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ECCV Water Conservation Plan 2025

Contents

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The East Cherry Creek Valley Water and Sanitation District (ECCV) provided in-kind services and all of the District data for this project. In addition to the Board of Directors, current staff that provided in-kind services include: Dave Kaunisto, Rick Clark, Gabriel Thomas, Laura Coutu, Lauren Florman, and Rebecca Bellamy.

Section 1: Introduction

1.1: Purpose

The East Cherry Creek Valley Water & Sanitation District (ECCV) has been proactive in promoting water conservation and efficiency and has implemented ongoing water conservation, public education, residential customer rebate, and non-potable irrigation system programs. In response to the State requirements for water conservation planning, coupled with new developments in the field of water conservation, ECCV has updated its 2018 Water Conservation Master Plan with this 2025 Water Conservation Master Plan (the Plan). The development of this Plan has been funded in part by a grant from the Colorado Water Conservation Board.

The purposes of the Plan are to:

1. Assess the overall characteristics of current and future ECCV water use.
2. Summarize the current status of raw water supply and treatment capacity.
3. Use this information to frame ECCV's water conservation and efficiency program with respect to current and ongoing water supply needs and water demand management.
4. Provide a detailed assessment related to the identification and selection of future water conservation and efficiency measures and programs that ECCV may choose to implement.

Throughout its history, ECCV has provided safe, reliable, potable water to its residential, commercial, irrigation, and institutional water users. ECCV is committed to sustainable and efficient use of its water resources and uses an integrated water resources planning approach by implementing and integrating both water supply additions and water conservation measures to manage demands. In response to the sustainability commitment, ECCV has developed a renewable water rights portfolio. Although it has made a major effort to develop significant renewable water supplies, ECCV is aware of the need to evaluate and refine its water supply and demand management efforts in light of advancing technologies and program innovations. Water conservation technology has improved to the point that water use efficiency can be planned and implemented more reliably and predictably than at any time in the past.

This Plan recommends water conservation and efficiency measures and programs that will continue to promote, support, and sustain efficient water use by ECCV's residential, commercial, irrigation, and institutional customers. The Plan identifies the various stages of water conservation and efficiency for the next seven years and has been prepared in adherence with state statutory requirements.

1.2: Organization

This Plan was prepared following the six steps outlined in the Colorado Water Conservation Board (CWCB) Municipal Water Efficiency Plan Guidance Document (2012) as well as a seventh step to address the Best Practices for Implementing Water Conservation and Demand Management Through Land Use Planning Efforts Addendum to 2012 Guidance Document (2019). The seven steps are as follows:

1. Profile of Existing Water System

2. Profile of Water Demands and Historical Demand Management
3. Integrated Planning and Water Efficiency Benefits and Goals
4. Best Practices for Implementing Water Conservation & Demand Management Through Land Use Planning Efforts
5. Selection of Water Efficiency Activities
6. Implementation and Monitoring Plan
7. Adoption of New Policy, Public Review, and Formal Approval

Each step of the planning process is incorporated in the Plan, noting that Step 6 will occur only after the Plan has been accepted, approved, and implemented.

The Plan is organized as follows:

1. Introduction
2. Profile of existing system and proposed facilities
3. Historical and current water use
4. Land use planning
5. Existing conservation efforts
6. Identification and screening of proposed conservation measures
7. Demand forecasts with different conservation programs
8. Impacts of conservation programs
9. Implementation and Monitoring Plan

Although the Plan is organized differently than the CWCB Water Conservation Planning Guidance Document, each of the seven steps has been incorporated into the Plan.

Section 2: Profile of Existing System and Proposed Facilities

2.1: District Formation

The East Cherry Creek Valley Water & Sanitation District, hereto referred as ECCV, is a quasi-municipal corporation and a political subdivision of the State of Colorado. ECCV was created pursuant to Article 1 of Title 32 C.R.S. for the purpose of providing a complete water supply system, complete sanitary sewer system, and a regional storm drainage system for the inhabitants of ECCV. ECCV was formed in 1962.

2.2: Geography, History of Area, and Demographics

ECCV encompasses approximately 8,725 acres located in unincorporated Arapahoe County and the City of Centennial. It is located approximately 11 miles southeast of downtown Denver, Colorado and immediately south of the City of Aurora, Colorado. ECCV's service area includes both urban and rural areas of four ZIP codes. Census and demographic tracking by ZIP code is problematic because the ECCV service area covers portions, but not the entirety, of multiple ZIP codes. ECCV's service area is highlighted in blue in Figure 2-1.

ECCV is located along the historic Smoky Hill Trail. As noted in the description below, the geographic area of ECCV is characterized by dry streams and a lack of surface water. The portion of the Smoky Hill Trail through ECCV was initially known as the Middle Smoky Hill and later Starvation Trail.

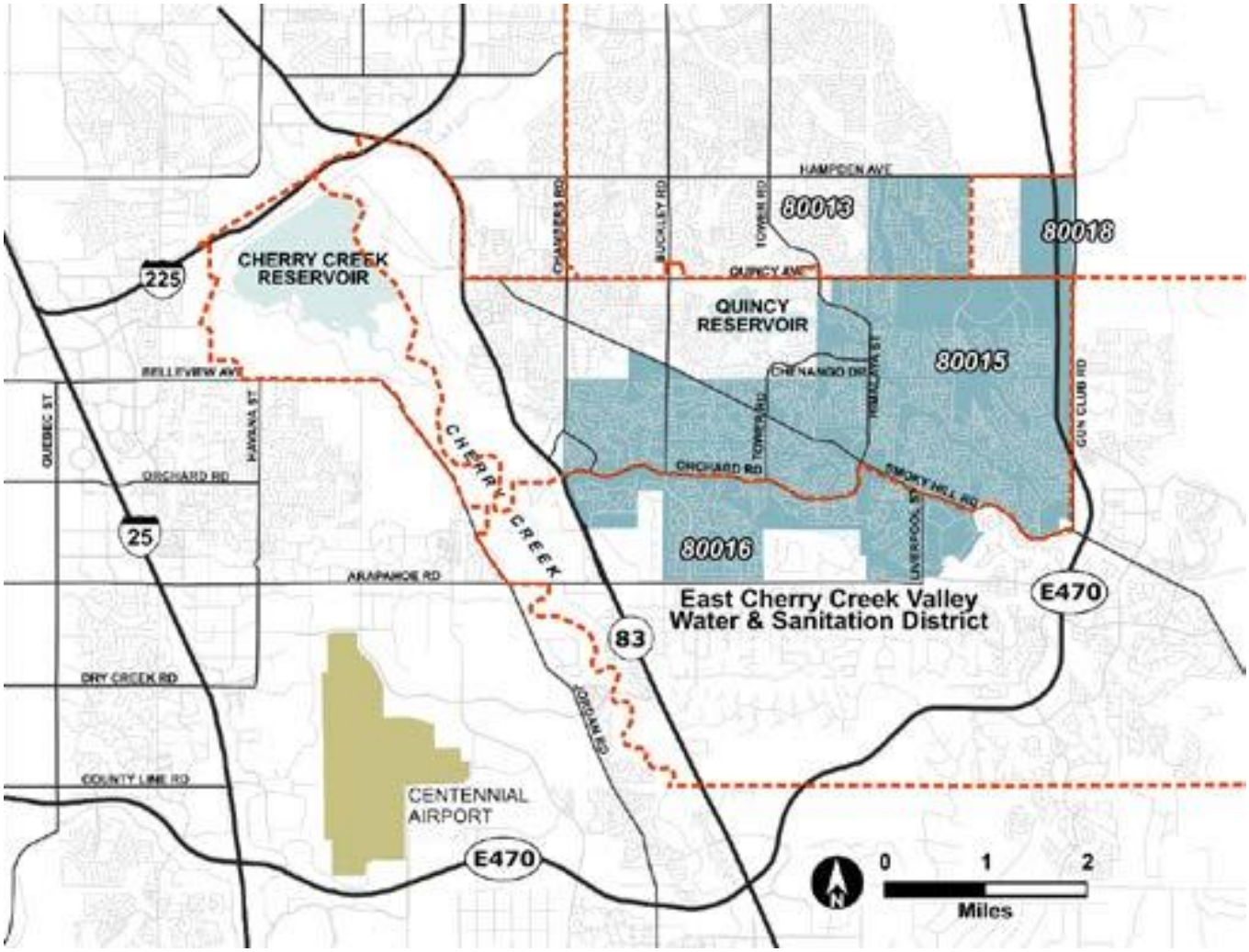

Figure 2-1. Location of East Cherry Creek Valley Water & Sanitation District Service Area

2.3: Historical Water System Development

ECCV is located in an area of limited and unreliable surface water supplies. The South Platte River is located many miles to the west and, at the time of District formation, ECCV did not have the financial resources to develop the water rights and infrastructure necessary to divert, store, convey, and treat surface water supplies from the South Platte. Local streams in the vicinity of ECCV have intermittent flow and are unreliable for meeting the primary water supply needs of a water district such as ECCV. As a result, at the time of District formation, water supply development initially focused on nontributary groundwater. Nontributary groundwater supplies in the Denver Basin formation were readily available, drought resistant, could be developed incrementally at a relatively low cost, and needed minimal treatment. ECCV's goal was to eventually develop renewable water supplies to supplement their existing nontributary groundwater supplies.

There was only minor growth in the District from its inception in 1962 through 1976. Growth during those years was annexed into and provided water service by the City of Aurora. Major development commenced in 1977. Figure 2-2 shows the estimated ECCV population for 1981–2024. This data was estimated using a 3.18 person estimate per single family equivalent, at 92% occupancy. Population in 1981 was approximately 3,110 and has steadily increased to an estimated population of approximately 65,614 in 2024. Growth rates in the early 1980s were as high as 41%. Since 1981, growth has averaged 7.8 percent per year.

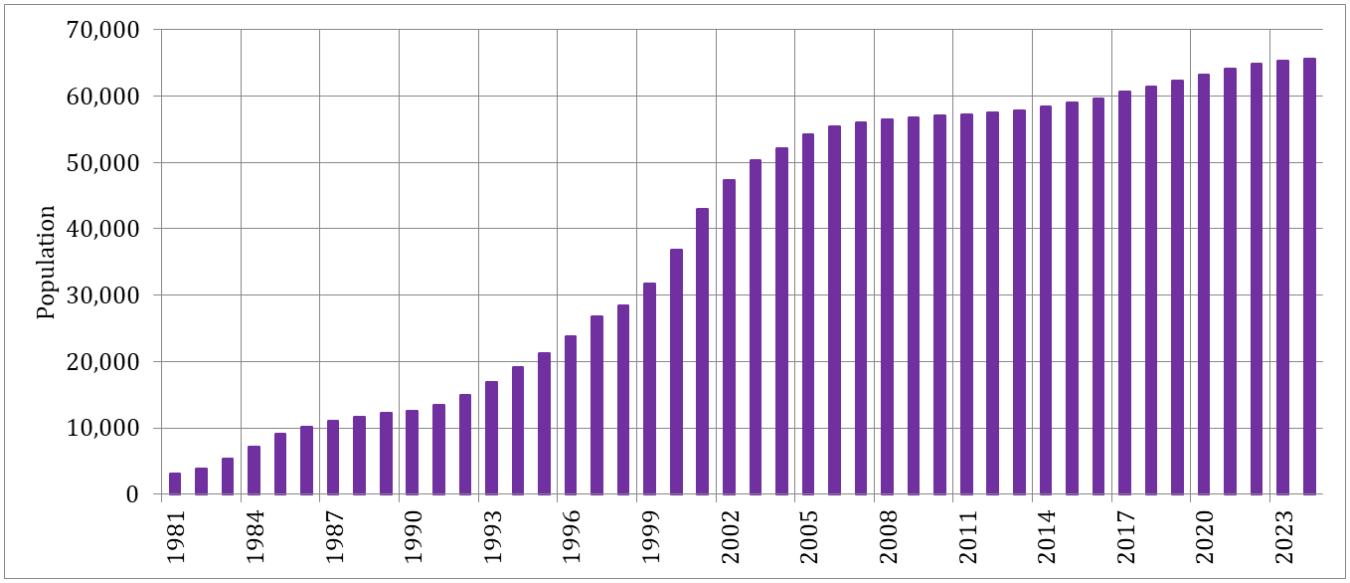

Figure 2-2. ECCV Estimated Residential Population 1981–2024

2.3.1: Nontributary Groundwater

ECCV's existing nontributary groundwater supplies are derived from wells drilled in the Denver groundwater Basin. The Denver Basin formations underlying ECCV's service area include the Dawson, Denver, Arapahoe, and Laramie-Fox Hills formations. Figure 2-3 shows a cross-section of the Denver Basin aquifer formations.

The initial groundwater development to meet ECCV's water demands occurred within the District boundaries. Wells were drilled incrementally as development occurred. The nontributary groundwater supplies developed by ECCV require minimal treatment; therefore, ECCV does not have a central water treatment facility for treating its nontributary groundwater. Treatment to meet regulatory requirements for disinfection is completed at all sources prior to entry into the distribution system. Table 2-1 provides information on the location and aquifer source of ECCV's existing 74 nontributary groundwater wells that are operational.

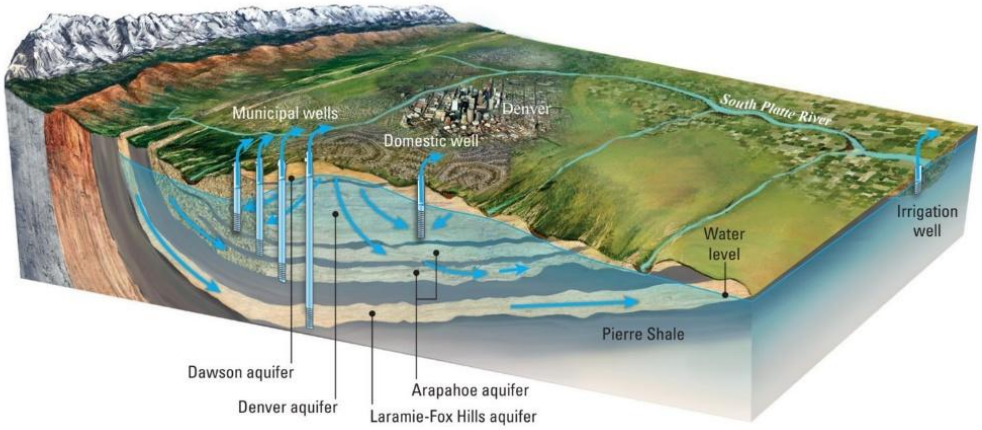

Figure 2-3. Conceptual Block Diagram Denver Basin Aquifer West-East Cross Section

ECCV's long-range water supply planning recognized that future renewable supply sources would be required to complement the existing nontributary sources and provide for long-term sustainability through aquifer storage and recovery or the development of additional renewable water supplies. As the search for renewable supplies continued, increasing water demands were met in the interim by drilling additional Denver Basin aquifer wells. Over time, the new wells did not meet the anticipated yields as a result of a number of factors. The Laramie-Fox Hills wells experienced poor water quality. Some wells have been decommissioned due to equipment failures or surrounding residential development. Denver Basin supplies have become less reliable following the Colorado Supreme Court's decision in *Parker Water & Sanitation District v. Rein*, 2024 CO 71, 559 P.3d 217, which limits wells to a 100-year pumping volume.

Table 2-1. ECCV Nontributary Groundwater Supplies

Number of Wells in Each Aquifer			
Location	**Arapahoe**	**Laramie-Fox Hills**	**Total**
In-District	32	27	59
Western System	13	2	15
Total	45	29	74

2.3.2: Two Forks Reservoir Project

The first major attempt by ECCV to develop renewable water supplies was through participation in the Denver Water Board's Two Forks Reservoir Project and System-wide Environmental Impact Statement (EIS). Two Forks Reservoir was a planned 1,100,000 acre-feet (AF) reservoir that would store water from the Colorado and South Platte River basins and provide over 100,000 AF per year of firm yield to Denver and its suburban participants.

ECCV was one of the largest suburban participants in this project. ECCV's 6.05 percent participation in the Two Forks Reservoir would provide approximately 4,840 AF firm yield of renewable water supplies. The federal environmental permitting process commenced in 1982 with the suburban participants funding 80 percent of the cost of the EIS and other costs such as Denver Water Department staff time. After six years of environmental studies and over $40 million in expenditures by Denver Water Department and its suburban participants, the Army Corps of Engineers issued a final EIS and authorized a 404 permit for the construction of Two Forks Reservoir. The Environmental Protection Agency (EPA) vetoed the Two Forks Reservoir Project permit in 1989. The veto of the permit was not appealed by the Denver Water Board. As a result, ECCV was forced to seek other sources of renewable water and commenced a 15-year search for reliable sources of renewable water. ECCV began a permanent lease of 771 acre-feet per year (AFY) from Denver Water to compensate for the cancelled Two Forks Reservoir Project.

2.3.3: State Board of Land Commissioners Wells

ECCV entered into an agreement with OAR, Inc., the predecessor to the Rangeview Metropolitan District (Rangeview), in 1983 for the lease and development of Denver Basin groundwater on nearby State Board of Land Commissioners (SBLC) Lowry Range land leased by OAR. In order to delay the need for immediate development of the SBLC wells, ECCV entered into a temporary water trade agreement with the City of Aurora. Pumping of groundwater from the SBLC wells eventually started in 1996 and was used by ECCV to provide water to the City of Aurora under the terms of the water trade agreement in exchange for water delivered from Aurora to ECCV. A total of eight wells were developed pursuant to this agreement, and ECCV built a pipeline from the SBLC wells to the ECCV treated water storage tanks on Smoky Hill Road to deliver groundwater pumped from those wells to ECCV when the wells were not being used to deliver water to Aurora.

These wells did not produce the desired yield to ECCV. This supply was intended to provide an interim water supply while long-term renewable water supplies were developed. In 2012, ECCV entered into a lease arrangement with Rangeview that, for the remainder of the original lease terms through 2032, this system would be leased back to Rangeview. As a result, this supply is no longer available to ECCV.

2.3.4: Western Project

In 1999, ECCV entered into an agreement with the Willows Water District for the acquisition of the Willows nontributary groundwater system. This system is located near C-470 and Quebec outside and west of ECCV boundaries. The acquisition of the Willows system and construction of pumping and transmission facilities (the Western Project) provides additional potable water deliveries to ECCV to meet average and peak demands while ECCV continues to develop long-term renewable water supplies. The Western Project also provides valuable long-term drought protection backup to future renewable supplies as well as a potential Aquifer Storage and Recovery (ASR) system that ECCV and potentially other South Metro water providers can use in the future to better manage water supplies in the Denver Basin aquifers. The acquisition of the Willows system was possible as the result of Willows entering into a treated water agreement with the Denver Water Board for service from Denver. The ECCV-Willows agreement was contingent on the Water Court approval of the transfer of the Willows nontributary groundwater rights. The Water Court approval was concluded in 2001 and ECCV received title to the Willows facilities.

ECCV constructed a 48–54 inch pipeline along a 14-mile alignment that follows C-470 and E-470 from Quebec Street to its storage tanks on Smoky Hill Road to deliver the groundwater from the Western wells to ECCV. The Western Water Project began delivering water to ECCV in May 2003. The Western Project represents a potential maximum of 2,719 AFY of nontributary groundwater supplies. The Western Booster Pump Station (WBPS) has a capacity of 14 MGD, but sustainable peak deliveries from this well field over an entire irrigation season without recharge are estimated at approximately 5 MGD. This supply was intended to provide an interim water supply while long-term renewable water supplies were developed through the Northern Water Supply Project.

In 2014, ECCV entered into an agreement with a consortium, including the Denver Water Board and the South Metro WISE Authority, which conveyed the Western Pipeline to these entities. ECCV has reserved 8 MGD capacity that will allow its continued use of the Western line. ECCV retains ownership of the wells and the WBPS.

The Quebec Street Water Treatment Plant was designed and constructed as part of the South Metro WISE project, wherein the South Metro WISE consortium purchased the Western Pipeline from ECCV. In order to achieve the water quality desired by South Metro WISE, an iron removal facility was constructed by the consortium.

The facility consists of six mixed media pressure filters with a nominal capacity of 6 MGD, with the capability to bypass a portion of the flows during high-demand periods. Iron filtration replaced orthophosphate sequestration of iron, as many of the South Metro WISE are within the Cherry Creek Basin and strict phosphate limits apply to their systems. The facility also provides chloramine disinfection to the water, replacing a free chlorine disinfection that was formerly applied. The facility is jointly owned by ECCV, Denver, and South Metro WISE; the facility is operated under contract by ECCV.

Water produced at the facility is introduced into the western end of the Western Pipeline, along with some purchased water from Denver Water. The total meter volume of water in at the western end of the line is matched by an equal volume of water drawn out of the pipeline's eastern end at the ECCV Zone 2 connection to the WISE system.

2.3.5: Non-potable Irrigation System

As part of ECCV's overall water management and conservation program, in 2004 the District implemented a non-potable irrigation system. The ECCV non-potable irrigation system pumps tributary groundwater from the Piney Creek alluvium. The non-potable system provides an additional water supply that is derived from the reuse of ECCV potable deliveries via the capture of lawn irrigation return flows (LIRFs) from ECCV customers. These LIRFs return to the Piney Creek/Cherry Creek alluvium. The accounting for ECCV's LIRFs was decreed by Division 1 Water Court in Case No. 88CW054. As the ECCV wells have relatively junior water right priorities and are rarely in priority to pump, some of ECCV's out-of-priority alluvial well pumping is replaced (augmented) by the use of the ECCV LIRFs. The ECCV accounting for its replacement of out-of-priority well pumping for its non-potable system is now coordinated as part of the Upper Cherry Creek Water Association (UCCWA) augmentation plan (Case No. 01CW284). The other members of UCCWA are the City of Aurora, Arapahoe County Water and Wastewater Authority, Cottonwood Water and Sanitation District, and Colorado State Parks.

The ECCV non-potable system delivers disinfected treated non-potable water to large irrigation customers in the southwest portion of ECCV. The system consists of three alluvial wells, a chlorination station, and a 2.3 MGD storage tank. The system currently supplies approximately 350 AFY of water. The use of the LIRFs represents a reuse of a scarce resource and reduces the demand for potable water supplies, including pumping of nonrenewable Denver Basin groundwater supplies.

ECCV is using its non-potable system to the fullest legal extent. At times when ECCV did not have sufficient LIRFs to meet its non-potable needs, it used LIRFs from the Upper Cherry Creek Water Users Association (UCCWUA), to which it belongs. Recently, ECCV also supplemented the non-potable system with up to 10 MG diverted from the potable system at the end of the season. This is an indication that ECCV is maximizing the amount of non-potable water delivered to its customers and at times must supplement the non-potable system with potable supplies when there is a lack of non-potable water. In 2017, ECCV added additional LIRF water in Case No. 12CW220. With the additional LIRF water, ECCV will reduce its use of UCCWUA LIRFs and reduce the use of potable water to supplement the non-potable system.

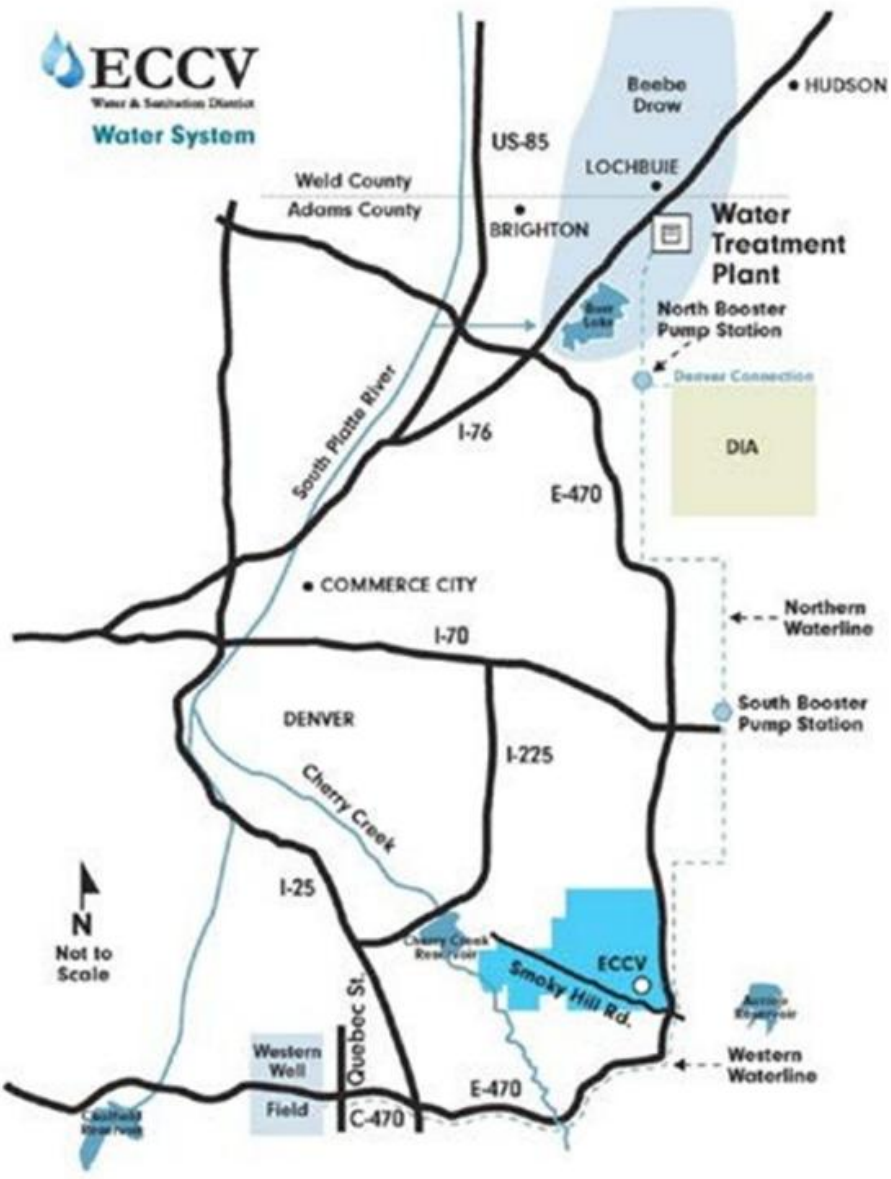

Figure 2-4. ECCV Northern Water Supply Project Facilities

2.3.6: Northern Water Supply Project

ECCV is developing renewable surface water supplies through its Northern Water Supply Project, a multi-phase project to deliver surface water from the South Platte River to ECCV and reduce the reliance on Denver Basin nontributary groundwater. ECCV initiated the planning of the Northern Water Supply Project in 2003 to provide a renewable surface water source that diversifies the resources of ECCV's water supply system, offering a reliable and sustainable water supply for ECCV's customers. This project was developed in cooperation with United Water and Sanitation District and the Farmers Reservoir and Irrigation Company.

Phase I of the Northern Water Supply Project, known as H2'06, was completed in 2006 and included a contract for the eventual acquisition of approximately 6,200 AF of renewable surface water rights; the construction of six wells in the Beebe Draw alluvium approximately 2.5 miles downstream from Barr Lake; a 48 inch, 31-mile pipeline (Northern Pipeline); two pumping stations; and storage tanks to deliver potable water to ECCV, as shown in Figure 2.4. ECCV takes delivery of water pumped from the alluvial wells in the Beebe Draw and transports it to ECCV's storage tanks on the eastern edge of ECCV near Smoky Hill Road and E-470. At this location, water is blended with ECCV's other supplies and distributed to ECCV's customers. Water pumped from the Beebe Draw

under the Northern Water Supply Project is fully consumptive because it is augmented under the 404/442 Decree when depletions are out of priority.

Successful implementation of conservation measures delayed the need for ECCV to add water treatment capacity until 2012, at which time the Northern Project Water Treatment Plant (WTP) came on line and began delivering water. Water from Northern Project WTP replaced ECCV's temporary lease agreement with Denver for an additional 1,000 AFY, which ended in 2012.

ECCV began construction of the second phase of the Northern Water Supply Project in 2010 with completion in 2012. This phase included the construction of a 10 MGD nominal capacity reverse osmosis (RO) WTP and an additional six alluvial wells below Barr Lake. Thus far, the Northern Water Supply Project is able to treat and deliver 25 MGD. At total buildout capacity, major facilities and the Northern Pipeline components of the Northern Water Supply Project were sized to provide expansion to treat and deliver up to 47 MGD of high-quality water for a total of over 50,000 AF per year, in the future. ECCV's goal is to develop sufficient renewable supplies such that its reliance on nontributary supplies is minimal.

Nontributary groundwater would primarily function as a backup supply and to firm treated water deliveries to customers during drought periods, when renewable rights may be yielding less than projected. The sustainability of the nontributary groundwater as a backup supply will require the use of recharge of the Denver Basin aquifer, using renewable water sources, and employing ASR methods. The yield of ECCV's junior conditional surface water rights will be used to help ECCV achieve its renewable goals, understanding that the yield from the conditional rights will not be firm and yields may not be sustainable during extended droughts. Through ASR, the water diverted can be beneficially used and reduce reliance on nonrenewable resources. In addition, a portion of the annual water demand will be met by the non-potable irrigation system and Denver Water–treated water deliveries. Any remaining demand not met by the Northern Water Supply Project, non-potable irrigation, and Denver deliveries must be met from the in-district and Western nontributary wells.

The Northern Water Supply Project also delivers treated water to Arapahoe County Water and Wastewater Authority (ACWWA). ACWWA has other water supplies including in-district wells that are not delivered through the Northern Water Supply Project. Other potential deliveries from the Northern Water Supply Project system include members of the South Metro Water Supply Authority (SMWSA) that have acquired capacity in the Northern Pipeline but have not acquired capacity in the RO plant or the pump stations. Participating SMWSA members in the ECCV Northern Pipeline, in addition to ACWWA, include Highlands Ranch Water and Sanitation District, Cottonwood Water & Sanitation District, Inverness Water & Sanitation District, Stonegate Village Metropolitan District, and the Town of Castle Rock. These members must secure their own water supplies and treatment in order to use their capacity in the Northern Pipeline. Initially, ACWWA has acquired 2.25 MGD of capacity in the existing ECCV RO WTP and a total of 5.25 MGD of capacity in the ECCV Northern Pipeline. Mid-year 2020, the capacity of the WTP was increased to 20 MGD, with ACWWA's share being 5.25 MGD. In 2024 and 2025 a fifth train was included at the WTP, increasing the capacity to 25 MGD, with ACWWA's share remaining the same.

The Northern Water Supply Project system includes several storage reservoirs in the vicinity of the alluvial wells and along the South Platte and Cache la Poudre rivers. It also includes a portfolio of senior water rights in several ditch, reservoir, and canal companies throughout the South Platte Basin and junior water rights associated with the storage reservoirs. These water rights are used to augment pumping depletions from the Beebe Draw alluvial wells. ECCV is also currently expanding the Northern Water Supply Project pump stations and adding additional wells for supply.

2.3.7: Denver Water

In addition to nontributary groundwater and the renewable surface water supplies from the Northern Water Supply Project, ECCV has an agreement with Denver Water for 771 AFY of treated water. ECCV takes delivery of this water through a connection to its Northern Water Supply Project pipeline from Denver Water's system near Denver International Airport. Denver Water retains ownership of the return flows associated with deliveries to ECCV to the extent the water delivered by Denver is reusable.

ECCV and Denver Water have modified the agreement, allowing ECCV to take water at its Western connection, located at University and C-470. Water delivery began at that location on January 1, 2018 and is delivered seasonally based on Denver's needs. Water is also delivered into the WISE system. See Appendix A for more information on WISE system.

2.3.8: Reuse of ECCV Wastewater Return Flows

ECCV currently delivers approximately 4,000 AFY of wastewater to the Metro Wastewater Reclamation District (Metro) for treatment and discharge. This wastewater is currently delivered to Metro via the City of Aurora sewer interceptor system under a 1976 agreement that provides for some ability by Aurora to reuse the consumable portion of ECCV wastewater.

2.3.9: Timeline of ECCV Water System Development

Table 2-2 provides a timeline of the major ECCV water system development activities since the inception of the District in 1962.

Table 2-2. ECCV Water System Development Timeline

Year	Water System Activities/Milestones
1962	East Cherry Creek Valley Water and Sanitation District is formed.
1976	ECCV enters into an agreement with the City of Aurora for carriage of ECCV sewer flows to Metro Wastewater Reclamation District via the City of Aurora sewer system.
1977	Development in the District accelerates, and ECCV begins a program of annually drilling additional Denver basin wells to meet demands.
1982	ECCV and other suburban water providers enter into participation agreement with the Denver Water Board for Two Forks Project and System-wide Environmental Impact Statement.
1983	ECCV enters into an agreement with OAR, Inc. for the development of Denver basin wells on State Board of Land Commissioners Lowry Range lands. This lease lasts through 2032.
1989	After a total expenditure of over $40,000,000 by Denver Water Board and suburban providers, the Environmental Protection Agency vetoes the Two Forks Permit issued by the Army Corps of Engineers. Denver decides not to appeal the veto.
1998	ECCV identifies middle South Platte supplies as a potential water supply source and begins discussions with the Farmers Reservoir and Irrigation Company (FRICO), a Brighton based mutual ditch company, as a possible provider of renewable water.
1999	ECCV enters into an agreement with Willows Water District that provides the supply for the ECCV Western Project. The agreement provides for the acquisition, subject to water court approval, of the Willows non-tributary groundwater system.
2002-2003	Construction of the Western Project. Western Project commences delivery of water to ECCV in 2003.
2003	ECCV enters into an agreement with United Water and Sanitation District to acquire approximately 6,000 acre feet per year of South Platte surface water in Weld County and to develop the infrastructure to deliver it to a proposed ECCV water treatment plant located near Brighton. The project is termed the "Northern Water Supply Project."
2003 - 2004	ECCV develops a non-potable irrigation system based on renewable alluvial groundwater pumped from the Cherry Creek Alluvium.
2005-2006	Construction of Phase One of the Northern Water Supply Project – alluvial wells(Phase 1 Wells) and pump stations, DIA/Denver Connection at NBPS. Northern Water Supply Project Phase One begins delivering approximately 1,800 AF/year of renewable supply in July 2006.
2007	Construction of Northen Pipeline
2008	Design and permitting begins on Phase Two of the Northern Water Supply Project.
2010 - 2011	Construction and development of the current phase of the Northern Water Supply Project.
2011 - 2012	Phase II wells – six additional production alluvial wells
2010 - 2012	10 MGD RO water treatment plant, also includes HSPS and DI-1 injection well Upgrading NBPS & SBPS w/ 4th pumps at both. NWTP included 2 RO trains and UV systems.
2012	Lease of State Board of Land Commissioners wells to Rangeview for the remainder of the original OAR lease agreement.
2013	Deliveries of water to partner agency ACWWA began in July 2013. ACWWA demands are accounted for separately and are not included in this document.
2014	WISE Agreement executed including sale of Western line to South Metro WISE
2014	10CW306 case for additional five wells decreed.
2017	Design of Northern Plant, pump station expansion, and DI-2 begins
2018	Start of Northern Plant and Pump Station Expansion construction. Includes a second storage reservoir at each site.
2018 - 2019	Phase III production alluvial wells – five additional wells decreed in 2014
2020	Completion of construction of Northern Plant and Pump Station Expansion. Phase 2A (FKA Phase 2) for the NWTP completed which included two additional RO trains to increase firm production capacity. Phase 2 of NBPS & SBPS expansion completed.
2024 - 2025	Start of NWTP Phase 2B improvements – will include a 5th train, bi-furcation between southern wells and northern wells to better treat for Mn
2025	Start design and permitting DI-4

2.4.: Water Sources and Yields

The existing potential annual yield and peak day projection capability of the major treated water sources for ECCV are summarized in Table 2-3. In 2006, ECCV began the Northern Water Supply Project with the H2'06 project, which produced water from the Beebe Draw with the construction of six wells, the North & South Booster Pump Stations, and the 31-mile 48-inch pipeline to the District. These original six wells were blended with leased water from Denver to achieve an acceptable TDS. In 2012, ECCV brought on line the next portion of the Northern Water Supply Project, including construction of six additional wells and construction of advanced RO treatment with capacity of 10 MGD. This delivers high-quality renewable water at a peak flow rate of 7.8 MGD for use by ECCV customers and 2.2 MGD for use by ACWWA. An additional production of up to 0.7 MGD is achieved at the plant through a secondary recovery of RO reject water through a brine minimization process. Membrane cleaning and routine maintenance require the plant to operate at reduced capacity for a portion of each week. Routine net weekly deliveries are approximately at a rate of 4.25 to 12.25 MGD for the week.

ECCV has a permanent lease with Denver Water for 771 AFY of treated water. ECCV also has significant nontributary groundwater supplies that can meet a portion of ECCV's annual demand. These nontributary supplies are considered nonrenewable, and ECCV has estimated the production rates from its nontributary wells in the Arapahoe aquifer will decrease by 2.7 percent annually. In-district, use of the Laramie-Fox Hills wells was minimized once the Northern Plant came on line, but the wells are being maintained in their current condition as a measure to increase redundancy in the system. Production of In-District Laramie-Fox Hills wells in 2023 was 0.5 AF and in 2024 was 0 AF. In the Western System, the two Laramie-Fox Hills wells have continued to produce 250 AF over the past three years. ECCV is considering a project to connect the Laramie-Fox Hills wells to the non-potable system for supplemental irrigation. These nontributary supplies are not adequate to meet the current potable demands during the summer when outdoor use increases; nontributary supplies have decreased in importance as a source of supply to the ECCV system. As a result, ECCV will continue to develop additional facilities and renewable sources to meet future water demands and replace the current nontributary sources.

Table 2-3. Summary of Major Water Sources for ECCV

Water Supply Source	2024 Peak Day Capacity* (MGD)	Estimated Current Potential Annual Yield* (AFY)
In District non-tributary groundwater wells	6.3	7,500 (maximum with all wells operating)
Western System non-tributary groundwater wells	7.9	3,500 (maximum with all wells operating)
Northern Water Supply Project Phases I, II, and III	24.6	6,600
Denver Treated Water	3.2	771
Total	42	18,371

*The peak capacity reflects maximum short-term pumping capability and does not represent sustained year-round production. Based on anticipated operating schedules, system management practices, and seasonal demand variability, the wells may be capable of producing the stated potential annual yield, subject to operational limitations, aquifer conditions, and applicable regulatory requirements.

2.5: Ability to Serve

ECCV currently relies on wells from the Denver Basin aquifers for approximately 41 percent of its water supply. ECCV has 95 wells drilled; not all are currently operational. If all the wells currently in operation are pumped simultaneously, the wells would produce approximately 20 MGD. As shown in Table 2-3, the sustainable peak day production is estimated at 14.2 MGD. If all of the nontributary wells owned or under the control of ECCV were drilled, fully operating, connected to the system, and producing the decreed amount, the aggregate yield would be higher. However, the current ability of the system is much less.

ECCV has ongoing planning for the raw and treated water systems including water supply acquisitions, water rights applications, treatment plants, pump stations, storage tanks, and major distribution pipelines to serve ECCV. A summary of system conditions is shown in Table 2-4.

Table 2-4. ECCV Summary of System Conditions

Planning questions	Yes	No	Comments
Is the system in a designated critical water supply area?	X		The ECCV system resides above the Denver Basin Aquifer. Scientific evidence shows recent draw down on the aquifer. This region was identified in SWSI as a critical water supply area.
Does the system experience frequent shortages or supply emergencies?		X	
Does the system have substantial unaccounted-for and lost water?		X	
Is the system experiencing a high rate of population and/or growth?		X	
Is the system planning substantial improvements or additions?	X		ECCV is continuing the development of its Northern Water Supply Project with substantial expansions both to satisfy demand and to provide source water for the District's ASR project, if permitted.
Are increases to wastewater system capacity anticipated within the planning horizon?	X		Increases in capacity will be made to meet future growth. ECCV may pursue the right to reclaim some or all of its wastewater return flows. ECCV is working on a contract with Aurora to intercept wastewater flow, ECCV only deals with local collections.
Is there a need for additional drought reserves?	X		Consistent with the Colorado Water Plan, ECCV recognizes drought conditions can reduce available supply while simultaneously increasing municipal demand. To address this risk, ECCV will maintain drought reserve supplies as a component of overall system reliability during dry and critically dry conditions.
Are there drinking water quality issues?		X	
Is aging infrastructure in need of repair?		X	There are no significant projects needed at this time or significant repairs to infrastructure in the current planning horizon.
Are there issues with water pressure in portions of the distribution system?	X		ECCV is in the proccess of identifying pressure issues within its distribution system. There are no pressure issues related to supply. ECCV currently has a hydraulic model that is routinely updated to reflect the most current conditions and has not observed any pressure related issues.

Section 3: Current Water Use

3.1: Annual and Monthly Water Use by Customer Class

ECCV's customer base, as shown in Table 3-1, Figure 3-1, and Figure 3-2, consists primarily of single family residential accounts, with the remainder being school, commercial, and irrigation-only accounts. Single family residential represents 79 percent of total billed water use with potable irrigation the next largest user class at 8 percent. Non-potable irrigation use is 4 percent and commercial and commercial-irrigation use is also at 4 percent of total annual billed water usage, respectively. School use, including irrigation, makes up 3 percent, multi-family residential make up 1 percent, and fire hydrant use is 1 percent.

Table 3-1. Annual Water Use by Customer Class

General Class	2011-2024 Average (Kgal)	% of Total
Single Family Residential	2,098,492	79%
Multi-Family Residential	25,878	1%
Commercial	97,058	4%
School	87,315	3%
Irrigation (potable)	221,519	8%
Irrigation (non-potable)	97,476	4%
Fire Hydrant	14,469	1%
Total	2,642,208	100%

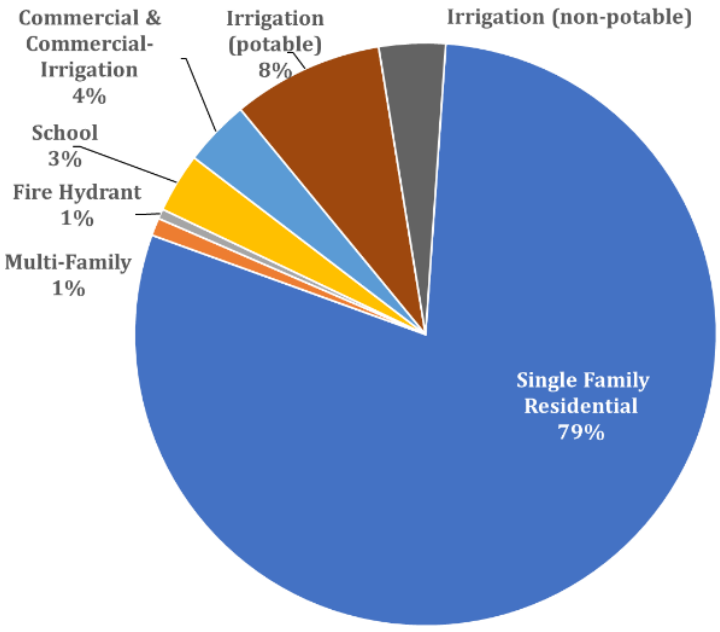

Figure 3-1. Percentage of Annual Water Use by Customer Class

The average monthly water usage is shown in Figure 3-2. During the summer, monthly use mirrors the average annual water usage with single family residential comprising the largest demand. During the winter months of November through March, when irrigation ceases, single family residential use reduces to half; commercial and school uses also greatly decline; and potable and non-potable irrigation uses are close to zero.

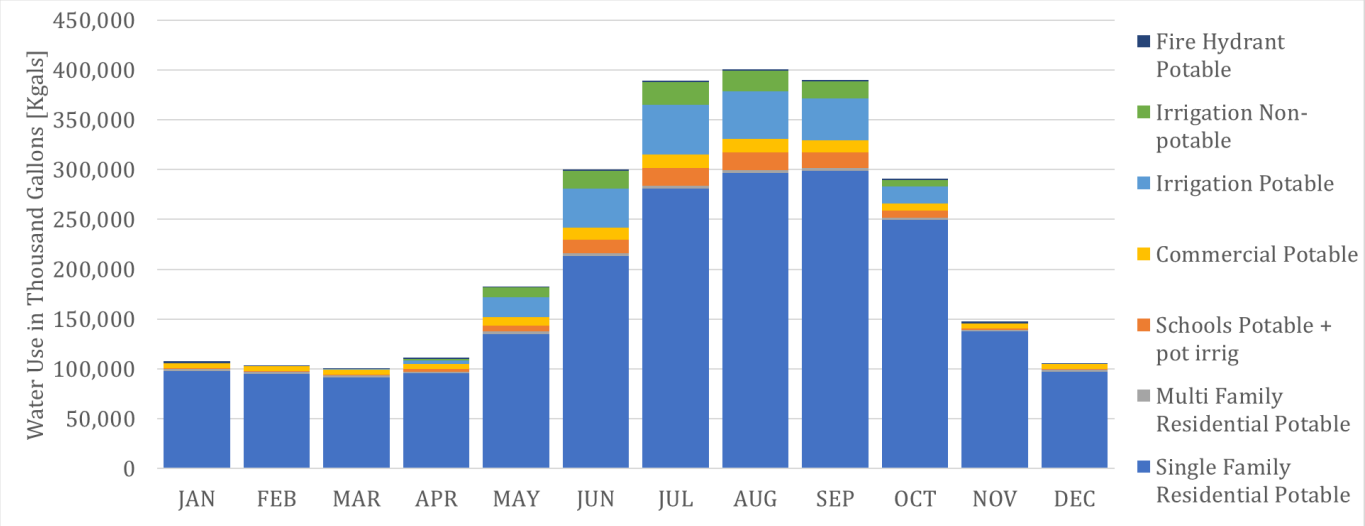

Figure 3-2. ECCV Only Average Monthly Water Use for 2013 to 2024 by Customer Class

3.2: Historical Water Demand

Total annual water production for 1981–2024 is shown in Figure 3-3. Non-potable water usage began in 2005 and is also included in the total water production shown in this figure. As seen in Figure 3-3, demand has increased an average of about 220 AF per year from approximately 600 AFY in 1981 to 11,000 AF per year of potable and non-potable demand in recent years.

Population in the District has grown significantly since 1981. ECCV tracks the number of water customers as single family equivalents (SFEs), which is the estimated water use for a 3/4'' water tap. Other water users that have larger water taps are converted to SFEs as shown in Table 3-2.

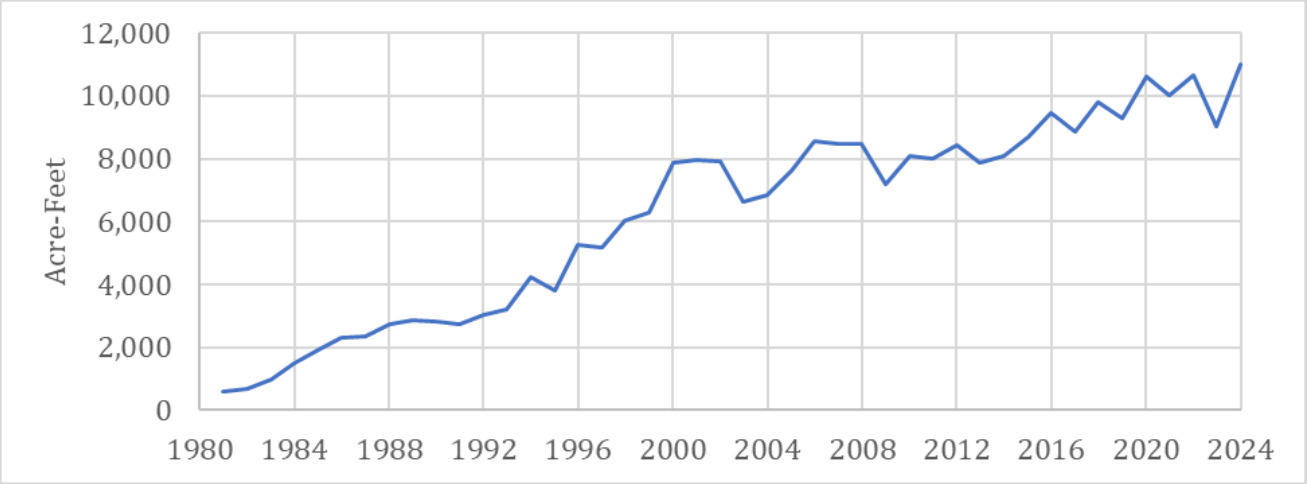

Figure 3-3. ECCV Total Annual Water Billed 1981–2024 (includes ACWWA and non-potable water)

Table 3-2. Single Family Equivalents by Tap Size

Tap Size (inches)	Single Family Equivalent
3/4	1
1	2
1.5	4
2	8
3	18
4	36

The growth of single family equivalents in ECCV is shown in Figure 3-4 as total SFEs in the ECCV system. Annual average water usage is also shown in the figure. The decrease in water usage after the 2002 drought can be seen in this figure. However, due to growth and climate conditions, water usage has rebounded to higher levels.

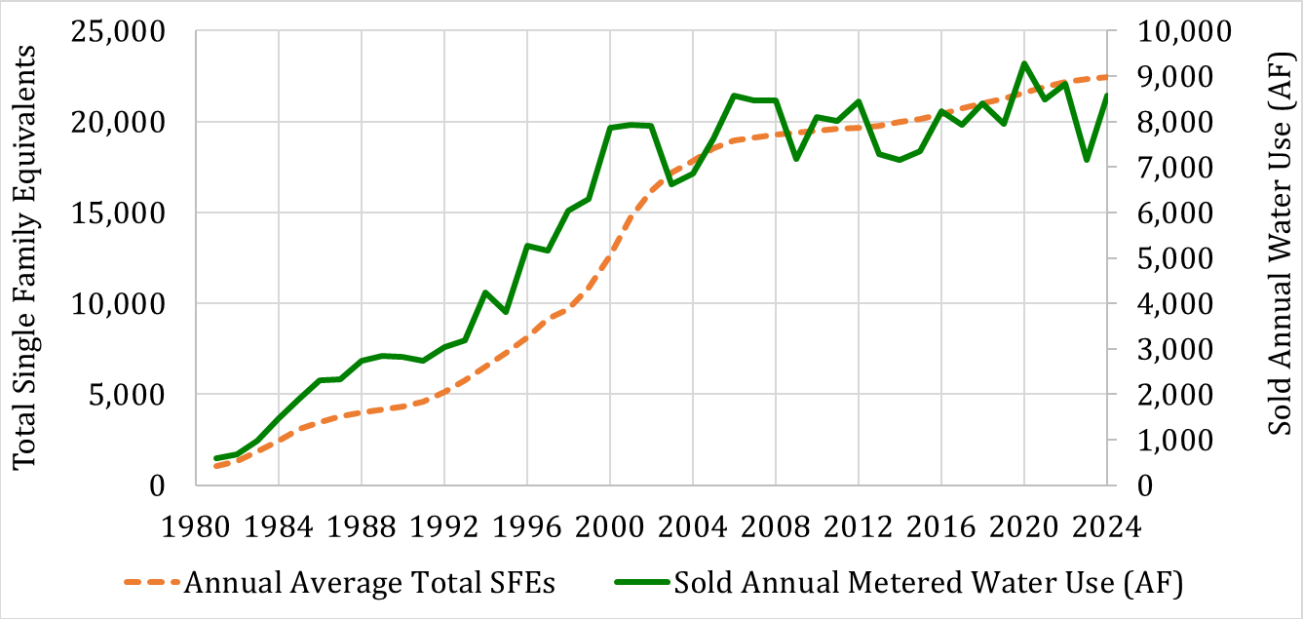

Figure 3-4. ECCV System Growth in SFEs and Water Use 1981 to 2024

The additional SFEs added to the ECCV district varies from year to year. Figure 3-5 illustrates the number of SFEs added to the ECCV district each year since 1982. The number of SFEs added reached a peak in 2001 with 2,098 and declined until 2011. The SFEs added each year began to increase again in 2013 until a drop in 2023 and a large increase in 2024.

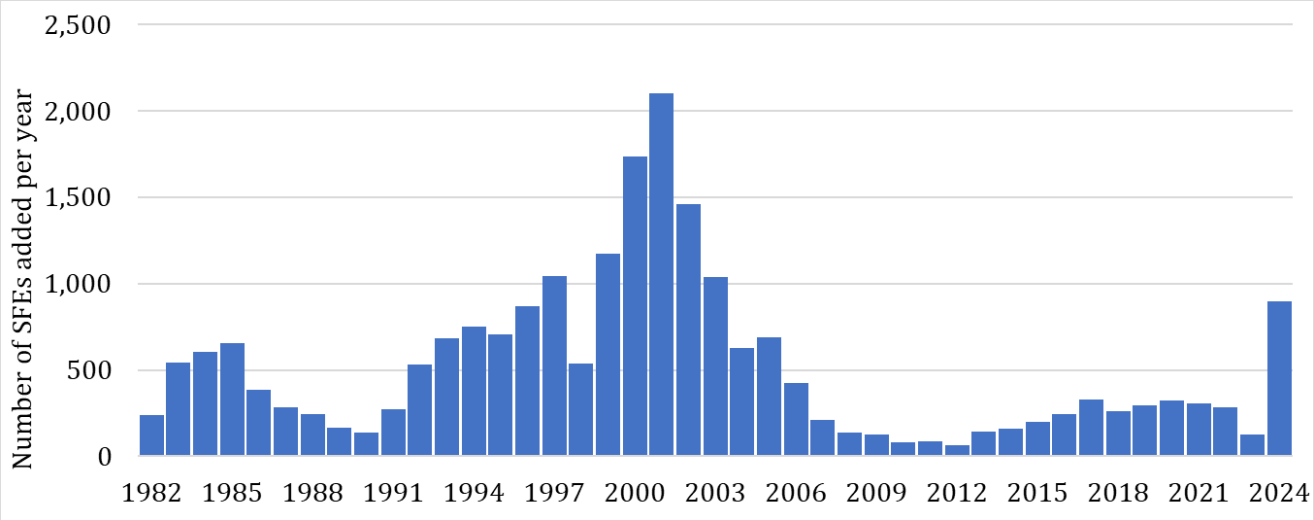

Figure 3-5. Number of SFEs added per year to the ECCV District for 1982 to 2024

3.2.1: Historical Water Demand by Customer Class

Historical water billed by customer class has been tracked since 1998 and is shown in Table 3-3 and Figure 3-6. Billing is conducted monthly and is available electronically. As previously noted, residential water use represents approximately 80 percent of total demand, followed by potable and non-potable irrigation. The non-potable irrigation system became fully operational in 2005 and currently represents approximately 4 percent of total water billed. The highest annual total billed water use occurred in 2020 with a total billed water use of 9,270 AF. The highest non-potable use occurred in 2024 with 356 AF used for non-potable irrigation. ECCV treats water for ACWWA. ACWWA has its own water rights and accounts for this water in its own accounting.

Table 3-3. ECCV-only Annual Water Billed by Customer Class

ECCV Only Annual Water Use in Acre-Feet (AF)							
Year	Commercial	Schools	Potable Irrigation	Non-potable Irrigation	Single Family Residential	Multi-Family Residential	Total
1998	159	270	429	0	4,435	0	5,294
1999	184	298	495	0	4,729	0	5,707
2000	262	410	760	0	6,097	0	7,528
2001	215	351	828	0	6,539	0	7,933
2002	263	325	790	0	6,517	0	7,895
2003	215	243	553	0	5,602	0	6,613
2004	221	244	753	0	5,643	0	6,861
2005	237	306	608	179	6,296	0	7,626
2006	287	337	634	276	7,042	0	8,575
2007	302	358	679	264	6,861	0	8,464
2008	314	361	769	285	6,741	0	8,471
2009	318	277	536	211	5,840	0	7,182
2010	302	277	623	314	6,586	0	8,103
2011	305	283	664	305	6,461	0	8,017
2012	335	319	695	340	6,751	0	8,439
2013	369	241	542	257	5,875	0	7,283
2014	433	233	529	251	5,708	0	7,154
2015	346	278	583	253	5,897	0	7,357
2016	372	224	697	324	6,543	0	8,159
2017	406	256	626	317	6,314	64	7,983
2018	416	286	676	300	6,650	70	8,398
2019	385	263	673	264	6,295	69	7,950
2020	275	268	861	345	7,444	79	9,270
2021	282	248	763	290	6,816	83	8,482
2022	332	289	841	349	6,918	91	8,820
2023	275	207	578	237	5,770	84	7,151
2024	326	287	789	356	6,720	96	8,575

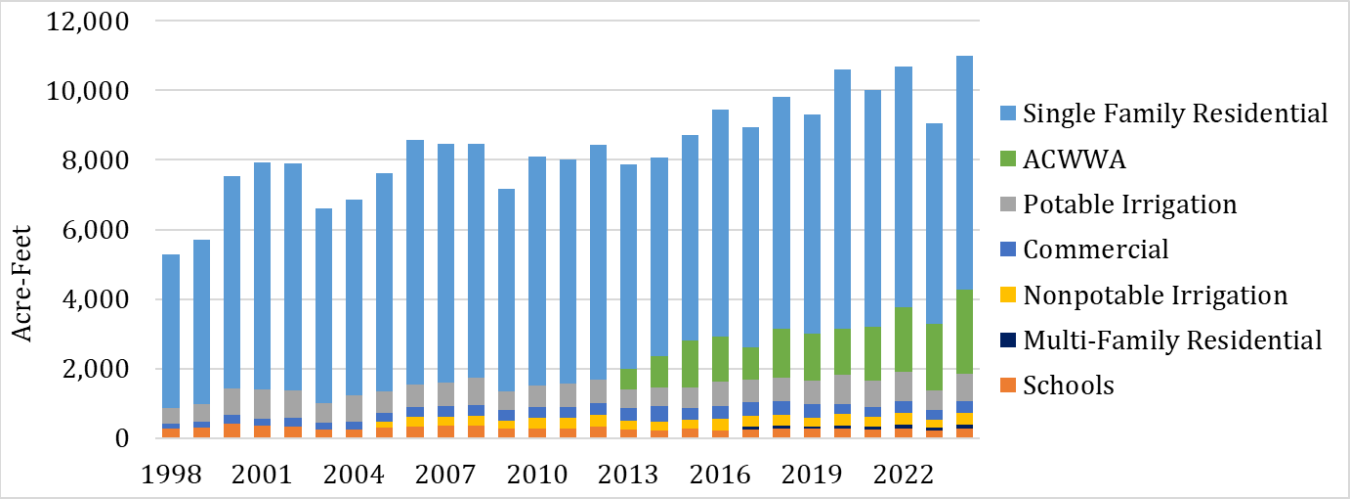

Figure 3-6. Annual Water Billed by Customer Class for 1998 to 2024

3.2.2: Historical Residential and Per Capita Water Use

An analysis of per capita water demand is a common measurement of water use. Average daily water demand divided by the population served provides total system gallons per capita per day (gpcd). Comparison of total system gpcd should be viewed cautiously, as the percentage of water use by nonresidential customer classes or nonpermanent residences can impact the gpcd calculation. Residential-only gpcd is calculated by dividing residential water use by the estimated population served. Single-family-only residential gpcd is also used if there is a high percentage of multifamily customers.

Population, total, and residential per capita water demands have been calculated for 1998–2024 and are shown in Table 3-4. Annual population increased at double-digit rates from 1998–2002 and averaged over 3 percent growth from 2003–2007. From 2008–2014, growth slowed to just over 0.6 percent but has averaged just over 1percent from 2015-2024.

Per capita water demands showed the opposite trend, with decreases in total and residential per capita water use over these same periods. The 1998– 2002 total gpcd averaged 161, while the 2003–2007 total gpcd averaged 126, a 22 percent decrease. For 2008–2014 and 2015-2024, total gpcd averaged 120 and 117 respectively, collectively a 7 percent decrease from the 2003–2007 period. Similarly, for residential-only gpcd, the 1998–2002 average was 132 and the 2003–2007 average was 104, a 22 percent decrease. The 2008–2014 and 2015-2024 residential-only gpcd averages are 97 and 94, a collective 9 percent decrease from the 2003–2007 period. Total system and residential-only gpcd are shown in Figure 3-7.

Table 3-4. ECCV Historical per Capita Water Use for 1998 to 2024

Year	Estimated Population	Population Change %	Residential Accounts	Total system gpcd[1]	Residential gpcd[2]
1998	28,374	5.9%	9,699	161	135
1999	31,812	12.1%	10,874	156	129
2000	36,892	16.0%	12,610	177	144
2001	43,031	16.6%	14,708	162	133
2002	47,296	9.9%	16,166	146	121
2003	50,332	6.4%	17,204	116	98
2004	52,162	3.6%	17,830	116	95
2005	54,171	3.9%	18,516	125	103
2006	55,406	2.3%	18,938	138	113
2007	56,023	1.1%	19,149	134	109
2008	56,430	0.7%	19,288	133	106
2009	56,806	0.7%	19,417	113	92
2010	57,049	0.4%	19,500	127	103
2011	57,307	0.5%	19,588	124	100
2012	57,488	0.3%	19,650	130	104
2013	57,909	0.7%	19,794	110	91
2014	58,383	0.8%	19,956	107	87
2015	58,971	1.0%	20,157	110	89
2016	59,682	1.2%	20,400	120	98
2017	60,642	1.6%	20,728	115	94
2018	61,429	1.3%	20,997	122	98
2019	62,268	1.4%	21,284	114	91
2020	63,213	1.5%	21,607	131	106
2021	64,112	1.4%	21,914	118	96
2022	64,936	1.3%	22,196	121	96
2023	65,332	0.6%	22,331	98	80
2024	65,614	0.4%	22,428	117	93

1 Calculated as the total treated water production divided by total service population.

2 Calculated as the total residential + multifamily metered treated water demand divided by total service population.

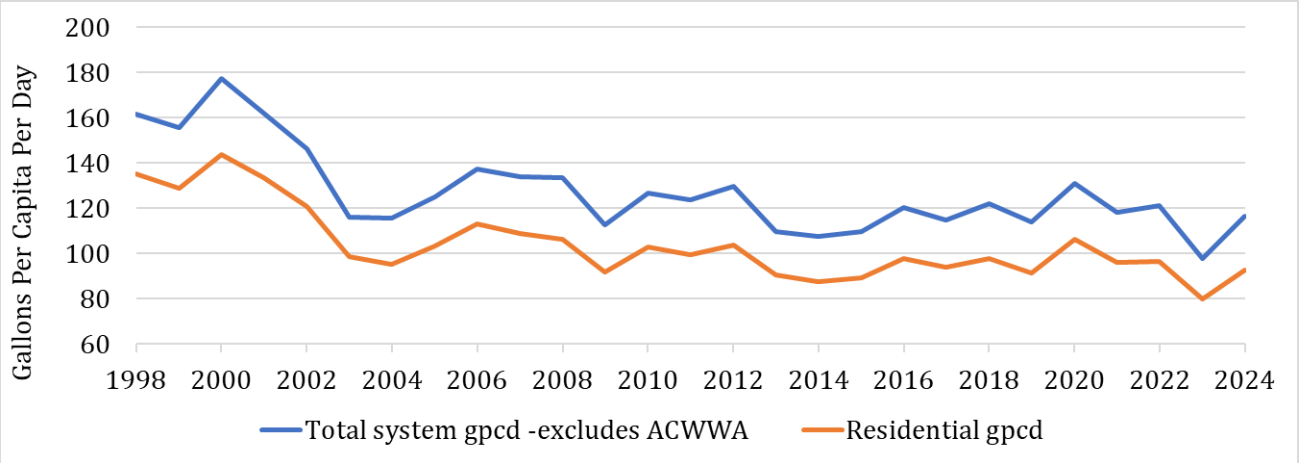

Figure 3-7. ECCV Historical Total System and Residential per Capita Water Use for 1998 to 2024

3.2.3: Historical Peak Day Water Demand

ECCV determines water treatment and delivery capacity requirements using a maximum daily use per SFE and multiplying it by a projected SFE buildout figure. Historically, ECCV has used 1.2 gallons per minute (gpm) per SFE at maximum day as its planning criteria for sizing water production and transmission infrastructure. This planning criterion includes a reasonable safety factor and allowances for firefighting and other uses.

The tracking of daily water production for the ECCV system has historically been a challenge due to the significant number (> 90) of individual wells in the ECCV water system. Historical daily water production and consumption data are incomplete for years prior to 2005 due to unavailability of data as a result of limited telemetry from individual wells. For the periods that have estimated peak day water use data, peak day water demand was highest at 1.27 gpm/SFE in 1990. By the mid-1990s, peak day demand averaged 1.0 gpm/SFE. Starting in 2002, ECCV implemented designated watering restrictions for two days per week. These restrictions were modified to three days per week in 2006. The days of the week are specified based on address. In 2013, temporary restrictions were planned to limit residential watering days to two days per week. This is the routine drought response. However, implementation of the restrictions was not required due to increased precipitation. During drought conditions, commercial irrigation is limited from 48 hours of watering per week to 39 hours per week.

Peak day water use has averaged 0.6 gpm/SFE from 2005 to 2024. The historical maximum recorded peak day occurred in 2005 at 21.0 MGD. Data are unavailable for 1999–2004, but a greater historical peak day may have occurred during this period. Historical average daily and peak day demands are shown in Figure 3-8. Average annual daily demands have increased from 0.5 MGD in 1981 to 7.7 MGD in 2024.

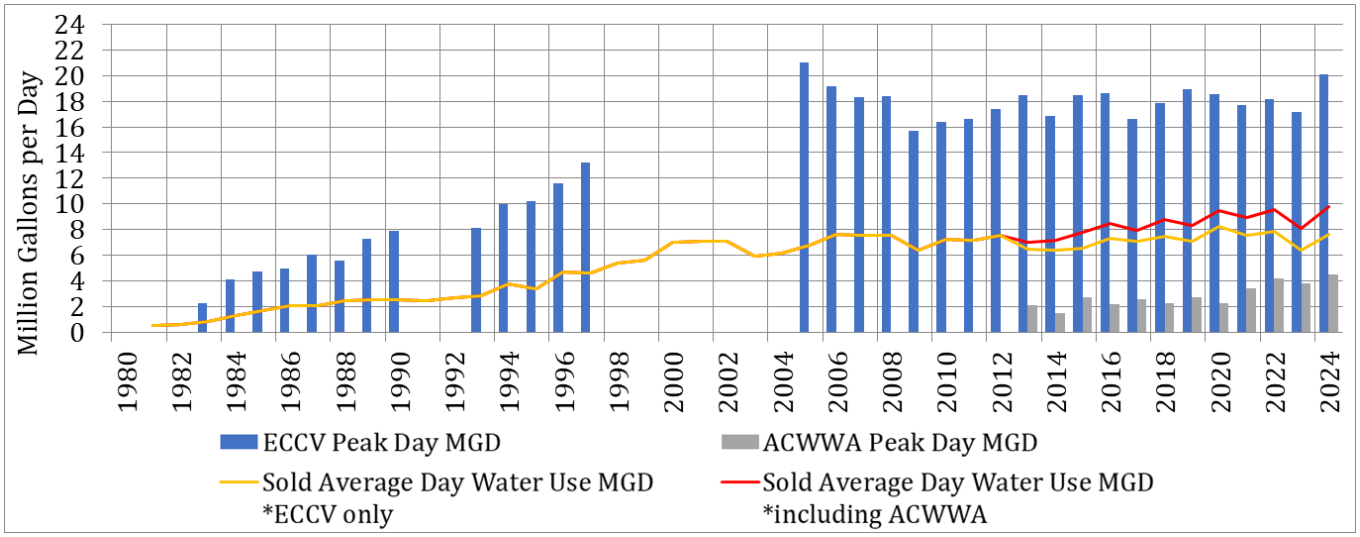

Figure 3-8. Historical Average Daily and Peak Day Water Demands (potable only)

As noted, when planning for meeting peak day demands, appropriate safety factors should be included. The volume of treated water storage as a percentage of peak day demand is also a consideration when determining safety factors and the ability to meet peak hour demands for firefighting and other purposes.

3.3: Water Loss Accounting

The description of current water use in this Plan is meant to be consistent with the International Water Association (IWA) and American Water Works Association (AWWA) Water Balance approach, which was updated in 2012 (AWWA, 2012) to provide utilities a consistent methodology for assessing water loss. In 2025, ECCV utilized AWWA's Free Water Audit Software (FWAS) for developing the water loss audit for Water Year 2024. This tool is the industry standard for performing annual water audits. Although the full assessment of a water balance is outside the realm of this report, the terminology is consistent. The main categories discussed for ECCV are revenue (metered) and non-revenue (metered and unmetered) water, which are defined in Figure 3-9 below.

AWWA Free Water Audit Software

Water Balance — **Water Audit Report for: East Cherry Creek Valley W&SD** — **Audit Year: mmm dd yyyy - mmm dd yyyy** — **Data Validity Tier: Tier III (51-70)**

Volume from Own Sources (corrected for known errors)	**System Input Volume**	**Water Exported (corrected for known errors)**	**Billed Water Exported**			**Revenue Water (Exported)**
		Water Supplied	**Authorized Consumption**	**Billed Authorized Consumption**	**Billed Metered Consumption (water exported is removed)**	**Revenue Water**
					Billed Unmetered Consumption	
				Unbilled Authorized Consumption	**Unbilled Metered Consumption**	**Non-Revenue Water**
					Unbilled Unmetered Consumption	
			Water Losses	**Apparent Losses**	**Systematic Data Handling Errors**	
					Customer Metering Inaccuracies	
					Unauthorized Consumption	
Water Imported (corrected for known errors)				**Real Losses**	**Leakage on Transmission and/or Distribution Mains**	
					Leakage and Overflows at Utility's Storage Tanks	
					Leakage on Service Connections	

Figure 3-9. AWWA Water Balance Summary

All of ECCV water use is metered and billed. There are no customers who receive water that is not billed or charged, and all metered water use is Revenue Water as defined in the IWA/AWWA Water Balance. The non-revenue water use for the ECCV system includes:

- Unbilled, unmetered consumption (see below)
- Customer metering inaccuracies
- Data-handling error
- Leakage on mains
- Leakage on service lines
- Leakage and overflows at storage

Unbilled, unmetered consumption includes the following:

- Annual waterline and fire hydrant flushing program conducted by ECCV (estimated at 3 to 5 million gallons per year).
- Street-sweeping operations using fire hydrants to fill street- sweeping vehicles. These are local jurisdictions with street maintenance responsibilities that are separate from ECCV. They are required to have a hydrant meter, but occasionally a sweeper operator will not use the hydrant meter in violation of ECCV requirements.
- Fire department operations filling fire trucks for firefighting and training activities. These fire departments are separate from ECCV.

As noted, the tracking of total and daily water production for the ECCV system has been a challenge due to the significant number (> 90) of individual wells in the ECCV water system and the historical lack of central telemetering. Historical total water production data have not been included in the following analysis for years prior to 2005 due to unavailability of data as a result of limited telemetry from individual wells prior to 2005. In 2005, ECCV implemented a program of upgrading the SCADA reporting and meter accuracies all metered wells. Upgrades to the system are continuously checked and ongoing. At the present time, the SCADA system is being monitored on a continuous basis as part of ECCV's Water Loss Control Program. As a result, water production and billing data for 2005–2024 are the years included in the estimate of water loss accounting. ECCV took part in the Colorado Water Loss Initiative training in 2024 and 2025. ECCV is using the results from the FWAS results to develop cost-effective water loss control and revenue recovery.

Review of production and sales information has been conducted by ECCV annually since 2005 to determine the efficiency of the water distribution system. There are three pieces of data used to perform this evaluation: total water production; total water billed to customers; and water accounted for but not billed. The non-revenue water is calculated by subtracting all accounted-for water (total water billed and accounted for but not billed) from the total water production. All water use in the ECCV system that is metered is billed. Industry standards consider up to 10 percent non-revenue water to be acceptable. For the last five years, 2019 through 2024, non-revenue water was between 1 and 6 percent, showing that the District's water system is consistently within an acceptable range.

A comparison of metered total water production vs. total water billed and accounted for/not billed is shown in Figure 3-9. The difference between total production and billed is non-revenue water as described above. As shown in Figure 3-10, non-revenue water ranged from a high of 13 percent in 2005 to a low of 1 percent in 2021 with a 20-year average of 6 percent. It is important to note that ECCV only implemented its water loss-accounting program in 2005, and the actual determination of non-revenue water will increase in accuracy as SCADA upgrades and individual well meter analyses are complete. The high non-revenue water in 2005 compared to subsequent years is partially attributable to the following:

- Meter accuracy testing improved in each subsequent year as the Water Loss Control Program was implemented.

- Water production accounting improved in each subsequent year as the Water Loss Control Program was implemented.
- In 2005, many production sources were estimated due to inoperable meters or data compilation. As a result, 2005 non- revenue calculation is only an estimate.
- Steps were taken to improve meter function in 2006 and 2007 and are ongoing as part of the Water Loss Control Program. This is reflected in the lower non-revenue percentages for these years compared to the two previous years.

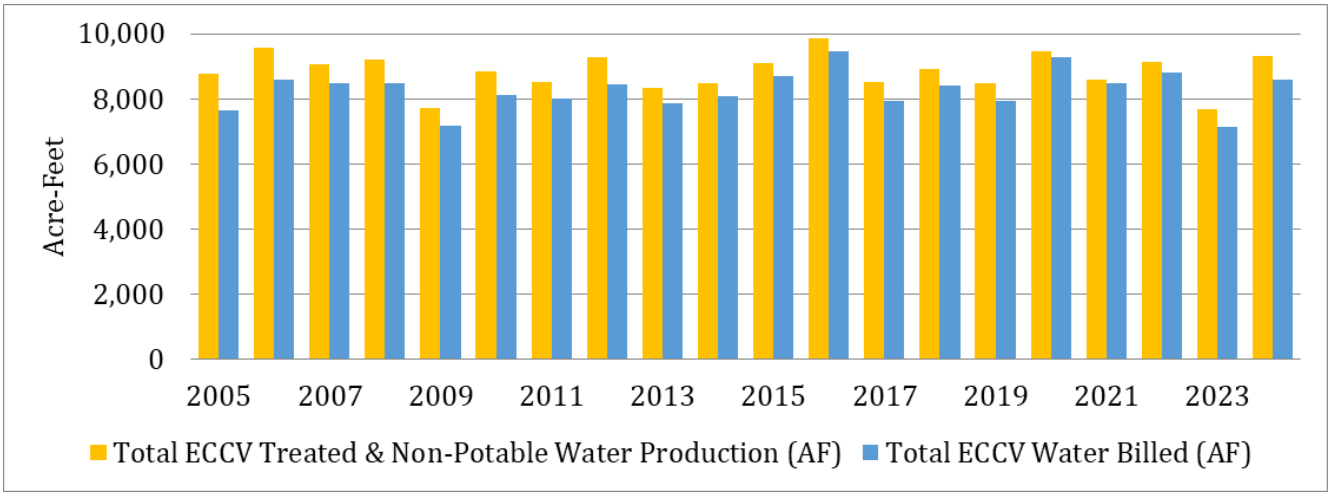

Figure 3-10. Total Water Production vs. Water Billed for 2005 to 2024

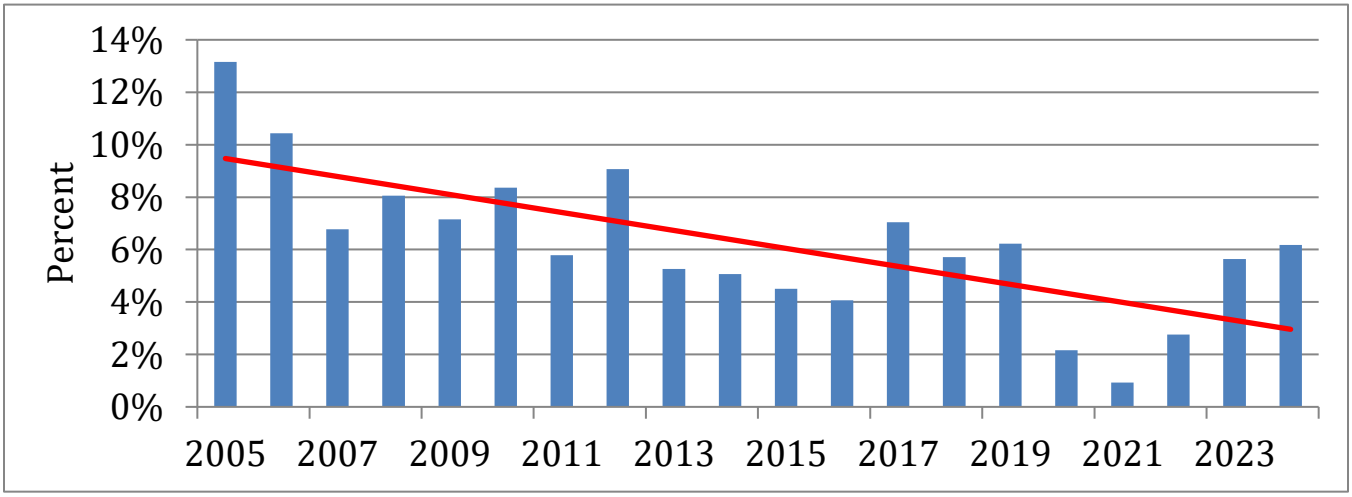

Figure 3-11. ECCV Non-Revenue Water for 2005 to 2024

If there is a reason to suspect a leak, ECCV contracts out for sonic leak detection equipment to locate leaks within the distribution system. The SCADA system is monitored continuously for any unusual changes in pressure and tank level. Leaks that are identified at the surface and located are repaired immediately. As shown in Table 3-5, 31 percent of ECCV's water lines are older than 35 years in age and 73 percent are older than 25 years.

Twenty-seven percent of ECCV's water lines are less than 25 years old and leaks in these lines are assumed to be minimal. This is confirmed by the relatively low number of water breaks experienced annually, averaging approximately 3.4 per year.

Table 3-6. Age of Construction of ECCV Waterlines

Years Constructed	Miles	Percent	Age (years)
1970-1980	22	8%	45+
1981-1990	60	23%	35-44
1991-2000	112	42%	25-34
2001-2010	46	17%	15-24
2011-2020	23	9%	5-14
2021-2024	3	1%	0-4
Total	266	100%	

ECCV started up its Northern Water Supply Project Treatment Plant in 2012. As a result of this additional supply and treatment capacity, ECCV has minimized usage of its In-District Laramie-Fox Hills wells and some of the less productive Arapahoe wells. In 2016, three Arapahoe wells were re-drilled adjacent to their original locations in order to assure capacity in conformance with their decrees. In conjunction with this reduction in active wells and associated meters, SCADA telemetry upgrades are underway. This will allow ECCV to increase its accuracy in determining system losses. Several years of data after the reduction in production wells are needed to determine if non-revenue water percentages have changed. With the ECCV system being a relatively new system and with many production meters to monitor, it is anticipated that the amount of non-revenue water will continue to stay within the acceptable range of less than 10 percent. ECCV purchased 38 new magnetic flow meters for the Arapahoe wells currently in use. Ten of the purchased magnetic flow meters were installed at various sites during 2018, replacing numerous types of mechanical meters, and allowing for more accurate flow totals. Additional meters were installed in 2019 at various well sites. All meters are electronic now.

As part of the expansion of the Northern Water Supply System, ECCV is working on converting all of the existing magnetic meters and those new production meters to Ethernet protocol, as well as capturing totalizer values electronically. Ethernet protocol is being applied to in-district supply wells. There are 32 meters left to be converted to digital protocol for In-District wells, out of a total of 32 Arapahoe well meters, 22 are HART protocol and 10 are Ethernet capable. ECCV is currently working to digitize flow meter data via their SCADA system as well as upgrading the SCADA system to receive more reliable and accurate data.

Section 4: Land Use

ECCV is a Colorado Title 32 special district without land use control. The City of Centennial and Arapahoe County have land use authority. ECCV coordinates with the appropriate entity for water and wastewater flows within its jurisdiction, see the map of jurisdictions within the ECCV district, Figure A-1. ECCV is evaluating land use planning and coordination with Arapahoe County and others in the future on landscaping for schools, HOAs, and other large irrigators.

ECCV's wastewater is delivered to City of Aurora interceptor sewers and transported to the Metro treatment plant at 56th & York, where it is treated and discharged to the South Platte River.

The 1976 sewer use contract between ECCV and Aurora states:

> *"The City of Aurora agrees in this connection not to oppose any overall plan of development for the District or the Service Area lying outside the City of Aurora city limits, or incremental parts thereof, devoted to residential, office, and retail commercial centers which do not exceed an overall gross density of 3.5 dwelling units per acre."*

The 1976 contract has been replaced by the 2025 Master Sewer Agreement between ECCV and Aurora, which limits the densities that ECCV can allow within the District boundaries now and would limit redevelopment in the future.

There are very few undeveloped parcels remaining within the ECCV legal boundaries. There are few to none within the City of Centennial. The bulk of the undeveloped land lies in unincorporated Arapahoe County, see Figure A-1.

- All of the Copperleaf Subdivision, with the exception of area M4 is already partially or completely through the development process. Parcel M4 is a 76-acre parcel slated for some type of regional commercial center.
- Arapahoe Park & Recreation District (APRD) owns a 168-acre parcel north of Quincy, west of E-470 slated for a regional park/open space/recreation facility.
- Areas N (30 Acre) and O (10 Acre) are parcels sited between E-470 and Gun Club Road. They are narrow parcels, approximately 400 feet wide.
- There is a 23-acre vacant parcel located under the Buckley overflight zone, which has very restricted uses.

There is no specific guidance for irrigation of landscape for any of these parcels. Each of them presents unique challenges that will need to be addressed at the time of development.

The District's service territory is about 7,900 acres. Some of the service territory has approved development plans which have not yet been executed. ECCV estimates selling approximately 50 additional SFEs each year for the next five years as the service area achieves full build-out (2026 through 2030).

The existing Dove Hill development lies within the District legal boundaries. This area is fully developed as an Arapahoe County large-lot, single family, well and septic project. Changes are unlikely within the planning horizon of this document.

The housing stock within ECCV is very new, varying from 1972 to current date construction, and almost all of it is single family detached. The likelihood of a Denver-style redevelopment with slot homes, etc. is very unlikely within the planning horizon of this document.

Section 5: Existing Conservation Efforts

ECCV has used water conservation and efficiency measures to manage water demands and conserve water for over 20 years. ECCV's water conservation and efficiency program offers a diverse range of programs and measures targeted at all water demand customer classes. Demand management strategies have included conservation measures designed to manage peak day demands and other measures designed to reduce total annual demands. ECCV has implemented a conservation-oriented water rate structure designed to encourage efficient use through the implementation of water budgets for irrigation accounts and tiered-rate structure for all customers.

Other measures include designated watering days to manage peak and irrigation season demands, rebates on high efficiency plumbing fixtures, and a range of activities designed for irrigation use. The current program is described in this section and summarized in Table 5-6.

5.1: Operational Utility Side Measures

Integrated Resources Planning – ECCV has practiced integrated resources planning (IRP) as part of its overall water supply and demand management strategy. A least-cost analysis of demand and supply options resulted in the conclusion that water conservation and efficiency and demand management options were cost-effective and, as a result, were incorporated into future supply planning. As implemented by ECCV, the IRP approach is a comprehensive planning effort that incorporates water conservation and efficiency as key components for meeting future needs. The results of the IRP approach have resulted in savings of tens of millions of dollars to ECCV as described in Section 8.

Full Metering – All ECCV customers and associated water use is metered and billed.

Modifications to Increasing Block Rate Structure – ECCV implemented significant changes in its tiered, increasing block rate water structure in 1998 in order to promote water conservation through pricing. As experience was gleaned from the implementation of the rate structure, the rates and blocks were modified to increase the water conservation effect. An analysis of average residential lot size and irrigated area using a generalized water budget approach was used in 2003 to adjust the tiers for residential water use in order to increase the water pricing and water conservation signal to customers. The blocks for the residential rate structure since 1998 are shown in Table 5-1.

Table 5-1. ECCV Residential Water Rate Tiers

Block	1998	1999	2000 to mid 2002	2003 to 2005	2006 to 2019	2020 to 2022	2023 to 2024
	Monthly Water Use in 1,000 gallons						
1	0 to 16	0 to 14	0 to 8	0 to 6	0 to 5	0 to 5	0 to 5
2	17 to 32	15 to 28	9 to 20	7 to 20	6 to 20	6 to 20	6 to 18
3	>32	>28	>21	21 to 30	21 to 30	21 to 30	19 to 28
4	N/A	N/A	N/A	31 to 40	31 to 40	>31	>29
5	N/A	N/A	N/A	>40	>40		

Water-Use-Based Irrigation Tap Fees – All irrigation tap fees are based on irrigated area and planting materials. Existing large irrigators are allowed to add water taps at no charge (other than installation and meter cost) so they can irrigate more efficiently. This was in response to the fact that most of the older systems were undersized because the tap fees were based on meter size, and developers undersized meters to avoid additional tap fee charges.

Sustainable Water Assurance Fee (SWAF) – ECCV has developed and implemented the Northern Water Supply Project to develop renewable water supplies and reduce dependence on nontributary groundwater. In order to finance the implementation of this policy, a SWAF is applied to all customers at differing levels based on use amount and type (Table 5-2). For Commercial SFEs see Table 3-2 for meter size equivalencies. This additional water bill charge results in a water conservation signal to customers that has resulted in reduced water use.

Table 5-2. ECCV Sustainable Water Assurance Fees by Customer Type

Customer Type	SWAF / Month
Residential	$30
Large Irrigators	25% of total monthly water use
Commercial	$30/SFE

Designated Watering Days – Designated watering days are in effect for all customers on a permanent basis. This program manages peak irrigation demands as well as total water use. The current program allows watering three days per week and prohibits watering between the hours of 10 a.m. and 6 p.m. Designated watering days started in 2002; watering was limited to two days per week. The number of water days was increased to three days per week in 2006 when the first phase of the Northern Water Supply Project operated. Experience has shown that the three days per week watering schedule allows water production to be paced closer to demand. Enforcement of the watering day schedules is accomplished using seasonal water conservation staff. From 2002–2006, water conservation patrols were daily. From 2007 to 2022, the patrols were typically only on the weekends. In 2023, water patrol increased back to daily. In 2025, additional remote monitoring of water schedule adherence was added allowing ECCV to increase the number of customers contacted by 85%.

Seasonal Planting Limits for Turf – No new sod or grass seed planting is allowed from June 1 to September 1. Exemptions have been made on a case-specific basis for buffalo grass planting and large irrigators with a short planting season such as athletic fields. In 2025 ECCV implemented a new Sod Permit Program. For the program, customers submit an application to request watering variance for establishing new seed or sod. The permit is dependent on inspection for soil amendments. A permit sign is delivered to customers home with the 21-day watering schedule exemption dates displayed. After the end date of the exemption, the Water Efficiency Technician reviews watering schedule compliance using the Beacon system.

Water Waste Ordinance – ECCV adopted new rules and regulations in 2014. Specific to water conservation, the District prohibited the wasting of water and defined water waste within the service area. ECCV also outlined how water restrictions, curtailments, or prohibitions upon water use may be enacted and provided details for the tiered water rate system. Failure to comply with the Conservation Plan and violations of wasting water may result in Water Waste Charges. ECCV improved enforcement of Water Waste Charges by improving automation of their monitoring and leak notification system using asset and task management systems.

High Use Target Efficiency Outreach Program – ECCV implemented a new program utilizing the billing system reporting function to identify high use customers in the following categories: winter high use over 10,000 gallons per month for a period of 3 years and customers with leak duration over 10 gallons per hour over 10 weeks. Letters were sent to customers identified in these categories to notify and educate them regarding their usage or leaks. These letters were also used for documentation and follow-up with customers.

New Development Multi-Family Sub-Metering – ECCV now requires multi-family housing such as apartment buildings to submeter all units. Submetering units helps improve leak detection and high use within individual units.

5.2: Water Loss Control Program

Annual System Water Accounting Audits – System-wide accounting audits have been conducted by ECCV annually since 2005 to determine the efficiency of the water distribution system. ECCV will continue this best practice annually as part of its normal operations. There are three pieces of data used to perform this evaluation:

1. Total water production
2. Total water billed to customers
3. Water accounted for, but not billed

The non-revenue water is calculated by subtracting all accounted-for water (total water billed and accounted

for/not billed) from the total water production. The industry standards consider up to 10 percent non-revenue water to be acceptable. Table 5-3 shows the average 5-year non-revenue percentage. From 2005–2009, the average percentage of non- revenue water was 5.70 percent, 6.59 percent for 2010–2014, 5.13 percent for 2015–2019 , and now is 3.87 percent for 2020-2024, showing that the District's water system is consistently within an acceptable range since the SCADA upgrades. Currently, ECCV's goal is to maintain their current level of non-revenue water, not to exceed 8 percent. If the annual system water audits show an increase above 8 percent on a 36-month running average, ECCV will implement system-wide sonic leak detection covering 20 percent of the system annually.

Table 5-3. ECCV Sustainable Water Assurance Fees by Customer Type

5-Year Average	Average Non-revenue Percentage
2005-2009	5.70%
2010-2014	6.59%
2015-2019	5.13%
2020-2024	3.87%

If there is a reason to suspect a leak, ECCV contracts out for sonic leak detection equipment to locate leaks within the distribution system. The SCADA system is monitored continuously for any unusual changes in pressure and tank level. As shown in Table 3-5, 31 percent of ECCV's water lines are older than 34 years in age and 73 percent are older than 24 years. Twenty-seven percent of ECCV's water lines are less than 25 years old and leaks are estimated to be minimal. This is confirmed by the relatively low number of water breaks experienced annually. In the past 16 years, ECCV has had an average of 3.4 water main breaks per year. In the past 5 years, many of the main breaks were due to development work as well as ECCV taking a more proactive role in finding water leaks and fixing water lines.

ECCV completed its Northern Water Treatment Plant in 2012; during that year, the temporary treated water lease with Denver expired. As a result of this additional supply and treatment capacity, ECCV has become less reliant upon a number of low-yielding/poor-quality nontributary wells. In conjunction with this reduction in wells and associated meters, SCADA telemetry upgrades are ongoing. This may result in an increase in accuracy in determining system losses. Several years of data collected after the reduction in production wells are needed to determine if non-revenue water percentages have changed. With the ECCV system being a relatively new system and with the many production meters to monitor, it is anticipated that the percent of non-revenue water will continue to fall within ECCV's goal of < 8 percent. Over the recent period analyzed, non-revenue water, including leaks, has averaged 4.8 percent over a 36-month moving average ending in 2024.

5.3: Education and Public Information

Water Efficiency Coordinator – The Water Efficiency Coordinator role was added in 2025, an expansion of the original position of Specialist.. The Water Efficiency Coordinator's sole responsibility is water conservation and efficiency efforts to increase efficiency and lower costs for customers. The Water Efficiency Coordinator will review and evaluate the continuation of the rebate program in the next year. This staff member will also create programs and content to carry out the recommendations of this Plan. With the growing conservation efforts, ECCV also added a Water Efficiency Technician in 2024. and a Key Account Coordinator in 2025. The Key Account Coordinator serves as the liaison for customers who play a significant role in ECCV's water system and community, such as large water users (i.e. irrigators and commercial entities) and customers who require more frequent support or have complex needs. The Key Account Coordinator proactively communicates about events or changes that may affect service in an effort to build trust and long-term relationships through consistent outreach. Through these relationships and outreach, ECCV has been able to proactively inform large water users when they have leaks or are out of compliance leading to more timely leak repairs and adherence to the watering schedule. Examples of Key Accounts are school districts, parks and recreation districts, grocery stores, shopping centers and home owners associations.

Conservation Public Information Campaign – ECCV continues to expand their public information services,

most recently adding a public outreach team and social media profiles for the water efficiency team. ECCV's social media posts include water efficiency programs and events, and water conservation strategies for customers. In June 2025 ECCV and partner members with South Metro Water Supply Authority ("SMWSA") held the first ever South Metro Water Festival, a family-friendly event. ECCV plans to continue this event annually. ECCV continues to disseminate water conservation and efficiency information via bill inserts, brochures, and the ECCV website (http://www.eccv.org/). The ECCV website has been updated with dedicated conservation pages. These pages include educational conservation materials for customers to access. ECCV has increased outreach materials during the watering season through monthly water conservation newsletters. Water conservation and efficiency topics include information on the toilet and sprinkler rebate programs, irrigation management, Xeriscape landscaping, and other water-saving tips. In 2019 ECCV began offering water efficiency classes for customers. In 2021 ECCV added classes during watering months, offered three times per month for all customers. These classes cover general information on water in Colorado, education on soil, turf, plant types, and irrigation systems including efficient watering and scheduling. Staff also respond to residential and commercial customers with water use or billing questions and requests for water conservation information.

Xeriscape of ECCV Office and Other In-District Areas – The District offices and maintenance facilities were constructed in 2003. A portion of the facility was landscaped using Xeriscape plantings and customers can view several Xeriscape gardens as they enter the facility. A second demonstration garden was added at ECCV's decommissioned well house A-13 due to turf damage. Through a CWCB grant, ECCV was able to expand its turf removal area and replace the damaged turf with low-water and native plants. The project covers 5,000 square feet and includes a walking path, three benches and will have future signage on water-wise landscaping and the Garden in a Box program. It is accessible to residents as it is near walking paths and schools and is highly visible to the neighborhood located near the intersection of S. Jebel and E. Union Drive.

School Education Programs – Staff responds to requests for water conservation presentations to school classes. A proactive education program to visit schools with water conservation programs is under development.

Annual Large Irrigators Water Conservation Open House – ECCV has shifted from annual meetings to holding annual open houses. This change provided flexibility for large irrigators to get answers tailored for their specific needs at a time that works for their schedule. Large Irrigators include homeowners' associations (HOAs), irrigation management companies, and irrigation specialists. The open house provides information related to the ECCV water conservation program, including irrigation water budgets, watering schedules, water rates, and penalties. It is also used to explain in detail the components of the water budget and irrigation management program, including evapotranspiration calculations, calculation of irrigated areas, and establishment of water budgets.

Customer Online Access to Water Use History – Customers have online access to their water bills and have the ability to view and compare monthly water use history. This program allows customers to adjust water use in response to past history and cost of water.

EyeOnWater – EyeOnWater is a mobile device app available at no cost to users. EyeOnWater allows customers with compatible meters to access hourly data from their water meter on a daily basis. Various alerts and warnings can be programmed by the user to indicate issues with the account including leak detection. Initial installation of meters using this technology started in 2016, and in 2017 all commercial accounts within the District were provided with this technology. There is currently an installed base of approximately 21,634 water meters (out of approximately 22,428) that could access this information. Of these, 21,467 have active endpoints that communicate to the network daily. Approximately 1,000 require endpoint replacements due to failures to communicate. A final group of 167 residential accounts require new meters & endpoints in order to communicate with the network. The approximately 1,167 meters needing replacement will be conducted in 2026. Public outreach campaigns were created to inform, educate, and encourage customer account sign up. For more information about EyeOnWater and Badger Meter, see Appendix B.

5.4: Indoor – Residential

High-Efficiency Toilet Rebates – Rebates are offered for high-efficiency (HE) EPA WaterSense ultra low-flow (ULF) toilets. The program has been in effect since 2004. Rebates of $50 are available if a toilet with 1.6 gallons

per flush (gpf) or 1.28 gpf is replaced with a new toilet with 1.1gpf or less. Rebates of $100 are available if a toilet with 3.5pgf or higher is replaced with a new toilet of 1.1gpf or less. . Each customer can receive up to two toilet rebates. Rebates for HE clothes washers were offered from 2004 through 2021 but are no longer offered. The annual number of rebates is shown in Table 5-4.

Table 5-4. ECCV Residential Indoor and Outdoor High Efficiency Fixture Rebates from 2004 to 2024

High Efficiency Fixture Rebates 2004 - 2024									
Year	**Washer**	**Toilet**	**Sprinkler Controllers**	**Rain Sensors**	**Nozzles**	**Sprinklers**	**Actual Total**	**Annual Budget Total**	**Date Program Ended**
2004	356	138	0	0	0	0	$58,338	$50,000	12/29/2004
2005	330	103	0	0	0	0	$51,188	$50,000	11/17/2005
2006	345	68	0	0	0	0	$49,963	$50,000	9/6/2006
2007	445	94	0	0	0	0	$65,000	$65,000	7/13/2007
2008	666	156	0	0	0	0	$98,850	$100,000	9/3/2008
2009	622	188	0	0	0	0	$98,213	$100,000	12/21/2009
2010	603	177	0	0	0	0	$93,013	$100,000	12/30/2010
2011	442	140	0	0	0	0	$69,250	$75,000	12/30/2011
2012	226	105	0	0	0	0	$38,750	$65,000	12/30/2012
2013	165	106	31	0	0	0	$33,001	$65,000	12/31/2013
2014	36	113	17	0	0	0	$16,859	$65,000	12/31/2014
2015	20	66	31	0	0	0	$14,764	$65,000	12/31/2015
2016	36	85	71	0	0	0	$18,863	$65,000	12/31/2016
2017	36	56	124	0	0	0	$20,914	$65,000	12/31/2017
2018	47	42	123	0	0	0	$24,699	$55,000	12/31/2018
2019	35	19	90	7	10	7	$22,081	$55,000	12/31/2019
2020	44	5	98	9	13	10	$22,222	$60,000	12/31/2020
2021	40	5	59	4	9	9	$20,107	$60,000	12/31/2021
2022	0	3	55	4	10	12	$33,065	$60,000	12/31/2022
2023	0	0	60	1	6	3	$78,315	$60,000	12/31/2023
2024	0	6	64	7	16	14	$63,397	$120,000	12/31/2024

5.5: Outdoor Efficiency – Landscapes and Irrigation

Water Budgets for Irrigation Accounts – Water budgets for irrigation accounts were first implemented in 2005. Aerial photography and GIS were used to calculate the irrigated areas for each irrigation account. Customers were provided the opportunity to verify the calculation of irrigated areas. Monthly water budgets are established based on evapotranspiration (ET) requirements for bluegrass in the Denver area. Individual block rate structures are established for each irrigator that corresponds to blocks used for residential customers. For residential customers, irrigation is assumed to average 14,000 gallons during the peak month based on average residential lot size as calculated using GIS. The blocks for residential and irrigation water use are shown in Table 5-5.

Table 5-5. ECCV Blocks for Residential and Irrigation Customers

Block	Range (gallons)	Residential Block (1,000 gallons)	Large Irrigator Block	2023 Rate (per 1,000 gallons)	2024 Rate (per 1,000 gallons)
1	0-5,000	Indoor usage	N/A	$4.60	$4.75
2	6,000-18,000	Average outdoor usage	Water budget	$6.80	$7.30
3	19,000-28,000	1.5 x average outdoor usage	1.5 x water budget	$9.90	$10.55
4	>29,000	2.0 x average outdoor usage	2.0 x water budget	$13.05	$13.85

In 2021, ECCV adopted a Drought Surcharge Fee to be implemented as warranted during drought conditions. A Stage 1 drought surcharge is assessed at 10% to tiers 2, 3 and 4. A Stage 2 drought surcharge is assessed at 30% to tiers 2, 3 and 4. A Stage 3 drought surcharge is assessed at 80% to tiers 2, 3 and 4. For more information on non-residential water tiers and budgets, see **Appendix C**.

Irrigation System Water Conservation Requirements and Certification of Landscape Professionals – Irrigation design and water use requirements have been established as a performance standard. All irrigation system designs must be submitted for review and approval prior to the issuance of an irrigation tap for non-single family residential properties. These design and usage requirements were established to conserve water. High water and maintenance expenses can be reduced when these irrigation system design requirements and performance standards are implemented and maintained. The water-reduction implementation measure requirement applies to all new irrigation systems except single family residences. The irrigation designer shall be a Certified Irrigation Designer (Commercial) as certified by The Irrigation Association or other professional with extensive experience in the design of commercial irrigation systems as determined by the District Manager.

Water Efficient Maintenance Practices for New and Existing Landscapes – ECCV irrigation design standards require that a regular maintenance schedule shall be submitted to ensure irrigation efficiency. The maintenance schedule shall include weekly or biweekly reviews of the system. Heads will be checked for coverage and leakage, and controllers will be reprogrammed monthly or more often if necessary. ECCV conducts an annual review if any large irrigator went over the allotted budget and incurred penalty rates.

ET Irrigation Controllers – A program to assist large irrigators in replacing outdated irrigation controllers with systems that can improve irrigation efficiency has been in place since 2000. ECCV will provide up to $35,000 for the purchase of smart controllers, as a credit to the customers water bill. All irrigation controllers must have battery backup or be unaffected by a power interruption and be secured to prevent tampering. ECCV continues to monitor the results of the program. ECCV is looking at how to approach the program and is evaluating where to focus resources.

There are no set schedules for schools due to the many activities and use of athletic fields. Schools have established water budgets, and water use must be within the budget. All of the large irrigators have the EyeOnWater Tool available to them for monitoring their accounts. The Water Efficiency Coordinator has built relationships with the maintenance team at the schools and has access to their software, allowing ECCV to view when each property is being watered.

Weather Station for Monthly Allowance –ECCV purchased its own weather station in 2022 which is installed near an ECCV well house. The weather station collects ET rates for a given month. The ET rate is factored into large irrigators' water budgets. If the ET rate is higher than normal, then the water budget is increased for the month, but if the ET rate is lower, then the water budget is reduced for the month. The average weather data for the prior month is compiled. The average ET rate is used to determine the water budget for billing.

Residential Sprinkler Controller Rebates – Smart, weather-based irrigation clocks automatically adjust an irrigation system's run-time based on historical weather data. This reduces the amount of water applied in cooler months and increases the amount during peak irrigation season. ECCV offers a 50 percent rebate of up to $100 on the installation and cost of new, qualifying irrigation sprinkler controllers. As technology improves, the program may require identification of more sophisticated controllers for rebates. ECCV may possibly work with builders on providing controllers for new neighborhoods and subdivisions. In addition to these rebates, ECCV provides rebates on rain sensors and efficient sprinkler components, both the sprinkler body and nozzles.

Large Irrigator Lawn Replacement and Irrigation System Upgrades Rebates – ECCV added a cost share program for Large Irrigators in 2025 for lawn replacement and irrigation system upgrades. ECCV created this program to address requests from HOAs. ECCV will cover 50% of the cost for turf removal up to $35,000 annually, applied in monthly installment credits on the account. ECCV also added budget for larger irrigator rebates for sprinkler controllers.

Resource Central Programs – Resource Central is a Colorado non-profit that partners with water providers and municipalities to provide water conservation program. In partnership with Resource Central, starting in 2022, ECCV connects residential water users to the Garden In A Box, Lawn Replacement, and Slow the Flow sprinkler

evaluations programs. The Garden In A Box program offers a selection of professionally designed, low-water garden kits tailor-made for Colorado yards. The Lawn Replacement program helps transform grass areas into water-wise landscaping. In the Slow the Flow sprinkler evaluations and services program, Resource Central's professional team goes on-site to perform irrigation tests and a visual inspection, provide a customized watering schedule, educate water users about their sprinkler system, and recommend ways to improve efficiency and reduce water waste.

5.6: Water Reuse Systems

Non-potable Irrigation System – As part of ECCV's overall water management and conservation program, the District implemented reuse of legally reusable flows. This is accomplished via a non-potable irrigation system. The ECCV non-potable irrigation system pumps tributary groundwater from the Cherry Creek alluvium and delivers disinfected treated non-potable water to large irrigation customers in the southwest portion of ECCV. The system currently supplies approximately 275–362 AFY of water. The use of LIRFs represents a reuse of a scarce resource and reduces the demand for potable water supplies including pumping of non-renewable Denver Basin groundwater supplies.

5.7: Water Savings from Previous and Existing Conservation Efforts

In the South Platte Basin Implementation Plan, the Metro Basin Roundtable set a goal to reduce system-wide per-capita water use from a baseline of 155 gallons per capita day (gpcd) in 2010 to 129 gpcd by 2050. The Metro Basin includes Denver and surrounding areas including the ECCV District. The South Platte Roundtable set a goal to reduce per capita water use from a baseline of 188 gpcd in 2010 to 146 gpcd by 2050. As discussed in Section 3.2.2, the system-wide per capita water use in the ECCV District averaged 117 gpcd from 2009–2017 and the residential-only per capita water use averaged 94 gpcd. ECCV has met its conservation goals of reducing per capita water use and is well below the goals set for the Basin to achieve by 2050. The majority of ECCV's water demand is for residential use and thus, conservation efforts have been focused on those uses. Moving forward, ECCV's task is to maintain the current level of water conservation and efficiency.

Figure 5-1 displays the decline in annual water use in AF per SFE. The decrease in annual billed AF per SFE indicates that water savings from past and current conservation measures have been significant. The average billed AF per SFE in 2011 was 0.41 AF; in 2017, it was 0.34 AF, a decrease of 18 percent. Based on the number of SFEs in 2017, the difference between 0.41 AF per SFE and 0.34 AF per SFE equals a 1,450 AF savings. Due to various factors including the phasing in and out of water conservation efforts, the initial high rate of savings and gradual savings decline of rebate programs, and the frequent updates to technology such as meters, it is not possible to allocate exact water savings to specific water conservation efforts.

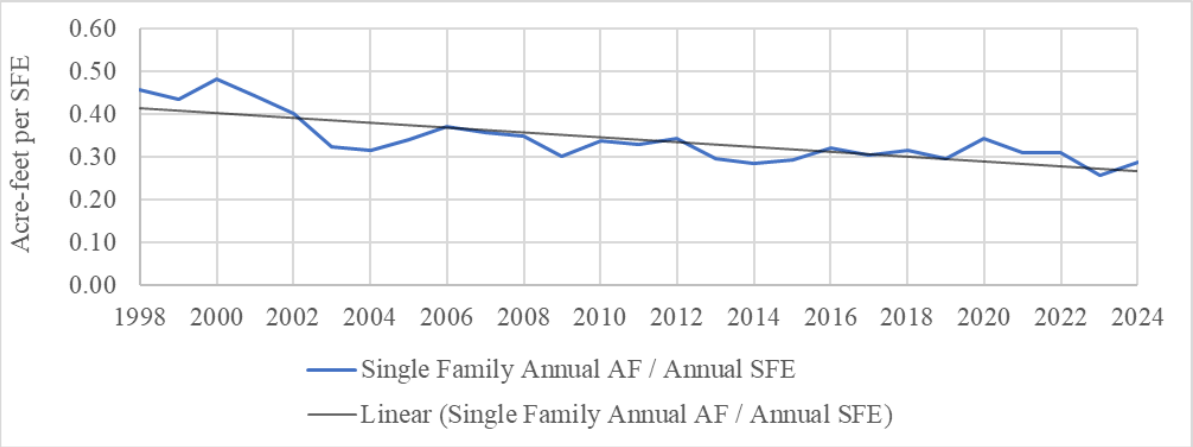

Figure 5-1. ECCV Only Single Family Annual Water Use per Single Family Equivalent for 1998 to 2024

Table 5-6. ECCV Current Water Conservation Program

Water Conservation Measure	Year Implemented
Operational Utility Side Measures	
Integrated Resources Planning	2004
Full Metering	1976
Modifications to Increasing Block Rate Structure	1998
Water-Use-Based Irrigation Tap Fees	2001
Sustainable Water Assurance Fee	2003
Designated Watering Days	2002
Seasonal Planting Limits for Turf Sod Permit Program	2002 2025
Water Waste Ordinance Rates, Fees and Charges - Drought Surcharge Included	2014 2021
High Use Target Efficiency Outreach Program	2025
New Development Multi-Family Sub-Metering	2019
System Water Loss Control	
Annual System Water Accounting Audits	2005
Education and Public Information	
Water Efficiency Specialist Changed to Water Efficiency Coordinator	2018 2024
Water Efficiency Coordinator	2024
Key Account Coordinator	2025
Conservation Public Information Campaign	2001
Xeriscape of ECCV Office and Other In-District Areas Xeriscape of ECCV Office Water-wise demonstration garden at A-13 well site	 2003 2025
School Education Programs	2009
Water Efficiency Classes for Customers Offered	2019
Annual Large Irrigators Water Conservation Open House	2005
Customer Online Access to Water Use History	2005
Eye on Water	2016
Indoor - Residential	
Residential Toilet Rebates	2004
Outdoor Efficiency - Landscapes and Irrigation	
Water Budgets for Irrigation Accounts	2005
Irrigation System Water Conservation Requirements and Certification of Landscape Professionals	2001
Water Efficient Maintenance Practices for New and Existing Landscapes	2001
ET Irrigation Controllers	2000
Weather Station for Monthly Allowance	2006
Residential Sprinkler Controller Rebates Rain Sensor, Sprinkler Nozzles and Sprinkler Body Rebates	2013 2019
Large Irrigator Lawn Replacement and Irrigation System Upgrades Rebates	2024
Resource Central Programs Garden In A Box Slow the Flow Lawn Replacement HOA Turf Replacement Consultations	 2022 2023 2024 2026
Water Reuse Systems	
Non-potable System Augmented by Reusable Return Flow Credits	2004

Section 6: Identification and Screening of Proposed Conservation Measures

6.1: Water Efficiency Goals

As was described in Section 5.7, ECCV has met its previous goal of per capita water use and will work to maintain the current level of water conservation and efficiency. ECCV has updated its water efficiency goals based on this level of performance. Details of ECCV's water efficiency goals and measurements for success are presented in Table 6-1.

ECCV has implemented a comprehensive water conservation program described in Section 5. Significant water use savings have been realized. As part of this Water Conservation Plan, the existing water conservation measures and additional water conservation programs and measures were evaluated. ECCV conducts internal discussions among senior staff members to identify, screen, and evaluate conservation efforts and programs. Conservation measures are screened and evaluated based on their applicability to the ECCV service area (majority residential); their proven effectiveness and reliability; and whether they fit within the conservation program budget. The District is meeting its conservation goals and does not have any areas of major conservation concern; therefore, ECCV staff have selected conservation measures that will maintain the current level of water use and help to improve water efficiency. It is important to note that as a water district, ECCV does not have land use or building permit regulatory authority, as mentioned in Section 4. As a result, ECCV does not have the regulatory authority to require certain water conservation measures.

In July 2008, the CWCB awarded an efficiency grant to Colorado WaterWise, a water conservation non-profit group, to create a best management practices guidebook specific to Colorado. The second edition of the Colorado WaterWise Guidebook of Best Practices for Municipal Water Conservation in Colorado was published in 2024. It is a planning tool prepared for the purpose of improving and enhancing water efficiency in Colorado. The guidebook assists water providers with the selection and implementation of effective water conservation programs and measures. The Best Practices Guidebook for Municipal Water Conservation in Colorado (Best Practices Guidebook) offers a detailed description of specific water conservation measures, program elements, regulations, policies, and procedures that can be implemented by Colorado water providers to help ensure reliable and sustainable water supplies for future generations. The second edition of the Guidebook includes best practices in the following seven areas:

1. Planning and Implementation
2. Rates and Fees
3. Measurement and Data
4. Development and Costs
5. Education and Communication
6. Indoor Water Use
7. Outdoor Water Use

The existing ECCV water conservation measures were evaluated and compared to the Best Practices Guidebook to determine if there were potential best practices to be considered that are not already part of the current ECCV water conservation program. The best practices are shown in Table 6-2. The Best Practices Guidebook was also used to evaluate potential additional conservation measures.

Descriptions of the existing and proposed conservation measures that were evaluated are included below. For new conservation measures that have not been fully implemented, the descriptions also include steps that will be taken for implementation, the anticipated implementation timeline, and actions necessary to implement the activity. ECCV will continue to be flexible, active, and responsive to customers' conservation needs and requests. A summary of the water conservation measures is shown in Table 6-3.

Table 6-1. ECCV Water Efficiency Goals

Goal Category	Goal	Measurement of Success
Water Rate Structure	Maintain a fair and equitable water rate structure that promotes efficient use while maintaining sufficient revenue	Revenue remains sufficient and per capita demands are maintained / usage is stabilized.
Public Involvement and Education	Educate the public on the value of water. Foster a water efficiency ethic via educational outreach and publicly available tools.	Track the number of educational outreach programs, hours spent, and estimate of number of customers reached.
Water efficiency targets for certain customer categories	Continue to retrofit residential meters and promote the Eye on Water program for customer self-monitoring	Monitor billing data (water demands)
Water efficiency targets for certain customer categories	Reduce the duration of customer leaks and educate customers on detecting leaks themselves	Monitor progress of leak detection and shortened duration through water monitoring applications.
Non-Revenue water	Continue to reduce non-revenue water and maintain level below 8%	Monthly review of water produced vs. water billed. Maintain 36-month running average calculations
Water Savings for largest users	Educational outreach for high water users	Monitor billing data (water demands)

Table 6-2. Water Conservation Best Practices from Guidebook

Best Practice	Measure
BP 1 Planning and Implementation	Water Efficiency Plans
	Integration with Other Relevant Plans and Services
	Dedicated Coordination of a Water Conservation Program
BP 2 Rates and Fees	Conservation-Oriented Tap or Connection Fees
	Conservation-Oriented Water Rate Structure
BP 3 Measurement and Data	Metering
	Water Loss Control
	Water Budgets
	Data and Data Management
BP 4 Development and Codes	Development Regulations
	Building Regulations
	Other Codes and Ordinances
BP 5 Education and Communication	Education and Communication
BP 6 Indoor Water Use	Targeting Users
	Residential Indoor Efficiency
	Non-Residential Indoor Efficiency
	Customer Leak Detection
BP 7 Outdoor Water Use	WaterWise Basics
	Landscape Design, Installation and Maintenance
	Efficient Irrigation
	Landscape Transformation Programs
	Elevating the Landscaping Industry

6.2: Operational Utility Side Measures

Integrated Resources Planning – This is an existing measure and will continue to be the foundation of ECCV's water supply and demand management strategy. As described in Section 7, this approach has resulted in significant infrastructure and water rights development and operation and maintenance (O&M) costs. This measure is listed as Best Practices Guidebook Best Practice (**BP #1**).

Full Metering – All ECCV customers and associated water use will continue to be metered and billed. **(BP #3**)

Modifications to Increasing Block Rate Structure – This is an existing measure, and ECCV will continue to refine its water rate structure to promote water conservation. (**BP #3**)

Water-Use-Based Irrigation Tap Fees – This is an existing measure, and ECCV will continue to implement irrigation tap fees that are based on irrigated area and planting materials. (**BP #3**)

Sustainable Water Assurance Fee (SWAF) – ECCV will continue its program to develop renewable water supplies and reduce dependence on nontributary groundwater. ECCV will finance this with a SWAF of $30 per month, which was instituted for all residential customers. This additional water bill charge results in a water conservation signal to customers that has resulted in reduced water use. (**BP #3**)

Designated Watering Days – Designated watering days will remain in effect for all customers. This program manages the demands of peak irrigation and total water use. The continued use of patrols and remote monitoring to enforce the program will be evaluated annually. (**BP #4** and **#7**)

Seasonal Planting Limits for Turf – ECCV will continue to enforce that no new sod or grass seed planting will be allowed from June 1 to September 1. Exemptions may be made on a case-specific basis for buffalo grass planting or for specific uses such as athletic fields. ECCV will also continue the New Sod Permit Program. (**BP #4** and **#7**)

Water Waste Ordinance – ECCV adopted new rules and regulations in 2014. Specific to water conservation, the District prohibits the wasting of water and defined water waste within the service area. ECCV also outlined how water restrictions, curtailments, or prohibitions upon water use may be enacted and provided details for the tiered water rate system. Failure to comply with the Conservation Plan and violations of wasting water may result in Water Waste Charges as illustrated in the ordinance. ECCV improved enforcement of Water Waste Charges by improving automation of their monitoring and leak notification system using asset and task management systems. (**BP #4**)

High Use Target Efficiency Outreach Program – ECCV is continuing this program and starting in 2026 plans to take further steps to offer resources, education, and potential financial assistance to customers with long running high use and/or leaks. ECCV will utilize permeable vs. non-permeable areas to identify these customers. (**BP #1, #3,** and **#6**)

New Development Multi-Family Sub-Metering – ECCV now requires multi-family housing such as apartment buildings to submeter all units. Submetering units helps improve leak detection and high use within individual units. (**BP #3**)

6.3: Water Loss Control Program

Water Loss Control Program – System-wide audits have been conducted by the ECCV annually since 2005 to determine the efficiency of the water distribution system. Industry standards consider up to 10 percent non-revenue water to be acceptable. For 2015–2017, the non-revenue water averaged 5.2 percent.

A leak identification survey uses sonic leak detection equipment to identify leaks within a section of piping. The results of the survey would determine the amount of water that could possibly be saved. This measure would allow ECCV to prioritize and repair sections of the distribution system before a leak surfaces. ECCV understands the importance of identifying leaks within the distribution system and the water savings that can be achieved with such a water conservation measure. A system-wide leak detection program that would survey 20 percent of the system each year is estimated to cost$50,000 per year for contractor and administrative costs. The expenditure of

additional funds for leak detection would reduce the financial resources for other conservation programs. ECCV has established a goal of a maximum of 8 percent non-revenue water and will implement a system-wide leak detection program if non-revenue water increases to over 8 percent on a 3-year running average. (**BP #3**)

6.4: Education and Public Information

Water Efficiency Coordinator – The Water Efficiency Coordinator role was created in 2024, an expansion of the original a full-time Water Efficiency Specialist added in March 2018. This staff member's sole responsibility is water conservation and efficiency efforts to increase efficiency and lower costs for customers. The Water Efficiency Coordinator will review and evaluate the continuation of the rebate program in the next year. This staff member will also create programs and content to carry out the recommendations of this Plan. With the growing conservation efforts, ECCV also added a Water Efficiency Technician in 2024. and a Key Account Coordinator in 2025. The Key Account Coordinator serves as the liaison for customers who play a significant role in ECCV's water system and community, such as large water users (i.e. irrigators and commercial entities) and customers who require more frequent support or have complex needs. (**BP #1**)

Conservation Public Information Campaign – ECCV continues to expand their public information services, most recently adding a public outreach team and social media profiles for the water efficiency team. ECCV's social media posts include water efficiency programs and events, and water conservation strategies for customers. In 2025 ECCV and partner members with SMWSA held the first ever South Metro Water Festival Water Festival, a family-friendly event. ECCV plans to continue this event annually. ECCV continues to disseminate water conservation and efficiency information via bill inserts, brochures, and the ECCV website (http://www.eccv.org/). The ECCV website has been updated with dedicated conservation pages. These pages include educational conservation materials for customers to access. ECCV has increased outreach materials during the watering season through monthly water conservation newsletters. Water conservation and efficiency topics include information on the toilet rebate programs, irrigation management, Xeriscape landscaping, and other water-saving tips. Staff responds to residential and commercial customers with water use or billing questions and requests for water conservation information.(**BP #5**)

Xeriscape of ECCV Office and Other In-District Areas – ECCV will work on the implementation of Xeriscape Design Clinics for all water providers in the SMWSA. ECCV may hold a customer Xeriscape contest and provide prizes to the winners. Customers may also get reimbursed for taking Xeriscape classes from local garden businesses. The new demonstration garden at decommissioned well site A-13 will be used for future customer classes and demonstrations to showcase low-water landscaping options. (**BP #5** and **#7**)

School Education Programs –The ECCV public outreach team will be working with SMWSA's Water Ambassador team to create curriculum for elementary school presentations at in-district Cherry Creek Schools. (**BP #5**)

Annual Large Irrigators Water Conservation Open House – ECCV staff will continue to hold an annual open house with Large Irrigators, including HOAs, irrigation management companies and irrigation specialists. During the annual open house ECCV will review the water conservation program including irrigation water budgets, watering schedules, and water rates and penalties. ECCV will also hold meetings tailored for landscape contractors and management companies and their board members. ECCV is also considering hosting Qualified Water Efficient Landscaper certification training courses for landscape contractors.(**BP #7**)

Customer Online Access to Water Use History – Customers have online access to their water bills and have the ability to view and compare monthly water use history. This program allows customers to adjust water use in response to past history and cost of water. (**BP #3**)

EyeOnWater – ECCV will expand its EyeOnWater program to all residential customers. EyeOnWater is a mobile device app available at no cost to users. EyeOnWater allows customers with compatible meters to access hourly data from their water meter on a daily basis. Various alerts and warnings can be programmed by the user to indicate various issues with the account including leak detection. Initial installation of meters using this technology started in 2016, and in 2017 all nonresidential accounts within the District were provided with this technology. There is currently an installed base of approximately 21,634 water meters (out of approximately

22,428) that could access this information. The District is actively working to expand the use of this technology by all customers through outreach and education programs. The Water Efficiency Coordinator will provide education to customers on the capabilities of the EyeOnWater app and encourage customers to self-monitor water usage and look for leak detection. (**BP #3**)

6.5: Indoor – Residential

Toilet Rebates – ECCV will continue its toilet rebate program but will limit the toilet rebates to only those toilets that meet the EPA WaterSense criteria. The annual budget allocated for rebates will be evaluated annually. Rebates for HE clothes washers were offered through 2021 but are no longer offered. (**BP #6**)

Rules for New Construction – ECCV, as a water district, does not have the regulatory authority to require HE plumbing fixtures or other conservation measures for new residential construction. (**BP #4**)

6.6: Indoor – CII

High-efficiency Indoor Fixture Audits and Retrofits – ECCV has very limited commercial customers representing 4 percent of total billed water usage and no industrial customers. The Water Efficiency Coordinator has conducted water audits of some of ECCV's commercial customers and will conduct audits as requested. ECCV will be potentially providing toilet retrofits and submetering for properties that do not have separate irrigation and domestic use meters to target leaks and compliance with watering schedules. (**BP #6**)

Rules for New Construction – Building Codes Requiring High-efficiency Fixtures and Process Equipment – ECCV, as a water district, does not have the regulatory authority to require HE plumbing fixtures or other conservation measures for new Commercial, Industrial, or Institutional construction. (**BP #6**)

6.7: Outdoor Efficiency - Landscapes and Irrigation

Water Budgets for Irrigation Accounts – Water budgets for irrigation accounts will continue. Local ET data will continue to be used to establish the water budgets. The water budgets will also be based on irrigation area type. In 2026 ECCV will begin the process of updating all Large Irrigator irrigation budgets to more accurately reflect turf areas. ECCV will look into doing audits of all HOA customers to improve mapping and meter information related to irrigated areas. There will also be updates to the management of watering schedules and potential adjustments to watering schedules themselves, accounting for more tailored water budgets and improved controllers. (**BP #7**)

Irrigation System Water Conservation Requirements and Certification of Landscape Professionals – Irrigation design and water use requirements will continue as a performance standard. All irrigation system designs must be submitted for review and approval prior to the issuance of an irrigation tap for multi-family residential and HOA properties and inspected after installation. The irrigation designer shall be a Certified Irrigation Designer (Commercial) as certified by The Irrigation Association or other professional with extensive experience in the design of commercial irrigation systems as determined by the District Manager. ECCV may help bolster water-wise irrigation design by hosting Qualified Water Efficient Landscaper (QWEL) certifications for landscape contractors. (**BP #7**)

Water Efficient Maintenance Practices for New and Existing Landscapes – ECCV irrigation design standards will continue to require that a regular maintenance schedule be submitted to ensure irrigation efficiency. The maintenance schedule shall include weekly or biweekly reviews of the system by the owner/operator. (**BP #7**)

Efficient Irrigation Systems Program – If irrigation customers request financial assistance for the replacement of existing irrigation systems or installation of new systems with highly efficient irrigation systems, ECCV will evaluate the request on a case-specific basis to determine if there is potential for significant water savings. Efficient irrigation systems include subsurface irrigation methods to reduce evaporation losses and increase overall irrigation efficiency. The irrigation customer must show the ability to perform recommended operations and maintenance for the life of the system as a prerequisite to financial assistance from ECCV. ECCV is looking at how to approach the program and is evaluating where to focus resources. (**BP #7**)

ET Irrigation Controllers – If irrigation customers request financial assistance for the replacement of ET

irrigation controllers, ECCV will evaluate the request on a case-specific basis to determine if there is potential for significant water savings from replacement of controllers. ECCV will provide up to $35,000 for the purchase of smart controllers, as a credit to the customers water bill. All irrigation controllers must have battery backup or be unaffected by a power interruption and be secured to prevent tampering. ECCV is looking at how to approach the program and is evaluating where to focus resources. One option ECCV will be offering is cost share for HOA customers for better technology beyond smart controllers (e.g., Calsense), implementation of remote master valve shut off/remote schedule adjustments, and better overall management of systems. Once better technologies are present to monitor and manage water use, ECCV will be able to help HOA customers further optimize water budgets and schedules (**BP #7**)

Weather Station for Monthly Allowance – ECCV purchased its own weather station in 2022, which it installed near an ECCV well house. The weather station collects data including ET rates. The ET rate is factored into large irrigators water budget. If the ET rate is higher than normal then the water budget is increased for the month, but if the ET rate is lower, then the water budget is reduced for the month. The average weather data for the prior month is compiled. The average ET rate is used to determine the water budget for billing. ECCV will continue using the weather station for water budget billing. (**BP #7**)

Residential Sprinkler Controller rebates - ECCV will continue providing rebates for sprinkler controllers and is considering pairing the Slow the Flow program with the sprinkler controller rebates. ECCV offers a 50 percent rebate of up to $100 on the installation and cost of new, qualifying irrigation sprinkler controllers. As technology improves, the program may require identification of more sophisticated controllers for rebates. ECCV may possibly work with builders on providing controllers for new neighborhoods and subdivisions. (**BP #7**)

Resource Central Programs – ECCV will continue its collaboration with Resource Central's Garden In A Box, Lawn Replacement, and Slow the Flow sprinkler evaluations programs. In combination with the water budget updates for Large Irrigators, ECCV will add HOA Turf Replacement Assessments program. These will include consultation to a select number of large irrigator customers for turf replacement by providing education, support, guidance, contractor coordination and grant funding for project completion. ECCV will reimburse up to 50% of the cost for HOAs not to exceed $35,000. In addition, ECCV is looking into adding landscape webinars and in-person classes at ECCV's demonstration gardens. (**BP #5** and **#7)**

Limits on Turf Landscaping for New Construction – ECCV, as a water district, does not have the regulatory authority to limit turf landscaping for new construction and does not intend to pursue this with local governments at this time. (**BP #7**)

6.8: Water Reuse Systems

Non-potable Irrigation System – ECCV will continue to reuse legally available lawn irrigation return flows (LIRFs) for non-potable irrigation. The current non-potable irrigation users consume all the LIRF water available (338 AF in 2025). If additional water were to become available, it would be possible to expand the system where it is cost- effective and supply has been determined to be sustainable. A study for a potential next phase of the non-potable system has been completed. Expansion of the current system would require a pump station and additional piping infrastructure to reach potential users. Long- term lawn irrigation return flow credits may diminish due to increased irrigation efficiency, and there may be insufficient LIRFs to justify the cost of expansion. (**BP #1**)

Reuse of Consumable Effluent Return Flows – ECCV will continue to investigate the right to reclaim the use of all or a portion of its consumable wastewater flows for diversion in its Northern Water Supply Project, to augment alluvial non-potable well pumping or by other means. Currently, all sanitary sewer returns flow through the Aurora interceptor system and are owed to the City of Aurora under terms of the 1976 sanitary sewer service agreement and therefore are unavailable for reuse by ECCV. (**BP #1**)

Table 6-3. Evaluated Water Conservation Program Activities (continues on next page)

Water Conservation Measure	Existing Measure to be Continued	ECCV has Regulatory Authority?	Best Practices Guidebook BP #	Retained for Continued and/or Future Implementation?
Operational Utility Side Measures				
Integrated Resources Planning	X	Yes	1	Yes
Full Metering	X	Yes	3	Yes
Modifications to Increasing Block Rate Structure	X	Yes	2	Yes
Water-Use-Based Irrigation Tap Fees	X	Yes	2	Yes
Sustainable Water Assurance Fee	X	Yes	2	Yes
Designated Watering Days	X	Yes	4 & 7	Yes
Seasonal Planting Limits for Turf Sod Permit Program	X	Yes	4 & 7	Yes
Water Waste Ordinance	X	Yes	4	Yes
High Use Target Efficiency Outreach Program	X	Yes	1, 3, & 6	Yes
New Development Multi-Family Sub-Metering	X	Yes	3	Yes
Water Loss Control Program				
Annual System Water Accounting Audits	X	Yes	3	Yes
Education and Public Information				
Water Efficiency Coordinator, Water Efficiency Technician, Key Accounts Coordinator	X	Yes	1 & 5	Yes
Conservation Public Information Campaign	X	Yes	5	Yes
Xeriscape of ECCV Office and Other In-District Areas	X	Yes	5 & 7	Yes
School Education Programs	X	Yes	5	Yes
Annual Large Irrigators Water Conservation Open House	X	Yes	5	Yes
Customer Online Access to Water Use History	X	Yes	5	Yes
Eye On Water	X	Yes	3 & 5	Yes
Indoor - Residential				
High-Efficiency Toilet Rebates	X	Yes	6	Yes
Rules for New Construction		No	6	No
Building Codes Requiring High Efficiency Fixtures		No	4	No
Indoor - CII				
High-efficiency Indoor Fixture Audits and Retrofits	X	Yes	6	Yes
Rules for New Construction		No	6	No
Outdoor Efficiency - Landscapes and Irrigation				
Water Budgets for Irrigation Accounts	X	Yes	3	Yes
Irrigation System Water Conservation Requirements and Certification of Landscape Professionals	X	Yes	5 & 7	Yes
Water Efficient Maintenance Practices for New and Existing Landscapes	X	Yes	7	Yes
Efficient Irrigation Systems Program	X	Yes	9	Yes
ET Irrigation Controllers	X	Yes	7	Yes
Weather Station for Monthly Allowance	X	Yes	3	Yes

Residential Sprinkler Controller Rebates Rain Sensor, Sprinkler Nozzles and Sprinkler Body Rebates	X	Yes	7	Yes
Large Irrigator Lawn Replacement and Irrigation System Upgrades Rebates		Yes	5 & 7	Yes
Resource Central Programs Garden In A Box Slow the Flow Lawn Replacement HOA Turf Replacement Consultations	X	Yes	5 & 7	Yes
Limits on Turf Landscaping for New Construction		No		No
Water Reuse Systems				
Non-potable Irrigation System	X	Yes	7	Yes
Reuse of Consumable Effluent Return Flows		Yes	7	Yes

Section 7: Water Demand Forecasts

ECCV conducts its own annual baseline demand forecast. The District is currently at 99 percent buildout and projects to be at 100 percent buildout within 5 years. The baseline forecast represents the historical water use of 0.6 AF per SFE for all water customers. The Alliance for Water Efficiency (AWE) Conservation Tracking Tool v3.0 was used to determine plumbing code and program savings. The Water Conservation Tracking Tool is an Excel-based spreadsheet tool for evaluating the water savings, costs, and benefits of urban water conservation programs. In addition to providing users a standardized methodology for water savings and benefit-cost accounting, the tool includes a library of pre-defined, fully parameterized conservation activities from which users can construct conservation programs. Detailed information on the inputs, assumptions, and methods used in Water Conservation Tracking Tool can be found in the User Guide. Results from the AWE Conservation Tracking Tool are included in this plan.

Four demand forecasts were made using ECCV's Baseline Demand Forecast, a Climate Change Forecast for outdoor use, and the Water Conservation Tracking Tool:

1. Baseline
2. Baseline + climate change
3. Baseline + climate change + plumbing code savings
4. Baseline + climate change + plumbing code savings + existing and planned water conservation program savings

7.1: Baseline Demand Forecast

The baseline forecast represents the ECCV demand forecast based on the historical water use of 0.6 AF per SFE. This forecast is based on SFE demands before the implementation of aggressive water conservation measures starting in 2000 and the drought of 2002. The baseline forecast includes growth in SFEs as projected by ECCV. Since ECCV is nearly at buildout and remaining undeveloped land within its service area has been platted, the future land use and SFEs is known with a relatively high degree of certainty. ECCV projects that its service area will reach buildout by 2030 at 23,500 SFEs. This results in a buildout water demand of 14,100 AF per year (AFY.) This demand forecast includes an estimated 7 percent water loss but does not include the normal water supply planning safety factors. Instead, the difference between the current SFE demands with water efficiency activities and the SFE demands prior to implementation of conservation measures is incorporated as a water supply planning safety factor. The demand forecasts in Sections 7.2 through 7.4 are treated water forecasts, understanding that raw water supply requirements are greater, as described in Section 8. For the purposes of this plan, demand forecasts are treated water forecasts, understanding that firm yield raw water supply requirements are significantly greater, approximately 20–30 percent.

7.2: Baseline + Climate Change Forecast

This forecast includes the baseline demands plus additional demands for outdoor irrigation due to the impacts of climate change. Several studies on the Front Range have shown that climate change will result in a growing season that starts earlier in the spring and continues later into the fall, in addition to warmer summer temperatures. This will result in higher evapotranspiration of irrigated areas and higher outdoor irrigation requirements. These studies were summarized in McCurry 2011. Water demands are expected to increase by 6 percent based on a recent report for the Pueblo Board of Water Works (BOWW) which states that even when considering conservation efforts, demand for water is expected to increase in the future as a result of long-term growth and climate changes and is projected to be affected by short-term drought conditions (Abt Associates 2019 and Deere & Ault 2019). ECCV will be impacted by climate change and short-term drought in the same way as Pueblo Water. The studies suggested that climate change will be in full effect by 2050, thus the change in demand due to climate change is forecasted for 2050. This additional water use was added to the Baseline demand forecast.

The buildout water demand plus climate change considerations is 14,946 AFY in 2050, an addition of 846 AFY or 6 percent of demands.

7.3: Baseline + Climate Change + Plumbing Code Savings Forecast

The Baseline + Climate Change + Plumbing Code Savings forecast includes forecasted reductions in demand that have or will occur as a result of national plumbing code efficiency standards. For example, ULF toilet requirements included in the National Energy Policy Act took effect in 1994. New efficiency requirements for clothes washers took effect in 2011. In Colorado a WaterSense law was passed in 2014 requiring that only WaterSense fixtures be available for sale. Based on this legislation, the values for plumbing code savings may be realized more quickly, and this change may be reflected in the next iteration of the plan.

The Baseline + Climate Change + Plumbing Code Savings demand forecast is approximately 14,642 AFY in 2050, a savings of 304 AFY from the Baseline + Climate Change Scenario. Due to phased adoption and ramping up of plumbing code savings, the total estimated water savings from 2025–2050 could be less.

7.4: Baseline + Climate Change + Plumbing Code Savings + Program Savings Forecast

In addition to the savings projected from national plumbing code efficiency standards, the Baseline + Climate Change + Plumbing Code Savings + Program Savings forecast includes savings from the existing and planned water conservation program.

The existing and planned water conservation programs were included as inputs into the AWE Water Tracking Tool to estimate and forecast the water savings from the existing and planned programs. The total average annual estimated water savings from 2025–2050 from water conservation programs is approximately 2,535 AFY before the 6 percent increase for climate change. This is an increased annual savings of approximately 300 AF compared to the previous conservation plan due to the implementation of new conservation programs such as turf replacement and the continuation and evolution of these successful conservation programs as customer and system requirements change. Table 7.1 shows the average water savings from the current and new water conservation programs, grouped by program type. It is difficult to attribute savings to individual measures, such as select education and public information programs, as these savings are reflected in the successful implementation of other programs. As a result, the estimated water savings should be evaluated by major category rather than evaluating the efficacy of individual conservation programs. For example, Designated Water Days are under the same program and therefore single family, commercial, and schools are grouped together.

Table 7-1. ECCV Water Conservation Activities and Savings included in AWE Tool

Program	Average Savings through 2035* [AF]	Average Savings through 2050* [AF]
Water Loss Control Program (System wide Leak detection)	0	0
Residential Surveys	15	7
Large Land. Irrigation Controller	25	10
Residential HE Toilets, SF	58	58
Residential Irrigation Controller and Efficient Nozzles, SF	64	32
Residential HE Washer, SF	69	37
Large Landscape Water Budgets	110	110
Residential Turf Replacement	176	90
Large Land Turf Replacement	190	82
Designated Water Days	668	668
Residential Increasing Block Rates	705	706
Enhanced Water Meters	721	734
Total	**2,802**	**2,535**

**These are the average annual savings from 2025 - 2035 and 2025 - 2050. Savings by 2050 are estimated at 2,390 AFY after the 6% increase for climate change.*

The highest average savings came from the programs related to Enhanced Water Meters such as the Full Metering and New Development Multi-Family Sub-Metering programs. Closely following these were the Residential Block Rates and Designated Watering Days. Despite Large Landscape groups such as HOAs and Schools having higher

water allotments, the Large Landscape Water Budget category had less savings than the Residential Block Rates. This is due to the much larger number of residential accounts compared to commercial accounts. By 2050, the total estimated water savings from conservation programs decrease to 2,390 AFY (with an addition of 6% for climate change impacts) as a result of declining savings several years after residential water conservation survey activities have taken place and the useful life of install devices has ended.

Programs not part of the forecast include programs such as the Annual System Water Accounting Audits, where the water savings is indirect and varies based on need. The goal of the audit is to understand on an annual basis the percent of non-revenue water (water loss). If the audit shows an increase in water loss above 8 percent on a 36-month running average, then ECCV would implement system-wide sonic leak detection at an annual cost of $100,000 per year. This action could then be categorized as a program savings activity. The audit is valuable; however, the savings are not anticipated to occur given the average age of transmission and distribution lines, the very low frequency of water line breaks, and system losses that are well within industry standards, and, therefore, are not included in the forecast.

In 2050 the total annual water savings forecast including the plumbing code and ECCV program code savings is 2,694 AF. This represents an 18 percent total savings over the baseline plus climate change water demands as shown in Table 7.2.

Table 7-2. ECCV Water Conservation Savings

Service Area Water Savings	Units	2050
Plumbing Code Water Savings	AF	304
Program Water Savings	AF	2,390
Total Water Savings	**AF**	**2,694**
% of Baseline + Climate Change Demands	%	18%

Section 8: Impacts of Conservation Programs

The forecasted total water savings of 2,694 AFY represents significant benefits to ECCV. Figure 8-1 shows the annual water demands based on the baseline, baseline + climate change, baseline + climate change + code savings, and baseline + climate change + code savings + program savings for 2024 to 2050. Also included in this figure is the estimated current capacity of the ECCV water supply system. The current limiting factor is water production capacity.

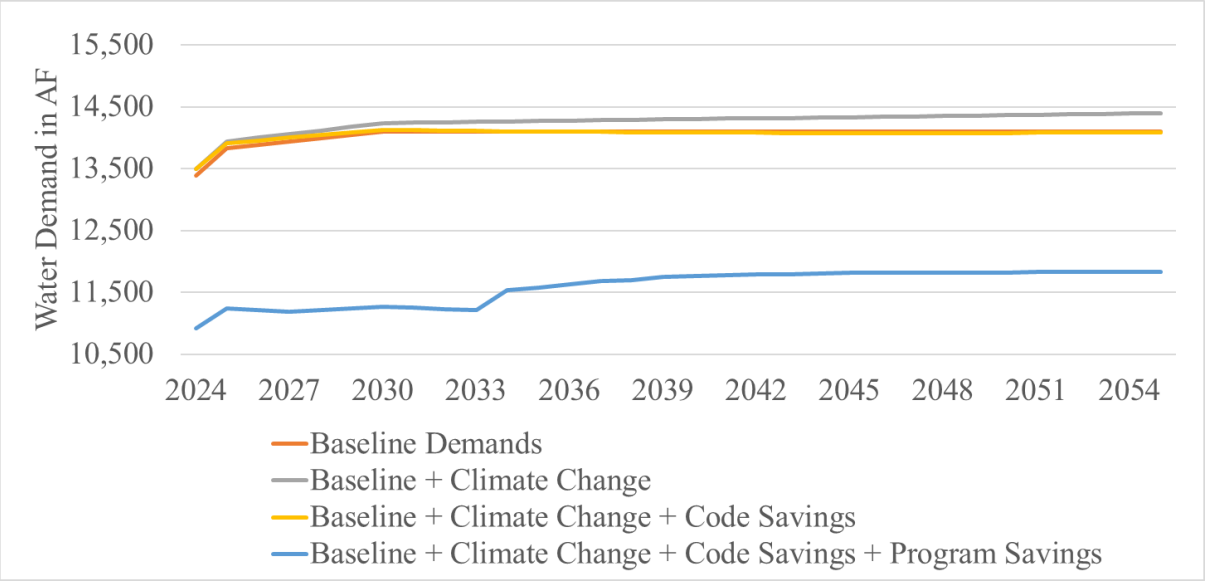

Figure 8-1. ECCV Forecast Total Water Demands

8.1: Benefits and Financial Savings

The following benefits and potential financial savings in capital improvements have been identified based on the projected water savings. Ongoing conservation efforts have will continue to be required to ensure that the identified water conservation savings can be made permanent.

Raw Water Supply Development – ECCV will continue to acquire renewable water supplies to meet buildout water demand. The estimated cost for additional raw water supply development, including water rights acquisitions, Water Court transfers, diversion facilities, operational and firming storage, alluvial pretreatment, and conveyance to the ECCV Water Treatment Plant is $32,000 per acre foot. The forecast demand reduction of 2,694 AFY from the ECCV water conservation programs and plumbing codes (combined program), if permanent, represent a savings of $86.2M (based on $32,000/ AF).

Water Treatment Plant – The projected reduction in peak demands from the combined program is 9 MGD. The projected cost per MGD of additional water treatment capacity, including RO concentrate disposal through a deep injection well, is $5.8M. This represents a total savings of $52.2M from avoided water treatment capital projects.

Northern Pipeline and Pump Stations – The projected savings in peak demands from the combined program is 9 MGD. ECCV has already constructed the Northern Pipeline to meet its baseline peak demands. ECCV reserved approximately 24 MGD capacity for buildout demand in the Northern Pipeline and Pump Stations. If conservation programs and plumbing code savings are achieved, ECCV could have 9 MGD of additional capacity to sell. ECCV has already sold available capacity for $1.5M per MGD. The cost to develop additional pumping capacity in the ECCV North and South Booster Pump Stations is $1.5M per MGD. The total combined savings or additional revenue if freed capacity is sold is $22.5M.

The savings to ECCV for capital expenditures is summarized in Table 8-1. The total savings in avoided capital expenditures for raw water supply development, water treatment, and conveyance infrastructure is $160,908,000. Ongoing water conservation programs will be needed to ensure that these savings are permanent.

Table 8-1. ECCV Capital Expenditure Savings

Water Development Activity	Water Demand Units	Total Water Conservation Program Forecast Demand Reductions	Estimated Unit Cost	Total Financial Savings if Demand Reductions are Permanent
Raw Water Supply Acquisition and Development	AFY	2,694	$32,000	$86,208,000
Water Treatment	MGD	9	$5,800,000	$52,200,000
Northern Water Line and Pump Stations	MGD	9	$2,500,000	$22,500,000
Total				**$160,908,000**

8.2: Conservation Program Costs

The estimated cost to ECCV per AF saved by the program was evaluated using the AWE Tool is shown in Figure 8-2. The residential increasing block water rates, which ECCV has been implementing for over 20 years, continues to be a low-cost and effective program for water savings. The installation of enhanced water meters for commercial and residential accounts, allowing customers to self-monitor their water usage and detect leaks with the EyeOnWater app, is another cost-effective measure that ECCV began implementing in 2016. The relatively high costs for education and public information is partially attributable to the incorporation of some of the savings from education and public information to other conservation measures that are successfully implemented as a result of the education and public information programs. Although not included in the table, the estimated loss control (system- wide leak detection) program is also a high cost program as the ECCV water transmission and distribution system is relatively young, water line breaks average 3.4 per year, and non-revenue water is well within industry standards. Water loss savings from system leaks can vary significantly, and it is questionable how much reduction ECCV may achieve given its low system loss percentage. Implementing a system-wide leak detection program is a lower priority at this time. As the system ages, water loss control may be expected to be more cost-effective. As noted, a system-wide leak detection program covering 20 percent of the system annually will be implemented if system losses average greater than 8 percent on a 36-month running average. The Water Efficiency Specialist may conduct water audits of ECCV's commercial customers as requested. A measure to address commercial indoor fixtures or processes will be implemented if warranted based on the results of the audits, and additional water savings will be assessed as part of the audit.

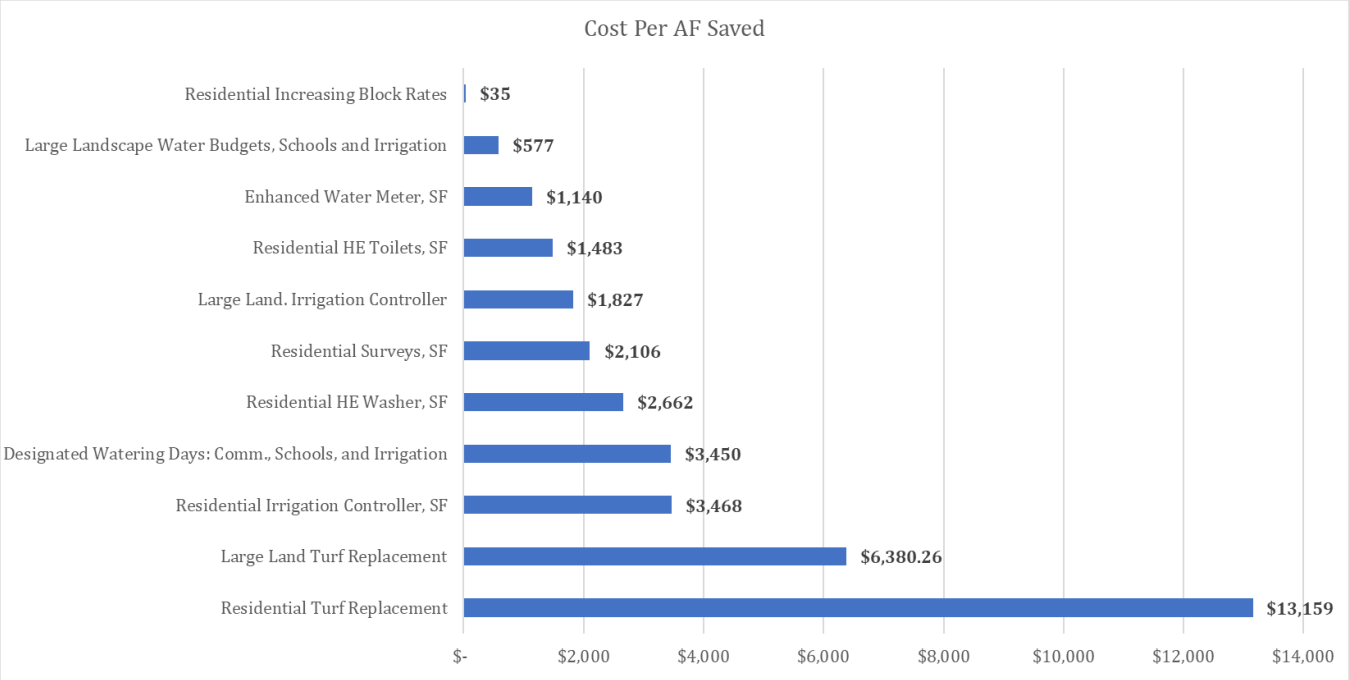

Figure 8-2. Conservation Programs Cost to ECCV per AF Saved

8.3: Other Considerations

There are other considerations in addition to reduced capital project expenditures when evaluating the impacts of the water conservation program.

Reduced Non-potable Irrigation Supply – As irrigation demands are reduced, the lawn irrigation return flow credits generated from lawn watering are also reduced. This results in less augmentation supply available to offset the ECCV non-potable well pumping. The impacts on the non-potable system have not been quantified for this analysis but will be monitored on an ongoing basis as part of the non-potable irrigation accounting.

Sewer Charges – ECCV currently pays a flat monthly fee per SFE to the City of Aurora for conveyance of sewer flows to Metro Wastewater Reclamation District and treatment by Metro. ECCV charges its customers a flat monthly fee for sewer service. As a result, any decreases in sewer flows by individual users do not result in reductions in sewer charges to that customer. The estimated sewer flows are evaluated periodically by reviewing water usage data, and any reductions in indoor water usage resulting in reduced total sewer flows can result in reductions in the total sewer charge paid by ECCV to Aurora that can be passed on to customers.

Operations, Maintenance, and Replacement – Most of the ECCV O&M costs are fixed, especially for labor. The 18 percent forecast demand reductions will likely only result in minor savings in labor costs. The savings will primarily be realized in operations and maintenance costs such as electricity and chemicals from the reduced need to divert, treat, and pump supplies. Over the long term, there will be fewer capital facilities to replace. Based on ECCV's estimate of the variable operations, maintenance, and replacement costs per AF of water treated of $1,600, for an annual savings of $4.3M. This is not a direct savings to ECCV as it would not treat and deliver this water without customer demand. The customers would experience annual savings of $6.4M, assuming an average cost of water saved at $7.30 per 1,000 gallons.

Reduced Revenue – As noted, ECCV will experience less O&M and the customers will pay less in water bills. This results in a loss of potential revenue to ECCV. As long as ECCV can recover its costs for existing investment in the Northern Pipeline and Pump Stations, this loss of potential revenue should not present a problem for operations, although the ECCV fixed costs for labor will likely not be reduced. The District's water charge structure has significant flat fees which are not impacted by volumetric changes in demand which help mitigate reduced revenue due to conservation or drought.

Section 9: Implementation and Monitoring Plan

9.1: Implementation

ECCV will continue its current water conservation programs. In addition, it will implement the new programs as previously described in Section 6 and shown in Table 9-1. This table also indicates the proposed dates of implementation.

9.2: Ongoing Monitoring

ECCV will track the impacts of the Conservation Plan annually and will collect data monthly. Monitoring of total and billed water usage will provide information on water use and progress toward the water conservation goals. ECCV will also track system per capita water use, system peak day water use, and billed water use by customer category including treated and raw metered water use. As part of ECCV's Annual Water Efficiency Report to the CWCB, ECCV will also document meter-reading frequency; meter updates; the billing rate structure; system loss and leak detection information; conservation program incentives, staffing, costs, and education; and water waste activities. Utilities staff will continue to produce an annual report on the conservation program that includes a detailed description of plan implementation as well as the measured impacts on usage. Conservation Plan monitoring and evaluation results including lessons learned will be communicated to the ECCV Board of Directors at the annual Board Retreat, which occurs every fall.

Table 9-1. ECCV Implementation Plan

Water Conservation Measure	Date of Implementation if New Measure
Operational Utility Side Measures	
Integrated Resources Planning	Ongoing
Full Metering	Ongoing
Modifications to Increasing Block Rate Structure	Ongoing
Water-Use-Based Irrigation Tap Fees	Ongoing
Sustainable Water Assurance Fee	Ongoing
Designated Watering Days	Ongoing
Seasonal Planting Limits for Turf Sod Permit Program	Ongoing 2025
Water Waste Ordinance	Ongoing
High Use Target Efficiency Outreach Program	2025
New Development Multi-Family Sub-Metering	2019
Water Loss Control Program	
Annual System Water Accounting Audits	Ongoing
Education and Public Information	
Water Efficiency Coordinator (formerly Specialist), Water Efficiency Technician, Key Accounts Coordinator	2018, 2024, 2025
Conservation Public Information Campaign	Ongoing
Xeriscape of ECCV Office and Other In-District Areas	Ongoing
School Education Programs	Ongoing
Annual Large Irrigators Water Conservation Open House	Ongoing
Customer Online Access to Water Use History	Ongoing
Eye on Water	Ongoing
Indoor - Residential	
High-Efficiency Toilet Rebates	Ongoing
Indoor - CII	
High-Efficiency Indoor Fixture Audits and Retrofits	Ongoing
Outdoor Efficiency - Landscapes and Irrigation	
Water Budgets for Residential and Irrigation Accounts	Ongoing
Irrigation System Water Conservation Requirements and Certification of Landscape Professionals	Ongoing

Water Efficient Maintenance Practices for New and Existing Landscapes	Ongoing
Efficient Irrigation Systems Program	Ongoing
ET Irrigation Controllers	Ongoing
Weather Station for Monthly Allowance	Ongoing
Residential Sprinkler Controller Rebates	Ongoing
Rain Sensor, Sprinkler Nozzles, and Sprinkler Body Rebates	2019
Large Irrigator Lawn Replacement and Irrigation System Upgrades Rebates	2024
Resource Central Programs	
Garden In A Box	2022
Slow the Flow	2023
Lawn Replacement	2024
HOA Turf Replacement Consultations	2026
Water Reuse Systems	
Non-potable Irrigation System	Ongoing
Reuse of Consumable Effluent Return Flows	See Note 1

Note: ECCV will continue to investigate the right to reclaim the use of all or a portion of its consumable wastewater flows for diversion in its Northern Water Supply Project to augment alluvial non-potable well pumping or by other means.

9.3: Compliance with State Planning Requirements

Colorado Statutes Title 37 Water and Irrigation – CWCB and Compacts 37- 60-126 requires a state-approved water conservation plan for covered entities as a condition of seeking financial assistance from the CWCB. Key planning requirements of the statute include the following items:

1. Consideration of specific conservation measures and programs including (I) fixtures and appliances; (II) water-wise landscapes; (III) CII measures; (IV) water reuse systems; (V) water loss and system leakage; (VI) information and education; (VII) conservation-oriented rate structure; (VIII) technical assistance; (IX) regulatory measures; (X) incentives and rebates.
2. Role of conservation in the entity's supply planning.
3. Plan implementation, monitoring, review, and revision.
4. Future review of plan within seven years.
5. Estimated savings from previous conservation efforts as well as estimates from implementation of current plan.
6. A 60-day minimum public comment period.

As identified in Sections 6 and 9.1, all of the criteria listed in 1-5 above have been satisfied. In addition, as noted in Section 6, the measures identified in the Best Practices Guidebook were also used to guide the selection of conservation measures.

A public review of the Conservation Plan (#6) took place from December XX, 2025 to February XX, 2026. A draft version of the Plan was provided to the public on the ECCV website (https://www.eccv.org/conservation), and the public was invited to review the draft and provide comments or ask questions via telephone or e-mail correspondence. No comments were received.

The ECCV Water Conservation Plan was formally adopted by the ECCV Board of Directors on February XX, 2026. A copy of the Board Memo officially adopting the plan is included in Appendix D.

9.4: Plan Refinement

ECCV will review the program and implementation for conformance with this plan annually. ECCV may adjust the programs identified in this plan as warranted due to new technology or analysis of the effectiveness of individual programs. Monitoring results will be evaluated and ECCV will determine if changes to conservation programs are needed to maintain the current level of water conservation and efficiency. Necessary modifications

identified will be incorporated into plan updates. A complete review and revision of the Conservation Plan will be completed seven years after adoption.

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Appendix A: WISE SYSTEM

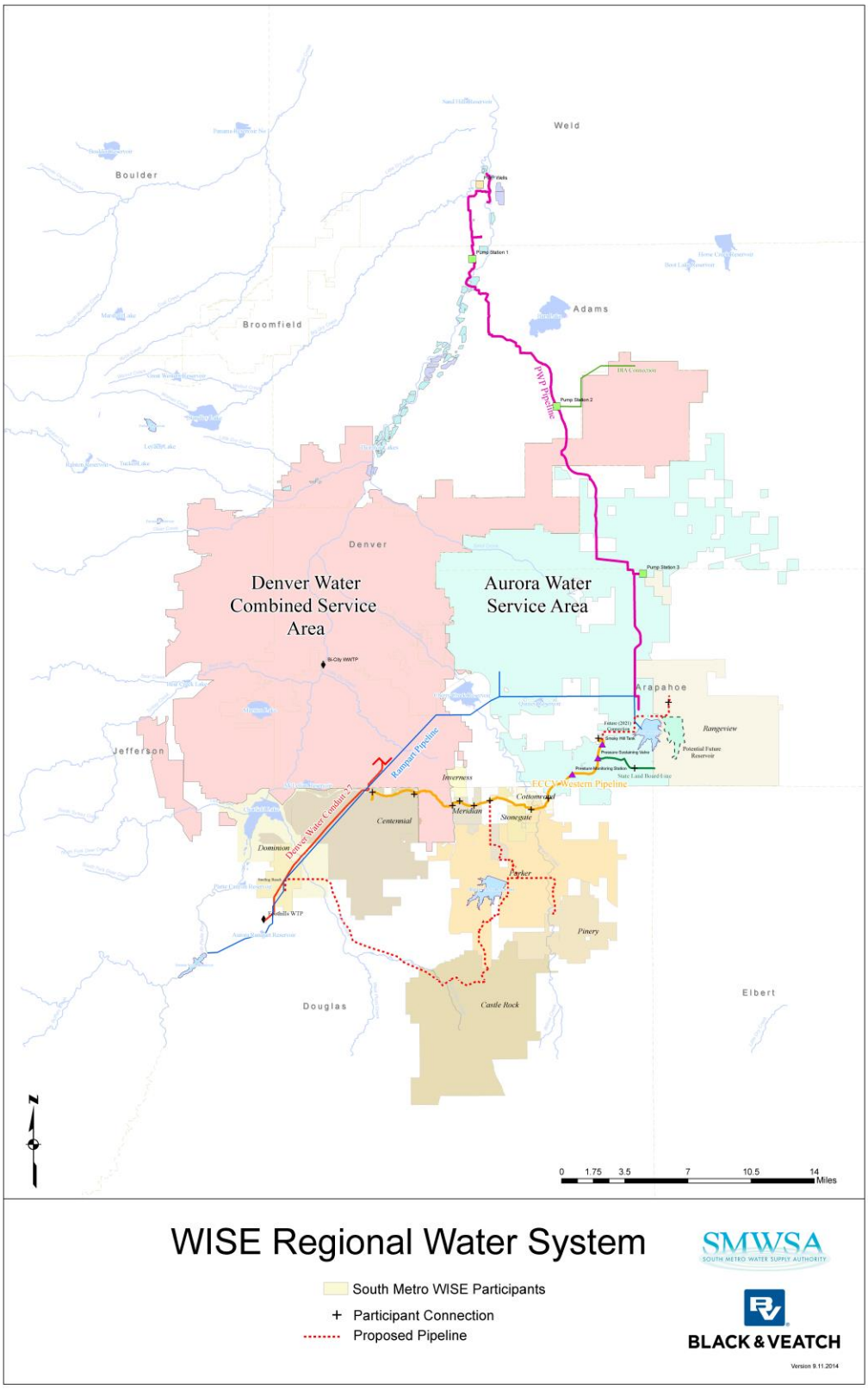
The WISE (Water Infrastructure and Supply Efficiency) Partnership

In February 2008, Aurora Water and Denver Water entered into an Intergovernmental Agreement (IGA) to investigate cooperative water supply opportunities; i.e., the sharing of water and/or infrastructure that could be mutually beneficial. In November 2008, the South Metro Water Supply Authority (SMWSA) joined the investigation through a Memorandum of Understanding (MOU). It was the expectation of the parties that the engineering investigations would lead to the development of a joint water supply project, utilizing available supplies and capacities in the parties' existing and planned water systems. The relationship between the three parties was solidified with an IGA executed in May 2009, with a final Water Delivery Agreement (WDA) defining the terms of deliveries executed in December 2013. The collective group of water suppliers are now referred to as the Water Infrastructure and Supply Efficiency (WISE) Partnership.

The backbone of WISE is Aurora's Prairie Waters Project (PWP). PWP, shown in the map below, pumps reusable water from the lower South Platte back to Aurora, where it is treated at the Binney Water Purification Facility. There are times when Aurora has available capacity in PWP and unused treatment capacity at Binney. At times, Aurora also has available reusable supplies in the lower South Platte that could be delivered to PWP.

Denver Water has an extensive water delivery system, including water it diverts from the west slope to the South Platte through the Roberts Tunnel. After Denver makes use of that water, the unconsumed portions of these flows return to the lower South Platte near PWP. These return flows are fully reusable, which, at times, Denver cannot fully use.

The SMWSA is comprised of thirteen water providers in Douglas and Arapahoe counties. The SMWSA relies heavily on non-renewable groundwater, and has been investigating developing renewable surface water supplies for a number of years. Several years of engineering study have identified opportunities to achieve efficiencies within the three systems of the Partnership through sharing and cooperative uses of infrastructure and supplies. A regional water supply project concept was developed and the necessary agreements are in place. Ten of the thirteen SMWSA members have contracted to receive water under the WISE Partnership. The ten members formed the new South Metro WISE Authority (WISE Authority) and are a signatory to the WDA, and include: Centennial Water and Sanitation District, Cottonwood Water and Sanitation District, Dominion Water and Sanitation District, Inverness Water and Sanitation District, Meridian Metropolitan District, Parker Water and Sanitation District, Pinery Water and Wastewater District, Rangeview Metropolitan District, Stonegate Village Metropolitan District, and the Town of Castle Rock.

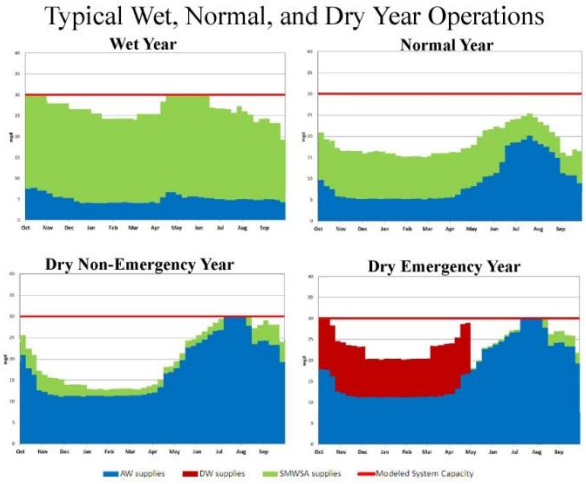

Weld
Boulder
Broomfield
Adams
Denver
Jefferson
Arapahoe
Douglas
Elbert
PWP Pipeline
Rampart Pipeline
Denver Water Combined Service Area
Aurora Water Service Area
Inverness
Centennial
Meridian
Cottonwood
Stonegate
Dominion
Parker
Pinery
Castle Rock
Rangeview
Potential Future Reservoir
ECCV-Western Pipeline
Denver Water Conduit 27
0 1.75 3.5 7 10.5 14 Miles
WISE Regional Water System
SMWSA
SOUTH METRO WATER SUPPLY AUTHORITY
South Metro WISE Participants
Participant Connection
Proposed Pipeline
BLACK & VEATCH
Version 9.11.2014

How the WISE Partnership Works

Sharing infrastructure capacity and available water supplies will provide significant benefits to all three partners. The majority of the time, supplies will be made available to South Metro from both Aurora and Denver. Aurora and Denver offered to make available 100,000 ac-ft every 10 years. Of this, the WISE Authority subscribed to 72,250 ac-ft every 10 years with an average delivery of 7,225 ac-ft/yr, and under an option agreement with Douglas County the project can grow to the full 100,000 ac-ft/10 yrs. Deliveries noted in this summary are based on the current WDA; if additional options are exercised by Douglas County, deliveries will be adjusted accordingly. Water deliveries do vary and are interruptible, with annual deliveries ranging from at or near 0 up to a maximum annual delivery of 18,063 ac-ft under the WDA. Some South Metro water providers may be able to store WISE water in the Town of Parker's Rueter-Hess Reservoir, further stretching the yield of the project. Aquifer storage and recovery (ASR) is also being investigated by South Metro as a means to firm project yield.

Denver Water will benefit by being able to utilize the project to provide up to 15,000 ac-ft/yr of backup water supply for its own needs on an infrequent basis.

Aurora will benefit by putting its PWP system to fuller use, keeping rates down for its customers.



WISE water deliveries are possible due to the manner in which the partners' water supplies and infrastructure can be utilized both seasonally and under varying hydrologic conditions. The chart to the left shows examples of how WISE could operate under a modeled wet, normal, and dry year, and in a year when Denver Water needs to use its supplies. The chart shows Denver Water using its supplies during a dry year for illustration, but Denver Water may choose to use its supplies in any type of hydrologic conditions when it needs its backup supply. The red line represents the capacity of the PWP system. The blue area represents Aurora's planned use, the red area is Denver's, and the green area represent water available to South Metro. For instance:

- *Wet Year* – Aurora would have adequate mountain supplies and not need to fully utilize PWP, Denver may also not need to take deliveries through WISE, leaving a large amount of water available to South Metro.
- Normal *year* (not wet or dry) – Aurora's use of PWP will increase, Denver might again not use the system, and significant supplies would be available to South Metro.
- *Dry year* – Aurora will rely heavily on PWP, likely using the full system capacity during the summer months. If Denver also needs to use its backup supply, there would likely be limited capacity and supply available for South Metro. However, Denver may not always choose to take water in dry years and some limited supplies and capacity may still be available to South Metro during such years.

Note that if Denver chooses to take water in wet and normal years, there will generally be sufficient supply and capacity remaining to also allow some level of WISE deliveries to South Metro. The water available to South Metro is a mix of Denver and Aurora available reusable supplies. The relative mix will vary from year to year. In wet years, it will generally be mostly Aurora supplies as Denver is not anticipated to have reusable effluent. In drier years, the supply could be mostly from Denver. In normal years, the supply will be a mix of the two sources.

WISE water will be fully treated potable water through a process of treatment and blending that will result in water that meets or exceeds all existing and anticipated drinking water standards and provides water that will be indistinguishable from Aurora's current supplies. Deliveries under all scenarios would be at a master meter connection at which water will be conveyed to individual members of South Metro.

Delivery Schedule and Implementation

Downstream of the Master Meter, the WISE Authority will invest in significant infrastructure. The WISE Authority and Denver Water purchased East Cherry Creek Valley's Western Pipeline as the transmission pipeline for WISE water deliveries. Modifications necessary to make that pipeline successfully operate the WISE project are being designed and constructed in anticipation of water deliveries starting in 2016. In addition to Western Pipeline modifications, a number of connections to the pipeline will be constructed by WISE Authority members in order to take delivery of water. Initially, 5,000 ac-ft/yr will be offered each delivery year under this plan through 2021. Deliveries exceeding 5,000 ac-ft/yr may be offered on an as-available basis. During this delivery period, additional infrastructure will be constructed by the Partnership to increase these deliveries to an average of 7,225 ac-ft/yr with a commitment to provide 72,250 ac-ft over a 10-year block period on a permanent basis.

The WISE (Water Infrastructure and Supply Efficiency) Partnership

Denver Water and Aurora Water have been providing water to more than 2/3 of the Denver Metro Area's population for over 100 years and 60 years, respectively, and the WISE Partnership can provide a much-needed reliable and sustainable water supply to the South Metro area for years to come. As indicated below, the WISE Partnership will be of mutual benefit to Aurora, Denver, and South Metro.

The WISE Partnership truly represents:

A Regional Partnership for a Sustainable Water Future

Benefits to Aurora

- Efficient utilization of the Prairie Waters Project (PWP) system
  - Offset PWP costs
  - Share in the cost of future expansion and water rights purchases
  - Protects current and future firm yield of water supply system

Benefits to Denver

- Back up supply for Denver
  - Access to unused supplies
  - May be used to replace portion of "Strategic Water Reserve"
  - New "system feed" from lower South Platte

Benefits to South Metro

- Greater regional cohesion
- Efficient utilization of regional infrastructure
- Provides a portion of the region's renewable water supply goal
- Reduces reliance on groundwater
- Minimizes the need to purchase agricultural water rights

Benefits to Partnership

- Connected systems and a cooperative atmosphere will provide added options and redundancy during emergencies
- A regional solution to best utilize existing water and infrastructure resources to meet future water supply needs in a regionally sustainable manner
- Reducing legal fees and water rights disputes between parties

Appendix B: EyeOnWater and Badger Meter

Badger Meter

BEACON® Advanced Metering Analytics

Managed Solution

OVERVIEW

The BEACON® Advanced Metering Analytics (AMA) managed solution from Badger Meter brings a new level of utility optimizing information to light. The managed solution approach combines our intuitive BEACON AMA software suite with the proven ORION® communication technologies to give you greater visibility and control over utility management.

Configured for your utility, the BEACON AMA managed solution utilizes two-way communications—plus cellular and fixed networks—to deliver a simple, yet powerful end-to-end-solution.

Built-in infrastructure management services and a system design that keeps you in step with technology advancements, allows you to do what you do best—manage your water utility. Plus, built-in consumer engagement tools help enhance customer service, increase satisfaction and reduce costs.

SOFTWARE APPLICATIONS

BEACON Advanced Metering Analytics (AMA)

With tools beyond meter reading and network management, BEACON AMA software offers targeted Advanced Metering Analytics. BEACON AMA software puts interval meter data to work to increase efficiency in day-to-day utility operations and address demands for actionable intelligence.

- **Problem solver** – User intuitive data tools place the power of water consumption data at your fingertips, allowing you to rapidly respond to customer inquiries and quickly resolve—and even eliminate—many billing issues.
- **Customized design** – A customizable dashboard delivers information configured to user security access level in a format matched to the utility's individual requirements, providing data management integrity, security and control.
- **Works with you** – Integration with utility systems—billing, work order, inventory, Customer Relationship Management (CRM) and Geographic Information Systems (GIS)—streamlines and improves utility operations without disrupting the current utility billing interface file transfer process.
- **Find out fast** – Alert conditions can be set to monitor and notify users of system exceptions, including continuous flow, for faster leak detection.
- **Innovation at your service** – Secure, hosted platform with automatic software upgrades ensures the latest technology and features are always available.

EyeOnWater®

The BEACON AMA software suite includes informative consumer outreach tools to improve customer service consisting of the EyeOnWater consumer engagement website, smartphone mobile apps, and email or SMS text alerts, providing easy access to personal consumption data and alerts to potential leaks. With these tools, water consumers are able to view their usage activity, and gain greater understanding and control of what they use and the value you provide.

HARDWARE

The BEACON AMA managed solution is built on the proven ORION system for interval data capture and two-way communication. In a managed solution, a network analysis of the deployment area is performed to determine the optimal mix of ORION technologies to achieve system performance goals. Should the analysis recommend the inclusion of any fixed network gateways and endpoints, Badger Meter installs and maintains the gateways. The solution also employs cellular endpoints which, as they leverage the public cellular network and require no proprietary gateways to operate, dramatically reduce infrastructure requirements compared to a traditional fixed network. This speeds installations and simplifies expansion as a system evolves.

- **Hourly data** – ORION endpoints are programmed to automatically broadcast hourly meter reading and event data to the BEACON software on a daily basis. Hourly data helps identify potential customer-side leaks and other anomalies in water use, and provide the utility with a potent tool to enhance its customer service. Optionally, endpoints can be reprogrammed over the air via the network to collect data and transmit more frequently.
- **Two-way communication** – BEACON software communicates with ORION endpoints to accomplish a number of system tasks, including requesting additional information from the endpoint and synchronizing the internal endpoint clock. If needed, the ORION two-way system architecture sends upgrades to the endpoint firmware over the air via the network, utilizing the powerful BEACON AMA software suite.
- **Data integrity** – ORION endpoints utilize secure and robust encryption to ensure that data is reliably transmitted and received, that the integrity of the data is maintained, and that data cannot be captured or altered by unauthorized users.

Product Data Sheet

SECURITY

BEACON AMA is ISO 27001 certified and SOC 2 examined for security, availability and confidentiality.

TECHNICAL SUPPORT AND TRAINING

Configured for the utility, the safe and secure BEACON AMA managed solution provides utilities with regular software updates, long-term support and maintenance. Comprehensive training is provided at the time of system deployment. To maintain best practices, a library of online videos and options for web-based training and support are also available. Once deployed, our technical support specialists can be contacted by phone, email and web to provide ongoing, customer-friendly support.

Additionally, Badger Meter offers extended customized training to further enhance user expertise.

TECHNICAL REQUIREMENTS

BEACON AMA

Developed as a hosted software platform, BEACON AMA is a cloud-based application accessed through a standard web browser. Internet access is required. User logins provide secure access.

BEACON AMA supported web browsers include the latest and next previous major releases of Google® Chrome, Microsoft® Edge, Mozilla® Firefox®, Microsoft® Internet Explorer® (IE 11 only); and Apple® Safari®.

EyeOnWater Consumer Engagement

The EyeOnWater consumer engagement website is a cloud-based application accessed through a standard web browser. Internet access is required. Water consumer user logins provide secure access to their information.

Supported web browsers include the latest and next previous major releases of Google® Chrome, Microsoft® Edge, Mozilla® Firefox®, Microsoft® Internet Explorer® (IE 11 only); and Apple® Safari®.

EyeOnWater smartphone applications require Android 4.1 or iOS 9.1 or later, and can be downloaded from Google Play or the Apple Store. Maximum screen density for Android smartphone applications is 640 ppi.

Making Water Visible®

www.badgermeter.com

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Appendix C: ECCV Non-Residential Water Tier Breakdown

Tier Breakpoints for Non-Residential Classes

1. For Multi-Family, Commercial, Government & Municipal-like Entities, the total units per Tier is multiplied by SFE equivalent (meters size) in Table A (see below).

Table A. Water Meter Size Single Family Equivalent

Water Meter Size (inches)	Single Family Equivalent (SFE)
¾"	1
1"	2
1 ½ "	4
2"	8
3"	18
4"	36

Units per tier are multiplied based off a ¾" Residential Tier breakdown:

- Tier 1 (5 units)
- Tier 2 (13 units)
- Tier 3 (10 units)
- Tier 4 (99999 units)

2. Schools (Domestic Only) are based off School type:

*Preschool T1 = 20 units T2 = 30 units T3 = 25 units Tier 4 = 9999 units

*Elementary School T1 = 80 units T2 = 120 units T3 = 100 units Tier 4 = 9999 units

*Middle School T1 = 185 units T2 = 278 units T3 = 231 units Tier 4 = 9999 units

*High School T1 = 400 units T2 = 600 units T3 = 500 units Tier 4 = 9999 units

3. School Irrigation (Potable & Non-potable) Tiers are custom based off water rate code that is determined by irrigated acreage. No Tier 1. ***

4. For Schools that have only one meter (Domestic & Irrigation) the non-irrigation months (November – March) bill at the Domestic Tier rates above and the Irrigation months (April – September) bill at the School Irrigation rates above.

5. Irrigation Only (Potable & Non-potable) Tiers are custom based off a water rate code that is determined by irrigated acreage. No Tier 1. ***

6. ACWWA water rate (TPT) does not have Tiers and is currently billing at $2.34 per unit (no limit). ACWWA Capacity Fee (ACF) & ACWWA Admin Cost Markup (ACM) change per ECCV Accounting discretion. ACWWA Billing Fee (ACB) is a fixed Admin Fee billing at ¾" Residential & Commercial going rate.

***For Irrigation Only Water Rates (Those that do NOT have Tier 1) water rate codes are determined by area. The number of units per tier is based off a formula using irrigated acreage & expected demand by area based off historical average monthly precipitation values. During irrigation months (March – November), they are multiplied by a 'weather factor' providing an additional percentage of units at each tier using the actual monthly precipitation values.

*NOTE: Over 95% of our Water Rates DO NOT fall under Irrigation Only or Schools.

Most active billings accounts have water rate codes:

Residential = WR1 & WR2
Commercial = W01, W02, W03, W04, W05, W06

These common rate codes above all follow Table A (Meter Size/SFE) multipliers to determine the total units allotted for each tier.

Usage and Billing

All usages are even numbers (in 1,000 gallons). Do you bill customers based on rounded usage? If so, do you round them up or down?

ECCV only bills per 1,000-gallon increments. Meter reading is actual reads so it's not rounded but for monthly billing purposes you could say ECCV bills by 'rounding down'. We don't charge the 1,000-gallon increment until the read rolls over to the next 1,000-gallon value. For example: a monthly billing read totals 9,995 gallons used, they will only be billed for 9,000 gallons that month. The next billing read starts at the same prior end read. When the water consumption reads greater than or equal to 1000 gallons (+5 gallons in this case) the 1,000-gallon increment will be added to the total monthly water billed for the next month.