### 2019 Colorado Springs Utilities Water Tour Itinerary

#### DAY 1
**Thursday, September 5, 2019**

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<th>Time</th>
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<tr>
<td>7:00 – 7:30</td>
<td>• Check-in at Conservation &amp; Environmental Center, 2855 Mesa Rd.</td>
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<tr>
<td>7:30 – 9:20</td>
<td>• Conservation &amp; Environmental Center - Water System Overview, Water Treatment Plant Upgrades, Water Wise Garden Tour</td>
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<tr>
<td>9:20 – 12:00</td>
<td>• Crystal Reservoir/ North Slope System – Dam Resurfacing Project, Watershed Protection/ Fire Mitigation, Wildland Fire Team, Lunch</td>
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<td>12:00 – 2:25</td>
<td>• Travel to Mountain Raw Water System</td>
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<td>2:25 – 3:15</td>
<td>• Arkansas River Diversion – Project Overview, Recreational Partnerships</td>
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<td>4:30 – 6:00</td>
<td>• Leadville - Hotel Check-in and Break</td>
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<td>6:00 – 7:30</td>
<td>• Dinner at Treeline Kitchen, Leadville</td>
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#### DAY 2
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<td>• Breakfast and Hotel Check-out</td>
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<td>8:00 – 9:00</td>
<td>• Travel and Camp Hale Pull-off – Eagle River MOU</td>
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<td>9:00 – 10:55</td>
<td>• Homestake Reservoir – Overview and dam walk</td>
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<td>10:55 – 2:00</td>
<td>• Travel and Otero Pump Station – Lunch, Tour</td>
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<td>2:00 – 4:30</td>
<td>• Return to Colorado Springs Conservation &amp; Environmental Center</td>
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Colorado Springs Utilities... Your four service utility

In 1924, citizens of Colorado Springs, growing dissatisfied with private utility practices, voted to form their own four-service utility. They sought lower prices, higher reliability, a voice in decisions and service tailored to their needs, values and vision for the community.

As the hometown provider for nearly a century, Colorado Springs Utilities has consistently delivered utility services to meet the needs of families and businesses. As a community-owned, four-service municipal utility, we focus on the basics – providing safe, reliable, competitively-priced electric, natural gas, water and wastewater services to our citizen owners and customers. A multi-service utility makes excellent business sense. This interconnection among four distinct systems helps Colorado Springs Utilities achieve economies-of-scale that can reduce operating costs and protect our ratepayers from excessive costs.

Customers also expect us to be responsible stewards – a requirement we embrace to manage assets and resources with efficiency, accountability and transparency. This also includes working in a manner that protects the environment by meeting regulatory requirements and providing customers choices with renewable energy and options to increase the efficient use of their utility services. In addition, planning reflects local values because residents have a voice in decisions affecting their energy and water services through a representative and accessible local board.

As a community partner, our significantly lower than average commercial and industrial electric rates, long-term water capacity, and the convenience of four services form a vital part of our community’s foundation to facilitate economic development as we retain, grow and attract businesses and employers to Colorado Springs.

Looking ahead, we face a changing industry, regulations and expectations. While parts of our business evolve, our commitment to customers is unchanged – to sustain a safe, reliable system, and perhaps just as important, build a stronger community for our customers.
Colorado Springs’ Water History

Water has always been one of Colorado Springs’ greatest challenges and greatest successes. How and where do we get water? How shall we store it and how should we provide for the future?

Settlers began addressing water supply in the early 1870s by digging an open ditch from Fountain Creek into town. The water ran “clear and limpid through the streets,” according to early-day accounts. From the El Paso Canal, residents dipped out their needs for bathing and washing clothes. Wells were relied upon for drinking water.

In 1873, the ditch water and many wells became polluted and local citizens demanded a new system. Officials looked to the mountains for a water supply, starting with Ruxton Creek above Manitou.

Development of a local mountain system – water from Pikes Peak – began in the 1890s. Through U.S. Congress grants and other purchases, the city received title to the Seven Lakes on the South Slope of Pikes Peak and surrounding lands. In 1891, Colorado Springs paid $70,000 for the Seven Lakes and built Lake Moraine Dam. The South Slope and other facilities were sufficient to keep the city supplied with quality domestic water into the 1930s.

Survey work on the North Slope watershed began in 1901. In 1908, the city acquired private property on North and South Catamount, Crystal, North Cascade, South Cascade, and Cascade Creeks. In 1930, the city purchased the holdings of the Empire Land and Water Company for $30,000.

During the 1930s, when the federal government was encouraging projects to help pull the nation out of the Great Depression, two North Slope reservoirs – Crystal and South Catamount – were built with 30 percent of the funding provided by the federal government. North Catamount Reservoir was added to this system in 1960, primarily to handle water collected from the Blue River System.

In 1949, Colorado Springs Utilities expanded again, this time obtaining the Northfield System consisting of the Old Northfield Reservoir,
Nichols Reservoir and a treatment facility. The system included water rights and was purchased for about $1.25 million.

The Blue River System, completed in the early 1950s, marked the Utilities’ first venture into transmountain water diversion. This project was spurred on by the need to meet water requirements for the United States Air Force Academy. While building the system, engineers already were at work acquiring water rights and designing a project that led to construction of Phase I of the Homestake Project.

Homestake was a joint venture of Colorado Springs and Aurora, with the two cities sharing equally the costs and the production. It opened in 1967.

Colorado Springs and Aurora proceeded with plans to further develop the Homestake Project. Work was halted when Eagle County denied a 1041 Land Use Permit for the Homestake II project configuration within the Holy Cross Wilderness Area. The Eagle County decision was unsuccessfully appealed to the Supreme Court, however, the water rights were confirmed.

After long negotiations and public hearings, Colorado Springs completed a monumental water acquisition in 1972 with the purchase of shares in the Twin Lakes Company at a cost of $13.5 million. Since then, we have exercised our options and today own a majority interest in this water.
Since the late 1970s, Colorado Springs and other cities such as Pueblo have received water from the Bureau of Reclamation’s Fryingpan-Arkansas Project.

Purchase of the majority interest in the Colorado Canal, Lake Henry and Lake Meredith occurred in early 1986. Water is diverted for these sources at the Colorado Canal headgate on the Arkansas River near Boone. Water can be released from storage in Lake Meredith to return to the Arkansas River in exchange for water stored in upstream reservoirs. The exchanged water is delivered to the city through the Southern Delivery System Otero Pump Station and Homestake Pipeline.

Colorado Springs reuses transmountain return flows by exchanging the water upstream into our local water system to points that are tributary to Fountain Creek and to Pueblo Reservoir. This exchange first occurred in 1981. The Water Court decreed an exchange water right in 1987. The reuse of water enabled by these exchanges significantly increase the effective yields of existing and future imported transmountain water sources.

In 1996, through the development of the Water Resources Plan, the need for a major delivery system to convey additional water to Colorado Springs was identified as a requirement before 2020. In April 2016, we completed the Southern Delivery System, which delivers water from Pueblo Reservoir to Colorado Springs and our partners in Fountain, Security and Pueblo West.

In 2017, Colorado Springs Utilities completed the next iteration of comprehensive water planning, which will serve as our community’s road map for ensuring a reliable, cost-effective water supply for the next 50 years. We now are working to implement the various programs and projects set forth in the Integrated Water Resource Plan (IWRP).

Water System Timeline

- 1870: Colorado Springs Established
- 1871: El Paso Canal
- 1870s: South Slope 1891
- 1890s-1940s: North Slope 1908
- 1908: Northfield 1949
- 1950s-1960s: Blue River System
- 1964: Fry-Ark Project (Start Receiving Water)
- 1967: Homestake System
- 1972: Twin Lakes System
- 1976: Colorado Canal System
- 1979: Southern Delivery System
- 2000s: South Slope 1891
- 2016: Southern Delivery System
- 2016: Southern Delivery System
Our Water Systems Today

As the largest city in Colorado that is not located on a major water source, Colorado Springs understands the value of water because it must travel long distances before it makes its way to the nearly 500,000 people we serve. That understanding guides how Colorado Springs Utilities manages every drop of this precious resource, every step of the way. We have built an elaborate and comprehensive system to store, transport and treat our water—from where it falls to where it is used and then returned or reused.

Our water service area covers 195 square miles. We import most water from up to 100 miles away through four major pipelines and seven collection systems. Our 25 reservoirs can hold up to three years of water demand and that water travels through 260 miles of raw water pipeline and is cleaned by six water treatment facilities. **On average we deliver about 70 million gallons a day (or about 25 billion gallons a year)** to our customers through 2,140 miles of distribution pipe. We reclaim about 38 million gallons of water a day at two wastewater treatment plants and one solids handling facility. Colorado Springs Utilities maximizes supply through exchange and reuse and plans for future water needs at least 50 years ahead. The following pages provide a brief overview of each of our water collection systems.

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**Water Systems Average Percent Yield**

- **Twin Lakes** 21%
- **Homestake** 12%
- **Blue River** 9%
- **Local/Pikes Peak** 16%
- **Exchange to Pueblo Reservoir** 21%
- **Colo. Canal & Arkansas River** 18%
- **FryArk – Actual Allocations** 4%
Local Water Systems

South Slope Water System
The Pikes Peak South Slope was Colorado Springs’ first major water source, with development beginning in the late 1880s. The seven reservoirs on South Slope have a combined storage capacity of approximately 2,286,100,000 gallons (7,016 acre feet).

Water collected in Bighorn and Wilson Reservoirs is diverted through the Strickler Tunnel to Boehmer Reservoir. Water from Boehmer Reservoir is released downstream into either Mason or McReynolds Reservoirs. Water from Mason and/or McReynolds Reservoirs flows through the St. John’s Tunnel to Lake Moraine on Ruxton Creek. Water from Lake Moraine can be diverted to Big Tooth Reservoir or delivered through the Ruxton Hydro Power Plant and Manitou Hydro Power Plant to the Tollefson Water Treatment Plant. Water from Big Tooth Reservoir and stream flow from Main Ruxton, Lion and Sheep Creeks is diverted through the Manitou Hydro Power Plant to the Tollefson Water Treatment Plant.

Ruxton Hydro Power Plant and Manitou Hydro Power Plant have a combined production of six megawatts.

South Slope and Ruxton Creek water also can be routed down Ruxton Creek and Fountain Creek and diverted at the Manitou Intake or 33rd Street Pump Station.

North Slope Water System
The three reservoirs on the North Slope of Pikes Peak – Crystal, South Catamount and North Catamount – have a combined capacity of about 5,916,600,000 gallons (18,157 acre feet). This was the second mountain system purchased and developed for Colorado Springs citizens.

North Slope water can be discharged from any one of the reservoirs into the transfer line to Northfield or into the North Slope pipeline that delivers water to the Tollefson Water Treatment Plant.

Water flowing through the New North Slope pipeline can be diverted through the Northfield transfer line for treatment at the Pine Valley Water Treatment Plant, or through the Manitou Hydro Power Plant before treatment at the Tollefson Water Treatment Plant. North Slope pipeline water also flows to the Ute Pass Water Treatment Plant, which provides service to Green Mountain Falls, Chipita Park, and Cascade.

Stream flow from the Cascade Creeks and French Creek are collected by the Old North Slope line prior to delivery to the Tollefson Water Treatment Plant.

Cascade Creeks and French Creek water also can flow into Fountain Creek and be picked up at the 33rd Street Pump Station for delivery to Tollefson Water Treatment Plant.
Northfield Water System
The total combined capacity of Northfield storage — Rampart Reservoir built in 1970, Northfield Reservoir built in 1890 and Nichols Reservoir built in 1913 — is approximately 13,599,000,000 gallons (41,733 acre-feet). This was the third watershed system to be purchased and developed for citizens of Colorado Springs.

Most water stored in Northfield Reservoirs comes from other systems. This includes water transported from the North Slope of Pikes Peak, Homestake, Blue River, Twin Lakes and Fryingpan-Arkansas, Colorado Canal and exchange water delivered from the Otero Pump Station in Buena Vista. The primary flow to McCullough and Pine Valley Water Treatment Plants from Rampart Reservoir is via the Stanley Canyon Tunnel and through the Tesla Hydro Power Plant. Alternatively, water stored in Rampart Reservoir can flow through a pipeline 3.8 miles to the Pine Valley Water Treatment Plant. Water released from Rampart Reservoir also flows downstream into Nichols Reservoir. Released Nichols Reservoir water runs downstream into Northfield Reservoir. Water from Northfield Reservoir can be delivered via the pipeline to the Pine Valley Water Treatment Plant.

Other Local System Supplies
Water from the Rosemont Watershed primarily is used for non-potable purposes on Broadmoor Hotel grounds and other users in the area. A pipeline delivers Cheyenne Creek water to Penrose Reservoir for use by The Broadmoor Hotel when Rosemont water supplies are low.

Rosemont water is delivered via South Cheyenne Canyon to South Suburban and Gold Camp Reservoirs, then on to the Tollefson Water Treatment Plant for treatment to supply potable water needs.

South Suburban
In 1966, Colorado Springs purchased the South Suburban Water Company, including water rights on North and South Cheyenne Creeks. An intake located one mile west of the intersection of North and South Cheyenne Canyon Roads diverts North Cheyenne Creek water. South Cheyenne Creek intake diverts water into a pipeline and transfers it one-half mile to a pump station. Water diverted by the intakes flows into South Suburban Reservoir, or to Gold Camp Reservoir via a branch line extending from the original pipeline and the Cheyenne Pump Station.

Pipelines that convey South Suburban water to the Tollefson Water Treatment Plant and bring filtered water back to the area were constructed in the 1990s. Another pipeline connects the pump station to Penrose Reservoir in order to enhance the water supply for the Broadmoor’s irrigation system and other non-potable uses.

Pikeview Reservoir
Pikeview Reservoir diverts water from Monument Creek. Up to six million gallons per day can be delivered to the non-potable water system or pumped to the Tollefson Water Treatment plant for treatment and use in our potable water system.

Local Stream Flow Supply
Over the years, local streams have supplied their share of water consumed in Colorado Springs. In the early 1930s, about 60 percent of the water used annually came from streams in the immediate area, compared to about 20 percent today.

Local streams are North and South Cheyenne Creeks, Bear Creek, Sutherland Creek, Fountain Creek and Monument Creek.

Fountain Creek: An intake and pump station at the intersection of 33rd Street and Fountain Creek diverts up to 8 million gallons per day from Fountain Creek water and water from the North and South Slopes of Pikes Peak. The 33rd Street pump station, comprised of four pumps, boosts the water through a pipeline 1.5 miles to the Tollefson Water Treatment Plant.
Blue River Water System
The Blue River System is Colorado Springs’ first transmountain water diversion project and is located in the Upper Blue River Basin, which is tributary to the Colorado River. The Blue River System was completed in the early 1960s to support economic growth in Colorado Springs, the expansion of Fort Carson and establishment of the Air Force Academy, for drought protection purposes, and recognition of the need to diversify Pikes Peak water sources with a transmountain water supply.

The System diverts water from several tributaries located in the headwaters of the Blue River Watershed. Water diverted from these tributaries is either taken by direct flow through the Hoosier Tunnel to Montgomery Reservoir located on the Middle Fork of the South Platte River, or temporarily stored in Upper Blue Reservoir for subsequent delivery through the tunnel. From Montgomery Reservoir, water travels 70 miles by gravity through the Blue River Pipeline to terminal storage on the North Slope of Pikes Peak.

The combined storage of Montgomery and Upper Blue Reservoirs is 7,178 acre-feet.

Homestake Water System
Colorado Springs and Aurora are equal partners in the Homestake Project and share in the ownership, costs and yield of the water rights, collection system and much of the transmission infrastructure.

The joint venture ends on the Homestake Pipeline, south of Spinney Mountain Reservoir. From there, Colorado Springs and Aurora have constructed facilities to transmit water to their respective systems. Colorado Springs’ share of Homestake Reservoir is about 21,441 acre-feet. Full capacity, including Aurora's share, is 42,892 acre-feet.

Water is collected in Homestake Reservoir and moves through the Continental Divide via the Homestake Tunnel into Lake Fork Creek above Turquoise Reservoir.

Homestake water flows through Turquoise Reservoir via the Mount Elbert Conduit where it is used to generate electricity. After that, it flows into Twin Lakes Reservoir and is transported by a pipeline to the Otero Pump Station near Buena Vista. This pipeline transports Homestake, Twin Lakes, Fry-Ark, Colorado Canal, temporary use and exchange waters."

At Otero, the water is boosted for travel to Colorado Springs through a 66-inch diameter, 50-mile pipeline to the south of Spinney Mountain Reservoir. Aurora's water is released at this location.

From here, Colorado Springs' water flows through a 48-inch diameter, 26-mile pipeline, where it is boosted by the Twin Rock Pump Station, just west of Divide, into Rampart
In 1930 the water users under the Colorado Canal enlarged their water supply by constructing the Independence Pass Transmountain Diversion System, taking water from the headwaters of the Roaring Fork River for direct flow use in the Colorado Canal system with storage in Twin Lakes Reservoir.

In 1972, Colorado Springs Utilities purchased 54.7 percent of the Twin Lakes Reservoir and Canal Company.

Colorado Springs' share of Twin Lakes water collects from the Roaring Fork River tributaries, the New York System and Grizzly Creek into Grizzly Reservoir. Water then moves through the Twin Lakes Tunnel into Lake Creek, and finally to Twin Lakes Reservoir (now owned and operated by the Bureau of Reclamation).

Water then flows from Twin Lakes down the Otero Pipeline to the Otero Pump Station, through the Homestake Pipeline to the Twin Rock Pump Station to Northfield, or is diverted via the 30-inch Blue River Pipeline to the North Slope of Pikes Peak. It also may flow from Twin Lakes down the Arkansas River to Pueblo Reservoir and be delivered to Colorado Springs via the Fountain Valley Authority system or the Southern Delivery System.

**Fryingpan-Arkansas Project**

The Bureau of Reclamation’s Fryingpan-Arkansas Project is a transmountain diversion that supplies southeastern Colorado with a supplemental water supply for irrigation, municipal and industrial uses, hydroelectric power generation, and transmission and recreational opportunities. The project earned its name because it collects about 59,000 acre-feet of water each year from the Fryingpan River Basin on the west slope of the Continental Divide and delivers to the Arkansas River Basin on the eastern slope.
Pueblo Dam and Reservoir, the largest reservoir in the project, is on the Arkansas River. The project also includes a 200-megawatt hydroelectric power plant at the base of Mount Elbert, and a 7.5-megawatt plant at Pueblo Reservoir.

Fryingpan-Arkansas water primarily is delivered to Colorado Springs from Pueblo Reservoir via the Fountain Valley Authority Pipeline or the Southern Delivery System. As an alternative, water can be stored in Turquoise or Twin Lakes Reservoirs and transported to Colorado Springs via the Homestake system.

The communities of Colorado Springs, Fountain, Security, Widefield and Stratmoor Hills participate in the project and all have ownership in the Fountain Valley Authority pipeline.

**Colorado Canal**

In 1985, City Council passed an ordinance allowing purchase of water rights, storage, land and rights-of-way, and a controlling interest in the Colorado Canal Company, the Lake Meredith Reservoir Company, and the Lake Henry Reservoir Company, all located east of Pueblo.

These facilities produce an annual average yield of about 28,000 acre-feet. They also provide valuable additional storage rights that increase the operational flexibility of our other water rights. Lake Meredith and Lake Henry are used as regulating reservoirs for exchange.

The water rights, as well as the reservoirs and the Colorado Canal, were once part of the Twin Lakes Reservoir and Canal Company. The rights, however, were separated into four distinct companies before the sale of the controlling interest in the Twin Lakes Company to Colorado Springs Utilities and others in the 1970s.

The Colorado Canal diverts water from the Arkansas River about 2.5 miles upstream from the town of Boone, 17 miles east of Pueblo. The canal travels east for 50 miles to a terminus at Lake Meredith and Lake Henry. Lake Henry is about 1.5 miles long by 1.5 miles wide at its widest point. Lake Meredith is about six and a half miles long running southwest to northeast, and is about two miles wide at its widest point. Lake Henry has an active storage capacity of 3,051,000,000 gallons (9,363 acre-feet). Lake Meredith has an active storage capacity of 12,970,000,000 gallons (39,804 acre-feet).

The interest purchased in the three water companies is 56.4 percent simple majority interest in the Colorado Canal Company,
51.9 percent simple majority interest in the Lake Meredith Company, and 77.2 percent controlling interest in the Lake Henry Company.

Colorado Canal water is not delivered to Colorado Springs through any pipeline. Interest in this company allows us to exchange water to upstream reservoirs for delivery through the Fountain Valley Pipeline, the Southern Delivery System and Homestake systems. Colorado Canal water is released from one of the reservoirs to meet downstream water rights.

**Southern Delivery System**

The Southern Delivery System (SDS) was built 2010 through 2016 and delivered on time at a cost of about $825 million, about $160 million under budget. SDS was constructed and integrated into the Colorado Springs Utilities system to convey water stored in Pueblo Reservoir to Colorado Springs and its three partner communities: Pueblo West Metropolitan District, City of Fountain and Security Water District. The need for SDS includes system redundancy to back up aging pipeline systems, additional water supplies for future population growth, and diversification of water sources. The exchange rights necessary for SDS to be operated date back to 1984.

The permitted capacity of SDS – meaning the pipeline capacity – is 78 mgd. As constructed in Phase 1, SDS is governed by the capacity of the three pump stations and treatment plant at 50 mgd.

To construct SDS Phase 1, Utilities built the new North Outlet Works and valve house at Pueblo Dam. Under pressure from the weight of the water in the reservoir, water flows into a 90-inch pipeline that features turnouts designed to support a hydroelectric unit (now complete), and a connection for Pueblo West’s new pipeline that serves its pump station. The pipe diameter reduces to 66 inches as the pipeline delivers water to Juniper Pump station, about half a mile from the dam. Juniper features four 2,270-horsepower pumps and has room for three more additional pumps when system demands call for them in the future.

Juniper Pump Station pumps SDS water more than 20 miles to the start of a mile-long tunnel that crosses 90 feet under Interstate 25, Fountain Creek and two rail lines. From here, it’s more than four miles to Williams Creek Pump Station, which features four 2,000-horsepower pumps and room for three more.

Water is then pumped about nine more miles to Bradley Pump Station which contains three 2,250-horsepower pumps with room for one more. Bradley pumps the water about another nine miles to the 10-million-gallon raw water storage tank at the Edward W. Bailey Water Treatment plant.

After state-of-the-art treatment, Bailey’s finished water pump station moves water north along Marksheffel Road into the Northfield Pressure Zone and southward into the Highline Transmission Main, making up more than four miles of finished water line.

Phase I of SDS was completed in 2016. Phase II, to be built as system demands indicate, could include the Gary M. Bostrom Reservoir as terminal storage; Williams Creek Reservoir to store and release return flows to Fountain Creek; up to seven additional pumps at the pump stations; and expansion at the treatment plant to serve additional pressure zones within the distribution system.
Water Exchanges, Reuse and Nonpotable Water

Through the reuse and exchange of imported water, Utilities can stretch existing water supplies and optimize our operations. In many cases, each acre foot of water we import can be reused up to two additional times. Water Exchanges and Reuse are both critical ways to meet our community’s water requirements now and in the future. (See “Use to extinction” in glossary.)

**Water Exchanges**

There are two types of water exchanges: river exchanges and contract exchanges. Exchanges provide system flexibility by placing water where the demand exists.

River exchanges involve storing water upstream and in exchange releasing the same amount of water at a downstream location. River exchanges operate under a complex set of rules and can only be used when there are no intervening senior water rights between the downstream and upstream points of exchange.

Contract exchanges involve two bodies of stored water. For example, water can be exchanged from one reservoir for the same amount of water in another. Contract exchanges are not dependent on river flows, so they can occur any time there is enough water in both storage locations to be exchanged. And, because the water does not have to physically move from one reservoir to the other, it saves that water naturally lost during the transportation process.

**Reuse and Nonpotable Water**

We have the legal right and in some cases, a legal obligation to reuse and successively use to extinction the return flows that result from the initial use of our transmountain water and certain other water sources. Currently, the amount of return flows available for reuse average 31,500 acre feet per year. Return flow reuse can occur directly through non-potable uses of reclaimed wastewater or indirectly through exchanges and through augmentation of well pumping and diversions.

The reuse of wastewater return flows by exchange from Fountain Creek to Pueblo Reservoir and other locations in the Upper Arkansas River Basin yields around 20 percent of our annual water supply.

Colorado Springs Utilities’ nonpotable water system is one of the oldest and largest in the western United States. The nonpotable water distribution system is comprised of raw water (untreated surface and groundwater) and reclaimed water (wastewater that goes through additional treatment, including filtration). This water is used to irrigate parks, golf courses, campuses and community properties, and for our own utilities operations.

Nonpotable water development continues to play a critical role in water supply planning and management. Today, about 11 percent of our water portfolio is comprised of non-potable water.
Water Sharing and Alternative Transfer Methods

Alternative Transfer Methods (ATMs) are a critical strategy to meet future water demands for Colorado Springs Utilities. Utilities’ water supply is ever-fluctuating and when water yields are extremely high or too low, our system moves out of balance. During these times, we look to partner and cooperate with others in our region to support the wide variety of water uses which are valued by our region.

Our water sharing program aims to develop more conjunctive use for water by securing an additional supply for the City in times of shortage and continuing to make excess water accessible to farmers whenever available. The first step for the program was the exchange decreed in Colorado Water Court Case 05CW96 that allows Temporary Use Waters to be moved upstream from Pueblo Reservoir to points in the Upper Arkansas River Basin where it will be stored to meet municipal demands. For this program to continue to work, we need to have partners that can provide water to us at a fair market price, make deliveries to locations where we can move it to our system and the arrangements to allow us to continue to make water available to agriculture in years of abundance.

For the last decade, Utilities has leased more water back to the Lower Arkansas Valley for use in the basin than we have taken for supplies in the basin. Our partners to leasing agreements have included irrigation and augmentation organizations as well as Colorado Parks & Wildlife.

In July 2018, Colorado Springs Utilities negotiated a water sharing agreement that represents a substantial step forward in Utilities’ plans to meet its Integrated Water Resource Plan’s (IWRP) goals to diversify Utilities’ water supply portfolio and develop, by 2070, 15,000 to 25,000 acre-feet of additional water supply through Alternative Transfer Methods (ATMs). This agreement between Colorado Springs Utilities and the Lower Arkansas Water Management Association (LAWMA) consists of a long-term temporary water transfer that provides an alternative to a permanent agricultural to municipal water transfer, commonly referred to as “buy-and-dry.”

Agreements like this are consistent with policy direction contained in the Colorado Water Plan to develop and implement ATMs, and supports meeting the Plan’s stated goal of developing 50,000 acre-feet of ATM water supplies by the year 2030.

As part of the agreement, Utilities purchased 2,500 water shares from an existing LAWMA shareholder for use in the water sharing agreement. The water allocated to those shares will, on average, yield 2,050 acre-feet of water to Colorado Springs for municipal use in 5 out of 10 years and will then be used by LAWMA’s other members in the remaining 5 years. As part of the agreement, Utilities will reimburse LAWMA $1.75 million for 500 acre-feet of storage in a lined gravel pit reservoir near Lamar. This storage will give LAWMA added flexibility to manage its water rights both in times of drought and excess supply.
Water Treatment and Water Quality

Water treatment involves physical, chemical and biological changes that transform raw water into potable water. We use a process that consists of five fundamental processes:

Coagulation is the destabilization and aggregation of colloidal and finely-divided suspended matter by the addition of a chemical, such as hydrated aluminum sulfate, to form precipitate comprised of floc particles that are more or less gelatinous in character.

Flocculation enhances the aggregation of particles into large flocs, or clumps.

Sedimentation is the process of gravity settling and deposition of suspended matter carried by water. It is completed by reducing the velocity of the water below the point at which it can transport the suspended material.

Filtration removes suspended matter from water as it passes through layers of porous material. The degree of removal depends on the character and size of the filter media, and the size and quantity of the suspended particles.

Disinfection is a specialized treatment for the destruction of harmful organisms. Classically, disinfection is used to destroy disease-producing organisms, specifically bacteria of intestinal origin. Disinfection is typically done by adding chlorine to the water before it enters the treatment process or just before water enters the distribution system.

WATER TREATMENT FACILITIES

Our water system includes six water treatment facilities, with a sustained rated water treatment capacity of 274 million gallons per day, or MGD. An additional increment of treatment capacity will be added under a subsequent phase of SDS, increasing the sustained rated water treatment capacity to 324 MGD. Upon full development of the SDS water treatment facilities, our system’s treatment capacity is expected to be sufficient until at least the 2040 decade.

Our system has more than 2,000 miles of water distribution system mains, most of which have been installed since 1954. Unaccounted water is about 8 percent, including unmetered water, such as fire flows, main breaks and system leakage.

FACILITIES HISTORY

The Phillip H. Tollefson Water Treatment Plant was built in 1942 with a capacity of six million gallons per day and was expanded in 1960 to a capacity of 24 MGD. In 1970, capacity was increased to 32 MGD. Improvements made in 1978 and 1980 upped the maximum capacity to 38 MGD. Construction during the late 1980s increased the capacity to 42 MGD. Currently, the Tollefson Water Treatment Plant is under construction to enhance its treatment capabilities and restore infrastructure to industry standards. Construction is expected to be complete in 2020.
Construction of a third water treatment plant, the Northfield Water Treatment Plant on the Rampart Range, began in 1957. Additions of micro-straining units and associated equipment in 1962 and 1963 increased the rated capacity of the plant to 16 MGD. The plant was retired when the McCullough Water Treatment Plant was placed into service in 1996.

As part of the Southern Delivery System, in 2016 the Edward W. Bailey Water Treatment Plant was completed and provides state-of-the-art treatment for 50 MGD, Expandable to 100 MGD.

WATER DISTRIBUTION
Colorado Springs' water distribution is generally a gravity system, however, pumped service is provided to some areas. Ground elevations range from about 7,800 feet to 5,750 feet throughout the service area.

There are five major service areas: Briargate, Templeton, Northfield, Highline and Lowline. Each lower service level can be fed through regulators from the higher levels and from its own distribution storage tanks. The distribution system includes more than 2,100 miles of mains and 37 treated water storage tanks and reservoirs.

WATER QUALITY
Colorado Springs' water comes from a variety of sources, with most of it coming directly from high country snowmelt. That means we are primarily first-time users of the water.

One of our top priorities is providing customers with a reliable supply of high-quality drinking water. By performing chemical, physical and biological analyses our staff diligently monitors water quality at all stages of the process – from source water and treatment plant processes to finished water from the plant and in the distribution system.

Due to multiple sources and the complexity of the raw water supply system, the chemical content of the water varies; however, the finished water consistently meets or exceeds regulations in the Federal Safe Drinking Water Act.
Our complex system of wastewater pipes, lift stations and treatment facilities work in concert to ensure the health of our community. We operate one of Colorado's largest wastewater systems, providing environmentally-responsible, reliable wastewater collection and treatment services.

More than 40 million gallons of wastewater flow through 150 square miles of pipe to our water resource recovery facilities each day. Sanitary sewer mains range in size from six to 66 inches in diameter. About 30,000 manholes provide access for the operation and maintenance of the system. In addition to hundreds of miles of gravity flow pipelines, 14 lift stations pump wastewater into mains.

COLLECTION
Since 2004, Colorado Springs Utilities has invested a total of $250 million on wastewater collection system maintenance and improvements. Our spills per 100 miles of pipe are among the lowest in the nation.

Our collection system uses a variety of methods to minimize wastewater overflow and ensure protection of human health and the environment. Our rate of releases is significantly lower than most other systems of similar size, and we clean more than one-third of the system annually.

TREATMENT
The wastewater treatment process ensures that final effluent meets or is below discharge permit levels set by the Colorado Department of Public Health and Environment and the United States Environmental Protection Agency.

Las Vegas Street Water Resource Recovery Facility (LVSWRRF)
The first facility of its type in Colorado Springs, the Las Vegas Street Resource Recovery Facility was established in 1930, with upgrades in the 1950s, 1970s, 1990s and 2000s. The permitted capacity of this plant is 75 MGD. In addition to serving as our city’s main water resource recovery facility, the LVSWRRF is also home to our water quality laboratories and industrial pretreatment management program.

J.D. Phillips Water Resource Recovery Facility (JDPWRRF)
Located near Pikeview Reservoir, the J.D. Phillips Water Resource Recovery Facility came online in 2007 to help meet the increasing service demands of the north and northeast areas of our community. The permitted capacity of this plant is 20 MGD. The state of the art facility is fully enclosed to help control odor and is operated with a small staff.

Clear Spring Ranch Resource Recovery Facility (CSRRRF)
Biosolids recovered from the LVSWRRF and the JDPWRRF are processed at this campus built in 1984 and located just south of the city of Fountain.

After traveling through a 17.6 mile-long pipeline, solids are treated by an anaerobic digestion process for a period of about 20 days, where complex organic substances are broken down into methane, carbon dioxide, trace gases and stabilized solids. Methane gas generated in the process is burned in gas boilers and used for digester heating. Biosolids are then stored in facultative sludge basins for up to five years for further treatment and then pumped from the basins and injected below the soil surface in fields.
An adjacent dam prevents runoff or groundwater from leaving the disposal site. All liquids are contained on the site and are not conveyed to any external water sources.

**NUTRIENT REMOVAL**
As technology evolves, so do the methods by which we measure wastewater effluent quality. As of 2019, regulators require wastewater utilities to remove a larger percentage of nutrients, otherwise known as phosphorous and nitrogen, from treated wastewater.

Phosphorous and nitrogen, which are naturally excreted by the human body, and found in fertilizers and household cleaners, have been linked to algae blooms in waterways.

Meeting increased nutrient regulations will be a large and expensive undertaking by utilities around the United States. Colorado Springs Utilities transformed the Las Vegas Water Resource Recovery Facility to advanced treatment capabilities in the early 1990s and built a second, state-of-the-art system at the J.D. Phillips Water Resource Recovery Facility in 2007, putting us significantly ahead of the curve in meeting regulations. A 12 million dollar construction project for biological nutrient removal was completed at LVSWRRF in 2018.

**QUALITY**
Laboratory staff routinely examine the reclaimed water (effluent) for a variety of parameters. They also periodically analyze Fountain Creek water samples to ensure the effluent does not negatively impact the ecosystem or downstream users. Such processes ensure that final effluent meets or exceeds discharge permit levels.

**INDUSTRIAL PRETREATMENT**
Our industrial pretreatment program protects our wastewater collection system and treatment facilities, as well as the environment, by preventing toxic, dangerous substances from being discharged into the sanitary sewer collection system. In addition to issuing discharge permits, monitoring discharges, performing site inspections, and enforcing pretreatment standards and requirements, our experts help increase local awareness by educating businesses about program requirements.

**RECOVERY PONDS**
Any wastewater system carries a risk for spills. Should untreated wastewater enter Fountain Creek, the Fountain Creek Recovery Ponds (lined with concrete) divert contaminated water from the creek to the recovery ponds. The collection ponds are lined and can hold up to 18.5 million gallons of liquid. This keeps spills caused by vandalism, grease blockages and failed bypass operations from reaching downstream communities.

Captured water is transferred back to the LVSWRRF for treatment. To ensure that streamflows are maintained, a 20 million gallon capacity pond is located next to the recovery pond. This stores clean water for water rights exchanges.

J.D. Phillips Water Resource Recovery Facility
Watershed Management

Colorado Springs has an extensive water collection and delivery system spanning 650 square miles in 10 counties and 67 distinct watersheds.

Multiple factors affect water supply including forest health conditions, wildfire, development, recreational use, security, source water contamination, invasive species, threatened and endangered species and changing regulations. To ensure a safe and reliable water supply, we proactively manage watershed lands and natural resources while honoring operational needs and community values.

FOREST MANAGEMENT & WILDFIRE MITIGATION

Sound forest management reduces the risk and severity of wildfire by mitigating the amount, types and structure of forest fuels. These activities help restore forest ecosystems to more natural conditions, making them more resilient to catastrophic wildfire, insect infestations and disease. Some management techniques include forest thinning, creating large openings up to 40 acres, cutting in fuel breaks and the responsible use of prescribed fire.

We have assessed the risks of wildfire around our water supply watersheds and implemented forest health projects to reduce the threat and severity of wildfire near collection and storage infrastructure.

SOURCE WATER PROTECTION & OUTREACH

The Colorado Source Water Assessment and Protection (SWAP) Program is part of a national program administered by the United States Environmental Protection Agency and required by the Safe Drinking Water Act.

We have assessed the susceptibility of source waters and are engaged in the protection planning phase of the SWAP program. Such efforts include those with the Upper Arkansas Area Council of Governments, City of Victor and Denver Water’s Upper South Platte plan. Source water protection is a focus area in our watershed management plans and protection strategies have been developed for the North Slope, South Slope of Pikes Peak and our Local System. Current plans are in development for the Blue River watershed. Other areas in our system will be assessed for source water protection as additional watershed management plans are developed.

Colorado Springs Utilities is actively involved in activities surrounding the Fountain Creek watershed including participation in Arkansas Fountain Coalition for Urban Rivers Evaluation (AF CURE) which recently completed a watershed plan to address significant nonpoint sources of E. coli in the Fountain Creek watershed. There is continued support of the Fountain Creek Watershed, Flood Control and Greenway District and the District’s creek improvement projects. To date, the District has completed over 10 major creek channel improvement projects, and eight assessment and planning studies, many with detailed evaluations through Colorado Springs Utilities’ support and funding.
Recreation and Public Access

More than 15,200 acres of municipal watershed lands and nine reservoirs are open to recreational use. Colorado Springs Utilities jointly manages many of the lands and reservoirs with other agencies such as the U.S. Forest Service, Colorado Parks and Wildlife, El Paso County and Colorado Springs Parks, Recreation and Cultural Services. For the past several decades, we have engaged in intensive public discussion to define and implement recreational uses.

In 1967, Colorado Springs citizens passed a charter amendment allowing the city to open the North Slope and Northfield system of reservoirs for recreational use. In 1991 and 1992, the City Council appointed a North Slope Advisory Committee to develop a plan for recreational use. The area opened for its first season July 8, 1992.

In 1999, we, along with partner agencies, citizen groups and interested public completed the Pikes Peak Multi-Use Plan. The PPMUP created a regional vision for accommodating recreational activity on municipal watersheds and United States Forest Service lands.

In 2010, after two years of public process, City Council approved the Plan for Recreational Uses on Municipal Watershed Lands allowing recreational uses on Pikes Peak South Slope and Ute Pass Trail on Longs Ranch.

In 2012, City Council authorized us to issue revocable permits for special events on municipal watersheds that have a direct tangible benefit to the community. We have developed policies and procedures to accommodate special events while protecting water quality and natural resources as well as mitigate operational conflicts.

In 2014 the Front Range Trail through Clear Spring Ranch was extended to offer about four miles of trail and river access points along Fountain Creek. The project was funded through Great Outdoors Colorado Lottery proceeds aimed to enhance parks, rivers, trails and open spaces.

Our reservoirs and watersheds are a natural attraction for anglers, families, hikers, bikers and other outdoor enthusiasts. We strive to balance operational needs, environmental stewardship and recreational uses; providing clean, reliable drinking water is our first priority.
Water Demand Management

Colorado Springs Utilities is recognized as a national leader in water conservation. Water Demand Management plays a significant role in water supply planning.

Well-designed water efficiency programs moderate the high and low fluctuation in water use so that water restrictions are experienced less often. Our strategies include education, pricing, efficiency incentives and regulation.

Through outreach and education, our programs help customers manage their overall water use, establish landscapes that thrive despite inevitable periods of drought or economic downturn, and minimize waste.

Education and outreach are an integral part of such programs as they help our customers better understand their water supply, our climate and the value of water to our community. We support this effort by connecting our customers to global, regional and local water facts and their personal impact on our water supply and water quality.

WHY WE DO WHAT WE DO

The work of water efficiency and conservation are critical to the careful stewardship of water in our state and in the west. Our programs meet the water savings goals identified in the 2017 Integrated Water Resources Plan. The IWRP established a target of 3,600 million to 4,200 million gallons per year of additional water use efficiency savings by buildout (~2070).

In addition, Colorado Water Conservation Act of 2004 established the Colorado Water Conservation Board (CWCB) as the managing entity for assuring effective conservation planning by water providers in Colorado. Colorado Springs Utilities filed an updated Water Use Efficiency Plan with CWCB in 2015.

Measures outlined in our Water Use Efficiency Plan will elevate annual community savings to more than 7,100 million gallons by 2021.

Achieving our goals and gaining a more sustainable urban landscape requires strong community commitment. Since 1986, population has increased 78% but today’s water use remains the same as then –90 gallons per capita per day.
**Glossary of Terms**

**Acre-foot:** Volume of water that covers one acre (43,560 square feet) to a depth of one foot (often averaged to 326,000 gallons).

**Appropriation:** Amount of water a user has the legal right to withdraw from a water source.

**Aquifer:** Geologic formation of permeable rock, gravel or sand that stores and transmits water to wells.

**Augmentation of well pumping:** Replaces water into a stream due to losses from well usage.

**CCF:** One hundred cubic feet or 748 gallons.

**Conjunctive use:** Coordinated use of surface water and groundwater to maximize sufficient yield.

**Consumptive use:** Water use that permanently withdraws water from its source. Water that is no longer available because it has evaporated, been transpired by plants, incorporated into products or crops, consumed by people or livestock, or otherwise removed from the immediate water environment.

**Demand-side Management:** Water and energy efficiency measures, practices or incentives implemented by utilities to reduce or change the of customer demand patterns.

**Diversion:** Alteration in the natural course of a stream for the purpose of water supply, usually causing some of the water to leave the natural channel. In Colorado Springs this includes taking water through a ditch, tunnel, pipe or other conduit.

**Drought:** Water supply shortage that is caused by natural conditions such as an extended period of below-normal precipitation.

**Firm yield:** the annual amount of demand that a water system can reliably meet.

**GPCD:** Gallons per capita per day.

**Hydrology:** the science concerned with the movement of water on or near the land surface through the hydrologic cycle including the processes of precipitation, evaporation, infiltration, runoff stream flow, and the transport of substances dissolved or suspended in the flowing water.

**In-basin water:** See “native water.”

**Integrated resource planning:** Open planning process emphasizing balanced consideration of supply and demand management options for meeting water needs; typically in 50 year window.

**MGD:** Million gallons per day.

**Native water:** Water which is used and remains in the basin of origin. This water is usually not reusable, which means that the return flows from native water are usually required to be returned to the river system for subsequent use by other water users.

**Non potable water:** Water that has not been treated to make it safe for drinking, or is not intended for drinking.

**Potable water:** Water suitable for drinking.

**Priority (in and out):** Right to divert or store water, based on the Doctrine of Prior Appropriation. In Colorado, this is regulated by the Division of Water Resource and is based on the date of the water right (i.e. “first in time, first in right”).

**Return flow:** Wastewater effluent or excess water returning to the stream system from lawn irrigation.

**Reuse:** Additional use of previously used water or the beneficial use of treated wastewater.

**Reusable water:** Water with the legal characteristic of being able to be used, reused, and subsequently used to extinction.
Glossary of Terms

**Service area**: Territory in which utilities are required or has the right to supply service to customers.

**Terminal storage**: Storage in a water system, usually just upstream of treatment facilities, used to minimize risk by providing a reliable supply for water treatment plants, and to minimize demand fluctuation impacts on delivery system facilities.

**Transmission line**: Pipeline that carries water from points of supply to terminal or local storage reservoirs.

**Transmountain diversion**: Water project that diverts water from one river basin to another. For Colorado Springs, this typically is a project to divert water from the Colorado River Basin to the Arkansas Basin.

**Transmountain water (transbasin water)**: Water diverted from the western slope of the Continental Divide. See also “reusable water.”

**Use to extinction**: Water that has been imported to a new river basin is considered ‘foreign’ with respect to the ‘native’ water that arises or accrues within the receiving basin. Foreign water may be used successively by the importer within the receiving basin in contrast to native water that may only be used once by the first appropriator. Foreign water that can no longer be distinguished volumetrically from native water is considered to be ‘used to extinction.’

**Water right**: Property right created by the diversion of water and the placing of it to a beneficial use (appropriation). Water rights become officially recognized and administrable when documented in a decree of the state water court (adjudicated).


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### Water Equivalents

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<table>
<thead>
<tr>
<th></th>
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<tbody>
<tr>
<td>1 cubic foot</td>
<td>7.48 gallons</td>
</tr>
<tr>
<td>1 acre-foot*</td>
<td>43,560 cubic feet or 325,851 gallons</td>
</tr>
<tr>
<td>1 cubic foot per second</td>
<td>449 gallons per minute 646,317 gallons per day</td>
</tr>
<tr>
<td>1 cubic foot per second for 24 hours</td>
<td>.983 acre-feet</td>
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<td>1,121 acre-feet per year</td>
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<tr>
<td>1,000 gallons per minute</td>
<td>2.23 cubic foot per second</td>
</tr>
<tr>
<td>1 million gallons per day</td>
<td>1.547 cubic foot per second, 694 gallons per minute</td>
</tr>
</tbody>
</table>

*An acre-foot covers one acre of land one foot deep.*