		19,870		23,490		23,490		23,490	
Groundwater (not desalinated)	Saugus Formation - Planned	3,010		2,790		2,790		2,790		2,790	
Recycled Water	Planned recycled supplies	1,849		3,696		5,091		6,498		7,499	
	Total	108,399	0	106,406	0	110,248	0	109,745	0	110,746	0

***Units of measure (AF, CCF, MG)** must remain consistent throughout the UWMP as reported in Table 2-3.*

NOTES: Values shown here are based on projected normal year supplies (See UWMP Table 7-2).

Submittal Table 7-1 Retail: Basis of Water Year Data (Reliability Assessment)			
Year Type	**Base Year** If not using a calendar year, type in the last year of the fiscal, water year, or range of years, for example, water year 2019-2020, use 2020	**Available Supplies if Year Type Repeats**	
		☐	Quantification of available supplies is not compatible with this table and is provided elsewhere in the UWMP. Location_____
		☑	Quantification of available supplies is provided in this table as either volume only, percent only, or both.
		Volume Available *	**% of Average Supply**
Average Year	2021	93,550	100%
Single-Dry Year	2021	80,140	86%
Consecutive Dry Years 1st Year	2021	85,860	92%
Consecutive Dry Years 2nd Year	2022	124,220	133%
Consecutive Dry Years 3rd Year	2023	80,020	86%
Consecutive Dry Years 4th Year	2024	98,760	106%
Consecutive Dry Years 5th Year	2025	98,780	106%

Supplier may use multiple versions of Table 7-1 if different water sources have different base years and the supplier chooses to report the base years for each water source separately. If a Supplier uses multiple versions of Table 7-1, in the "Note" section of each table, state that multiple versions of Table 7-1 are being used and identify the particular water source that is being reported in each table.

***Units of measure (AF, CCF, MG)** must remain consistent throughout the UWMP as reported in Table 2-3.*

NOTES: Average year assumes total of 58% SWP delivery of Table A plus other base supplies in 2021. Single Dry Year assumes total of 5% SWP delivery of Table A, the worst single dry year on record, and all base and augmentation supplies available in 2021. Consecutive Dry Year Assessment assumes 1988-1992 hydrology, representing worst five-year consecutive dry period on record.

Submittal Table 7-2 Retail: Normal Year Supply and Demand Comparison					
	2025	2030	2035	2040	2045 *(Opt)*
Supply totals (*autofill from Table 6-9)*	108,399	106,406	110,248	109,745	110,746
Demand totals *(autofill from Table 4-3)*	76,499	81,646	88,741	93,548	97,449
Difference	31,900	24,760	21,507	16,197	13,297
NOTES:					

Submittal Table 7-3 Retail: Single Dry Year Supply and Demand Comparison					
	2025	2030	2035	2040	2045 (Opt)
Supply totals*	86,109	105,486	116,178	117,585	118,586
Demand totals*	81,000	86600	94,000	99,200	103,400
Difference	5,109	18,886	22,178	18,385	15,186
***Units of measure (AF, CCF, MG)** must remain consistent throughout the UWMP as reported in Table 2-3.*					
NOTES: See UWMP Table 7-3 for details. Demands shown here reflect demands with passive and active conservation.					

Submittal Table 7-4 Retail: Multiple Dry Years Supply and Demand Comparison						
		2025*	2030*	2035*	2040*	2045* (Opt)
First year	Supply totals	77,880	85,880	98,090	108,920	109,920
	Demand totals	74,170	80,180	86,120	92,850	96,700
	Difference	3,710	5,700	11,970	16,070	13,220
Second year	Supply totals	130,810	137,130	151,290	160,400	161,400
	Demand totals	77,730	83,740	90,500	96,560	100,580
	Difference	53,080	53,390	60,790	63,840	60,820
Third year	Supply totals	92,510	105,050	115,740	117,150	118,150
	Demand totals	79,670	85,120	92,480	97,530	101,590
	Difference	12,840	19,930	23,260	19,620	16,560
Fourth year	Supply totals	103,130	123,610	133,170	133,310	134,320
	Demand totals	77,670	83,150	90,630	94,910	98,710
	Difference	25,460	40,460	42,540	38,400	35,610
Fifth year	Supply totals	102,210	118,490	129,540	130,660	131,310
	Demand totals	79,890	85,910	93,100	97,060	100,790
	Difference	22,320	32,580	36,440	33,600	30,520
Sixth year *(optional)*	Supply totals					
	Demand totals					
	Difference	0	0	0	0	0

***Units of measure (AF, CCF, MG)** must remain consistent throughout the UWMP as reported in Table 2-3.*

NOTES: Demands are with active and passive conservation. Additional details in UWMP Table 7-4

Submittal Table 7-5: Five-Year Drought Risk Assessment Tables to address Water Code Section 10635(b)

2021	Total
Total Water Use	70,290
Total Supplies	63,800
Surplus/Shortfall w/o WSCP Action	(6,490)
Planned WSCP Actions (use reduction and supply augmentation)	
WSCP - supply augmentation benefit	22,060
WSCP - use reduction savings benefit	
Revised Surplus/(shortfall)	15,570
Resulting % Use Reduction from WSCP action	0%

2022	Total
Total Water Use	74,380
Total Supplies	102,160
Surplus/Shortfall w/o WSCP Action	27,780
Planned WSCP Actions (use reduction and supply augmentation)	
WSCP - supply augmentation benefit	22,060
WSCP - use reduction savings benefit	
Revised Surplus/(shortfall)	49,840
Resulting % Use Reduction from WSCP action	0%

2023	Total
Total Water Use	76,800
Total Supplies	57,980
Surplus/Shortfall w/o WSCP Action	(18,820)
Planned WSCP Actions (use reduction and supply augmentation)	
WSCP - supply augmentation benefit	22,060
WSCP - use reduction savings benefit	
Revised Surplus/(shortfall)	3,240
Resulting % Use Reduction from WSCP action	0%

2024	Total
Total Water Use	75,190
Total Supplies	76,690
Surplus/Shortfall w/o WSCP Action	1,500
Planned WSCP Actions (use reduction and supply augmentation)	
WSCP - supply augmentation benefit	22,060
WSCP - use reduction savings benefit	
Revised Surplus/(shortfall)	23,560
Resulting % Use Reduction from WSCP action	0%

2025	Total
Total Water Use	77,910
Total Supplies	76,720
Surplus/Shortfall w/o WSCP Action	(1,190)
Planned WSCP Actions (use reduction and supply augmentation)	
WSCP - supply augmentation benefit	22,060
WSCP - use reduction savings benefit	
Revised Surplus/(shortfall)	20,870
Resulting % Use Reduction from WSCP action	0%

Submittal Table 8-1
Water Shortage Contingency Plan Levels

Shortage Level	Percent Shortage Range	Shortage Response Actions (*Narrative description*)
1	Up to 10%	Supply augmentation, expanded outreach, water efficiency programs, restrictions
2	Up to 20%	Supply augmentation, expanded outreach, water efficiency programs, restrictions
3	Up to 30%	Supply augmentation, expanded outreach, water efficiency programs, restrictions
4	Up to 40%	Supply augmentation, expanded outreach, water efficiency programs, restrictions
5	Up to 50%	Supply augmentation, expanded outreach, water efficiency programs, restrictions
6	>50%	Supply augmentation, expanded outreach, water efficiency programs, restrictions

NOTES: See WSCP Table 4.

Submittal Table 8-2: Demand Reduction Actions				
Shortage Level	Demand Reduction Actions ***Drop down list*** *These are the only categories that will be accepted by the WUEdata online submittal tool. Select those that apply.*	How much is this going to reduce the shortage gap? *Include units used (volume type or percentage)*	Additional Explanation or Reference *(optional)*	Penalty, Charge, or Other Enforcement? ***For Retail Suppliers Only*** *Drop Down List*
Add additional rows as needed				
1	Expand Public Information Campaign	Up to 5%	Education	No
1	Other	Up to 3%	Increased Conservation Program Marketing	No
1	Other	Up to 1%	Targeted Engagement	No
1	Other	Up to 1%	Mandatory Prohibition	Yes
2	Expand Public Information Campaign	5%	Educate about Moderate Shortage	No
2	Other	Up to 3.5%	Increased Conservation Program Marketing	No
2	Other	Up to 10%	Targeted Engagement	No
2	Other	Up to 3%	Mandatory Prohibition	Yes
3	Expand Public Information Campaign	5%	Educate about Significant Shortage	No
3	Other	Up to 5%	Increased Conservation Program Marketing - Consider Direct Installation	No
3	Other	Up to 15%	Targeted Engagement - Add Mid-range Users	No
3	Other	Up to 5%	Mandatory Prohibition	Yes
4	Expand Public Information Campaign	10%	Educate about Severe Shortage	No
4	Other	Up to 6%	Increased Conservation Program Incentives	No
4	Other	Up to 15%	Targeted Engagement - Broaden	No
4	Other	Up to 5%	Mandatory Prohibition	Yes
5	Expand Public Information Campaign	10%	Educate about Critical Shortage	No
5	Other	Up to 6%	Suspend Lawn Replacement Programs, Continue Installation and Support Programs	No
5	Other	Up to 15%	Targeted Engagement - Broaden	No
5	Other	Up to 25%	Mandatory Prohibition	Yes
6	Expand Public Information Campaign	10%	Educate about Critical Shortage	No
6	Other	Less than 1%	Conservation: Suspend all Program Except Leak Detection & Repairs	No
6	Other	Up to 15%	Announce Water for Essential Use Only	No
6	Other	Up to 25%	Mandatory Prohibition	Yes
NOTES:				

Submittal Table 8-3: Supply Augmentation and Other Actions			
Shortage Level	Supply Augmentation Methods and Other Actions by Water Supplier ***Drop down list*** *These are the only categories that will be accepted by the WUEdata online submittal tool*	How much is this going to reduce the shortage gap? *Include units used (volume type or percentage)*	Additional Explanation or Reference *(optional)*
Add additional rows as needed			
1-6	Stored Emergency Supply	Varies each year	Article 56C (Carryover Supplies SWP)
1-6	Stored Emergency Supply	10,000 AFY	Rosedale-Rio Bravo Bank
1-6	Stored Emergency Supply	5,000 AFY	Semitropic Bank
1-6	Other Actions (describe)	amounts vary	Pump more Saugus groundwater
1-6	Other Actions (describe)	1,000 AFY	Yuba Accord Water
1-6	Transfers	3,000 AFY	State Water Contractors Dry Year Transfer
1-6	Other Actions (describe)	1,607 AFY	Nickel Water
1-6	Stored Emergency Supply	4,950 AFY	Newhall Land Bank
1-6	Stored Emergency Supply	6,060 AFY	Emergency Storage in Castaic Lake
NOTES: The selection of flexible (dry year) supplies will be determined on a real-time, case by case basis depending on the circumstances discerned by the SCV Water's supply and demand assessment and the drought monitoring process.			

Submittal Table 10-1 Retail: Notification to Cities and Counties		
City Name	60 Day Notice	Notice of Public Hearing
Add additional rows as needed		
Santa Clarita	Yes	Yes
County Name *Drop Down List*	60 Day Notice	Notice of Public Hearing
Add additional rows as needed		
Ventura County	Yes	Yes
Los Angeles County	Yes	Yes
NOTES:		

Appendix D: SBX7-7 Verification Tables

SB X7-7 Table 0: Units of Measure Used in 2020 UWMP* *(select one from the drop down list)*
Acre Feet
**The unit of measure must be consistent throughout the UWMP, as reported in Submittal Table 2-3.*
NOTES:

SB X7-7 Table 2: Method for 2020 Population Estimate	
Method Used to Determine 2020 Population (may check more than one)	
☐	**1. Department of Finance** (DOF) or **American Community Survey** (ACS)
☐	**2. Persons-per-Connection Method**
☐	**3. DWR Population Tool**
☑	**4. Other** DWR recommends pre-review
NOTES: Based on Maddaus Water Management, Inc. 2021 SCV Demand Study: Land-Use Based Demand Forecast Analysis.	

SB X7-7 Table 3: 2020 Service Area Population	
2020 Compliance Year Population	
2020	280,192
NOTES: Based on Maddaus 2021.	

SB X7-7 Table 4: 2020 Gross Water Use							
Compliance Year 2020	**2020 Volume Into Distribution System** *This column will remain blank until SB X7-7 Table 4-A is completed.*	**2020 Deductions**					**2020 Gross Water Use**
		Exported Water *	**Change in Dist. System Storage*** (+/-)	**Indirect Recycled Water** *This column will remain blank until SB X7-7 Table 4-B is completed.*	**Water Delivered for Agricultural Use***	**Process Water** *This column will remain blank until SB X7-7 Table 4-D is completed.*	
	64,266			-		-	**64,266**

*** Units of measure (AF, MG , or CCF)** must remain consistent throughout the UWMP, as reported in SB X7-7 Table 0 and Submittal Table 2-3.

NOTES:

SB X7-7 Table 4-A: 2020 Volume Entering the Distribution System(s), Meter Error Adjustment

Complete one table for each source.

Name of Source	Imported Water
This water source is *(check one)* **:**	
☑	The supplier's own water source
☐	A purchased or imported source

Compliance Year 2020	Volume Entering Distribution System [1]	Meter Error Adjustment [2] *Optional (+/-)*	Corrected Volume Entering Distribution System
	48,191	-	48,191

[1] ***Units of measure (AF, MG , or CCF)*** *must remain consistent throughout the UWMP, as reported in SB X7-7 Table 0 and Submittal Table 2-3.* [2] ***Meter Error Adjustment*** *- See guidance in Methodology 1, Step 3 of Methodologies Document*

NOTES

SB X7-7 Table 4-A: 2020 Volume Entering the Distribution System(s) Meter Error Adjustment

Complete one table for each source.

Name of Source	Treated Groundwater
This water source is *(check one)* **:**	
☑	The supplier's own water source
☐	A purchased or imported source

Compliance Year 2020	Volume Entering Distribution System [1]	Meter Error Adjustment [2] *Optional (+/-)*	Corrected Volume Entering Distribution System
	2,794		2,794

[1] ***Units of measure (AF, MG , or CCF)*** *must remain consistent throughout the UWMP, as reported in SB X7-7 Table 0 and Submittal Table 2-3.* [2] ***Meter Error Adjustment*** *- See guidance in Methodology 1, Step 3 of Methodologies Document*

NOTES:

SB X7-7 Table 4-A: 2020 Volume Entering the Distribution System(s), Meter Error Adjustment

Complete one table for each source.

Name of Source	Alluvial Groundwater
This water source is *(check one)* **:**	
☑	The supplier's own water source
☐	A purchased or imported source

Compliance Year 2020	Volume Entering Distribution System [1]	Meter Error Adjustment [2] *Optional (+/-)*	Corrected Volume Entering Distribution System
	7,571		7,571

[1] ***Units of measure (AF, MG , or CCF)*** *must remain consistent throughout the UWMP, as reported in SB X7-7 Table 0 and Submittal Table 2-3.* [2] ***Meter Error Adjustment*** *- See guidance in Methodology 1, Step 3 of Methodologies Document*

NOTES:

SB X7-7 Table 4-A: 2020 Volume Entering the Distribution System(s), Meter Error Adjustment

Complete one table for each source.

Name of Source	Saugus Groundwater
This water source is *(check one)* **:**	
☑	The supplier's own water source
☐	A purchased or imported source

Compliance Year 2020	Volume Entering Distribution System [1]	Meter Error Adjustment [2] *Optional (+/-)*	Corrected Volume Entering Distribution System
	5,710		5,710

[1] ***Units of measure (AF, MG , or CCF)*** *must remain consistent throughout the UWMP, as reported in SB X7-7 Table 0 and Submittal Table 2-3.* [2] ***Meter Error Adjustment*** *- See guidance in Methodology 1, Step 3 of Methodologies Document*

NOTES:

SB X7-7 Table 5: 2020 Gallons Per Capita Per Day (GPCD)		
2020 Gross Water *Fm SB X7-7 Table 4*	**2020 Population** *Fm SB X7-7 Table 3*	**2020 GPCD**
64,266	280,192	**205**
NOTES:		

SB X7-7 Table 9: 2020 Compliance							
Actual 2020 GPCD[1]	Optional Adjustments to 2020 GPCD Enter "0" if Adjustment Not Used Extraordinary Events[1]	Weather Normalization[1]	Economic Adjustment[1]	TOTAL Adjustments[1]	Adjusted 2020 GPCD [1] *(Adjusted if applicable)*	2020 Confirmed Target GPCD [1, 2]	**Did Supplier Achieve Targeted Reduction for 2020?**
205	-	-	-	-	205	220	**YES**

[1] *All values are reported in GPCD*

[2] ***2020 Confirmed Target GPCD*** *is taken from the Supplier's SB X7-7 Verification Form Table SB X7-7, 7-F.*

NOTES:

SB X7-7 Table 0: Units of Measure Used in UWMP* *(select one from the drop down list)*
Acre Feet
**The unit of measure must be consistent with Submittal Table 2-3*
NOTES:

SB X7-7 Table-1: Baseline Period Ranges			
Baseline	**Parameter**	**Value**	**Units**
10- to 15-year baseline period	2008 total water deliveries	74,235	Acre Feet
	2008 total volume of delivered recycled water	-	Acre Feet
	2008 recycled water as a percent of total deliveries		**See Note 1**
	Number of years in baseline period[1, 2]	10	Years
	Year beginning baseline period range	1999	
	Year ending baseline period range[3]	2008	
5-year baseline period	Number of years in baseline period	5	Years
	Year beginning baseline period range	2003	
	Year ending baseline period range[4]	2007	

[1] *If the 2008 recycled water delivery is less than 10 percent of total water deliveries, then the 10-15year baseline period is a continuous 10-year period. If the amount of recycled water delivered in 2008 is 10 percent or greater of total deliveries, the 10-15 year baseline period is a continuous 10- to 15-year period.*

[2] *The Water Code requires that the baseline period is between 10 and 15 years. However, DWR recognizes that some water suppliers may not have the minimum 10 years of baseline data.*

[3] *The ending year for the 10-15 year baseline period must be between December 31, 2004 and December 31, 2010.*

[4] *The ending year for the 5 year baseline period must be between December 31, 2007 and December 31, 2010.*

NOTES:

SB X7-7 Table 2: Method for Population Estimates	
Method Used to Determine Population (may check more than one)	
☐	**1. Department of Finance** (DOF) or **American Community Survey** (ACS)
☐	**2. Persons-per-Connection Method**
☐	**3. DWR Population Tool**
☑	**4. Other** DWR recommends pre-review
NOTES: Based on Maddaus Water Management, Inc. 2021 SCV Demand Study: Land-Use Based Demand Forecast Analysis.	

SB X7-7 Table 3: Service Area Population		
Year		Population
10 to 15 Year Baseline Population		
Year 1	1999	179,260
Year 2	2000	186,236
Year 3	2001	196,619
Year 4	2002	206,400
Year 5	2003	215,779
Year 6	2004	227,823
Year 7	2005	237,065
Year 8	2006	242,464
Year 9	2007	247,194
Year 10	2008	248,909
Year 11		
Year 12		
Year 13		
Year 14		
Year 15		
5 Year Baseline Population		
Year 1	2003	215,779
Year 2	2004	227,823
Year 3	2005	237,065
Year 4	2006	242,464
Year 5	2007	247,194
NOTES: UWMP Table 3-1.		

SB X7-7 Table 4: Annual Gross Water Use *

Baseline Year *Fm SB X7-7 Table 3*		Volume Into Distribution System *This column will remain blank until SB X7-7 Table 4-A is completed.*	Deductions					Acre Feet
			Exported Water	Change in Dist. System Storage (+/-)	Indirect Recycled Water *This column will remain blank until SB X7-7 Table 4-B is completed.*	Water Delivered for Agricultural Use	Process Water *This column will remain blank until SB X7-7 Table 4-D is completed.*	Annual Gross Water Use
10 to 15 Year Baseline - Gross Water Use								
Year 1	1999	56,596			-		-	56,596
Year 2	2000	60,188			-		-	60,188
Year 3	2001	59,829			-		-	59,829
Year 4	2002	67,151			-		-	67,151
Year 5	2003	66,219			-		-	66,219
Year 6	2004	70,642			-		-	70,642
Year 7	2005	69,113			-		-	69,113
Year 8	2006	71,820			-		-	71,820
Year 9	2007	75,435			-		-	75,435
Year 10	2008	74,235			-		-	74,235
Year 11	0	-			-		-	-
Year 12	0	-			-		-	-
Year 13	0	-			-		-	-
Year 14	0	-			-		-	-
Year 15	0	-			-		-	-
10 - 15 year baseline average gross water use								**67,123**
5 Year Baseline - Gross Water Use								
Year 1	2003	66,219			-		-	66,219
Year 2	2004	70,642			-		-	70,642
Year 3	2005	69,113			-		-	69,113
Year 4	2006	71,820			-		-	71,820
Year 5	2007	75,435			-		-	75,435
5 year baseline average gross water use								**70,646**

*** Units of measure** (AF, MG , or CCF) must remain consistent throughout the UWMP, as reported in Table 2-3.

NOTES:

SB X7-7 Table 4-A: Volume Entering the Distribution System(s)
Complete one table for each source.

Name of Source	Imported Water
This water source is:	
☑	The supplier's own water source
☐	A purchased or imported source

Baseline Year *Fm SB X7-7 Table 3*		Volume Entering Distribution System[1]	Meter Error Adjustment [2] *Optional (+/-)*	Corrected Volume Entering Distribution System
10 to 15 Year Baseline - Water into Distribution System				
Year 1	1999	26,628		26,628
Year 2	2000	31,779		31,779
Year 3	2001	34,462		34,462
Year 4	2002	40,694		40,694
Year 5	2003	43,241		43,241
Year 6	2004	46,351		46,351
Year 7	2005	37,140		37,140
Year 8	2006	38,759		38,759
Year 9	2007	43,745		43,745
Year 10	2008	40,351		40,351
Year 11	0			-
Year 12	0			-
Year 13	0			-
Year 14	0			-
Year 15	0			-
5 Year Baseline - Water into Distribution System				
Year 1	2003	43,241		43,241
Year 2	2004	46,351		46,351
Year 3	2005	37,140		37,140
Year 4	2006	38,759		38,759
Year 5	2007	43,745		43,745

[1] ***Units of measure*** *(AF, MG , or CCF) must remain consistent throughout the UWMP, as reported in Table 2-3.*

[2] ***Meter Error Adjustment*** *- See guidance in Methodology 1, Step 3 of Methodologies Document*

NOTES:

SB X7-7 Table 4-A: Volume Entering the Distribution System(s)
Complete one table for each source.

Name of Source	Alluvial Groundwater
This water source is:	
☑	The supplier's own water source
☐	A purchased or imported source

Baseline Year *Fm SB X7-7 Table 3*		Volume Entering Distribution System [1]	Meter Error Adjustment [2] *Optional (+/-)*	Corrected Volume Entering Distribution System
10 to 15 Year Baseline - Water into Distribution System				
Year 1	1999	27,240		27,240
Year 2	2000	25,216		25,216
Year 3	2001	22,100		22,100
Year 4	2002	22,097		22,097
Year 5	2003	19,397		19,397
Year 6	2004	18,590		18,590
Year 7	2005	26,025		26,025
Year 8	2006	27,189		27,189
Year 9	2007	25,632		25,632
Year 10	2008	27,919		27,919
Year 11	0			0
Year 12	0			0
Year 13	0			0
Year 14	0			0
Year 15	0			0
5 Year Baseline - Water into Distribution System				
Year 1	2003	19,397		19,397
Year 2	2004	18,590		18,590
Year 3	2005	26,025		26,025
Year 4	2006	27,189		27,189
Year 5	2007	25,632		25,632

[1] ***Units of measure*** *(AF, MG , or CCF) must remain consistent throughout the UWMP, as reported in Table 2-3.*

[2] ***Meter Error Adjustment*** *- See guidance in Methodology 1, Step 3 of Methodologies Document*

NOTES:

SB X7-7 Table 4-A: Volume Entering the Distribution System(s)
Complete one table for each source.

Name of Source	Saugus Groundwater
This water source is:	
☑	The supplier's own water source
☐	A purchased or imported source

Baseline Year *Fm SB X7-7 Table 3*		Volume Entering Distribution System [1]	Meter Error Adjustment [2] *Optional (+/-)*	Corrected Volume Entering Distribution System
10 to 15 Year Baseline - Water into Distribution System				
Year 1	1999	2,728		2,728
Year 2	2000	3,193		3,193
Year 3	2001	3,267		3,267
Year 4	2002	4,360		4,360
Year 5	2003	3,581		3,581
Year 6	2004	5,701		5,701
Year 7	2005	5,948		5,948
Year 8	2006	5,872		5,872
Year 9	2007	6,058		6,058
Year 10	2008	5,965		5,965
Year 11	0			0
Year 12	0			0
Year 13	0			0
Year 14	0			0
Year 15	0			0
5 Year Baseline - Water into Distribution System				
Year 1	2003	3,581		3,581
Year 2	2004	5,701		5,701
Year 3	2005	5,948		5,948
Year 4	2006	5,872		5,872
Year 5	2007	6,058		6,058

[1] ***Units of measure*** *(AF, MG , or CCF) must remain consistent throughout the UWMP, as reported in Table 2-3.*

[2] ***Meter Error Adjustmen*** *t - See guidance in Methodology 1, Step 3 of Methodologies Document*

NOTES:

SB X7-7 Table 5: Baseline Gallons Per Capita Per Day (GPCD)				
Baseline Year *Fm SB X7-7 Table 3*		Service Area Population *Fm SB X7-7 Table 3*	Annual Gross Water Use *Fm SB X7-7 Table 4*	Daily Per Capita Water Use (GPCD)
10 to 15 Year Baseline GPCD				
Year 1	1999	179,260	56,596	282
Year 2	2000	186,236	60,188	289
Year 3	2001	196,619	59,829	272
Year 4	2002	206,400	67,151	290
Year 5	2003	215,779	66,219	274
Year 6	2004	227,823	70,642	277
Year 7	2005	237,065	69,113	260
Year 8	2006	242,464	71,820	264
Year 9	2007	247,194	75,435	272
Year 10	2008	248,909	74,235	266
Year 11	0	-	-	
Year 12	0	-	-	
Year 13	0	-	-	
Year 14	0	-	-	
Year 15	0	-	-	
10-15 Year Average Baseline GPCD				**275**
5 Year Baseline GPCD				
Baseline Year *Fm SB X7-7 Table 3*		Service Area Population *Fm SB X7-7 Table 3*	Gross Water Use *Fm SB X7-7 Table 4*	Daily Per Capita Water Use
Year 1	2003	215,779	66,219	274
Year 2	2004	227,823	70,642	277
Year 3	2005	237,065	69,113	260
Year 4	2006	242,464	71,820	264
Year 5	2007	247,194	75,435	272
5 Year Average Baseline GPCD				**270**
NOTES:				

SB X7-7 Table 6: Baseline GPCD *From Table SB X7-7 Table 5*	*Summary*
10-15 Year Baseline GPCD	275
5 Year Baseline GPCD	270
NOTES:	

SB X7-7 Table 7: 2020 Target Method *Select Only One*		
Target Method		**Supporting Tables**
☑	Method 1	SB X7-7 Table 7A
☐	Method 2	SB X7-7 Tables 7B, 7C, and 7D
☐	Method 3	SB X7-7 Table 7-E
☐	Method 4	Method 4 Calculator *Located in the WUE Data Portal at wuedata.water.ca.gov* Resources *button*
NOTES:		

SB X7-7 Table 7-A: Target Method 1 20% Reduction	
10-15 Year Baseline GPCD	**2020 Target GPCD**
275	**220**
NOTES:	

SB X7-7 Table 7-F: Confirm Minimum Reduction for 2020 Target					
5 Year Baseline GPCD *From SB X7-7 Table 5*	Maximum 2020 Target[1]	**Calculated 2020 Target [2]**			**Confirmed 2020 Target[4]**
		As calculated by supplier in this SB X7-7 Verification Form	**Special Situations[3]**		
			Prorated 2020 Target	Population Weighted Average 2020 Target	
270	256	220			**220**

[1] ***Maximum 2020 Target*** *is 95% of the 5 Year Baseline GPCD except for suppliers at or below 100 GPCD.*

[2] ***Calculated 2020 Target*** *is the target calculated by the Supplier based on the selected Target Method, see SB X7-7 Table 7 and corresponding tables for agency's calculated target. Supplier may only enter one calculated target.*

[3] ***Prorated targets and population weighted target*** *are allowed for special situations only. These situations are described in Appendix P, Section P.3*

[4] ***Confirmed Target*** *is the lesser of the Calculated 2020 Target (C5, D5, or E5) or the Maximum 2020 Target (Cell B5)*

NOTES:

Appendix E: Detail Water Supply Tables

Customer Water Use Worksheet (Potable and Non-Potable Combined) - Optional Planning Tool

Indicate units: *Acre Feet*

Part 1: Current (2020) Total Water Use[(a)]

Use Category	M1	M2	M3	M4	M5	M6	M7	M8	M9	M10	M11	M12	2020 Tot.
2020 Total Water Use	3,400	3,980	3,000	3,520	6,450	6,810	7,620	7,870	7,160	6,440	5,060	4,690	66,000

Part 3: Estimating Total Water Use for next 5 years [(b)]

For Drought Risk Assessment		M1	M2	M3	M4	M5	M6	M7	M8	M9	M10	M11	M12	Total
	2021 Total Water Use	3,800	3,420	4,150	5,200	6,610	7,380	8,440	8,510	7,520	6,330	4,990	3,940	70,290
	2022 Total Water Use	4,020	3,620	4,410	5,500	6,990	7,810	8,930	9,000	7,960	6,690	5,280	4,170	74,380
	2023 Total Water Use	4,150	3,750	4,550	5,680	7,220	8,060	9,220	9,290	8,220	6,910	5,450	4,300	76,800
	2024 Total Water Use	4,060	3,660	4,460	5,560	7,070	7,890	9,020	9,100	8,050	6,770	5,340	4,210	75,190
	2025 Total Water Use	4,210	3,790	4,620	5,770	7,320	8,180	9,350	9,430	8,340	7,010	5,530	4,360	77,910

Notes:

(a) Total water demand for 2020 is actual water use, rounded up, broken out into monthly demands.

(b) 2021-2025 water use shows assumed weather adjusted demands for assumed driest five years on record (1988-1992). Includes demands for SCV Water, LACWWD 36 and Recycled Water with Active Conservation Programs (Table 2-10).

Water Supply Worksheet (Potable and Non-Potable Combined) - Optional Planning Tool

Indicate units: *Acre Feet*

Part 1: SUMMARY: Existing Supply Tables *[use of monthly data is recommended]*

Total Supply		M1	M2	M3	M4	M5	M6	M7	M8	M9	M10	M11	M12	Total
eAR (for comparison)														
2020 Actual Use[a]		3,460	4,010	3,040	3,550	6,470	6,830	7,640	7,910	7,190	6,490	5,110	4,720	66,420
Normal Year[b]		4,690	4,330	6,150	7,380	8,790	9,580	10,720	10,860	9,790	8,470	6,920	5,870	93,550
Single Dry Year[c]		4,410	3,970	5,210	5,820	7,420	8,800	10,055	10,180	8,315	6,830	5,320	3,810	80,140
Multi-Year Drought[d]	2021 (1st year)	4,310	4,250	4,990	5,410	6,830	8,220	7,180	6,830	5,630	4,190	3,100	2,860	63,800
	2022 (2nd year)	5,210	4,800	6,690	8,050	9,590	10,440	11,680	11,860	10,690	9,240	7,510	6,400	102,160
	2023 (3rd year)	4,230	3,090	3,360	3,870	4,780	4,990	6,910	6,820	6,140	6,060	4,580	3,150	57,980
	2024 (4th year)	4,190	3,660	5,230	6,210	7,180	7,720	8,560	8,730	7,940	6,940	5,670	4,660	76,690
	2025 (5th year)	4,580	3,480	4,320	5,430	6,880	8,200	9,410	9,460	8,370	7,000	5,520	4,070	76,720

Part 1: Individual: Existing Supply (current monthly conditions *[use of monthly data is recommended]*

Supply Source		M1	M2	M3	M4	M5	M6	M7	M8	M9	M10	M11	M12	Total
Source 1:[e]		State Water Project Table A (95,200 AF max)- Base Supply												
2020 Actual use of supply		0	0	0	0	1,370	1,790	670	0	2,020	1,540	2,930	1,190	11,510
Normal Year		2,980	2,650	3,260	4,090	5,190	5,800	6,630	6,680	5,910	4,970	3,920	3,140	55,220
Single Dry Year							1,000	1,000	1,000	1,000	400	300	60	4,760
Multi-Year Drought	2021 (1st year)					1,100	2,300	2,430	2,480	1,600	560			10,470
	2022 (2nd year)	3,080	2,740	3,370	4,230	5,370	6,000	6,850	6,910	6,110	5,140	4,060	3,260	57,120
	2023 (3rd year)	2,080	1,000			500	500	2,000	1,800	1,500	1,900	1,100		12,380
	2024 (4th year)	1,590	1,140	1,400	1,760	2,240	2,500	2,860	2,880	2,550	2,140	1,690	1,050	23,800
	2025 (5th year)	1,500	500		360	1,240	2,220	2,880	2,740	2,200	1,530	1,010		16,180
Source 2:[f]		Alluvial Groundwater (local)- Base Supply												
2020 Actual use of supply		710	1,010	280	360	780	690	720	690	590	640	490	560	7,520
Normal Year		830	820	860	1,040	1,180	1,260	1,400	1,450	1,310	1,130	910	790	12,980
Single Dry Year		830	820	860	1,040	1,180	1,260	1,400	1,450	1,310	1,130	910	790	12,980
Multi-Year Drought	2021 (1st year)	830	800	860	1,040	1,180	1,260	1,400	1,450	1,310	1,130	910	810	12,980
	2022 (2nd year)	1,040	1,010	1,070	1,300	1,480	1,580	1,760	1,820	1,640	1,410	1,140	1,010	16,260
	2023 (3rd year)	980	950	1,010	1,220	1,390	1,480	1,650	1,710	1,540	1,330	1,070	930	15,260
	2024 (4th year)	1,220	1,180	1,260	1,530	1,740	1,850	2,060	2,140	1,930	1,660	1,330	1,170	19,070
	2025 (5th year)	1,300	1,260	1,340	1,620	1,840	1,970	2,190	2,270	2,050	1,760	1,420	1,250	20,270
Source 3:[g]		Saugus Groundwater (local)- Base Supply												
2020 Actual use of supply		690	750	660	710	860	980	1,020	950	840	900	660	690	9,710
Normal Year		860	840	890	1,080	1,230	1,310	1,460	1,510	1,360	1,170	950	830	13,490
Single Dry Year		960	930	990	1,200	1,360	1,450	1,620	1,680	1,510	1,300	1,050	930	14,980
Multi-Year Drought	2021 (1st year)	960	930	990	1,200	1,360	1,450	1,620	1,680	1,510	1,300	1,050	930	14,980
	2022 (2nd year)	1,060	1,020	1,090	1,320	1,500	1,600	1,780	1,850	1,670	1,440	1,160	1,010	16,500
	2023 (3rd year)	1,140	1,110	1,180	1,430	1,630	1,730	1,950	2,000	1,810	1,560	1,250	1,090	17,880
	2024 (4th year)	1,340	1,300	1,380	1,670	1,900	2,030	2,260	2,340	2,110	1,820	1,470	1,310	20,930
	2025 (5th year)	1,730	1,670	1,780	2,160	2,450	2,620	2,910	3,020	2,720	2,350	1,890	1,670	26,970
Source 4:[h]		Recycled Water (local)- Base Supply												
2020 Actual use of supply		10	20	10	20	60	70	70	70	60	20	30	20	460
Normal Year		20	20	40	70	90	110	130	120	110	100	40	10	860
Single Dry Year		20	20	40	70	90	110	130	120	110	100	40	10	860
Multi-Year Drought	2021 (1st year)	20	20	40	70	90	110	130	120	110	100	40	20	870
	2022 (2nd year)	30	30	60	100	140	160	190	180	170	150	50	20	1,280
	2023 (3rd year)	30	30	70	120	160	180	210	210	190	170	60	30	1,460
	2024 (4th year)	40	40	90	150	200	240	280	270	250	220	80	30	1,890
	2025 (5th year)	50	50	100	190	250	290	330	330	300	260	100	50	2,300
Source 5:[i]		BVRRB (11,000 AF firm water purchase) - Base Supply												
2020 Actual use of supply		0	0	0	480	1,100	1,100	1,710	2,570	1,280	1,100	1,000	660	11,000
Normal Year				1,100	1,100	1,100	1,100	1,100	1,100	1,100	1,100	1,100	1,100	11,000
Single Dry Year				1,100	1,100	1,100	1,100	1,100	1,100	1,100	1,100	1,100	1,100	11,000
Multi-Year Drought	2021 (1st year)			1,100	1,100	1,100	1,100	1,100	1,100	1,100	1,100	1,100	1,100	11,000
	2022 (2nd year)			1,100	1,100	1,100	1,100	1,100	1,100	1,100	1,100	1,100	1,100	11,000
	2023 (3rd year)			1,100	1,100	1,100	1,100	1,100	1,100	1,100	1,100	1,100	1,100	11,000
	2024 (4th year)			1,100	1,100	1,100	1,100	1,100	1,100	1,100	1,100	1,100	1,100	11,000
	2025 (5th year)			1,100	1,100	1,100	1,100	1,100	1,100	1,100	1,100	1,100	1,100	11,000

Source 6: [j]		State Water Project Article 56 Carryover - Base Year Supply for 2021 only												
2020 Actual use of supply		2050	780	210	0	0	0	0	0	0	0	0	0	3,040
Normal Year														0
Single Dry Year		2,600	1,200	800	1,000	1,270	1,700	2,300	2,300	330				13,500
Multi-Year Drought	2021 (1st year)	2,500	2,500	2,000	2,000	2,000	2,000	500						13,500
	2022 (2nd year)													0
	2023 (3rd year)													0
	2024 (4th year)													0
	2025 (5th year)													0
Source 7: [k]		RRB Water Banking Program - Dry Year Supply Augmentation												
2020 Actual use of supply													1,600	1,600
Normal Year														0
Single Dry Year			1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000		10,000
Multi-Year Drought	2021 (1st year)		1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000		10,000
	2022 (2nd year)		1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000		10,000
	2023 (3rd year)		1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000		10,000
	2024 (4th year)		1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000		10,000
	2025 (5th year)		1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000		10,000
Source 8: [k]		Semitropic SWRU Banking Program - Dry Year Supply Augmentation												
2020 Actual use of supply						350	400	710	500	750	2,290			5,000
Normal Year														0
Single Dry Year				420	410	410	170	170	170	620	790	920	920	5,000
Multi-Year Drought	2021 (1st year)			420	410	410	170	170	170	620	790	920	920	5,000
	2022 (2nd year)			420	410	410	170	170	170	620	790	920	920	5,000
	2023 (3rd year)			420	410	410	170	170	170	620	790	920	920	5,000
	2024 (4th year)			420	410	410	170	170	170	620	790	920	920	5,000
	2025 (5th year)			420	410	410	170	170	170	620	790	920	920	5,000
Source 9: [l]		Yuba Water Accord Dry Year Purchase Program - Dry Year Supply Augmentation												
2020 Actual use of supply							260							260
Normal Year														0
Single Dry Year							325	350	325					1,000
Multi-Year Drought	2021 (1st year)						325	350	325					1,000
	2022 (2nd year)						325	350	325					1,000
	2023 (3rd year)						325	350	325					1,000
	2024 (4th year)						325	350	325					1,000
	2025 (5th year)						325	350	325					1,000
Source 10: [m]		Castaic Flex Storage - Dry Year Supply Augmentation												
2020 Actual use of supply														0
Normal Year														0
Single Dry Year					1,010	1,010	1,010	1,010	1,010	1,010				6,060
Multi-Year Drought	2021 (1st year)				1,010	1,010	1,010	1,010	1,010	780	20	210		6,060
	2022 (2nd year)				1,010	1,010	1,010	1,010	1,010	1,010				6,060
	2023 (3rd year)			400	1,030	2,000	1,010	1,010	330			280		6,060
	2024 (4th year)				1,010	1,010	1,010	1,010	1,010	1,010				6,060
	2025 (5th year)				1,010	1,010	1,010	1,010	1,010	1,010				6,060
Source 11: [n]		Nickel Water (base supply)												
2020 Actual use of supply														0
Normal Year														0
Single Dry Year														0
Multi-Year Drought	2021 (1st year)													0
	2022 (2nd year)													0
	2023 (3rd year)													0
	2024 (4th year)													0
	2025 (5th year)													0

Source 12: [o]		Newhall Land Semitropic Banking Water Purchase - Dry Year Supply Augmentation												
2020 Actual use of supply														0
Normal Year														0
Single Dry Year														0
Multi-Year Drought	2021 (1st year)													0
	2022 (2nd year)													0
	2023 (3rd year)													0
	2024 (4th year)													0
	2025 (5th year)													0
Source 13: [p]		Water Exchange Program Return Water - Dry Year Supply Augmentation (RRB, WKWD, AVEK -2020)(AVEK, UWCD - 2021-2025)												
2020 Actual use of supply			1,450	1,880	1,980	1,950	1,800	2,480	3,130	1,650				16,320
Normal Year														0
Single Dry Year														0
Multi-Year Drought	2021 (1st year)													0
	2022 (2nd year)													0
	2023 (3rd year)													0
	2024 (4th year)													0
	2025 (5th year)													0

Notes:

(a) Actual monthly water use for 2020.

(b) Average or Normal year assumes total of 58% SWP delivery of Table A referenced in DWR's 2019 DCR, plus other base supplies available in 2021.

(c) The single dry year assumes 2021 supply and demands. Single Dry Year assumes total of 5% SWP delivery of Table A and all base and augmentation supplies available in 2021 (DWR's 2019 DCR states 2014 was the worst single dry year on record).

(d) Consecutive Dry Year Assessment assumes 1988-1992 hydrology (driest consecutive five years on record) from 2021-2025. SWP supplies delivery reference from DWR's 2019 DCR. The quantities of groundwater extracted by existing or future and recovered well capacity will vary depending on operating conditions. Schedule for recovered well capacity based on Groundwater Treatement Implementation Plan Technical Memorandum, Kennedy Jenks 2021 in UWMP Appendix M also Table 4-8 B, 4-8 C, 4-9 B and 4-9 C in UWMP Appendix E. However, overall pumping remains within the groundwater basin yields per the 2020 SCV-GSA Draft Water Budget Development Tech Memo (GSI 2020) and the updated Basin Yield Analysis(LSC & GSI 2009).

(e) SWP supplies are a base year supply. Delivery references from DWR's 2019 DCR.

(f) The quantities of groundwater extracted by existing or future and recovered well capacity will vary depending on operating conditions. Schedule for recovered well capacity based on Groundwater Treatement Implementation Plan Technical Memorandum, Kennedy Jenks 2021 in UWMP Appendix M also Table 4-8 B and 4-8 C in UWMP Appendix E. However, overall pumping remains within the groundwater basin yields per the 2020 SCV-GSA Draft Water Budget Development Tech Memo (GSI 2020) and the updated Basin Yield Analysis(LSC & GSI 2009). Alluvial groundwater is assumed to be a base supply.

(g) The quantities of groundwater extracted by existing or future and recovered well capacity will vary depending on operating conditions. Schedule for recovered well capacity based on Groundwater Treatement Implementation Plan Technical Memorandum, Kennedy Jenks 2021 in UWMP Appendix M also Table 4-9 B and 4-9 C in UWMP Appendix E. However, overall pumping remains within the groundwater basin yields per the 2020 SCV-GSA Draft Water Budget Development Tech Memo (GSI 2020) and the updated Basin Yield Analysis(LSC & GSI 2009). Saugus groundwater is assumed to be a base supply.

(h) Existing recycled Water is based on current average annual use. This supply includes existing and planned recycled water. Recycled water is assumed to be a base supply.

(i) Buena Vista Rosedale-Rio Bravo water supply is assumed to be a base supply.

(j) SWP carryover (Article 56) supplies is based on actual total available for SCV Water in 2021. This is assumed to be a base supply for 2021 only.

(k) Supplies shown are annual amounts that can be withdrawn using existing firm withdrawal capacity and would typically be used only during dry years, therefore assumed to be a dry year augmentation supply.

(l) Supply shown is amount available in dry periods, after delivery losses. This supply would typically be used only during dry years and is available through 2025. This supply is assumed to be a dry year augmentation supply.

(m) Includes both SCV Water and Ventura County entities flexible storage accounts. Extended term of agreement with Ventura County entities expires after 2025. This supply is utilized in emergencies and in dry years and therefore assumed to be a dry year augmentation supply.

(n) Existing Newhall Land supply committed under approved Newhall Ranch Specific Plan. Water is available from 2021 -2034 to meet supply shortfalls associated with the Newhall Ranch Specific Plan. Assumed to be transferred to SCV Water once Newhall Ranch development is completed around 2035.

(o) Existing Newhall Land supply. Assumed to be transferred to SCV Water during Newhall Ranch development by 2035.

(p) 2020 supplies represent actual totals recovered from the combination of multiple exchange programs. Future exchange program use represents the combination of two exchange programs and would typically be recovered only during dry years with SWP allocation greater than 30%.

5-year Drought Risk Assessment Tool (potable and non-potable)

	= auto calculated	
	= From prior tables	

5-year Drought Risk Assessment Tables to address Water Code Section 10635(b)[(a)]

2021	M1	M2	M3	M4	M5	M6	M7	M8	M9	M10	M11	M12	**Total** *Can use this column to populate Table 7-5*
Total Water Use [Use Worksheet]	3,800	3,420	4,150	5,200	6,610	7,380	8,440	8,510	7,520	6,330	4,990	3,940	70,290
Total Supplies [Supply Worksheet]	4,310	4,250	4,990	5,410	6,830	8,220	7,180	6,830	5,630	4,190	3,100	2,860	63,800
Surplus/Shortfall w/o WSCP Action	510	830	840	210	220	840	-1,260	-1,680	-1,890	-2,140	-1,890	-1,080	-6,490
Planned WSCP Actions (use reduction and supply augmentation)													
WSCP - Supply Augmentation	0	1000	1420	1410	2420	2180	2505	2530	2955	2570	1940	1130	22060
WSCP - use reduction savings benefit													0
Revised Surplus/(shortfall)	510	1,830	2,260	1,620	2,640	3,020	1,245	850	1,065	430	50	50	15,570
Resulting % Use Reduction from WSCP action	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%

2022	M1	M2	M3	M4	M5	M6	M7	M8	M9	M10	M11	M12	Total
Total Water Use [Use Worksheet]	4,020	3,620	4,410	5,500	6,990	7,810	8,930	9,000	7,960	6,690	5,280	4,170	74,380
Total Supplies [Supply Worksheet]	5,210	4,800	6,690	8,050	9,590	10,440	11,680	11,860	10,690	9,240	7,510	6,400	102,160
Surplus/Shortfall w/o WSCP Action	1,190	1,180	2,280	2,550	2,600	2,630	2,750	2,860	2,730	2,550	2,230	2,230	27,780
Planned WSCP Actions (use reduction and supply augmentation)													
WSCP - supply augmentation benefit	0	1000	1420	1410	2420	2180	2505	2530	2955	2800	1920	920	22060
WSCP - use reduction savings benefit													0
Revised Surplus/(shortfall)	1,190	2,180	3,700	3,960	5,020	4,810	5,255	5,390	5,685	5,350	4,150	3,150	49,840
Resulting % Use Reduction from WSCP action	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%

2023	M1	M2	M3	M4	M5	M6	M7	M8	M9	M10	M11	M12	Total
Total Water Use [Use Worksheet]	4,150	3,750	4,550	5,680	7,220	8,060	9,220	9,290	8,220	6,910	5,450	4,300	76,800
Total Supplies [Supply Worksheet]	4,230	3,090	3,360	3,870	4,780	4,990	6,910	6,820	6,140	6,060	4,580	3,150	57,980
Surplus/Shortfall w/o WSCP Action	80	-660	-1,190	-1,810	-2,440	-3,070	-2,310	-2,470	-2,080	-850	-870	-1,150	-18,820
Planned WSCP Actions (use reduction and supply augmentation)													
WSCP - supply augmentation benefit	0	1000	1420	1810	2440	3170	2505	2530	2275	1790	1920	1200	22060
WSCP - use reduction savings benefit													0
Revised Surplus/(shortfall)	80	340	230	0	0	100	195	60	195	940	1,050	50	3,240
Resulting % Use Reduction from WSCP action	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%

2024	M1	M2	M3	M4	M5	M6	M7	M8	M9	M10	M11	M12	Total
Total Water Use [Use Worksheet]	4,060	3,660	4,460	5,560	7,070	7,890	9,020	9,100	8,050	6,770	5,340	4,210	75,190
Total Supplies [Supply Worksheet]	4,190	3,660	5,230	6,210	7,180	7,720	8,560	8,730	7,940	6,940	5,670	4,660	76,690
Surplus/Shortfall w/o WSCP Action	130	0	770	650	110	-170	-460	-370	-110	170	330	450	1,500
Planned WSCP Actions (use reduction and supply augmentation)													
WSCP - supply augmentation benefit	0	1000	1420	1410	2420	2180	2505	2530	2955	2800	1920	920	22060
WSCP - use reduction savings benefit													0
Revised Surplus/(shortfall)	130	1,000	2,190	2,060	2,530	2,010	2,045	2,160	2,845	2,970	2,250	1,370	23,560
Resulting % Use Reduction from WSCP action	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%

2025	M1	M2	M3	M4	M5	M6	M7	M8	M9	M10	M11	M12	Total
Total Water Use [Use Worksheet]	4,210	3,790	4,620	5,770	7,320	8,180	9,350	9,430	8,340	7,010	5,530	4,360	77,910
Total Supplies [Supply Worksheet]	4,580	3,480	4,320	5,430	6,880	8,200	9,410	9,460	8,370	7,000	5,520	4,070	76,720
Surplus/Shortfall w/o WSCP Action	370	-310	-300	-340	-440	20	60	30	30	-10	-10	-290	-1,190
Planned WSCP Actions (use reduction and supply augmentation)													
WSCP - supply augmentation benefit	0	1000	1420	1410	2420	2180	2505	2530	2955	2800	1920	920	22060
WSCP - use reduction savings benefit													0
Revised Surplus/(shortfall)	370	690	1,120	1,070	1,980	2,200	2,565	2,560	2,985	2,790	1,910	630	20,870
Resulting % Use Reduction from WSCP action	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%

Notes:

(a) Summary of supply worksheet details represented in each year 2021-2025.

TABLE 4-7 B
ACTIVE MUNICIPAL GROUNDWATER SOURCE CAPACITY — EXISTING , FUTURE, AND RECOVERED ALLUVIAL AQUIFER WELLS[a] NORMAL YEAR DETAIL (2021-2030)

Well	Permitted Capacity (gpm)	Max. Annual Capacity (AF)	Normal Year (AF)[b] 2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Existing Wells[c]												
Castaic 1	640	1,030	430	430	430	430	430	430	430	430	430	430
Castaic 2	500	810	220	220	220	220	220	220	220	220	220	220
Castaic 4	330	530	-	-	-	-	-	-	-	-	-	-
Castaic 6	600	970	-	-	-	-	-	-	-	-	-	-
Castaic 7	2,000	3,230	580	580	580	580	580	580	580	580	580	580
Pinetree 3	550	890	310	310	310	310	310	310	310	310	310	310
Pinetree 4	500	810	-	-	-	-	-	-	-	-	-	-
Guida	1,000	1,610	560	560	560	560	560	560	560	560	560	560
Lost Canyon 2[d]	800	1,290	410	410	410	410	410	410	410	410	410	410
Lost Canyon 2A[d]	1,000	1,610	420	420	420	420	420	420	420	420	420	420
N. Oaks West	750	1,210	-	-	-	-	-	-	-	-	-	-
Sand Canyon	1,200	1,940	730	730	730	730	730	730	730	730	730	730
Well E-15[d]	1,400	2,260	1,680	1,680	1,680	1,680	1,680	1,680	1,680	1,680	1,600	1,600
Well W9	800	1,290	1,030	1,030	1,030	1,030	1,030	1,030	1,030	1,030	1,010	1,010
Well W11	1,000	1,610	1,240	1,240	1,240	1,240	1,240	1,240	1,180	1,180	1,180	1,180
Well E-17[d]	1,200	1,940	1,290	1,290	1,290	1,290	1,290	1,290	1,290	1,290	730	730
Existing Subtotal	*14,270*	*23,030*	*8,900*	*8,900*	*8,900*	*8,900*	*8,900*	*8,900*	*8,840*	*8,840*	*8,180*	*8,180*
Future[e] and Recovered Wells												
Pinetree 1[f]	300	480	-	-	-	-	-	-	-	-	-	190
Pinetree 5[f]	500	810	-	-	-	-	-	-	-	-	-	200
Clark[f]	550	890	-	-	-	-	-	-	-	-	-	380
Honby[f]	950	1,530	-	-	760	760	760	760	760	760	760	760
Mitchell 5B[f]	1,000	1,610	-	-	-	-	-	-	-	-	-	200
N. Oaks Central[f]	1,200	1,940	-	-	-	-	-	-	-	-	-	500
N. Oaks East[f]	950	1,530	-	-	-	-	-	-	-	-	-	500
Santa Clara[f]	1,500	2,420	-	-	1,010	1,010	1,010	1,010	1,010	1,010	1,010	1,010
Sierra[f]	1,000	1,610	-	-	-	-	-	-	-	-	-	400
Valley Center[f]	1,200	1,940	-	1,190	1,190	1,030	1,030	1,030	1,030	1,030	1,030	1,030
Well D[f]	1,050	1,690	-	-	-	-	-	-	-	1,210	1,210	1,210
Well N[f]	1,250	2,020	980	870	870	630	630	630	630	630	630	630

Well	Permitted Capacity (gpm)	Max. Annual Capacity (AF)	Normal Year (AF)[b]									
			2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Well N7[f]	2,500	4,040	2,600	2,180	2,180	1,470	1,470	1,470	1,470	1,470	1,470	1,470
Well N8[f]	2,500	4,040	2,600	2,180	2,180	1,430	1,430	1,430	1,430	1,430	1,430	1,430
Well Q2[g]	1,200	1,940	-	940	940	770	770	770	770	770	770	770
Well S6[f]	2,000	3,230	-	-	-	640	640	640	640	640	640	640
Well S7[f]	2,000	3,230	-	-	-	620	620	620	620	620	620	620
Well S8[f]	2,000	3,230	-	-	-	610	610	610	610	610	610	610
Well T7[f]	1,200	1,940	-	-	-	750	750	750	750	750	750	750
Well U4[f]	1,000	1,610	-	-	-	700	700	700	700	700	700	700
Well U6[f]	1,250	2,020	-	-	-	800	800	800	800	800	800	840
Well W10[f]	1,500	2,420	-	-	-	-	-	-	1,650	1,650	1,650	1,650
Well E-14[h]	1,200	1,940	-	-	-		740	740	740	740	740	740
Well E-16[h]	1,200	1,940	-	-	-		250	650	650	650	650	650
Well G-45[h]	1,200	1,940	-	-	-	-	-	-	-	-	1,670	1,670
Well C-11[h]	2,000	3,230	-	-	-	-	-	-	-	-	-	-
Well C-12[h]	2,000	3,230	-	-	-	-	-	-	-	-	-	-
S9 (Mitchell 5A Replacement)[h]	1,000	1,610	-	-	-	320	320	320	320	320	320	320
Future Subtotal	*37,200*	*60,060*	*6,180*	*7,360*	*9,130*	*11,540*	*12,530*	*12,930*	*14,580*	*15,790*	*17,460*	*19,870*
Total	**51,470**	**83,090**	**15,080**	**16,260**	**18,030**	**20,440**	**21,430**	**21,830**	**23,420**	**24,630**	**25,640**	**28,050**

Notes:

(a) The quantities of groundwater extracted by existing or future and recovered well capacity will vary depending on operating conditions. However, overall pumping remains within the groundwater basin yields per the 2020 SCV-GSA Draft Water Budget Development Tech Memo (GSI 2020) and the updated Basin Yield Analysis (LSC & GSI 2009).

(b) Schedule for recovered well capacity based on Groundwater Treatment Implementation Plan Technical Memorandum, Kennedy Jenks 2021 in Appendix M.

(c) Existing Category include all wells currently online and in use.

(d) E wells and Lost Canyon have not come below the RL so are not impacted wells but are anticipated to be connected into central treatment systems.

(e) Future Category includes all wells restored from PFAS and Perchlorate water quality issues, and other future alluvial wells including those associated with development under the Newhall Ranch Specific Plan.

(f) PFAS impacted well.

(g) Perchlorate impacted well.

(h) Future wells.

TABLE 4-7 C
ACTIVE MUNICIPAL GROUNDWATER SOURCE CAPACITY — EXISTING , FUTURE, AND RECOVERED ALLUVIAL AQUIFER WELLS[a]
DRY YEAR DETAIL (2021-2030)

Well	Permitted Capacity (gpm)	Max. Annual Capacity (AF)	Dry Year (AF)[b] 2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Existing Wells[c]												
Castaic 1	640	1,030	420	420	420	420	420	420	420	420	420	420
Castaic 2	500	810	220	220	220	220	220	220	220	220	220	220
Castaic 4	330	530	-	-	-	-	-	-	-	-	-	-
Castaic 6	600	970	-	-	-	-	-	-	-	-	-	-
Castaic 7	2,000	3,230	730	730	730	730	730	730	730	730	730	730
Pinetree 3	550	890	0	0	0	0	0	0	0	0	0	0
Pinetree 4	500	810	-	-	-	-	-	-	-	-	-	-
Guida	1,000	1,610	560	560	560	560	560	560	560	560	560	560
Lost Canyon 2[d]	800	1,290	250	250	250	250	250	250	250	250	250	250
Lost Canyon 2A[d]	1,000	1,610	160	160	160	160	160	160	160	160	160	160
N. Oaks West	750	1,210	-	-	-	-	-	-	-	-	-	-
Sand Canyon	1,200	1,940	310	310	310	310	310	310	310	310	310	310
Well E-15[d]	1,400	2,260	1,440	1,440	1,440	1,440	1,440	1,440	1,440	1,440	1,440	1,360
Well W9	800	1,290	940	940	940	940	940	940	940	940	940	700
Well W11	1,000	1,610	1,210	1,210	1,210	1,210	1,210	1,210	1,210	1,210	1,210	1,000
Well E-17[d]	1,200	1,940	1,060	1,060	1,060	1,060	1,060	1,060	1,060	1,060	1,060	620
Existing Subtotal	*14,270*	*23,030*	7,300	7,300	7,300	7,300	7,300	7,300	7,300	7,300	7,300	6,330
Future[e] and Recovered Wells												
Pinetree 1[f]	300	480	-	-	-	-	-	-	-	-	-	0
Pinetree 5[f]	500	810	-	-	-	-	-	-	-	-	-	0
Clark[f]	550	890	-	-	-	-	-	-	-	-	-	270
Honby[f]	950	1,530	-	-	110	110	110	110	110	110	110	110
Mitchell 5B[f]	1,000	1,610	-	-	-	-	-	-	-	-	-	60
N. Oaks Central[f]	1,200	1,940	-	-	-	-	-	-	-	-	-	340
N. Oaks East[f]	950	1,530	-	-	-	-	-	-	-	-	-	220
Santa Clara[f]	1,500	2,420	-	-	250	250	250	250	250	250	250	250
Sierra[f]	1,000	1,610	-	-	-	-	-	-	-	-	-	60
Valley Center[f]	1,200	1,940	-	800	800	610	610	610	610	610	610	610
Well D[f]	1,050	1,690	-	-	-	-	-	-	-	920	920	920
Well N[f]	1,250	2,020	1,060	1,060	1,060	1,060	1,060	1,060	1,060	1,060	1,060	1,060

Well	Permitted Capacity (gpm)	Max. Annual Capacity (AF)	Dry Year (AF)[b] 2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Well N7[f]	2,500	4,040	2,310	2,310	2,310	1,680	1,680	1,680	1,680	1,680	1,680	1,680
Well N8[f]	2,500	4,040	2,310	2,310	2,310	1,680	1,680	1,680	1,680	1,680	1,680	1,680
Well Q2[g]	1,200	1,940	-	1,110	1,110	850	850	850	850	850	850	850
Well S6[f]	2,000	3,230	-	-	-	2,080	2,080	2,080	2,080	2,080	2,080	2,080
Well S7[f]	2,000	3,230	-	-	-	780	780	780	780	780	780	780
Well S8[f]	2,000	3,230	-	-	-	760	760	760	760	760	760	760
Well T7[f]	1,200	1,940	-	-	-	360	360	360	360	360	360	360
Well U4[f]	1,000	1,610	-	-	-	570	570	570	570	570	570	570
Well U6[f]	1,250	2,020	-	-	-	660	660	660	660	660	660	660
Well W10[f]	1,500	2,420	-	-	-	-	-	-	1,030	1,030	1,030	1,490
Well E-14[h]	1,200	1,940	-	-	-		620	620	620	620	620	620
Well E-16[h]	1,200	1,940	-	-	-		580	580	580	580	580	580
Well G-45[h]	1,200	1,940	-	-	-	-					650	690
Well C-11[h]	2,000	3,230	-	-	-	-	-	-	-	-	-	-
Well C-12[h]	2,000	3,230	-	-	-	-	-	-	-	-	-	-
S9 (Mitchell 5A Replacement)[h]	1,000	1,610	-	-	-	320	320	320	320	320	320	320
Future Subtotal	*37,200*	*60,060*	*5,680*	*7,590*	*7,950*	*11,770*	*12,970*	*12,970*	*14,000*	*14,920*	*15,570*	*17,020*
Total	**51,470**	**83,090**	**12,980**	**14,890**	**15,250**	**19,070**	**20,270**	**20,270**	**21,300**	**22,220**	**22,870**	**23,350**

Notes:

(a) The quantities of groundwater extracted by existing or future and recovered well capacity will vary depending on operating conditions. However, overall pumping remains within the groundwater basin yields per the 2020 SCV-GSA Draft Water Budget Development Tech Memo (GSI 2020) and the updated Basin Yield Analysis (LSC & GSI 2009).

(b) Dry-year production represents anticipated maximum dry year production. Schedule for recovered well capacity based on Groundwater Treatment Implementation Plan Technical Memorandum, Kennedy Jenks 2021 in Appendix M.

(c) Existing Category include all wells currently online and in use.

(d) E wells and Lost Canyon have not come below the RL so are not impacted wells but are anticipated to be connected into central treatment systems.

(e) Future Category includes all wells restored from PFAS and Perchlorate water quality issues, and other future alluvial wells including those associated with development under the Newhall Ranch Specific Plan.

(f) PFAS impacted well.

(g) Perchlorate impacted well.

(h) Future wells.

TABLE 4-8 B
MUNICIPAL GROUNDWATER SOURCE CAPACITY- EXISTING, FUTURE, AND RECOVERED SAUGUS FORMATION WELLS[a]
NORMAL YEAR DETAIL (2021-2030)

Well	Permitted Capacity (gpm)	Max. Annual Capacity (AF)	Normal Year[b] 2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Existing Wells[c]												
LACWWD36[d]												
Palmer	2,000	3,220	500	500	500	500	500	500	500	500	500	500
SCV Water												
12[i]	2,500	4,030	2,220	2,220	2,220	2,220	2,220	530	530	530	530	530
13	2,500	4,030	2,280	2,280	2,280	2,280	2,280	540	540	540	540	540
160	2,000	3,230	-	-	-	-	-	-	-	-	-	-
201[e]	2,000	3,230	-	2,580	2,580	2,580	2,580	2,480	2,420	2,420	2,420	2,420
206	2,500	4,030	2,830	2,830	2,830	2,020	2,020	200	200	200	200	180
207	2,500	4,030	2,860	2,860	2,860	2,040	2,040	180	180	180	180	140
Saugus 1	1,100	1,770	1,450	1,450	1,450	1,450	1,450	1,450	1,450	1,450	1,450	1,450
Saugus 2	1,100	1,770	1,350	1,350	1,350	1,350	1,350	1,350	1,350	1,350	1,350	1,350
SCV Water Subtotal	*16,200*	*26,120*	*12,990*	*15,570*	*15,570*	*13,940*	*13,940*	*6,730*	*6,670*	*6,670*	*6,670*	*6,610*
Existing Purveyor Subtotal	*18,200*	*29,340*	*13,490*	*16,070*	*16,070*	*14,440*	*14,440*	*7,230*	*7,170*	*7,170*	*7,170*	*7,110*
Future[f] and Recovered Wells												
205[g]	2,700	4,360	-	-	-	3,010	2,610	2,610	2,610	2,610	2,610	2,610
Saugus 3[h]	2,500	4,030	-	-	-	-	200	30	30	30	30	30
Saugus 4[h]	2,500	4,030	-	-	-	-	200	30	30	30	30	30
Saugus 5[h]	2,000	3,230	-	-	-	-	-	-	30	30	30	30
Saugus 6[h]	2,000	3,230	-	-	-	-	-	-	30	30	30	30
Saugus 7[h]	2,000	3,230	-	-	-	-	-	-	-	-	-	30
Saugus 8[h]	2,000	3,230	-	-	-	-	-	-	-	-	-	30
Future Subtotal	*15,700*	*25,340*	*0*	*0*	*0*	*3,010*	*3,010*	*2,670*	*2,730*	*2,730*	*2,730*	*2,790*
Total Purveyors	**33,900**	**54,680**	**13,490**	**16,070**	**16,070**	**17,450**	**17,450**	**9,900**	**9,900**	**9,900**	**9,900**	**9,900**

Notes:

(a) The quantities of groundwater extracted by existing or future and recovered well capacity will vary depending on operating conditions. However, overall pumping remains within the groundwater basin yields per the 2020 SCV-GSA Draft Water Budget Development Tech Memo (GSI 2020) and the updated Basin Yield Analysis(LSC & GSI 2009).

(b) Schedule for recovered well capacity based on Groundwater Treatment Implementation Plan Technical Memorandum, Kennedy Jenks 2021 in Appendix M.

(c) Existing Category include all wells currently online and in use.

(d) LAWWD36 anticipated production for normal and dry-years.

(e) Well 201 is awaiting DDW permitting, returning to service in 2021.
(f) Future Category includes one well restored from Perchlorate water quality issues, and other future Saugus wells.
(g) Well 205 is impacted by Perchlorate and is expected to return to service in 2024.
(h) Future wells, Saugus 3 & 4, are planned replacement wells, Saugus 5-8 are new Dry Year wells. The new dry-year wells would not typically be operated during average/normal years.
(i) Permitted at 2,500 gpm but capacity was reduced to 2,000 gpm during last rehab.

TABLE 4-8 C
MUNICIPAL GROUNDWATER SOURCE CAPACITY- EXISTING, FUTURE, AND RECOVERED SAUGUS FORMATION WELLS[a]
DRY YEAR DETAIL (2021-2030)

Well	Permitted Capacity (gpm)	Max. Annual Capacity (AF)	Normal Year[b] 2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Existing Wells[c]												
LACWWD36[d]												
Palmer	2,000	3,220	1,250	1,250	1,250	1,250	1,250	1,250	1,250	1,250	1,250	1,250
SCV Water												
12[i]	2,500	4,030	2,280	2,280	2,280	2,280	2,280	2,280	2,280	2,280	2,280	2,280
13	2,500	4,030	2,280	2,280	2,280	2,280	2,280	2,280	2,280	2,280	2,280	2,280
160	2,000	3,230	680	680	680	680	680	680	680	680	680	680
201[e]	2,000	3,230	-	2,900	2,900	2,900	2,900	2,900	2,900	2,900	2,900	2,900
206	2,500	4,030	2,830	2,830	2,830	2,830	2,830	2,830	2,830	2,830	2,830	2,830
207	2,500	4,030	2,860	2,860	2,860	2,860	2,860	2,860	2,860	2,860	2,860	2,860
Saugus 1	1,100	1,770	1,450	1,450	1,450	1,450	1,450	1,450	1,450	1,450	1,450	1,450
Saugus 2	1,100	1,770	1,350	1,350	1,350	1,350	1,350	1,350	1,350	1,350	1,350	1,350
SCV Water Subtotal	*16,200*	*26,120*	*13,730*	*16,630*	*16,630*	*16,630*	*16,630*	*16,630*	*16,630*	*16,630*	*16,630*	*16,630*
Existing Purveyor Subtotal	*18,200*	*29,340*	*14,980*	*17,880*	*17,880*	*17,880*	*17,880*	*17,880*	*17,880*	*17,880*	*17,880*	*17,880*
Future[f] and Recovered Wells												
205[g]	2,700	4,360	-	-	-	3,050	3,050	3,050	3,050	3,050	3,050	2,920
Saugus 3[h]	2,500	4,030	-	-	-	-	3,020	3,020	2,620	2,620	2,620	2,620
Saugus 4[h]	2,500	4,030	-	-	-	-	3,020	3,020	2,620	2,620	2,620	2,620
Saugus 5[h]	2,000	3,230	-	-	-	-	-	-	2,420	2,420	2,420	1,940
Saugus 6[h]	2,000	3,230	-	-	-	-	-	-	2,420	2,420	2,420	1,940
Saugus 7[h]	2,000	3,230	-	-	-	-	-	-	-	-	-	1,940
Saugus 8[h]	2,000	3,230	-	-	-	-	-	-	-	-	-	1,940
Future Subtotal	*15,700*	*25,340*	*0*	*0*	*0*	*3,050*	*9,090*	*9,090*	*13,130*	*13,130*	*13,130*	*15,920*
Total Purveyors	**33,900**	**54,680**	**14,980**	**17,880**	**17,880**	**20,930**	**26,970**	**26,970**	**31,010**	**31,010**	**31,010**	**33,800**

Notes:

(a) The quantities of groundwater extracted by existing or future and recovered well capacity will vary depending on operating conditions. However, overall pumping remains within the groundwater basin yields per the 2020 SCV-GSA Draft Water Budget Development Tech Memo (GSI 2020) and the updated Basin Yield Analysis(LSC & GSI 2009).

(b) Dry-year production represents anticipated maximum dry year production. Schedule for recovered well capacity based on Groundwater Treatment Implementation Plan Technical Memorandum, Kennedy Jenks 2021 in Appendix M.

(c) Existing Category include all wells currently online and in use.

(d) LAWWD36 anticipated production for normal and dry-years.
(e) Well 201 is awaiting DDW permitting, returning to service in 2021.
(f) Future Category includes one well restored from Perchlorate water quality issues, and other future Saugus wells.
(g) Well 205 is impacted by Perchlorate and is expected to return to service in 2024.
(h) Future wells, Saugus 3 & 4, are planned replacement wells, Saugus 5-8 are new Dry Year wells. The new dry-year wells would not typically be operated during average/normal years.
(i) Permitted at 2,500 gpm but capacity was reduced to 2,000 gpm during last rehab.

TABLE 7-5 C FIVE-YEAR DROUGHT RISK ASSESSMENT (AF)
(2021 Represents Actual Conditions)

	2021	2022	2023	2024	2025
Existing Supplies					
Existing Groundwater[a]					
Alluvial Aquifer	7,300	8,900	7,300	7,300	7,300
Saugus Formation	14,980	16,500	17,880	17,880	17,880
Total Groundwater	**22,280**	**25,400**	**25,180**	**25,180**	**25,180**
Recycled Water[b]					
Total Recycled	**450**	**450**	**450**	**450**	**450**
Imported Water					
State Water Project[c]	4,760	57,120	12,380	23,800	16,180
State Water Project Carryover Supply[d]	13,500	0	0	0	0
Flexible Storage Accounts[e]	6,060	6,060	6,060	6,060	6,060
Buena Vista-Rosedale	11,000	11,000	11,000	11,000	11,000
Nickel Water - Newhall Land[f]	0	0	0	0	0
Yuba Accord Water[g]	1,000	1,000	1,000	1,000	1,000
Total Imported	**36,320**	**75,180**	**30,440**	**41,860**	**34,240**
Existing Banking and Exchange Programs					
Rosedale Rio-Bravo Bank[h]	10,000	10,000	10,000	10,000	10,000
Semitropic Bank[h]	5,000	5,000	5,000	5,000	5,000
Semitropic – Newhall Land Bank[h][i]	0	0	0	0	0
Exchange Programs[j]	-	-	-	-	-
Total Bank/Exchange	**15,000**	**15,000**	**15,000**	**15,000**	**15,000**
Total Existing Supplies	**74,050**	**116,030**	**71,070**	**82,490**	**74,870**
Planned Supplies					
Future and Recovered Groundwater[k]					
Alluvial Aquifer[l]	5,680	7,360	7,950	11,770	12,970
Saugus Formation[m]	-	-	-	3,050	9,090
Total Future Recovered Groundwater	**5,680**	**7,360**	**7,950**	**14,820**	**22,060**
Future Recycled Water[n]					
Total Future Recycled Water	**420**	**830**	**1010**	**1440**	**1850**
Planned Banking Programs					
Rosedale Rio-Bravo Bank[o]	-	-	-	-	-
Total Planned Banking	**0**	**0**	**0**	**0**	**0**
Total Planned Supplies	**6,100**	**8,190**	**8,960**	**16,260**	**23,910**
Total Existing and Planned Supplies[q]	**80,150**	**124,220**	**80,030**	**98,750**	**98,780**
Total Base Supplies	**58,090**	**102,160**	**57,970**	**76,690**	**76,720**
Total Dry Year Augmentation Supplies	**22,060**	**22,060**	**22,060**	**22,060**	**22,060**
Demands with Passive and Active Conservation[p][q]	**74,020**	**74,380**	**76,800**	**75,190**	**77,910**

Notes:

(a) Existing groundwater supplies represent the quantity of groundwater available to be pumped with existing wells. Declines from 2025 pumping levels reflect transfer of normal year pumping from existing wells to future and recovered wells.
(b) Existing recycled water is current average annual use.
(c) SWP supplies assume 2021 hydrology for the first year and 1989-1992 hydrology (1988-1992 driest consecutive five years on record) from 2022-2025. Delivery reference from DWR's 2019 DCR.
(d) SWP carryover (Article 56) supplies are actual total for SCV Water in 2021.
(e) Includes both SCV Water and Ventura County entities flexible storage accounts. Extended term of agreement with Ventura County entities expires after 2025.
(f) Existing Newhall Land supply committed under approved Newhall Ranch Specific Plan. Water is available from 2021 -2034 to meet supply shortfalls associated with the Newhall Ranch Specific Plan. Assumed to be transferred to SCV Water once Newhall Ranch development is completed around 2035.
(g) Supply shown is amount available in dry periods, after delivery losses. This supply would typically be used only during dry years and is available through 2025.
(h) Supplies shown are annual amounts that can be withdrawn using existing firm withdrawal capacity and would typically be used only during dry years.
(i) Existing Newhall Land supply. Assumed to be transferred to SCV Water during Newhall Ranch development by 2035.
(j) Supplies shown are totals recoverable under the exchange and would typically be recovered only during dry years with SWP allocation greater than 30%.
(k) Future and Recovered groundwater supplies include recovered impacted wells and new groundwater well capacity that may be required by SCV Water's production objectives in the Alluvial Aquifer and the Saugus Formation. When combined with existing Agency and non-Agency groundwater supplies, total groundwater production remains within the sustainable ranges identified in Tables 4-10 and 4-11 and is within the groundwater basin yields per the 2020 SCV-GSA Draft Water Budget Development Tech Memo(GSI 2020) and the updated Basin Yield Analysis(LSC & GSI 2009).
(l) Future Category includes all wells restored from PFAS and Perchlorate water quality issues, and other future alluvial wells including those associated with development under the Newhall Ranch Specific Plan.
(m) Future and Recovered Saugus wells include perchlorate-impacted Well 205, two replacement wells (Saugus 3 & 4), and up to four new wells (Saugus 5-8) planned to provide additional dry-year supply. New dry-year wells would not typically be operated during average/normal years.
(n) Planned recycled Water is the total projected recycled Water use from Table 5-3 less existing use. Projections reflect demands that can be cost-effectively served with projected supplies. Refer to Section 5 for additional details on recycled Water demands and supplies.
(o) Firm withdrawal capacity under existing Rosedale Rio-Bravo Banking Program to be expanded by 10,000 AFY by 2030 (for a combined total of 20,000 AFY).
(p) For completeness, LAWWD36 sales are included in demands and supplies. Breakdown of LACWWD 36 and SCV Water Demands are shown in Table 2-10. Further, LACWWD 36's Saugus groundwater supplies shown in Table 4-8A.
(q) Demands are weather adjusted for dry 1988-1992 hydrology. 2021 demands in this scenario are adjusted assuming Single Dry-Year hydrology (increased by 6%).

Appendix F: Population and Demand Technical Memorandum (Maddaus)

DRAFT Technical Memorandum

Date: April 19, 2021

To: Dirk Marks and Rick Vasilopulos, Santa Clarita Valley Water Agency

From: Lisa Maddaus, Maddaus Water Management Inc.
Anil Bamezai, Western Policy Research

Title: DRAFT 2021 SCV Demand Study: Land-Use-Based Demand Forecast Analysis

1. INTRODUCTION

This Demand Study (Study) provides projected demands for the area served by Santa Clarita Valley Water Agency (SCV Water). The purpose of this Technical Memorandum (TM) is to document and present the demand projections for the Santa Clarita Valley, which include the following:

1. Demand projection methodologies
2. Data inputs used in the analysis
3. Demand analysis results including updated Santa Clarita Valley demand projections through buildout (2050)
4. Climate change factors based on similar assumptions used in the Groundwater Sustainability Plan (GSP)
5. Demand analysis results including passive savings[1] and current active conservation program implementation savings[2] through buildout.

2. BACKGROUND

Since the last demand forecast was prepared and finalized in the March 2016 Demand Study,[3] Santa Clarita Valley Water Agency was created on January 1, 2018 by an act of the State Legislature (SB 634) through the merger of several public water agencies in the Santa Clarita Valley. The merger included Castaic Lake Water Agency (CLWA) and three of its four previous water retailers: Santa Clarita Water Division (SCWD), Newhall County Water District (NCWD) and the Valencia Water Company (VWC). The CLWA was originally formed as a wholesale water agency to acquire, treat, and deliver State Water Project water supply throughout the Santa Clarita Valley. SCV Water also provides wholesale water to Los Angeles County Waterworks District #36 (LACWD) Val Verde System. There has been a long history of detailed analyses of water demand and conservation

[1] Passive savings are water use savings due to plumbing codes.

[2] Active savings are water use savings due to SCV Water's Water Use Efficiency Program activities.

[3] CLWA (now SCV Water) Updated Final Technical Memorandum #2 – SCV Demand Study Update: Land-Use Based Demand Forecast Analysis, dated March 3, 2016.

programs in the former CLWA, performed for each of the retailer water agency service areas. This demand analysis served as the basis for the now merged SCV Water service area and sales to LACWD.

This study was commissioned by SCV Water and conducted by Maddaus Water Management, Inc. (MWM) and Western Policy Research (WPR). Several past planning efforts were leveraged for the execution of this analysis. As a result, some past modeling efforts and documentation refer to the former agency naming conventions and, in this document, former "service areas" are now referenced as "Service Divisions."

This TM is provided to support the 2020 Urban Water Management Plan (UWMP). This TM is necessary to document revised and refined information since the 2015 UWMP, which required an update due to new information on future demand forecast. The most notable changes are the parameters for the West Side Communities Development Project (formerly called Newhall Ranch). The analysis contains the best information currently available related to historical water demands and planned future new development of the updated 2020 UWMP in compliance with the California Water Code associated with the Urban Water Management Planning Act to be completed and submitted to the Department of Water Resources (DWR) by July 1, 2021.

This TM presents the demand forecast for the SCV Water service area since the merger and accounts for its future growth. It is confined to the existing SCV Water's three Water Divisions service areas, LACWD, and the anticipated annexations into SCV Water. The summary information in this TM is provided for SCV Water; Appendix A and Appendix B present more details specific to future growth for SCV Water and LACWD, respectively.

All planned developments are consistent with the One Valley One Vision (OVOV)) General Plan.[4] There is some development in the regional OVOV plan that is outside these areas, and where appropriate some future, potential development has been included in these demand projections. The forecasts in this TM are based on planned detailed land use development in compilation with OVOV year 2050 buildout for the purposes of estimating water demand projections. A description of how the demand forecast incorporated information from the OVOV General Plan is presented in Appendix A.

Overall, a higher population projection is now associated with the land-use-based forecasts than the historical estimated projection reported in the 2015 UWMP. The updated 2050 valleywide buildout estimated total population is approximately 432,200, using current developed and undeveloped parcels in the existing SCV Water service area, LACWD, and proposed future annexations into the SCV Water service area. This includes unassigned dwelling units that are not associated with any planned development within the City of Santa Clarita and Los Angeles County. For comparison purposes, the projected demands and population that were reported in SCV's 2015 UWMP can be found in Appendix C.

3. DEMAND METHODOLOGY

This section presents the demand methodology used in this analysis. This demand analysis incorporates both potable and non-potable water demands while accounting for drought rebound, a partial continuation of work-at-home trends resulting from the current COVID-19 pandemic, the addition of accessory dwelling units not

[4] More information is available online: One Valley One Vision – Economic Development Division (santa-clarita.com). Reference details published in the OVOV General Plan.

previously planned for, climate change, and potential irrigation practice and device inefficiencies if development policies and/or enforcement protocols are not adopted by the appropriate agencies.

3.1 Summary of Approach

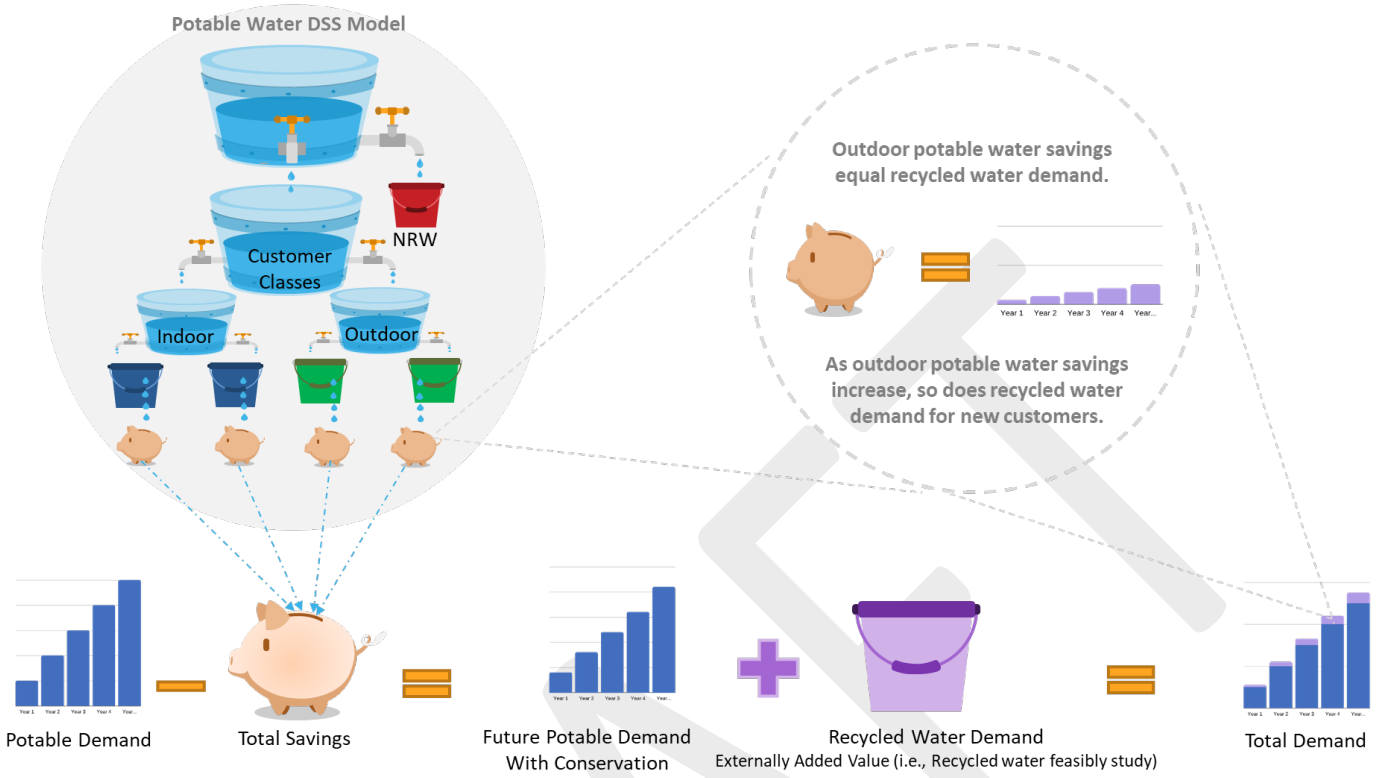
The valleywide demand forecast is a compilation of the following demands as presented in Figures 1 and 2:

1. **SCV Water:** A potable demand forecast determined from land-use-based estimates from 2020 through 2050 (buildout) for SCV Water's three Water Divisions: Newhall Water Division (NWD), Santa Clarita Water Division (SCWD), and Valencia Water Division (VWD). The land-use-based estimates were determined in a land use analysis that compiled data from planned development contracts and the OVOV General Plan.
2. **Los Angeles County Water District 36**: A population-based approach for potable demands using OVOV-based population estimates.
3. **Non-Potable Water**: Demand based on volume and schedule for non-potable use provided by SCV Water.

The potable demand projections for SCV Water and LACWD were developed using the Least Cost Planning Decision Support System Model (DSS Model) and incorporate econometric-based adjustments to better develop an accurate forecast through the year 2050. These adjustments include accounting for climate change, drought rebound, weather normalization, COVID-19 pandemic-prompted work-at-home trends, and overwatering/irrigation equipment efficiency degradation. A more detailed description of the adjustments can be found in Section 3.2.5, more details on the econometric modeling framework are in Appendix D, and climate change adjustment is presented in Appendix E.

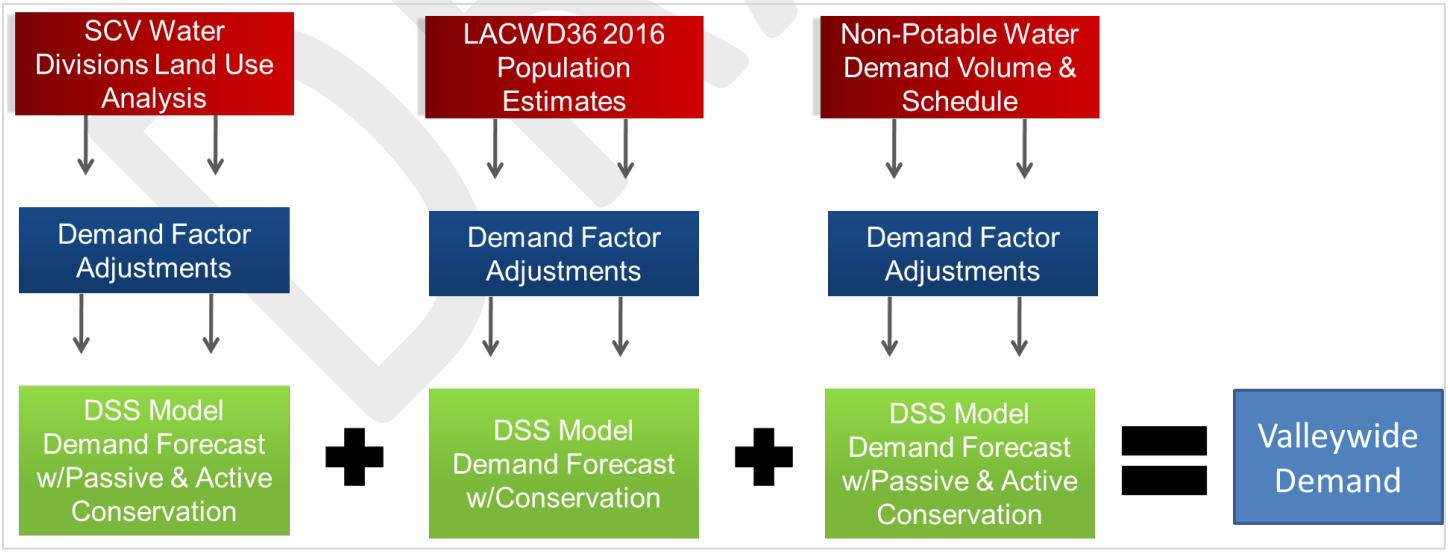
An overview of Figure 1 presents how potable and non-potable demands are accounted for in this analysis. In general, the DSS Model accounts for existing and future potable water consumption by water customers and estimated passive and active water conservation savings. For the non-potable supplies, a simplified estimate was developed building on the existing approximately 450 AF demands. It is estimated that future recycled irrigation demands will be generated from and provided to future developments, including West Side communities. An overall estimate was built between DSS Model potable demands with reductions due to conservation savings then added to the recycled water demands to generate an overall demand forecast for the SCV Water service area.

Figure 1. Accounting for Benefits of Conservation and Recycled Water



Numerous processes were undertaken to build up the estimates using a robust land-use-based analysis as the baseline for both existing customers and new development water demands. The following sections describe the processes in detail. Figure 2 provides an overview of the development of the demand forecast for the overall valleywide demand to be served by SCV Water.

Figure 2. Valleywide Demand Forecast Modeling Approach Flow Diagram

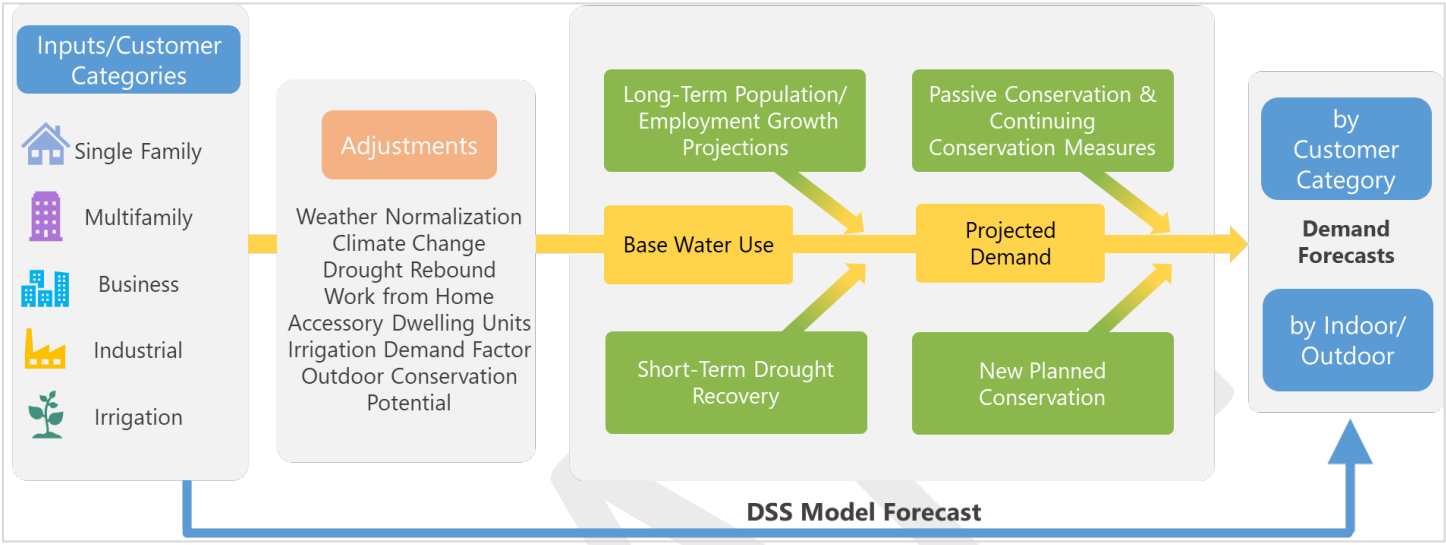


3.1.1 DSS Model Overview

The DSS Model prepares long-range water demand and conservation water savings projections. The model is an end-use model that breaks down total water production (i.e., water demand in the service area) into specific

water end uses (e.g., toilets, faucets, irrigation). This "bottom-up" approach allows for detailed criteria to be considered when estimating future demands, such as the effects of natural fixture replacement, plumbing codes, and conservation efforts. The purpose of using the end-use data is to enable a more accurate assessment of the impact of water efficiency programs on demand and to provide a rigorous and defensible modeling approach necessary for projects subject to regulatory or environmental review.

Figure 3. Potable DSS Model Flow Diagram



As shown in Figure 3, the first step taken in this analysis for forecasting water demands using the DSS Model was to gather customer category billing data. The next step was to calibrate the model by comparing water use data with available demographic data to characterize water usage for each customer category (single family, multifamily, commercial, industrial and institutional) in terms of number of users per account and per capita water use. During the model calibration process, data were further analyzed to approximate the indoor/outdoor split by customer category. The indoor/outdoor water usage was further divided into typical end uses for each customer category. Published data on average per capita indoor water use and average per capita end use were combined with the number of water users to calibrate the volume of water allocated to specific end uses in each customer category. In other words, the DSS Model reflects local trends and social norms from end-use studies on water use behavior (e.g., for flushes per person per day). Additional description and background of the DSS Model and modeling approach is provided in Appendix F and Appendix J.

3.1.2 DSS Model Development

For the 2020 UWMP update, two DSS Models were produced: (1) a combined DSS Model for the Santa Clarita Valley based on SCV Water's three Water Divisions and (2) an updated DSS Model for LACWD. These DSS Models incorporated historical data for the respective service areas to establish a historic water balance at a monthly resolution. Data analyzed include historical system production between 1995 and 2020,[5] water rates, weather (rainfall and reference evapotranspiration [ETo]), population, unemployment rate, and other data as approved and verified by SCV Water. From this historic baseline, the DSS Model forecasts future water demand. The forecast reflects how future service area water use characteristics may differ from the historical patterns, at an annual resolution, including indoor and outdoor water use for each customer category.

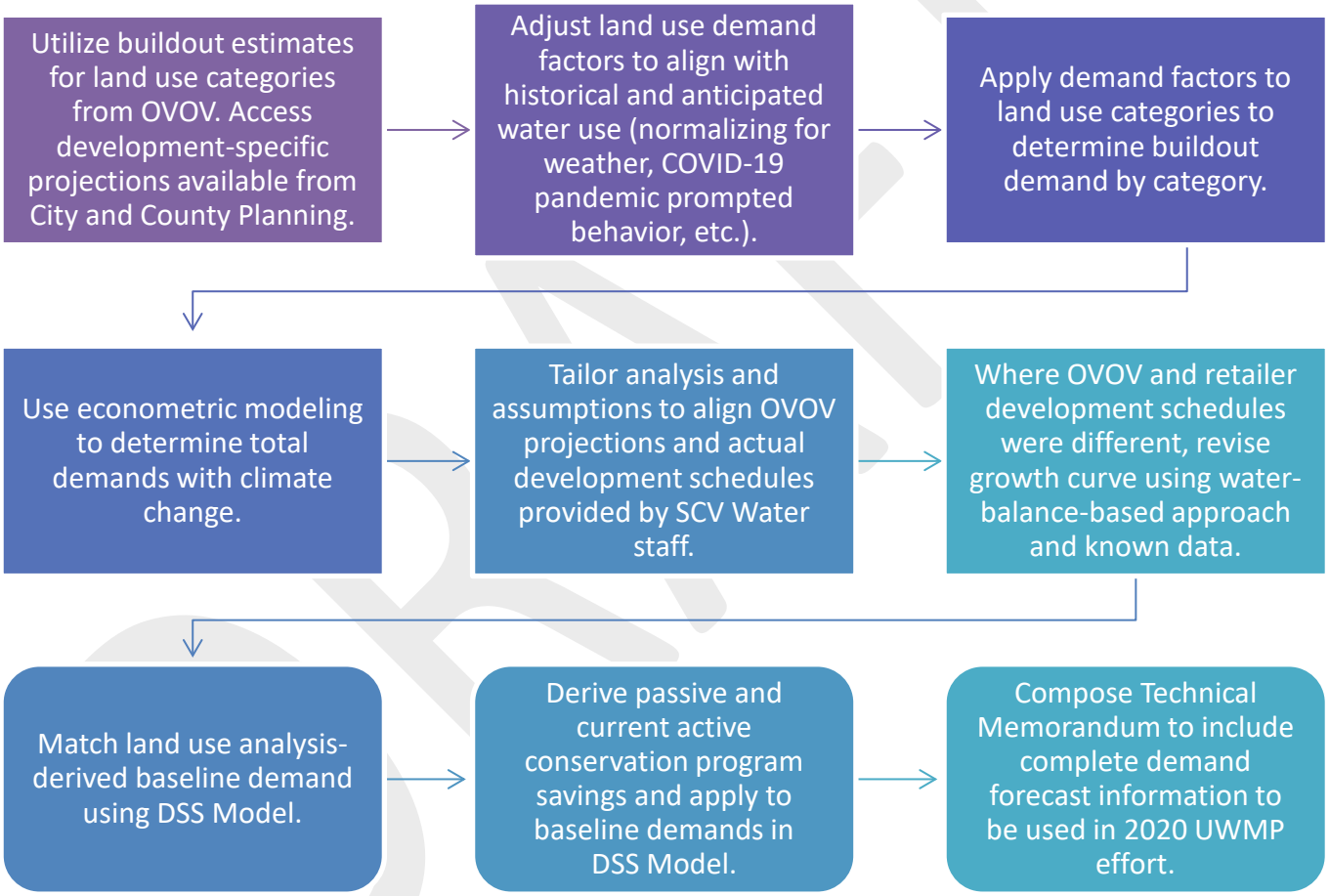
[5] If a Water Division or retailer was unable to provide complete data going back to 1995, a shorter window was used.

In both DSS Models, estimates of savings from plumbing codes were evaluated. In the SCV Water three Water Divisions DSS Model, current active conservation measures also were analyzed, and savings incorporated. Information about the basis of passive conservation savings can be found in Appendix F. Quantification of savings from SCV Water's current active conservation program is presented in Appendix G.

3.2 Preparation of Detailed Land-Use-Based Demand Forecast

This section presents the methods used to prepare the SCV Water land use forecast. As introduced previously, the land use analysis conducted for the SCV Water supported the development of land-use-based estimates for input into the DSS Model. Figure 4 illustrates the flow of work and basic steps taken to develop the land-use-based demand forecast.

Figure 4. Flow Chart of Steps for Land-Use-Based Demand Projections



3.2.1 SCV Water Land Use Analysis Methodology

The overall summary basis for this land use analysis was to build future demand forecasts using a "bottom-up" approach for land-use-based anticipated land development. A more detailed description is provided in Appendix A. In general, the approach leveraged the following information:

- Estimated dwelling units provided by City of Santa Clarita and Los Angeles County Planning Department staff. This information was based on the Santa Clarita Valley Area Plan Update | DRP (lacounty.gov) and the OVOV General Plan.

- Land-use-based GIS map shape files provided by the City of Santa Clarita and Los Angeles County planners for determining the appropriate number of dwelling units and non-residential building area:
    - 2012 Traffic Analysis Zone (TAZ) transportation modeling parameters used in the March 2016 land-use-based analysis
    - Buildout (2050) used in the OVOV General Plan and the March 2016 land-use-based analysis
- Queries from GIS maps to determine dwelling units were multiplied by persons per household from the U.S. Census modified for the developments depending on their Water Division customer service area.
    - Information informed the June 2014 Population Assessment and, with no census data available since 2010, was used to inform the existing population basis
- Monthly billing data by customer category (single family, multifamily, non-residential, and non-potable)
- Climate adjustment factors for normalizing demands
- Future demand factors

3.2.2 Summary of Information Provided

This section presents a summary of the information provided from the previous 2016 effort by City of Santa Clarita and Los Angeles County planners and by SCV Water service area new development contractors.

For the nine adjoining communities that collectively comprise the West Side communities in the Santa Clarita Valley in the Valencia Water Division, this land-use-based analysis used information reported in the Draft Technical Memorandum prepared by GSI Water Solutions, Inc. (GSI) in August 2020 (GSI, 2020). Owned by Five Point Holdings, LLC, this Five Point Project includes five villages comprising the master planned West Side communities (formerly Newhall Ranch). The five villages are Landmark Village, Mission Village, Homestead Village South, Homestead Village North, and Potrero Village. The Five Point Project will also include three other future communities: Legacy Village, Entrada Village South, and Entrada Village North, as well as buildout of an ongoing development (Valencia Commerce Center). The Five Point Project Draft Technical Memorandum by GSI (2020 GSI Draft TM) provided the basis for the potable and non-potable demands used in the land-use-based analysis including dwelling unit counts, people per household, non-residential building area, dedicated irrigation acreage, and demand factors.

Since the SCV Water merger and 2016 effort, there were nominal boundary changes for SCV Water's three Water Divisions; therefore, the 2016 Demand Study's determination of the portion of the land use residing in which TAZ was still applicable. The land area located in each Water Division's service area was based on buildout estimates for land use types determined using the GIS TAZ. The historical land use assessment was conducted using land use data by TAZ for year 2012. TAZ data for 2004 and 2012 was ground-truthed in the previous March 2016 land use analysis effort when a water balance was derived to confirm TAZ and water use categories. Additionally, the 2014 SCV Population Assessment provided 2010 census-based baseline estimates for residential dwelling units land use types.

Los Angeles County Department of Regional Planning's online Specific Plan documentation provided information about each new development project in the county including the number of residential units and non-residential square footage. Schedules for each county development project were provided by the County Planning Department and/or SCV Water staff. The City of Santa Clarita Planning Department provided an extensive inventory of approved and pending development with estimated construction time frames for over 90 projects. City planning provided the number of units for Single Family (SF), Multifamily (MF), and Detached Condos, as well as square footage by Retail, Office, Industrial and Other.

Historical and projected residential land use was based on existing dwelling units (DUs) and added DUs by land use type as provided by City Planning, County Planning and/or SCV Water staff, or if not provided, OVOV

estimates. Historical and projected non-residential land use was based on growth provided by City Planning, County Planning and/or SCV Water staff, or if not provided, OVOV estimates. Accessory dwelling units (ADU) on SF properties were added to the development profile as an additional development feature to the OVOV buildout unit numbers at the direction of SCV Water staff based on a recent increase in permit applications for this kind of use. A summary of residential dwelling units, including existing and new development units, is presented in Table 1.

Table 1. Summary of Residential Land Use Type Dwelling Units

Land Use Type	Dwelling Units[1]		
	2030	2035	Buildout[2]
Single Family	55,000	60,200	67,400
Multifamily	45,300	51,200	55,200
ADU	2,200	3,200	6,200

[1] Values are rounded to the nearest 100 units.
[2] Buildout values for Single Family and Multifamily units are based on OVOV General Plan parameters for the service area.

3.2.3 Development of the Population Projection

Future population projections were based on future land use projections that were determined from the OVOV buildout estimates in year 2050 and the interim planned development schedules. Projections were incorporated into the SCV Water Three Water Divisions DSS Model. Historical population from 1994 through 2010 was validated through the Population Assessment project in spring 2014 using 2010 census data. The population was then extended from 2010 through 2013 in the 2016 Demand Study and from 2013-2020 in this current effort based on new account data using the same assumptions developed for the Population Assessment Project.

The land-use-based population projections were founded on dwelling unit projection estimates from specific City of Santa Clarita and Los Angeles County development plans and the total remaining OVOV-based buildout projection. The people per household (PPH) estimates determined for each development and residential land use type varied depending on available data and the development's location. Estimated people per household factors were then applied to dwelling units according to land use type to calculate population.

3.2.4 Development of Baseline Water Demand Factors

Existing residential demand water use factors, and new and existing non-residential demand factors (commercial, industrial, institutional, and other) were based on adjusted 2018 and 2019 outdoor water use and 2017 indoor water use. Historical monthly billing data was reviewed and leveraged to determine that 2018 and 2019 represented the most normal recent year water use profile. For purposes of this analysis, recent non-drought, non-wet year 2017 was established as the base year for indoor water use to be consistent with the recent 2016 Santa Clarita Valley Water Agency Indoor Water Use Estimates technical analysis.[6]

[6] Technical Memorandum – Santa Clarita Valley Water Agency Indoor Water Use Estimates, dated September 26, 2019.

New residential demand factors were based on 50 indoor gallons per capita per day (GPCD) and align outdoor use with California's Model Water Efficiency Landscape Ordinance[7]. The basis for new development outdoor water use factors are presented in Appendix H. MWM & WPR based the potential outdoor demand for the region on an annual normal ETo of 66.7 inches. In summary, even though the 2015 MWELO specifies an ETo value of 61.5 inches for Santa Clarita, an ETo of 66.7 inches per year was the 10-year average observed at a monitoring station located at SCV Water's Rio Vista water treatment plant. Using the observed ETo value provided a conservative (high) estimate of potential outdoor water demands. These outdoor factors were applied to both potable and non-potable new development residential and non-residential irrigated areas. New residential outdoor demand factors were applied to an estimated residential outdoor irrigated area by residential land use type.

3.2.5 Development of the Water Demand Adjustment Factors

Given that the baseline demand factors were developed using historical consumption data, a review of SCV Water's future community water use necessitated some adjustments to better align with how land use development is planned. As a result, demand factor adjustments addressed the need to account for weather normalization, drought rebound, and COVID-19 pandemic-prompted work-at-home trends. More information about this part of the analysis can be found in Appendix A. The adjustment factors apply to both existing residential use and all non-residential use. The assumptions associated with each factor are described below and presented in Figure 5 and Table 2.

Climate Change: The 2050 customer category demands were increased by 3.77% to capture the effect of climate change. This bump was feathered in linearly starting with a zero increase initially and rising to 3.77% in 2050. More information on the basis of this increase can be found in Appendix E. This climate change increase was not applied to the non-revenue water (NRW) volume directly; however, since NRW was calculated as a percent of production, NRW subsequently increased as well.

Weather Normalization: 2018 and 2019 demands were adjusted to account for 2018 being slightly warmer than normal and 2019 being significantly cooler than normal. More information on the basis of this adjustment can be found in Appendix D.

Drought Rebound: It was estimated that a total drought rebound of 9% occurred by 2019 as compared to year 2015 pre-drought water use. This analysis assumed an additional 2% rebound (increase) in water use on top of the weather normalized average 2018 and 2019 outdoor water use and 2017 indoor water use. This adjustment applied to the water use basis of existing residential and all non-residential accounts. More information on the basis of this adjustment can be found in Appendix D.

Work-at-Home: This analysis assumed a 1% increase in water use due to the continuation of SF and MF population working at home beginning in the COVID-19 pandemic. This adjustment was in addition to the drought rebound and weather normalized adjustments previously presented. This modification applied to existing residential accounts only. The 1% value was a preliminary estimate that SCV Water anticipates adjusting as post-pandemic data becomes available.

Accessory Dwelling Units: Accessory dwelling units were added to the development profile as an additional development feature to the OVOV buildout unit numbers. The city received 80 permit applications for these in 2020. This analysis assumed the number of permit applications for ADUs may more than double to approximately 200 per year through buildout. ADUs were assumed to add approximately 1 person per ADU as

[7] Model Water Efficient Landscape Ordinance

well as indoor water use only at 50 GPCD. ADU outdoor demand was assumed to be part of the single family account in which the ADU resides.

Irrigation Demand Factor: This analysis derived an irrigation demand factor for each land use type based on the SCV Water Residential and Non-Residential Outdoor Water Use Study (Outdoor Water Use Study). The irrigation demand factor accounts for baseline irrigation use estimated by land use types for landscaped areas for future customers based on the Model Water Efficient Landscape Ordinance requirements. More details on this can be found in the Outdoor Water Use Study in Appendix H.

Outdoor Conservation Potential/Overwatering Factor: This overwatering factor adjusted the previously presented irrigation demand factor to account for outside water uses beyond irrigation. Using the output from the Outdoor Water Use Study, this factor took into account outside water uses like car washing, in addition to potential overwatering due to irrigation inefficiencies and irrigation device degradation. These landscape inefficiencies and device disrepair have been proven to occur if developers do not design, operate, and install landscapes to standards that account for efficiency losses through time. This overwatering factor was applied to both potable and non-potable new development residential and non-residential irrigated areas and offers additional potential water conservation opportunities. This outdoor overwatering factor was partially derived from the difference between the MWELO/MAWA design standard and what the Outdoor Water Use Study found was actually being applied.

Figure 5. Water Demand Adjustment Factors

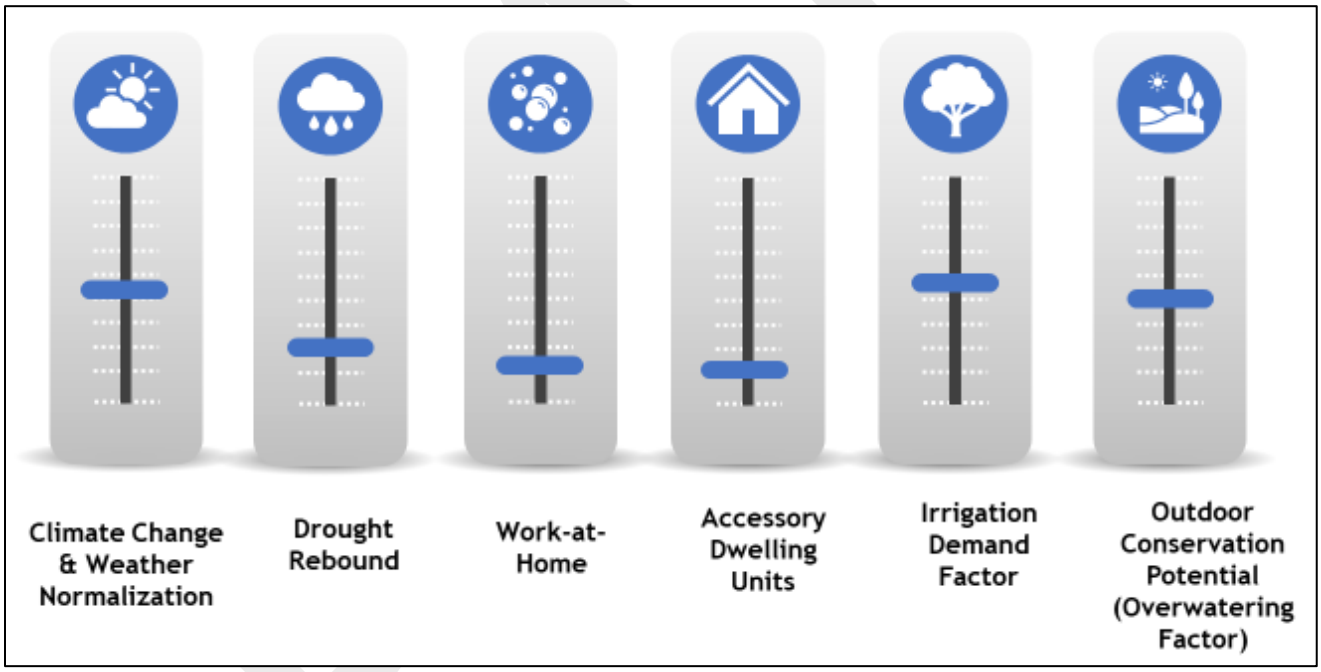


Table 2. Demand Factor Adjustment Values

Adjustment Factors	Value	
	2018	2019
Weather Normalization	-0.78%	5.21%
Adjustment Factors	**Value**	
Climate Change	3.77%	Percent
Drought Rebound	2.0%	Percent
Work-at-Home	1.0%	Percent
Accessory Dwelling Units	1	People per household
	50	Indoor GPCD
Residential Overwatering Factor	26.5%	Percent
Non-Residential Overwatering Factor	25.6%	Percent

3.2.6 SCV Water Demand Forecast Methodology

New residential indoor demands were derived by applying the 50 GPCD to the annual cumulative population of various residential land use types. New residential outdoor demand factors were applied to an estimated residential outdoor irrigated area by residential land use type. New irrigation account demand was derived by applying the adjusted outdoor demand factor to the derived and compiled residential HOA common area and developed park acreages.

Non-residential demand projections for commercial, industrial, institutional, and other customer categories were based on the adjusted 2018 and 2019 demand factors previously presented, starting with existing category accounts growing annually as each customer category's compiled land use units grow. As explained previously, non-residential land use type units (in thousand square feet of developed land use) were compiled into commercial, industrial, institutional, and other categories for all new development (including the OVOV balance) annually.

West Side communities' projected residential and non-residential total indoor and outdoor potable and non-potable demand was provided in the 2020 GSI Draft TM. The West Side communities estimated development schedule was provided by SCV Water staff. Annual potable demands were tracked for indoor single family, outdoor single family, indoor multifamily, outdoor multifamily, commercial, institutional, industrial, other and irrigation. An additional potable irrigation demand due to potential overwatering from Five Point Project was calculated and included in the total potable irrigation demand; potential irrigation equipment and device deterioration is not currently included in Five Point Project demand estimates per the 2020 GSI Draft TM. The basis for the overwatering factor is presented in Appendix H.

Existing account's potable water use conversion to non-potable supply volume was considered for offsetting projected potable demand for commercial, institutional and irrigation accounts (there are no industrial non-potable accounts). Existing account conversion volume magnitudes were consistent with the 2016 Recycled

Water Master Plan[8] and confirmed by SCV Water staff. SCV Water staff also provided a revised potable to non-potable conversion schedule for these existing accounts. Potable demand was compiled for the following customer categories: Existing SF, Existing MF, New SF Indoor, New SF Outdoor, New MF Indoor, New MF Outdoor, Commercial, Industrial, Institutional, Other, and Irrigation. This demand does not include those existing accounts' water use that is specifically planned to be served by non-potable.

NRW was estimated to be 8.8% of total production as directed by SCV staff and based on the per weighted average of the three Water Divisions' 2019 and 2020 NRW. Estimated savings from passive conservation (plumbing codes) and SCV Water's current active conservation measures were calculated and applied in the DSS Model.

Los Angeles County Water District 36 did not have detailed enough information (such as specific billing data by lot type) to derive land-use-based demand factors and therefore developed a population-based demand forecast. Future population and demand projections based on OVOV buildout estimates in year 2050 can be found in Appendix B for the LACWD DSS Model.

3.3 Non-Potable Demand Methodology

Existing potable account conversion volume magnitudes reported in the 2016 Recycled Water Master Plan were confirmed by SCV staff and referenced as the volume basis for the development of a non-potable projection. SCV staff provided a revised potable to non-potable conversion schedule for existing accounts including the 2016 Recycled Master Plan phased schedule. Raw water account use conversion to non-potable use volume and schedule was also confirmed by SCV staff.

By 2050 customer category demands were increased by 3.77% to capture the effect of climate change. This bump was feathered in linearly starting with a zero increase and rising to 3.77% in 2050. More information on the basis of this increase can be found in Appendix A.

No NRW was accounted for in the non-potable demand estimate; this might warrant an additional 8-15%.

A table presenting a summary of SCV Water's projected non-potable demand by project or phase is provided in Appendix I.

4. RESULTS

This section presents the overall valleywide demand analysis results for the SCV Water three divisions and LACWD; results are presented for potable demands, non-potable demands and combined total demands. All demands include climate change.

4.1 Potable Demand Projections

The Econometric Model and DSS Model were used to generate water demand projections. As previously described, the Econometric Model generated baseline water demand adjustments that were applied to the baseline land-use-based demand projection for SCV Water's three Water Divisions. The DSS Model determined passive and active savings. Figure 7 presents a summary of potable demand projections through 2050 for the entire service area.

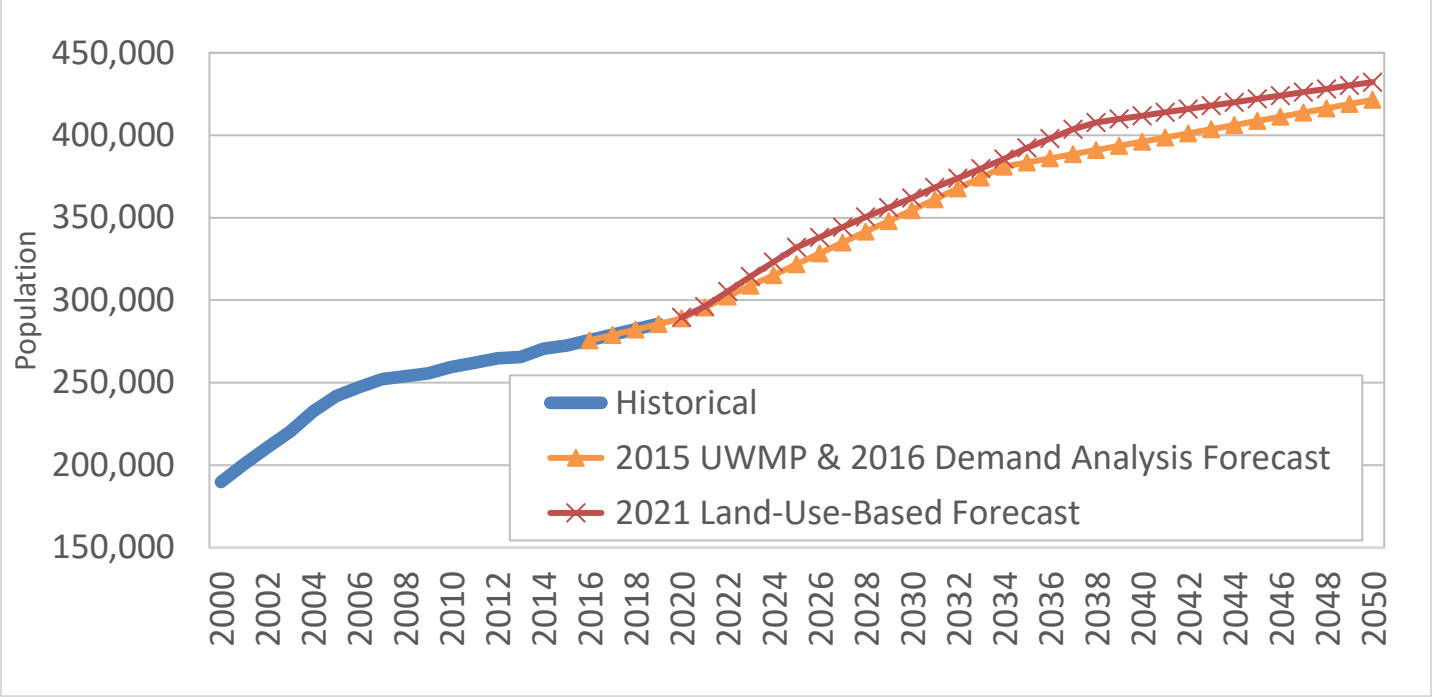
[8] Castaic Lake Water Agency. (2016). *Recycled Water Master Plan* – Final.

Potable demand and population projections for SCV Water and LACWD can be found in tabular format in Appendix A and Appendix B, respectively, and include the following information:

- **Projected Population.** Population for LACWD specifically and for the combined SCV Water based on land use dwelling unit projections using buildout and PPH estimates.
- **Projected Total Demand with No Plumbing Code Savings.** Potable water demands in five-year increments that do not include the plumbing code.
- **Projected Total Demand with Plumbing Code & Standards Savings.** Potable water demands in five-year increments that includes the effect of plumbing codes.
- **Projected Total Demand with Current Active Conservation Program Including Plumbing Code & Standards Savings.** Potable water demands for SCV Water in five-year increments that includes the effect of projected active conservation program implementation and plumbing codes. A brief summary of active current conservation program measure design and water savings is presented in Appendix G. No active conservation savings are estimated for LACWD in this effort. SCV efforts that target LACWD's customers are included in the SCV active conservation program budget and savings.

The population forecasts are presented in Table 3 and Figure 6, along with the 2015 UWMP population. Appendix C also presents a comparison of the current estimated population and demand projections for LACWD and the SCV Water with the 2015 UWMP (and 2016 Demand Study) estimates.

Figure 6. Valleywide Population Forecast



Note: Population includes both LACWD and SCV Water's three Water Divisions.

Table 3. Valleywide Land-Use-Based Population and Potable Demand Projections

Demand Forecast	2020[1]	2025	2030	2035	2040	2045	2050
Projected Population[2]	289,600	332,100	362,100	392,500	411,900	422,100	432,200
2015 UWMP Population[2,5]	289,000	321,900	354,700	383,400	396,100	408,800	421,500
Estimated Total Potable Demand WITH Climate Change and NO Plumbing Code Savings (AFY)[2,3]	65,500	78,900	85,200	92,500	99,200	104,900	110,700
Estimated Total Potable Demand WITH Climate Change and Plumbing Code Savings (AFY) [2,3]		77,600	82,800	89,200	95,100	100,100	105,300
Estimated Total Potable Demand WITH Climate Change and Active Conservation and Plumbing Code Savings (AFY) [2,3,4]		71,900	75,200	80,300	84,400	88,000	91,300

[1] Year 2020 values are actual estimated population and actual water demand for LACWD and SCV Water. No additional adjustment has been made to actual year 2020 demands to account for climate change, plumbing codes, or active conservation.

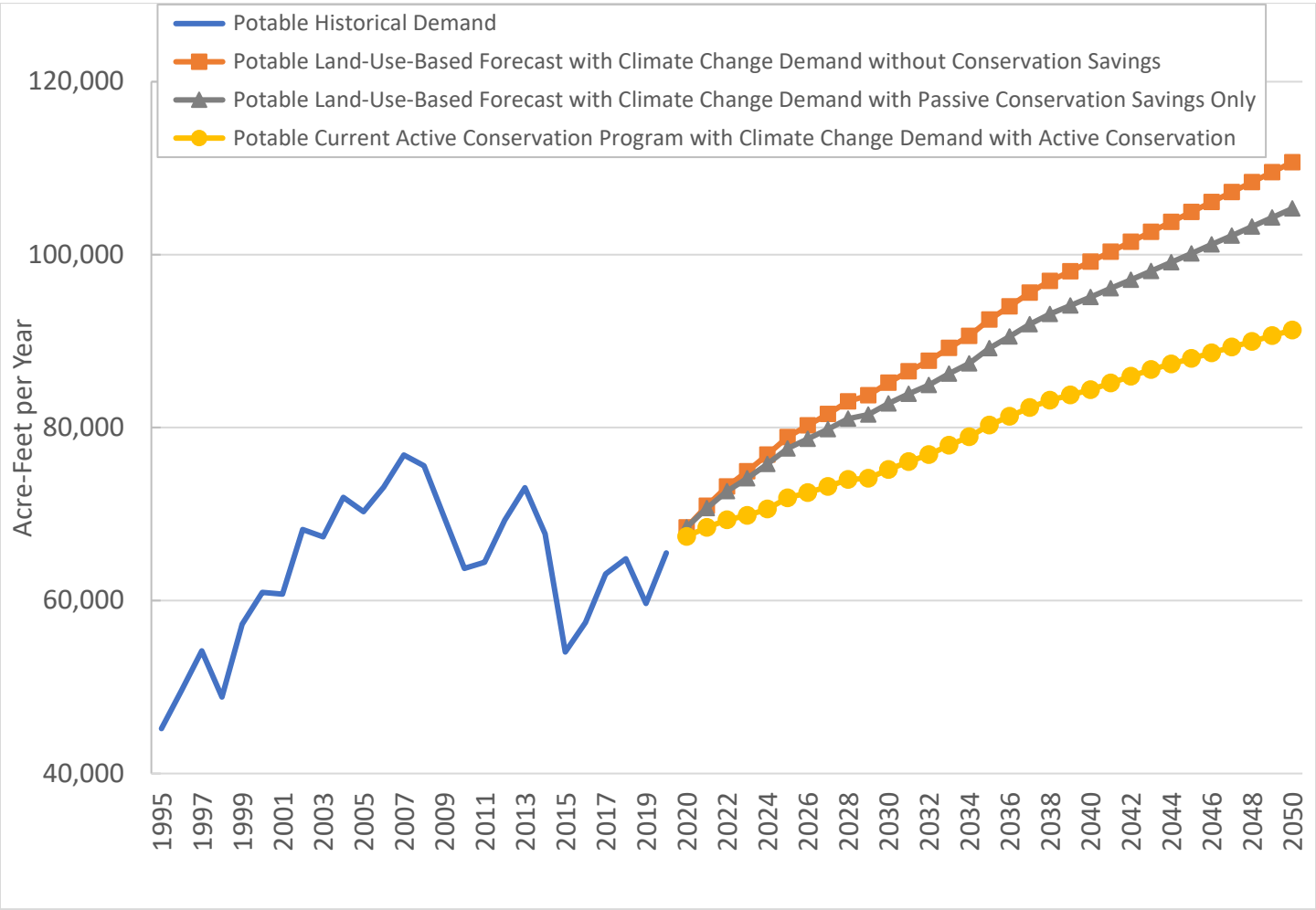
[2] Values have been rounded to the nearest 100.

[3] Potable demands include climate change and do not include recycled water.

[4] No active conservation savings are estimated for LACWD in this effort. SCV Water efforts that target LACWD's customers are included in the SCV Water active conservation program budget and savings.

[5] The 2015 UWMP population forecast is provided for comparison purposes only. Population combines LACWD and SCV Water's three Water Divisions.

Figure 7. Valleywide Land-Use-Based Projected Potable Demands to 2050



Notes:

1. No active conservation savings are estimated for LACWD in this effort. SCV Water efforts that target LACWD's customers are included in the SCV Water active conservation program budget and savings.
2. Demands include climate change and no recycled water.

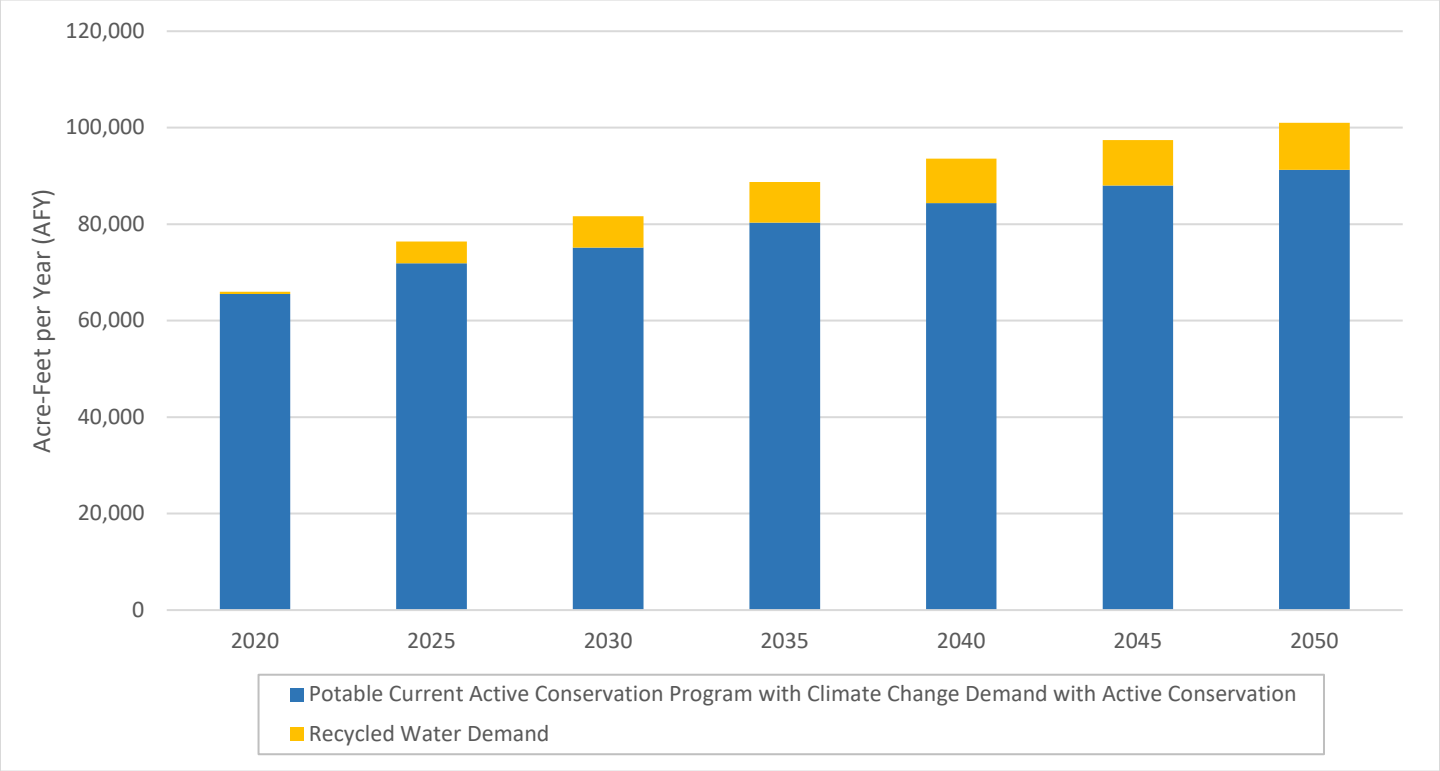
Potable demand projections for SCV Water and LACWD can be found in the graphs in Appendix A and Appendix B, respectively, and include the following curves:

- Actual Demand – This is historical demand as submitted to MWM from SCV Water.
- Estimated Demand – Assumes applicable demand adjustments: 1) 2018 & 2019 base year, 2) drought rebound, 3) COVID-19 pandemic-prompted work-at-home continuation/shift adjustment, 4) weather normalization, 5) overwatering factor *(SCV Water only)*, 6) land-use-based analysis projections from available development and OVOV buildout information and PPH estimates determined from recent development data and in the 2014 Population Assessment *(SCV Water only)*, 7) climate change considerations (3.77% increase by 2050), and 8) NO plumbing code or passive savings.
- Estimated Demand *with* Plumbing Code – Assumes applicable demand adjustments WITH plumbing code/passive savings as described in Appendix F.
- Estimated Demand *with* Current Active Conservation Program Implementation and Plumbing Code – Assumes applicable demand factor adjustments WITH plumbing code and a continuation of current active conservation program measure implementation as described in Appendix G.

4.2 Non-Potable Demand Projections

At approximately 450 AF currently, SCV Water's recycled water demand is estimated to increase to 9,750 AF by buildout. This is based on existing potable account conversion volume magnitudes reported in the Draft 2016 Recycled Water Master Plan and confirmed by SCV Water staff. The projected non-potable demand also includes an additional non-potable irrigation demand due to potential overwatering from irrigation practices and equipment and device efficiency deterioration. Furthermore, by 2050 non-potable customer category demands are increased by 3.77% to capture the effect of climate change. No non-revenue water is accounted for in the total non-potable demand estimate. Non-potable demand is presented with valleywide potable demand with passive and active conservation savings in Figure 8 and valleywide recycled water projection is presented in Figure 9. More information on this non-potable demand can be found in Appendix I.

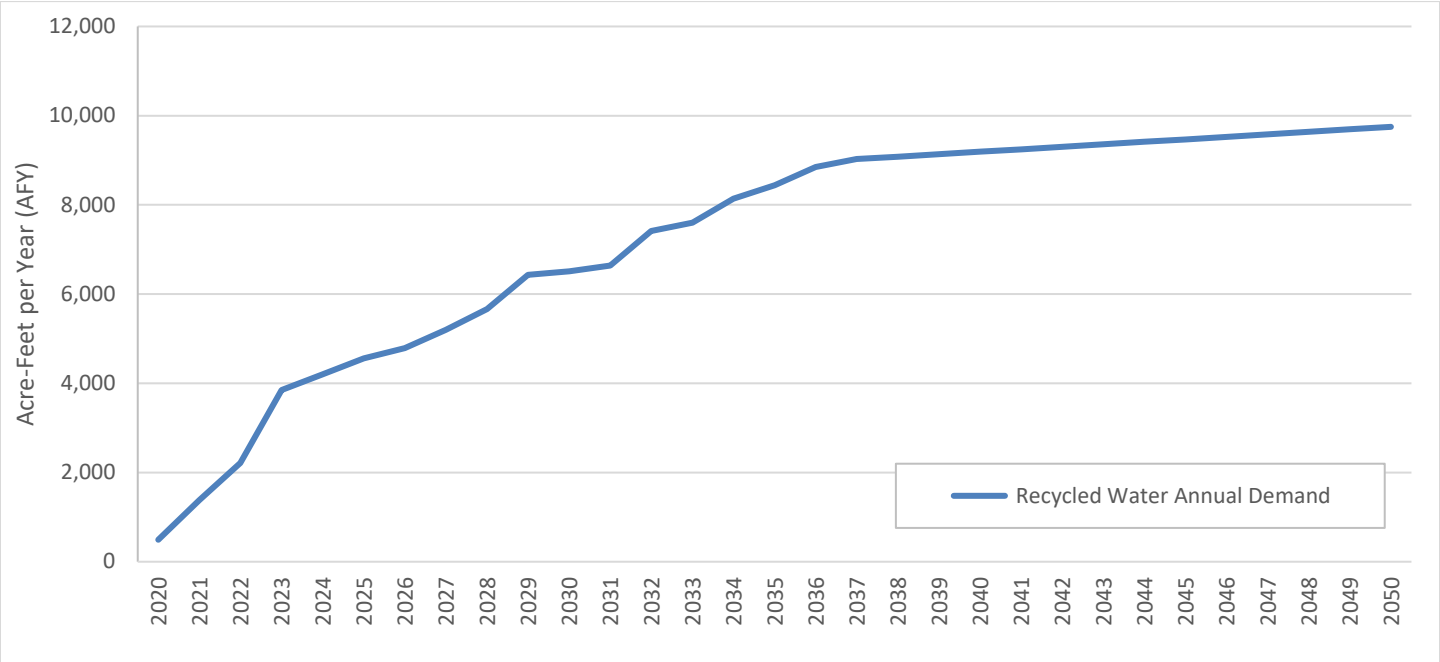
Figure 8. Valleywide Projected Potable and Recycled Water Demands



Notes:

1. 2020 represents actual potable and non-potable demand for SCV Water and LACWD.
2. This figure presents valleywide potable and non-potable demands including climate change, passive savings, and current active conservation savings.

Figure 9. Valleywide Projected Recycled Water Demands



Note: Projected valleywide non-potable demand only.

Table 4. Valleywide Projected Recycled Water Demands

Demand Forecast	2020[1]	2025	2030	2035	2040	2045	2050
Recycled Water Annual Demand (AFY)[2]	500	4,600	6,500	8,400	9,200	9,500	9,700

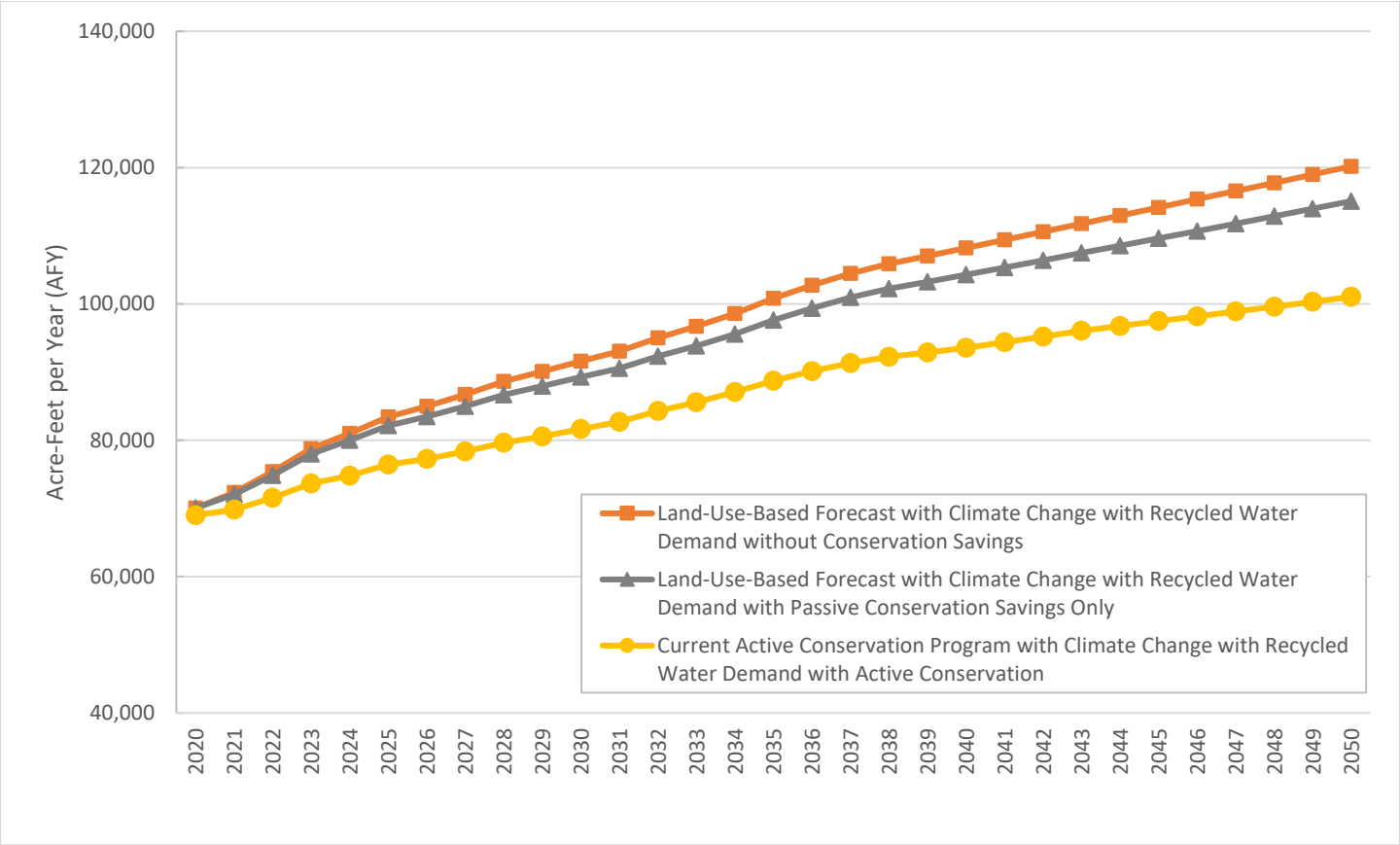
[1] 2020 is actual non-potable water demand.
[2] Non-potable demands rounded to the nearest 100 AFY.

4.3 Total Demand Projections

Total demand for the SCV Water service area including LACWD retail sales and non-potable demand is presented in Figure 10 and Table 5. Total demand estimates are considered conservative as they include adjustments like potential overwatering. SCV Water anticipates that this estimate may change once state objectives are clarified regarding existing and future irrigation.

Though indoor water use estimates are available, recycled water supply availability will slow the new development schedule as the development builds out to generate the recycled water. It is recognized that there will be a temporary need to use potable water to supply recycled water demands; furthermore, in emergency conditions on the recycled water system, any shortfalls will be met with “make-up” potable water supplies. The volume of this make-up water is based on seasonal recycled water demands, recycled water storage, and indoor water use within the sanitation district.

Figure 10. Valleywide Land-Use-Based Projected Total Demands to 2050



Note: Valleywide demands include LACWD and SCV Water. Demands include climate change and recycled water.

Table 5. Valleywide Land-Use-Based Projected Total Demands to 2050

Demand Forecast	2020	2025	2030	2035	2040	2045	2050
Estimated Total Demand with No Plumbing Code Savings (AFY)	66,100	83,400	91,600	100,800	108,200	114,200	120,200
Estimated Total Demand With Plumbing Code Savings (AFY)		82,100	89,300	97,600	104,300	109,600	115,100
Estimated Total Demand With Active Conservation and Plumbing Code Savings (AFY)		76,400	81,700	88,700	93,600	97,500	101,000

Notes:

1. Valleywide demands include LACWD and SCV Water. Demands include climate change and recycled water.
2. Demands have been rounded to the nearest 100 AFY.

5. CONCLUSIONS

The population and water demand forecasts contained in this technical memorandum reflect a significant enhancement from those used in the 2015 UWMP. Though similar methodologies were employed in this analysis, the more current estimate uses much more refined land use development information provided by City and County planners. This effort also leverages updated results from extended and refined econometric models developed for SCV Water's service area to projected buildout in 2050. In this case, an updated land-use-based approach was used because, as the Santa Clarita Valley approaches buildout, such an approach can further improve upon assumptions regarding how future conditions are estimated to occur (i.e., climate change, etc.), how types of land use are planned in new development, and how water usage patterns might be significantly different than they were in the past, including conservation savings.

Further analysis is planned for the Water Efficiency Program planning when more information becomes available on future regulations from the 2018 "Making Water Conservation a California Way of Life" legislation. Until regulations are finalized, SCV Water is planning to continue with its current conservation program design. Modeling results can be found in Appendix F for passive code based water savings and Appendix G for the active conservation program savings.

For comparison purposes, the projected demands and population that were reported in SCV's 2015 UWMP can be found in Appendix C.

APPENDIX A – SCV WATER RETAIL SERVICE AREA-ONLY DEMAND ANALYSIS METHODOLOGY AND RESULTS

This appendix presents the land use demand analysis methodology steps, Traffic Analysis Zone (TAZ) and land use background data, land use demand factors, and projected land use and land-use-based demand. A TAZ is the unit of geography most commonly used in transportation planning models. Though the size of a TAZ varies, typically a zone of less than 3,000 people is common. The spatial extent of zones varies, ranging from very large areas in undeveloped regions to zones as small as a city block or group of buildings in a central business district. The basis for the TAZ specific data came from the One Valley One Vision (OVOV)) General Plan.

A.1 Land Use Analysis Steps and Inputs

Los Angeles County area developments included Northlake, Spring Canyon, Sloan Canyon, Tapia, Tesoro del Valle, and the Five Point Project. As part of this project, the land use assessment was conducted using the following basic steps/inputs for the service areas of SCV Water's three Water Divisions.

1. MWM used as a basis the 2012 TAZ units by Water Division (not including LACWD) from the March 2016 effort. Kept OVOV buildout by TAZ unit by service division as 2050 general buildout target total. MWM generally followed the OVOV buildout total by specific TAZ unit land use type, however the analysis is aligned by customer category. In some cases, more high-density single-family dwelling units are planned to be constructed than the OVOV land use breakdown originally estimated, even though the overall dwelling unit count did not change.
2. Los Angeles County Planning confirmed no significant added units outside the City of Santa Clarita between 2012 and 2019.
3. The City of Santa Clarita provided a list of built, approved, and pending units with construction time frames included between 2012 and 2050 (buildout). In many cases, land use types were inferred by MWM and SCV Water staff.
4. Homeowner Association (HOA) common area dedicated irrigation acreage was tracked separately from land use types. If not specifically available from the development design, the acreage of this common area was based on an average of available development multifamily and single family common area square footages per dwelling units as provided by SCV Water staff. These average factors were used for the city's pending residential developments, as well as the county's new development areas of Northlake, Spring Canyon, Sloan Canyon, and those units not yet specifically planned for but tracked as the OVOV buildout balance. Tesoro del Valle and Tapia had common area landscape areas available for use.
5. ADUs were added to the development profile as an additional development feature to the OVOV buildout unit numbers. The city received 80 permit applications for these in 2020. This analysis assumed the number of permit applications for ADUs may more than double to approximately 200 per year through buildout. ADUs were assumed to add approximately 1 person per ADU for indoor water use only. (Outdoor demand was assumed to be part of the single family account in which the ADU resides.)
6. Northlake Project assumed residential and non-residential linear growth between 2030 and 2035 within the Newhall Water Division service area.
7. Spring Canyon assumed residential linear growth between 2025 and 2030 in the Newhall Water Division service area.
8. Sloan Canyon assumed residential and non-residential linear growth between 2020 and 2025 in the Newhall Water Division service area.

9. Residential Tapia, located in the Newhall Water Division, assumes 100 units online per year starting in 2025 with 105 units in 2030 (the last year of development). Common area dedicated irrigation square footage was available.
10. Tesoro Del Valle, located in the Newhall Water Division, assumes development is online between 2022 and 2024. Common area dedicated irrigation square footage was available.
11. Five Point Project's projected residential and non-residential development was provided in the 2020 GSI Draft TM. The Five Point Project estimated development schedule was provided by SCV Water staff. This analysis used population as well as potable and non-potable indoor and outdoor residential and non-residential demands as directly reported in the 2020 GSI Draft TM. Five Point's development is expected to occur between 2021 and 2038.
12. In order to determine the balance of development not yet specifically planned for but still accounted for in the OVOV buildout, OVOV buildout units by land use type for SCV Water's three Water Divisions were compiled and compared to the planned city and county development (including West Side communities). In some cases, there were more units of a specific land use type already planned for than outlined in the OVOV buildout total. In these cases, a net balance by customer category (single family, multifamily, commercial, institutional, industrial, etc.) was calculated. The balance of the OVOV development that is not yet approved is assumed to occur between 2035 and 2050 for SCV Water planning purposes.

A.2 Processing TAZ and Land Use Data

This section presents the TAZ land use assessment methodology and the land use data by SCV Water as presented in step 1 in Section A.1. In the 2016 Demand Study, the land use data by TAZ was provided for years 2004, 2012, and 2050 (buildout). The land use assessment was conducted by evaluating the land use types in each TAZ to determine what portion of the land use in that TAZ was located in each Water Division's service area. Furthermore, the 2014 SCV Population Assessment provided 2010 census-based estimates for residential land use types as a basis for comparison and methodology confirmation. Buildout was estimated from the OVOV General Plan.

A.2.1 TAZ Approach Methodology

This analysis leveraged the 2016 Demand Study GIS analysis that was conducted with coordination between Water Division GIS specialists, water resources planners, City of Santa Clarita planners and Los Angeles County planners. More information about the TAZ approach methodology can be found in the 2016 Demand Study TM.

A.2.2 Land Use Types and Estimates

There are 42 types of land uses which include estimates of dwelling units (DU), total square footage (TSF), students (STU), acreage (AC), rooms, and seats by relevant land uses (e.g., the number of seats per movie theater, number of students per school, and number of dwelling units in the category of single family housing with 1-5 DU/AC). A list of the types of unit codes included in the transportation model GIS shape files provided by the City of Santa Clarita and Los Angeles County is presented in Table A-1.

As part of this analysis, where necessary, some land use categories were further consolidated to align with demand factors and water use data. Since the land use data was generated for transportation models, the land use types with special generator (SG) units were applicable only in transportation planning scenarios and not in water resources planning.

Table A-1. City of Santa Clarita and Los Angeles County Transportation Model Land Use Types

Land Use Type	Units
Single Family (<1 du/ac)	DU
Single Family (1-5 du/ac)	DU
Single Family (6-10 du/ac)	DU
Condominium/Townhouse	DU
Apartment	DU
Mobile Homes	DU
Senior (Active)	DU
Commercial Center (>30ac)	TSF
Commercial Center (10-30a)	TSF
Commercial Center (<10ac)	TSF
Commercial Shops	TSF
Hotel	ROOM
Sit-Down Restaurant	TSF
Fast Food Restaurant	TSF
Movie Theater	SEAT
Health Club	TSF
Car Dealership	TSF
Elementary/Middle School	STU
High School	STU
College	STU
Hospital	TSF
Library	TSF
Church	TSF

Land Use Type	Units
Day Care	STU
Industrial Park	TSF
Business Park	TSF
Manufacturing/Warehouse	TSF
Utilities	TSF
Regional Post Office	TSF
Commercial Office	TSF
High-Rise Office	TSF
Medical Office	TSF
Post Office	TSF
Golf Course	AC
Developed Park	AC
Undeveloped Park	AC
Wayside Honor Ranch*	AFY

* Wayside ranch has its own water supply.

A.2.3 Residential Land Uses

The number of dwelling units by land use type were combined into summary groupings that would allow for TAZ-based data to be compared to and checked with other available data. Accessory dwelling units were added to the development profile as an additional development feature to the OVOV buildout unit numbers.

Table A-2. Land Use Units versus Number of Accounts – SCV Water Retail Service Area Only

Land Use Code and Type/Account Customer Category	Units	Projected Future 2030 DUs	Projected Future 2035 DUs	Projected Future Buildout DUs
Single Family	DU	55,000	60,200	67,400
Multifamily	DU	45,300	51,200	55,200
ADU	DU	2,200	3,200	6,200

Notes:

1. Projected units are based on Los Angeles County area developments: Northlake, Spring Canyon, Sloan Canyon, Tapia, Tesoro del Valle, the Five Point Project, and City of Santa Clarita developments provided in an extensive inventory of approved and pending development units.
2. Buildout unit thresholds for single family and multifamily land uses are based on the OVOV General Plan for the service area.
3. The city received 80 permit applications for ADUs in 2020. This analysis assumed the number of permit applications for ADUs may more than double to approximately 200 per year through buildout. ADUs were assumed to add approximately 1 person per ADU for indoor water use only. (Outdoor demand was assumed to be part of the Single Family account in which the ADU resides.)

A.2.4 Non-Residential Land Uses

Non-residential new development land use types were aligned with TAZ land use categories as best as possible with the primary goal of aligning them into the correct non-residential billing categories as follows:

- Commercial – Tracked primarily in thousand square feet. Includes non-residential commercial land use types.
- Institutional – Tracked primarily in thousand square feet. Includes non-residential institutional land use types: Post Office, Regional Post Office, Church, Library, Hospital, Day Care, Elementary/Middle School, High School, and College.
- Industrial – Tracked in thousand square feet. Includes non-residential industrial land use type Industrial Park.
- Other – Tracked in thousand square feet. Includes utility site demands.
- Irrigation – Tracked in acreage. Includes Golf Courses, Developed Parks, and Undeveloped Parks.

An added land use category for residential HOA common areas was included in this analysis with the dedicated irrigation acreage tracked separately from other land use types. Tracked in acreage, HOA irrigation includes SF and MF HOA irrigated common areas.

If not specifically available from the planned development's design, the acreage of the HOA common area was based on an average of available development common area square footages per dwelling units as provided by

SCV Water staff. These average factors, ranging from approximately 2,000 square feet per dwelling unit to 3,650 square feet per DU, were used for the city's pending residential developments as well as Los Angeles County new development areas: Northlake, Spring Canyon, Sloan Canyon, and those units not yet specifically planned for but tracked as the OVOV buildout balance. Tesoro del Valle and Tapia had common area landscape areas available for use. Buildout unit thresholds for each land use category were based on the OVOV General Plan for the service area.

A.3 Population

Historical and existing population was determined in the March 2016 effort (based on the 2010 census and 2014 population assessment) with recent year values ground-truthed by project and SCV staff against new accounts. The land-use-based population was determined through an assessment of future dwelling units based on schedules provided by City and County Planning and SCV Water staff. In order to determine the balance of development not yet approved but still accounted for in planning purposes in the OVOV buildout estimate, OVOV buildout units by land use type for SCV Water's three Water Divisions were compiled and compared to the planned city and county development. To calculate population, estimated people per household factors were applied to dwelling units according to land use type. The range was determined to be between 1 person per household (PPH) for an ADU up to 3.8 PPH in some low-density single-family units. The basis for people per household estimates is presented as follows.

- New development units estimated by the city and calculated in the OVOV balance assumed average PPH values derived for the Santa Clarita Water Division and Newhall Water Division based on the March 2016 analysis (which was based on the 2010 census and 2014 population assessment). A weighted average of the SCWD and NWD PPH was taken using each division's 2015 population.
- Northlake, Sloan Canyon, Spring Canyon, Tapia, and Tesoro del Valle assume NWD PPH as derived in the March 2016 analysis.
- Five Point Project PPH were presented in the 2020 GSI Draft TM and used in this analysis.
- ADUs were assumed to have 1 PPH, however not represented an additional new single family account, given is it assumed that the ADU located within an existing or planned single family account's property.

New development population was tracked by single family and multifamily housing categories and associated population. The future population was added to the previous effort's 2016 estimated single family and multifamily population, and was consistent with actual new accounts added to SCV Water based on data provided by customer category.

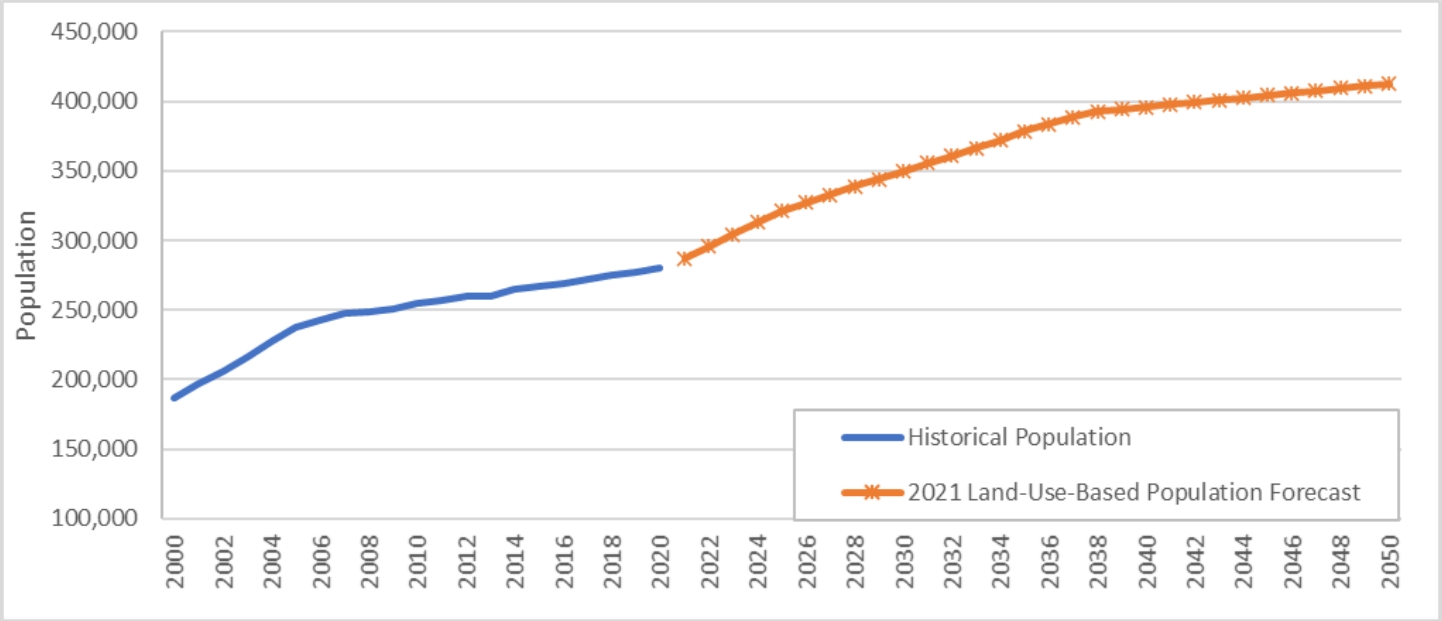
Table A-3 and Figure A-1 show current and projected population for SCV.

Table A-3. SCV Land-Use-Based Population Forecast

Demand Forecast	2020	2025	2030	2035	2040	2045	2050
Projected Population	280,600	321,300	349,500	378,300	395,900	404,300	412,700

Note: Population values have been rounded to the nearest 100.

Figure A-1. SCV Land-Use-Based Population Forecast

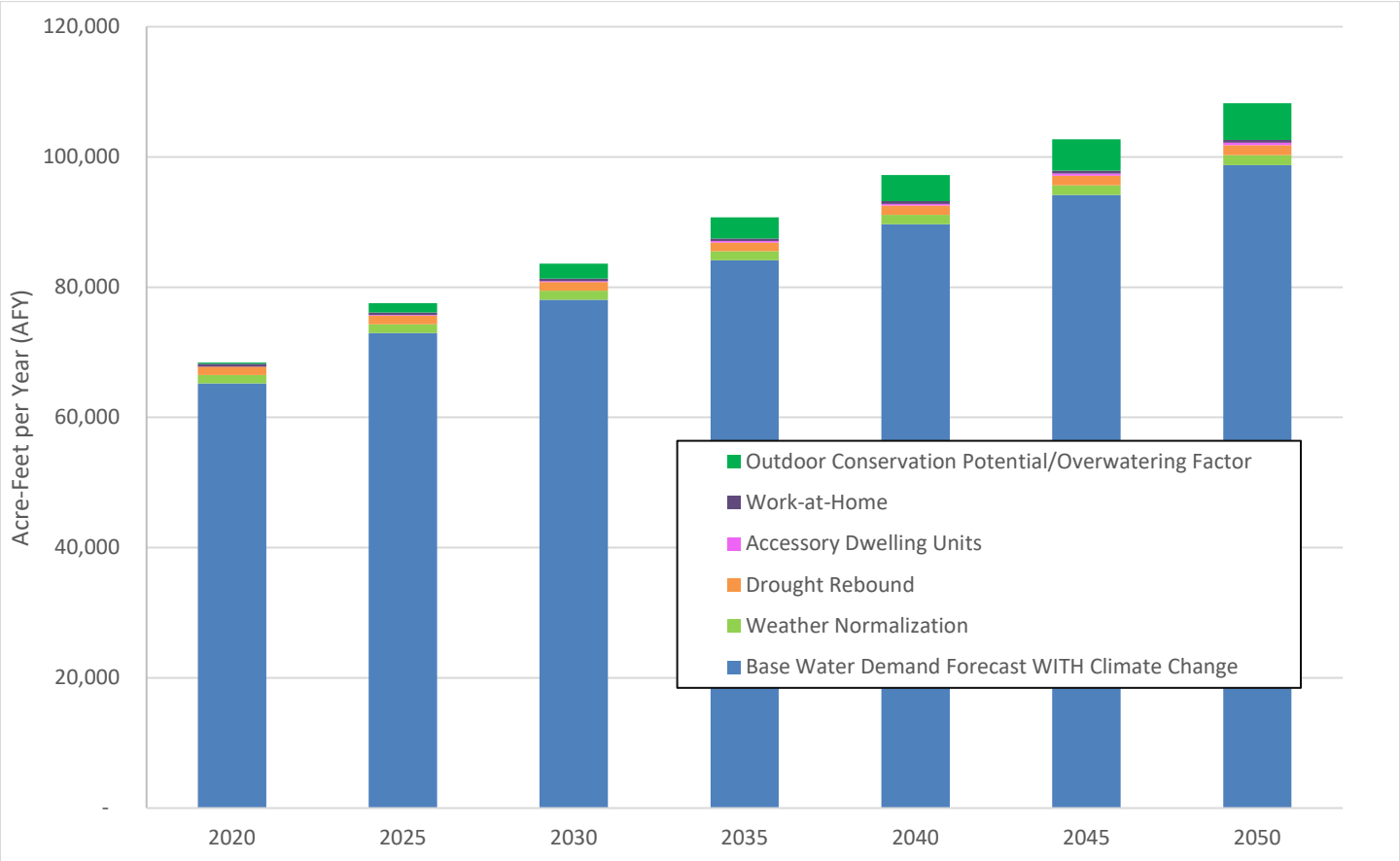


A.4 Demand Factors

Demand factor adjustments address the need to account for weather normalization, drought rebound, and COVID-19 pandemic-prompted work-at-home trends. Figure A-2 presents relative water demand for each demand adjustment.[9] Due to being designed as a percentage of demand, adjustment savings are not directly additive. It is important to note that baseline demands include climate change, but do not include passive and active savings.

[9] When an adjustment's percentage is applied to demand, that demand volume changes. Then another adjustment percentage is applied to the adjusted demand volume, then a third is applied. As a result, the volume of savings is different than if the adjustment percentages had been used against total baseline volume.

Figure A-2. Relativity of SCV Water Potable Water Demand Adjustments



Notes:

1. Due to being designed as a percentage of demand, adjustment savings are not directly additive.
2. Baseline demands do include climate change. Demand is increased by approximately 3.77% by 2050 to capture the effects of climate change.
3. Baseline demands do not include passive savings or active conservation program savings.
4. Baseline demands do not include LACWD demands.
5. Baseline demands do not include recycled water.
6. Weather normalization is based on an adjustment of -0.78% of 2018 data and 5.21% of 2019 data.
7. Drought rebound is based on an increased adjustment of 2% of base year demand.
8. ADUs assume an increase of 1 person for interior water use for ~200 residential accounts per year.
9. Work-at-home assumes a 1% increase in residential water use.
10. Outdoor irrigation inefficiencies are conservatively assumed to be approximately 26% of new development exterior water use.

A.5 Projected Land-Use-Based Demand

New development land use types were aligned with TAZ land use categories as best as possible with the primary goal of aligning them into the correct non-residential billing categories as presented in Table A-4. The table presents projected demand by customer account categories with plumbing code savings and current active conservation program savings. Projected demands also include climate change. Existing customer category account water use projections are a modified projection. This projection was based on 2018 and 2019 actual use adjustments and combined with projected customer category account water use projections, though derived independently as explained previously.

Table A-4. Projected Customer Category Water Demand

Customer Category	Demand (AFY)[1]						
	2020/ Actual[10]	2025	2030	2035	2040	2045	2050/ Buildout
Single Family[2]	32,900	32,700	34,700	36,200	37,500	38,400	39,100
Multifamily[3]	5,200	8,300	8,900	10,500	11,000	11,200	11,500
Commercial[4]	3,700	5,100	5,500	5,800	6,300	6,800	7,300
Industrial[5]	1,100	1,800	1,800	2,100	2,300	2,500	2,700
Institutional[6]	1,700	1,800	2,100	2,100	2,000	2,000	2,000
Irrigation[7]	13,300	12,800	12,800	13,400	13,200	13,100	12,900
Other[8]	400	2,100	2,100	2,400	3,700	5,000	6,300
Subtotal	58,300	64,600	67,900	72,500	76,000	79,000	81,800
Non-Revenue Water[9]	5,900	6,000	5,800	6,200	6,600	7,000	7,400
Total	64,200	70,600	73,700	78,700	82,600	86,000	89,200

[1] Demands include climate change, plumbing code savings, and current active conservation program savings. All values have been rounded to the nearest 100 AFY.
[2] Includes SF unit <1/DU/AC, 5-10 DU/ac, 6-10 DU/AC).
[3] Includes MF condominiums, townhouses, and apartments.
[4] Includes non-residential land use types.
[5] Includes non-residential industrial land use types.
[6] Includes non-residential institutional land use types.
[7] Includes golf courses, parks and HOA common area irrigation.
[8] Includes utility site demands.
[9] NRW in 2020 is actual SCV Water production minus consumption. NRW is estimated to be 8.8% for projected years.
[10] 2020 is actual consumption by category and NRW. 2020 does not include climate change, plumbing code, or active conservation.

Total demand projections presented in presented in Table A-5 and Figure A-3, account for the total projected potable water production in a service area water system, including NRW, regardless of source. Source may be provided from SCV Water surface water or groundwater supplies.

Passive code and standards estimated water savings as well as active current conservation program implementation water savings are presented in Appendix F and Appendix G, respectively.

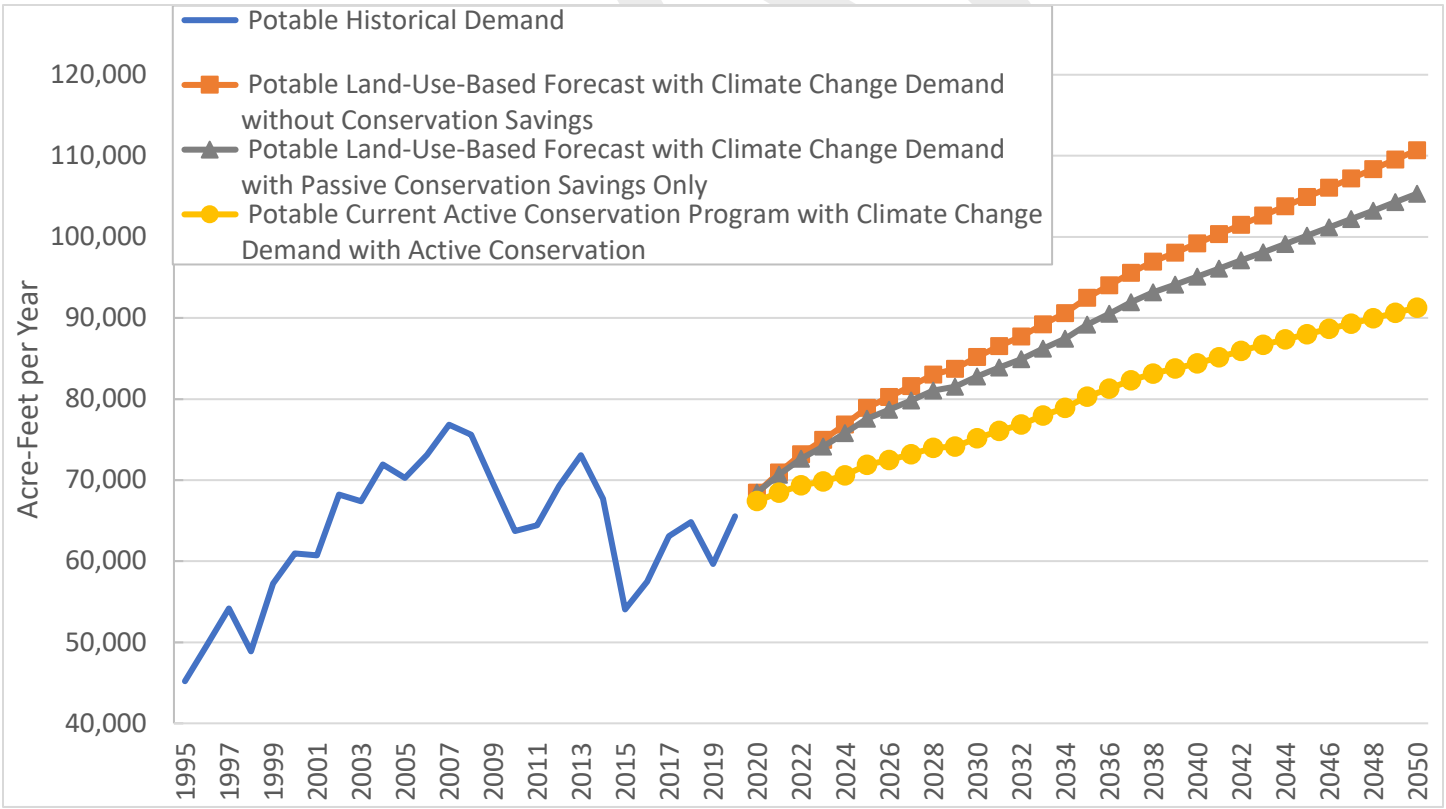
Table A-5. Land-Use-Based Potable Demand Projections – SCV Water

Demand Forecast	2020	2025	2030	2035	2040	2045	2050
Population (Land-Use-Based)	280,600	321,300	349,500	378,300	395,900	404,300	412,700
Land-Use-Based Total Potable Demand with No Plumbing Code Savings (AFY)	64,300	77,600	83,700	90,700	97,200	102,700	108,200
Land-Use-Based Total Potable Demand With Plumbing Code Savings (AFY)		76,300	81,300	87,500	93,300	98,100	103,100
Land-Use-Based Total Potable Demand With Active Conservation Program and Plumbing Code Savings (AFY)		70,600	73,700	78,700	82,600	86,000	89,200

Notes:

1. Year 2020 demands are actual.
2. Total demand accounts for the total projected potable water demand in a service area water system. Source can be from surface water or groundwater.
3. Water demands include climate change and are rounded to the nearest 100 AFY.

Figure A-3. Land-Use-Based Demand Projection – SCV Water



Notes:

1. Demand projections include climate change and do not include recycled water.
2. 2020 demand is actual.

APPENDIX B – LACWD DEMAND ANALYSIS METHODOLOGY AND RESULTS

This appendix presents the population and demand projections for Los Angeles County Water District 36. LACWD did not have detailed enough information (such as specific billing data by lot type) to derive land-use-based demand factors and therefore has a population-based demand forecast. Future population projections based on OVOV buildout estimates in year 2050 were used for the LACWD DSS Model.

B.1 LACWD Population

LACWD historical, current, and projected populations were based on the March 2016 effort (which was based on the 2010 census and 2014 population assessment) with recent year values compared to new accounts by project and SCV staff. Projected population continues to be based on OVOV General Plan estimates for the retail service area based on the GIS efforts conducted in the March 2016 effort.

B.2 LACWD Demand

LACWD demands were based on adjusted 2018 and 2019 average per account water use and relatively normal water year 2017 indoor water use. Demand adjustments were applied to address the need to account for weather normalization, drought rebound, and COVID-19 pandemic-prompted work-at-home trends. 2018 and 2019 demands were adjusted to account for slightly warmer and significantly cooler than normal conditions, respectively. More information about this part of the analysis can be found in Appendix B.

Weather normalization and drought rebound adjustment apply to the retailer's total estimated start year water use. It was estimated that a total drought rebound of 9% occurred by 2019 as compared to year 2015 pre-drought water use. This analysis assumed an additional 2% rebound (increase) in water use on top of the weather normalized average 2018 and 2019 water use. It also assumed a 1% increase in water use due to the continuation of the residential population working at home, that began with the COVID-19 pandemic; this is a preliminary estimate that SCV Water anticipates adjusting as post-pandemic data becomes available. This adjustment was in addition to the drought rebound and weather normalized adjustments previously presented. LACWD's water use is over 90% SF water use.

By 2050, customer category demands are increased by 3.77% to capture the effect of climate change. This bump was feathered in linearly starting with a zero increase initially, rising to 3.77% in 2050 (see Appendix E). This climate change increase is not applied to the NRW volume directly. However, since NRW is calculated as a percent of production, NRW subsequently increases as well. This climate change adjustment is applied "post-process" to the demands with passive savings estimate calculated in the DSS Model. NRW is estimated to be 15.5% of total production as directed by SCV staff and based on an average of 2018 and 2019 LACWD NRW calculated as the difference between production and consumption.

Estimated savings from passive conservation (plumbing codes) were calculated and applied in the DSS Model. No active conservation savings were estimated in this effort for LACWD specifically. SCV efforts that target LACWD's customers were included in the SCV active conservation program budget and savings. Estimated demands with and without passive savings are presented in Table B-1 and Figure B-1. Both demand scenarios include climate change adjustments.

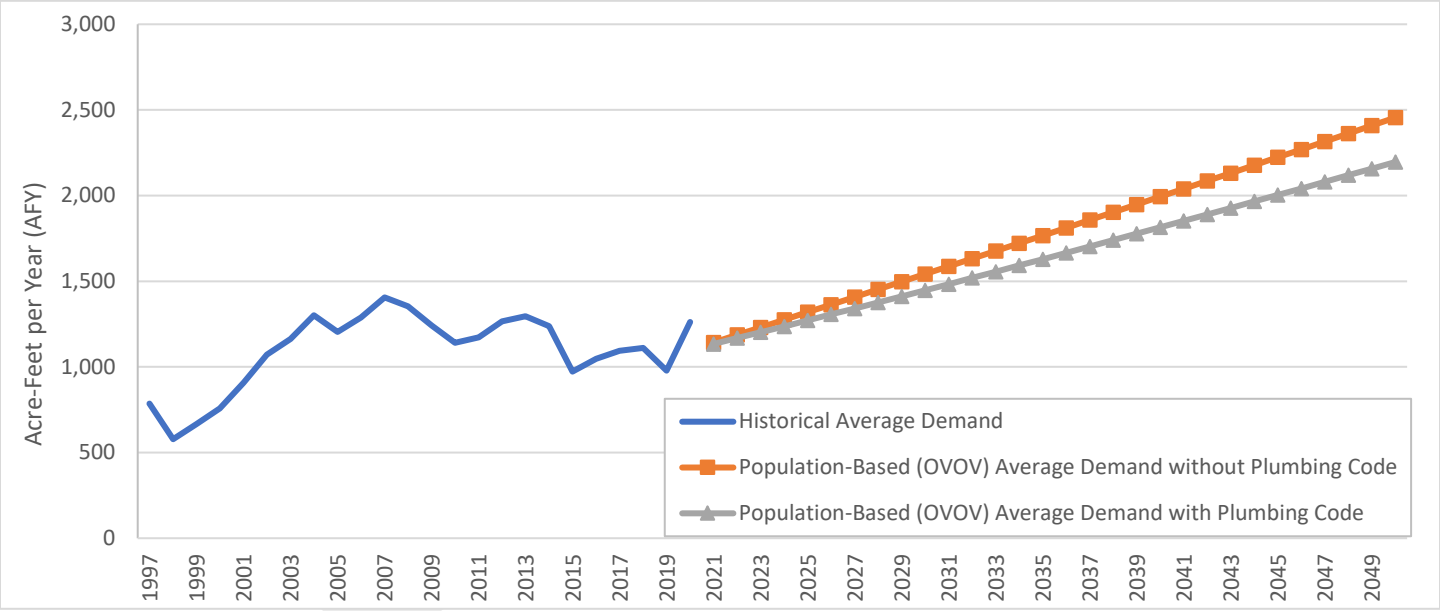
Table B-1. Population-Based Potable Demand Projections – LACWD

Demand Forecast	2020	2025	2030	2035	2040	2045	2050
Population (OVOV Based)	9,000	10,800	12,500	14,300	16,000	17,800	19,500
Population-Based Total Potable Demand with No Plumbing Code Savings (AFY)	1,260	1,320	1,540	1,770	1,990	2,220	2,460
Population-Based Total Potable Demand With Plumbing Code Savings (AFY)		1,270	1,450	1,630	1,810	2,000	2,200

Notes:

1. 2020 is actual demand provided by SCV Water.
2. Total demand accounts for the total projected potable water demand in a service area water system. No active conservation savings were estimated for LACWD in this effort. SCV Water Use Efficiency Program efforts that target LACWD's customers are included in the SCV active conservation program budget and savings.
3. Demand projections include climate change considerations.
4. Population values have been rounded to the nearest 100.
5. Demand values have been rounded to the nearest 10 AFY to better distinguish between scenarios.

Figure B-1. Retailer Demand Projection – LACWD



Notes:

1. Total demand accounts for the total projected potable water demand in a service area water system. No active conservation savings are estimated for LACWD in this effort. SCV Water Use Efficiency Program efforts that target LACWD's customers are included in the SCV active conservation program budget and savings.
2. Demand projections include climate change considerations.

APPENDIX C – COMPARISON WITH PAST 2015 UWMP DEMAND FORECAST AND POPULATION PROJECTIONS

This appendix presents a comparison of the current estimated population and demand projections with the 2015 UWMP (2016 Demand Study) estimates. Overall, valleywide dwelling units are consistent with the OVOV General Plan, and valleywide population is estimated to be approximately 3% higher and total valleywide demands are 7% higher at buildout from the 2015 UWMP. The comparison includes non-potable demands since these were not isolated in the last effort. Current demand projections are higher at buildout due to 1) the increase in demand from climate change at an estimated 4% by buildout, 2) the 3% increase in population, and 3) an additional 25% increase in future irrigation water use due to anticipated overwatering and equipment inefficiencies.

Table C-1 presents valleywide estimated population and demand projections from the 2015 UWMP and 2016 Demand Study.

Table C-1. 2015 Urban Water Management Plan and 2016 Demand Study Water Demands and Population

Demand Forecast	2015	2020	2025	2030	2035	2040	2045	2050
Projected Population	272,600	289,000	321,900	354,700	383,400	396,100	408,800	421,500
Estimated Total Demand with No Plumbing Code Savings (AFY)	72,000	79,800	90,100	100,400	109,500	113,800	118,200	122,600
Estimated Total Demand With Plumbing Code Savings (AFY)	71,600	76,700	84,800	92,800	100,000	103,300	106,800	110,300
Estimated Total Demand With Active Conservation and Plumbing Code Savings (AFY)	69,100	69,000	74,600	80,800	86,100	88,500	91,000	94,000

Note: Demands and population values are from the 2015 Urban Water Management Plan, include recycled water, and have been rounded to the nearest 100.

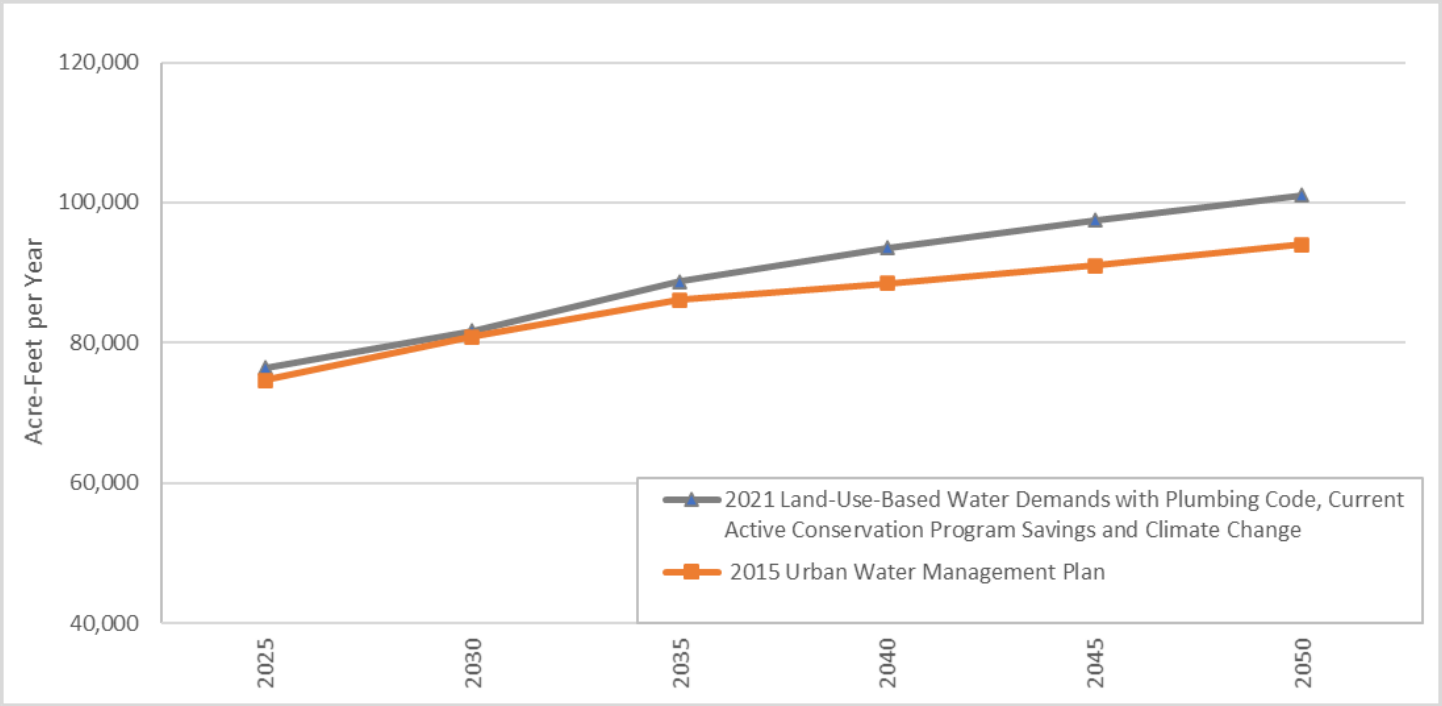
Table C-2 and Figure C-1 present the estimated valleywide population and demand projections.

Table C-2. 2021 Land-Use-Based Projected Water Demands and Population

Demand Forecast	2025	2030	2035	2040	2045	2050
Projected Population	332,100	362,100	392,500	411,900	422,100	432,200
Estimated Total Demand with No Plumbing Code Savings (AFY)	83,400	91,600	100,800	108,200	114,200	120,200
Estimated Total Demand With Plumbing Code Savings (AFY)	82,100	89,300	97,600	104,300	109,600	115,100
Estimated Total Demand With Active Conservation and Plumbing Code Savings (AFY)	76,400	81,700	88,700	93,600	97,500	101,000

Note: Demands include LACWD, recycled water, and climate change and have been rounded to the nearest 100.

Figure C-1. 2021 Land-Use-Based Water Demands versus 2015 Urban Water Management Plan Demands



Notes:

1. Both demand lines include passive savings, active conservation savings and recycled water.
2. The grey 2021 Land-Use-Based demand also includes climate change.

Buildout population is higher primarily due to 1-person ADUs being added to the projected annual estimate at approximately 200 per year. ADUs are located on existing SF properties, increasing SF population and indoor use but not SF accounts or outdoor use.

APPENDIX D – ECONOMETRIC MODEL

This appendix presents the econometric model and related results. Also included is an evaluation of the climate change scenario's impact on demand. The parameters that define the climate change scenario itself are developed and presented in greater detail in Appendix E.

D.1 Introduction

In preparing the 2020 Urban Water Management Plan, SCV Water opted to use the same demand forecasting framework that was previously adopted in 2015. This framework leverages the power of econometric models to generate short-term forecasts, with the power of a land-use-based forecasting methodology for extended years. To establish a valid starting point for a baseline demand forecast, it has become increasingly difficult to identify what might be considered a "normal" or set of "normal" years from which to a derive such a starting point. California has experienced few normal years during the last decade or so. There was a deep recession in 2008 with effects on demand lingering through 2010. With quickening economic activity, demand began to rebound. However, California soon found itself facing a severe drought with increasingly stringent water-use restrictions going into effect from 2014 until the drought was declared over in 2017. Once again, demand began to rebound from the low levels reached during 2015 and 2016, only to once again be confounded by the COVID-19 pandemic of 2020 (continuing into 2021).

The purpose of the econometric model is to estimate the impact of these past confounding factors (economic cycles,[10] weather fluctuations, and drought restrictions) on water demand using monthly production data from 1995-2019. No attempt was made to capture the impact of the COVID-19 pandemic since that is still an evolving influence with an unknown long-term impact. In addition to these cyclical confounding factors, the econometric model also is able to capture the impact of past rate increases, which have a cumulative dampening effect on water demand over time. The econometric model can be used to address questions such as, how much more will demand rebound, normalized for weather, as the recent drought fades from memory?

Finally, the econometric model is put to a new purpose for the 2020 UWMP update effort and this land-use based demand analysis. Since a key purpose of building the econometric model is to capture the impact of weather on demand, it can also be used to evaluate the impact of future climate change. Appendix E discusses the development of SCV Water's climate change scenario from data resources made available by DWR. Evaluation of this scenario's impact on demand is undertaken through the econometric model, as discussed below.

The same model specification as the one used in 2015, with a few modifications, was selected for the present round of analysis (Eq. 1):

$$Ln(monthly\ GPCD) = \alpha + \beta Trend + \theta Ln(unemployment\ rate) + \delta Ln(marginal\ price) + \vartheta Reference\ ETo\ Deviation + \Omega Rainfall\ Deviation + \pi monthly\ indicators + \mu drought\ restriction\ indicators + \varepsilon \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots Eq.\ 1$$

Where,

- Monthly production is measured in GPCD.
- α is a scaling constant.

[10] Economic conditions were captured by the monthly unemployment rate for the City of Santa Clarita obtained from the Bureau of Labor Statistics. The City of Santa Clarita's and Los Angeles County's unemployment rates performed comparably in the models.

- Trend is a variable that takes on a value of 0 in the first year, 1 in the second year, and so on.
- Unemployment rate is captured as an annual percent (for example, 7%).
- Marginal price is for single family customers, measured in dollars per hundred cubic feet.
- Reference ETo deviation is measured in total inches (average monthly ETo minus average for the same month between 1995 and 2019).
- Rainfall deviation is measured in total inches (total rainfall in a given month minus average total rainfall for same month between 1995 and 2019).
- Monthly indicators are binary 0-1 variables, taking on a value of 1 for a given month in question, 0 otherwise.
- Drought restriction timeline indicators are binary 0-1 variables, taking on a value of 1 for when a restriction was in effect, 0 otherwise.
- ε denotes random statistical error.

The variable on the left-hand side of the equation is known as the dependent variable, while the right-hand side variable is the independent variable. Each independent variable is preceded by a coefficient (i.e., β, etc.) that measures the strength of the impact of an independent variable on monthly demand. A positive coefficient implies that increases in an independent variable will be associated with an increase in the dependent variable; a negative coefficient implies the opposite. The purpose of model development is both to select the elements of the equation, as well as to estimate each independent variable's coefficient. Continuous variables such as the marginal price and the unemployment rate are logarithmically transformed so that their respective coefficients can be given a proportional interpretation. So, for example, the coefficient on logarithmically transformed marginal price becomes the price elasticity, and so on. The trend variable captures changes in GPCD over time not accounted for by price, unemployment rate, or weather. It was included and tested in the model, but found to be unnecessary.

The basic model specification (Eq. 1) includes several features. First, SCV Water's Water Division-specific production data are modeled at a monthly, not annual level. The reason for estimating monthly level models is to allow for the impact of weather to vary by time of year. Prior research strongly indicates that abnormal weather does not have the same effect in January as, say, in May.[11] Working with monthly production data allows for the incorporation of time-varying weather effects. Second, metrics used to capture weather (reference ETo and rainfall[12]) enter the model as deviations from their respective monthly averages, capturing directly how demand reacts to weather as it deviates from average. Normal seasonality in monthly demand (i.e., July demand being much higher than January demand) is captured by the monthly indicator variables. It is necessary to capture the impact of weather using reference ETo and rainfall instead of temperature and rainfall because DWR's climate change tool defines climate change scenarios only in former terms.

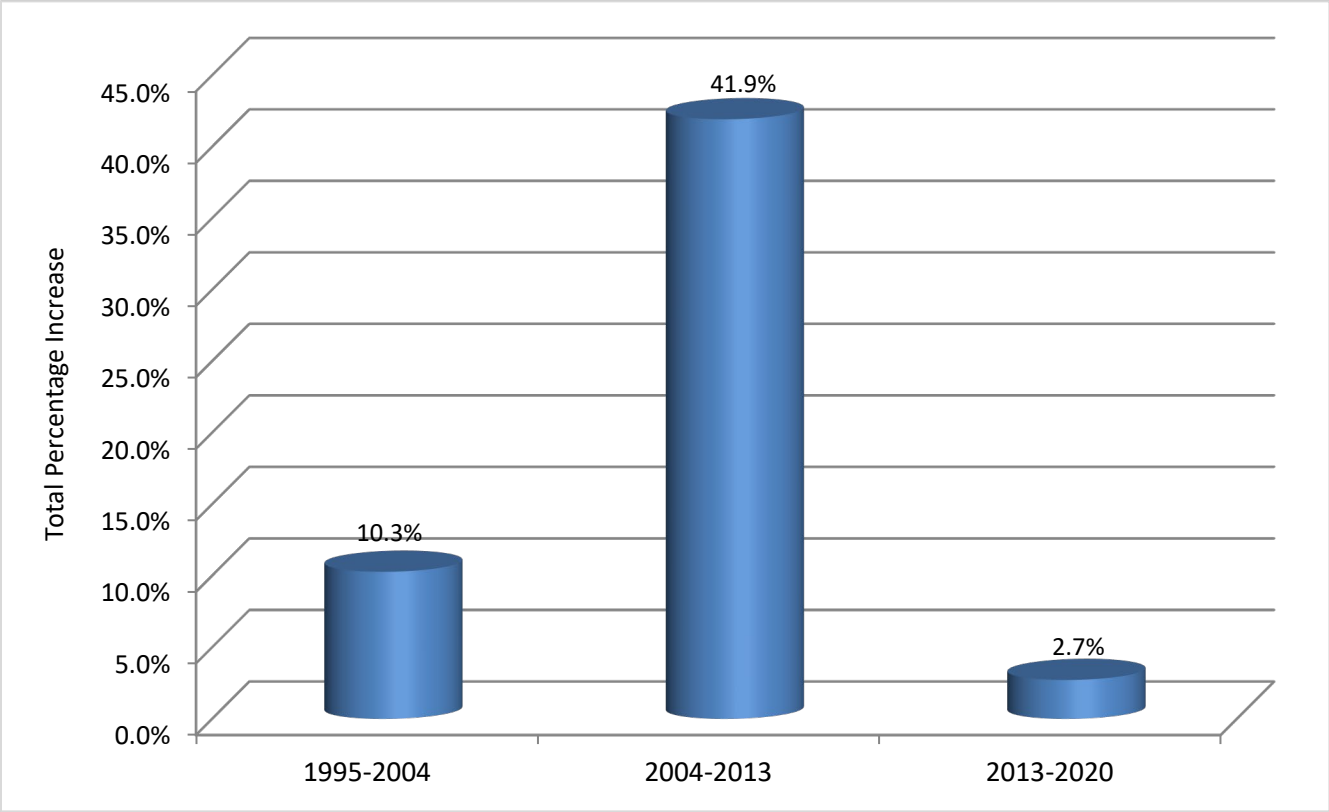
Finally, the model also includes a measure of the marginal price of water in real terms (i.e., price deflated by the consumer price index published by the Bureau of Labor Statistics). The marginal price of water faced by the average single family customer in a Water Division is used to depict price variation over time. By and large, CII

[11] Bamezai, A. (2011). *GPCD Weather Normalization Methodology*, final report submitted to the California Urban Water Conservation Council.

[12] Reference ETo and rainfall data were obtained from the CIMIS station in Santa Clarita. This station offers monthly data from 2007 onward. For the 1995-2006 period, rainfall histories were reconstructed using National Oceanic and Atmospheric Administration weather stations located in Santa Clarita Valley, and reference ETo was reconstructed using DWR resources (PRISM and Spatial CIMIS).

and single family price trends appear similar. Figure D-1 shows price escalation faced by single family customers in SCV Water's service area overall, calculated as a weighted average of each Water Division's price data. The period between 2004 and 2013 saw sharp increases in water rates, rising a total of 41.9% in real terms during that 10-year period.

Figure D-1. Trends in the Single Family Real Price of Water for SCV Water's Three Water Divisions



D.2 Econometric Model Results

A single model was developed using data from each of SCV Water's three Water Divisions to characterize the impact of various drivers on monthly demand (Table D-1). This type of model is known as a time-series, cross-sectional model.[13] Treating each Water Division as a separate cross-section allows for rate histories to vary across Water Divisions. This three-piece model incorporates Water Division-level fixed effects, a correction for autocorrelation in the error term, and population weighting to account for the different Water Division sizes. The fixed effects capture the impact of Water Division characteristics that do not vary much over time, such as average household income and lot size, leading to a much more robust model specification than one without these fixed effects. In other words, implicitly through these fixed effects the model captures the impact on GPCD of income, lot size, and other unobservable time-invariant differences across Water Divisions.

[13] The time series part refers to the length of time that is modeled (i.e., monthly data from 1995-2019). The cross-section part refers to SCV Water's three Water Divisions that comprise SCV Water's service area.

Table D-1. SCV Water Model Results

Independent Variable	Coefficient	Std. Error	t-statistic
Ln(Marginal Price)	-0.304	0.038	-8.1
Ln(Unemployment Rate)	-0.081	0.015	-5.4
Reference ETo Dev. (Apr-Jun)	0.078	0.008	9.8
Reference ETo Dev. (Jul-Oct)	0.059	0.009	6.8
Reference ETo Dev. (Nov-Mar)	0.128	0.009	14.5
Rain Dev. (Apr-Jun)	-0.064	0.008	-8.4
Rain Dev. (Jul-Oct)	-0.024	0.007	-3.6
Rain Dev. (Nov-Mar)	-0.020	0.002	-10.2
Feb Indicator	-0.070	0.011	-6.2
Mar	0.086	0.015	5.8
Apr	0.330	0.018	18.7
May	0.596	0.019	31.9
Jun	0.751	0.019	39.3
Jul	0.879	0.019	45.7
Aug	0.891	0.019	46.6
Sep	0.778	0.019	42.0
Oct	0.562	0.018	32.1
Nov	0.330	0.015	21.4
Dec	0.070	0.013	5.6
Drought Indicator (May-Dec of 2014)	-0.066	0.031	-2.2
Drought Indicator (2015)	-0.058	0.030	-2.0
Drought Indicator (June-Sep of 2015)	-0.215	0.039	-5.5
Drought Indicator (2016)	-0.141	0.030	-4.7
Drought Indicator (June-Sep of 2016)	-0.058	0.039	-1.5
Drought Indicator (Jan-Sep of 2017)	-0.185	0.030	-6.1
Constant	5.200	0.032	161.8
Water Division interactions with monthly dummies	Included		
R-Square	0.89		

Notes:

1. Model includes SCV Water's three Water Divisions.
2. Dependent Variable: Ln(Monthly Baseline GPCD)
3. The large number of coefficients associated with the Water Division fixed effects and Water Division interactions with monthly dummies are not shown for the sake of brevity.

In addition to the fixed effects, each Water Division is allowed to have its own time trend to capture the impact of service area dynamics that influence water use but are not fully captured either by price, unemployment rate, or weather. The normal seasonality in water use is also allowed to vary across retailers.

The estimated three-Water Division model (Table D-1) has three columns, including one for the estimated coefficient, one for the likely band of error surrounding this coefficient (referred to as standard error), and one for the t-statistic. An independent variable's t-statistic is the ratio of the coefficient over its standard error. A t-

statistic of 2 or greater indicates a statistically significant relationship between the dependent and independent variable; less than 2 indicates that the data are not able to conclusively demonstrate a relationship. The latter finding may reflect the lack of any relationship. Or, it may occur because of data errors or other problems, such as two or more independent variables being highly correlated with one another. The model's R-square is indicative of the overall explanatory power of a statistical model. It can vary between zero and 1, with higher numbers indicating greater explanatory power.

Table D-1's coefficients have the following interpretation:

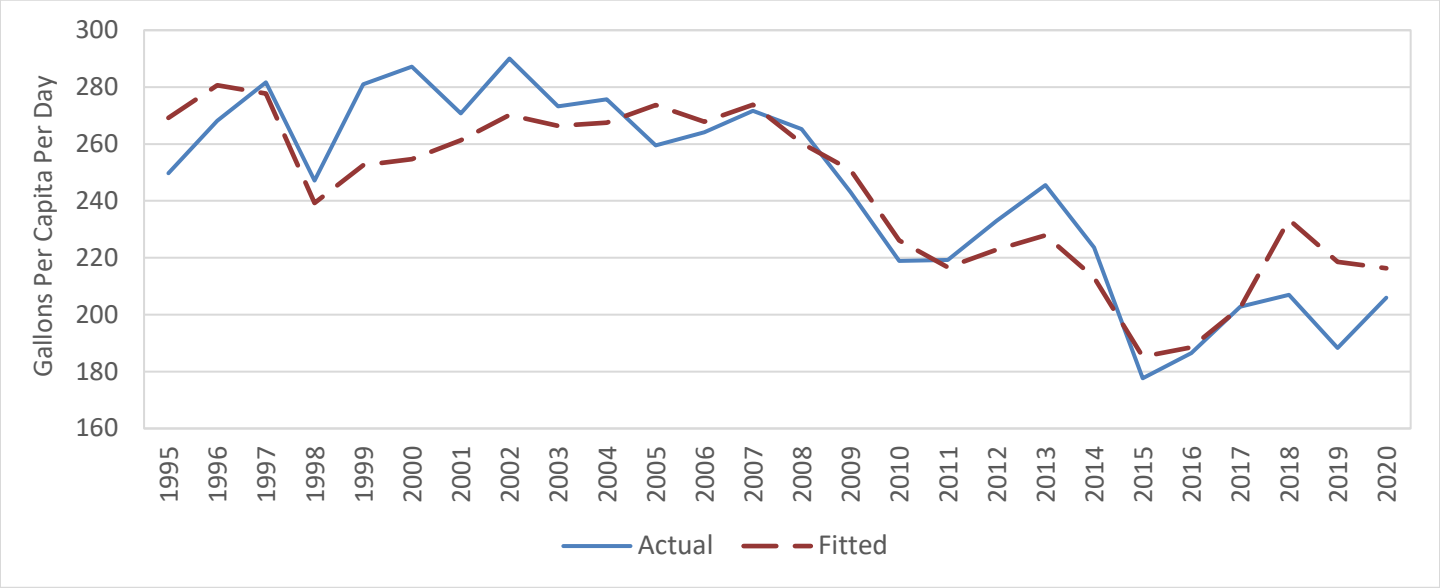
- A price elasticity of -0.3 indicates that a 10% real increase in the marginal price of water can be expected to reduce demand by 3%. This estimate of price elasticity compares well with the published literature on this topic.
- A 10% increase in the annual unemployment rate is likely to depress water demand by 0.8%. Both the impact of price and economic conditions on demand are statistically significant.
- The weather coefficients are all significant and behave in expected ways. An extra inch of rainfall per month during the spring season reduces monthly demand by roughly 6.1%, while the same extra inch during the winter months only depresses monthly demand by 2.0%.
- On the reference ETo dimension, if monthly ETo is one inch greater than normal, this is likely to raise monthly water demand by 8.0% during the spring season, 6.0% during the summer season, and 13.2% during late fall and winter seasons. Lower than average reference ETo would have the opposite effect.

The monthly indicator variables also exhibit the expected pattern with July and August exhibiting the largest coefficients, indicating that July and August demand is greatest during the year, reaching a minimum during February.

To capture the impact of drought messaging in 2014 and subsequent irrigation restrictions in 2015 and 2016, the model also includes time-period indicator variables. For example, the model suggests that drought messaging that began in May of 2014 and remained in effect until the end of the year caused monthly demand to fall by approximately 6.6% during the May-December period. The effect of messaging in 2015 was comparable to 2014, but irrigation restrictions caused summer demand in 2015 to further drop by an additional 21.5%. By 2016 and 2017, conservation behavior had been internalized by customers and reduced demand exhibits itself as an all-year phenomenon instead of a largely summer phenomenon, as was the case during 2015.

Figure D-2 shows how the model's fitted values compare with SCV Water's GPCD trend at an annual level (the monthly model's fitted values are aggregated to an annual level). The resulting R-square value of 0.89 shows that there is a good match between actual and fitted values. The model captures the downturn in demand experienced during the 2008-2011 period, a result of the recession and its aftereffects. Then, from 2014 onward, demand once again drops due to drought messaging initially then eventually due to implementation of irrigation restrictions in 2015.

Figure D-2. SCV Water Econometric Model Fit



The model's fitted values in 2018 and 2019 exceed actual demand in these two post-drought years. Year 2020 data is also shown for illustration purposes, but was not used for model estimation because of the COVID-19 pandemic. One interpretation of fitted values exceeding actual 2018 and 2019 demand is that the gap illustrates likely remaining demand rebound that will resurface as lingering drought behaviors fade. However, by 2020, the model's fitted value was approaching 2020 actual demand. This suggests while there may exist remaining increased demand normalization for post-drought demand to rebound, it is assumed the rebound will likely remain relatively small and as result was represented by a net 2% increase in future base year demands. The data suggest that 2018 was a slightly warmer than normal year and 2019 was the reverse, cooler than normal. The weather normalization corrections work out to -0.78% for 2018 and 5.21% for 2019. Weather normalized demand in 2018 and 2019 are very close to one another. The starting point for the baseline demand forecast is derived using the average of 2018 and 2019 weather-normalized demands, increased by 2% to account for yet-to-be-realized drought rebound.

D.3 Climate Change Assessment

Appendix E shows the development of a climate change scenario for Santa Clarita Valley in 2050, the horizon year for this land-use-based demand analysis planning effort. The climate scenario is defined in terms of monthly change factors in reference ETo and precipitation relative to baseline normal weather. The econometric demand model was constructed in a way so as to easily accommodate these types of climate change simulation inputs. First, a demand model is constructed at a monthly time step using reference ETo and precipitation to capture weather fluctuation. The model specification evaluates the impact of weather deviations from normal. It is straightforward to take the estimated model coefficients and simulate how much demand would be higher if weather deviations from normal are set to what the 2050 climate scenario suggests.

The difference works out to a projected net increase of 3.77%. In other words, if 2050 weather were present in 2018 and 2019, on average demand would have been 3.77% higher across the two years compared to normal weather. This increase, however, is expected to arrive gradually over time, essentially starting with a 0% impact in 2020 and rising to 3.77% annually in 2050. Between these two bracketing years (2020 and 2050) the impact of climate change is layered linearly onto the baseline demand forecast.

APPENDIX E – CLIMATE CHANGE SCENARIO DEVELOPMENT

The 2020 UWMP land use demand forecast extends to the year 2050 buildout. To factor in the effect of climate change requires an estimate of how 2050 climate is likely to differ compared to baseline normal climate. These estimates are obtained from the climate change scenarios and supporting data that DWR has made available for assessing groundwater basin sustainability to support implementation of the Sustainable Groundwater Management Act (SGMA). GSI Water Solutions recently completed a groundwater basin sustainability study for SCV Water utilizing these data resources. To remain consistent with climate change scenarios used for evaluating supply impacts, the same set of assumptions are used for evaluating the impact of climate change on future demand.[14]

More specifically, DWR provides downscaled, gridded information about expected percentage changes in reference ETo and precipitation for two different time horizons (i.e., year 2030 and 2070).[15] Each grid is roughly 6 kilometers by 6 kilometers in area, allowing for a granular assessment of local groundwater conditions. These change factors are derived as the average of 20 climate model predictions for each horizon year. These 20 climate models were selected by DWR's *Climate Change Technical Advisory Group* in 2015 as best representing California.[16]

The gridded change factors are provided as a climatological time series by month and year between 1915 and 2011. It is meant to capture how historical weather during the 1915-2011 period in a grid would have been different under expected climate conditions in 2030 and 2070. This format allows groundwater modelers to simulate water budgets under alternative scenarios, such as actual historical weather, or historical weather modified by the change factors to reflect expected 2030 or 2070 weather conditions. This simulation approach preserves historical inter-annual weather variability, allowing for an apples-to-apples comparison across the simulation of alternative scenarios.

To capture expected future weather conditions in the Santa Clarita Valley, change factors for reference ETo and precipitation were downloaded for the two grids that cover the SCV Water service area (Grid ID# 10052 & Grid ID# 10134) and averaged. With the goal of demand forecasting at a future point in time instead of simulating the impact of inter-year variability on a groundwater budget, the change factors were averaged by month across the 1980-2010 period which worked out to 1995, the beginning of the demand modeling period. Figure E-1 shows monthly factors by which reference ETo is expected to be higher relative to 1995 in both year 2030 and year 2070. Figure E-2 shows the same for precipitation. Change factors are multipliers; thus, a factor of 1.0 would mean no change.

[14] GSI Water Solutions, Inc. (2020). *Development of a Numerical Groundwater Flow Model for the Santa Clara River Valley East Groundwater Subbasin*, Draft Report prepared for SCV Water.

[15] The SGMA data viewer and download tool is available at SGMA Data Viewer (ca.gov). A detailed description of these data resources and how to use them is included in the following report: Department of Water Resources (2018). *Guidance for Climate Change Data Use During Groundwater Sustainability Plan Development*.

[16] Department of Water Resources and Climate Change Technical Advisory Group. (2015). *Perspectives and Guidance for Climate Change Analysis*.

Figure E-1. Monthly Reference ETo Change Factors

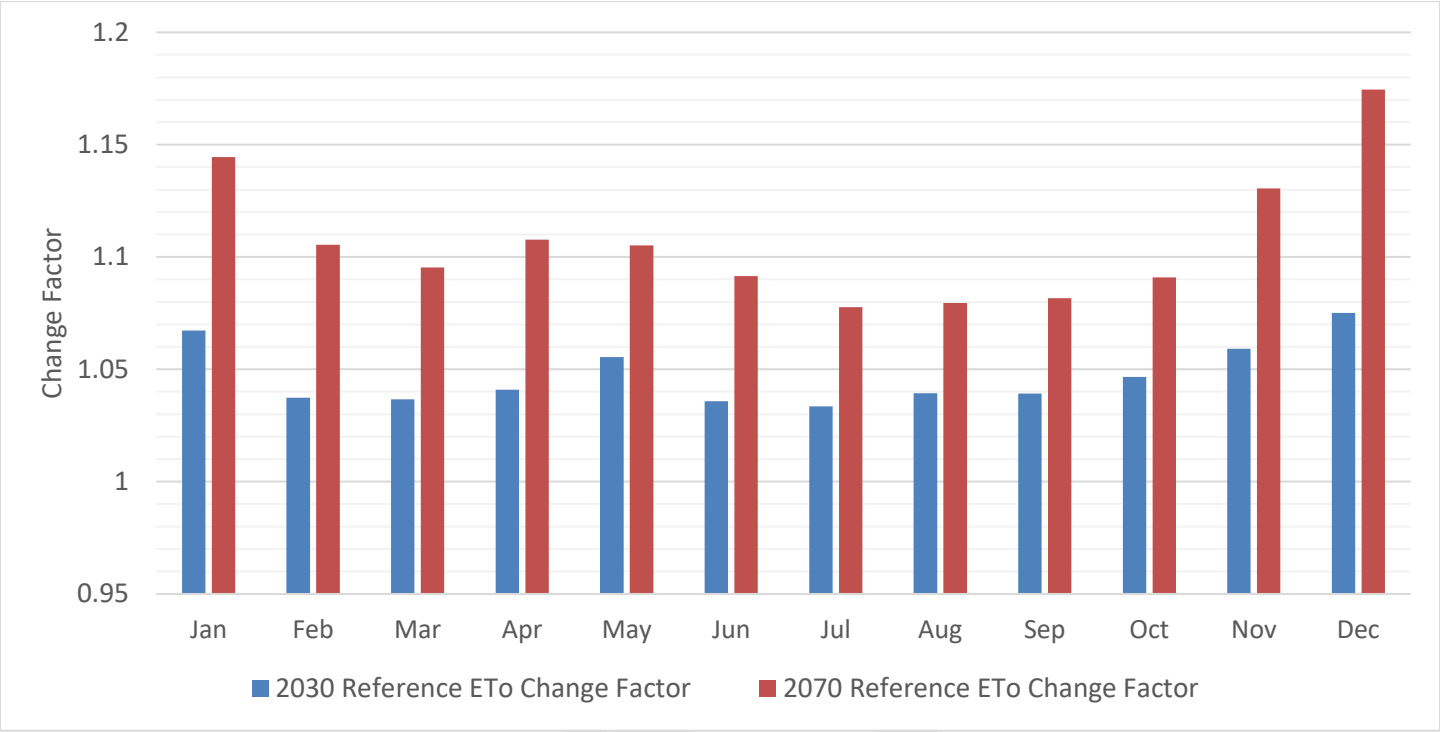
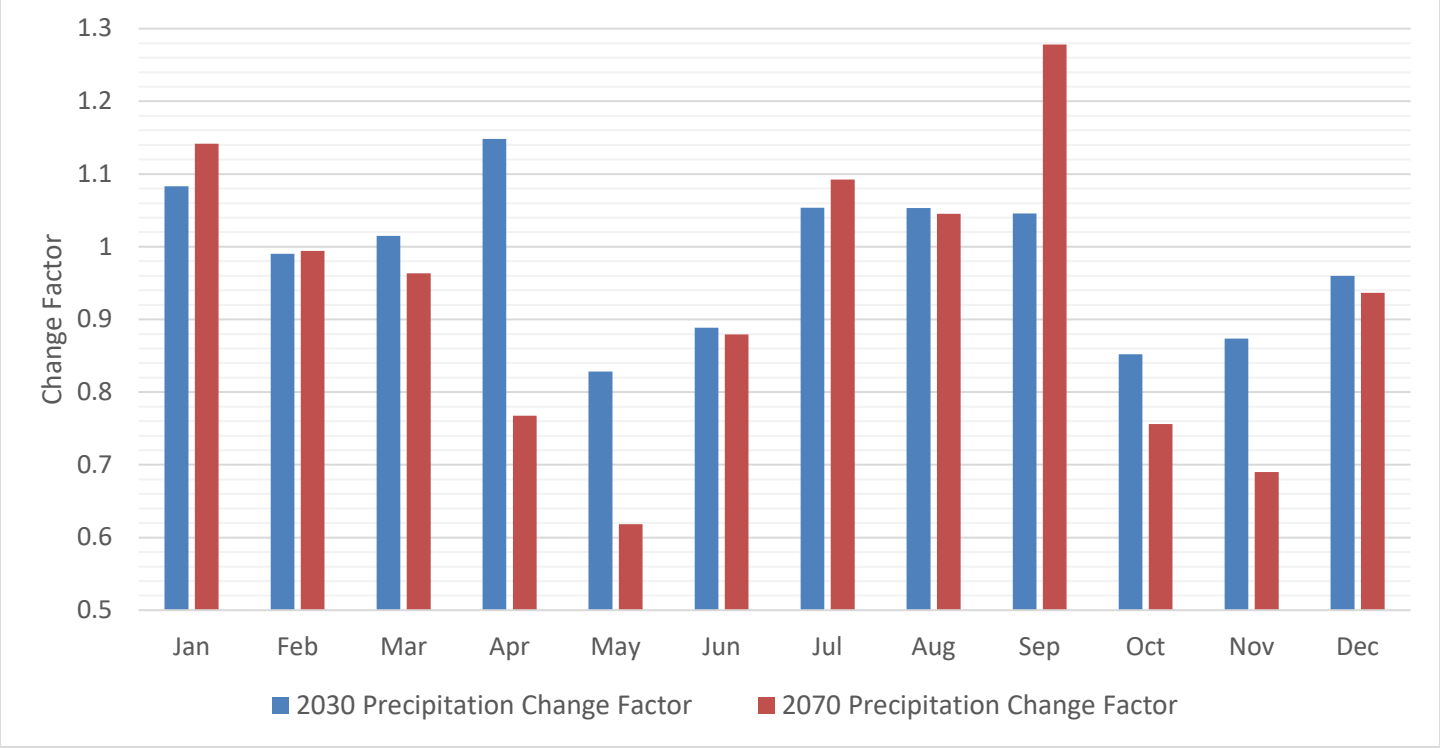


Figure E-2. Monthly Precipitation Change Factors



These climate change factors suggest that the monthly reference ETo in the Santa Clarita Valley is expected to be higher by approximately 5% in 2030, and 10% in 2070. Although by 2070, winter months would have experienced sharper warming that other months. With respect to precipitation, climate change is not expected to have much effect on the primary rainy months in the Santa Clarita Valley (December-March) and summer

months may actually see a mild increase in precipitation. Overall, climate change is expected to have a more material impact on reference ETo than precipitation.

To develop a climate change scenario that represents the land-use analysis' end-point of 2050, the change factors for 2030 and 2070 were averaged since the midpoint of this period coincided with 2050. This exercise yielded 12 monthly change factors each for reference ETo and precipitation. The econometric demand model was constructed at a monthly time step and used reference ETo and precipitation to model the impact of weather. So, incorporating these change factors was straightforward.

These change factors were fed into the econometric model to forecast what demand would have been in 2018 and 2019 under projected 2050 weather conditions. The model also was used to forecast what demand would have been in 2018 and 2019 under baseline normal weather conditions. The starting point of the baseline demand forecast was estimated from the weather normalized average of 2018 and 2019 demand.

The difference worked out to a projected increase of 3.77% on total production. In other words, if 2050 weather were present in 2018 and 2019, on average demand would have been 3.77% higher across the two years as compared to normal weather. As described in Appendix D, this increase, however, is expected to arrive gradually over time, essentially starting with a 0% impact in 2020 rising to 3.77% in 2050. Between these two bracketing years (2020 and 2050) the impact of climate change is layered linearly on to the baseline demand forecast.

APPENDIX F – PASSIVE CONSERVATION SAVINGS BASIS

This appendix presents the methodology used to determine passive water savings in the SCV Water Three Water Divisions DSS Model and in the LACWD DSS Model, information regarding national and state plumbing codes, and key inputs and assumptions used in the DSS Model including fixture replacement and estimates. Note that the DSS Model does not assess passive water savings for outdoor use. It focuses on plumbing code change impacts on indoor fixtures. However, the DSS Model does incorporate impacts of outdoor code changes, such as MWELO updates, into in active conservation savings analyses.

F.1 Plumbing Code Savings Summary

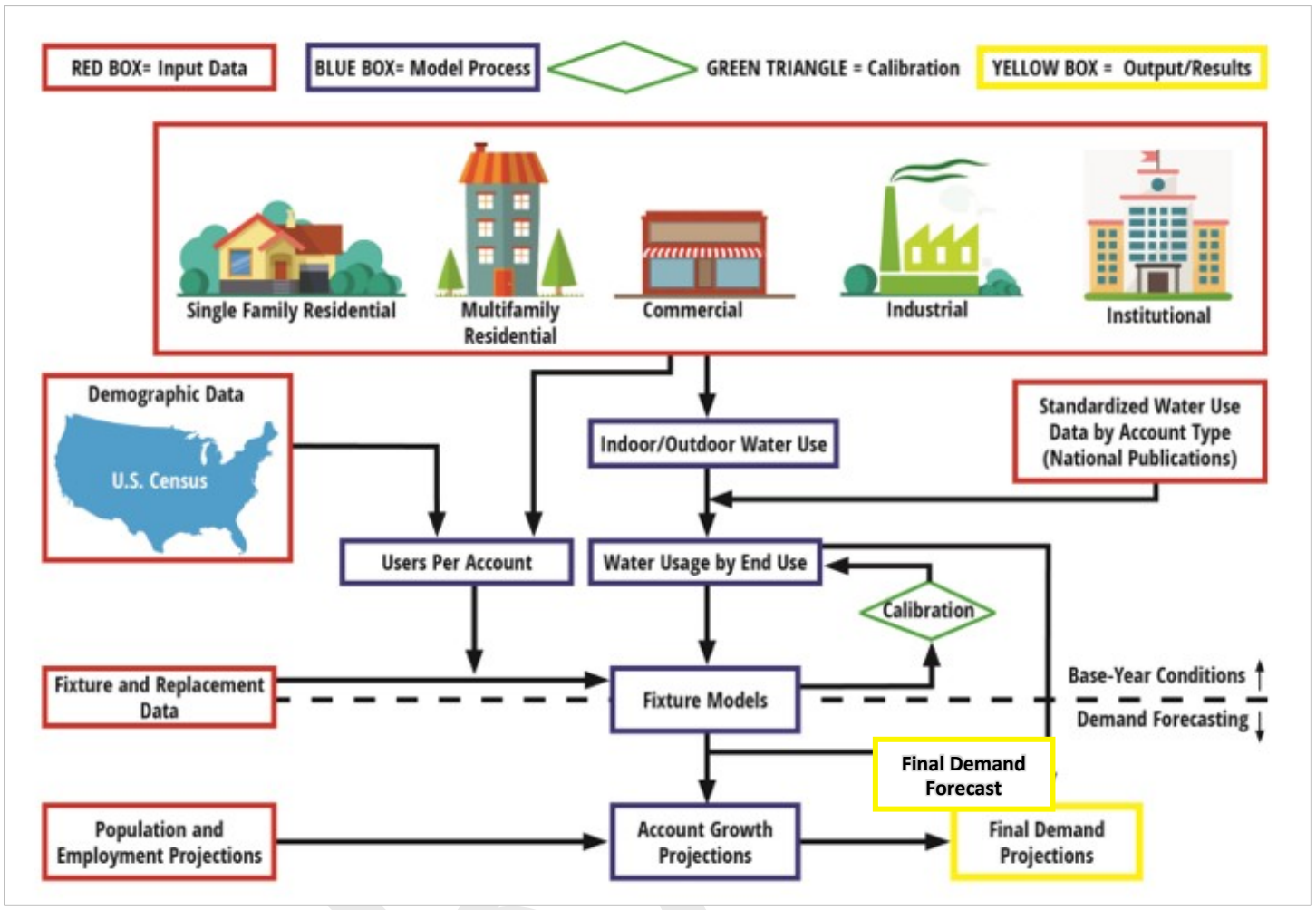
In the codes and standards portion of the DSS Model, specific fixture end-use type (point of use fixture or appliance), average water use, and lifetime are compiled to forecast service area water fixture use. Additionally, state and national plumbing codes and appliance standards for toilets, urinals, showers, and clothes washers are modeled by customer category. This approach yields two distinct demand forecasts related to plumbing code savings: 1) with plumbing codes and 2) without plumbing codes. Plumbing code measures are independent of any water use efficiency program and are based on customers following applicable local, state, and federal laws, building codes, and ordinances.

Plumbing code-related water savings are considered "passive" and reliable long-term savings and can be depended upon over time to help reduce overall system water demand. In contrast, water savings are considered "active" if a specific action unrelated to the implementation of codes and standards is taken by SCV Water to accomplish water use efficiency measure savings (e.g., offering turf removal rebates). The DSS Model incorporates the following items as a "code," meaning that the savings are assumed to occur and therefore are "passive" savings:

- The Federal Energy Policy Act of 1992 (amended in 2005)
- California Code of Regulations Title 20 California State Law (Assembly Bill 715)
- California State Law Senate Bill 407
- 2015 California Code of Regulations Title 20 Appliance Efficiency Regulations
- 2019 CALGreen Code (effective January 1, 2020)

Figure F-1 conceptually describes how plumbing codes using "fixture models" are incorporated into the flow of information in the DSS Model. The demand forecast, including plumbing code savings, further assumes no active involvement by SCV Water, and that the costs of purchasing and installing replacement equipment (and new equipment in new construction) are borne solely by the customers, occurring at no SCV Water expense.

Figure F-1. DSS Model Overview Used to Make Water Demand Forecast



The inverse of the fixture life is the natural replacement rate expressed as a percent (i.e., 10 years is a rate of 10% per year).

F.2 National Plumbing Code

The Federal Energy Policy Act of 1992, as amended in 2005, mandates that only fixtures (as listed below) meeting the following standards can be installed in new buildings:

- Toilet – 1.6 gal/flush maximum
- Urinals – 1.0 gal/flush maximum
- Showerhead – 2.5 gal/min at 80 pounds per square inch (psi)
- Residential faucets – 2.2 gal/min at 60 psi
- Public restroom faucets – 0.5 gal/min at 60 psi
- Dishwashing pre-rinse spray valves – 1.6 gal/min at 60 psi

Replacement of fixtures in existing buildings is also governed by the Federal Energy Policy Act, which mandates that only devices with the specified level of efficiency (as shown above) can be sold as of 2006. The net result of the plumbing code is that new buildings will have more efficient fixtures and old inefficient fixtures will slowly be replaced with new, more efficient models. The national

plumbing code is an important piece of legislation and must be carefully taken into consideration when analyzing the overall water efficiency of a service area.

In addition to the plumbing code, the U.S. Department of Energy regulates appliances, such as residential clothes washers, further reducing indoor water demands. Regulations to make these appliances more energy efficient have driven manufactures to dramatically reduce the amount of water these machines use. Generally, front-loading washing machines use 30-50% less water than conventional (top-loading) models, which are still available but are becoming more water efficient.

In this analysis, the DSS Model forecasts a gradual transition to high efficiency clothes washers (using 12 gallons or less) so that by the year 2025 that will be the only type of machine available for purchase. In addition to the industry becoming more efficient, rebate programs for washers have been successful in encouraging customers to buy more water efficient models. Given that machines last about 10 years, eventually all machines on the market will be the more water efficient models. Energy Star washing machines have a water factor of 6.0 or less – the equivalent of using 3.1 cubic feet (or 23.2 gallons) of water per load. The maximum water factor for residential clothes washers under current federal standards is 6.5 (equates to approximately 19 gallons per load based on an average 2.9 cubic ft. tub). The water factor equals the number of gallons used per cycle per cubic foot of capacity.

Water Factor (WF) = gallons per load/tub volume

OR

washer capacity (cubic ft.)/average tub volume

Prior to the year 2000, the water factor for a typical new residential clothes washer was around 12 (equates to approximately 35 gallons per load based on an average 2.9 cubic ft. tub). In March 2015, the federal standard reduced the maximum water factor for top- and front-loading machines to 8.4 and 4.7, respectively. In 2018, the maximum water factor for top-loading machines was further reduced to 6.5. For commercial washers, the maximum water factors were reduced in 2010 to 8.5 and 5.5 for top- and front-loading machines, respectively. Beginning in 2015, the maximum water factor for Energy Star certified washers was 3.7 for front-loading and 4.3 for top-loading machines. In 2011, the U.S. Environmental Protection Agency estimated that Energy Star washers comprised more that 60% of the residential market and 30% of the commercial market (Energy Star, 2011). A new Energy Star compliant washer uses about two-thirds less water per cycle than washers manufactured in the 1990s.

F.3 State Plumbing Code

This section describes California state codes applicable to SCV Water's water use.

F.3.1 California State Law – AB 715

Plumbing codes for toilets, urinals, showerheads, and faucets were initially adopted by California in 1991, mandating the sale and use of ultra-low flush toilets (ULFTs) using 1.6 gpf, urinals using 1 gpf, and low-flow showerheads and faucets. AB 715 led to an update to California Code of Regulations Title 20 (see Section F.3.3) mandating that all toilets and urinals sold and installed in California as of January 1, 2014 must be high efficiency versions having flush ratings that do not exceed 1.28 gpf (toilets) and 0.5 gpf (urinals).

F.3.2 California State Laws – SB 407 and SB 837

SB 407 addresses plumbing fixture retrofits on resale or remodel. The DSS Model carefully considers the overlap with SB 407, the plumbing code (natural replacement), CALGreen, AB 715 and rebate programs (such as toilet rebates). SB 407 (enacted in 2009) requires that properties built prior to 1994 be fully retrofitted with water conserving fixtures by the year 2017 for single family residential houses and 2019 for multifamily and commercial properties. SB 407 program length is variable and continues until all the older high flush toilets have been replaced in the service area. The number of accounts with high flow fixtures is tracked to make sure that the situation of replacing more high flow fixtures than actually exist does not occur. Additionally, SB 407 conditions issuance of building permits for major improvements and renovations upon retrofit of non-compliant plumbing fixtures. SB 837 (enacted in 2011) requires that sellers of real estate property disclose on their Real Estate Transfer Disclosure Statement whether their property complies with these requirements. Both laws are intended to accelerate the replacement of older, low efficiency plumbing fixtures, and ensure that only high efficiency fixtures are installed in new residential and commercial buildings.

F.3.3 2019 CALGreen and 2015 CA Code of Regulations Title 20 Appliance Efficiency Regulations

Fixture characteristics in the DSS Model are tracked in new accounts, which are subject to the requirements of the 2019 California Green Building Code and 2015 California Code of Regulations Title 20 Appliance Efficiency Regulations adopted by the California Energy Commission (CEC) on September 1, 2015. The CEC 2015 appliance efficiency standards apply to the following new appliances, if they are sold in California: showerheads, lavatory faucets, kitchen faucets, metering faucets, replacement aerators, wash fountains, tub spout diverters, public lavatory faucets, commercial pre-rinse spray valves, urinals, and toilets. The DSS Model accounts for plumbing code savings due to the effects these standards have on showerheads, faucet aerators, urinals, toilets, and clothes washers.

- Showerheads – July 2016: 2.0 gpm; July 2018: 1.8 gpm
- Wall Mounted Urinals – January 2016: 0.125 gpf (pint)
- Lavatory Faucets and Aerator – July 2016: 1.2 gpm at 60 psi
- Kitchen Faucets and Aerator – July 2016: 1.8 gpm with optional temporary flow of 2.2 gpm at 60 psi
- Public Lavatory Faucets – July 2016: 0.5 gpm at 60 psi

In summary, the controlling law for **toilets** is Assembly Bill 715, requiring high efficiency toilets of 1.28 gpf sold in California beginning in 2014. The controlling law for wall-mounted urinals is the 2015 CEC efficiency regulations requiring that ultra-high efficiency pint **urinals** (0.125 gpf) be exclusively sold in California beginning January 1, 2016. This is an efficiency progression for urinals from AB 715's requirement of high efficiency (0.5 gpf) urinals starting in 2014.

Standards for **residential clothes washers** fall under the regulations of the U.S. Department of Energy. In 2018, the maximum water factor for standard top-loading machines was reduced to 6.5.

Showerhead flow rates are regulated under the 2015 California Code of Regulations Title 20 Appliance Efficiency Regulations adopted by the CEC, which requires the exclusive sale in California of 2.0 gpm showerheads at 80 psi as of July 1, 2016 and 1.8 gpm showerheads at 80 psi as of July 1, 2018. The WaterSense specification applies to showerheads that have a maximum flow rate of 2.0 gpm or less. This represents a 20% reduction in showerhead flow rate over the current federal standard of 2.5 gpm, as specified by the Energy Policy Act of 1992.

Faucet flow rates likewise have been regulated by the 2015 CEC Title 20 regulations. This standard requires that the residential faucets and aerators manufactured on or after July 1, 2016 be exclusively sold in California at 1.2 gpm at 60 psi; and public lavatory and kitchen faucets/aerators sold or offered for sale on or after July 1, 2016 be 0.5 gpm at 60 psi and 1.8 gpm at 60 psi (with optional temporary flow of 2.2 gpm), respectively. Previously, all faucets had been regulated by the 2010 California Green Building Code at 2.2 gpm at 60 psi.

F.4 Key Baseline Potable Demand Inputs, Passive Savings Assumptions, and Resources

The following tables present the key assumptions and references that are used in the DSS Model in determining projected demands with plumbing code savings. The assumptions having the most dramatic effect on future demands are the natural replacement rate of fixtures, how residential or commercial future use is projected, and the percent of estimated real water losses.

Table F-1. List of Key Assumptions

Parameter	Model Input Value, Assumptions, and Key References	
	SCV3	LACWD
Model Start Year for Analysis	2020	2020
Water Demand Factor Year (Base Year)	2018 & 2019 (adjusted)	2018 & 2019 (adjusted)
Population Projection Source	Land-use-based analysis including specific development plans provided by City and County Planning and OVOV	OVOV

Potable Water System Base Year Water Use Profile – SCV Water's Three Water Divisions				
Customer Categories	**Start Year Accounts**	**Total Water Use Distribution**	**Demand Factors (gpd/acct)**	**Indoor Use %**
	SCV Water	**SCV Water**	**SCV Water**	**SCV Water**
Single Family Existing	60,767	52.4%	480	46%
Multifamily Existing	5,403	8.7%	894	83%
Commercial	2,034	7.8%	2,125	59%
Industrial	406	2.0%	2,735	43%
Institutional	253	3.0%	6,573	25%
Dedicated Irrigation	2,739	22.0%	4,482	0%

Other	672	3.4%	2,811	0%
New Single Family Indoor	174	0.1%	237	100%
New Single Family Outdoor	174	0.1%	362	0%
New Multifamily Indoor	858	0.2%	143	100%
New Multifamily Outdoor	858	0.4%	230	0%
Total/Avg	73,306	**100%**	**N/A**	**N/A**
Potable Water System Base Year Water Use Profile – LACWD				
Customer Categories	**Start Year Accounts**	**Total Water Use Distribution**	**Demand Factors (gpd/acct)**	**Indoor Use %**
	LACWD	**LACWD**	**LACWD**	**LACWD**
Single Family	1,332	92.0%	572	53%
Multifamily	1	1.9%	15,516	89%
Commercial	9	0.4%	362	54%
Institutional	9	5.4%	4,937	22%
Other	5	0.3%	0	0%
Total/Avg	**1,356**	**100%**	**N/A**	**N/A**

Table F-2. Key Assumptions Resources

Parameter	Resource
Residential End Uses	Key Reference: CA DWR Report "California Single Family Water Use Efficiency Study," (DeOreo, 2011 – Page 28, Figure 3: Comparison of household end uses) and AWWA Research Foundation (AWWARF) Report “Residential End Uses of Water, Version 2 - 4309” (DeOreo, 2016). Table 2-A. Water Consumption by Water-Using Plumbing Products and Appliances - 1980-2012. PERC Phase 1 Report. Plumbing Efficiency Research Coalition. 2013. http://www.map-testing.com/content/info/menu/perc.html Model Input Values are found in the “End Uses” section of the DSS Model on the “Breakdown” worksheet.

Parameter	Resource
Non-Residential End Uses, percent	Key Reference: AWWARF Report "Commercial and Institutional End Uses of Water" (Dziegielewski, 2000 – Appendix D: Details of Commercial and Industrial Assumptions, by End Use). Santa Clara Valley Water District Water Use Efficiency Unit. "SCVWD CII Water Use and Baseline Study." February 2008. Model Input Values are found in the "End Uses" section of the DSS Model on the "Breakdown" worksheet.
Efficiency Residential Fixture Current Installation Rates	U.S. Census, Housing age by type of dwelling plus natural replacement plus rebate program (if any). Key Reference: GMP Research, Inc. (2019). 2019 U.S. WaterSense Market Penetration Industry Report. Key Reference: Consortium for Efficient Energy (www.cee1.org). Model Input Values are found in the "Codes and Standards" green section of the DSS Model by customer category fixtures.
Water Savings for Fixtures, gal/capita/day	Key Reference: AWWARF Report "Residential End Uses of Water, Version 2 - 4309" (DeOreo, 2016). Key Reference: CA DWR Report "California Single Family Water Use Efficiency Study" (DeOreo, 2011 – Page 28, Figure 3: Comparison of household end uses). Key Reference: California Energy Commission, Staff Analysis of Toilets, Urinals and Faucets, Report # CEC-400-2014-007-SD, 2014. Model Input Values are found in the "Codes and Standards" green section on the "Fixtures" worksheet of the DSS Model.
Non-Residential Fixture Efficiency Current Installation Rates	Key Reference: 2010 U.S. Census, Housing age by type of dwelling plus natural replacement plus rebate program (if any). Assume commercial establishments built at same rate as housing, plus natural replacement. California Energy Commission, Staff Analysis of Toilets, Urinals and Faucets, Report # CEC-400-2014-007-SD, 2014. Santa Clara Valley Water District Water Use Efficiency Unit. "SCVWD CII Water Use and Baseline Study." February 2008. Model Input Values are found in the "Codes and Standards" green section of the DSS Model by customer category fixtures.
Residential Frequency of Use Data, Toilets, Showers, Faucets, Washers, Uses/user/day	Key Reference: AWWARF Report "Residential End Uses of Water, Version 2 - 4309" (DeOreo, 2016). Summary values can be found in the full report: http://www.waterrf.org/Pages/Projects.aspx?PID=4309 Key Reference: California Energy Commission, Staff Analysis of Toilets, Urinals and Faucets, Report # CEC-400-2014-007-SD, 2014. Key Reference: Alliance for Water Efficiency, The Status of Legislation, Regulation, Codes & Standards on Indoor Plumbing Water Efficiency, January 2016. Model Input Values are found in the "Codes and Standards" green section on the "Fixtures" worksheet of the DSS Model and confirmed in each "Service Area Calibration End Use" worksheet by customer category.

Parameter	Resource
Non-Residential Frequency of Use Data, Toilets, Urinals, and Faucets, Uses/user/day	Key References: Estimated based on AWWARF Report "Commercial and Institutional End Uses of Water" (Dziegielewski, 2000 – Appendix D: Details of Commercial and Industrial Assumptions, by End Use). Key Reference: California Energy Commission, Staff Analysis of Toilets, Urinals and Faucets, Report # CEC-400-2014-007-SD, 2014. Fixture uses over a 5-day work week are prorated to 7 days. Non-residential 0.5gpm faucet standards per Table 2-A. Water Consumption by Water-Using Plumbing Products and Appliances - 1980-2012. PERC Phase 1 Report. Plumbing Efficiency Research Coalition, 2012. http://www.map-testing.com/content/info/menu/perc.html Model Input Values are found in the "Codes and Standards" green section on the "Fixtures" worksheet of the DSS Model and confirmed in each "Service Area Calibration End Use" worksheet by customer category.
Natural Replacement Rate of Fixtures (percent per year)	Residential Toilets 2%-4%
	Non-Residential Toilets 2%-3%
	Residential Showers 4% (corresponds to 25-year life of a new fixture)
	Residential Clothes Washers 10% (based on 10-year washer life). Key References: "Residential End Uses of Water" (DeOreo, 2016) and "Bern Clothes Washer Study, Final Report" (Oak Ridge National Laboratory, 1998).
	Residential Faucets 10% and Non-Residential Faucets 6.7% (every 15 years). CEC uses an average life of 10 years for faucet accessories (aerators). A similar assumption can be made for public lavatories, though no hard data exists and since CII fixtures are typically replaced less frequently than residential, 15 years is assumed. CEC, Analysis of Standards Proposal for Residential Faucets and Faucet Accessories, a report prepared under CEC's Codes and Standards Enhancement Initiative, Docket #12-AAER-2C, August 2013.
	Model Input Value is found in the "Codes and Standards" green section on the "Fixtures" worksheet of the DSS Model.
Residential Future Water Use	Increases Based on Population Growth and Demographic Forecast
Non-Residential Future Water Use	Increases Based on Employment Growth and Demographic Forecast

F.4.1 Fixture Estimates

Determining the current level of efficient fixtures in a service area while evaluating the passive savings in the DSS Model is part of the standard process and is called "initial fixture proportions." As described earlier, MWM reconciled water efficient fixtures and devices installed within the service area and estimated the number of outstanding inefficient fixtures.

MWM used the DSS Model to perform a saturation analysis for toilets, urinals, showerheads, faucets, and clothes washers. The process included a review of age of buildings from census data, number of rebates per device, and assumed natural replacement rates. MWM presumed the fixtures that were nearing saturation and worth analysis would include residential toilets and residential clothes washers, as both have been included in recommended water use efficiency practices for over two decades.

In 2014, the Water Research Foundation updated its 1999 Residential End Uses of Water Study (REUWS). Water utilities, industry regulators, and government planning agencies consider it the industry benchmark for single family home indoor water use. This Plan incorporates recent study results that reflect the change to the water use profile in residential homes including adoption of more water efficient fixtures over the 15 years that transpired from 1999 to 2014. REUWS results were combined with SCV Water's historical rebate and billing data to enhance and verify assumptions made for all customer accounts, including saturation levels on the above-mentioned plumbing fixtures.

The DSS Model presents the estimated current and projected proportions of these fixtures by efficiency level within SCV Water's service area. These proportions were calculated by:

- Using standards in place at the time of building construction,
- Taking the initial proportions of homes by age (corresponding to fixture efficiency levels),
- Adding the net change due to natural replacement, and
- Adding the change due to rebate measure minus the "free rider effect."

Further adjustments were made to initial proportions to account for the reduction in fixture use due to lower occupancy and based on field observations. The projected fixture proportions do not include any future active water use efficiency measures implemented by SCV Water. More information about the development of initial and projected fixture proportions can be found in the DSS Model "Codes and Standards" section.

The DSS Model is capable of modeling multiple types of fixtures, including fixtures with different designs. For example, currently toilets can be purchased that flush at a rate of 0.8 gpf, 1.0 gpf or 1.28 gpf. The 1.6 gpf and higher toilets still exist but can no longer be purchased in California. Therefore, they cannot be used for replacement or new installation of a toilet. So, the DSS Model utilizes fixture replacement rates to determine what type of fixture should be used for a new construction installation or replacement. The replacement of the fixtures is listed as a percentage within the DSS Model. A value of 100% would indicate that all the toilets installed would be of one particular flush volume. A value of 75% means that three out of every four toilets installed would be of that particular flush volume. All the Fixture Model information and assumptions were carefully reviewed and accepted by SCV Water staff.

The DSS Model provides inputs and analysis of the number, type, and replacement rates of fixtures for each customer category (e.g., single family toilets, commercial toilets, residential clothes washing machines.). For example, the DSS Model incorporates the effects of the 1992 Federal Energy Policy Act and AB 715 on toilet fixtures. A DSS Model feature determines the "saturation" of 1.6 gpf toilets as the 1992 Federal Energy Policy Act was in effect from 1992-2014 for 1.6 gpf toilet replacements. AB 715 now applies for the replacement of toilets at 1.28 gpf. Further consideration and adjustments were made to replacement rates to account for the reduction in fixture use and wear, due to lower occupancy and based on field observations.

APPENDIX G – ACTIVE CONSERVATION SAVINGS BASIS

This analysis included SCV Water's current active water conservation measures. There are 3 codes and 17 measures included in the active conservation portion of the DSS Model, adding savings to the indoor plumbing code measures included in the passive savings section of the modeling. Depending on the measure analyzed, different customer classes are selected. For example, the DSS Model tracks both new and existing SF and MF customer categories separately, and not every measure that targets existing SF would apply to new SF. New residential accounts are assumed to be efficient and not targeted for indoor efficiency measures. Measure participation/activity and costs were developed to align with SCV Water recent participation and budgets. The active conservation measures take into consideration targeted water user group end uses (e.g., single family toilets), utility unit code (e.g., cost of rebate, cost of out-of-house service), retail customer cost (i.e., the remainder of any cost after rebate), and utility admin and marketing costs. Current measures were only analyzed for SCV Water; no active conservation savings are estimated for LACWD in this effort. SCV efforts that target LACWD's customers are included in the SCV active conservation program budget and savings. See Table G-1 for a breakdown of savings and costs.

Table G-1. Current Active Conservation Program Analysis Results

Savings/Costs	Total
Average Water Savings*	8,800 AFY
Cost of Savings per Unit Volume	$550/AF
2021 Utility Cost	$8,607,000
2021 Utility Cost (excluding admin cost)	$7,742,000
2021 Water Savings	2,200 AFY
2050 Water Savings	14,100 AFY

Notes:

1. Values are based on current active conservation program.
2. Values are rounded to the nearest 100 AFY and $50.

Included in the current active conservation program are the following measures (*indicates a code):

- Fixture Retrofit on Resale or Water Account Change*
- New Development Submetering*
- Landscape & Irrigation Codes*
- Water Waste Implementation
- AMI
- Real Water Loss Reduction
- Education
- Water Smart Workshop Credit
- Landscape Transformation Incentives
- Smart Controller Rebates
- Irrigation Incentives
- Irrigation Check-Ups
- Pool Cover Rebates
- Residential Check-Ups
- Hot Water on Demand Rebate
- CII Check-Ups
- CII HET and HEU Rebates
- High Efficiency Fixture Giveaway
- Schools Retrofits

The active conservation methodology is an update from SCV Water's 2016 Water Use Efficiency Strategic Plan. LACWD participation rates are included. SCV Water is looking to track and monitor production data along with consumption by customer category and overall alignment with the upcoming regulations for the 2018 Water Conservation Legislation entitled "Making Water Conservation a California Way of Life."

APPENDIX H – RESIDENTIAL AND NON-RESIDENTIAL OUTDOOR WATER USE STUDY – DRAFT TECHNICAL MEMORANDUM

Technical Memorandum – DRAFT

Date: April 15, 2021

To: Dirk Marks and Rick Vasilopulos, Santa Clarita Valley Water Agency

From: Anil Bamezai, Western Policy Research
Lisa Maddaus, Maddaus Water Management Inc.

Title: Draft Residential and Non-Residential Outdoor Water Use Research Study

1. INTRODUCTION

Western Policy Research (WPR) and Maddaus Water Management Inc. (MWM) worked together as the project team to provide research and modeling assistance for this Outdoor Water Use Research Study (Study). The goal of the Study was to determine if actual irrigation water use in permitted landscapes is consistent with projected Model Water Efficient Landscape Ordinance (MWELO)[1] water budgets in the Santa Clarita Valley. The Study was undertaken to better understand the outdoor water use of existing residential and non-residential accounts in order to refine future outdoor water demand of planned dwelling units and non-residential developments.

Santa Clarita Valley Water Agency (SCV Water) is responsible for meeting current and future water demands. To estimate water demands, SCV Water collects planning information from developers operating in the Santa Clarita Valley including expected lot size and landscape area of new single family homes. The responsibility of ensuring permitted landscapes (parcel) adhere to the California MWELO requirements belongs to the land use authority for the parcel. In this case, a parcel's landscape must be approved by either the City of Santa Clarita or Los Angeles County Planning Department.

The planning data in recent years have indicated a trend toward increased densification of single family housing development in the future. Increased densification results in smaller lot sizes, smaller landscaped areas, and reduced use of turf. Due to this change in trend, SCV Water wanted to confirm the accuracy of establishing future water demand through a linear extrapolation of per-account single family historical water demand.

For non-residential accounts, there was interest in determining outdoor water use relative to landscaped area in Commercial, Industrial, and Institutional (CII) categories that include numerous small accounts. Large CII customers (i.e., hospitals, schools, universities, etc.) were not included in the Study because, at the time of permitting new large CII customers, it is possible to project baseline water demand using historical usage of similar large CII customers, with suitable adjustments. Multifamily housing was also excluded from this study because, while multifamily housing may become a larger portion of the total housing stock in the future, it is not expected to increase in density. Therefore, baseline demand for future multifamily housing or large CII customers can be established by extrapolating historical trends in a more reliable way for potentially applicable new policy guidelines.

WPR and MWM collaborated with SCV Water's Water Resources, Water Use Efficiency, and Geographic Information Systems (GIS) staff to design and implement the technical analysis based on best available

[1] More information on the MWELO is published on the California Department of Water Resources website: https://water.ca.gov/Programs/Water-Use-And-Efficiency/Urban-Water-Use-Efficiency/Model-Water-Efficient-Landscape-Ordinance

information. The benefit of this Study is to determine more accurate outdoor water use estimates by factoring in reduced landscape area and increased landscape efficiency required by the currently mandated 2015 MWELO guidelines.

To summarize, this Study attempts to address the following questions:

1. How much water is being used outdoors relative to landscape and reference ETo by existing single family residential and small CII accounts?
2. Is there a difference in applied irrigation for single family accounts that were built when different MWELO guidelines were in place?

2. BACKGROUND

MWELO was created by the California Department of Water Resources (DWR) to promote water efficiency in landscape irrigation. It is a model for local agencies to enforce minimum standards in landscape design, providing a path to design, install, manage, and maintain landscapes that conserve water. MWELO aims to achieve this through specific requirements related to soil, plants, irrigation, stormwater, and non-potable water supplies. It sets an upper limit for the water budgets of landscape projects, thereby driving water efficiency through the thoughtful selection of climate-appropriate plants, organic soil amendments, water-saving irrigation devices, and the use of alternative water supplies. MWELO requires land use authorities to only permit landscapes of a certain size depending on land use type (i.e., 500 square feet and larger) as a policy to encourage less water use than the upper limit of the permitted, designed water budget. It also encourages the innovation of landscaping equipment, products, and materials that use resources as efficiently as possible. The actual water use by the customer once the landscape is installed and maintained has yet to be studied in the SCV Water service area.

MWELO guidelines have been revised over for the past several decades as documented in the DWR Guidelines for MWELO.[2] The original MWELO was adopted in 1992 as Assembly Bill 325 and allowed landscapes to be built with a maximum water allowance (MAWA) of 80% of reference ETo. This level of reference ETo was heavily lobbied by the turf industry and, at that time, was essentially the same ETo as cool season turfgrass. This created a policy with a generous water budget and enforcement was thought to be inconsistent around the state. The MWELO guidelines were studied by a task force established with Assembly Bill 2717 and revised by Assembly Bill 2515. This led to a revised MWELO post-drought in 2009 then again in 2015 during California's most recent and more severe drought. Between 2009 and 2015, MAWA was reduced to 70% of reference ETo for residential and CII landscapes. After 2015, MWELO applied to smaller permitted, irrigated landscape areas and MAWA was reduced to 55% of reference ETo for residential landscapes and 45% for non-residential landscapes.

In addition to refining outdoor water demand of planned construction, the Study was designed to determine if, and to what extent, the increasing specification in landscape design guidelines had influenced outdoor use in existing single family housing and non-residential properties.

With over 65% of total SCV water used outdoors in 2020, this effort was undertaken to better understand the outdoor water use of existing residential and non-residential accounts in order to refine future outdoor water demand of planned dwelling units and non-residential developments. Furthermore, there is a need to assess

[2] DWR. (2015). *Model Water Efficient Landscape Ordinance Guidebook*. https://water.ca.gov/-/media/DWR-Website/Web-Pages/Programs/Water-Use-And-Efficiency/Urban-Water-Use-Efficiency/MWELO-Files/MWELO-Guidebook/1--Model-Water-Efficient-Landscape-Ordinance-Guidebook.pdf

future outdoor water use demand factors for new development impact fees. This effort also provides useful context for understanding the legacy residential and non-residential benefits from MWELO and can determine if higher outdoor demands should be considered due to changes in landscape demand over time as irrigation systems age and landscape practices and plant choices shift.

3. ANALYTICAL APPROACH

A representative sample of existing accounts were studied for both residential and non-residential sectors, and were selected for landscape measurement designed to produce statistically significant results. The effort was focused on randomly selecting parcels, measuring their landscape area by plant type from aerial imagery, then matching these accounts with their respective billing histories to yield estimates of outdoor water use in applied inches. These findings were then compared to maximum allowable water use per the most recent 2015 MWELO guidelines. The end result is to then understand consistency and compliance with MWELO projections and regulations, and better inform future SCV Water Outdoor Water Demand planning and policy.

Data Inventory and Collection

SCV Water staff provided an existing parcel database that was compiled during an earlier project. This database included lot size, construction year, and land use category for all SCV Water parcels. Using this database, the project team isolated the land use categories of interest including single family accounts, detached condominiums, and CII categories with small accounts. From the target land use categories, a subset of developed parcels was selected for landscape measurement using a stratified sampling approach because landscape area exhibits a skewed statistical distribution. When a small portion of all parcels account for most of the total landscape area in that category, stratification can help to reduce overall sample size requirements and study costs.

Residential Accounts Sample Size Design

In the residential sector, stratification by Traffic Analysis Zone (TAZ) land use categories implicitly amounts to stratification by lot size, with the larger lot size categories being oversampled relative to their proportion in the population of all residential parcels. The distribution of landscape area is skewed with the larger lots accounting for a disproportionate share of landscape area in the residential sector. In such a situation, stratified sampling makes the study design more cost effective.

The single family (sf) and detached condominium (detcondo) land use categories were stratified based on lot size and construction year. Land use categories were aligned with TAZ land use types in order to derive landscape areas and irrigation factors to apply in the Land-Use-Based Water Demand Study,[3] which sorts and tracks new development by TAZ land use area. The TAZ land use types also align with the scheme developers use to report development plans. This alignment ensured the results generated by this Study could be directly associated with developer planning and reporting data provided to SCV Water. For example, a developer may report a plan to build 300 single family units at a density of 10 units per acre and 5 units at a density of 1 unit per acre. This nomenclature was operationalized using lot size cutoffs as shown in Table 1. The construction year stratification was undertaken to evaluate the impact on outdoor water use of tightening MWELO requirements over time. The construction year age bands were defined as follows: those built prior to 2009,

[3] SCV Water Draft Technical Memorandum – SCV Demand Study: Land-Use-Based Demand Forecast Analysis, dated April 13, 2021.

those built between 2009 and 2015; and those built after 2015. Table 1 identifies the number of parcels that align into each stratification band for SCV Water's service area and the study sample set.

Table 1. Residential Data Sample Summary

Parcel Size Stratification Categories	Stratification in Terms of Density (Units/Acre)	Stratification in Terms of Parcel Square Footage	Construction Age Stratification	Number of Parcels in SCV Water's Service Area	Number of Parcels with Landscape Measurements	Number of Parcels with Landscape Measurements & Water Use Data
Detached Condo (detcondo1)	>10 units/acre	<4,356 sqft	2009-2015	397	17	2
			post-2015	315	20	2
			pre-2009	1,798	38	17
Detached Condo (detcondo2)	6-10 units/acre	4,356-7,260 sqft	2009-2015	217	26	4
			post-2015	176	22	8
			pre-2009	1,786	32	11
Detached Condo (detcondo3)	<=5 units/acre	>7,260 sqft	2009-2015	60	21	3
			post-2015	71	18	5
			pre-2009	1,386	32	22
Single Family (sf1)	>10 units/acre	<4,356 sqft	2009-2015	129	10	9
			post-2015	8	6	6
			pre-2009	3,194	10	7
Single Family (sf2)	6-10 units/acre	4,356-7,260 sqft	2009-2015	1,174	100	81
			post-2015	300	31	22
			pre-2009	24,009	99	84
Single Family (sf3)	2-5 units/acre	7,260-43,560 sqft	2009-2015	771	118	97
			post-2015	181	39	31
			pre-2009	21,548	99	89
Single Family (sf4)	1 unit/acre	>43,560 sqft	2009-2015	34	13	9
			post-2015	4	4	3
			pre-2009	1930	112	87
Totals				**59,488**	**867**	**599**

Non-Residential Accounts Sample Size Design

A skewed pattern similar to residential land use categories also exists among the non-residential land use categories. Therefore, to address this pattern in CII categories, an 80-20 stratification by lot size was undertaken. Parcels falling in the top 20% of the lot-size distribution were over-sampled; those falling in the bottom 80% were under-sampled. Table 2 details the number of samples included in the study calculations including commercial (comm), industrial (ind), institutional (inst), and dedicated irrigation meter (Imd) accounts.

It became very difficult to align county assessor parcel boundaries with dedicated irrigation landscapes and billing history data since it required detailed fieldwork to determine what area an irrigation meter actually covered. For these reasons, the final sample set in the dedication irrigation category ended up being very small even though 20 parcels were sampled at random from the bottom 80% and 20 from the top 20% coded as "Imd"

parcels. None of the parcels selected from the bottom 80% of dedicated irrigation meter accounts could be aligned with meters, so the applied inches estimate for the top 20% of the dedicated irrigation meter accounts was applied to the entire "lmd" sector. The age-based stratification was not feasible for the CII strata because most of these properties were constructed prior to 2009.

Table 2. Non-Residential Data Sample Summary

Parcel Size Stratification Categories	Number of Parcels in SCV Water's Service Area	Number of Parcels With Landscape Measurements	Number of Parcels With Landscape Measurements & Water Use Data
Commercial – Bottom 80% (commbot)	867	29	19
Commercial – Top 20% (commtop)	289	29	20
Industrial – Bottom 80% (indbot)	741	22	17
Industrial – Top 20% (indtop)	247	38	29
Institutional – Bottom 80% (instbot)	51	16	10
Institutional – Top 20% (insttop)	17	8	6
Dedicated Landscape Meter – Bottom 80% (lmdbottom)*	182	1	0
Dedicated Landscape Meter – Top 20% (lmdtop)	60	5	2
Totals	**2,454**	**148**	**103**

*Assumed AI for "lmdtop" also applies to "lmdbottom" sector.

Preparation of Landscape Area Measurements

To ensure any errors in customer classification or parcel boundaries were identified and corrected, selected parcels were pre-screened by SCV Water staff before landscape area measurements were undertaken to ensure efficient use of staff time. Parcels rejected during the pre-screening were replaced with similar randomly selected parcels. As is common practice, parcel boundary rectification is an ongoing internal exercise at SCV Water to remove errors from the Los Angeles County parcel base map and to identify and separate common-area landscapes in HOAs from landscapes tied to individual property water meters.

Comparison to Historical Billing Consumption

Parcels with measured landscape area were matched with their historical billing data for years 2018 and 2019. Not all parcels with measured landscape area had clean and complete billing histories because of occupant turnover, mismatches between assessor parcel numbers and billing system account numbers, or data outliers. Estimation of average landscape area in a stratum is based on all parcels with landscape area measurements that fall into a given strata. However, estimation of outdoor demand factors is based on the subset where both landscape area and billing data are available.

Estimating Residential Outdoor Water Use

For single family accounts, residential indoor water use was calculated based on the people per household (PPH) and indoor gallon per capita per day water use (GPCD).

$$PPH \times GPCD \times 365 \frac{days}{year} = Estimated\ Indoor\ Water\ Use\ Per\ Parcel\ Per\ Year\ (gal)$$

A PPH estimate for each water division was compiled from the 2014 Population Assessment and GPCD Review.[4] The estimate of 63 GPCD for the entire service area was compiled from the DSS Model. Outdoor water use was then calculated by subtracting the estimated indoor water use from the total annual water consumption. The annual outdoor water use was then divided by the parcel measured landscape to calculate the outdoor water use in gallons per square foot and the applied inches of irrigation (AI). This AI estimate was used as the basis for identifying and removing outliers in the data set.

Estimating Non-Residential Outdoor Water Use

For CII accounts, minimum month usage in a year was used as the best estimate of indoor use. Annual outdoor use was estimated by subtracting from annual consumption twelve times the consumption in the minimum month. Factoring in the measured landscape area, outdoor use in gallons was converted to AI.

After the AI was calculated for all parcels in the study and outliers were removed, weighted averages of outdoor water use and landscape area by strata were calculated to derive strata-specific AI values. These strata-specific AI values were compared to the post-2015 MAWA values for residential (55% of ETo[5]) and commercial (45% ETo) categories. Average annual ETo is estimated to be 66.7 inches per year in the Santa Clarita Valley. For the residential and non-residential sectors, post-2015 MAWA works out to roughly 36.7 inches/year and 30 inches/year, respectively.

4. STUDY RESULTS

Table 3 shows estimates of current (i.e., average of 2018 and 2019) irrigation demand in applied inches across the various strata combinations included in this study. The first seven rows of Table 3 show estimates of applied inches by the single family and detached condominium categories, including all years of construction. The next row shows the average of applied inches when all single family homes and detached condominiums are combined into a single category, including all years of construction. This is followed by five rows showing the variation in applied inches by age of construction, but with data pooled across single family and detached condominiums that fall within an age band. The effect of age of construction was designed to be discernible across single family and detached condominium categories pooled together. To design a study where differences by age of construction would be discernible within each single family lot size category and each detached condominium category would have greatly inflated sample size requirements and with it the landscape measurement effort. All the AI estimates were weighted to account for the stratified sampling design.

There was no significant difference observed in outdoor water use between the various strata combinations except for land use category sf3 (2-5 units/acre) constructed after 2015. This specific stratum displayed a significantly lower outside water use of 27.7 applied inches. In discussions with SCV Water staff, it was learned

[4] CLWA (now SCV Water) Population Assessment and GPCD Review, dated November 20, 2014.

[5] The 2015 MWELO specifies an ETo value of 61.5 inches for Santa Clarita Valley. However, an ETo of 66.7 inches per year was the 10-year average observed at a monitoring station located at SCV Water's Rio Vista water treatment plant.

that much of the post-2015 construction in this land use category includes the installation of artificial turf in front yards. Installation of artificial turf is not a requirement or initiative of SCV Water and may reflect a construction trend that may or may not continue into the future. Therefore, this stratum was excluded for estimating the existing single family housing stock's current level of applied irrigation.

The weighted average of AI in the residential sector among post-2015 properties (excluding sf3, 2-5 units per acre SF properties) was calculated as 46.4 inches/year (95% confidence interval around this estimate is ±6%), or 26.5% over the expected MAWA AI of 36.7 inches per year. This, then, is the best estimate of how much water is presently being used outdoors given current irrigation practices in SCV Water's service area among single family homes and detached condominiums. Table 3 also shows outdoor demand factors in gallons/account/day calculated using strata-specific estimates of AI as well as the overall best estimate of AI (46.4 inches).

Actual estimated irrigation exceeding post-2015 MAWA can have many explanations (e.g., inefficient irrigation practices, deterioration in irrigation equipment over time such as broken and misaligned sprinkler heads or improper pressure regulation, landscape modifications over time relative to what was initially permitted, etc.). The gap between actual applied irrigation and MAWA also represents a conservation opportunity, to be reclaimed through appropriate programs and regulations.

The weighted average of AI in the non-residential sector was calculated as 37.7 inches/year (95% confidence interval around this estimate is ±16% because of the smaller non-residential sample size) or 25.6% over the expected MAWA AI of 30 inches/year (Table 4).

Baseline outdoor water demand forecasts are generated from demand factors that are estimated from overall average residential and non-residential estimates of applied irrigation (last column of Table 3 and Table 4 labeled MAWA PLUS). These demand factors implicitly include the 26.5% and 25.6% difference between expected outside water use, based on 2015 MWELO MAWA, and the observed outside water use as determined in this study.

Table 3. Residential Land Use Category Outdoor Demand Factor Inputs

Land Use Category	Land Use in Terms of Density (units/acre)	Average Observed Landscape per parcel (sqft)	Post-2015 MAWA, 55% of ETo (inches/year)	Observed Applied Inches in 2018/2019 (inches/year)	Post-2015 MAWA, 55% of ETo + additional Observed Use Factor	Annual Outdoor Demand (gallons/ account/day)	MAWA PLUS Annual Outdoor Demand (gallons/ account/day)
sf4	1 unit/acre	16,240	36.7	42.6	46.4	1,182	1,287
sf3	2-5 units/acre	4,538	36.7	41.3	46.4	320	360
sf2	6-10 units/acre	2,446	36.7	51.2	46.4	214	194
sf1	>10 units/acre	1,341	36.7	51.2	46.4	117	106
detcondo3	<=5 units/acre	1,682	36.7	38.7	46.4	111	133
detcondo2	6-10 units/acre	933	36.7	46.6	46.4	74	74
detcondo1	>10 units/acre	729	36.7	48.2	46.4	60	58
All sf + detcondo	–	3,467	36.7	44.8	46.4	265	275
All sf + detcondo: pre-2009	–	3,553	36.7	44.7	46.4	271	282
All sf + detcondo: 2009-2015	–	2,579	36.7	49.1	46.4	216	204
All sf + detcondo: post-2015	–	1,583	36.7	39.4	46.4	107	125
Only sf3: post-2015	–	3,952	–	27.7*	–	187	0
All sf + detcondo without sf3: post-2015	–	–	–	**46.4 (+26.5%)**	–	–	–

Table 4. Non-Residential Land Use Category Outdoor Demand Factor Inputs

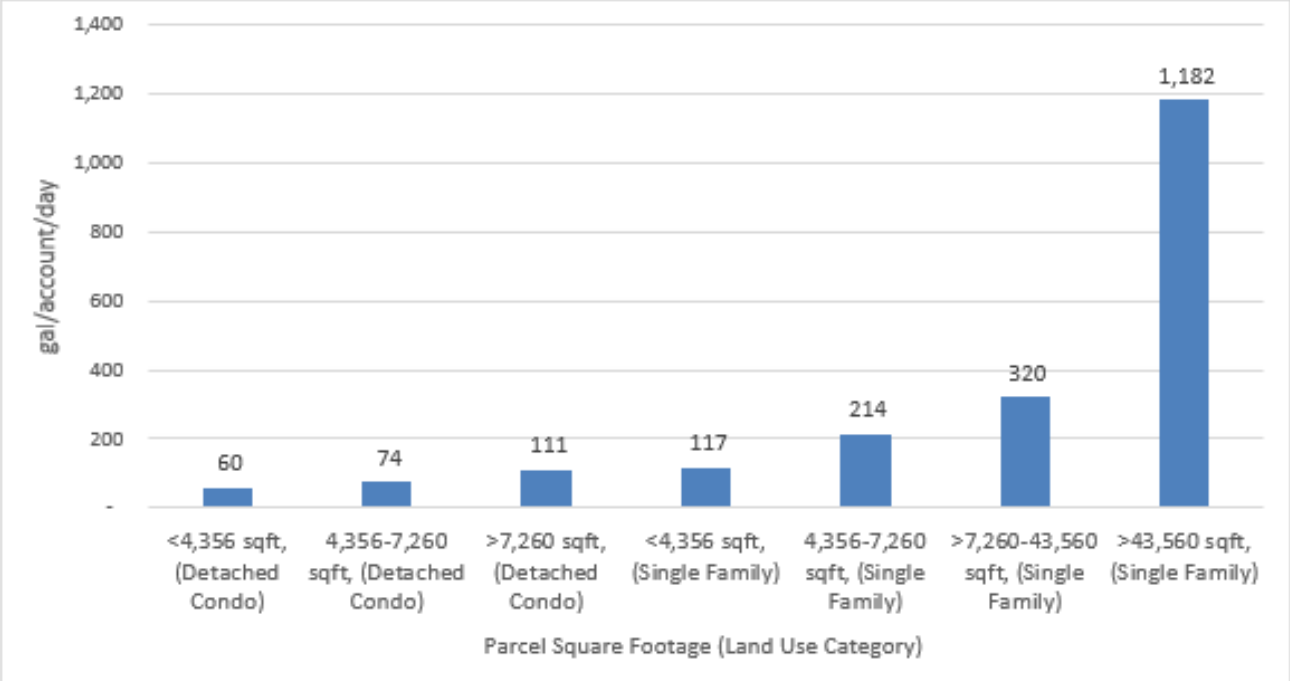
Land Use Category	Land Use in Terms of Density (units/acre)	Average Observed Landscape per Parcel (sqft)	Post-2015 MAWA, 45% of ETo (inches/year)	Observed Applied Inches in 2018/2019 (inches/year)	Post-2015 MAWA, 45% of ETo + Overwatering Factor	Annual Outdoor Demand (gallons/ account/day)	MAWA PLUS Annual Outdoor Demand (gallons/ account/day)
COMM	–	13,690	30	33.0	37.7	772	881
IND	–	16,164	30	41.0	37.7	1,132	1,040
INST	–	38,607	30	42.7	37.7	2,815	2,484
LMD	–	41,595	30	35.1	37.7	2,496	2,677
All CII	–	–	–	**37.7 (+25.6%)**	–	–	–

The framework described previously in this section produced a baseline outdoor demand forecast that was more realistic since it accounted for potential overwatering due to irrigation inefficiencies and irrigation device degradation (if developers do not design and install landscapes to standards that account for efficiency losses over time). This overwatering factor was applied to both potable and non-potable new development residential and non-residential irrigated areas. However, the demand and conservation analysis did not stop at this point because the overwatering factor implicitly built into the baseline forecast also offers potential water conservation opportunities. The overwatering could be prevented and converted into conservation savings if a series of explicit programs and regulations are undertaken. Ongoing and future water efficiency program management and planning will consider the steps needed to be undertaken to convert this conservation opportunity into realized savings in the future. Further analysis is planned for the Water Efficiency Program when more information becomes available on future regulations for the 2018 "Making Water Conservation a California Way of Life" legislation.

Until regulations are finalized, SCV Water is planning to continue with its current conservation program design. Conservation modeling results can be found in the Land-Use-Based Water Demand Study TM. The active conservation program will continue to evolve and ultimately provide an update from SCV Water's 2016 Water Use Efficiency Strategic Plan. SCV Water is looking to track and monitor production data along with consumption by customer category and overall alignment with upcoming legislative regulations.

Part of this monitoring and tracking effort will be tracking water use by different land use types, such as water use by lot sizes. Figure 1 illustrates the quantified results showing smaller lots using less water.

Figure 1. Residential Annual Outdoor Demand Factors



5. APPLICATION OF RESEARCH FINDINGS

The findings in this study supported the SCV Water Land-Use-Based Demand Forecast Analysis insofar as providing the fundamental basis for new development outdoor water use. This study provided the following two inputs, as previously explained:

(1) Average landscape per parcel (sqft) by residential land use types

- Values were applied to each new residential development unit land use type and number of units to generate an outdoor landscaped area by residential land use type.

(2) Applied irrigation in inches (post-2015 MAWA, 55% [or 45%] of ETo + overwatering factor) for all land use types

- Values were applied to each new development land use type area to generate an outdoor water use volume by land use type.

In the Land-Use-Based Demand Forecast Analysis, the MAWA PLUS outdoor water use factors were applied to both potable and non-potable new development residential and non-residential irrigated areas.

Again, new residential outdoor demand factors were applied to an estimated residential outdoor irrigated area by residential land use type. New irrigation account demand was derived by applying the adjusted outdoor demand factor from this study to the derived and compiled residential HOA common area and developed park acreages. An additional non-potable irrigation demand, due to potential overwatering from planned recycled water use in new developments because of irrigation equipment device deterioration, was calculated to be included in the total non-potable irrigation demand.

6. CONCLUSIONS AND FUTURE RECOMMENDATIONS

The City of Santa Clarita and Los Angeles County are required to ensure that developers' plans conform to MWELO requirements. In collaboration with SCVWA, it should be confirmed that new developments are designed and constructed to MWELO standards and that actual water use is consistent with design MAWA.

The Study results indicate a need to improve enforcement to the MWELO requirements in new developments and for conducting long term monitoring of water use by SCVWA. To support this, as well as SCV Water's responsibility to maintain reliable water supplies for existing and future developments, a couple questions needed addressing to benchmark existing water use in residential and non-residential landscapes. These questions were successfully addressed through this Study:

1. How much water is being used outdoors relative to landscape and reference ETo by existing single family residential and small CII accounts?
2. Is there a difference in applied irrigation for single family accounts that were built when different MWELO guidelines were in place?

Current irrigation practices in SCV Water's service area indicate that, in general, all residential customer categories use more water than designed permit limits for MAWA provided in the MWELO, including homes built after 2015 to the existing MWELO. The only exception to this finding is the post-2015 single family homes built at a density of 2-5 units per acre; this stratum's outdoor demand falls significantly below the 2015 MAWA, presumed to be due to greater use of artificial turf. Use of artificial turf, however, is not a requirement in SCV

Water's service area or the landscape transformation incentive program. Excluding this stratum, it appears the residential sector uses 26.5% more water, on average, than permitted by the 2015 MAWA.

In addition, this Study confirmed the expected correlation between residential parcel size and quantified outdoor water use insofar as smaller lots use less water. This relates to the development trend toward densification, which has implications for future water demand. The Study provided empirical estimates for forecasting the impact of this expected densification on residential water demand.

Current irrigation practices in the nonresidential sector also indicate that applied water exceeds the MAWA from the 2015 MWELO by roughly the same proportion (25.6%). Actual estimated irrigation exceeding post-2015 MAWA can have many explanations (e.g., inefficient irrigation practices, deterioration in irrigation equipment over time such as broken and misaligned sprinkler heads or improper pressure regulation, landscape modifications over time relative to what was initially permitted, etc.). The gap between actual applied irrigation and MAWA also represents a conservation opportunity, to be reclaimed through appropriate programs and regulations.

Additional research into the outdoor water end use profile would be valuable to determine how much of observed high water use above MAWA is due to irrigation overwatering compared to other outdoor uses. Furthermore, a subsequent study to complement and/or expand upon the research herein might be useful to develop this Study for multifamily as well as to continue work on the SCV Water GIS databases. These research opportunities could serve to align water efficiency policies and further refine information for future planning purposes.

APPENDIX I – NON-POTABLE DEMAND ANALYSIS

SCV Water staff confirmed non-potable demand projections based on the 2016 Recycled Master Plan. Five Point Project non-potable demand by customer category is available in the 2020 GSI Draft TM with the estimated schedule provided by SCV Water staff, which is consistent with the Five Point potable demand development schedule.

An additional non-potable irrigation demand due to potential overwatering from planned recycled water use in new developments for irrigation equipment device deterioration is calculated to be included in the total non-potable irrigation demand. The basis for the overwatering factor is presented in the Outdoor Water Use Study (Appendix H).

An estimated 600 AF of raw water account use conversion to non-potable use volume for the Big V golf course is included. Five Point Project's non-potable demand by customer category is included per the 2020 GSI Draft TM. No NRW is accounted for in the total non-potable demand estimate.

The following table presents a summary of SCV Water's projected non-potable demand.

Table I-1. Recycled Water Demand

	Schedule	Total Annual Demand by 2050 (AF)	Notes
Existing Recycled Water Demand	Ongoing	500	Based on 2019 use. Assumes 450 AF for planning purposes per SCV Water staff.
2016 Recycled Water Master Plan Phase 2C Raw Water	Online 2023	600	Irrigation use for Big V golf course currently served by raw water will be converted to recycled water.
2016 Recycled Water Master Plan Phase 2A	Online 2029	600	Volume does not overlap with Five Point Project.
2016 Recycled Water Master Plan Phases 2D, 2B, and 2C	Online 2021-2023	1,300	Volume does not overlap with Five Point Project.
Five Point Project Recycled Demand	Online 2021-2043	5,200	Per 2020 GSI Draft TM.
Additional Demand due to Overwatering at New Development	Online 2021-2050	1,300	Approximately 43 AF added demand annually. Based on residential and non-residential overwatering factors of ~25%.
Total Demand (AF)	**2050**	**9,400**	
Total Demand WITH Climate Change (AF)	**2050**	**9,700**	Climate change effect feathered in linearly starting with a 0% increase initially and rising to 3.77% in 2050.

Note: Values rounded to nearest 100 AF.

APPENDIX J – DSS MODEL OVERVIEW

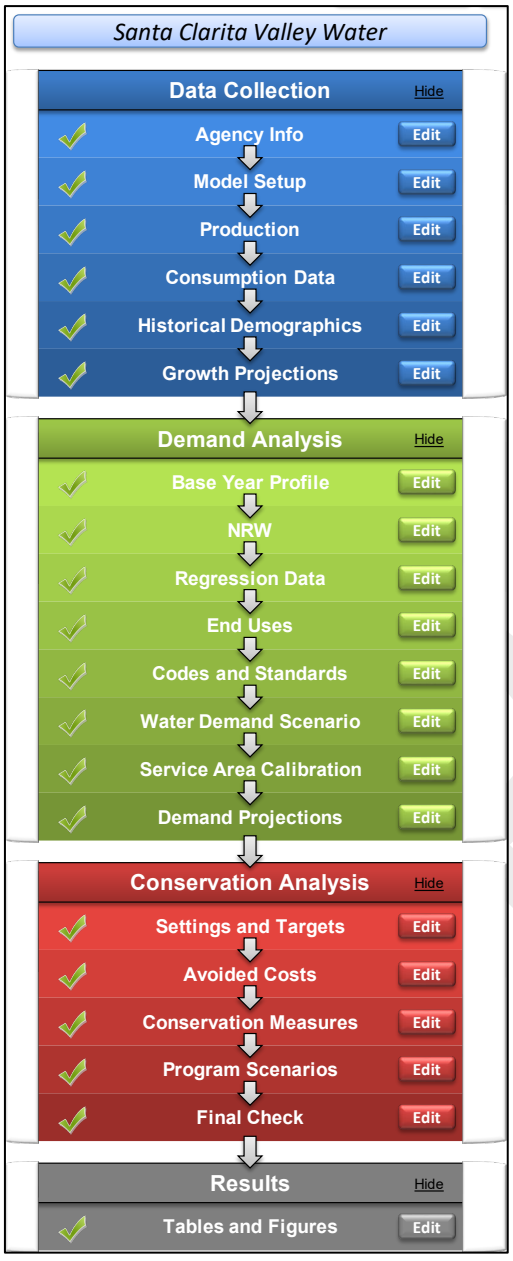


Figure J-1. DSS Model Main Page

DSS Model Overview: The Least Cost Planning Decision Support System Model (DSS Model) is used to prepare long-range, detailed demand projections. The purpose of the extra detail is to enable a more accurate assessment of the impact of water efficiency programs on demand and to provide a rigorous and defensible modeling approach necessary for projects subject to regulatory or environmental review.

Originally developed in 1999 and continuously updated, the DSS Model is an "end-use" model that breaks down total water production (water demand in the service area) to specific water end uses, such as plumbing fixtures and appliances. The model uses a bottom-up approach that allows for multiple criteria to be considered when estimating future demands, such as the effects of natural fixture replacement, plumbing codes, and conservation efforts. The DSS Model may also use a top-down approach with a utility-prepared water demand forecast.

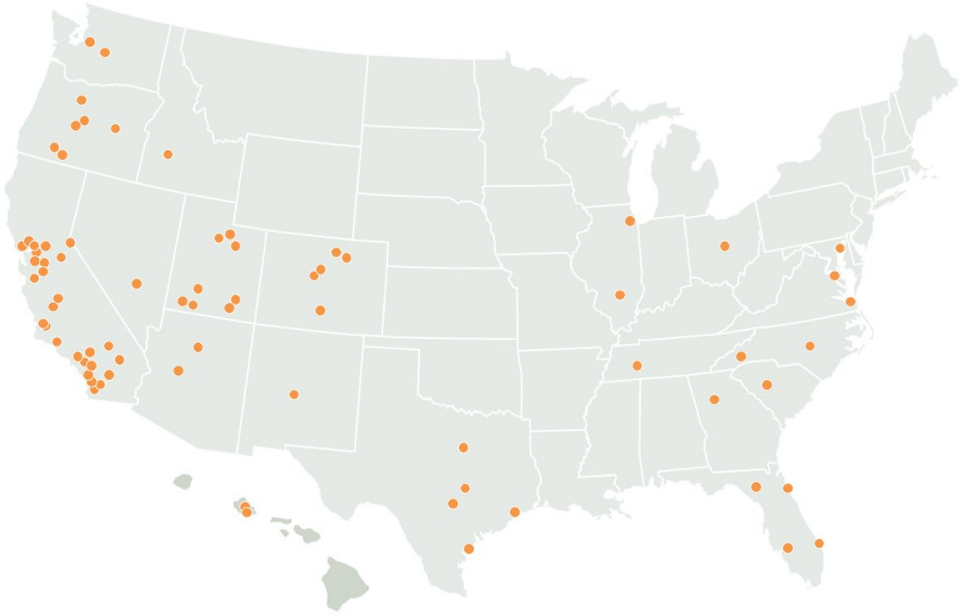
Demand Forecast Development and Model Calibration: To forecast urban water demands using the DSS Model, customer demand data is obtained from the water agency being modeled. Demand data is reconciled with available demographic data to characterize water usage for each customer category in terms of number of users per account and per capita water use. Data is further analyzed to approximate the split of indoor and outdoor water usage in each customer category. The indoor/outdoor water usage is further divided into typical end uses for each customer category. Published data on average per capita indoor water use and average per capita end use is combined with the number of water users to calibrate the volume of water allocated to specific end uses in each customer category. In other words, the DSS Model checks that social norms from end studies on water use behavior (e.g., flushes per person per day) are not exceeded or drop below reasonable use limits.

Passive Water Savings Calculations: The DSS Model is used to forecast service area water fixture use. Specific end-use type, average water use, and lifetime are compiled for each fixture. Additionally, state, and national plumbing codes and appliance standards are modeled by customer category. These fixtures and plumbing codes can be added to, edited, or deleted by the user. This process yields two demand forecasts, one with plumbing codes and one without plumbing codes.

Active Conservation Measure Analysis Using Benefit-Cost Analysis: The DSS Model evaluates active conservation measures using benefit-cost analysis with the present value of the cost of water saved ($/Million Gallons or $/Acre-Feet). Benefits are based on savings in water and wastewater facility operations and maintenance (O&M) and any deferred capital expenditures. The figures on the previous page illustrate the processes for forecasting conservation water savings, including the impacts of fixture replacement due to existing plumbing codes and standards.

Model Use and Validation: The DSS Model has been used and updated for the past 8 years by SCV Water and overtime used for 20 years for practical applications of conservation planning in over 300 service areas representing 60 million people, including extensive efforts nationally and internationally in Australia, New Zealand, and Canada.

Figure J-2. DSS Model Analysis Locations in the U.S.



The California Water Efficiency Partnership, or CalWEP (formerly the CUWCC), has peer reviewed and endorsed the model since 2006. It is offered to all CalWEP members for use to estimate water demand, plumbing code, and conservation program savings.

The DSS Model can use one of the following: 1) a statistical approach to forecast demands (e.g., an econometric model); 2) a forecasted increase in population and employment; 3) predicted future demands; or 4) a demand projection entered into the model from an outside source.

Appendix G: AWWA Water Loss Reporting Worksheets

AWWA Free Water Audit Software v5.0

This spreadsheet-based water audit tool is designed to help quantify and track water losses associated with water distribution systems and identify areas for improved efficiency and cost recovery. It provides a "top-down" summary water audit format, and is not meant to take the place of a full-scale, comprehensive water audit format.

Auditors are strongly encouraged to refer to the most current edition of AWWA M36 Manual for Water Audits for detailed guidance on the water auditing process and targetting loss reduction levels

The spreadsheet contains several separate worksheets. Sheets can be accessed using the tabs towards the bottom of the screen, or by clicking the buttons below.

Please begin by providing the following information

Name of Contact Person:	Ernesto Velazquez
Email Address:	evelazquez@ncwd.org
Telephone (incl Ext.):	661 259 3610
Name of City / Utility:	Newhall County Water District
City/Town/Municipality:	Santa Clarita
State / Province:	California (CA)
Country:	United States
Year:	2015 Calendar Year
Audit Preparation Date:	3/8/2016
Volume Reporting Units:	Acre-feet
PWSID / Other ID:	

The following guidance will help you complete the Audit

All audit data are entered on the ***Reporting Worksheet***

- Value can be entered by user
- Value calculated based on input data
- These cells contain recommended default values

Use of Option (Radio) Buttons: Pcnt: 0.25% Value:

Select the default percentage by choosing the option button on the left

To enter a value, choose this button and enter a value in the cell

The following worksheets are available by clicking the buttons below or selecting the tabs along the bottom of the page

Instructions
The current sheet. Enter contact information and basic audit details (year, units etc)

Reporting Worksheet
Enter the required data on this worksheet to calculate the water balance and data grading

Comments
Enter comments to explain how values were calculated or to document data sources

Performance Indicators
Review the performance indicators to evaluate the results of the audit

Water Balance
The values entered in the Reporting Worksheet are used to populate the Water Balance

Dashboard
A graphical summary of the water balance and Non-Revenue Water components

Grading Matrix
Presents the possible grading options for each input component of the audit

Service Connection Diagram
Diagrams depicting possible customer service connection line configurations

Definitions
Use this sheet to understand the terms used in the audit process

Loss Control Planning
Use this sheet to interpret the results of the audit validity score and performance indicators

Example Audits
Reporting Worksheet and Performance Indicators examples are shown for two validated audits

Acknowledgements
Acknowledgements for the AWWA Free Water Audit Software v5.0

If you have questions or comments regarding the software please contact us via email at: wlc@awwa.org

AWWA Free Water Audit Software:
Reporting Worksheet

WAS v5.0

American Water Works Association

? Click to access definition
+ Click to add a comment

Water Audit Report for: Newhall County Water District
Reporting Year: 2015 (1/2015 - 12/2015)

Please enter data in the white cells below. Where available, metered values should be used; if metered values are unavailable please estimate a value. Indicate your confidence in the accuracy of the input

All volumes to be entered as: ACRE-FEET PER YEAR

To select the correct data grading for each input, determine the highest grade where the utility meets or exceeds all criteria for that grade and <---------- Enter grading in column 'E' and 'J' ----------> Master Meter and Supply Error Adjustments

WATER SUPPLIED

		Grading	Value		Master Meter Grading	Pcnt:	Value:	
Volume from own sources:	+	7	4,827.480	acre-ft/yr	3	-1.50%		acre-ft/yr
Water imported:	+	7	3,272.080	acre-ft/yr	2	-1.50%		acre-ft/yr
Water exported:	+	n/a		acre-ft/yr				acre-ft/yr

Enter negative % or value for under-registration
Enter positive % or value for over-registration

WATER SUPPLIED: 8,222.904 acre-ft/yr

AUTHORIZED CONSUMPTION

Click here: ? for help using option buttons

		Grading	Value		Pcnt:	Value:	
Billed metered:	+	8	7,462.040	acre-ft/yr			
Billed unmetered:	+	n/a		acre-ft/yr			
Unbilled metered:	+	9	3.260	acre-ft/yr			
Unbilled unmetered:	+		102.786	acre-ft/yr	1.25%		acre-ft/yr

Default option selected for Unbilled unmetered - a grading of 5 is applied but not displayed

Use buttons to select percentage of water supplied OR value

AUTHORIZED CONSUMPTION: 7,568.086 acre-ft/yr

WATER LOSSES (Water Supplied - Authorized Consumption) 654.817 acre-ft/yr

Apparent Losses

		Grading	Value		Pcnt:	Value:	
Unauthorized consumption:	+		20.557	acre-ft/yr	0.25%		acre-ft/yr

Default option selected for unauthorized consumption - a grading of 5 is applied but not displayed

Customer metering inaccuracies:	+	7	314.296	acre-ft/yr	4.04%		acre-ft/yr
Systematic data handling errors:	+	5	18.655	acre-ft/yr	0.25%		acre-ft/yr

Default option selected for Systematic data handling errors - a grading of 5 is applied but not displayed

Apparent Losses: 353.508 acre-ft/yr

Real Losses (Current Annual Real Losses or CARL)

Real Losses = Water Losses - Apparent Losses: 301.309 acre-ft/yr

WATER LOSSES: 654.817 acre-ft/yr

NON-REVENUE WATER

NON-REVENUE WATER: 760.864 acre-ft/yr

= Water Losses + Unbilled Metered + Unbilled Unmetered

SYSTEM DATA

		Grading	Value	
Length of mains:	+	9	146.5	miles
Number of active AND inactive service connections:	+	7	9,800	
Service connection density:			67	conn./mile main
Are customer meters typically located at the curbstop or property line?			Yes	
Average length of customer service line:	+			(length of service line, beyond the property boundary, that is the responsibility of the utility)

Average length of customer service line has been set to zero and a data grading score of 10 has been applied

Average operating pressure:	+	8	97.4	psi

COST DATA

		Grading	Value	
Total annual cost of operating water system:	+	10	$9,647,491	$/Year
Customer retail unit cost (applied to Apparent Losses):	+	9	$2.53	$/100 cubic feet (ccf)
Variable production cost (applied to Real Losses):	+	9	$202.16	$/acre-ft

☐ Use Customer Retail Unit Cost to value real

WATER AUDIT DATA VALIDITY SCORE:

*** YOUR SCORE IS: 76 out of 100 ***

A weighted scale for the components of consumption and water loss is included in the calculation of the Water Audit Data Validity Score

PRIORITY AREAS FOR ATTENTION:

Based on the information provided, audit accuracy can be improved by addressing the following components:

1: Volume from own sources
2: Water imported
3: Unauthorized consumption

AWWA Free Water Audit Software:
System Attributes and Performance Indicators

WAS v5.0
American Water Works Association.

Water Audit Report for: Newhall County Water District
Reporting Year: 2015 | 1/2015 - 12/2015

*** YOUR WATER AUDIT DATA VALIDITY SCORE IS: 76 out of 100 ***

System Attributes:

	Apparent Losses:	353.508	acre-ft/yr
+	Real Losses:	301.309	acre-ft/yr
=	Water Losses:	654.817	acre-ft/yr
	Unavoidable Annual Real Losses (UARL):	246.87	acre-ft/yr
	Annual cost of Apparent Losses:	$389,313	
	Annual cost of Real Losses:	$60,913	Valued at Variable Production Cost

Return to Reporting Worksheet to change this assumpiton

Performance Indicators:

Financial:	Non-revenue water as percent by volume of Water Supplied:	9.3%	
	Non-revenue water as percent by cost of operating system:	4.9%	Real Losses valued at Variable Production Cost
Operational Efficiency:	Apparent Losses per service connection per day:	32.20	gallons/connection/day
	Real Losses per service connection per day:	27.45	gallons/connection/day
	Real Losses per length of main per day*:	N/A	
	Real Losses per service connection per day per psi pressure:	0.28	gallons/connection/day/psi
	From Above, Real Losses = Current Annual Real Losses (CARL):	301.31	acre-feet/year
	Infrastructure Leakage Index (ILI) [CARL/UARL]:	1.22	

* This performance indicator applies for systems with a low service connection density of less than 32 service connections/mile of pipeline

AWWA Free Water Audit Software:
User Comments

Use this worksheet to add comments or notes to explain how an input value was calculated, or to document the sources of the information used.

General Comment:	

Audit Item	Comment
Volume from own sources:	I used production information gathered from our monthly reports to the board.
Vol. from own sources: Master meter error adjustment:	There is no information available on the extent of our production meter inaccuracies. I have estimated this value using some of the information provided at the water loss workshop in 2015. However, it's a conservative guess.
Water imported:	I used information gathered from our monthly reports to the board. I use CLWA's production information for the turnouts instead of what our meters register so that it matches up with our billing.
Water imported: master meter error adjustment:	There is no information available on the extent of our production meter inaccuracies. I have estimated this value using some of the information provided at the water loss workshop in 2015. However, it's a conservative guess.
Water exported:	
Water exported: master meter error adjustment:	
Billed metered:	There is some variance in this value since we read customer meters towards the middle of the month and our production meters at the end of the month. The combined variance for all systems is about 8%.
Billed unmetered:	
Unbilled metered:	We do not bill our facilities. I got this number from our water usage database that Sidra updaes monthly.
Unbilled unmetered:	
Unauthorized consumption:	I used the default value.
Customer metering inaccuracies:	This value was determined using our customer meter testing program. Most the information was gathered in 2012. I used the meter efficiency tests performed for various meter sizes and performed a weighted average to make the values representative our system's meter population. 84% of our meters are 3/4" so this heavily weighed on the efficiency value.
Systematic data handling errors:	I used the default value.
Length of mains:	Danielle helped me gather this information from our GIS database.
Number of active AND inactive service connections:	There is some discrepency in determining the number of inactive connections to add to our active connection list. This is why we received a data validation value of 7.
Average length of customer service line:	
Average operating pressure:	I took the average Max and Average day demand for each zone. I then did a weighted average for pressures of each system based on the number of connections in each area.
Total annual cost of operating water system:	Rochelle provided this number.
Customer retail unit cost (applied to Apparent Losses):	Rochelle provided me with this value.
Variable production cost (applied to Real Losses):	Rochelle provided me with expense information for purchased water, power, maintenance, and chemical costs. I used this information to come up with the cost for well water and CLWA water. I then took a weighted average of each cost to come up with a blended average cost based on each sources contribution to our total annual production.

AWWA Free Water Audit Software: Water Balance

American Water Works

Water Audit Report for:	Newhall County Water District	
Reporting Year:	2015	1/2015 - 12/2015
Data Validity Score:	76	

Water Exported
0.000

Billed Water Exported

Own Sources
(Adjusted for known errors)
4,900.995

Water Supplied
8,222.904

Authorized Consumption
7,568.086

Billed Authorized Consumption
7,462.040

Billed Metered Consumption (water exported is removed)
7,462.040

Billed Unmetered Consumption
0.000

Revenue Water
7,462.040

Unbilled Authorized Consumption
106.046

Unbilled Metered Consumption
3.260

Unbilled Unmetered Consumption
102.786

Non-Revenue Water (NRW)
760.864

Water Losses
654.817

Apparent Losses
353.508

Unauthorized Consumption
20.557

Customer Metering Inaccuracies
314.296

Systematic Data Handling Errors
18.655

Real Losses
301.309

Leakage on Transmission and/or Distribution Mains
Not broken down

Leakage and Overflows at Utility's Storage Tanks
Not broken down

Leakage on Service Connections
Not broken down

Water Imported
3,321.909

AWWA Free Water Audit Software:
Dashboard

WAS v5.0

American Water Works Association.

The graphic below is a visual representation of the Water Balance with bar heights propotional to the volume of the audit components

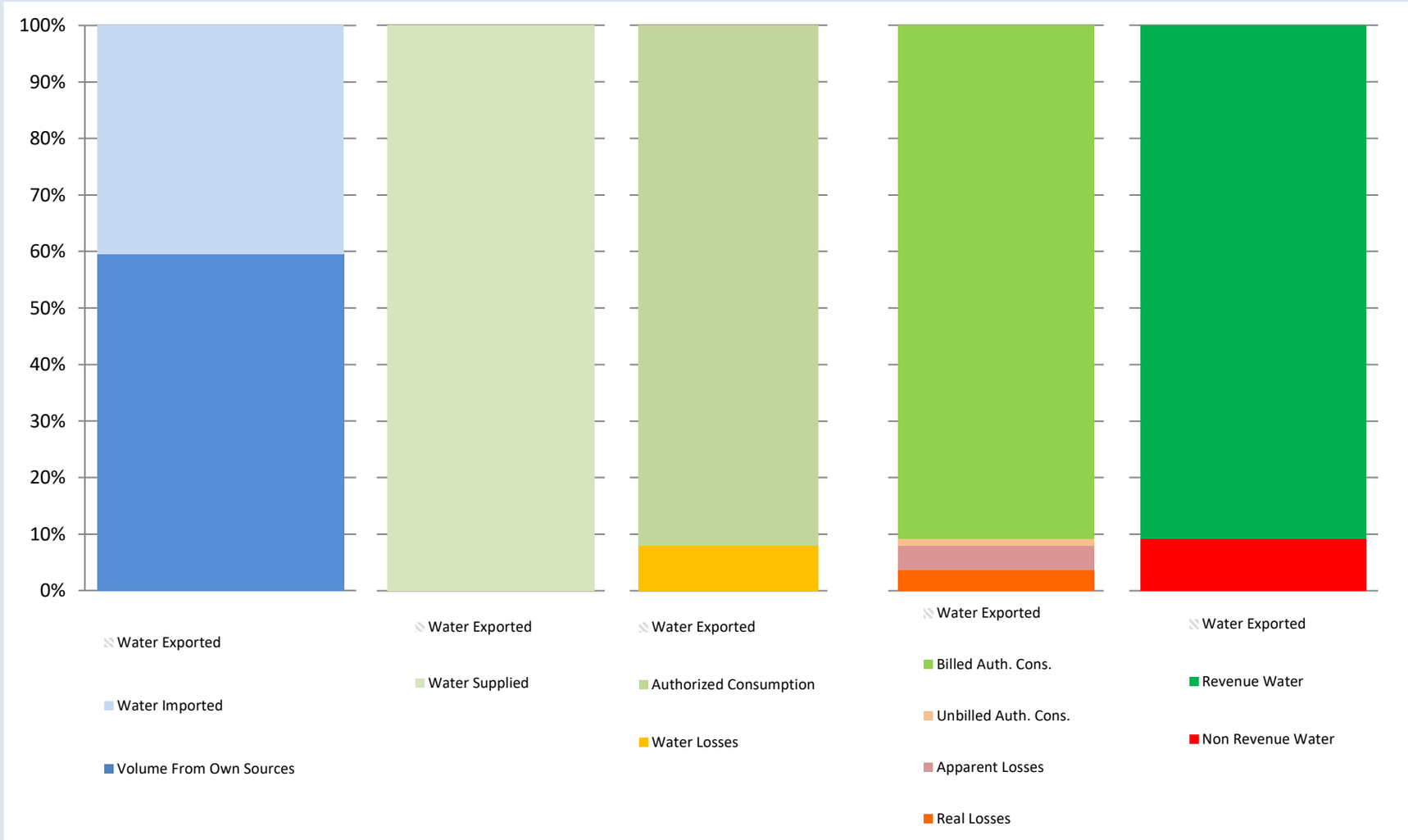
Water Audit Report for: **Newhall County Water District**

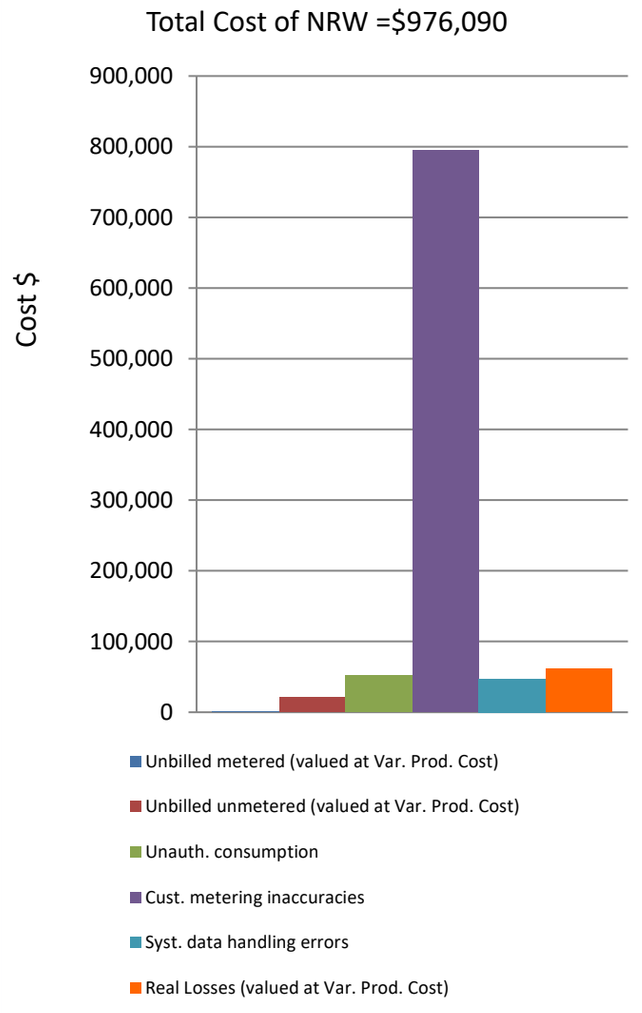
Reporting Year: **2015** **1/2015 - 12/2015**

Data Validity Score: **76**

○ Show me the VOLUME of Non-Revenue Water

◉ Show me the COST of Non-Revenue Water





AWWA Free Water Audit Software v5.0

This spreadsheet-based water audit tool is designed to help quantify and track water losses associated with water distribution systems and identify areas for improved efficiency and cost recovery. It provides a "top-down" summary water audit format, and is not meant to take the place of a full-scale, comprehensive water audit format.

Auditors are strongly encouraged to refer to the most current edition of AWWA M36 Manual for Water Audits for detailed guidance on the water auditing process and targetting loss reduction levels

The spreadsheet contains several separate worksheets. Sheets can be accessed using the tabs towards the bottom of the screen, or by clicking the buttons below.

Please begin by providing the following information

Name of Contact Person:	Ernesto Velazquez
Email Address:	Evelazquez@ncwd.org
Telephone (incl Ext.):	661 259-3610 x216
Name of City / Utility:	Newhall County Water District
City/Town/Municipality:	Santa Clarita
State / Province:	California (CA)
Country:	United States
Year:	2017 Financial Year
Start Date:	07/2016 Enter MM/YYYY numeric format
End Date:	06/2017 Enter MM/YYYY numeric format
Audit Preparation Date:	9/11/2017
Volume Reporting Units:	Acre-feet
PWSID / Other ID:	Newhall System - 1910096

The following guidance will help you complete the Audit

All audit data are entered on the ***Reporting Worksheet***

- Value can be entered by user
- Value calculated based on input data
- These cells contain recommended default values

Use of Option (Radio) Buttons: Pcnt: 0.25% Value:

Select the default percentage by choosing the option button on the left

To enter a value, choose this button and enter a value in the cell to the

The following worksheets are available by clicking the buttons below or selecting the tabs along the bottom of the page

Instructions
The current sheet. Enter contact information and basic audit details (year, units etc)

Reporting Worksheet
Enter the required data on this worksheet to calculate the water balance and data grading

Comments
Enter comments to explain how values were calculated or to document data sources

Performance Indicators
Review the performance indicators to evaluate the results of the audit

Water Balance
The values entered in the Reporting Worksheet are used to populate the Water Balance

Dashboard
A graphical summary of the water balance and Non-Revenue Water components

Grading Matrix
Presents the possible grading options for each input component of the audit

Service Connection Diagram
Diagrams depicting possible customer service connection line configurations

Definitions
Use this sheet to understand the terms used in the audit process

Loss Control Planning
Use this sheet to interpret the results of the audit validity score and performance indicators

Example Audits
Reporting Worksheet and Performance Indicators examples are shown for two validated audits

Acknowledgements
Acknowledgements for the AWWA Free Water Audit Software v5.0

If you have questions or comments regarding the software please contact us via email at: wlc@awwa.org

AWWA Free Water Audit Software:
Reporting Worksheet

WAS v5.0

? Click to access definition
+ Click to add a comment

Water Audit Report for: Newhall County Water District (Newhall System - 1910096)
Reporting Year: 2017 7/2016 - 6/2017

Please enter data in the white cells below. Where available, metered values should be used; if metered values are unavailable please estimate a value. Indicate your confidence in the accuracy of the input data by grading each component (n/a or 1-10) using the drop-down list to the left of the input cell. Hover the mouse over the cell to obtain a description of the grades

All volumes to be entered as: ACRE-FEET PER YEAR

To select the correct data grading for each input, determine the highest grade where the utility meets or exceeds all criteria for that grade and all grades below it.

Master Meter and Supply Error Adjustments

WATER SUPPLIED

					Pcnt:	Value:	
Volume from own sources:	7	3,346.580	acre-ft/yr	3	0.60%		acre-ft/yr
Water imported:	3	675.930	acre-ft/yr	3			acre-ft/yr
Water exported:	n/a	0.000	acre-ft/yr				acre-ft/yr
WATER SUPPLIED:		**4,002.550**	acre-ft/yr				

Enter negative % or value for under-registration
Enter positive % or value for over-registration

AUTHORIZED CONSUMPTION

Click here: ? for help using option buttons below

				Pcnt:	Value:	
Billed metered:	5	3,788.360	acre-ft/yr			
Billed unmetered:	n/a	0.000	acre-ft/yr			
Unbilled metered:	9	3	acre-ft/yr			
Unbilled unmetered:	5	10.006	acre-ft/yr		10.006	acre-ft/yr
AUTHORIZED CONSUMPTION:		**3,801.366**	acre-ft/yr			

Use buttons to select percentage of water supplied OR value

WATER LOSSES (Water Supplied - Authorized Consumption)

201.184 acre-ft/yr

Apparent Losses

				Pcnt:	Value:	
Unauthorized consumption:		10.006	acre-ft/yr	0.25%		acre-ft/yr

Default option selected for unauthorized consumption - a grading of 5 is applied but not displayed

Customer metering inaccuracies:	3	38.297	acre-ft/yr	1.00%		acre-ft/yr
Systematic data handling errors:		9.471	acre-ft/yr	0.25%		acre-ft/yr

Default option selected for Systematic data handling errors - a grading of 5 is applied but not displayed

Apparent Losses: **57.774** acre-ft/yr

Real Losses (Current Annual Real Losses or CARL)

Real Losses = Water Losses - Apparent Losses: **143.410** acre-ft/yr

WATER LOSSES: **201.184** acre-ft/yr

NON-REVENUE WATER

NON-REVENUE WATER: **214.190** acre-ft/yr

= Water Losses + Unbilled Metered + Unbilled Unmetered

SYSTEM DATA

Length of mains:	9	65.9	miles
Number of active AND inactive service connections:	9	3,824	
Service connection density:		58	conn./mile main

Are customer meters typically located at the curbstop or property line? Yes

Average length of customer service line: (length of service line, beyond the property boundary, that is the responsibility of the utility)

Average length of customer service line has been set to zero and a data grading score of 10 has been applied

Average operating pressure: 5 97.1 psi

COST DATA

Total annual cost of operating water system:	10	$3,818,782	$/Year
Customer retail unit cost (applied to Apparent Losses):	9	$2.92	$/100 cubic feet (ccf)
Variable production cost (applied to Real Losses):	5	$145.92	$/acre-ft

☐ Use Customer Retail Unit Cost to value real losses

WATER AUDIT DATA VALIDITY SCORE:

***** YOUR SCORE IS: 65 out of 100 *****

A weighted scale for the components of consumption and water loss is included in the calculation of the Water Audit Data Validity Score

PRIORITY AREAS FOR ATTENTION:

Based on the information provided, audit accuracy can be improved by addressing the following components:

1: Volume from own sources
2: Customer metering inaccuracies
3: Billed metered

AWWA Free Water Audit Software:
System Attributes and Performance Indicators

Water Audit Report for: Newhall County Water District (Newhall System - 1910096)
Reporting Year: 2017 | 7/2016 - 6/2017

*** YOUR WATER AUDIT DATA VALIDITY SCORE IS: 65 out of 100 ***

System Attributes:

	Apparent Losses:	57.774	acre-ft/yr
+	Real Losses:	143.410	acre-ft/yr
=	Water Losses:	201.184	acre-ft/yr
	? idable Annual Real Losses (UARL):	101.11	acre-ft/yr
	Annual cost of Apparent Losses:	$73,453	
	Annual cost of Real Losses:	$20,926	Valued at Variable Production Cost

Return to Reporting Worksheet to change this assumpiton

Performance Indicators:

Financial:	Non-revenue water as percent by volume of Water Supplied:	5.4%	
	Non-revenue water as percent by cost of operating system:	2.5%	Real Losses valued at Variable Production Cost
Operational Efficiency:	Apparent Losses per service connection per day:	13.49	gallons/connection/day
	Real Losses per service connection per day:	33.48	gallons/connection/day
	Real Losses per length of main per day*:	N/A	
	Real Losses per service connection per day per psi pressure:	0.34	gallons/connection/day/psi
	From Above, Real Losses = Current Annual Real Losses (CARL):	143.41	acre-feet/year
	? tructure Leakage Index (ILI) [CARL/UARL]:	1.42	

* This performance indicator applies for systems with a low service connection density of less than 32 service connections/mile of pipeline

AWWA Free Water Audit Software:
User Comments

Use this worksheet to add comments or notes to explain how an input value was calculated, or to document the sources of the information used.

General Comment:	The audit for NCWD's Newhall system shows that there are a few areas that we can improve on. Gathering daily data for tank volume changes can help us pinpoint water loss by helping us deduce whether the water was sold, stored or lost. Updating/improving our meter testing data and methodologies will improve: our estimated aparent loss volume, indicate the performance/efficiency of different field meter models, allow us to make adjustments to recover revenue, and will improve the accuracy of this audits estimated real loss volume so that we can compare it with our recorded losses.

Audit Item	Comment
Volume from own sources:	Our production information is gathered on a daily basis. Our operators gather meter readings and the production values are then input into a Microsoft Access Database. I create a weekly production report by comparing the results of the database with the hand written copies to check for discrepancies and typos. See "Attachment A" for our monthly production report.
Vol. from own sources: Master meter error adjustment:	This value was obtained using information provided on our Annual Edison Pump Efficiency Testing Report. The tester compared the flow reading from his pitot tube to what our meter was reading. Using this difference in pitot vs meter reads I came up with a percentage for the over/under registration of the meter. Lastly, since we have two wells in Newhall, I used a weighted average value based on each well's contribution to production. See Section D in Attachment B
Water imported:	This value was obtained from our monthly invoice for purchased water. Castaic Lake Water Agency sells us water and we use their metered values for our monthly reports. See Section E in Attachment B for reference.
Water imported: master meter error adjustment:	(Estimated Value) I emailed CLWA to find out if they test their meters at all. They told me that they send their meters to the manufacturer to be tested every ten years. They provided me a certificate they received from their last test. See Attachment D. I gave this a very low validity score since there is really no way to know how accurate their meters are.
Water exported:	We did not use any interties during this fiscal year.
Water exported: master meter error adjustment:	We did not use any interties during this fiscal year.
Billed metered:	This value came from our Master Water Use report (Attachment F) that we use to record billed metered usage as well as production information.
Billed unmetered:	We did not have any billed unmetered connections during this fiscal year.
Unbilled metered:	This information was gathered from our water usage database (attachment G). We record the metered usage from our facilities and flushing activities. (Leaks excluded)
Unbilled unmetered:	Used the reduced value of 0.25%. On our last conference call we discussed using this value as a temporary placeholder based on typical water use during California drought conditions.
Unauthorized consumption:	We have no information on this so I decided to use the default value of 0.25%
Customer metering inaccuracies:	This information was obtained from our customer meter flow tests that were performed in house on our meter testing workbench in 2012. The information is biased based on age since meters were only tested based on complaints and through routine replacement of old meters. The value was obtained by performing a weighted average based on the volume of water that each meter size contributed to total water sells. See Attachment E for more info.
Systematic data handling errors:	Default Value
Length of mains:	This information was gathered by our GIS technician. She updates our printed maps on an quarterly basis with the comments and corrections provided by our construction and maintenance crews. The crews also have a tablet that they can use in the field with our facilities maps so that they can provide feedback to our technician for any changes that need to be made. Hydrant laterals were included in the calculation. See Section C of Attachment B
Number of active AND inactive service connections:	This value was provided by our Customer Service and Efficiency Coordinator. He ran a report and gave me a breakdown of how many active and inactive meters we have in all four of our systems. Also, our GIS system helps manage the location of the meters which have been located via GPS to within a foot. Meters are read regardless of active/inactive customer status. See Section A in Attachment B to see the sizes and quantity of the meters we have in Newhall.
Average length of customer service line:	99.9% of our meters are located right at the curb as shown in Figure A of the Service Connection Diagram Tab
Average operating pressure:	The average operating pressure info was obtained from our hydraulic modeling company. I used the information that they gave me and performed a weighted average based on the number of meters in each pressure zone. The number of meters in each zone was obtained through our GIS system. The meter information is not 100% accurate as some meters in one zone can feed another zone, but it gave me a general idea of how to perform the weighted average. See Attachment B2 AND the Zone Pressures tab in Attachment B for supporting documentation.
Total annual cost of operating water system:	(Attachment I) The total cost to run NCWD, which includes everything but depreciation, was gathered by our HR and Accounting Department. They have a third party review our financials on an annual basis and they've won awards for transparency for the past few years. The one issue I had was that our finances are not split by distribution system (we operate 4 systems) so I had to come up with a way to find out how much money Newhall accounts for out of that total. See Section B in Attachment B for more details on how I accomplished this.
Customer retail unit cost (applied to Apparent Losses):	Attachment C- Rate History. The FY 2016-17 rate is calculated by adding NCWD's standard rate to the CLWA Surcharge and including the Water Revenue Adjustment Factor
Variable production cost (applied to Real Losses):	This value was determined using financial information obtained from our HR/Accounting Dept. (Detailed information in Attachment H). This information was used to determine the chemical cost, imported water cost, and pumping/energy cost. I performed weighted average calculation with some of the information so that Newhall costs would be accurately represented in the variable production cost calculation.

AWWA Free Water Audit Software: Water Balance

WAS v5.0

American Water Works Association.

Water Audit Report for:	Newhall County Water District (Newhall System - 1910096)	
Reporting Year:	2017	7/2016 - 6/2017
Data Validity Score:	65	

Own Sources (Adjusted for known errors) 3,326.620	Water Exported 0.000	Billed Water Exported			
	Water Supplied 4,002.550	Authorized Consumption 3,801.366	Billed Authorized Consumption 3,788.360	Billed Metered Consumption (water exported is removed) 3,788.360	Revenue Water 3,788.360
				Billed Unmetered Consumption 0.000	
			Unbilled Authorized Consumption 13.006	Unbilled Metered Consumption 3.000	Non-Revenue Water (NRW) 214.190
				Unbilled Unmetered Consumption 10.006	
		Water Losses 201.184	Apparent Losses 57.774	Unauthorized Consumption 10.006	
				Customer Metering Inaccuracies 38.297	
				Systematic Data Handling Errors 9.471	
Water Imported 675.930			Real Losses 143.410	Leakage on Transmission and/or Distribution Mains Not broken down	
				Leakage and Overflows at Utility's Storage Tanks Not broken down	
				Leakage on Service Connections Not broken down	

AWWA Free Water Audit Software:
Dashboard

WAS v5.0

The graphic below is a visual representation of the Water Balance with bar heights propotional to the volume of the audit components

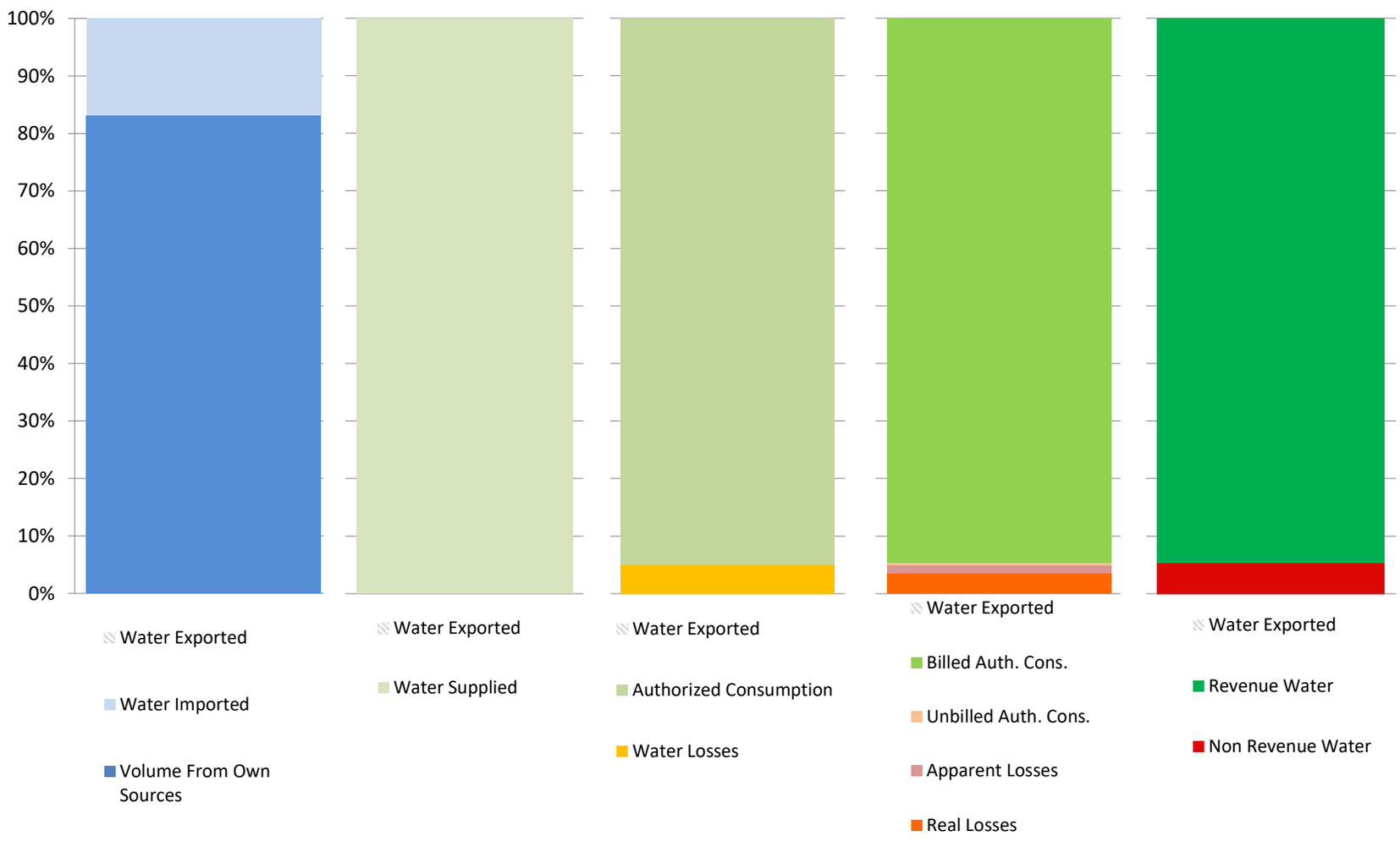
Water Audit Report for: **Newhall County Water District (Newhall System - 1910096)**

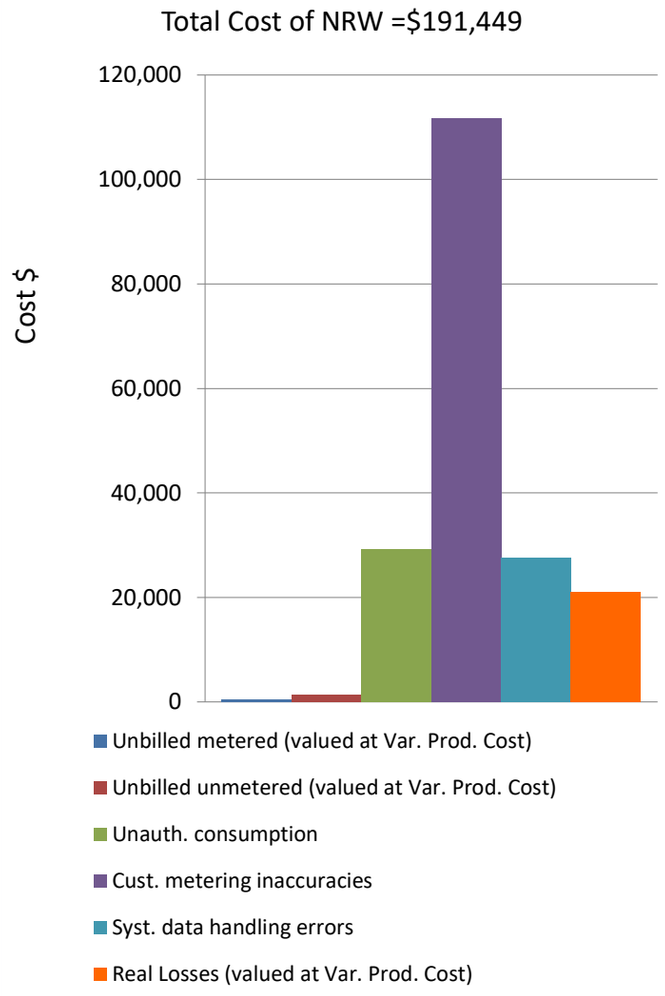
Reporting Year: **2017** **7/2016 - 6/2017**

Data Validity Score: **65**

○ Show me the VOLUME of Non-Revenue Water

◉ Show me the COST of Non-Revenue Water





AWWA Free Water Audit Software v5.0

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Auditors are strongly encouraged to refer to the most current edition of AWWA M36 Manual for Water Audits for detailed guidance on the water auditing process and targetting loss reduction levels

The spreadsheet contains several separate worksheets. Sheets can be accessed using the tabs towards the bottom of the screen, or by clicking the buttons below.

Please begin by providing the following information

Name of Contact Person:	Matthew Dickens
Email Address:	mdickens@scvwa.org
Telephone (incl Ext.):	661 705-7913
Name of City / Utility:	SCV Water - Newhall Division
City/Town/Municipality:	Santa Clarita
State / Province:	California (CA)
Country:	United States
Year:	2018 Financial Year
Start Date:	07/2017 Enter MM/YYYY numeric format
End Date:	06/2018 Enter MM/YYYY numeric format
Audit Preparation Date:	8/2/2018
Volume Reporting Units:	Acre-feet
PWSID / Other ID:	Newhall System - 1910096

The following guidance will help you complete the Audit

All audit data are entered on the ***Reporting Worksheet***

- Value can be entered by user
- Value calculated based on input data
- These cells contain recommended default values

Use of Option (Radio) Buttons: Pcnt: 0.25% Value:

Select the default percentage by choosing the option button on the left

To enter a value, choose this button and enter a value in the cell

The following worksheets are available by clicking the buttons below or selecting the tabs along the bottom of the page

Instructions
The current sheet. Enter contact information and basic audit details (year, units etc)

Reporting Worksheet
Enter the required data on this worksheet to calculate the water balance and data grading

Comments
Enter comments to explain how values were calculated or to document data sources

Performance Indicators
Review the performance indicators to evaluate the results of the audit

Water Balance
The values entered in the Reporting Worksheet are used to populate the Water Balance

Dashboard
A graphical summary of the water balance and Non-Revenue Water components

Grading Matrix
Presents the possible grading options for each input component of the audit

Service Connection Diagram
Diagrams depicting possible customer service connection line configurations

Definitions
Use this sheet to understand the terms used in the audit process

Loss Control Planning
Use this sheet to interpret the results of the audit validity score and performance indicators

Example Audits
Reporting Worksheet and Performance Indicators examples are shown for two validated audits

Acknowledgements
Acknowledgements for the AWWA Free Water Audit Software v5.0

If you have questions or comments regarding the software please contact us via email at: wlc@awwa.org

AWWA Free Water Audit Software:
Reporting Worksheet

WAS v5.0

American Water Works Association

? Click to access definition
\+ Click to add a comment

Water Audit Report for: SCV Water - Newhall Division (Newhall System - 1910096)
Reporting Year: 2018 7/2017 - 6/2018

Please enter data in the white cells below. Where available, metered values should be used; if metered values are unavailable please estimate a value. Indicate your confidence in the accuracy of the input

All volumes to be entered as: ACRE-FEET PER YEAR

To select the correct data grading for each input, determine the highest grade where the utility meets or exceeds all criteria for that grade and <---------- Enter grading in column 'E' and 'J' ---------->

Master Meter and Supply Error Adjustments

		Grading			Pcnt:	Value:	
WATER SUPPLIED							
Volume from own sources:	+	7	1,531.000	acre-ft/yr	3	-10.836	acre-ft/yr
Water imported:	+	3	2,827.940	acre-ft/yr	1		acre-ft/yr
Water exported:	+	n/a	0.000	acre-ft/yr			acre-ft/yr
WATER SUPPLIED:			4,369.776	acre-ft/yr			

Enter negative % or value for under-registration
Enter positive % or value for over-registration

		Grading			Pcnt:	Value:	
AUTHORIZED CONSUMPTION							
Billed metered:	+	5	4,060.760	acre-ft/yr			
Billed unmetered:	+	n/a	0.000	acre-ft/yr			
Unbilled metered:	+	9	3.9	acre-ft/yr			
Unbilled unmetered:	+	5	10.924	acre-ft/yr		10.924	acre-ft/yr
AUTHORIZED CONSUMPTION:			4,075.584	acre-ft/yr			

Click here: ? for help using option buttons

Use buttons to select percentage of water supplied **OR** value

		Grading			Pcnt:	Value:	
WATER LOSSES (Water Supplied - Authorized Consumption)			294.192	acre-ft/yr			
Apparent Losses							
Unauthorized consumption:	+		10.924	acre-ft/yr	0.25%		acre-ft/yr

Default option selected for unauthorized consumption - a grading of 5 is applied but not displayed

Customer metering inaccuracies:	+	3	82.952	acre-ft/yr	2.00%		acre-ft/yr
Systematic data handling errors:	+		10.152	acre-ft/yr	0.25%		acre-ft/yr

Default option selected for Systematic data handling errors - a grading of 5 is applied but not displayed

Apparent Losses:			104.029	acre-ft/yr			
Real Losses (Current Annual Real Losses or CARL)							
Real Losses = Water Losses - Apparent Losses:			190.163	acre-ft/yr			
WATER LOSSES:			294.192	acre-ft/yr			

		Grading					
NON-REVENUE WATER							
NON-REVENUE WATER:			309.016	acre-ft/yr			

= Water Losses + Unbilled Metered + Unbilled Unmetered

		Grading					
SYSTEM DATA							
Length of mains:	+	9	65.9	miles			
Number of active AND inactive service connections:	+	9	3,824				
Service connection density:			58	conn./mile main			
Are customer meters typically located at the curbstop or property line?			Yes				
Average length of customer service line:	+						

(length of service line, beyond the property boundary, that is the responsibility of the utility)

Average length of customer service line has been set to zero and a data grading score of 10 has been applied

Average operating pressure:	+	5	97.1	psi			
COST DATA							
Total annual cost of operating water system:	+	10	$3,818,782	$/Year			
Customer retail unit cost (applied to Apparent Losses):	+	9	$2.97	$/100 cubic feet (ccf)			
Variable production cost (applied to Real Losses):	+	5	$163.74	$/acre-ft	☐ Use Customer Retail Unit Cost to value real		

WATER AUDIT DATA VALIDITY SCORE:

*** YOUR SCORE IS: 58 out of 100 ***

A weighted scale for the components of consumption and water loss is included in the calculation of the Water Audit Data Validity Score

PRIORITY AREAS FOR ATTENTION:

Based on the information provided, audit accuracy can be improved by addressing the following components:

1: Water imported
2: Customer metering inaccuracies
3: Billed metered

AWWA Free Water Audit Software:
System Attributes and Performance Indicators

WAS v5.0
American Water Works Association.

Water Audit Report for: SCV Water - Newhall Division (Newhall System - 1910096)
Reporting Year: 2018 7/2017 - 6/2018

*** YOUR WATER AUDIT DATA VALIDITY SCORE IS: 58 out of 100 ***

System Attributes:

	Apparent Losses:	104.029	acre-ft/yr
+	Real Losses:	190.163	acre-ft/yr
=	Water Losses:	294.192	acre-ft/yr
	Unavoidable Annual Real Losses (UARL):	101.11	acre-ft/yr
	Annual cost of Apparent Losses:	$134,540	
	Annual cost of Real Losses:	$31,137	Valued at Variable Production Cost

Return to Reporting Worksheet to change this assumpiton

Performance Indicators:

Financial:	Non-revenue water as percent by volume of Water Supplied:	7.1%	
	Non-revenue water as percent by cost of operating system:	4.4%	Real Losses valued at Variable Production Cost
Operational Efficiency:	Apparent Losses per service connection per day:	24.29	gallons/connection/day
	Real Losses per service connection per day:	44.40	gallons/connection/day
	Real Losses per length of main per day*:	N/A	
	Real Losses per service connection per day per psi pressure:	0.46	gallons/connection/day/psi
	From Above, Real Losses = Current Annual Real Losses (CARL):	190.16	acre-feet/year
	Infrastructure Leakage Index (ILI) [CARL/UARL]:	1.88	

* This performance indicator applies for systems with a low service connection density of less than 32 service connections/mile of pipeline

AWWA Free Water Audit Software:
User Comments

WAS v5.0

American Water Works Association.

Use this worksheet to add comments or notes to explain how an input value was calculated, or to document the sources of the information used.

General Comment:	The audit for NCWD's Newhall system shows that there are a few areas that we can improve on. Gathering daily data for tank volume changes can help us pinpoint water loss by helping us deduce whether the water was sold, stored or lost. Updating/improving our meter testing data and methodologies will improve: our estimated aparent loss volume, indicate the performance/efficiency of different field meter models, allow us to make adjustments to recover revenue, and will improve the accuracy of this audits estimated real loss volume so that we can compare it with our recorded losses.

Audit Item	Comment
Volume from own sources:	Our production information is gathered on a daily basis. Our operators gather meter readings and the production values are then input into a Microsoft Access Database. I create a weekly production report by comparing the results of the database with the hand written copies to check for discrepancies and typos. See "Attachment A" for our monthly production report.
Vol. from own sources: Master meter error adjustment:	This value was obtained using information provided on our Annual Edison Pump Efficiency Testing Report. The tester compared the flow reading from his pitot tube to what our meter was reading. Using this difference in pitot vs meter reads I came up with a percentage for the over/under registration of the meter. Lastly, since we have two wells in Newhall, I used a weighted average value based on each well's contribution to production. See Section D in Attachment B
Water imported:	Should include N3 from import Production, could include use from intertie from Oak Orchard VWD (when in use).
Water imported: master meter error adjustment:	(Estimated Value) I emailed CLWA to find out if they test their meters at all. They told me that they send their meters to the manufacturer to be tested every ten years. They provided me a certificate they received from their last test. See Attachment D. I gave this a very low validity score since there is really no way to know how accurate their meters are.
Water exported:	We did not use any interties during this fiscal year.
Water exported: master meter error adjustment:	We did not use any interties during this fiscal year.
Billed metered:	This value came from our Master Water Use report (Attachment F) that we use to record billed metered usage as well as production information.
Billed unmetered:	We did not have any billed unmetered connections during this fiscal year.
Unbilled metered:	This information was gathered from our water usage database (attachment G). We record the metered usage from our facilities and flushing activities. (Leaks excluded)
Unbilled unmetered:	Used the reduced value of 0.25%. On our last conference call we discussed using this value as a temporary placeholder based on typical water use during California drought conditions.
Unauthorized consumption:	We have no information on this so I decided to use the default value of 0.25%
Customer metering inaccuracies:	This information was obtained from our customer meter flow tests that were performed in house on our meter testing workbench in 2012. The information is biased based on age since meters were only tested based on complaints and through routine replacement of old meters. The value was obtained by performing a weighted average based on the volume of water that each meter size contributed to total water sells. See Attachment E for more info.
Systematic data handling errors:	Default Value
Length of mains:	This information was gathered by our GIS technician. She updates our printed maps on an quarterly basis with the comments and corrections provided by our construction and maintenance crews. The crews also have a tablet that they can use in the field with our facilities maps so that they can provide feedback to our technician for any changes that need to be made. Hydrant laterals were included in the calculation. See Section C of Attachment B
Number of active AND inactive service connections:	This value was provided by our Customer Service and Efficiency Coordinator. He ran a report and gave me a breakdown of how many active and inactive meters we have in all four of our systems. Also, our GIS system helps manage the location of the meters which have been located via GPS to within a foot. Meters are read regardless of active/inactive customer status. See Section A in Attachment B to see the sizes and quantity of the meters we have in Newhall.
Average length of customer service line:	99.9% of our meters are located right at the curb as shown in Figure A of the Service Connection Diagram Tab
Average operating pressure:	The average operating pressure info was obtained from our hydraulic modeling company. I used the information that they gave me and performed a weighted average based on the number of meters in each pressure zone. The number of meters in each zone was obtained through our GIS system. The meter information is not 100% accurate as some meters in one zone can feed another zone, but it gave me a general idea of how to perform the weighted average. See Attachment B2 AND the Zone Pressures tab in Attachment B for supporting documentation.
Total annual cost of operating water system:	(Attachment I) The total cost to run NCWD, which includes everything but depreciation, was gathered by our HR and Accounting Department. They have a third party review our financials on an annual basis and they've won awards for transparency for the past few years. The one issue I had was that our finances are not split by distribution system (we operate 4 systems) so I had to come up with a way to find out how much money Newhall accounts for out of that total. See Section B in Attachment B for more details on how I accomplished this.
Customer retail unit cost (applied to Apparent Losses):	Attachment C- Rate History. The FY 2016-17 rate is calculated by adding NCWD's standard rate to the CLWA Surcharge and including the Water Revenue Adjustment Factor
Variable production cost (applied to Real Losses):	This value was determined using financial information obtained from our HR/Accounting Dept. (Detailed information in Attachment H). This information was used to determine the chemical cost, imported water cost, and pumping/energy cost. I performed weighted average calculation with some of the information so that Newhall costs would be accurately represented in the variable production cost calculation.

AWWA Free Water Audit Software: Water Balance

American Water Works

Water Audit Report for:	SCV Water - Newhall Division (Newhall System - 1910096)
Reporting Year:	2018 — 7/2017 - 6/2018
Data Validity Score:	58

Water Exported
0.000

Billed Water Exported

Own Sources
(Adjusted for known errors)
1,541.836

Water Supplied
4,369.776

Water Imported
2,827.940

Authorized Consumption
4,075.584

Billed Authorized Consumption
4,060.760

Billed Metered Consumption (water exported is removed)
4,060.760

Billed Unmetered Consumption
0.000

Revenue Water
4,060.760

Unbilled Authorized Consumption
14.824

Unbilled Metered Consumption
3.900

Unbilled Unmetered Consumption
10.924

Non-Revenue Water (NRW)
309.016

Water Losses
294.192

Apparent Losses
104.029

Unauthorized Consumption
10.924

Customer Metering Inaccuracies
82.952

Systematic Data Handling Errors
10.152

Real Losses
190.163

Leakage on Transmission and/or Distribution Mains
Not broken down

Leakage and Overflows at Utility's Storage Tanks
Not broken down

Leakage on Service Connections
Not broken down

AWWA Free Water Audit Software:
Dashboard

WAS v5.0

American Water Works Association.

The graphic below is a visual representation of the Water Balance with bar heights propotional to the volume of the audit components

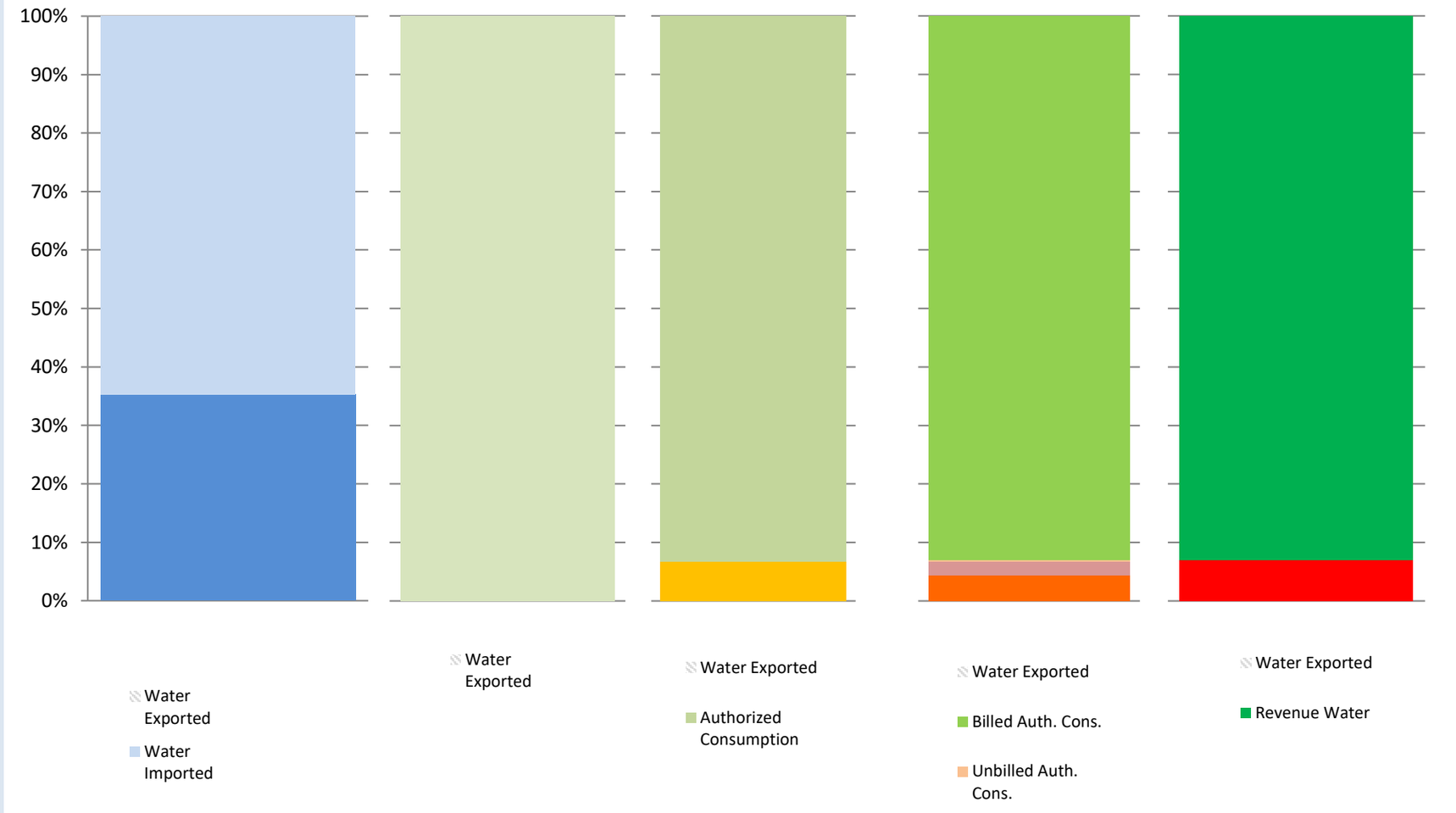
Water Audit Report for: **SCV Water - Newhall Division (Newhall System - 1910096)**

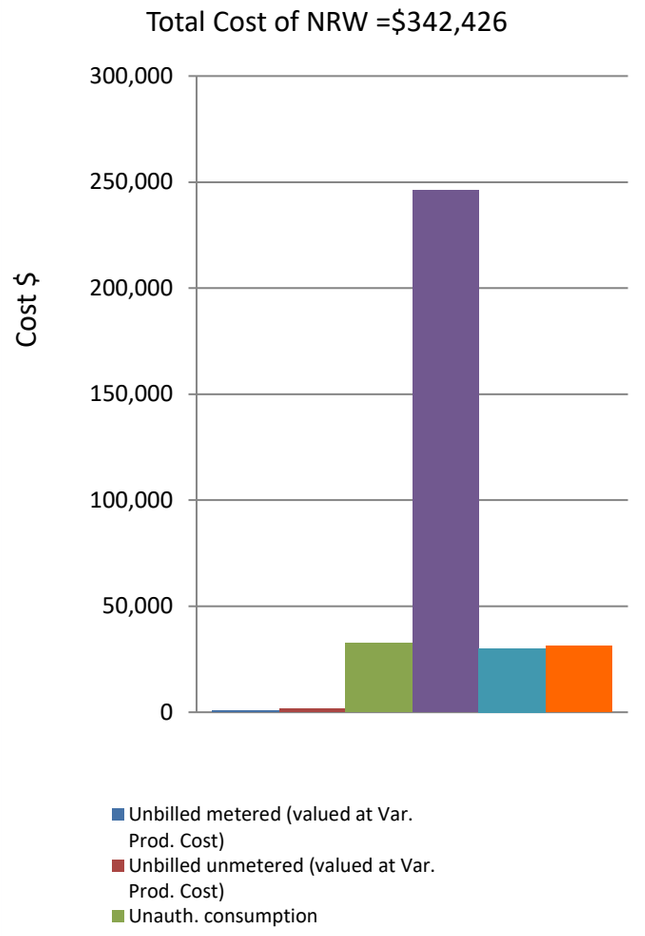
Reporting Year: **2018** **7/2017 - 6/2018**

Data Validity Score: **58**

○ Show me the VOLUME of Non-Revenue Water

◉ Show me the COST of Non-Revenue Water





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Please begin by providing the following information

Name of Contact Person:	Matthew Dickens
Email Address:	mdickens@scvwa.org
Telephone (incl Ext.):	661 705-7913
Name of City / Utility:	SCV Water - Newhall Division
City/Town/Municipality:	Santa Clarita
State / Province:	California (CA)
Country:	United States
Year:	FY19 Financial Year
Start Date:	07/2018 Enter MM/YYYY numeric format
End Date:	06/2019 Enter MM/YYYY numeric format
Audit Preparation Date:	8/2/2018
Volume Reporting Units:	Acre-feet
PWSID / Other ID:	Newhall System - 1910096

The following guidance will help you complete the Audit

All audit data are entered on the ***Reporting Worksheet***

- Value can be entered by user
- Value calculated based on input data
- These cells contain recommended default values

Use of Option (Radio) Buttons: Pcnt: 0.25% Value:

Select the default percentage by choosing the option button on the left

To enter a value, choose this button and enter a value in the cell

The following worksheets are available by clicking the buttons below or selecting the tabs along the bottom of the page

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The current sheet. Enter contact information and basic audit details (year, units etc)

Reporting Worksheet
Enter the required data on this worksheet to calculate the water balance and data grading

Comments
Enter comments to explain how values were calculated or to document data sources

Performance Indicators
Review the performance indicators to evaluate the results of the audit

Water Balance
The values entered in the Reporting Worksheet are used to populate the Water Balance

Dashboard
A graphical summary of the water balance and Non-Revenue Water components

Grading Matrix
Presents the possible grading options for each input component of the audit

Service Connection Diagram
Diagrams depicting possible customer service connection line configurations

Definitions
Use this sheet to understand the terms used in the audit process

Loss Control Planning
Use this sheet to interpret the results of the audit validity score and performance indicators

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Reporting Worksheet and Performance Indicators examples are shown for two validated audits

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If you have questions or comments regarding the software please contact us via email at: wlc@awwa.org

AWWA Free Water Audit Software:
Reporting Worksheet

WAS v5.0

American Water Works Association

? Click to access definition
+ Click to add a comment

Water Audit Report for: SCV Water - Newhall Division (Newhall System - 1910096)
Reporting Year: FY19 7/2018 - 6/2019

Please enter data in the white cells below. Where available, metered values should be used; if metered values are unavailable please estimate a value. Indicate your confidence in the accuracy of the input

All volumes to be entered as: ACRE-FEET PER YEAR

To select the correct data grading for each input, determine the highest grade where the utility meets or exceeds all criteria for that grade and <---------- Enter grading in column 'E' and 'J' ---------->

Master Meter and Supply Error Adjustments

WATER SUPPLIED		Grading	Value		Pcnt:	Value:	
Volume from own sources:	+	5	1,591.092	acre-ft/yr	3	1.73%	acre-ft/yr
Water imported:	+	6	2,312.572	acre-ft/yr	1	-3.00%	acre-ft/yr
Water exported:	+	n/a	0.000	acre-ft/yr			acre-ft/yr
WATER SUPPLIED:			**3,948.129**	acre-ft/yr			

Enter negative % or value for under-registration
Enter positive % or value for over-registration

AUTHORIZED CONSUMPTION		Grading	Value		Pcnt:	Value:	
Billed metered:	+	5	3,707.000	acre-ft/yr			
Billed unmetered:	+	n/a	0.000	acre-ft/yr			
Unbilled metered:	+	n/a	0.000	acre-ft/yr			
Unbilled unmetered:	+	5	9.870	acre-ft/yr		9.870	acre-ft/yr
AUTHORIZED CONSUMPTION:			**3,716.870**	acre-ft/yr			

Click here: ? for help using option buttons

Use buttons to select percentage of water supplied **OR** value

WATER LOSSES (Water Supplied - Authorized Consumption)			**231.259**	acre-ft/yr			
Apparent Losses					Pcnt:	Value:	
Unauthorized consumption:	+		9.870	acre-ft/yr	0.25%		acre-ft/yr
Default option selected for unauthorized consumption - a grading of 5 is applied but not displayed							
Customer metering inaccuracies:	+	3	75.653	acre-ft/yr	2.00%		acre-ft/yr
Systematic data handling errors:	+		9.268	acre-ft/yr	0.25%		acre-ft/yr
Default option selected for Systematic data handling errors - a grading of 5 is applied but not displayed							
Apparent Losses:			**94.791**	acre-ft/yr			
Real Losses (Current Annual Real Losses or CARL)							
Real Losses = Water Losses - Apparent Losses:			**136.468**	acre-ft/yr			
WATER LOSSES:			**231.259**	acre-ft/yr			

NON-REVENUE WATER				
NON-REVENUE WATER:		**241.129**	acre-ft/yr	

= Water Losses + Unbilled Metered + Unbilled Unmetered

SYSTEM DATA		Grading	Value	
Length of mains:	+	9	66.0	miles
Number of active AND inactive service connections:	+	9	3,950	
Service connection density:			60	conn./mile main
Are customer meters typically located at the curbstop or property line?			Yes	
Average length of customer service line:	+			(length of service line, beyond the property boundary, that is the responsibility of the utility)
Average length of customer service line has been set to zero and a data grading score of 10 has been applied				
Average operating pressure:	+	5	97.1	psi

COST DATA		Grading	Value	
Total annual cost of operating water system:	+	10	$4,095,607	$/Year
Customer retail unit cost (applied to Apparent Losses):	+	3	$2.76	$/100 cubic feet (ccf)
Variable production cost (applied to Real Losses):	+	5	$511.45	$/acre-ft

☐ Use Customer Retail Unit Cost to value real

WATER AUDIT DATA VALIDITY SCORE:

*** YOUR SCORE IS: 54 out of 100 ***

A weighted scale for the components of consumption and water loss is included in the calculation of the Water Audit Data Validity Score

PRIORITY AREAS FOR ATTENTION:

Based on the information provided, audit accuracy can be improved by addressing the following components:

1: Water imported
2: Volume from own sources
3: Customer metering inaccuracies

AWWA Free Water Audit Software:
System Attributes and Performance Indicators

WAS v5.0
American Water Works Association.

Water Audit Report for: SCV Water - Newhall Division (Newhall System - 1910096)
Reporting Year: FY19 7/2018 - 6/2019

*** YOUR WATER AUDIT DATA VALIDITY SCORE IS: 54 out of 100 ***

System Attributes:

	Apparent Losses:	94.791	acre-ft/yr
+	Real Losses:	136.468	acre-ft/yr
=	Water Losses:	231.259	acre-ft/yr
	Unavoidable Annual Real Losses (UARL):	103.23	acre-ft/yr
	Annual cost of Apparent Losses:	$114,054	
	Annual cost of Real Losses:	$69,796	Valued at Variable Production Cost

Return to Reporting Worksheet to change this assumpiton

Performance Indicators:

Financial:	Non-revenue water as percent by volume of Water Supplied:	6.1%	
	Non-revenue water as percent by cost of operating system:	4.6%	Real Losses valued at Variable Production Cost
Operational Efficiency:	Apparent Losses per service connection per day:	21.42	gallons/connection/day
	Real Losses per service connection per day:	30.84	gallons/connection/day
	Real Losses per length of main per day*:	N/A	
	Real Losses per service connection per day per psi pressure:	0.32	gallons/connection/day/psi
	From Above, Real Losses = Current Annual Real Losses (CARL):	136.47	acre-feet/year
	Infrastructure Leakage Index (ILI) [CARL/UARL]:	1.32	

* This performance indicator applies for systems with a low service connection density of less than 32 service connections/mile of pipeline

AWWA Free Water Audit Software:
User Comments

Use this worksheet to add comments or notes to explain how an input value was calculated, or to document the sources of the information used.

General Comment:	The audit for NCWD's Newhall system shows that there are a few areas that we can improve on. Gathering daily data for tank volume changes can help us pinpoint water loss by helping us deduce whether the water was sold, stored or lost. Updating/improving our meter testing data and methodologies will improve: our estimated aparent loss volume, indicate the performance/efficiency of different field meter models, allow us to make adjustments to recover revenue, and will improve the accuracy of this audits estimated real loss volume so that we can compare it with our recorded losses.

Audit Item	Comment
Volume from own sources:	Our production information is gathered on a daily basis. Our operators gather meter readings and the production values are then input into a Microsoft Access Database. I create a weekly production report by comparing the results of the database with the hand written copies to check for discrepancies and typos. See - SCV Water Production Fiscal Year 2018-2019_Weighted Average Meter Testing
Vol. from own sources: Master meter error adjustment:	This value was obtained using information provided on our Advanced Flow Measurement field testing documentation. The tester compared the flow reading from his pitot tube to what our meter was reading. Using meter accutracy adjusted values vs meter reads I came up with a percentage for the over/under registration of the meter. Refer to "SCV Water Production Fiscal Year 2018-2019_Weighted Average Meter Testing"
Water imported:	Refer to "SCV Water Production Fiscal Year 2018-2019_Weighted Average Meter Testing"
Water imported: master meter error adjustment:	(Estimated Value) I emailed CLWA to find out if they test their meters at all. They told me that they send their meters to the manufacturer to be tested every ten years. They provided me a certificate they received from their last test. See Attachment D. I gave this a very low validity score since there is really no way to know how accurate their meters are.
Water exported:	We did not use any interties during this fiscal year.
Water exported: master meter error adjustment:	We did not use any interties during this fiscal year.
Billed metered:	See NWD 072014-062019Updated_Weighted Retail Rate
Billed unmetered:	We did not have any billed unmetered connections during this fiscal year.
Unbilled metered:	This information was gathered from our water usage database (attachment G). We record the metered usage from our facilities and flushing activities. (Leaks excluded)
Unbilled unmetered:	Used the reduced value of 0.25%. On our last conference call we discussed using this value as a temporary placeholder based on typical water use during California drought conditions.
Unauthorized consumption:	We have no information on this so I decided to use the default value of 0.25%
Customer metering inaccuracies:	This information was obtained from our customer meter flow tests that were performed in house on our meter testing workbench in 2012. The information is biased based on age since meters were only tested based on complaints and through routine replacement of old meters. The value was obtained by performing a weighted average based on the volume of water that each meter size contributed to total water sells. See Attachment E for more info.
Systematic data handling errors:	Default Value
Length of mains:	This information was gathered by our GIS technician. See "20190919 Length of Mains_All Divisions".
Number of active AND inactive service connections:	This value was provided by our Customer Service and Efficiency Coordinator. He ran a report and gave me a breakdown of how many active and inactive meters we have in all four of our systems. Also, our GIS system helps manage the location of the meters which have been located via GPS to within a foot. Meters are read regardless of active/inactive customer status. See Section A in Attachment B to see the sizes and quantity of the meters we have in Newhall.
Average length of customer service line:	99.9% of our meters are located right at the curb as shown in Figure A of the Service Connection Diagram Tab
Average operating pressure:	The average operating pressure info was obtained from our hydraulic modeling company. I used the information that they gave me and performed a weighted average based on the number of meters in each pressure zone. The number of meters in each zone was obtained through our GIS system. The meter information is not 100% accurate as some meters in one zone can feed another zone, but it gave me a general idea of how to perform the weighted average. See Attachment B2 AND the Zone Pressures tab in Attachment B for supporting documentation.
Total annual cost of operating water system:	(Attachment I) The total cost to run NCWD, which includes everything but depreciation, was gathered by our HR and Accounting Department. They have a third party review our financials on an annual basis and they've won awards for transparency for the past few years. The one issue I had was that our finances are not split by distribution system (we operate 4 systems) so I had to come up with a way to find out how much money Newhall accounts for out of that total. See Section B in Attachment B for more details on how I accomplished this.
Customer retail unit cost (applied to Apparent Losses):	See NWD 072014-062019Updated_Weighted Retail Rate
Variable production cost (applied to Real Losses):	This value was determined using financial information obtained from our HR/Accounting Dept. (Detailed information in Attachment H). This information was used to determine the chemical cost, imported water cost, and pumping/energy cost. I performed weighted average calculation with some of the information so that Newhall costs would be accurately represented in the variable production cost calculation.

AWWA Free Water Audit Software: Water Balance

American Water Works

Water Audit Report for:	SCV Water - Newhall Division (Newhall System - 1910096)
Reporting Year:	FY19 — 7/2018 - 6/2019
Data Validity Score:	54

Water Exported
0.000

Billed Water Exported

Own Sources
(Adjusted for known errors)
1,564.034

Water Supplied
3,948.129

Water Imported
2,384.095

Authorized Consumption
3,716.870

Billed Authorized Consumption
3,707.000

Billed Metered Consumption (water exported is removed)
3,707.000

Billed Unmetered Consumption
0.000

Revenue Water
3,707.000

Unbilled Authorized Consumption
9.870

Unbilled Metered Consumption
0.000

Unbilled Unmetered Consumption
9.870

Non-Revenue Water (NRW)
241.129

Water Losses
231.259

Apparent Losses
94.791

Unauthorized Consumption
9.870

Customer Metering Inaccuracies
75.653

Systematic Data Handling Errors
9.268

Real Losses
136.468

Leakage on Transmission and/or Distribution Mains
Not broken down

Leakage and Overflows at Utility's Storage Tanks
Not broken down

Leakage on Service Connections
Not broken down

AWWA Free Water Audit Software:
Dashboard

WAS v5.0

American Water Works Association.

The graphic below is a visual representation of the Water Balance with bar heights propotional to the volume of the audit components

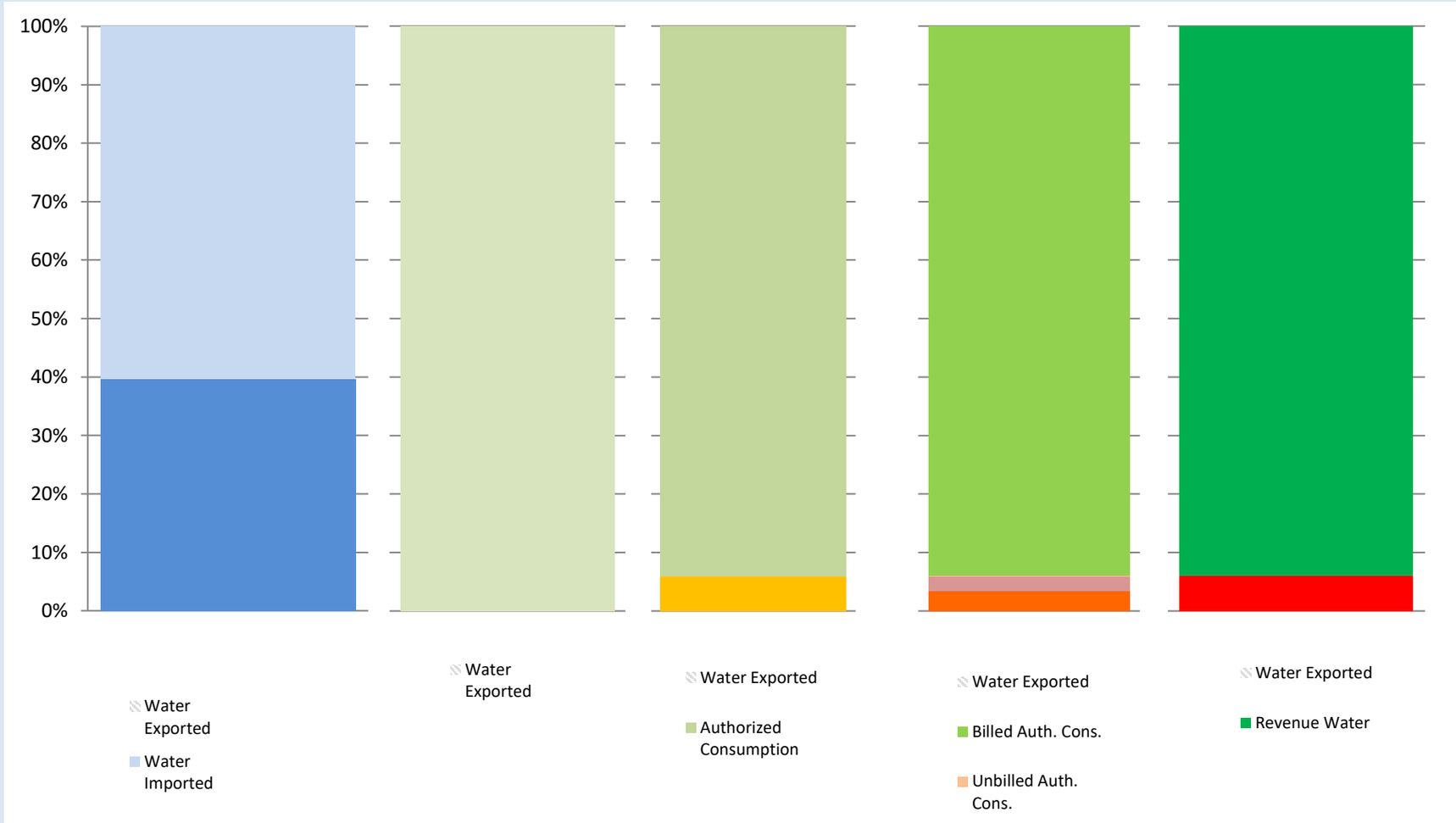
Water Audit Report for: **SCV Water - Newhall Division (Newhall System - 1910096)**

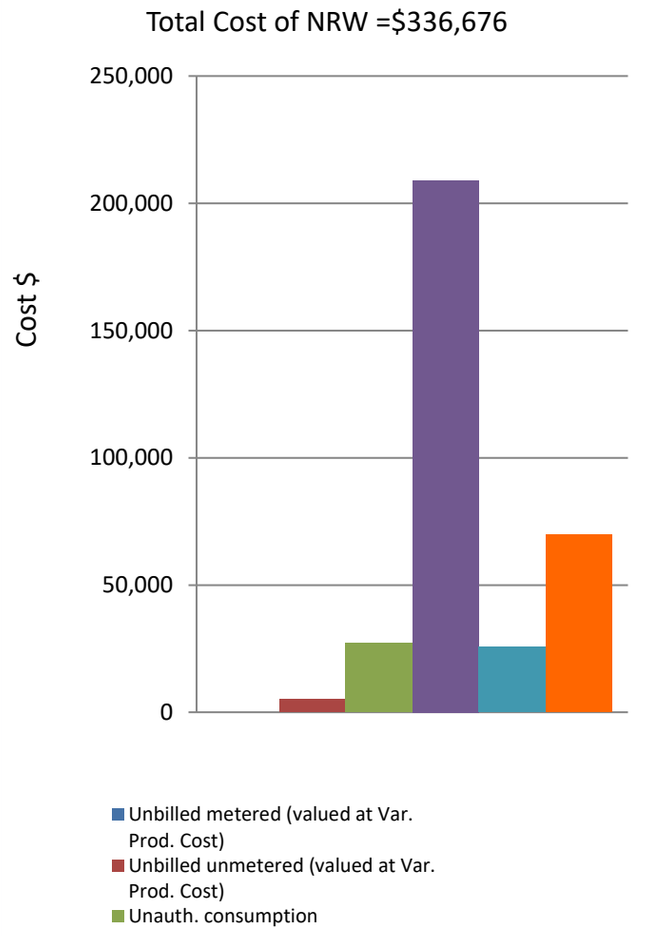
Reporting Year: **FY19** **7/2018 - 6/2019**

Data Validity Score: **54**

○ Show me the VOLUME of Non-Revenue Water

◉ Show me the COST of Non-Revenue Water





AWWA Free Water Audit Software v5.0

This spreadsheet-based water audit tool is designed to help quantify and track water losses associated with water distribution systems and identify areas for improved efficiency and cost recovery. It provides a "top-down" summary water audit format, and is not meant to take the place of a full-scale, comprehensive water audit format.

Auditors are strongly encouraged to refer to the most current edition of AWWA M36 Manual for Water Audits for detailed guidance on the water auditing process and targetting loss reduction levels

The spreadsheet contains several separate worksheets. Sheets can be accessed using the tabs towards the bottom of the screen, or by clicking the buttons below.

Please begin by providing the following information

Name of Contact Person:	Matthew Dickens/Chavon Halushka
Email Address:	mdickens@scvwa.org/chalushka@scvwa.org
Telephone (incl Ext.):	661 705-7913
Name of City / Utility:	SCV Water - Newhall Division
City/Town/Municipality:	Santa Clarita
State / Province:	California (CA)
Country:	United States
Year:	2019 Financial Year
Start Date:	07/2019 Enter MM/YYYY numeric format
End Date:	06/2020 Enter MM/YYYY numeric format
Audit Preparation Date:	8/2/2018
Volume Reporting Units:	Acre-feet
PWSID / Other ID:	Newhall System - 1910096

The following guidance will help you complete the Audit

All audit data are entered on the ***Reporting Worksheet***

- Value can be entered by user
- Value calculated based on input data
- These cells contain recommended default values

Use of Option (Radio) Buttons: Pcnt: 0.25% Value:

Select the default percentage by choosing the option button on the left

To enter a value, choose this button and enter a value in the cell

The following worksheets are available by clicking the buttons below or selecting the tabs along the bottom of the page

Instructions
The current sheet. Enter contact information and basic audit details (year, units etc)

Reporting Worksheet
Enter the required data on this worksheet to calculate the water balance and data grading

Comments
Enter comments to explain how values were calculated or to document data sources

Performance Indicators
Review the performance indicators to evaluate the results of the audit

Water Balance
The values entered in the Reporting Worksheet are used to populate the Water Balance

Dashboard
A graphical summary of the water balance and Non-Revenue Water components

Grading Matrix
Presents the possible grading options for each input component of the audit

Service Connection Diagram
Diagrams depicting possible customer service connection line configurations

Definitions
Use this sheet to understand the terms used in the audit process

Loss Control Planning
Use this sheet to interpret the results of the audit validity score and performance indicators

Example Audits
Reporting Worksheet and Performance Indicators examples are shown for two validated audits

Acknowledgements
Acknowledgements for the AWWA Free Water Audit Software v5.0

If you have questions or comments regarding the software please contact us via email at: wlc@awwa.org

AWWA Free Water Audit Software: Reporting Worksheet

WAS v5.0

American Water Works Association

? Click to access definition
+ Click to add a comment

Water Audit Report for: SCV Water - Newhall Division (Newhall System - 1910096)
Reporting Year: 2019 (7/2019 - 6/2020)

Please enter data in the white cells below. Where available, metered values should be used; if metered values are unavailable please estimate a value. Indicate your confidence in the accuracy of the input

All volumes to be entered as: ACRE-FEET PER YEAR

To select the correct data grading for each input, determine the highest grade where the utility meets or exceeds all criteria for that grade and <---------- Enter grading in column 'E' and 'J' ---------->

Master Meter and Supply Error Adjustments

WATER SUPPLIED

		Grading	Value		Pcnt:	Value:	
Volume from own sources:	+	5	3,323.510	acre-ft/yr	3	-1.44%	acre-ft/yr
Water imported:	+	3	798.070	acre-ft/yr	1	2.40%	acre-ft/yr
Water exported:	+	n/a	0.000	acre-ft/yr			acre-ft/yr

Enter negative % or value for under-registration
Enter positive % or value for over-registration

WATER SUPPLIED: 4,151.433 acre-ft/yr

AUTHORIZED CONSUMPTION

Click here: ? for help using option buttons

		Grading	Value		Pcnt:	Value:	
Billed metered:	+	5	3,862.000	acre-ft/yr			
Billed unmetered:	+	n/a	0.000	acre-ft/yr			
Unbilled metered:	+	9	5.514	acre-ft/yr			
Unbilled unmetered:	+	5	10.379	acre-ft/yr		10.379	acre-ft/yr

Use buttons to select percentage of water supplied OR value

AUTHORIZED CONSUMPTION: 3,877.893 acre-ft/yr

WATER LOSSES (Water Supplied - Authorized Consumption) 273.540 acre-ft/yr

Apparent Losses

		Grading	Value		Pcnt:	Value:	
Unauthorized consumption:	+		10.379	acre-ft/yr	0.25%		acre-ft/yr

Default option selected for unauthorized consumption - a grading of 5 is applied but not displayed

Customer metering inaccuracies:	+	3	113.458	acre-ft/yr	2.85%		acre-ft/yr
Systematic data handling errors:	+	5	0.000	acre-ft/yr	0.25%		acre-ft/yr

Systematic data handling errors are likely, please enter a positive, non-zero value; otherwise grade = 1 (not displayed)

Apparent Losses: 123.836 acre-ft/yr

Real Losses (Current Annual Real Losses or CARL)

Real Losses = Water Losses - Apparent Losses: 149.704 acre-ft/yr

WATER LOSSES: 273.540 acre-ft/yr

NON-REVENUE WATER

NON-REVENUE WATER: 289.433 acre-ft/yr

= Water Losses + Unbilled Metered + Unbilled Unmetered

SYSTEM DATA

		Grading	Value	
Length of mains:	+	9	62.4	miles
Number of active AND inactive service connections:	+	9	3,851	
Service connection density:			62	conn./mile main

Are customer meters typically located at the curbstop or property line? Yes

Average length of customer service line: + (length of service line, beyond the property boundary, that is the responsibility of the utility)

Average length of customer service line has been set to zero and a data grading score of 10 has been applied

		Grading	Value	
Average operating pressure:	+	5	94.0	psi

COST DATA

		Grading	Value	
Total annual cost of operating water system:	+	10	$4,236,874	$/Year
Customer retail unit cost (applied to Apparent Losses):	+	9	$2.81	$/100 cubic feet (ccf)
Variable production cost (applied to Real Losses):	+	7	$222.65	$/acre-ft

☐ Use Customer Retail Unit Cost to value real

WATER AUDIT DATA VALIDITY SCORE:

*** YOUR SCORE IS: 58 out of 100 ***

A weighted scale for the components of consumption and water loss is included in the calculation of the Water Audit Data Validity Score

PRIORITY AREAS FOR ATTENTION:

Based on the information provided, audit accuracy can be improved by addressing the following components:

1: Volume from own sources
2: Customer metering inaccuracies
3: Billed metered

AWWA Free Water Audit Software:
System Attributes and Performance Indicators

WAS v5.0
American Water Works Association.

Water Audit Report for: SCV Water - Newhall Division (Newhall System - 1910096)
Reporting Year: 2019 7/2019 - 6/2020

*** YOUR WATER AUDIT DATA VALIDITY SCORE IS: 58 out of 100 ***

System Attributes:

	Apparent Losses:	123.836	acre-ft/yr
+	Real Losses:	149.704	acre-ft/yr
=	Water Losses:	273.540	acre-ft/yr
	Unavoidable Annual Real Losses (UARL):	96.39	acre-ft/yr
	Annual cost of Apparent Losses:	$151,580	
	Annual cost of Real Losses:	$33,332	Valued at Variable Production Cost

Return to Reporting Worksheet to change this assumpiton

Performance Indicators:

Financial:	Non-revenue water as percent by volume of Water Supplied:	7.0%	
	Non-revenue water as percent by cost of operating system:	4.4%	Real Losses valued at Variable Production Cost
Operational Efficiency:	Apparent Losses per service connection per day:	28.71	gallons/connection/day
	Real Losses per service connection per day:	34.70	gallons/connection/day
	Real Losses per length of main per day*:	N/A	
	Real Losses per service connection per day per psi pressure:	0.37	gallons/connection/day/psi
	From Above, Real Losses = Current Annual Real Losses (CARL):	149.70	acre-feet/year
	Infrastructure Leakage Index (ILI) [CARL/UARL]:	1.55	

* This performance indicator applies for systems with a low service connection density of less than 32 service connections/mile of pipeline

Use this worksheet to add comments or notes to explain how an input value was calculated, or to document the sources of the information used.

General Comment:	The audit for NCWD's Newhall system shows that there are a few areas that we can improve on. Gathering daily data for tank volume changes can help us pinpoint water loss by helping us deduce whether the water was sold, stored or lost. Updating/improving our meter testing data and methodologies will improve: our estimated aparent loss volume, indicate the performance/efficiency of different field meter models, allow us to make adjustments to recover revenue, and will improve the accuracy of this audits estimated real loss volume so that we can compare it with our recorded losses.

Audit Item	Comment
Volume from own sources:	Our production information is gathered on a daily basis. Our operators gather meter readings and the production values are then input into a Microsoft Access Database. I create a weekly production report by comparing the results of the database with the hand written copies to check for discrepancies and typos. See - SCV Water Production Fiscal Year 2018-2019_Weighted Average Meter Testing
Vol. from own sources: Master meter error adjustment:	This value was obtained using information provided on our Advanced Flow Measurement field testing documentation. The tester compared the flow reading from his pitot tube to what our meter was reading. Using meter accutracy adjusted values vs meter reads I came up with a percentage for the over/under registration of the meter. Refer to "SCV Water Production Fiscal Year 2018-2019_Weighted Average Meter Testing"
Water imported:	Refer to "SCV Water Production Fiscal Year 2018-2019_Weighted Average Meter Testing"
Water imported: master meter error adjustment:	(Estimated Value) I emailed CLWA to find out if they test their meters at all. They told me that they send their meters to the manufacturer to be tested every ten years. They provided me a certificate they received from their last test. See Attachment D. I gave this a very low validity score since there is really no way to know how accurate their meters are.
Water exported:	We did not use any interties during this fiscal year.
Water exported: master meter error adjustment:	We did not use any interties during this fiscal year.
Billed metered:	See NWD 072014-062019Updated_Weighted Retail Rate
Billed unmetered:	We did not have any billed unmetered connections during this fiscal year.
Unbilled metered:	This information was gathered from our water usage database (attachment G). We record the metered usage from our facilities and flushing activities. (Leaks excluded)
Unbilled unmetered:	Used the reduced value of 0.25%. On our last conference call we discussed using this value as a temporary placeholder based on typical water use during California drought conditions.
Unauthorized consumption:	We have no information on this so I decided to use the default value of 0.25%
Customer metering inaccuracies:	This information was obtained from our customer meter flow tests that were performed in house on our meter testing workbench in 2012. The information is biased based on age since meters were only tested based on complaints and through routine replacement of old meters. The value was obtained by performing a weighted average based on the volume of water that each meter size contributed to total water sells. See Attachment E for more info.
Systematic data handling errors:	Default Value
Length of mains:	This information was gathered by our GIS technician. See "20190919 Length of Mains_All Divisions".
Number of active AND inactive service connections:	This value was provided by our Customer Service and Efficiency Coordinator. He ran a report and gave me a breakdown of how many active and inactive meters we have in all four of our systems. Also, our GIS system helps manage the location of the meters which have been located via GPS to within a foot. Meters are read regardless of active/inactive customer status. See Section A in Attachment B to see the sizes and quantity of the meters we have in Newhall.
Average length of customer service line:	99.9% of our meters are located right at the curb as shown in Figure A of the Service Connection Diagram Tab
Average operating pressure:	The average operating pressure info was obtained from our hydraulic modeling company. I used the information that they gave me and performed a weighted average based on the number of meters in each pressure zone. The number of meters in each zone was obtained through our GIS system. The meter information is not 100% accurate as some meters in one zone can feed another zone, but it gave me a general idea of how to perform the weighted average. See Attachment B2 AND the Zone Pressures tab in Attachment B for supporting documentation.
Total annual cost of operating water system:	(Attachment I) The total cost to run NCWD, which includes everything but depreciation, was gathered by our HR and Accounting Department. They have a third party review our financials on an annual basis and they've won awards for transparency for the past few years. The one issue I had was that our finances are not split by distribution system (we operate 4 systems) so I had to come up with a way to find out how much money Newhall accounts for out of that total. See Section B in Attachment B for more details on how I accomplished this.
Customer retail unit cost (applied to Apparent Losses):	See NWD 072014-062019Updated_Weighted Retail Rate
Variable production cost (applied to Real Losses):	This value was determined using financial information obtained from our HR/Accounting Dept. (Detailed information in Attachment H). This information was used to determine the chemical cost, imported water cost, and pumping/energy cost. I performed weighted average calculation with some of the information so that Newhall costs would be accurately represented in the variable production cost calculation.

AWWA Free Water Audit Software: Water Balance

American Water Works

Water Audit Report for:	SCV Water - Newhall Division (Newhall System - 1910096)
Reporting Year:	2019 — 7/2019 - 6/2020
Data Validity Score:	58

Own Sources (Adjusted for known errors)
3,372.068

Water Imported
779.365

Water Exported
0.000

Water Supplied
4,151.433

Authorized Consumption
3,877.893

Water Losses
273.540

Billed Water Exported

Billed Authorized Consumption
3,862.000

Billed Metered Consumption (water exported is removed)
3,862.000

Billed Unmetered Consumption
0.000

Revenue Water
3,862.000

Unbilled Authorized Consumption
15.893

Unbilled Metered Consumption
5.514

Unbilled Unmetered Consumption
10.379

Non-Revenue Water (NRW)
289.433

Apparent Losses
123.836

Unauthorized Consumption
10.379

Customer Metering Inaccuracies
113.458

Systematic Data Handling Errors
0.000

Real Losses
149.704

Leakage on Transmission and/or Distribution Mains
Not broken down

Leakage and Overflows at Utility's Storage Tanks
Not broken down

Leakage on Service Connections
Not broken down

AWWA Free Water Audit Software:
Dashboard

WAS v5.0

American Water Works Association.

The graphic below is a visual representation of the Water Balance with bar heights propotional to the volume of the audit components

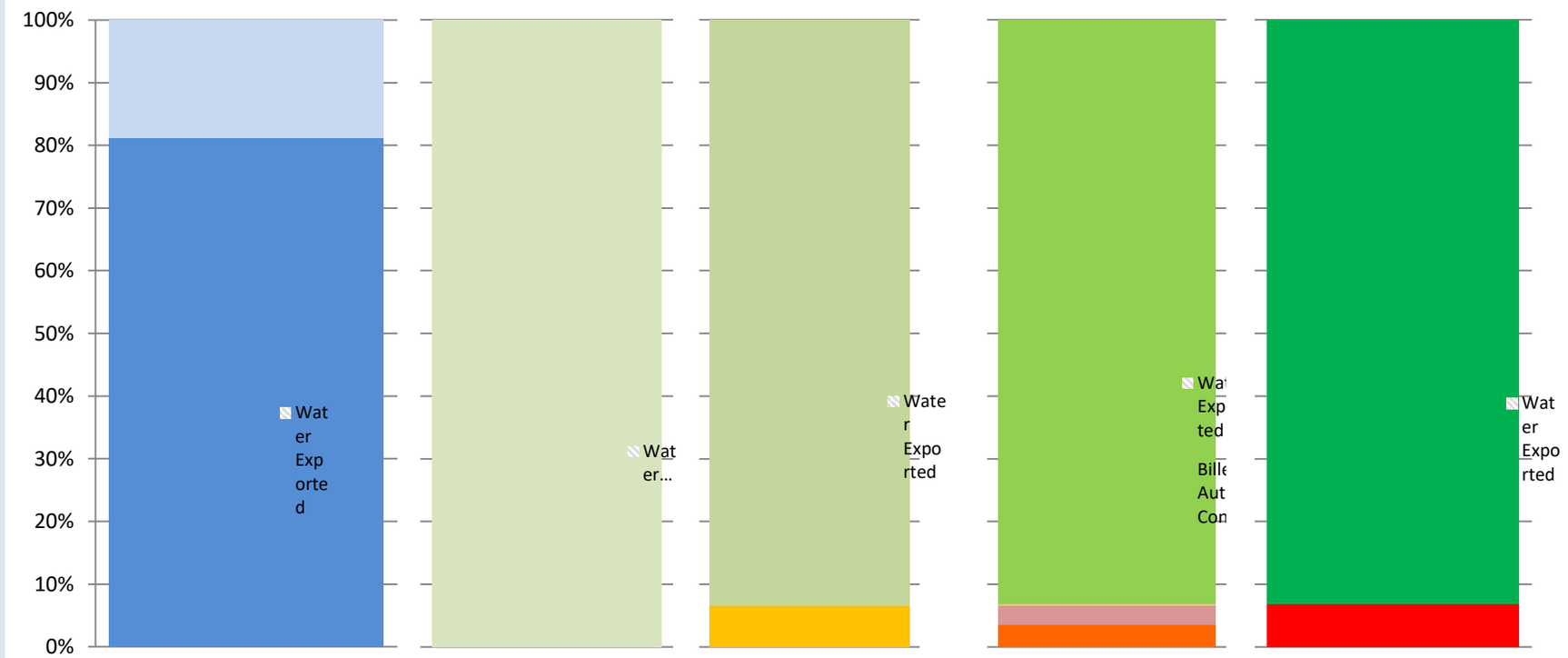
Water Audit Report for: **SCV Water - Newhall Division (Newhall System - 1910096)**

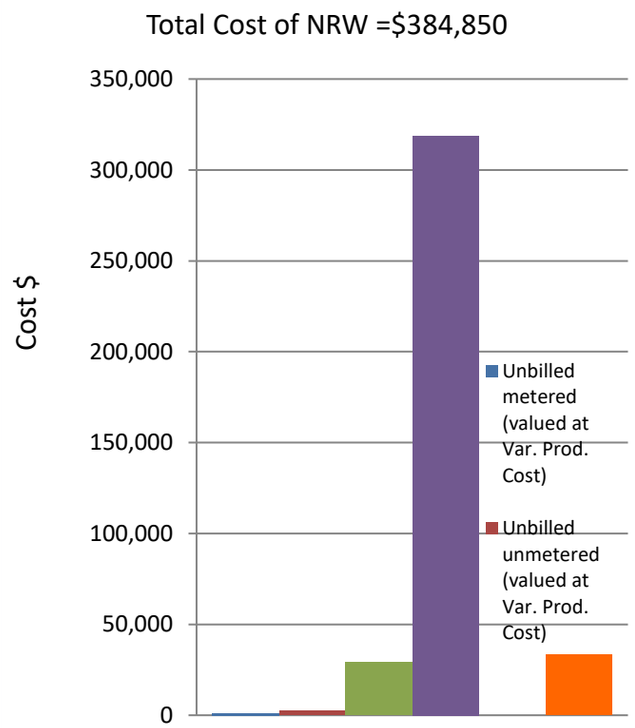
Reporting Year: **2019** **7/2019 - 6/2020**

Data Validity Score: **58**

○ Show me the VOLUME of Non-Revenue Water

◉ Show me the COST of Non-Revenue Water





AWWA Free Water Audit Software v5.0

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Auditors are strongly encouraged to refer to the most current edition of AWWA M36 Manual for Water Audits for detailed guidance on the water auditing process and targetting loss reduction levels

The spreadsheet contains several separate worksheets. Sheets can be accessed using the tabs towards the bottom of the screen, or by clicking the buttons below.

Please begin by providing the following information

Name of Contact Person:	
Email Address:	
Telephone (incl Ext.):	661-259-2737
Name of City / Utility:	Santa Clarita Water Division
City/Town/Municipality:	Santa Clarita
State / Province:	California (CA)
Country:	Los Angeles
Year:	2015
Start Date:	07/2014 Enter MM/YYYY numeric format
End Date:	06/2015 Enter MM/YYYY numeric format
Audit Preparation Date:	2/22/2016
Volume Reporting Units:	Acre-feet
PWSID / Other ID:	

The following guidance will help you complete the Audit

All audit data are entered on the ***Reporting Worksheet***

- Value can be entered by user
- Value calculated based on input data
- These cells contain recommended default values

Use of Option (Radio) Buttons: Pcnt: 0.25% Value:

Select the default percentage by choosing the option button on the left

To enter a value, choose this button and enter a value in the cell to the right

The following worksheets are available by clicking the buttons below or selecting the tabs along the bottom of the page

Instructions
The current sheet. Enter contact information and basic audit details (year, units etc)

Reporting Worksheet
Enter the required data on this worksheet to calculate the water balance and data grading

Comments
Enter comments to explain how values were calculated or to document data sources

Performance Indicators
Review the performance indicators to evaluate the results of the audit

Water Balance
The values entered in the Reporting Worksheet are used to populate the Water Balance

Dashboard
A graphical summary of the water balance and Non-Revenue Water components

Grading Matrix
Presents the possible grading options for each input component of the audit

Service Connection Diagram
Diagrams depicting possible customer service connection line configurations

Definitions
Use this sheet to understand the terms used in the audit process

Loss Control Planning
Use this sheet to interpret the results of the audit validity score and performance indicators

Example Audits
Reporting Worksheet and Performance Indicators examples are shown for two validated audits

Acknowledgements
Acknowledgements for the AWWA Free Water Audit Software v5.0

If you have questions or comments regarding the software please contact us via email at: wlc@awwa.org

AWWA Free Water Audit Software:
Reporting Worksheet

WAS v5.0

? Click to access definition
\+ Click to add a comment

Water Audit Report for: Santa Clarita Water Division
Reporting Year: 2015 | 7/2014 - 6/2015

Please enter data in the white cells below. Where available, metered values should be used; if metered values are unavailable please estimate a value. Indicate your confidence in the accuracy of the input data by grading each component (n/a or 1-10) using the drop-down list to the left of the input cell. Hover the mouse over the cell to obtain a description of the grades

All volumes to be entered as: ACRE-FEET PER YEAR

To select the correct data grading for each input, determine the highest grade where the utility meets or exceeds all criteria for that grade and all grades below it.

<-------- Enter grading in column 'E' and 'J' ---------->

Master Meter and Supply Error Adjustments

WATER SUPPLIED

						Pcnt:		Value:	
Volume from own sources:	7	4,341.000	acre-ft/yr	5	0.17%			acre-ft/yr
Water imported:	7	19,776.000	acre-ft/yr	4	-1.50%			acre-ft/yr
Water exported:	n/a		acre-ft/yr					acre-ft/yr

Enter negative % or value for under-registration
Enter positive % or value for over-registration

WATER SUPPLIED: 24,410.790 acre-ft/yr

AUTHORIZED CONSUMPTION

Click here: ? for help using option buttons below

				Pcnt:	Value:	
Billed metered:	7	23,296.055	acre-ft/yr			
Billed unmetered:	10	0.919	acre-ft/yr			
Unbilled metered:	3	93.343	acre-ft/yr			
Unbilled unmetered:	10	305.135	acre-ft/yr	1.25%		acre-ft/yr

Default option selected for Unbilled unmetered - a grading of 5 is applied but not displayed

AUTHORIZED CONSUMPTION: 23,695.452 acre-ft/yr

Use buttons to select percentage of water supplied **OR** value

WATER LOSSES (Water Supplied - Authorized Consumption) 715.338 acre-ft/yr

Apparent Losses

				Pcnt:	Value:	
Unauthorized consumption:		61.027	acre-ft/yr	0.25%		acre-ft/yr

Default option selected for unauthorized consumption - a grading of 5 is applied but not displayed

Customer metering inaccuracies:	7	477.335	acre-ft/yr	2.00%		acre-ft/yr
Systematic data handling errors:	9	58.240	acre-ft/yr	0.25%		acre-ft/yr

Default option selected for Systematic data handling errors - a grading of 5 is applied but not displayed

Apparent Losses: 596.602 acre-ft/yr

Real Losses (Current Annual Real Losses or CARL)

Real Losses = Water Losses - Apparent Losses: 118.737 acre-ft/yr

WATER LOSSES: 715.338 acre-ft/yr

NON-REVENUE WATER

NON-REVENUE WATER: 1,113.816 acre-ft/yr

= Water Losses + Unbilled Metered + Unbilled Unmetered

SYSTEM DATA

Length of mains:	9	340.0	miles
Number of active AND inactive service connections:	9	30,322	
Service connection density:		89	conn./mile main

Are customer meters typically located at the curbstop or property line?	Yes	
Average length of customer service line:		(length of service line, beyond the property boundary, that is the responsibility of the utility)

Average length of customer service line has been set to zero and a data grading score of 10 has been applied

Average operating pressure:	7	92.0	psi

COST DATA

Total annual cost of operating water system:	7	$24,796,146	$/Year
Customer retail unit cost (applied to Apparent Losses):	8	$1.88	$/100 cubic feet (ccf)
Variable production cost (applied to Real Losses):	7	$472.29	$/acre-ft

☐ Use Customer Retail Unit Cost to value real losses

WATER AUDIT DATA VALIDITY SCORE:

*** YOUR SCORE IS: 69 out of 100 ***

A weighted scale for the components of consumption and water loss is included in the calculation of the Water Audit Data Validity Score

PRIORITY AREAS FOR ATTENTION:

Based on the information provided, audit accuracy can be improved by addressing the following components:

1: Water imported
2: Unbilled metered
3: Billed metered

AWWA Free Water Audit Software:
System Attributes and Performance Indicators

Water Audit Report for: Santa Clarita Water Division
Reporting Year: 2015 7/2014 - 6/2015

*** YOUR WATER AUDIT DATA VALIDITY SCORE IS: 69 out of 100 ***

System Attributes:

	Apparent Losses:	596.602	acre-ft/yr
+	Real Losses:	118.737	acre-ft/yr
=	Water Losses:	715.338	acre-ft/yr
?	Unavoidable Annual Real Losses (UARL):	658.27	acre-ft/yr
	Annual cost of Apparent Losses:	$487,482	
	Annual cost of Real Losses:	$56,078	Valued at Variable Production Cost

Return to Reporting Worksheet to change this assumpiton

Performance Indicators:

Financial:	Non-revenue water as percent by volume of Water Supplied:	4.6%	
	Non-revenue water as percent by cost of operating system:	3.0%	Real Losses valued at Variable Production Cost
Operational Efficiency:	Apparent Losses per service connection per day:	17.57	gallons/connection/day
	Real Losses per service connection per day:	3.50	gallons/connection/day
	Real Losses per length of main per day*:	N/A	
	Real Losses per service connection per day per psi pressure:	0.04	gallons/connection/day/psi
	From Above, Real Losses = Current Annual Real Losses (CARL):	118.74	acre-feet/year
?	Infrastructure Leakage Index (ILI) [CARL/UARL]:	0.18	

* This performance indicator applies for systems with a low service connection density of less than 32 service connections/mile of pipeline

AWWA Free Water Audit Software:
User Comments

WAS

Use this worksheet to add comments or notes to explain how an input value was calculated, or to document the sources of the information used.

General Comment:	

Audit Item	Comment
Volume from own sources:	Based on meter reads at wells
Vol. from own sources: Master meter error adjustment:	based on periodic testing and calibrated new meter installs
Water imported:	based an reads taken at import water conections
Water imported: master meter error adjustment:	Based on data provided by CLWA
Water exported:	N/A
Water exported: master meter error adjustment:	N/A
Billed metered:	Based on information provided by finace
Billed unmetered:	Based on information provided by finace
Unbilled metered:	basd on data recording flushing and estimated water loss
Unbilled unmetered:	N/A
Unauthorized consumption:	N/A
Customer metering inaccuracies:	Based on sample testing and new meter accuracy
Systematic data handling errors:	N/A
Length of mains:	Provided by Engineering department
Number of active AND inactive service connections:	based on reports from utility billing software
Average length of customer service line:	N/A
Average operating pressure:	Provided by Engineering department
Total annual cost of operating water system:	provided by the finance department
Customer retail unit cost (applied to Apparent Losses):	provided by the finance department
Variable production cost (applied to Real Losses):	provided by the finance department

AWWA Free Water Audit Software: Water Balance

WAS v5.0

American Water Works Association.

Water Audit Report for:	Santa Clarita Water Division
Reporting Year:	2015 — 7/2014 - 6/2015
Data Validity Score:	69

Water Exported
0.000

Billed Water Exported

Own Sources
(Adjusted for known errors)
4,333.633

Water Supplied
24,410.790

Authorized Consumption
23,695.452

Billed Authorized Consumption
23,296.974

- **Billed Metered Consumption (water exported is removed)** *23,296.055*
- **Billed Unmetered Consumption** *0.919*

Revenue Water
23,296.974

Unbilled Authorized Consumption
398.478

- **Unbilled Metered Consumption** *93.343*
- **Unbilled Unmetered Consumption** *305.135*

Non-Revenue Water (NRW)
1,113.816

Water Losses
715.338

Apparent Losses
596.602

- **Unauthorized Consumption** *61.027*
- **Customer Metering Inaccuracies** *477.335*
- **Systematic Data Handling Errors** *58.240*

Real Losses
118.737

- **Leakage on Transmission and/or Distribution Mains** *Not broken down*
- **Leakage and Overflows at Utility's Storage Tanks** *Not broken down*
- **Leakage on Service Connections** *Not broken down*

Water Imported
20,077.157

AWWA Free Water Audit Software:
Dashboard

WAS v5.0

The graphic below is a visual representation of the Water Balance with bar heights propotional to the volume of the audit components

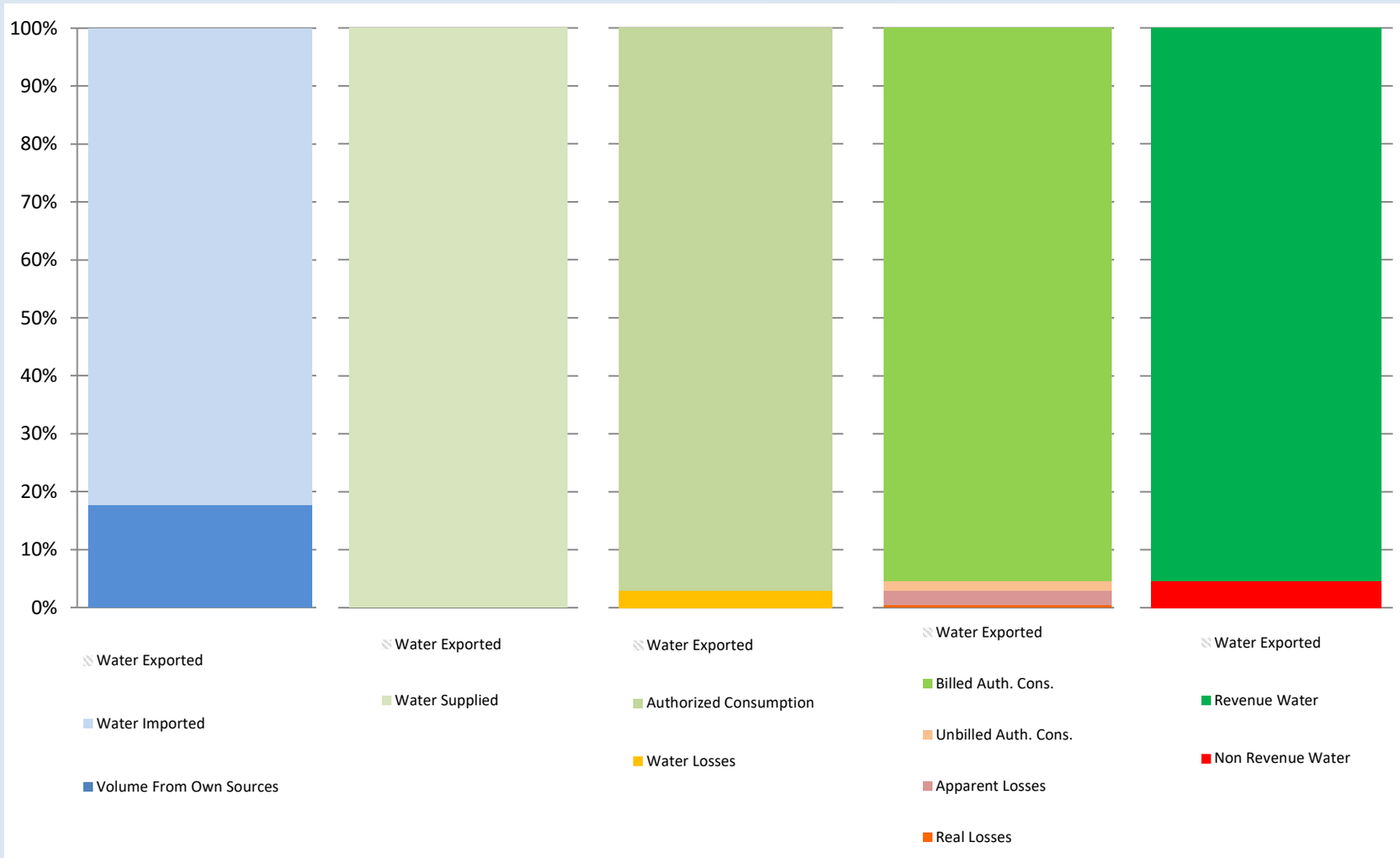
Water Audit Report for: **Santa Clarita Water Division**

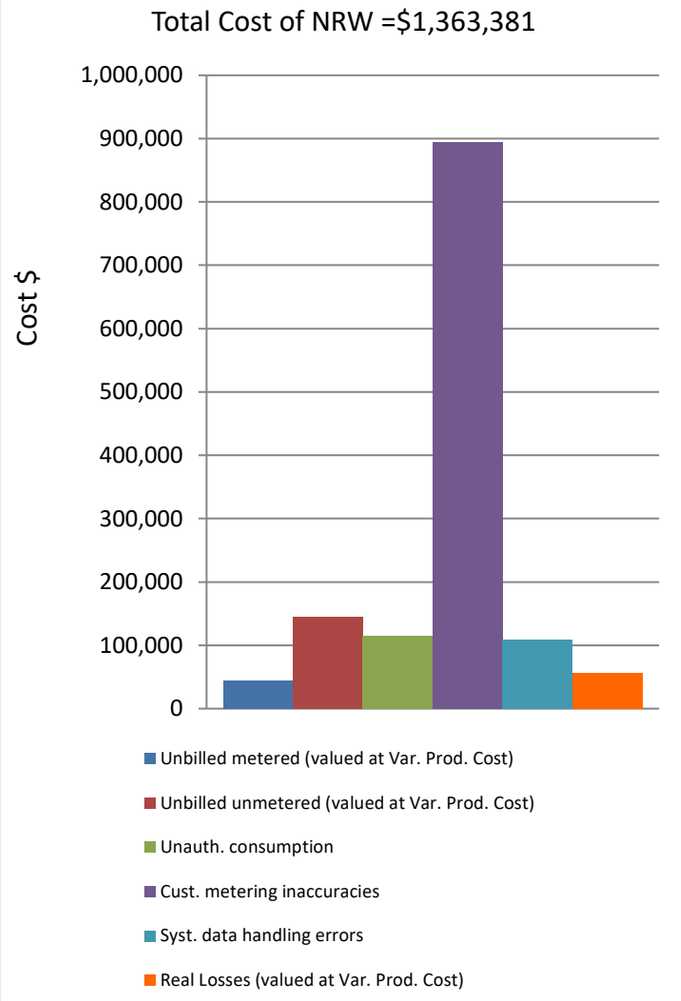
Reporting Year: **2015** **7/2014 - 6/2015**

Data Validity Score: **69**

○ Show me the VOLUME of Non-Revenue Water

◉ Show me the COST of Non-Revenue Water





AWWA Free Water Audit Software v5.0

This spreadsheet-based water audit tool is designed to help quantify and track water losses associated with water distribution systems and identify areas for improved efficiency and cost recovery. It provides a "top-down" summary water audit format, and is not meant to take the place of a full-scale, comprehensive water audit format.

Auditors are strongly encouraged to refer to the most current edition of AWWA M36 Manual for Water Audits for detailed guidance on the water auditing process and targetting loss reduction levels

The spreadsheet contains several separate worksheets. Sheets can be accessed using the tabs towards the bottom of the screen, or by clicking the buttons below.

Please begin by providing the following information

Name of Contact Person:	Roger Hitchen
Email Address:	rhitchen@scwater.org
Telephone (incl Ext.):	661-259-2737
Name of City / Utility:	Santa Clarita Water Division
City/Town/Municipality:	Santa Clarita
State / Province:	California (CA)
Country:	Los Angeles
Year:	2017 Financial Year
Start Date:	07/2016 Enter MM/YYYY numeric format
End Date:	06/2017 Enter MM/YYYY numeric format
Audit Preparation Date:	8/28/2017
Volume Reporting Units:	Acre-feet
PWSID / Other ID:	

The following guidance will help you complete the Audit

All audit data are entered on the ***Reporting Worksheet***

- Value can be entered by user
- Value calculated based on input data
- These cells contain recommended default values

Use of Option (Radio) Buttons: Pcnt: 0.25% Value:

Select the default percentage by choosing the option button on the left

To enter a value, choose this button and enter a value in the cell to the right

The following worksheets are available by clicking the buttons below or selecting the tabs along the bottom of the page

Instructions
The current sheet. Enter contact information and basic audit details (year, units etc)

Reporting Worksheet
Enter the required data on this worksheet to calculate the water balance and data grading

Comments
Enter comments to explain how values were calculated or to document data sources

Performance Indicators
Review the performance indicators to evaluate the results of the audit

Water Balance
The values entered in the Reporting Worksheet are used to populate the Water Balance

Dashboard
A graphical summary of the water balance and Non-Revenue Water components

Grading Matrix
Presents the possible grading options for each input component of the audit

Service Connection Diagram
Diagrams depicting possible customer service connection line configurations

Definitions
Use this sheet to understand the terms used in the audit process

Loss Control Planning
Use this sheet to interpret the results of the audit validity score and performance indicators

Example Audits
Reporting Worksheet and Performance Indicators examples are shown for two validated audits

Acknowledgements
Acknowledgements for the AWWA Free Water Audit Software v5.0

If you have questions or comments regarding the software please contact us via email at: wlc@awwa.org

AWWA Free Water Audit Software:
Reporting Worksheet

WAS v5.0

? Click to access definition
+ Click to add a comment

Water Audit Report for: Santa Clarita Water Division
Reporting Year: 2017 | 7/2016 - 6/2017

Please enter data in the white cells below. Where available, metered values should be used; if metered values are unavailable please estimate a value. Indicate your confidence in the accuracy of the input data by grading each component (n/a or 1-10) using the drop-down list to the left of the input cell. Hover the mouse over the cell to obtain a description of the grades

All volumes to be entered as: ACRE-FEET PER YEAR

To select the correct data grading for each input, determine the highest grade where the utility meets or exceeds all criteria for that grade and all grades below it.

Master Meter and Supply Error Adjustments

WATER SUPPLIED

<---------- Enter grading in column 'E' and 'J' ---------->

					Pcnt:	Value:	
Volume from own sources:	5	1,660.000	acre-ft/yr	3			acre-ft/yr
Water imported:	3	23,052.000	acre-ft/yr	4			acre-ft/yr
Water exported:	n/a	0.000	acre-ft/yr				acre-ft/yr

Enter negative % or value for under-registration
Enter positive % or value for over-registration

WATER SUPPLIED: 24,712.000 acre-ft/yr

AUTHORIZED CONSUMPTION

Click here: ? for help using option buttons below

			Pcnt:	Value:	
Billed metered:	7	22,436.000	acre-ft/yr			
Billed unmetered:	10	0.000	acre-ft/yr			
Unbilled metered:	5	13.278	acre-ft/yr			
Unbilled unmetered:	5	61.780	acre-ft/yr		61.780	acre-ft/yr

Use buttons to select percentage of water supplied **OR** value

AUTHORIZED CONSUMPTION: ? 22,511.058 acre-ft/yr

WATER LOSSES (Water Supplied - Authorized Consumption)

2,200.942 acre-ft/yr

Apparent Losses

			Pcnt:	Value:	
Unauthorized consumption:		61.780	acre-ft/yr	0.25%		acre-ft/yr

Default option selected for unauthorized consumption - a grading of 5 is applied but not displayed

Customer metering inaccuracies:	6	434.797	acre-ft/yr	1.90%	acre-ft/yr
Systematic data handling errors:	9	56.090	acre-ft/yr	0.25%	acre-ft/yr

Default option selected for Systematic data handling errors - a grading of 5 is applied but not displayed

Apparent Losses: ? 552.667 acre-ft/yr

Real Losses (Current Annual Real Losses or CARL)

Real Losses = Water Losses - Apparent Losses: ? 1,648.275 acre-ft/yr

WATER LOSSES: 2,200.942 acre-ft/yr

NON-REVENUE WATER

NON-REVENUE WATER: ? 2,276.000 acre-ft/yr

= Water Losses + Unbilled Metered + Unbilled Unmetered

SYSTEM DATA

Length of mains:	9	355.0	miles
Number of active AND inactive service connections:	9	31,296	
Service connection density:		88	conn./mile main

Are customer meters typically located at the curbstop or property line? Yes

Average length of customer service line: (length of service line, beyond the property boundary, that is the responsibility of the utility)

Average length of customer service line has been set to zero and a data grading score of 10 has been applied

Average operating pressure: 10 96.0 psi

COST DATA

Total annual cost of operating water system:	10	$34,863,039	$/Year	
Customer retail unit cost (applied to Apparent Losses):	8	$2.06	$/100 cubic feet (ccf)	
Variable production cost (applied to Real Losses):	5	$528.04	$/acre-ft	☐ Use Customer Retail Unit Cost to value real losses

WATER AUDIT DATA VALIDITY SCORE:

***** YOUR SCORE IS: 55 out of 100 *****

A weighted scale for the components of consumption and water loss is included in the calculation of the Water Audit Data Validity Score

PRIORITY AREAS FOR ATTENTION:

Based on the information provided, audit accuracy can be improved by addressing the following components:

1: Water imported
2: Unbilled metered
3: Variable production cost (applied to Real Losses)

AWWA Free Water Audit Software:
System Attributes and Performance Indicators

Water Audit Report for: Santa Clarita Water Division
Reporting Year: 2017 | 7/2016 - 6/2017

*** YOUR WATER AUDIT DATA VALIDITY SCORE IS: 55 out of 100 ***

System Attributes:

	Apparent Losses:	552.667	acre-ft/yr
+	Real Losses:	1,648.275	acre-ft/yr
=	Water Losses:	2,200.942	acre-ft/yr
?	Unavoidable Annual Real Losses (UARL):	711.33	acre-ft/yr
	Annual cost of Apparent Losses:	$495,928	
	Annual cost of Real Losses:	$870,355	Valued at Variable Production Cost

Return to Reporting Worksheet to change this assumpiton

Performance Indicators:

Financial:	Non-revenue water as percent by volume of Water Supplied:	9.2%	
	Non-revenue water as percent by cost of operating system:	4.0%	Real Losses valued at Variable Production Cost
Operational Efficiency:	Apparent Losses per service connection per day:	15.77	gallons/connection/day
	Real Losses per service connection per day:	47.02	gallons/connection/day
	Real Losses per length of main per day*:	N/A	
	Real Losses per service connection per day per psi pressure:	0.49	gallons/connection/day/psi
	From Above, Real Losses = Current Annual Real Losses (CARL):	1,648.27	acre-feet/year
?	Infrastructure Leakage Index (ILI) [CARL/UARL]:	2.32	

* This performance indicator applies for systems with a low service connection density of less than 32 service connections/mile of pipeline

AWWA Free Water Audit Software:
User Comments

WAS

Use this worksheet to add comments or notes to explain how an input value was calculated, or to document the sources of the information used.

General Comment:	

Audit Item	Comment
Volume from own sources:	
Vol. from own sources: Master meter error adjustment:	
Water imported:	
Water imported: master meter error adjustment:	
Water exported:	
Water exported: master meter error adjustment:	
Billed metered:	
Billed unmetered:	
Unbilled metered:	
Unbilled unmetered:	
Unauthorized consumption:	
Customer metering inaccuracies:	
Systematic data handling errors:	
Length of mains:	
Number of active AND inactive service connections:	
Average length of customer service line:	
Average operating pressure:	
Total annual cost of operating water system:	
Customer retail unit cost (applied to Apparent Losses):	
Variable production cost (applied to Real Losses):	

AWWA Free Water Audit Software: Water Balance

WAS v5.0

American Water Works Association.

Water Audit Report for:	Santa Clarita Water Division	
Reporting Year:	2017	7/2016 - 6/2017
Data Validity Score:	55	

Water Exported
0.000

Billed Water Exported

Own Sources
(Adjusted for known errors)
1,660.000

Water Supplied
24,712.000

Authorized Consumption
22,511.058

Billed Authorized Consumption
22,436.000

Billed Metered Consumption (water exported is removed)
22,436.000

Billed Unmetered Consumption
0.000

Revenue Water
22,436.000

Unbilled Authorized Consumption
75.058

Unbilled Metered Consumption
13.278

Unbilled Unmetered Consumption
61.780

Non-Revenue Water (NRW)
2,276.000

Water Losses
2,200.942

Apparent Losses
552.667

Unauthorized Consumption
61.780

Customer Metering Inaccuracies
434.797

Systematic Data Handling Errors
56.090

Real Losses
1,648.275

Leakage on Transmission and/or Distribution Mains
Not broken down

Leakage and Overflows at Utility's Storage Tanks
Not broken down

Leakage on Service Connections
Not broken down

Water Imported
23,052.000

AWWA Free Water Audit Software:
Dashboard

WAS v5.0

The graphic below is a visual representation of the Water Balance with bar heights propotional to the volume of the audit components

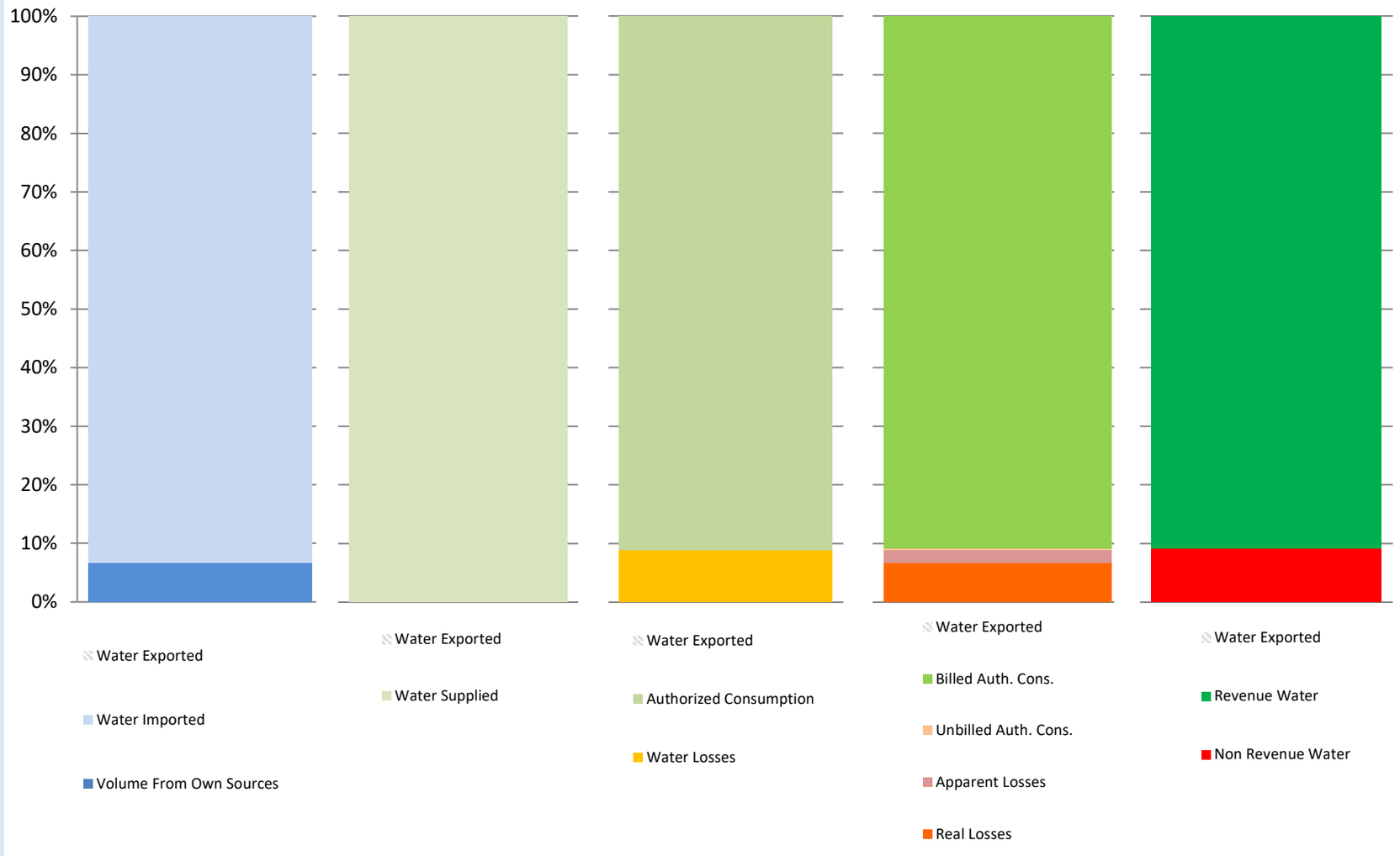
Water Audit Report for: **Santa Clarita Water Division**

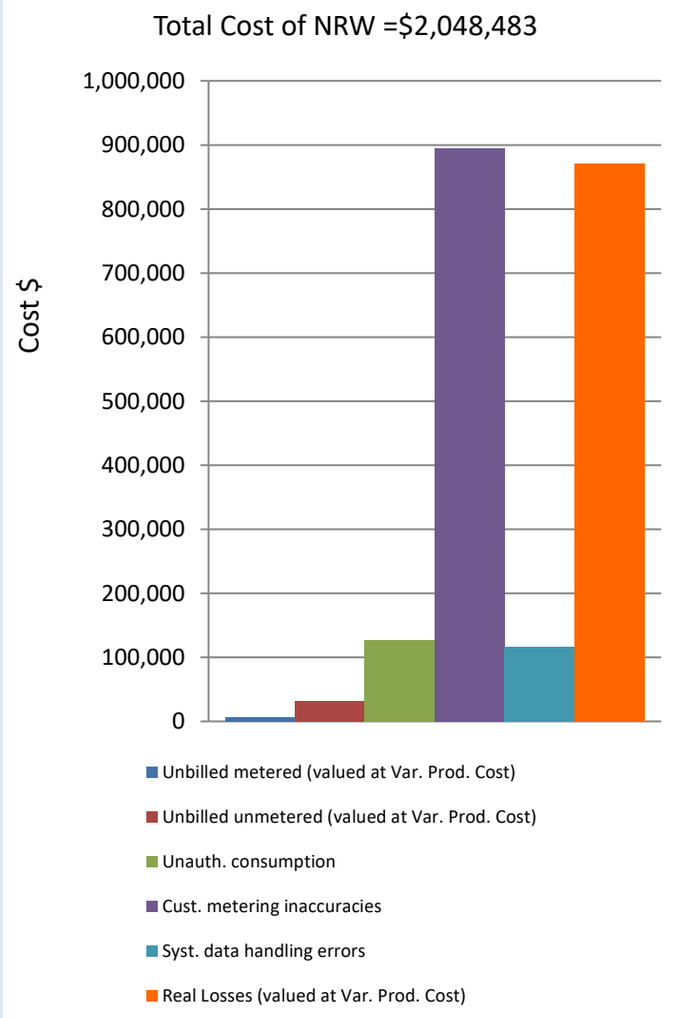
Reporting Year: **2017** **7/2016 - 6/2017**

Data Validity Score: **55**

○ Show me the VOLUME of Non-Revenue Water

◉ Show me the COST of Non-Revenue Water





AWWA Free Water Audit Software v5.0

This spreadsheet-based water audit tool is designed to help quantify and track water losses associated with water distribution systems and identify areas for improved efficiency and cost recovery. It provides a "top-down" summary water audit format, and is not meant to take the place of a full-scale, comprehensive water audit format.

Auditors are strongly encouraged to refer to the most current edition of AWWA M36 Manual for Water Audits for detailed guidance on the water auditing process and targetting loss reduction levels

The spreadsheet contains several separate worksheets. Sheets can be accessed using the tabs towards the bottom of the screen, or by clicking the buttons below.

Please begin by providing the following information

Name of Contact Person:	Matthew Dickens
Email Address:	mdickens@scvwa.org
Telephone (incl Ext.):	661-705-7913
Name of City / Utility:	Santa Clarita Water Division (a SCV Water Division)
City/Town/Municipality:	Santa Clarita
State / Province:	California (CA)
Country:	Los Angeles
Year:	FY2017-18 Financial Year
Start Date:	07/2017 Enter MM/YYYY numeric format
End Date:	06/2018 Enter MM/YYYY numeric format
Audit Preparation Date:	8/22/2018
Volume Reporting Units:	Acre-feet
PWSID / Other ID:	

The following guidance will help you complete the Audit

All audit data are entered on the ***Reporting Worksheet***

- Value can be entered by user
- Value calculated based on input data
- These cells contain recommended default values

Use of Option (Radio) Buttons: Pcnt: 0.25% Value:

Select the default percentage by choosing the option button on the left

To enter a value, choose this button and enter a value in the cell to the right

The following worksheets are available by clicking the buttons below or selecting the tabs along the bottom of the page

Instructions
The current sheet. Enter contact information and basic audit details (year, units etc)

Reporting Worksheet
Enter the required data on this worksheet to calculate the water balance and data grading

Comments
Enter comments to explain how values were calculated or to document data sources

Performance Indicators
Review the performance indicators to evaluate the results of the audit

Water Balance
The values entered in the Reporting Worksheet are used to populate the Water Balance

Dashboard
A graphical summary of the water balance and Non-Revenue Water components

Grading Matrix
Presents the possible grading options for each input component of the audit

Service Connection Diagram
Diagrams depicting possible customer service connection line configurations

Definitions
Use this sheet to understand the terms used in the audit process

Loss Control Planning
Use this sheet to interpret the results of the audit validity score and performance indicators

Example Audits
Reporting Worksheet and Performance Indicators examples are shown for two validated audits

Acknowledgements
Acknowledgements for the AWWA Free Water Audit Software v5.0

If you have questions or comments regarding the software please contact us via email at: wlc@awwa.org

AWWA Free Water Audit Software:
Reporting Worksheet

WAS v5.0

? Click to access definition
+ Click to add a comment

Water Audit Report for: Santa Clarita Water Division (a SCV Water Division)
Reporting Year: FY2017-18 7/2017 - 6/2018

Please enter data in the white cells below. Where available, metered values should be used; if metered values are unavailable please estimate a value. Indicate your confidence in the accuracy of the input data by grading each component (n/a or 1-10) using the drop-down list to the left of the input cell. Hover the mouse over the cell to obtain a description of the grades

All volumes to be entered as: ACRE-FEET PER YEAR

To select the correct data grading for each input, determine the highest grade where the utility meets or exceeds all criteria for that grade and all grades below it.

Master Meter and Supply Error Adjustments

WATER SUPPLIED

<---------- Enter grading in column 'E' and 'J' ---------->

					Pcnt:	Value:	
Volume from own sources:	7	1,576.000	acre-ft/yr	3	-2.10%		acre-ft/yr
Water imported:	5	25,280.230	acre-ft/yr	4			acre-ft/yr
Water exported:	n/a	0.000	acre-ft/yr				acre-ft/yr

Enter negative % or value for under-registration
Enter positive % or value for over-registration

WATER SUPPLIED: 26,890.036 acre-ft/yr

AUTHORIZED CONSUMPTION

Click here: ? for help using option buttons below

				Pcnt:	Value:	
Billed metered:	7	25,177.470	acre-ft/yr			
Billed unmetered:	n/a	0.000	acre-ft/yr			
Unbilled metered:	n/a	0.000	acre-ft/yr			
Unbilled unmetered:	5	67.225	acre-ft/yr		67.225	acre-ft/yr

Use buttons to select percentage of water supplied **OR** value

AUTHORIZED CONSUMPTION: 25,244.695 acre-ft/yr

WATER LOSSES (Water Supplied - Authorized Consumption) 1,645.341 acre-ft/yr

Apparent Losses

				Pcnt:	Value:	
Unauthorized consumption:		67.225	acre-ft/yr	0.25%		acre-ft/yr

Default option selected for unauthorized consumption - a grading of 5 is applied but not displayed

Customer metering inaccuracies:	7	487.637	acre-ft/yr	1.90%		acre-ft/yr
Systematic data handling errors:	5	62.944	acre-ft/yr	0.25%		acre-ft/yr

Default option selected for Systematic data handling errors - a grading of 5 is applied but not displayed

Apparent Losses: 617.806 acre-ft/yr

Real Losses (Current Annual Real Losses or CARL)

Real Losses = Water Losses - Apparent Losses: 1,027.535 acre-ft/yr

WATER LOSSES: 1,645.341 acre-ft/yr

NON-REVENUE WATER

NON-REVENUE WATER: 1,712.566 acre-ft/yr

= Water Losses + Unbilled Metered + Unbilled Unmetered

SYSTEM DATA

Length of mains:	9	355.0	miles
Number of active AND inactive service connections:	9	31,296	
Service connection density:		88	conn./mile main

Are customer meters typically located at the curbstop or property line? Yes

Average length of customer service line: (length of service line, beyond the property boundary, that is the responsibility of the utility)

Average length of customer service line has been set to zero and a data grading score of 10 has been applied

Average operating pressure: 10 101.2 psi

COST DATA

Total annual cost of operating water system:	10	$25,618,933	$/Year	
Customer retail unit cost (applied to Apparent Losses):	8	$1.96	$/100 cubic feet (ccf)	
Variable production cost (applied to Real Losses):	5	$547.02	$/acre-ft	☐ Use Customer Retail Unit Cost to value real losses

WATER AUDIT DATA VALIDITY SCORE:

*** YOUR SCORE IS: 64 out of 100 ***

A weighted scale for the components of consumption and water loss is included in the calculation of the Water Audit Data Validity Score

PRIORITY AREAS FOR ATTENTION:

Based on the information provided, audit accuracy can be improved by addressing the following components:

1: Water imported
2: Variable production cost (applied to Real Losses)
3: Billed metered

AWWA Free Water Audit Software:
System Attributes and Performance Indicators

Water Audit Report for: Santa Clarita Water Division (a SCV Water Division)
Reporting Year: FY2017-18 7/2017 - 6/2018

*** YOUR WATER AUDIT DATA VALIDITY SCORE IS: 64 out of 100 ***

System Attributes:

	Apparent Losses:	617.806	acre-ft/yr
+	Real Losses:	1,027.535	acre-ft/yr
=	Water Losses:	1,645.341	acre-ft/yr
?	Unavoidable Annual Real Losses (UARL):	749.86	acre-ft/yr
	Annual cost of Apparent Losses:	$526,660	
	Annual cost of Real Losses:	$562,082	Valued at Variable Production Cost

Return to Reporting Worksheet to change this assumpiton

Performance Indicators:

Financial:	Non-revenue water as percent by volume of Water Supplied:	6.4%	
	Non-revenue water as percent by cost of operating system:	4.4%	Real Losses valued at Variable Production Cost
Operational Efficiency:	Apparent Losses per service connection per day:	17.62	gallons/connection/day
	Real Losses per service connection per day:	29.31	gallons/connection/day
	Real Losses per length of main per day*:	N/A	
	Real Losses per service connection per day per psi pressure:	0.29	gallons/connection/day/psi
	From Above, Real Losses = Current Annual Real Losses (CARL):	1,027.54	acre-feet/year
?	Infrastructure Leakage Index (ILI) [CARL/UARL]:	1.37	

* This performance indicator applies for systems with a low service connection density of less than 32 service connections/mile of pipeline

AWWA Free Water Audit Software:
User Comments

WAS

Use this worksheet to add comments or notes to explain how an input value was calculated, or to document the sources of the information used.

General Comment:	

Audit Item	Comment
Volume from own sources:	Refer to Santa Clarita_FY17-18Volume from Own Sources
Vol. from own sources: Master meter error adjustment:	Refer to Santa Clarita_FY17-18Volume from Own Sources (Columns O & P)
Water imported:	See Production 17-18 (SCWD)
Water imported: master meter error adjustment:	
Water exported:	
Water exported: master meter error adjustment:	
Billed metered:	Refer to FY 2017-18 Consumption by Demographics (Q55)
Billed unmetered:	
Unbilled metered:	
Unbilled unmetered:	
Unauthorized consumption:	
Customer metering inaccuracies:	
Systematic data handling errors:	
Length of mains:	
Number of active AND inactive service connections:	
Average length of customer service line:	
Average operating pressure:	Refer to 2018-08-20 Water Pressure Data_Weighted Average
Total annual cost of operating water system:	Not yet available, coming in mid September.
Customer retail unit cost (applied to Apparent Losses):	
Variable production cost (applied to Real Losses):	

AWWA Free Water Audit Software: Water Balance

WAS v5.0

American Water Works Association.

Water Audit Report for:	Santa Clarita Water Division (a SCV Water Division)
Reporting Year:	FY2017-18 7/2017 - 6/2018
Data Validity Score:	64

Water Exported
0.000

Billed Water Exported

Own Sources
(Adjusted for known errors)
1,609.806

Water Supplied
26,890.036

Water Imported
25,280.230

Authorized Consumption
25,244.695

Billed Authorized Consumption
25,177.470

Billed Metered Consumption (water exported is removed)
25,177.470

Billed Unmetered Consumption
0.000

Revenue Water
25,177.470

Unbilled Authorized Consumption
67.225

Unbilled Metered Consumption
0.000

Unbilled Unmetered Consumption
67.225

Non-Revenue Water (NRW)
1,712.566

Water Losses
1,645.341

Apparent Losses
617.806

Unauthorized Consumption
67.225

Customer Metering Inaccuracies
487.637

Systematic Data Handling Errors
62.944

Real Losses
1,027.535

Leakage on Transmission and/or Distribution Mains
Not broken down

Leakage and Overflows at Utility's Storage Tanks
Not broken down

Leakage on Service Connections
Not broken down

AWWA Free Water Audit Software:
Dashboard

WAS v5.0

The graphic below is a visual representation of the Water Balance with bar heights propotional to the volume of the audit components

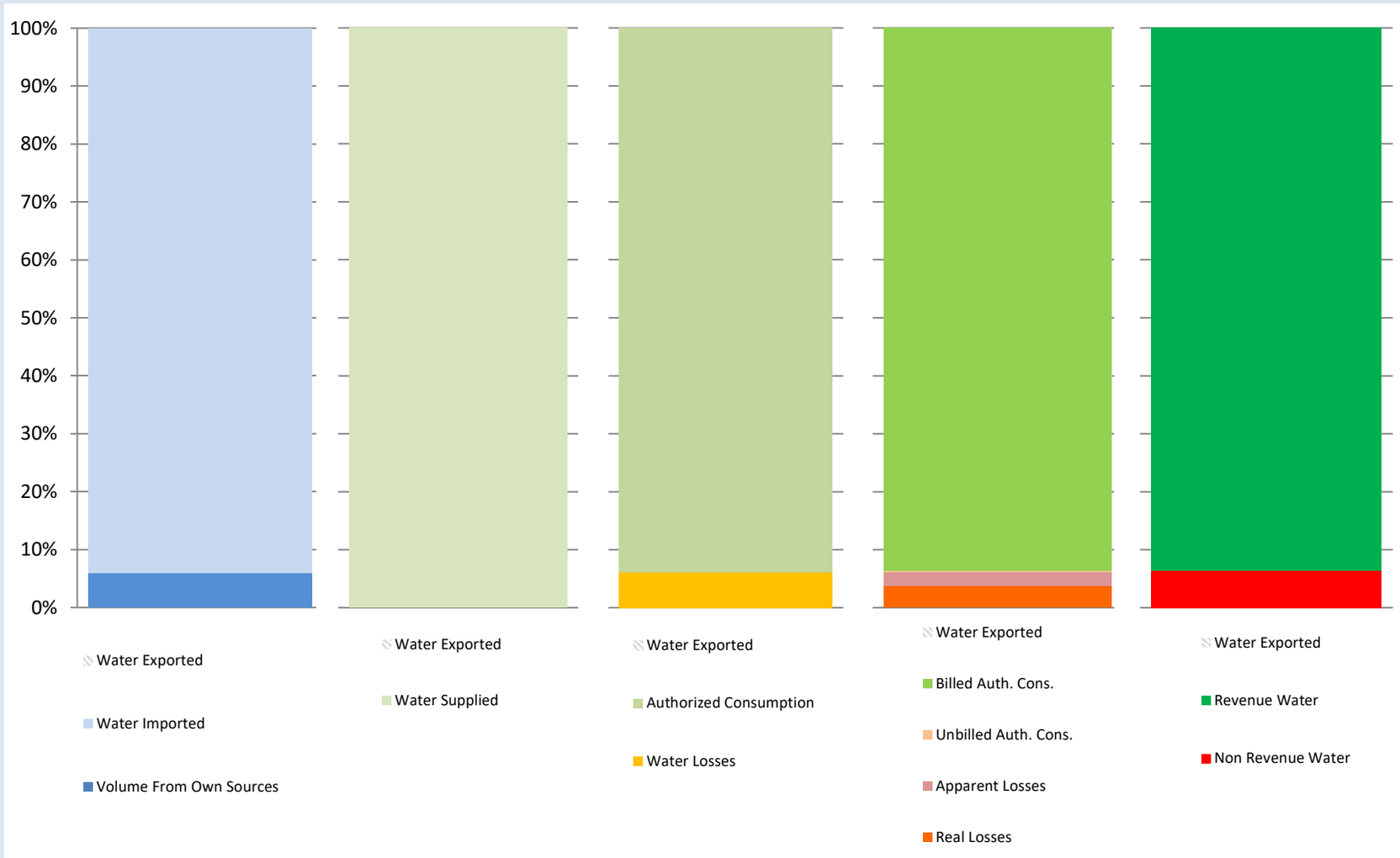
Water Audit Report for: **Santa Clarita Water Division (a SCV Water Division)**

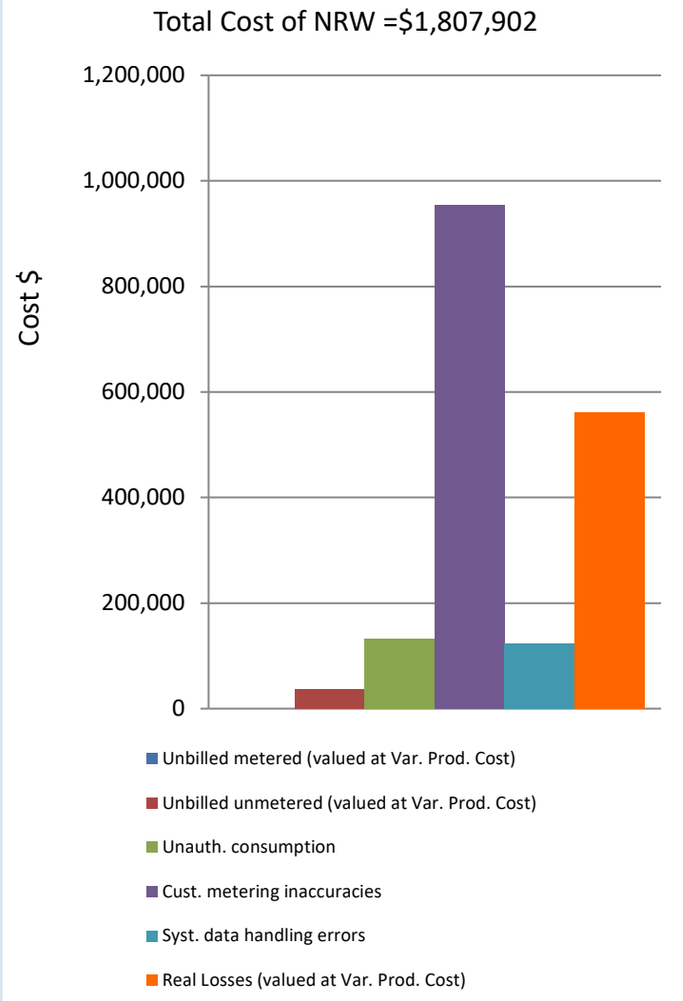
Reporting Year: **FY2017-18** **7/2017 - 6/2018**

Data Validity Score: **64**

○ Show me the VOLUME of Non-Revenue Water

◉ Show me the COST of Non-Revenue Water





AWWA Free Water Audit Software v5.0

This spreadsheet-based water audit tool is designed to help quantify and track water losses associated with water distribution systems and identify areas for improved efficiency and cost recovery. It provides a "top-down" summary water audit format, and is not meant to take the place of a full-scale, comprehensive water audit format.

Auditors are strongly encouraged to refer to the most current edition of AWWA M36 Manual for Water Audits for detailed guidance on the water auditing process and targetting loss reduction levels

The spreadsheet contains several separate worksheets. Sheets can be accessed using the tabs towards the bottom of the screen, or by clicking the buttons below.

Please begin by providing the following information

Name of Contact Person:	Matthew Dickens
Email Address:	mdickens@scvwa.org
Telephone (incl Ext.):	661-705-7913
Name of City / Utility:	Santa Clarita Water Division (a SCV Water Division)
City/Town/Municipality:	Santa Clarita
State / Province:	California (CA)
Country:	Los Angeles
Year:	FY19 Financial Year
Start Date:	07/2018 Enter MM/YYYY numeric format
End Date:	06/2019 Enter MM/YYYY numeric format
Audit Preparation Date:	9/13/2019
Volume Reporting Units:	Acre-feet
PWSID / Other ID:	

The following guidance will help you complete the Audit

All audit data are entered on the ***Reporting Worksheet***

- Value can be entered by user
- Value calculated based on input data
- These cells contain recommended default values

Use of Option (Radio) Buttons: Pcnt: 0.25% Value:

Select the default percentage by choosing the option button on the left

To enter a value, choose this button and enter a value in the cell to the right

The following worksheets are available by clicking the buttons below or selecting the tabs along the bottom of the page

Instructions
The current sheet. Enter contact information and basic audit details (year, units etc)

Reporting Worksheet
Enter the required data on this worksheet to calculate the water balance and data grading

Comments
Enter comments to explain how values were calculated or to document data sources

Performance Indicators
Review the performance indicators to evaluate the results of the audit

Water Balance
The values entered in the Reporting Worksheet are used to populate the Water Balance

Dashboard
A graphical summary of the water balance and Non-Revenue Water components

Grading Matrix
Presents the possible grading options for each input component of the audit

Service Connection Diagram
Diagrams depicting possible customer service connection line configurations

Definitions
Use this sheet to understand the terms used in the audit process

Loss Control Planning
Use this sheet to interpret the results of the audit validity score and performance indicators

Example Audits
Reporting Worksheet and Performance Indicators examples are shown for two validated audits

Acknowledgements
Acknowledgements for the AWWA Free Water Audit Software v5.0

If you have questions or comments regarding the software please contact us via email at: wlc@awwa.org

AWWA Free Water Audit Software:
Reporting Worksheet

WAS v5.0

? Click to access definition
+ Click to add a comment

Water Audit Report for: Santa Clarita Water Division (a SCV Water Division)
Reporting Year: FY19 7/2018 - 6/2019

Please enter data in the white cells below. Where available, metered values should be used; if metered values are unavailable please estimate a value. Indicate your confidence in the accuracy of the input data by grading each component (n/a or 1-10) using the drop-down list to the left of the input cell. Hover the mouse over the cell to obtain a description of the grades

All volumes to be entered as: ACRE-FEET PER YEAR

To select the correct data grading for each input, determine the highest grade where the utility meets or exceeds all criteria for that grade and all grades below it.

Master Meter and Supply Error Adjustments

WATER SUPPLIED

<---------- Enter grading in column 'E' and 'J' ---------->

						Pcnt:	Value:	
Volume from own sources:	7	2,715.000	acre-ft/yr	5		0.22%		acre-ft/yr
Water imported:	5	21,746.000	acre-ft/yr	4		-4.67%		acre-ft/yr
Water exported:	n/a	0.000	acre-ft/yr					acre-ft/yr

Enter negative % or value for under-registration
Enter positive % or value for over-registration

WATER SUPPLIED: 25,520.327 acre-ft/yr

AUTHORIZED CONSUMPTION

Click here: ? for help using option buttons below

				Pcnt:	Value:	
Billed metered:	7	22,671.080	acre-ft/yr			
Billed unmetered:	n/a	0.000	acre-ft/yr			
Unbilled metered:	n/a	0.000	acre-ft/yr			
Unbilled unmetered:	5	63.801	acre-ft/yr		63.801	acre-ft/yr

Use buttons to select percentage of water supplied **OR** value

AUTHORIZED CONSUMPTION: 22,734.881 acre-ft/yr

WATER LOSSES (Water Supplied - Authorized Consumption)

2,785.446 acre-ft/yr

Apparent Losses

				Pcnt:	Value:	
Unauthorized consumption:		63.801	acre-ft/yr	0.25%		acre-ft/yr

Default option selected for unauthorized consumption - a grading of 5 is applied but not displayed

Customer metering inaccuracies:	7	439.093	acre-ft/yr	1.90%		acre-ft/yr
Systematic data handling errors:	9	56.678	acre-ft/yr	0.25%		acre-ft/yr

Default option selected for Systematic data handling errors - a grading of 5 is applied but not displayed

Apparent Losses: 559.572 acre-ft/yr

Real Losses (Current Annual Real Losses or CARL)

Real Losses = Water Losses - Apparent Losses: 2,225.875 acre-ft/yr

WATER LOSSES: 2,785.446 acre-ft/yr

NON-REVENUE WATER

NON-REVENUE WATER: 2,849.247 acre-ft/yr

= Water Losses + Unbilled Metered + Unbilled Unmetered

SYSTEM DATA

Length of mains:	9	355.0	miles
Number of active AND inactive service connections:	9	30,571	
Service connection density:		86	conn./mile main

Are customer meters typically located at the curbstop or property line? Yes

Average length of customer service line: (length of service line, beyond the property boundary, that is the responsibility of the utility)

Average length of customer service line has been set to zero and a data grading score of 10 has been applied

Average operating pressure: 10 104.5 psi

COST DATA

Total annual cost of operating water system:	10	$37,042,917	$/Year	
Customer retail unit cost (applied to Apparent Losses):	8	$1.93	$/100 cubic feet (ccf)	
Variable production cost (applied to Real Losses):	5	$584.79	$/acre-ft	☐ Use Customer Retail Unit Cost to value real losses

WATER AUDIT DATA VALIDITY SCORE:

*** YOUR SCORE IS: 64 out of 100 ***

A weighted scale for the components of consumption and water loss is included in the calculation of the Water Audit Data Validity Score

PRIORITY AREAS FOR ATTENTION:

Based on the information provided, audit accuracy can be improved by addressing the following components:

1: Water imported
2: Variable production cost (applied to Real Losses)
3: Billed metered

AWWA Free Water Audit Software:
System Attributes and Performance Indicators

Water Audit Report for: Santa Clarita Water Division (a SCV Water Division)
Reporting Year: FY19 7/2018 - 6/2019

*** YOUR WATER AUDIT DATA VALIDITY SCORE IS: 64 out of 100 ***

System Attributes:

	Apparent Losses:	559.572	acre-ft/yr
+	Real Losses:	2,225.875	acre-ft/yr
=	Water Losses:	2,785.446	acre-ft/yr
?	Unavoidable Annual Real Losses (UARL):	761.58	acre-ft/yr
	Annual cost of Apparent Losses:	$469,461	
	Annual cost of Real Losses:	$1,301,669	Valued at Variable Production Cost

Return to Reporting Worksheet to change this assumpiton

Performance Indicators:

Financial:	Non-revenue water as percent by volume of Water Supplied:	11.2%	
	Non-revenue water as percent by cost of operating system:	4.9%	Real Losses valued at Variable Production Cost
Operational Efficiency:	Apparent Losses per service connection per day:	16.34	gallons/connection/day
	Real Losses per service connection per day:	65.00	gallons/connection/day
	Real Losses per length of main per day*:	N/A	
	Real Losses per service connection per day per psi pressure:	0.62	gallons/connection/day/psi
	From Above, Real Losses = Current Annual Real Losses (CARL):	2,225.87	acre-feet/year
?	Infrastructure Leakage Index (ILI) [CARL/UARL]:	2.92	

* This performance indicator applies for systems with a low service connection density of less than 32 service connections/mile of pipeline

AWWA Free Water Audit Software:
User Comments

WAS

Use this worksheet to add comments or notes to explain how an input value was calculated, or to document the sources of the information used.

General Comment:	

Audit Item	Comment
Volume from own sources:	Refer to SCV Water Production Fiscal Year 2018-2019
Vol. from own sources: Master meter error adjustment:	Accuracy percentages in field testing documentation SCVWA SCWD 2019
Water imported:	Refer to SCV Water Production Fiscal Year 2018-2019
Water imported: master meter error adjustment:	Accuracy percentages in field testing documentation SCVWA SCWD 2019
Water exported:	
Water exported: master meter error adjustment:	
Billed metered:	Refer to SCWD 072018-062019
Billed unmetered:	
Unbilled metered:	
Unbilled unmetered:	
Unauthorized consumption:	
Customer metering inaccuracies:	
Systematic data handling errors:	
Length of mains:	
Number of active AND inactive service connections:	Refer to SCWD 072018-062019
Average length of customer service line:	NA
Average operating pressure:	Refer to 2018-08-20 Water Pressure Data_Weighted Average
Total annual cost of operating water system:	Refer to SCWD FY 2019/19 Expenses (FY 2018/19 with CIP)
Customer retail unit cost (applied to Apparent Losses):	Refer to SCWD 072018-062019
Variable production cost (applied to Real Losses):	Refer to Matthew Dickens - 20190918 Variable Production Cost Calculator_SCWD

AWWA Free Water Audit Software: Water Balance

WAS v5.0

American Water Works Association.

Water Audit Report for:	Santa Clarita Water Division (a SCV Water Division)	
Reporting Year:	FY19	7/2018 - 6/2019
Data Validity Score:	64	

Water Exported
0.000

Billed Water Exported

Own Sources
(Adjusted for known errors)
2,709.040

Water Supplied
25,520.327

Water Imported
22,811.287

Authorized Consumption
22,734.881

Billed Authorized Consumption
22,671.080

Billed Metered Consumption (water exported is removed)
22,671.080

Billed Unmetered Consumption
0.000

Revenue Water
22,671.080

Unbilled Authorized Consumption
63.801

Unbilled Metered Consumption
0.000

Unbilled Unmetered Consumption
63.801

Non-Revenue Water (NRW)
2,849.247

Water Losses
2,785.446

Apparent Losses
559.572

Unauthorized Consumption
63.801

Customer Metering Inaccuracies
439.093

Systematic Data Handling Errors
56.678

Real Losses
2,225.875

Leakage on Transmission and/or Distribution Mains
Not broken down

Leakage and Overflows at Utility's Storage Tanks
Not broken down

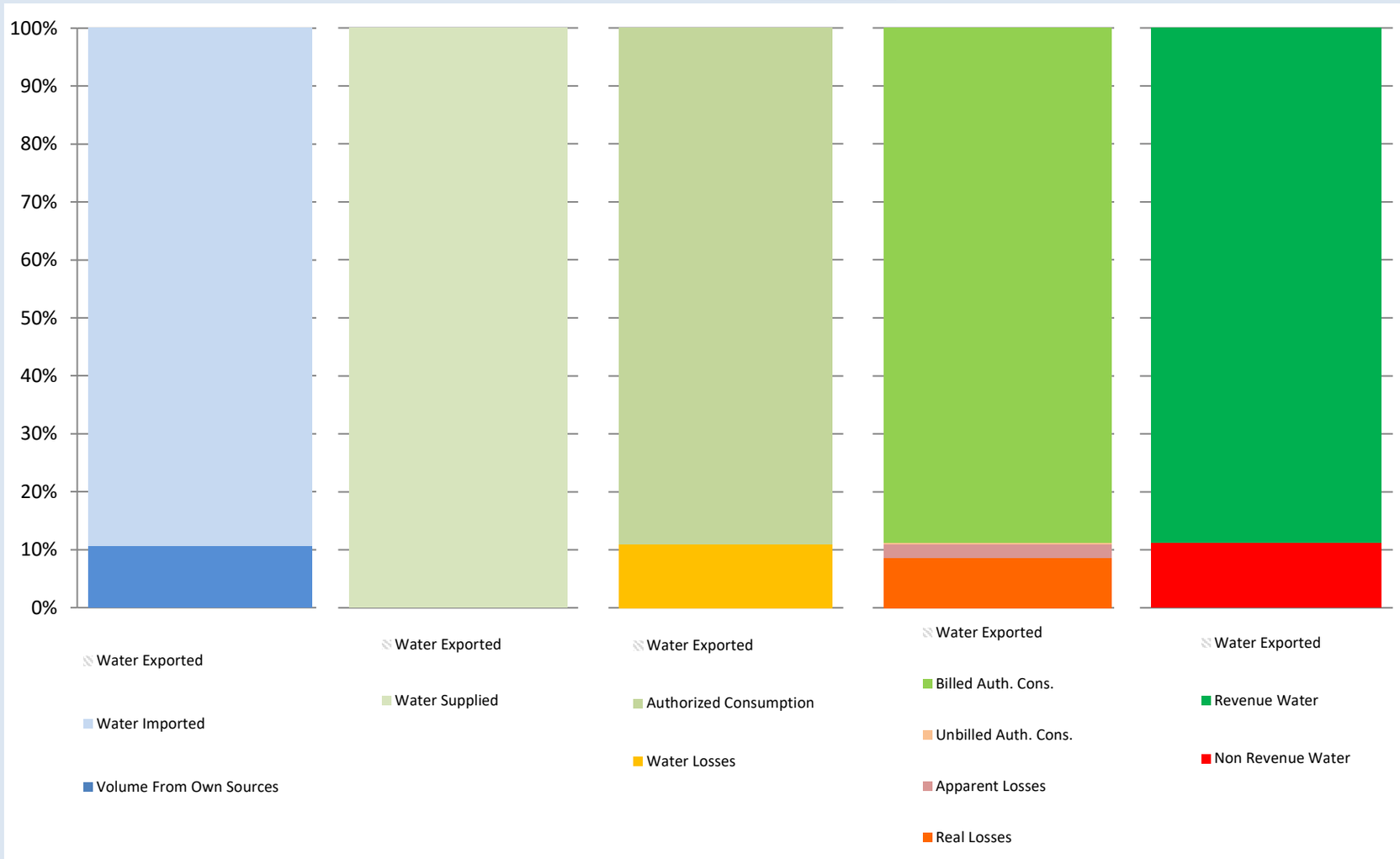
Leakage on Service Connections
Not broken down

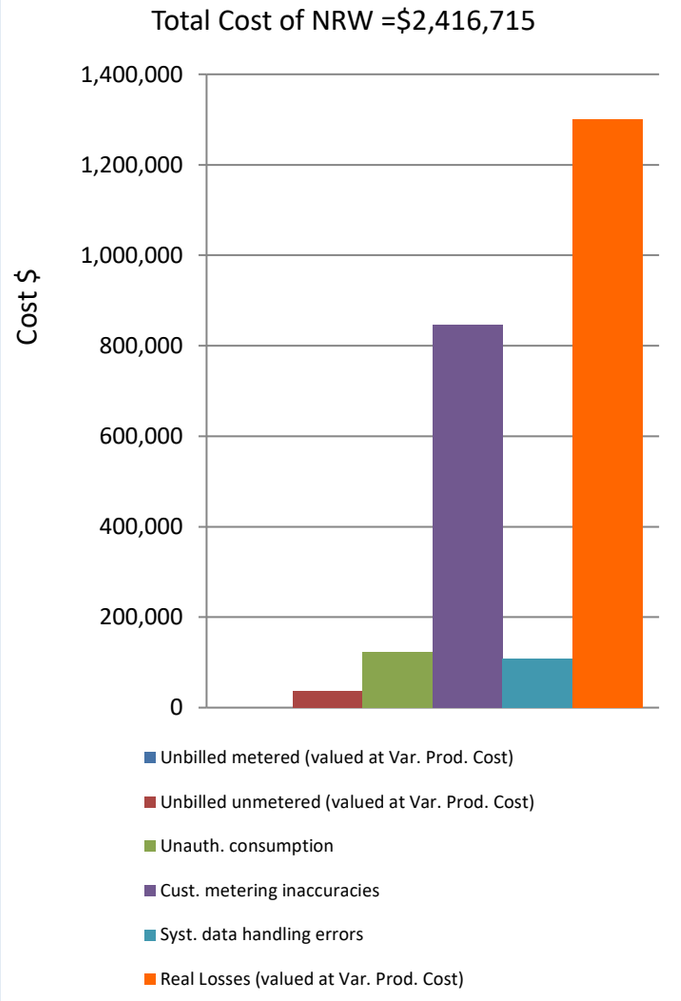
AWWA Free Water Audit Software:
Dashboard

The graphic below is a visual representation of the Water Balance with bar heights propotional to the volume of the audit components

Water Audit Report for: **Santa Clarita Water Division (a SCV Water Division)**
Reporting Year: **FY19** **7/2018 - 6/2019**
Data Validity Score: **64**

○ Show me the VOLUME of Non-Revenue Water
◉ Show me the COST of Non-Revenue Water





AWWA Free Water Audit Software v5.0

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Please begin by providing the following information

Name of Contact Person:	Matthew Dickens/Chavon Halushka
Email Address:	mdickens@scvwa.org/chalushka@scvwa.org
Telephone (incl Ext.):	661-705-7913
Name of City / Utility:	Santa Clarita Water Division (a SCV Water Division)
City/Town/Municipality:	Santa Clarita
State / Province:	California (CA)
Country:	Los Angeles
Year:	FY2019-20 Financial Year
Start Date:	07/2019 Enter MM/YYYY numeric format
End Date:	06/2020 Enter MM/YYYY numeric format
Audit Preparation Date:	8/22/2018
Volume Reporting Units:	Acre-feet
PWSID / Other ID:	1910017

The following guidance will help you complete the Audit

All audit data are entered on the ***Reporting Worksheet***

- Value can be entered by user
- Value calculated based on input data
- These cells contain recommended default values

Use of Option (Radio) Buttons: Pcnt: 0.25% Value:

Select the default percentage by choosing the option button on the left

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A graphical summary of the water balance and Non-Revenue Water components

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AWWA Free Water Audit Software:
Reporting Worksheet

WAS v5.0

? Click to access definition
+ Click to add a comment

Water Audit Report for: Santa Clarita Water Division (a SCV Water Division) (1910017)
Reporting Year: FY2019-20 7/2019 - 6/2020

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All volumes to be entered as: ACRE-FEET PER YEAR

To select the correct data grading for each input, determine the highest grade where the utility meets or exceeds all criteria for that grade and all grades below it.

Master Meter and Supply Error Adjustments

WATER SUPPLIED

<---------- Enter grading in column 'E' and 'J' ---------->

					Pcnt:	Value:	
Volume from own sources:	5	4,780.050	acre-ft/yr	5			acre-ft/yr
Water imported:	5	20,821.310	acre-ft/yr	4			acre-ft/yr
Water exported:	n/a	0.000	acre-ft/yr				acre-ft/yr

Enter negative % or value for under-registration
Enter positive % or value for over-registration

WATER SUPPLIED: 25,601.360 acre-ft/yr

AUTHORIZED CONSUMPTION

Click here: ? for help using option buttons below

				Pcnt:	Value:	
Billed metered:	7	23,198.330	acre-ft/yr			
Billed unmetered:	10	24.120	acre-ft/yr			
Unbilled metered:	5	4.114	acre-ft/yr			
Unbilled unmetered:	10	58.056	acre-ft/yr		58.056	acre-ft/yr

Use buttons to select percentage of water supplied **OR** value

AUTHORIZED CONSUMPTION: ? 23,284.620 acre-ft/yr

WATER LOSSES (Water Supplied - Authorized Consumption)

2,316.740 acre-ft/yr

Apparent Losses

			Pcnt:	Value:	
Unauthorized consumption:	64.003	acre-ft/yr	0.25%		acre-ft/yr

Default option selected for unauthorized consumption - a grading of 5 is applied but not displayed

Customer metering inaccuracies:	7	449.385	acre-ft/yr	1.90%	acre-ft/yr
Systematic data handling errors:	9	0.000	acre-ft/yr		acre-ft/yr

Systematic data handling errors are likely, please enter a positive, non-zero value; otherwise grade = 1 (not displayed)

Apparent Losses: ? 513.388 acre-ft/yr

Real Losses (Current Annual Real Losses or CARL)

Real Losses = Water Losses - Apparent Losses: ? 1,803.352 acre-ft/yr

WATER LOSSES: 2,316.740 acre-ft/yr

NON-REVENUE WATER

NON-REVENUE WATER: ? 2,378.910 acre-ft/yr

= Water Losses + Unbilled Metered + Unbilled Unmetered

SYSTEM DATA

Length of mains:	9	353.0	miles
Number of active AND inactive service connections:	9	32,798	
Service connection density:		93	conn./mile main

Are customer meters typically located at the curbstop or property line? Yes

Average length of customer service line: (length of service line, beyond the property boundary, that is the responsibility of the utility)

Average length of customer service line has been set to zero and a data grading score of 10 has been applied

Average operating pressure: 10 105.0 psi

COST DATA

Total annual cost of operating water system:	7	$28,076,635	$/Year
Customer retail unit cost (applied to Apparent Losses):	8	$1.97	$/100 cubic feet (ccf)
Variable production cost (applied to Real Losses):	7	$544.55	$/acre-ft

☐ Use Customer Retail Unit Cost to value real losses

WATER AUDIT DATA VALIDITY SCORE:

*** YOUR SCORE IS: 62 out of 100 ***

A weighted scale for the components of consumption and water loss is included in the calculation of the Water Audit Data Validity Score

PRIORITY AREAS FOR ATTENTION:

Based on the information provided, audit accuracy can be improved by addressing the following components:

1: Water imported
2: Systematic data handling errors
3: Unbilled metered

AWWA Free Water Audit Software:
System Attributes and Performance Indicators

Water Audit Report for: Santa Clarita Water Division (a SCV Water Division) (1910017)
Reporting Year: FY2019-20 7/2019 - 6/2020

*** YOUR WATER AUDIT DATA VALIDITY SCORE IS: 62 out of 100 ***

System Attributes:

	Apparent Losses:	513.388	acre-ft/yr
+	Real Losses:	1,803.352	acre-ft/yr
=	Water Losses:	2,316.740	acre-ft/yr

?	Unavoidable Annual Real Losses (UARL):	803.24	acre-ft/yr
	Annual cost of Apparent Losses:	$439,437	
	Annual cost of Real Losses:	$982,015	Valued at Variable Production Cost

Return to Reporting Worksheet to change this assumpiton

Performance Indicators:

Financial:	Non-revenue water as percent by volume of Water Supplied:	9.3%	
	Non-revenue water as percent by cost of operating system:	5.2%	Real Losses valued at Variable Production Cost

Operational Efficiency:	Apparent Losses per service connection per day:	13.97	gallons/connection/day
	Real Losses per service connection per day:	49.09	gallons/connection/day
	Real Losses per length of main per day*:	N/A	
	Real Losses per service connection per day per psi pressure:	0.47	gallons/connection/day/psi

	From Above, Real Losses = Current Annual Real Losses (CARL):	1,803.35	acre-feet/year
?	Infrastructure Leakage Index (ILI) [CARL/UARL]:	2.25	

* This performance indicator applies for systems with a low service connection density of less than 32 service connections/mile of pipeline

AWWA Free Water Audit Software:
User Comments

WAS

Use this worksheet to add comments or notes to explain how an input value was calculated, or to document the sources of the information used.

General Comment:	

Audit Item	Comment
Volume from own sources:	Refer to SCV Water Production Fiscal Year 2018-2019
Vol. from own sources: Master meter error adjustment:	Accuracy percentages in field testing documentation SCVWA SCWD 2019
Water imported:	Refer to SCV Water Production Fiscal Year 2018-2019
Water imported: master meter error adjustment:	Accuracy percentages in field testing documentation SCVWA SCWD 2019
Water exported:	
Water exported: master meter error adjustment:	
Billed metered:	Refer to Santa Clarita ME Cust Count FY 19_20, Jun20_Mth End Customer Counts
Billed unmetered:	Refer to SC Jumper Count (FY1920). This includes and Jumper and Tailpeices for new development, by month, at 5CCF per account per month.
Unbilled metered:	Refer to agency accounts that are metered by not billed (SCWD Unbilled Metered Accounts Usage).
Unbilled unmetered:	
Unauthorized consumption:	
Customer metering inaccuracies:	
Systematic data handling errors:	
Length of mains:	
Number of active AND inactive service connections:	Refer to SCWD 072018-062019
Average length of customer service line:	NA
Average operating pressure:	Refer to 2018-08-20 Water Pressure Data_Weighted Average
Total annual cost of operating water system:	Refer to SCWD FY 2019/19 Expenses (FY 2018/19 with CIP)
Customer retail unit cost (applied to Apparent Losses):	Refer to SCWD 072018-062019
Variable production cost (applied to Real Losses):	Refer to Matthew Dickens - 20190918 Variable Production Cost Calculator_SCWD

AWWA Free Water Audit Software: Water Balance

WAS v5.0

American Water Works Association.

Water Audit Report for:	Santa Clarita Water Division (a SCV Water Division) (1910017)	
Reporting Year:	FY2019-20	7/2019 - 6/2020
Data Validity Score:	62	

Water Exported
0.000

Billed Water Exported

Own Sources
(Adjusted for known errors)
4,780.050

Water Supplied
25,601.360

Water Imported
20,821.310

Authorized Consumption
23,284.620

Billed Authorized Consumption
23,222.450

Billed Metered Consumption (water exported is removed)
23,198.330

Billed Unmetered Consumption
24.120

Revenue Water
23,222.450

Unbilled Authorized Consumption
62.170

Unbilled Metered Consumption
4.114

Unbilled Unmetered Consumption
58.056

Non-Revenue Water (NRW)
2,378.910

Water Losses
2,316.740

Apparent Losses
513.388

Unauthorized Consumption
64.003

Customer Metering Inaccuracies
449.385

Systematic Data Handling Errors
0.000

Real Losses
1,803.352

Leakage on Transmission and/or Distribution Mains
Not broken down

Leakage and Overflows at Utility's Storage Tanks
Not broken down

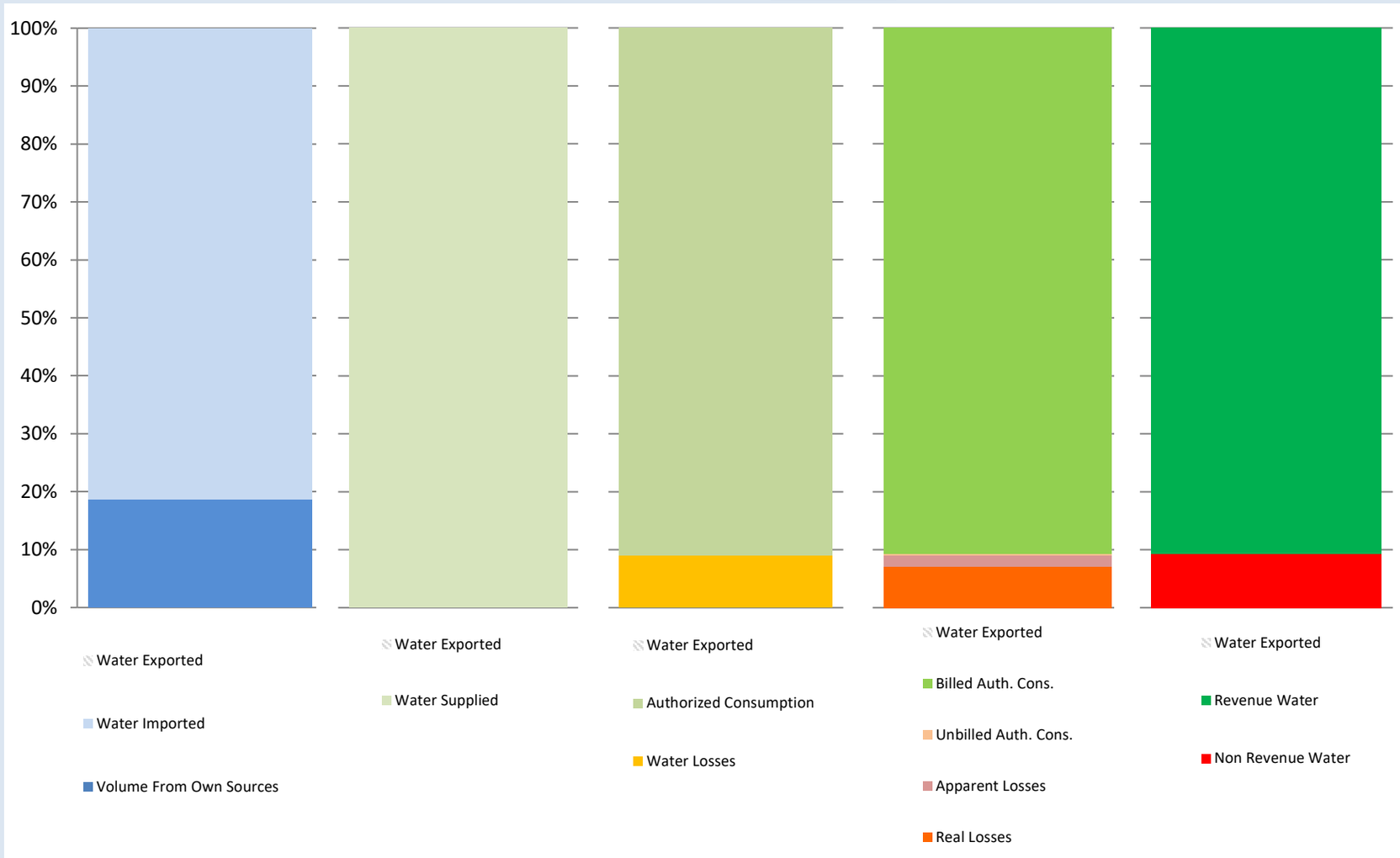
Leakage on Service Connections
Not broken down

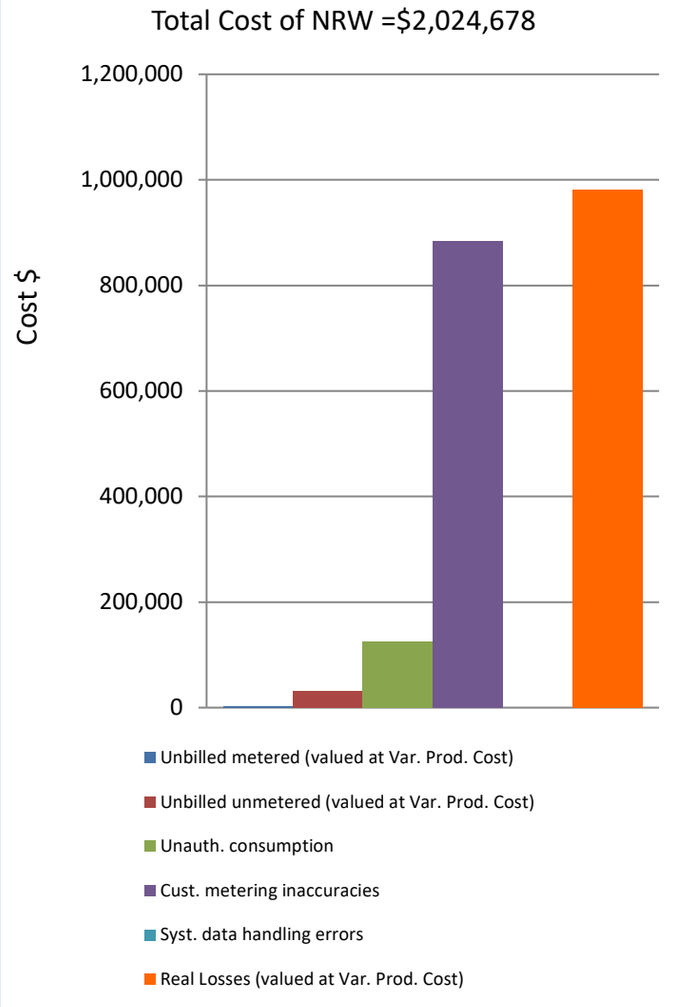
AWWA Free Water Audit Software:
Dashboard

The graphic below is a visual representation of the Water Balance with bar heights propotional to the volume of the audit components

Water Audit Report for: **Santa Clarita Water Division (a SCV Water Division) (1910017)**
Reporting Year: **FY2019-20** **7/2019 - 6/2020**
Data Validity Score: **62**

○ Show me the VOLUME of Non-Revenue Water
◉ Show me the COST of Non-Revenue Water





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The spreadsheet contains several separate worksheets. Sheets can be accessed using the tabs towards the bottom of the screen, or by clicking the buttons below.

Please begin by providing the following information

Name of Contact Person:	Matthew S. Dickens
Email Address:	mdickens@valenciawater.com
Telephone | Ext.:	661-295-6543
Name of City / Utility:	Valencia Water Company
City/Town/Municipality:	Valencia
State / Province:	California (CA)
Country:	USA
Year:	2015 Calendar Year
Audit Preparation Date:	3/10/2016
Volume Reporting Units:	Acre-feet
PWSID / Other ID:	

The following guidance will help you complete the Audit

All audit data are entered on the ***Reporting Worksheet***

- Value can be entered by user
- Value calculated based on input data
- These cells contain recommended default values

Use of Option (Radio) Buttons: Pcnt: 0.25% Value:

Select the default percentage by choosing the option button on the left

To enter a value, choose this button and enter a value in the cell

The following worksheets are available by clicking the buttons below or selecting the tabs along the bottom of the page

Instructions
The current sheet. Enter contact information and basic audit details (year, units etc)

Reporting Worksheet
Enter the required data on this worksheet to calculate the water balance and data grading

Comments
Enter comments to explain how values were calculated or to document data sources

Performance Indicators
Review the performance indicators to evaluate the results of the audit

Water Balance
The values entered in the Reporting Worksheet are used to populate the Water Balance

Dashboard
A graphical summary of the water balance and Non-Revenue Water components

Grading Matrix
Presents the possible grading options for each input component of the audit

Service Connection Diagram
Diagrams depicting possible customer service connection line configurations

Definitions
Use this sheet to understand the terms used in the audit process

Loss Control Planning
Use this sheet to interpret the results of the audit validity score and performance indicators

Example Audits
Reporting Worksheet and Performance Indicators examples are shown for two validated audits

Acknowledgements
Acknowledgements for the AWWA Free Water Audit Software v5.0

If you have questions or comments regarding the software please contact us via email at: wlc@awwa.org

AWWA Free Water Audit Software:
Reporting Worksheet

WAS v5.0

American Water Works Association

? Click to access definition
+ Click to add a comment

Water Audit Report for: Valencia Water Company
Reporting Year: 2015 (1/2015 - 12/2015)

Please enter data in the white cells below. Where available, metered values should be used; if metered values are unavailable please estimate a value. Indicate your confidence in the accuracy of the

All volumes to be entered as: ACRE-FEET PER YEAR

To select the correct data grading for each input, determine the highest grade where the utility meets or exceeds all criteria for that

<---------- Enter grading in column 'E' and 'J' ---------->

Master Meter and Supply Error Adjustments

WATER SUPPLIED

					Pcnt:	Value:	
Volume from own sources:	9	16,534.660	acre-ft/yr	5	0.17%		acre-ft/yr
Water imported:	7	6,647.740	acre-ft/yr	4	-1.50%		acre-ft/yr
Water exported:	8	212.160	acre-ft/yr	7	-1.00%		acre-ft/yr

Enter negative % or value for under-registration
Enter positive % or value for over-registration

WATER SUPPLIED: 23,041.270 acre-ft/yr

AUTHORIZED CONSUMPTION

Click here: ? for help using option buttons

				Pcnt:	Value:	
Billed metered:	7	22,146.460	acre-ft/yr			
Billed unmetered:	7		acre-ft/yr			
Unbilled metered:	10	0.760	acre-ft/yr			
Unbilled unmetered:		288.016	acre-ft/yr	1.25%		acre-ft/yr

Default option selected for Unbilled unmetered - a grading of 5 is applied but not displayed

Use buttons to select percentage of water supplied **OR** value

AUTHORIZED CONSUMPTION: 22,435.236 acre-ft/yr

WATER LOSSES (Water Supplied - Authorized Consumption)

606.034 acre-ft/yr

Apparent Losses

				Pcnt:	Value:	
Unauthorized consumption:		57.603	acre-ft/yr	0.25%		acre-ft/yr

Default option selected for unauthorized consumption - a grading of 5 is applied but not displayed

Customer metering inaccuracies:	8	111.293	acre-ft/yr	0.50%		acre-ft/yr
Systematic data handling errors:		55.366	acre-ft/yr	0.25%		acre-ft/yr

Default option selected for Systematic data handling errors - a grading of 5 is applied but not displayed

Apparent Losses: 224.262 acre-ft/yr

Real Losses (Current Annual Real Losses or CARL)

Real Losses = Water Losses - Apparent Losses: 381.773 acre-ft/yr

WATER LOSSES: 606.034 acre-ft/yr

NON-REVENUE WATER

NON-REVENUE WATER: 894.810 acre-ft/yr

= Water Losses + Unbilled Metered + Unbilled Unmetered

SYSTEM DATA

Length of mains:	10	369.0	miles
Number of active AND inactive service connections:	10	31,353	
Service connection density:		85	conn./mile main

Are customer meters typically located at the curbstop or property line? Yes

Average length of customer service line: (length of service line, beyond the property boundary, that is the responsibility of the utility)

Average length of customer service line has been set to zero and a data grading score of 10 has been applied

Average operating pressure: 9 115.0 psi

COST DATA

Total annual cost of operating water system:	10	$23,133,878	$/Year	
Customer retail unit cost (applied to Apparent Losses):	9	$1.52	$/100 cubic feet (ccf)	
Variable production cost (applied to Real Losses):	9	$380.49	$/acre-ft	☑ Use Customer Retail Unit Cost to value real

WATER AUDIT DATA VALIDITY SCORE:

*** YOUR SCORE IS: 82 out of 100 ***

A weighted scale for the components of consumption and water loss is included in the calculation of the Water Audit Data Validity Score

PRIORITY AREAS FOR ATTENTION:

Based on the information provided, audit accuracy can be improved by addressing the following components:

1: Billed metered
2: Water imported
3: Unauthorized consumption

AWWA Free Water Audit Software:
System Attributes and Performance Indicators

WAS v5.0
American Water Works Association.

Water Audit Report for: Valencia Water Company
Reporting Year: 2015 | 1/2015 - 12/2015

*** YOUR WATER AUDIT DATA VALIDITY SCORE IS: 82 out of 100 ***

System Attributes:

	Apparent Losses:	224.262	acre-ft/yr
+	Real Losses:	381.773	acre-ft/yr
=	Water Losses:	606.034	acre-ft/yr
	Unavoidable Annual Real Losses (UARL):	862.97	acre-ft/yr
	Annual cost of Apparent Losses:	$148,193	
	Annual cost of Real Losses:	$252,277	Valued at Customer Retail Unit Cost

Return to Reporting Worksheet to change this assumpiton

Performance Indicators:

Financial:	Non-revenue water as percent by volume of Water Supplied:	3.9%	
	Non-revenue water as percent by cost of operating system:	2.6%	Real Losses valued at Customer Retail Unit Cost
Operational Efficiency:	Apparent Losses per service connection per day:	6.39	gallons/connection/day
	Real Losses per service connection per day:	10.87	gallons/connection/day
	Real Losses per length of main per day*:	N/A	
	Real Losses per service connection per day per psi pressure:	0.09	gallons/connection/day/psi
	From Above, Real Losses = Current Annual Real Losses (CARL):	381.77	acre-feet/year
	Infrastructure Leakage Index (ILI) [CARL/UARL]:	0.44	

* This performance indicator applies for systems with a low service connection density of less than 32 service connections/mile of pipeline

AWWA Free Water Audit Software:
User Comments

WAS v5.0

American Water Works Association.

Use this worksheet to add comments or notes to explain how an input value was calculated, or to document the sources of the information used.

General Comment:	

Audit Item	Comment
Volume from own sources:	Refer to 1512Water (For Groundwater subtract Well 159 and 160 VGC)
Vol. from own sources: Master meter error adjustment:	GH compiled and reviewed the data 2015 production meter testing which consisted of wells, turnouts, and half of the boosters. Total average came out to 100.17% for 2015.
Water imported:	Refer to 1512Water for volumes and GH Email 12/01/2015 'Turnout meters" are tested every 10 years with the next test scheduled for 2019.
Water imported: master meter error adjustment:	Grading score based on CLWA data provided in the December 1, 2015 (2:00pm) email.
Water exported:	Refer to CAV 03/08/2016 "SCV Intertie" email based on production tracking 212.16 AF.
Water exported: master meter error adjustment:	Estimate based on discussion with GH (03/30/2016)
Billed metered:	Refer to VWC Exhibit 7-5 Statistical Measures
Billed unmetered:	Grading score based on team discussions 11/24/2015.
Unbilled metered:	VWC HQ water use (refer to VWC Landscape Water Use_ sub-meter)
Unbilled unmetered:	
Unauthorized consumption:	
Customer metering inaccuracies:	
Systematic data handling errors:	
Length of mains:	Provided by GH.
Number of active AND inactive service connections:	Refer to month end reports and includes all active and inactive accounts, fire service and metered construction.
Average length of customer service line:	VWC does not provide water service past the curb stop.
Average operating pressure:	Provided by GH from Scada reports
Total annual cost of operating water system:	Refer to BJ email from 03/10/2016 (10:11am)
Customer retail unit cost (applied to Apparent Losses):	From Water Rates 2015-2017 (SQR or Tier 2 Rate)
Variable production cost (applied to Real Losses):	Includes Purchased Water cost per ac-ft (as calculated in December 2015) and Total Power and and treatment costs for VWC groundwater.

AWWA Free Water Audit Software: Water Balance

American Water Works

Water Audit Report for:	Valencia Water Company
Reporting Year:	2015 — 1/2015 - 12/2015
Data Validity Score:	82

Own Sources (Adjusted for known errors)
16,506.599

Water Imported
6,748.975

System Input
23,255.573

Water Exported
214.303

Water Supplied
23,041.270

Authorized Consumption
22,435.236

Water Losses
606.034

Billed Water Exported
214.303

Billed Authorized Consumption
22,146.460

Unbilled Authorized Consumption
288.776

Apparent Losses
224.262

Real Losses
381.773

Billed Metered Consumption (water exported is removed)
22,146.460

Billed Unmetered Consumption
0.000

Unbilled Metered Consumption
0.760

Unbilled Unmetered Consumption
288.016

Unauthorized Consumption
57.603

Customer Metering Inaccuracies
111.293

Systematic Data Handling Errors
55.366

Leakage on Transmission and/or Distribution Mains
Not broken down

Leakage and Overflows at Utility's Storage Tanks
Not broken down

Leakage on Service Connections
Not broken down

Revenue Water
214.303

Revenue Water
22,146.460

Non-Revenue Water (NRW)
894.810

AWWA Free Water Audit Software:
Dashboard

WAS v5.0

American Water Works Association.

The graphic below is a visual representation of the Water Balance with bar heights propotional to the volume of the audit components

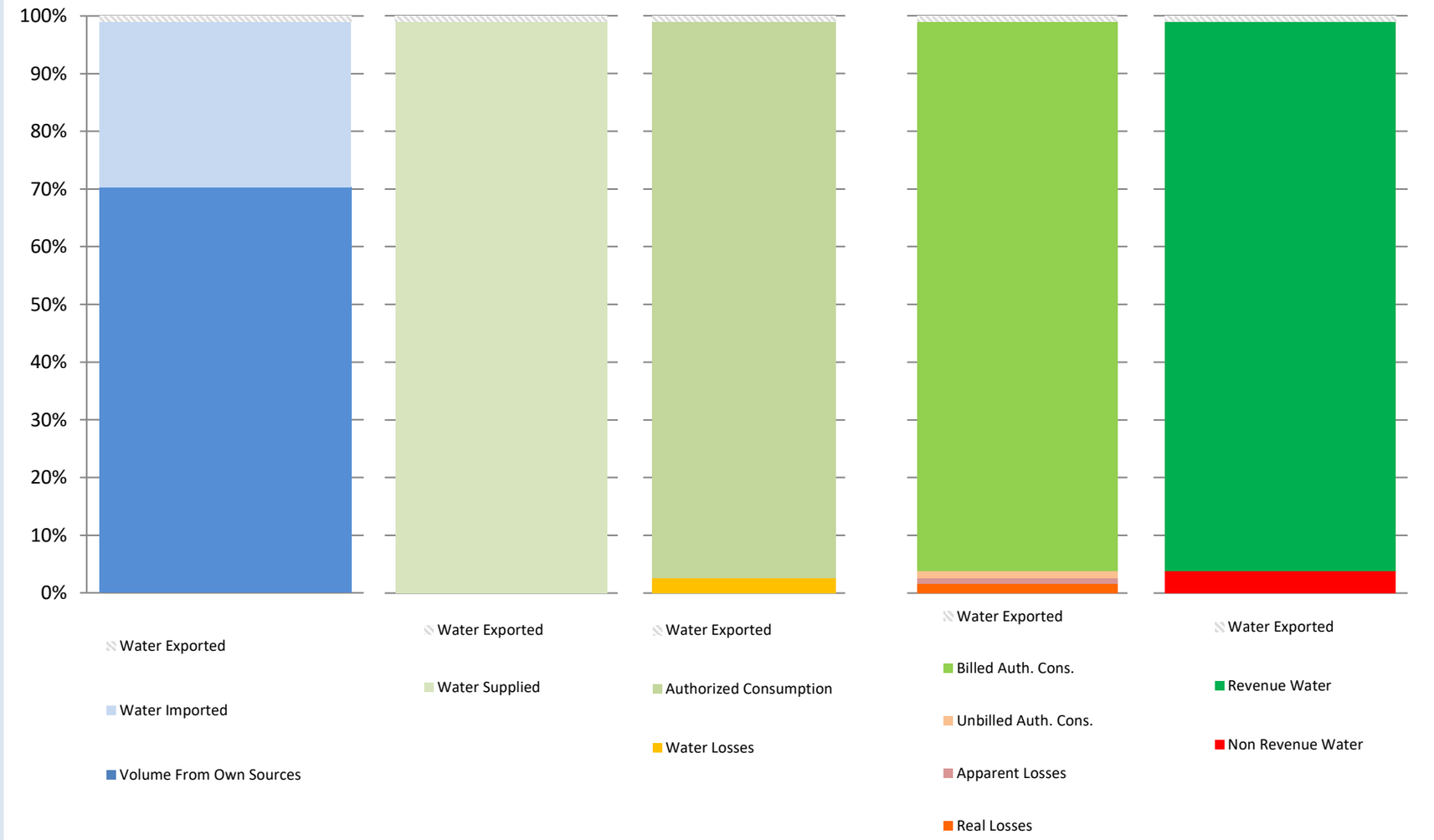
Water Audit Report for: **Valencia Water Company**

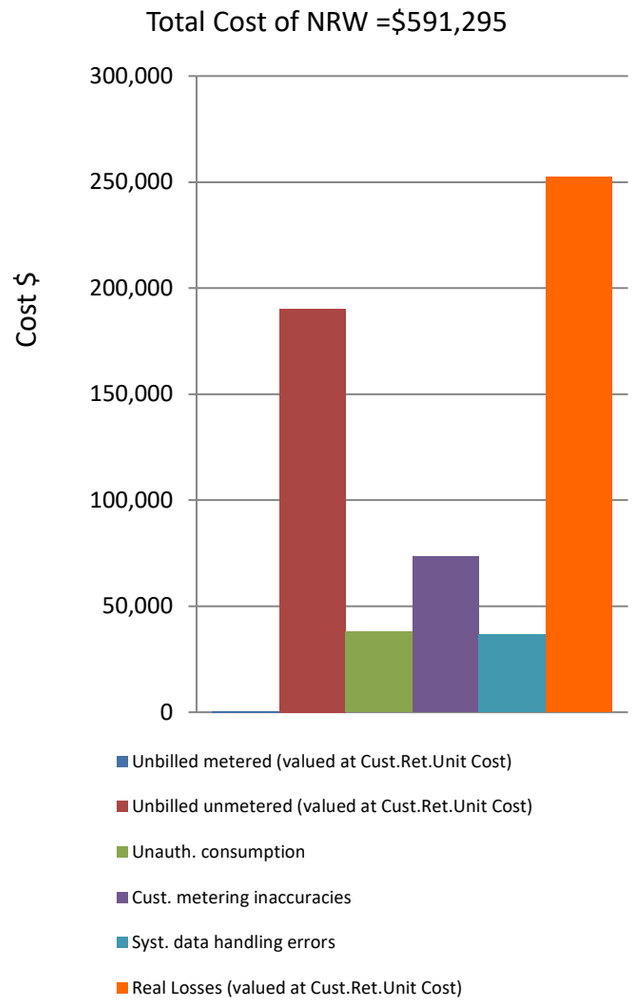
Reporting Year: **2015** **1/2015 - 12/2015**

Data Validity Score: **82**

○ Show me the VOLUME of Non-Revenue Water

◉ Show me the COST of Non-Revenue Water





AWWA Free Water Audit Software v5.0

This spreadsheet-based water audit tool is designed to help quantify and track water losses associated with water distribution systems and identify areas for improved efficiency and cost recovery. It provides a "top-down" summary water audit format, and is not meant to take the place of a full-scale, comprehensive water audit format.

Auditors are strongly encouraged to refer to the most current edition of AWWA M36 Manual for Water Audits for detailed guidance on the water auditing process and targetting loss reduction levels

The spreadsheet contains several separate worksheets. Sheets can be accessed using the tabs towards the bottom of the screen, or by clicking the buttons below.

Please begin by providing the following information

Name of Contact Person:	Matthew S. Dickens
Email Address:	mdickens@valenciawater.com
Telephone | Ext.:	661-295-6543
Name of City / Utility:	Valencia Water Company
City/Town/Municipality:	Calencia
State / Province:	California (CA)
Country:	USA
Year:	2016 Calendar Year
Audit Preparation Date:	6/1/2017
Volume Reporting Units:	Acre-feet
PWSID / Other ID:	

The following guidance will help you complete the Audit

All audit data are entered on the ***Reporting Worksheet***

- Value can be entered by user
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- These cells contain recommended default values

Use of Option (Radio) Buttons: Pcnt: 0.25% Value:

Select the default percentage by choosing the option button on the left

To enter a value, choose this button and enter a value in the cell

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A graphical summary of the water balance and Non-Revenue Water components

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Presents the possible grading options for each input component of the audit

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Diagrams depicting possible customer service connection line configurations

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Example Audits
Reporting Worksheet and Performance Indicators examples are shown for two validated audits

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If you have questions or comments regarding the software please contact us via email at: wlc@awwa.org

AWWA Free Water Audit Software:
Reporting Worksheet

WAS v5.0

American Water Works Association

? Click to access definition
+ Click to add a comment

Water Audit Report for: Valencia Water Company
Reporting Year: 2016 (1/2016 - 12/2016)

Please enter data in the white cells below. Where available, metered values should be used; if metered values are unavailable please estimate a value. Indicate your confidence in the accuracy of the input

All volumes to be entered as: ACRE-FEET PER YEAR

To select the correct data grading for each input, determine the highest grade where the utility meets or exceeds all criteria for that grade and <---------- Enter grading in column 'E' and 'J' ---------->

Master Meter and Supply Error Adjustments

WATER SUPPLIED

		Grading	Value		Pcnt:	Value:	
Volume from own sources:	+	7	13,922.010	acre-ft/yr	3	1.23%	acre-ft/yr
Water imported:	+	3	10,308.020	acre-ft/yr	4		acre-ft/yr
Water exported:	+	5	0.814	acre-ft/yr	3		acre-ft/yr

Enter negative % or value for under-registration
Enter positive % or value for over-registration

WATER SUPPLIED: 24,060.056 acre-ft/yr

AUTHORIZED CONSUMPTION

Click here: ? for help using option buttons

		Grading	Value		Pcnt:	Value:	
Billed metered:	+	5	23,412.075	acre-ft/yr			
Billed unmetered:	+	10	5.934	acre-ft/yr			
Unbilled metered:	+	10	0.631	acre-ft/yr			
Unbilled unmetered:	+	5	60.150	acre-ft/yr		60.150	acre-ft/yr

Use buttons to select percentage of water supplied **OR** value

AUTHORIZED CONSUMPTION: 23,478.790 acre-ft/yr

WATER LOSSES (Water Supplied - Authorized Consumption) 581.266 acre-ft/yr

Apparent Losses

		Grading	Value		Pcnt:	Value:	
Unauthorized consumption:	+		60.150	acre-ft/yr	0.25%		acre-ft/yr

Default option selected for unauthorized consumption - a grading of 5 is applied but not displayed

Customer metering inaccuracies:	+	3	117.652	acre-ft/yr	0.50%		acre-ft/yr
Systematic data handling errors:	+		58.530	acre-ft/yr	0.25%		acre-ft/yr

Default option selected for Systematic data handling errors - a grading of 5 is applied but not displayed

Apparent Losses: 236.332 acre-ft/yr

Real Losses (Current Annual Real Losses or CARL)

Real Losses = Water Losses - Apparent Losses: 344.934 acre-ft/yr

WATER LOSSES: 581.266 acre-ft/yr

NON-REVENUE WATER

NON-REVENUE WATER: 642.047 acre-ft/yr

= Water Losses + Unbilled Metered + Unbilled Unmetered

SYSTEM DATA

		Grading	Value	
Length of mains:	+	10	376.3	miles
Number of active AND inactive service connections:	+	9	31,485	
Service connection density:			84	conn./mile main
Are customer meters typically located at the curbstop or property line?			Yes	
Average length of customer service line:	+			(length of service line, beyond the property boundary, that is the responsibility of the utility)

Average length of customer service line has been set to zero and a data grading score of 10 has been applied

Average operating pressure:	+	8	106.6	psi

COST DATA

		Grading	Value	
Total annual cost of operating water system:	+	10	$24,654,211	$/Year
Customer retail unit cost (applied to Apparent Losses):	+	9	$1.57	$/100 cubic feet (ccf)
Variable production cost (applied to Real Losses):	+	5	$483.26	$/acre-ft

☐ Use Customer Retail Unit Cost to value real

WATER AUDIT DATA VALIDITY SCORE:

*** YOUR SCORE IS: 65 out of 100 ***

A weighted scale for the components of consumption and water loss is included in the calculation of the Water Audit Data Validity Score

PRIORITY AREAS FOR ATTENTION:

Based on the information provided, audit accuracy can be improved by addressing the following components:

1: Water imported
2: Volume from own sources
3: Customer metering inaccuracies

AWWA Free Water Audit Software:
System Attributes and Performance Indicators

WAS v5.0
American Water Works Association.

Water Audit Report for: Valencia Water Company
Reporting Year: 2016 | 1/2016 - 12/2016

*** YOUR WATER AUDIT DATA VALIDITY SCORE IS: 65 out of 100 ***

System Attributes:

	Apparent Losses:	236.332	acre-ft/yr
+	Real Losses:	344.934	acre-ft/yr
=	Water Losses:	581.266	acre-ft/yr
	Unavoidable Annual Real Losses (UARL):	806.93	acre-ft/yr
	Annual cost of Apparent Losses:	$161,832	
	Annual cost of Real Losses:	$166,693	Valued at Variable Production Cost

Return to Reporting Worksheet to change this assumpiton

Performance Indicators:

Financial:	Non-revenue water as percent by volume of Water Supplied:	2.7%	
	Non-revenue water as percent by cost of operating system:	1.5%	Real Losses valued at Variable Production Cost
Operational Efficiency:	Apparent Losses per service connection per day:	6.70	gallons/connection/day
	Real Losses per service connection per day:	9.78	gallons/connection/day
	Real Losses per length of main per day*:	N/A	
	Real Losses per service connection per day per psi pressure:	0.09	gallons/connection/day/psi
	From Above, Real Losses = Current Annual Real Losses (CARL):	344.93	acre-feet/year
	Infrastructure Leakage Index (ILI) [CARL/UARL]:	0.43	

* This performance indicator applies for systems with a low service connection density of less than 32 service connections/mile of pipeline

AWWA Free Water Audit Software:
User Comments

WAS v5.0

American Water Works Association.

Use this worksheet to add comments or notes to explain how an input value was calculated, or to document the sources of the information used.

General Comment:	

Audit Item	Comment
Volume from own sources:	Refer to 16Water (For Groundwater subtract Well 159 and 160 VGC)
Vol. from own sources: Master meter error adjustment:	Refer to 16Water (For Groundwater subtract Well 159 and 160 VGC) See Cell S36
Water imported:	100.18% accuracy (see Attachment D-CLWA Certificate of accuracy.pdf (2010)
Water imported: master meter error adjustment:	Grading score based on CLWA data provided in the December 1, 2015 (2:00pm) email.
Water exported:	Refer to CAV 06/22/2017 3:28pm "SCV Intertie" email based on production tracking 355 CCF."
Water exported: master meter error adjustment:	
Billed metered:	Refer to VWC Exhibit 7-5 Statistical Measures
Billed unmetered:	Includes Jumpers and Tail Pieces for accounts that are active and waiting for physical/permanent meter.
Unbilled metered:	VWC HQ water use (refer to VWC Landscape Water Use_ sub-meter)
Unbilled unmetered:	
Unauthorized consumption:	
Customer metering inaccuracies:	
Systematic data handling errors:	
Length of mains:	See Melissa Dominguez Email RE: GIS info Request (06/20/2017 3:16pm)
Number of active AND inactive service connections:	Source document- See page 8, Report #24 (24srvconnusageclassmtr122516) located at T:\Customer Service\S&S enQuesta\Month End Cognos Reports\Month End 2016\L December 2016
Average length of customer service line:	VWC does not provide water service past the curb stop.
Average operating pressure:	See Melissa Dominguez Email RE: GIS info Request (06/20/2017 3:16pm)
Total annual cost of operating water system:	Refer Beverly Johnson Email "RE: Water Loss Audit Review Data Request" 06/06/2017 11:22am
Customer retail unit cost (applied to Apparent Losses):	From 2016 Rates (See 20160622 Retail Rate Calculation.xlsx) MDICKENS
Variable production cost (applied to Real Losses):	Based on calculations stated in Variable Production Cost Calculator (20160622 Variable Production Cost Calculator.xlsx) MDICKENS

AWWA Free Water Audit Software: Water Balance

American Water Works

Water Audit Report for:	Valencia Water Company
Reporting Year:	2016 — 1/2016 - 12/2016
Data Validity Score:	65

Own Sources (Adjusted for known errors)
13,752.850

Water Imported
10,308.020

System Input
24,060.870

Water Exported
0.814

Water Supplied
24,060.056

Authorized Consumption
23,478.790

Billed Water Exported
0.814

Billed Authorized Consumption
23,418.009

Billed Metered Consumption (water exported is removed)
23,412.075

Billed Unmetered Consumption
5.934

Unbilled Authorized Consumption
60.781

Unbilled Metered Consumption
0.631

Unbilled Unmetered Consumption
60.150

Water Losses
581.266

Apparent Losses
236.332

Unauthorized Consumption
60.150

Customer Metering Inaccuracies
117.652

Systematic Data Handling Errors
58.530

Real Losses
344.934

Leakage on Transmission and/or Distribution Mains
Not broken down

Leakage and Overflows at Utility's Storage Tanks
Not broken down

Leakage on Service Connections
Not broken down

Revenue Water
0.814

Revenue Water

23,418.009

Non-Revenue Water (NRW)

642.047

AWWA Free Water Audit Software:
Dashboard

WAS v5.0

American Water Works Association.

The graphic below is a visual representation of the Water Balance with bar heights propotional to the volume of the audit components

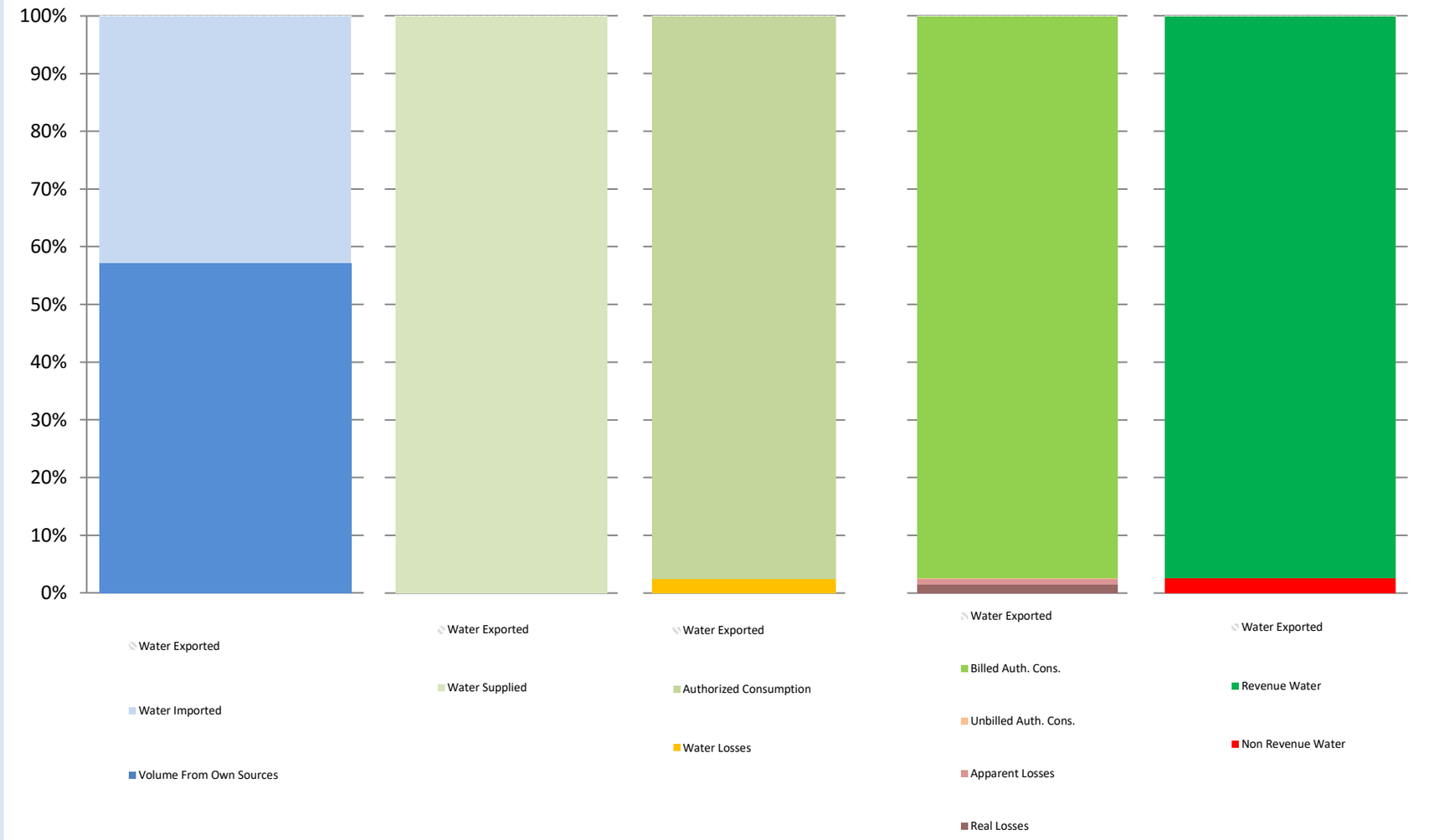
Water Audit Report for: **Valencia Water Company**

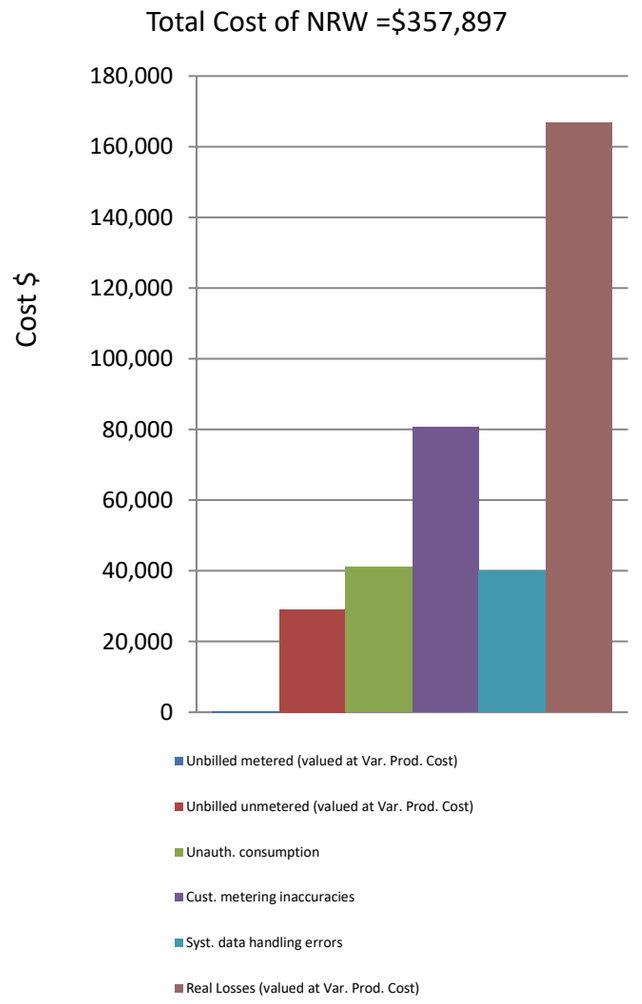
Reporting Year: **2016** **1/2016 - 12/2016**

Data Validity Score: **65**

○ Show me the VOLUME of Non-Revenue Water

◉ Show me the COST of Non-Revenue Water





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Email Address:	mdickens@valenciawater.com
Telephone | Ext.:	661-295-6543
Name of City / Utility:	Valencia Water Company
City/Town/Municipality:	Valencia
State / Province:	California (CA)
Country:	USA
Year:	2017 Calendar Year
Audit Preparation Date:	8/22/2018
Volume Reporting Units:	Acre-feet
PWSID / Other ID:	

The following guidance will help you complete the Audit

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- Value can be entered by user
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Use of Option (Radio) Buttons: Pcnt: 0.25% Value:

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Reporting Worksheet

WAS v5.0

American Water Works Association

? Click to access definition
+ Click to add a comment

Water Audit Report for: Valencia Water Company
Reporting Year: 2017 (1/2017 - 12/2017)

Please enter data in the white cells below. Where available, metered values should be used; if metered values are unavailable please estimate a value. Indicate your confidence in the accuracy of the input

All volumes to be entered as: ACRE-FEET PER YEAR

To select the correct data grading for each input, determine the highest grade where the utility meets or exceeds all criteria for that grade and <---------- Enter grading in column 'E' and 'J' ----------> Master Meter and Supply Error Adjustments

WATER SUPPLIED

		Grading	Value		Master Meter Error Adjustment Pcnt	Master Meter Error Adjustment Value	
Volume from own sources:	+ ?	7	9,107.000	acre-ft/yr	3		acre-ft/yr
Water imported:	+ ?	3	17,561.120	acre-ft/yr	3		acre-ft/yr
Water exported:	+ ?	5	12.240	acre-ft/yr	3		acre-ft/yr

Enter negative % or value for under-registration
Enter positive % or value for over-registration

WATER SUPPLIED: 26,655.880 acre-ft/yr

AUTHORIZED CONSUMPTION

Click here: ? for help using option buttons

		Grading	Value		Pcnt	Value
Billed metered:	+ ?	7	24,932.510	acre-ft/yr		
Billed unmetered:	+ ?	3	5.920	acre-ft/yr		
Unbilled metered:	+ ?	9	0.790	acre-ft/yr		
Unbilled unmetered:	+ ?	5	66.640	acre-ft/yr		66.640 acre-ft/yr

Use buttons to select percentage of water supplied **OR** value

AUTHORIZED CONSUMPTION: ? 25,005.860 acre-ft/yr

WATER LOSSES (Water Supplied - Authorized Consumption) 1,650.020 acre-ft/yr

Apparent Losses

		Grading	Value		Pcnt	Value
Unauthorized consumption:	+ ?		66.640	acre-ft/yr	0.25%	acre-ft/yr

Default option selected for unauthorized consumption - a grading of 5 is applied but not displayed

Customer metering inaccuracies:	+ ?	3	125.293	acre-ft/yr	0.50%	acre-ft/yr
Systematic data handling errors:	+ ?		62.331	acre-ft/yr	0.25%	acre-ft/yr

Default option selected for Systematic data handling errors - a grading of 5 is applied but not displayed

Apparent Losses: ? 254.264 acre-ft/yr

Real Losses (Current Annual Real Losses or CARL)

Real Losses = Water Losses - Apparent Losses: ? 1,395.756 acre-ft/yr

WATER LOSSES: 1,650.020 acre-ft/yr

NON-REVENUE WATER

NON-REVENUE WATER: ? 1,717.450 acre-ft/yr

= Water Losses + Unbilled Metered + Unbilled Unmetered

SYSTEM DATA

Length of mains:	+ ?	10	363.2	miles	
Number of active AND inactive service connections:	+ ?	10	34,485		
Service connection density:	?		95	conn./mile main	
Are customer meters typically located at the curbstop or property line?			Yes		
Average length of customer service line:	+ ?				(length of service line, beyond the property boundary, that is the responsibility of the utility)

Average length of customer service line has been set to zero and a data grading score of 10 has been applied

Average operating pressure:	+ ?	7	101.0	psi	

COST DATA

Total annual cost of operating water system:	+ ?	10	$26,073,000	$/Year	
Customer retail unit cost (applied to Apparent Losses):	+ ?	9	$1.64	$/100 cubic feet (ccf)	
Variable production cost (applied to Real Losses):	+ ?	5	$735.46	$/acre-ft	☐ Use Customer Retail Unit Cost to value real

Retail costs are less than (or equal to) production costs; please review and correct if necessary

WATER AUDIT DATA VALIDITY SCORE:

*** YOUR SCORE IS: 58 out of 100 ***

A weighted scale for the components of consumption and water loss is included in the calculation of the Water Audit Data Validity Score

PRIORITY AREAS FOR ATTENTION:

Based on the information provided, audit accuracy can be improved by addressing the following components:

1: Water imported
2: Billed unmetered
3: Customer metering inaccuracies

AWWA Free Water Audit Software:
System Attributes and Performance Indicators

WAS v5.0
American Water Works Association.

Water Audit Report for: Valencia Water Company
Reporting Year: 2017 | 1/2017 - 12/2017

*** YOUR WATER AUDIT DATA VALIDITY SCORE IS: 58 out of 100 ***

System Attributes:

	Apparent Losses:	254.264	acre-ft/yr
+	Real Losses:	1,395.756	acre-ft/yr
=	Water Losses:	1,650.020	acre-ft/yr
	Unavoidable Annual Real Losses (UARL):	807.51	acre-ft/yr
	Annual cost of Apparent Losses:	$181,088	
	Annual cost of Real Losses:	$1,026,523	Valued at Variable Production Cost

Return to Reporting Worksheet to change this assumpiton

Performance Indicators:

Financial:	Non-revenue water as percent by volume of Water Supplied:	6.4%	
	Non-revenue water as percent by cost of operating system:	4.8%	Real Losses valued at Variable Production Cost
Operational Efficiency:	Apparent Losses per service connection per day:	6.58	gallons/connection/day
	Real Losses per service connection per day:	36.13	gallons/connection/day
	Real Losses per length of main per day*:	N/A	
	Real Losses per service connection per day per psi pressure:	0.36	gallons/connection/day/psi
	From Above, Real Losses = Current Annual Real Losses (CARL):	1,395.76	acre-feet/year
	Infrastructure Leakage Index (ILI) [CARL/UARL]:	1.73	

* This performance indicator applies for systems with a low service connection density of less than 32 service connections/mile of pipeline

AWWA Free Water Audit Software:
User Comments

WAS v5.0

American Water Works Association.

Use this worksheet to add comments or notes to explain how an input value was calculated, or to document the sources of the information used.

General Comment:	

Audit Item	Comment
Volume from own sources:	Refer to Valencia_2017 Volume from Own Sources (For Groundwater subtract Well 159 and 160 VGC)
Vol. from own sources: Master meter error adjustment:	Refer to 16Water (For Groundwater subtract Well 159 and 160 VGC) See Cell S36
Water imported:	100.18% accuracy (see Production 17-18 Valencia)
Water imported: master meter error adjustment:	Grading score based on CLWA data provided in the December 1, 2015 (2:00pm) email.
Water exported:	Refer to Valencia_2017 Export
Water exported: master meter error adjustment:	
Billed metered:	Refer to Volume of Water Sold FINAL (Total sales minus Recycled Water) / 435.6 to convert to AF.
Billed unmetered:	Includes Jumpers and Tail Pieces for accounts that are active and waiting for physical/permanent meter.
Unbilled metered:	Refer to Usage_Details_26171300(1)
Unbilled unmetered:	
Unauthorized consumption:	
Customer metering inaccuracies:	
Systematic data handling errors:	
Length of mains:	See Melissa Dominguez Email RE: GIS info Request (06/20/2017 3:16pm)
Number of active AND inactive service connections:	Source document- See page 8, Report #24 (24srvconnusageclassmtr122516) located at T:\Customer Service\S&S enQuesta\Month End Cognos Reports\Month End 2016\L December 2016
Average length of customer service line:	VWC does not provide water service past the curb stop.
Average operating pressure:	Refer to Operating Pressure_VWD and NWD
Total annual cost of operating water system:	RE: 2018 Water Loss Audit & Validation - Valencia Division
Customer retail unit cost (applied to Apparent Losses):	Refer to VWC_Rate_Increase_Summary_2015-2018_Final
Variable production cost (applied to Real Losses):	Based on calculations stated in Variable Production Cost Calculator (20160622 Variable Production Cost Calculator.xlsx) MDICKENS

AWWA Free Water Audit Software: Water Balance

American Water Works

Water Audit Report for:	Valencia Water Company
Reporting Year:	2017 — 1/2017 - 12/2017
Data Validity Score:	58

Own Sources (Adjusted for known errors)
9,107.000

Water Imported
17,561.120

System Input
26,668.120

Water Exported
12.240

Water Supplied
26,655.880

Authorized Consumption
25,005.860

Water Losses
1,650.020

Billed Water Exported
12.240

Billed Authorized Consumption
24,938.430

Unbilled Authorized Consumption
67.430

Apparent Losses
254.264

Real Losses
1,395.756

Billed Metered Consumption (water exported is removed)
24,932.510

Billed Unmetered Consumption
5.920

Unbilled Metered Consumption
0.790

Unbilled Unmetered Consumption
66.640

Unauthorized Consumption
66.640

Customer Metering Inaccuracies
125.293

Systematic Data Handling Errors
62.331

Leakage on Transmission and/or Distribution Mains
Not broken down

Leakage and Overflows at Utility's Storage Tanks
Not broken down

Leakage on Service Connections
Not broken down

Revenue Water
12.240

Revenue Water
24,938.430

Non-Revenue Water (NRW)
1,717.450

AWWA Free Water Audit Software:
Dashboard

WAS v5.0

American Water Works Association.

The graphic below is a visual representation of the Water Balance with bar heights propotional to the volume of the audit components

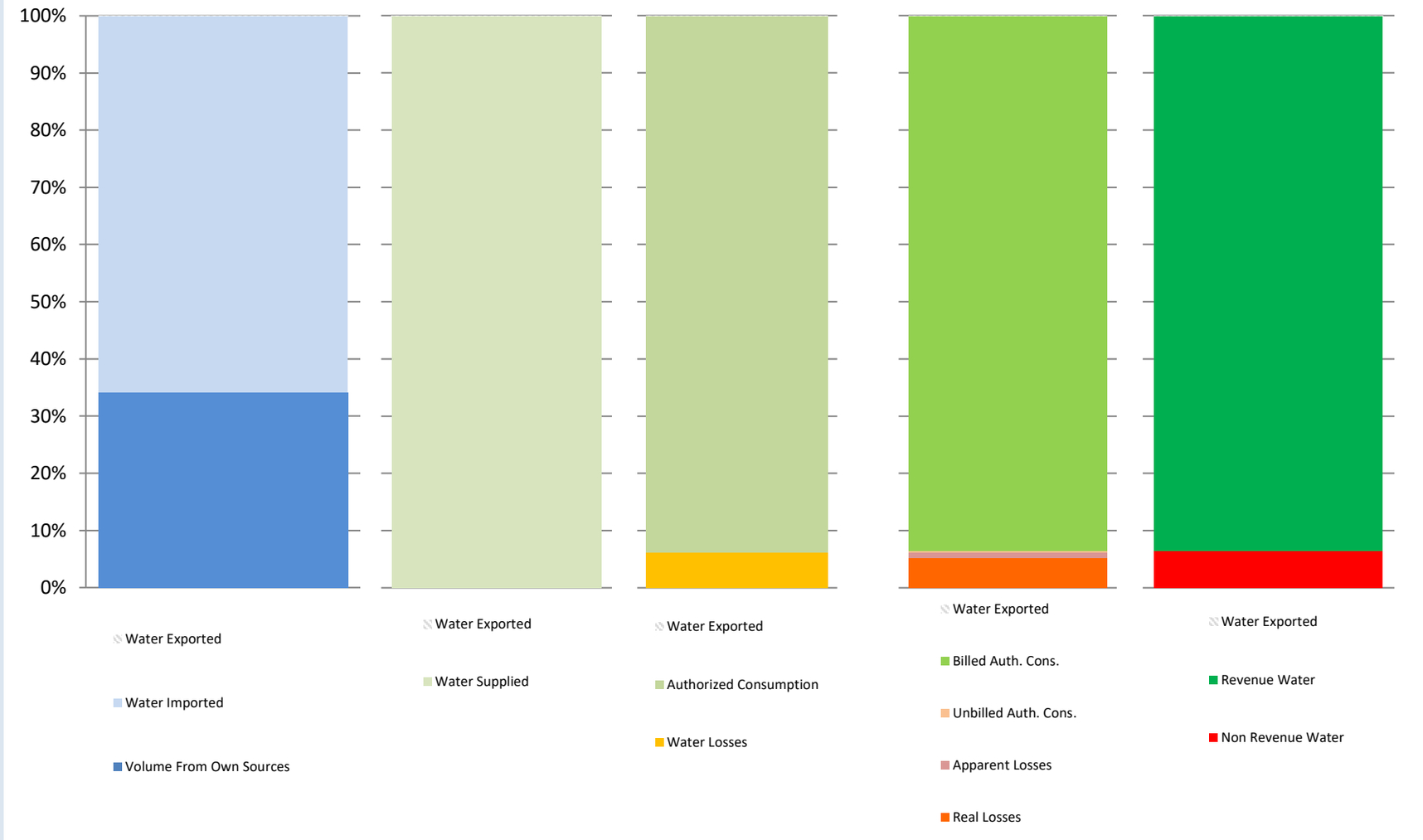
Water Audit Report for: **Valencia Water Company**

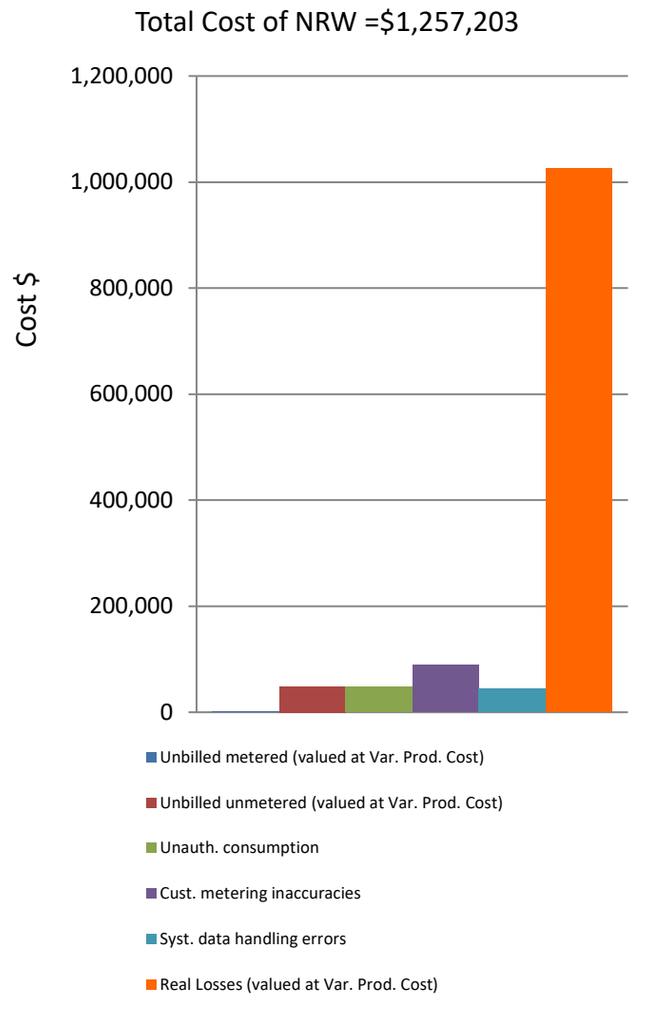
Reporting Year: **2017** **1/2017 - 12/2017**

Data Validity Score: **58**

○ Show me the VOLUME of Non-Revenue Water

◉ Show me the COST of Non-Revenue Water





AWWA Free Water Audit Software v5.0

This spreadsheet-based water audit tool is designed to help quantify and track water losses associated with water distribution systems and identify areas for improved efficiency and cost recovery. It provides a "top-down" summary water audit format, and is not meant to take the place of a full-scale, comprehensive water audit format.

Auditors are strongly encouraged to refer to the most current edition of AWWA M36 Manual for Water Audits for detailed guidance on the water auditing process and targetting loss reduction levels

The spreadsheet contains several separate worksheets. Sheets can be accessed using the tabs towards the bottom of the screen, or by clicking the buttons below.

Please begin by providing the following information

Name of Contact Person:	Matthew S. Dickens	
Email Address:	mdickens@valenciawater.com	
Telephone | Ext.:	661-295-6543	
Name of City / Utility:	Valencia Water Company	
City/Town/Municipality:	Valencia	
State / Province:	California (CA)	
Country:	USA	
Year:	2018	Financial Year
Start Date:	07/2018	Enter MM/YYYY numeric format
End Date:	06/2019	Enter MM/YYYY numeric format
Audit Preparation Date:	9/5/2019	
Volume Reporting Units:	Acre-feet	
PWSID / Other ID:		

The following guidance will help you complete the Audit

All audit data are entered on the ***Reporting Worksheet***

- Value can be entered by user
- Value calculated based on input data
- These cells contain recommended default values

Use of Option (Radio) Buttons: Pcnt: 0.25% Value:

Select the default percentage by choosing the option button on the left

To enter a value, choose this button and enter a value in the cell

The following worksheets are available by clicking the buttons below or selecting the tabs along the bottom of the page

Instructions
The current sheet. Enter contact information and basic audit details (year, units etc)

Reporting Worksheet
Enter the required data on this worksheet to calculate the water balance and data grading

Comments
Enter comments to explain how values were calculated or to document data sources

Performance Indicators
Review the performance indicators to evaluate the results of the audit

Water Balance
The values entered in the Reporting Worksheet are used to populate the Water Balance

Dashboard
A graphical summary of the water balance and Non-Revenue Water components

Grading Matrix
Presents the possible grading options for each input component of the audit

Service Connection Diagram
Diagrams depicting possible customer service connection line configurations

Definitions
Use this sheet to understand the terms used in the audit process

Loss Control Planning
Use this sheet to interpret the results of the audit validity score and performance indicators

Example Audits
Reporting Worksheet and Performance Indicators examples are shown for two validated audits

Acknowledgements
Acknowledgements for the AWWA Free Water Audit Software v5.0

If you have questions or comments regarding the software please contact us via email at: wlc@awwa.org

AWWA Free Water Audit Software:
Reporting Worksheet

WAS v5.0

American Water Works Association

? Click to access definition
+ Click to add a comment

Water Audit Report for: Valencia Water Company
Reporting Year: 2018 (7/2018 - 6/2019)

Please enter data in the white cells below. Where available, metered values should be used; if metered values are unavailable please estimate a value. Indicate your confidence in the accuracy of the input

All volumes to be entered as: ACRE-FEET PER YEAR

To select the correct data grading for each input, determine the highest grade where the utility meets or exceeds all criteria for that grade and <---------- Enter grading in column 'E' and 'J' ----------> Master Meter and Supply Error Adjustments

WATER SUPPLIED

					Pcnt:	Value:	
Volume from own sources:	7	10,732.200	acre-ft/yr	3	-1.69%		acre-ft/yr
Water imported:	7	16,195.000	acre-ft/yr	1	-1.82%		acre-ft/yr
Water exported:	5	37.000	acre-ft/yr	3			acre-ft/yr

Enter negative % or value for under-registration
Enter positive % or value for over-registration

WATER SUPPLIED: 27,374.905 acre-ft/yr

AUTHORIZED CONSUMPTION

Click here: ? for help using option buttons

				Pcnt:	Value:	
Billed metered:	3	25,482.310	acre-ft/yr			
Billed unmetered:	3		acre-ft/yr			
Unbilled metered:	9	1.037	acre-ft/yr			
Unbilled unmetered:	5	68.437	acre-ft/yr		68.437	acre-ft/yr

Use buttons to select percentage of water supplied OR value

AUTHORIZED CONSUMPTION: 25,551.784 acre-ft/yr

WATER LOSSES (Water Supplied - Authorized Consumption) 1,823.121 acre-ft/yr

Apparent Losses

				Pcnt:	Value:	
Unauthorized consumption:		68.437	acre-ft/yr	0.25%		acre-ft/yr

Default option selected for unauthorized consumption - a grading of 5 is applied but not displayed

Customer metering inaccuracies:	3	128.057	acre-ft/yr	0.50%		acre-ft/yr
Systematic data handling errors:		63.706	acre-ft/yr	0.25%		acre-ft/yr

Default option selected for Systematic data handling errors - a grading of 5 is applied but not displayed

Apparent Losses: 260.200 acre-ft/yr

Real Losses (Current Annual Real Losses or CARL)

Real Losses = Water Losses - Apparent Losses: 1,562.921 acre-ft/yr

WATER LOSSES: 1,823.121 acre-ft/yr

NON-REVENUE WATER

NON-REVENUE WATER: 1,892.595 acre-ft/yr

= Water Losses + Unbilled Metered + Unbilled Unmetered

SYSTEM DATA

Length of mains:	10	362.0	miles
Number of active AND inactive service connections:	10	31,826	
Service connection density:		88	conn./mile main

Are customer meters typically located at the curbstop or property line? Yes

Average length of customer service line: (length of service line, beyond the property boundary, that is the responsibility of the utility)

Average length of customer service line has been set to zero and a data grading score of 10 has been applied

Average operating pressure: 7 104.1 psi

COST DATA

Total annual cost of operating water system:	10	$32,668,072	$/Year
Customer retail unit cost (applied to Apparent Losses):	9	$1.75	$/100 cubic feet (ccf)
Variable production cost (applied to Real Losses):	5	$386.93	$/acre-ft

☐ Use Customer Retail Unit Cost to value real

WATER AUDIT DATA VALIDITY SCORE:

*** YOUR SCORE IS: 65 out of 100 ***

A weighted scale for the components of consumption and water loss is included in the calculation of the Water Audit Data Validity Score

PRIORITY AREAS FOR ATTENTION:

Based on the information provided, audit accuracy can be improved by addressing the following components:

1: Billed metered
2: Water imported
3: Customer metering inaccuracies

AWWA Free Water Audit Software:
System Attributes and Performance Indicators

WAS v5.0
American Water Works Association.

Water Audit Report for: Valencia Water Company
Reporting Year: 2018 | 7/2018 - 6/2019

*** YOUR WATER AUDIT DATA VALIDITY SCORE IS: 65 out of 100 ***

System Attributes:

	Apparent Losses:	260.200	acre-ft/yr
+	Real Losses:	1,562.921	acre-ft/yr
=	Water Losses:	1,823.121	acre-ft/yr
	Unavoidable Annual Real Losses (UARL):	784.66	acre-ft/yr
	Annual cost of Apparent Losses:	$198,351	
	Annual cost of Real Losses:	$604,741	Valued at Variable Production Cost

Return to Reporting Worksheet to change this assumpiton

Performance Indicators:

Financial:	Non-revenue water as percent by volume of Water Supplied:	6.9%	
	Non-revenue water as percent by cost of operating system:	2.5%	Real Losses valued at Variable Production Cost
Operational Efficiency:	Apparent Losses per service connection per day:	7.30	gallons/connection/day
	Real Losses per service connection per day:	43.84	gallons/connection/day
	Real Losses per length of main per day*:	N/A	
	Real Losses per service connection per day per psi pressure:	0.42	gallons/connection/day/psi
	From Above, Real Losses = Current Annual Real Losses (CARL):	1,562.92	acre-feet/year
	Infrastructure Leakage Index (ILI) [CARL/UARL]:	1.99	

* This performance indicator applies for systems with a low service connection density of less than 32 service connections/mile of pipeline

AWWA Free Water Audit Software:
User Comments

WAS v5.0

American Water Works Association.

Use this worksheet to add comments or notes to explain how an input value was calculated, or to document the sources of the information used.

General Comment:	

Audit Item	Comment
Volume from own sources:	See SCV Water Production Fiscal Year 2018-2019
Vol. from own sources: Master meter error adjustment:	Refer to 16Water (For Groundwater subtract Well 159 and 160 VGC) See Cell S36
Water imported:	See SCV Water Production Fiscal Year 2018-2019
Water imported: master meter error adjustment:	Grading score based on CLWA data provided in the December 1, 2015 (2:00pm) email.
Water exported:	See SCV Water Production Fiscal Year 2018-2019
Water exported: master meter error adjustment:	
Billed metered:	Refer to VWC FY 18-19
Billed unmetered:	Includes Jumpers and Tail Pieces for accounts that are active and waiting for physical/permanent meter.
Unbilled metered:	Refer to Valencia Metered Unbilled_2019
Unbilled unmetered:	
Unauthorized consumption:	
Customer metering inaccuracies:	
Systematic data handling errors:	
Length of mains:	See Melissa Dominguez Email RE: GIS info Request (06/20/2017 3:16pm)
Number of active AND inactive service connections:	Source document- See page 8, Report #24 (24srvconnusageclassmtr122516) located at T:\Customer Service\S&S enQuesta\Month End Cognos Reports\Month End 2016\L December 2016
Average length of customer service line:	VWC does not provide water service past the curb stop.
Average operating pressure:	Refer to Operating Pressure_VWD and NWD
Total annual cost of operating water system:	RE: 2018 Water Loss Audit & Validation - Valencia Division
Customer retail unit cost (applied to Apparent Losses):	Refer to VWC Resolution Rate Increase and VWD FY 18-19 (Weighted Average)
Variable production cost (applied to Real Losses):	See Matthew Dickens - 20190918 Variable Production Cost Calculator

AWWA Free Water Audit Software: Water Balance

American Water Works

Water Audit Report for:	Valencia Water Company
Reporting Year:	2018 — 7/2018 - 6/2019
Data Validity Score:	65

Water Exported *37.000*

Billed Water Exported

Revenue Water 37.000

Own Sources (Adjusted for known errors)

10,916.692

Water Imported

16,495.213

System Input

27,411.905

Water Supplied

27,374.905

Authorized Consumption

25,551.784

Billed Authorized Consumption

25,482.310

Billed Metered Consumption (water exported is removed)

25,482.310

Billed Unmetered Consumption

0.000

Revenue Water

25,482.310

Unbilled Authorized Consumption

69.474

Unbilled Metered Consumption

1.037

Unbilled Unmetered Consumption

68.437

Non-Revenue Water (NRW)

1,892.595

Water Losses

1,823.121

Apparent Losses

260.200

Unauthorized Consumption

68.437

Customer Metering Inaccuracies

128.057

Systematic Data Handling Errors

63.706

Real Losses

1,562.921

Leakage on Transmission and/or Distribution Mains

Not broken down

Leakage and Overflows at Utility's Storage Tanks

Not broken down

Leakage on Service Connections

Not broken down

AWWA Free Water Audit Software:
Dashboard

WAS v5.0

American Water Works Association.

The graphic below is a visual representation of the Water Balance with bar heights propotional to the volume of the audit components

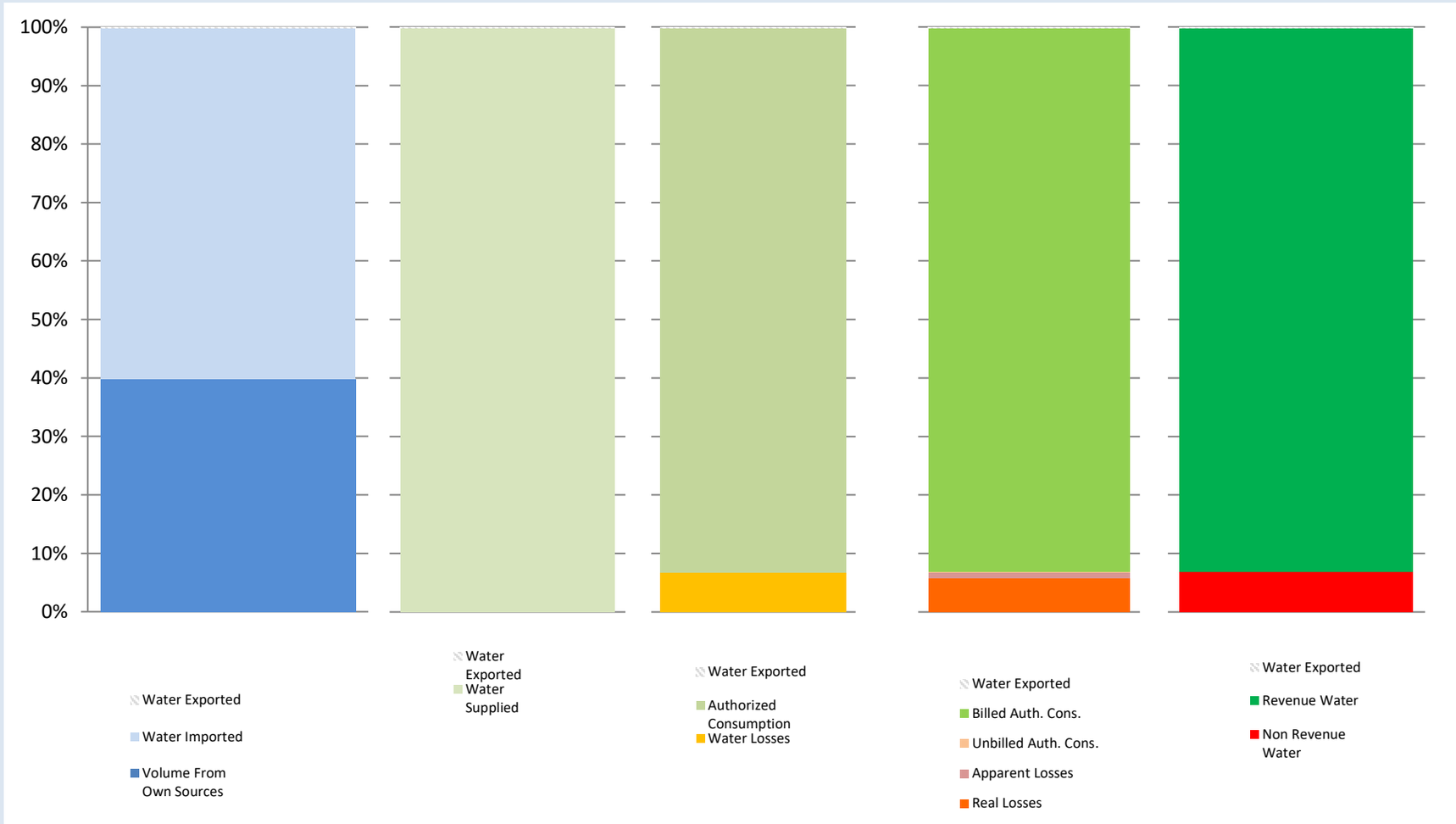
Water Audit Report for: **Valencia Water Company**

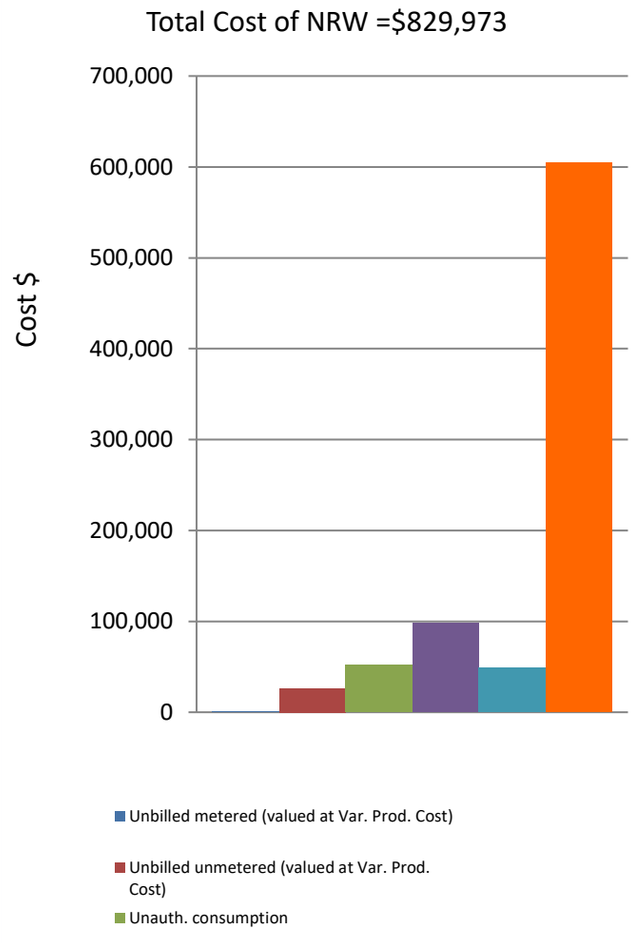
Reporting Year: **2018** **7/2018 - 6/2019**

Data Validity Score: **65**

Show me the VOLUME of Non-Revenue Water

Show me the COST of Non-Revenue Water





AWWA Free Water Audit Software v5.0

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Auditors are strongly encouraged to refer to the most current edition of AWWA M36 Manual for Water Audits for detailed guidance on the water auditing process and targetting loss reduction levels

The spreadsheet contains several separate worksheets. Sheets can be accessed using the tabs towards the bottom of the screen, or by clicking the buttons below.

Please begin by providing the following information

Name of Contact Person:	Matthew S. Dickens/Chavon Halushka	
Email Address:	mdickens@scvwa.org/chalushka@scvwa.org	
Telephone | Ext.:	661-705-7913	113
Name of City / Utility:	Santa Clarita Valley Water Agency - Valencia Water Division	
City/Town/Municipality:	Santa Clarita	
State / Province:	California (CA)	
Country:	USA	
Year:	2019	Financial Year
Start Date:	07/2019	Enter MM/YYYY numeric format
End Date:	06/2020	Enter MM/YYYY numeric format
Audit Preparation Date:	9/3/2020	
Volume Reporting Units:	Acre-feet	
PWSID / Other ID:	1910240	

The following guidance will help you complete the Audit

All audit data are entered on the ***Reporting Worksheet***

- Value can be entered by user
- Value calculated based on input data
- These cells contain recommended default values

Use of Option (Radio) Buttons: Pcnt: 0.25% Value:

Select the default percentage by choosing the option button on the left

To enter a value, choose this button and enter a value in the cell

The following worksheets are available by clicking the buttons below or selecting the tabs along the bottom of the page

Instructions
The current sheet. Enter contact information and basic audit details (year, units etc)

Reporting Worksheet
Enter the required data on this worksheet to calculate the water balance and data grading

Comments
Enter comments to explain how values were calculated or to document data sources

Performance Indicators
Review the performance indicators to evaluate the results of the audit

Water Balance
The values entered in the Reporting Worksheet are used to populate the Water Balance

Dashboard
A graphical summary of the water balance and Non-Revenue Water components

Grading Matrix
Presents the possible grading options for each input component of the audit

Service Connection Diagram
Diagrams depicting possible customer service connection line configurations

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Use this sheet to understand the terms used in the audit process

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Use this sheet to interpret the results of the audit validity score and performance indicators

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Acknowledgements
Acknowledgements for the AWWA Free Water Audit Software v5.0

If you have questions or comments regarding the software please contact us via email at: wlc@awwa.org

AWWA Free Water Audit Software:
Reporting Worksheet

WAS v5.0

American Water Works Association

? Click to access definition
+ Click to add a comment

Water Audit Report for: Santa Clarita Valley Water Agency - Valencia Water Division (1910240)
Reporting Year: 2019 (7/2019 - 6/2020)

Please enter data in the white cells below. Where available, metered values should be used; if metered values are unavailable please estimate a value. Indicate your confidence in the accuracy of the input

All volumes to be entered as: ACRE-FEET PER YEAR

To select the correct data grading for each input, determine the highest grade where the utility meets or exceeds all criteria for that grade and <---------- Enter grading in column 'E' and 'J' ----------> Master Meter and Supply Error Adjustments

WATER SUPPLIED

					Pcnt:	Value:	
Volume from own sources:	5	7,555.050	acre-ft/yr	3	-1.69%		acre-ft/yr
Water imported:	5	19,692.650	acre-ft/yr	1	-1.82%		acre-ft/yr
Water exported:	5	0.000	acre-ft/yr				acre-ft/yr

Enter negative % or value for under-registration
Enter positive % or value for over-registration

WATER SUPPLIED: 27,742.625 acre-ft/yr

AUTHORIZED CONSUMPTION

Click here: ? for help using option buttons

				Pcnt:	Value:	
Billed metered:	3	25,358.330	acre-ft/yr			
Billed unmetered:	3		acre-ft/yr			
Unbilled metered:	9	1.109	acre-ft/yr			
Unbilled unmetered:	5	69.357	acre-ft/yr		69.357	acre-ft/yr

Use buttons to select percentage of water supplied OR value

AUTHORIZED CONSUMPTION: 25,428.796 acre-ft/yr

WATER LOSSES (Water Supplied - Authorized Consumption) 2,313.830 acre-ft/yr

Apparent Losses

				Pcnt:	Value:	
Unauthorized consumption:		69.357	acre-ft/yr	0.25%		acre-ft/yr

Default option selected for unauthorized consumption - a grading of 5 is applied but not displayed

Customer metering inaccuracies:	3	127.434	acre-ft/yr	0.50%		acre-ft/yr
Systematic data handling errors:		63.396	acre-ft/yr	0.25%		acre-ft/yr

Default option selected for Systematic data handling errors - a grading of 5 is applied but not displayed

Apparent Losses: 260.187 acre-ft/yr

Real Losses (Current Annual Real Losses or CARL)

Real Losses = Water Losses - Apparent Losses: 2,053.643 acre-ft/yr

WATER LOSSES: 2,313.830 acre-ft/yr

NON-REVENUE WATER

NON-REVENUE WATER: 2,384.295 acre-ft/yr

= Water Losses + Unbilled Metered + Unbilled Unmetered

SYSTEM DATA

Length of mains:	10	362.5	miles
Number of active AND inactive service connections:	10	31,911	
Service connection density:		88	conn./mile main

Are customer meters typically located at the curbstop or property line? Yes

Average length of customer service line: (length of service line, beyond the property boundary, that is the responsibility of the utility)

Average length of customer service line has been set to zero and a data grading score of 10 has been applied

Average operating pressure:	7	103.0	psi

COST DATA

Total annual cost of operating water system:	10	$21,931,111	$/Year	
Customer retail unit cost (applied to Apparent Losses):	9	$1.81	$/100 cubic feet (ccf)	
Variable production cost (applied to Real Losses):	5	$475.72	$/acre-ft	☐ Use Customer Retail Unit Cost to value real

WATER AUDIT DATA VALIDITY SCORE:

*** YOUR SCORE IS: 58 out of 100 ***

A weighted scale for the components of consumption and water loss is included in the calculation of the Water Audit Data Validity Score

PRIORITY AREAS FOR ATTENTION:

Based on the information provided, audit accuracy can be improved by addressing the following components:

1: Water imported
2: Billed metered
3: Customer metering inaccuracies

AWWA Free Water Audit Software:
System Attributes and Performance Indicators

WAS v5.0
American Water Works Association.

Water Audit Report for: Santa Clarita Valley Water Agency - Valencia Water Division (1910240)
Reporting Year: 2019 | 7/2019 - 6/2020

*** YOUR WATER AUDIT DATA VALIDITY SCORE IS: 58 out of 100 ***

System Attributes:

	Apparent Losses:	260.187	acre-ft/yr
+	Real Losses:	2,053.643	acre-ft/yr
=	Water Losses:	2,313.830	acre-ft/yr
	Unavoidable Annual Real Losses (UARL):	778.55	acre-ft/yr
	Annual cost of Apparent Losses:	$205,027	
	Annual cost of Real Losses:	$976,959	Valued at Variable Production Cost

Return to Reporting Worksheet to change this assumpiton

Performance Indicators:

Financial:	Non-revenue water as percent by volume of Water Supplied:	8.6%	
	Non-revenue water as percent by cost of operating system:	5.5%	Real Losses valued at Variable Production Cost
Operational Efficiency:	Apparent Losses per service connection per day:	7.28	gallons/connection/day
	Real Losses per service connection per day:	57.45	gallons/connection/day
	Real Losses per length of main per day*:	N/A	
	Real Losses per service connection per day per psi pressure:	0.56	gallons/connection/day/psi
	From Above, Real Losses = Current Annual Real Losses (CARL):	2,053.64	acre-feet/year
	Infrastructure Leakage Index (ILI) [CARL/UARL]:	2.64	

* This performance indicator applies for systems with a low service connection density of less than 32 service connections/mile of pipeline

AWWA Free Water Audit Software:
User Comments

WAS v5.0

American Water Works Association.

Use this worksheet to add comments or notes to explain how an input value was calculated, or to document the sources of the information used.

General Comment:	

Audit Item	Comment
Volume from own sources:	See SCV Water Production Fiscal Year 2019-2020 (Tab VWD-2019-2020)
Vol. from own sources: Master meter error adjustment:	See SCV Water Production Fiscal Year 2019-2020 (Tab VWD-2019-2020). Refer to (For Groundwater subtract Well 159 and 160 VGC) See Cell N61
Water imported:	See SCV Water Production Fiscal Year 2019-2020 (Tab VWD-2019-2020)
Water imported: master meter error adjustment:	Grading score based on CLWA data provided in the December 1, 2015 (2:00pm) email.
Water exported:	See SCV Water Production Fiscal Year 2019-2020 (Tab VWD-2019-2020)
Water exported: master meter error adjustment:	
Billed metered:	See Val_Newhall24YEserconnusageclassmtr063020 (Non-Affiliated column)
Billed unmetered:	Includes Jumpers and Tail Pieces for accounts that are active and waiting for physical/permanent meter. See Val_Newhall24YEserconnusageclassmtr063020 (Non-Affiliated column, Non-Metered Construction (Valencia had none for FY 19/20))
Unbilled metered:	Refer to Valencia Metered Unbilled_2020
Unbilled unmetered:	
Unauthorized consumption:	
Customer metering inaccuracies:	
Systematic data handling errors:	
Length of mains:	2020 Mainline Mi_Op Pressure
Number of active AND inactive service connections:	Source document- See page 12, Report #24 (Val_Newhall24YEserconnusageclassmtr063020) Non-Affiliated Active and Vacant Accounts.
Average length of customer service line:	VWC does not provide water service past the curb stop.
Average operating pressure:	Refer to 2020 Mainline Mi_Op Pressure
Total annual cost of operating water system:	RE: 2019 Water Loss Audit & Validation - Valencia Division
Customer retail unit cost (applied to Apparent Losses):	Refer to Valencia _Cost-of-Service-Study-9-27-FINAL-rev (pg 36)
Variable production cost (applied to Real Losses):	See Matthew Dickens - 20201113 Variable Production Cost Calculator

AWWA Free Water Audit Software: Water Balance

American Water Works

Water Audit Report for:	Santa Clarita Valley Water Agency - Valencia Water Division (1910240)
Reporting Year:	2019 — 7/2019 - 6/2020
Data Validity Score:	58

Water Exported
0.000

Billed Water Exported

Revenue Water
0.000

Own Sources
(Adjusted for known errors)
7,684.925

Water Imported
20,057.700

System Input
27,742.625

Water Supplied
27,742.625

Authorized Consumption
25,428.796

Billed Authorized Consumption
25,358.330

Billed Metered Consumption (water exported is removed)
25,358.330

Billed Unmetered Consumption
0.000

Revenue Water
25,358.330

Unbilled Authorized Consumption
70.466

Unbilled Metered Consumption
1.109

Unbilled Unmetered Consumption
69.357

Non-Revenue Water (NRW)
2,384.295

Water Losses
2,313.830

Apparent Losses
260.187

Unauthorized Consumption
69.357

Customer Metering Inaccuracies
127.434

Systematic Data Handling Errors
63.396

Real Losses
2,053.643

Leakage on Transmission and/or Distribution Mains
Not broken down

Leakage and Overflows at Utility's Storage Tanks
Not broken down

Leakage on Service Connections
Not broken down

AWWA Free Water Audit Software:
Dashboard

WAS v5.0

American Water Works Association.

The graphic below is a visual representation of the Water Balance with bar heights propotional to the volume of the audit components

Water Audit Report for: **Santa Clarita Valley Water Agency - Valencia Water Division (1910240)**

Reporting Year: **2019** **7/2019 - 6/2020**

Data Validity Score: **58**

○ Show me the VOLUME of Non-Revenue Water

◉ Show me the COST of Non-Revenue Water