Castle Rock Water
Securing our future drop by drop
August 2018

New Wells Help to Increase Water Supplies

By: Matt Benak, P.E., Water Resources Manager

Drilling rig set up over Well 227

In 2018, Castle Rock Water completed four well projects that will help to bolster the Town's water supplies into the future. Wells 226 (Denver aquifer) and Well 227 (Arapahoe aquifer) are new wells that are located in the Castlewood Ranch development near Matney Park. Well 226 is expected to produce approximately 120 gallons per minute (gpm) and Well 227 approximately 220 gpm. The project was a team effort by the Water Resources and Engineering Divisions, with Heather Justus and Matt Hayes serving as project managers for the well drilling and civil infrastructure, respectively. Drilling work was performed by Layne Christensen, Inc. and Hydro Resources, while the infrastructure was designed by Dewberry Engineering and built by T. Lowell Construction.

Castle Rock Water also redrilled two wells near the P.S. Miller Water Treatment Plant and Plum Creek Golf Course that were at the end of their useful life. Well 15R (Denver aquifer) and Well 16R (Dawson aquifer) are expected to produce 200 gpm and 100 gpm, respectively. These wells can deliver raw water to either the P.S. Miller WTP or to Plum Creek Water Purification Facility. Hydro Resources completed the drilling of these facilities and also abandoned the existing Wells 15 and 16 in accordance with State regulations.

The combined flows from these four facilities will provide nearly 1 million gallons per day (MGD) and will help meet our customer's demands, particularly in the summertime. So far in 2018, the highest daily demand was 16.8 MGD and this peak is expected to increase to 18 MGD in 2019.

Take the Survey!

Meeting customer's needs is a priority for Castle Rock Water. In the past, the Town has provided an RV dump location for campers, but that service was discontinued due to costs.

Now, we want to know what you think. Is an RV dump station in Castle Rock something you're interested in? Would you be willing to pay for it? Take our survey, to tell us what you think.

https://www.surveymonkey.com/r/R6JC92Q

OUR VISION

We will be a national leader among water utilities focused on customer satisfaction and delivering outstanding quality and value.

What's New in Water?

Castle Rock Water wants you to know what's happening around town and in your local neighborhood. Check back here each month for a list of upcoming projects, or visit us at CRgov.com/waterprojects.

Terrain—Founders Sewer Project

Construction for this project is planned for Fall 2018, and includes a new sewer main which will eliminate the need for the Ray Waterman Regional Water Treatment Facility temporary lift station. The project has been awarded to Iron Woman Construction for $311,000.

Highway 85 Transmission Project

Planned for construction late in 2018, the Highway 85 transmission line project will complete about 2,100 linear feet of 20-inch potable water transmission line in a stretch beginning near the Meadows Boulevard intersection, extending south towards Justice Way. The project is needed to efficiently move water around the town to make best use of WISE water being distributed by the Ray Waterman Regional Water Treatment Center. Project survey is underway. The estimated cost is $703,000.

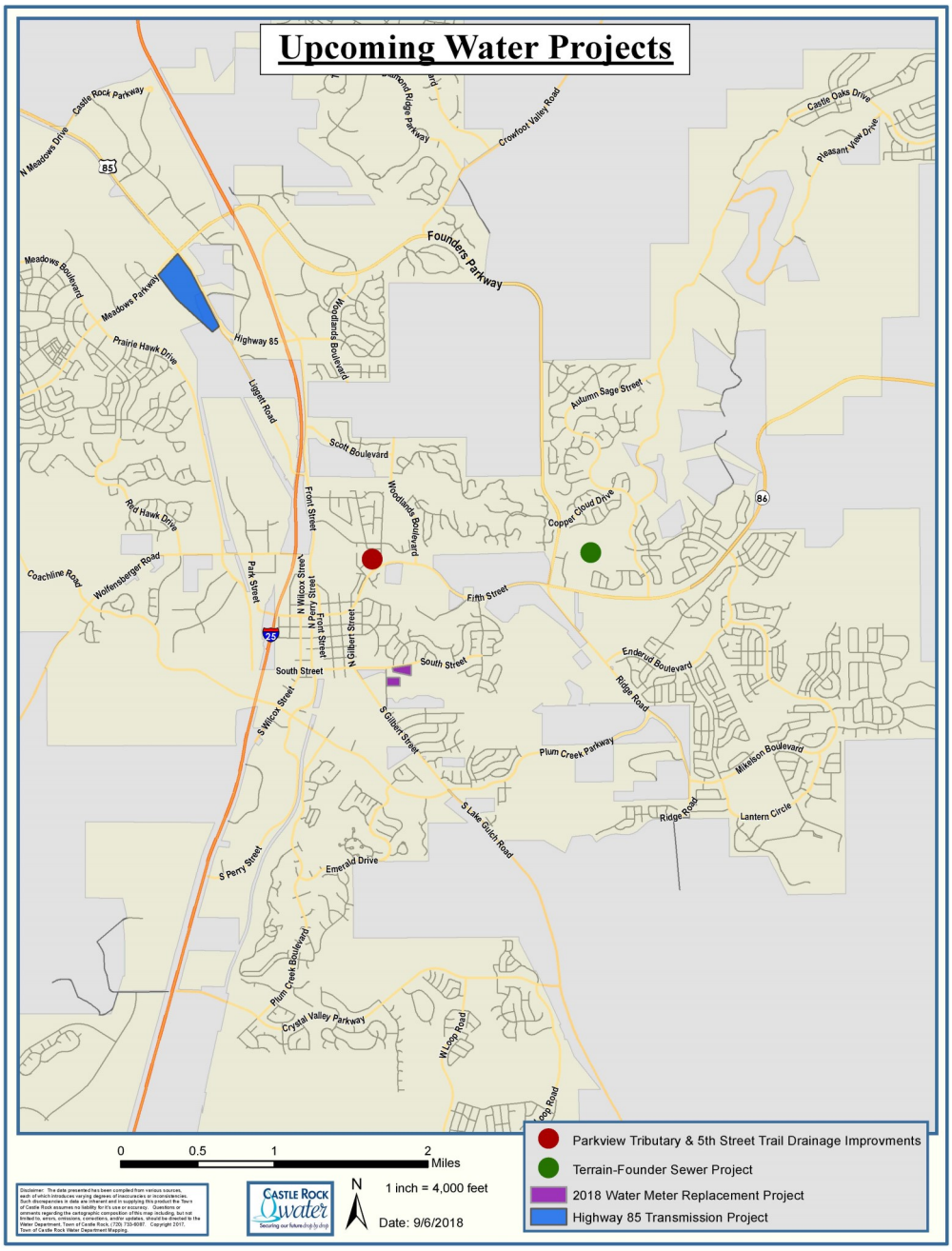
2018 Water Meter Replacement Project

This projct will rehabilitate meter pits at several apartment complexes to improve accessibility for meters crews to perform maintenance and replace aging metering infrastructure. Several old fire hydrants will be replaced, and a new one added to increase fire protection in the apartment neighborhood complex. Work may begin in late 2018 at a cost estimate of $250,000.

Parkview Tributary and 5th Street Trail Drainange Improvements

This project consists of designing and constructing Parkview Tributary master plan improvements from the south side of 5th Street to Sunset Drive, to safely and efficiently convey the drainageway flows through the Oakwood Park subdivision. Additionally, localized flooding of properties on Oakwood Court partially due to run-off from the concrete trail along the north side of 5th Street will be addressed. Construction is planned in Spring 2020 at an estimated cost of approximately $880,000.

See map on next page for approximate locations of these projects.



New Certifications

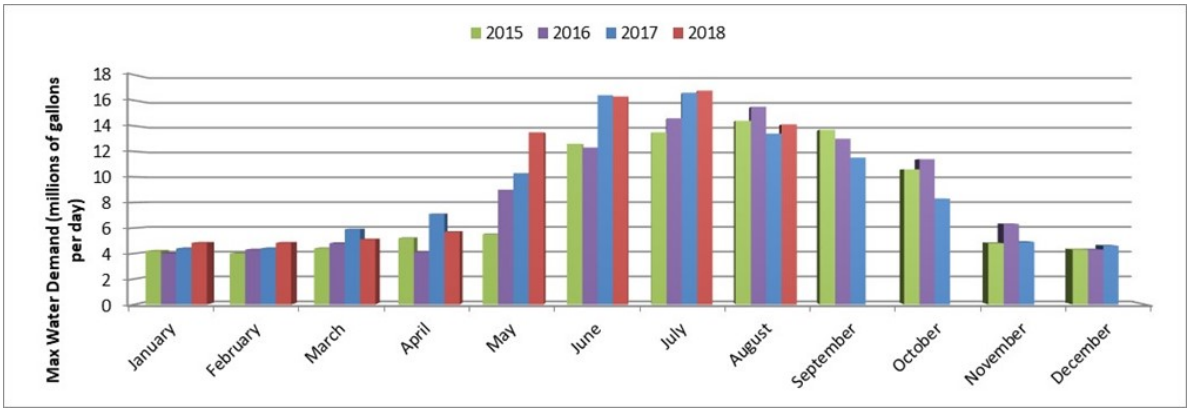
The water, wastewater and stormwater utility business is highly technical and regulated. As such, Castle Rock Water has to maintain an extensive staff of professionally licensed individuals. Most of these licenses require specialized education and the passing of state testing, as well as proof of continuing education. Below is a list of those passing various certifications this month:

Grant Garvin
CDL

2018 Water Demands

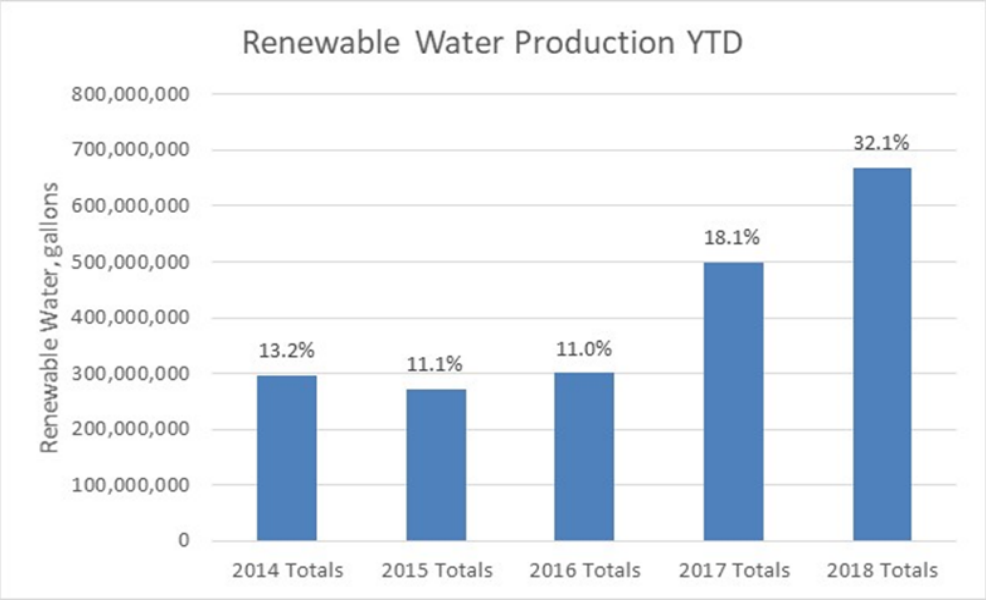
By: Heather Justus, Water Resources Program Manager

The maximum daily water demands are plotted by month from 2015 to the current month. As observed by the data, the maximum demand for the month of August was 14.1 million gallons per day (MGD) which was 2% greater than the 5-year average maximum daily demand for the month. Summer time maximum demands inform us of the size of the infrastructure necessary to provide water service over short periods of time and help us to plan future water resources needs. The water demand total for August was 379.9 million gallons (MG), which was about a 5.7% decrease from the July 2018 total of 402.9 MG, and a 15.5% increase from the August 2017 demand of 328.9 MG.



The CR-1 diversion produced an average of 0.80 MGD for the month of August, supplemented by 39.07 AF (minus stream losses) from our Bell Mountain – Denver Well sporadically during August. The Town's thirteen alluvial wells and CR-1 produced a total of 45.0 MG of renewable water, and imported deliveries- which included WISE and stored water from Rueter Hess Reservoir (RHR) - totaled 64.5 MG during August. In total, renewable supplies accounted for 26.8% of the total water supply for the month (408 MG or 1,253 acre-feet) and 32.1% of the annual water supply (2,087 MG or 6,403 acre-feet).

Renewable supplies are those water sources that are replenished by precipitation (think of our alluvial wells, and CR-1) whereas reusable supplies are those waters that are either from the Denver Basin (deep wells) or imported supplies (such as WISE and RHR) that can be used over and over, to extinction. The average reusable supplies used by Castle Rock for 2018 through August is 41.2%.



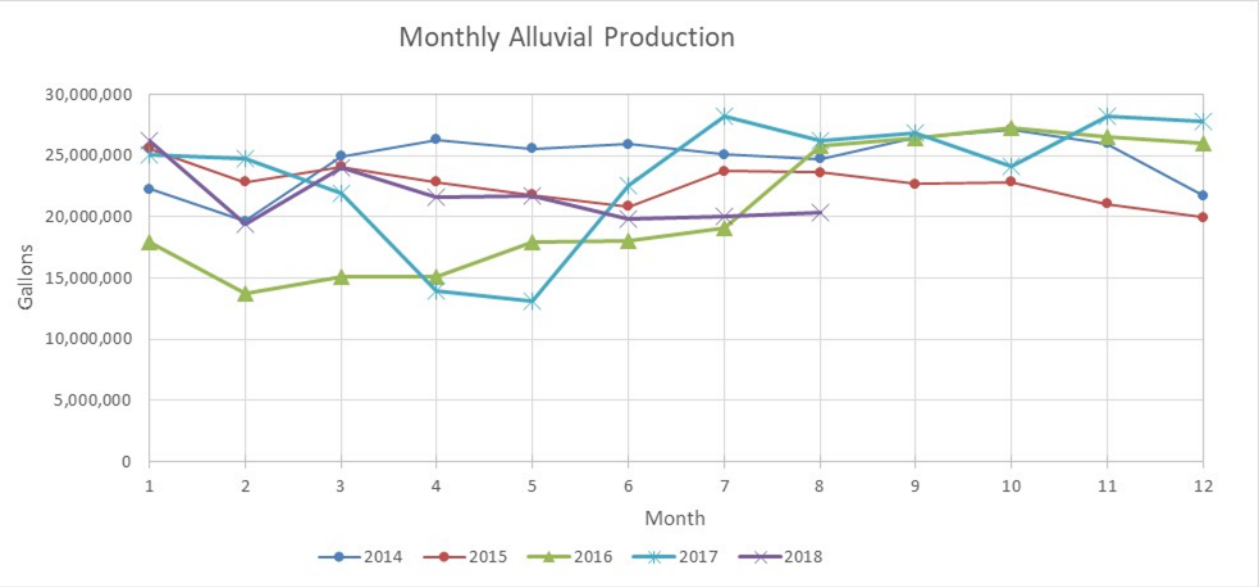
**2018 renewable production will vary as demand increases and additional sources are brought online.*

The percentage shown on top of the bars is the amount of renewable water relative to total water production.

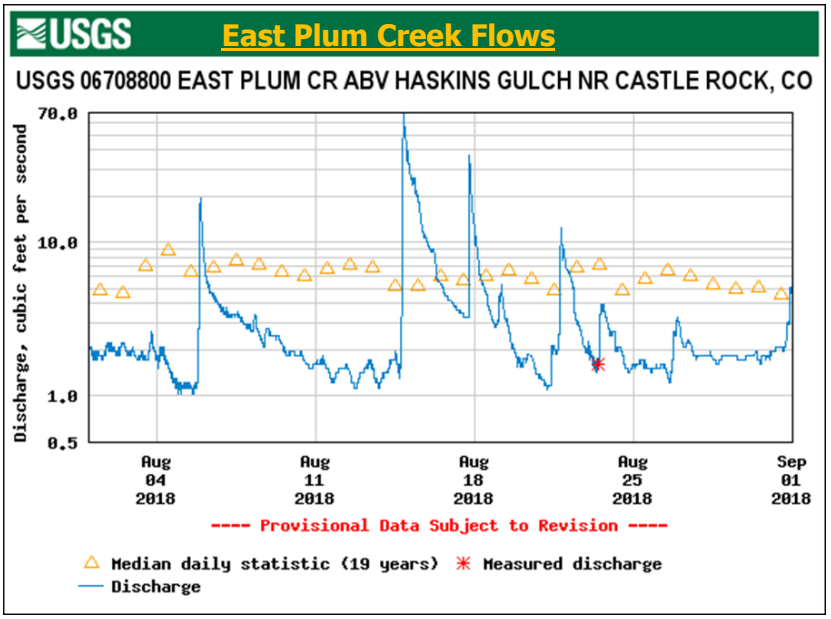
Continued on next page

Water Demands, continued

The following graph shows the monthly production of the Town's alluvial well system. The production from the alluvial wells in August 2018 was 20.4 MG, which is less than the second half of 2017. Lower production combined with decreasing water levels is primarily due to low stream flows in East Plum Creek. Well rehabilitation is scheduled for this fall.



The flow hydrograph represents stream flows in East Plum Creek taken from the stream gauge located above Haskins Gulch. The hydrograph shows that flows in the East Plum Creek basin ranged between 1.04 and 68.2 cubic feet per second (cfs) during the month of August. We had several precipitation events throughout the month, with most occurring during the second half of August. This August, the average streamflow in East Plum Creek (EPC) was 3.49 cfs which is approximately 32% of the median daily streamflow of 11 cfs. As a comparison, in August 2017 the average streamflow in EPC was 13 cfs, which is 118% of the median daily streamflow. Low streamflows in EPC correspond to a decrease in the amount of water that we can divert at CR-1, negatively impacting this surface water supply. We were, however, able to supplement East Plum Creek with 39.1 AF of water (minus stream losses) from our Bell Mountain – Denver Well upstream of CR-1.



There were active calls on the South Platte River in August. Some of the active calls have had a more senior water right than some of the Town's water rights. This means that those diversions are out-of-priority, so the stream depletions will be covered by non-tributary return flows. This also means that the Town will have slightly less reusable water going down Plum Creek during an active call. The priority date on a river call may change each day depending on the stream flow available and the seniority of the diversions that need water on that day.

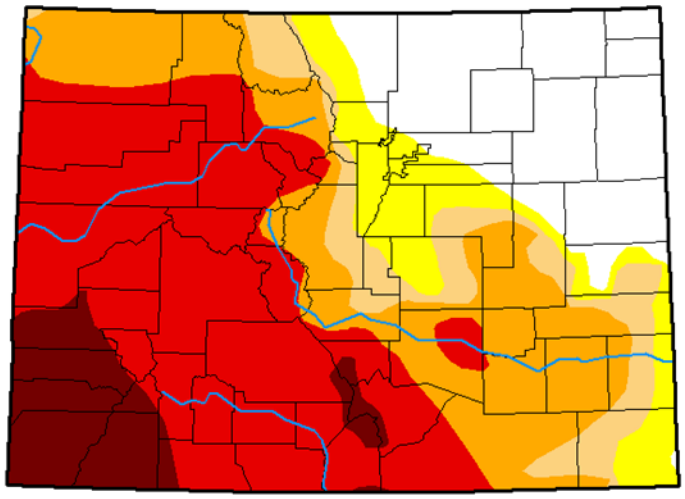
Continued on next page

Water Demands, continued

According to the U.S. Drought Monitor from USDA, Douglas County is abnormally dry, while many portions of Colorado are in Moderate to Exceptional drought. In April 2018, Town Council approved a Town of Castle Rock Drought Management Plan. This plan uses a Water Supply Index (WSI) for the Town that is similar to the U.S. Drought Monitor in that it provides us an indicator to drought level; however, the WSI accounts for local conditions relative to the Town's capability to address our water resources and daily water demands. The WSI is calculated by taking the sum of our supply (deep groundwater, alluvial wells, surface water, and WISE) and dividing that by our maximum daily demand. We generally want to see a WSI above 1.1, which means that we have enough resources to meet our demands. Anything below a 1.1 will trigger a drought stage relative to its severity. The average WSI for August was 1.4, above the 1.1 trigger level, which is considered "good."

U.S. Drought Monitor

Colorado



August 28, 2018

(Released Thursday, Aug. 30, 2018)

Valid 8 a.m. EDT

Drought Conditions (Percent Area)

	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	18.57	81.43	72.80	64.63	44.30	8.50
Last Week 08-21-2018	18.57	81.43	74.46	65.88	45.46	8.50
3 Months Ago 05-29-2018	24.68	75.32	63.92	50.55	33.67	7.79
Start of Calendar Year 01-02-2018	6.57	93.43	33.53	7.27	0.00	0.00
Start of Water Year 09-26-2017	67.63	32.37	3.72	0.00	0.00	0.00
One Year Ago 08-29-2017	81.29	18.71	0.00	0.00	0.00	0.00

Intensity:

- D0 Abnormally Dry
- D1 Moderate Drought
- D2 Severe Drought
- D3 Extreme Drought
- D4 Exceptional Drought

The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. See accompanying text summary for forecast statements.

Author:

Jessica Blunden

NCEI/NOAA

http://droughtmonitor.unl.edu/

Plan Review Update

By Tina Close, Plan Review Engineer

Castle Rock Water reviewed 74 applications (see below) this month which compares to 113 during the same time period in 2017. The average assigned due date by Development Services was 10.5 days, and Castle Rock Water completed the reviews in an average of 10 days.

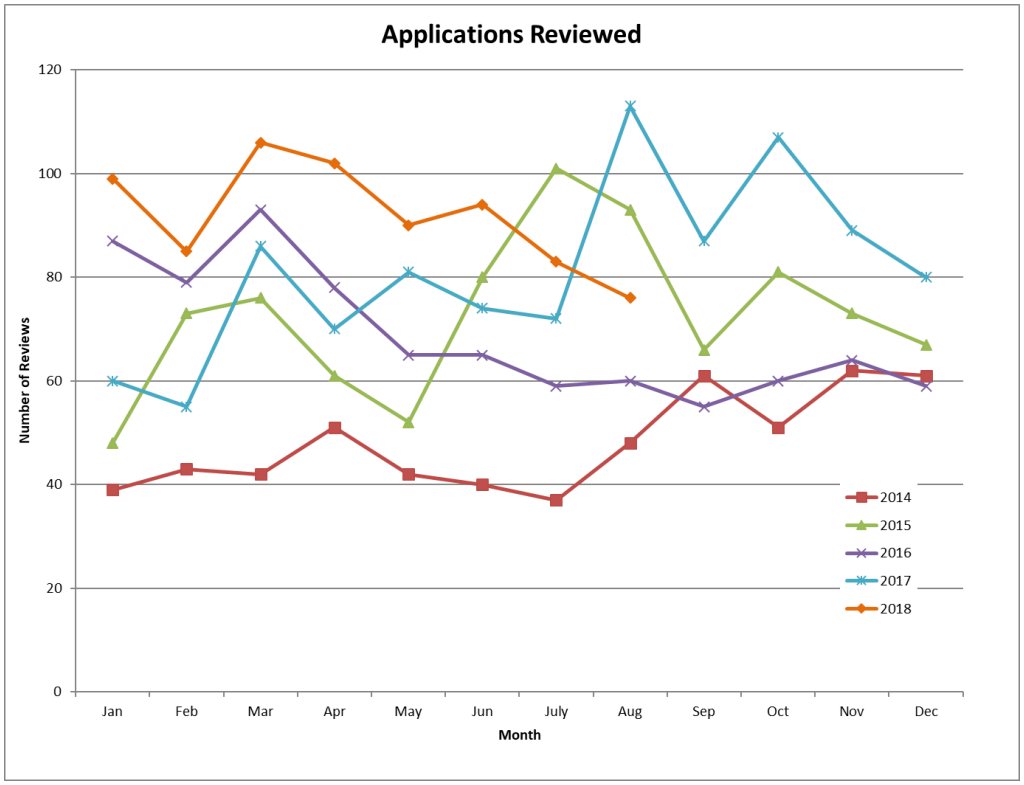
- 4 Agreements
- 17 Field Change Orders
- 6 Grading, Erosion, and Sediment Control (GESC) Plans
- 1 County Referral
- 1 Change of Zone
- 2 Planned Development Plans
- 3 Plats
- 4 Preliminary Project Applications
- 12 Construction Drawings
- 14 Site Development Plans
- 6 Technical Criteria Variances
- 6 Miscellaneous

The applications reviewed consisted of:

- 33 1st submittals
- 17 2nd submittals
- 16 3rd submittals
- 10 Special reviews
- 6 Completed late
- 70 Completed on-time as scheduled

In addition, Castle Rock Water completed 29 building permit reviews and associated system development fees.

Castle Rock Water provides plan review for all water, wastewater and stormwater projects submitted through the development review process. The line graph (below) shows development activity data (by month and year) since 2014.

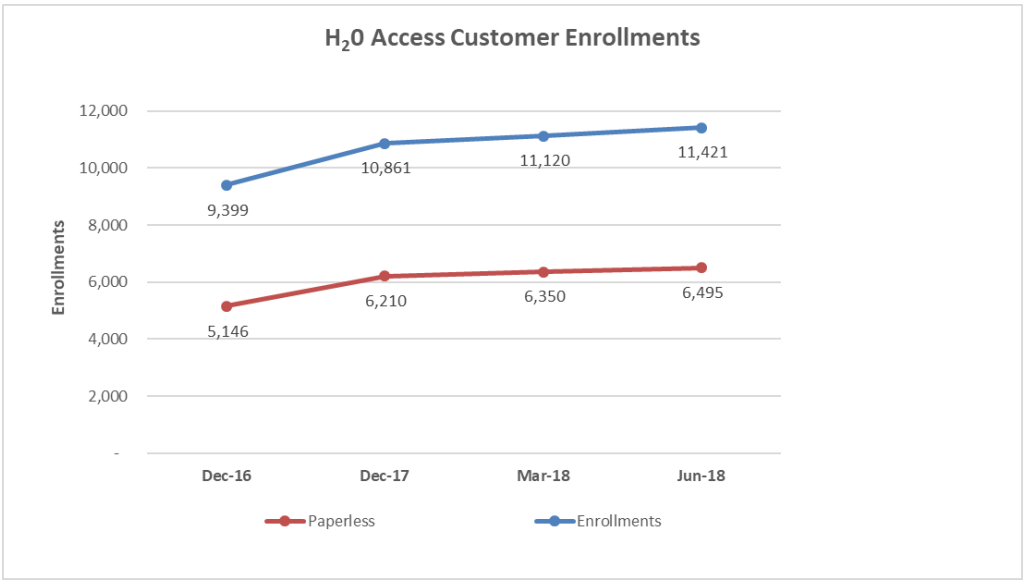


Business Solutions

Customer Statistics

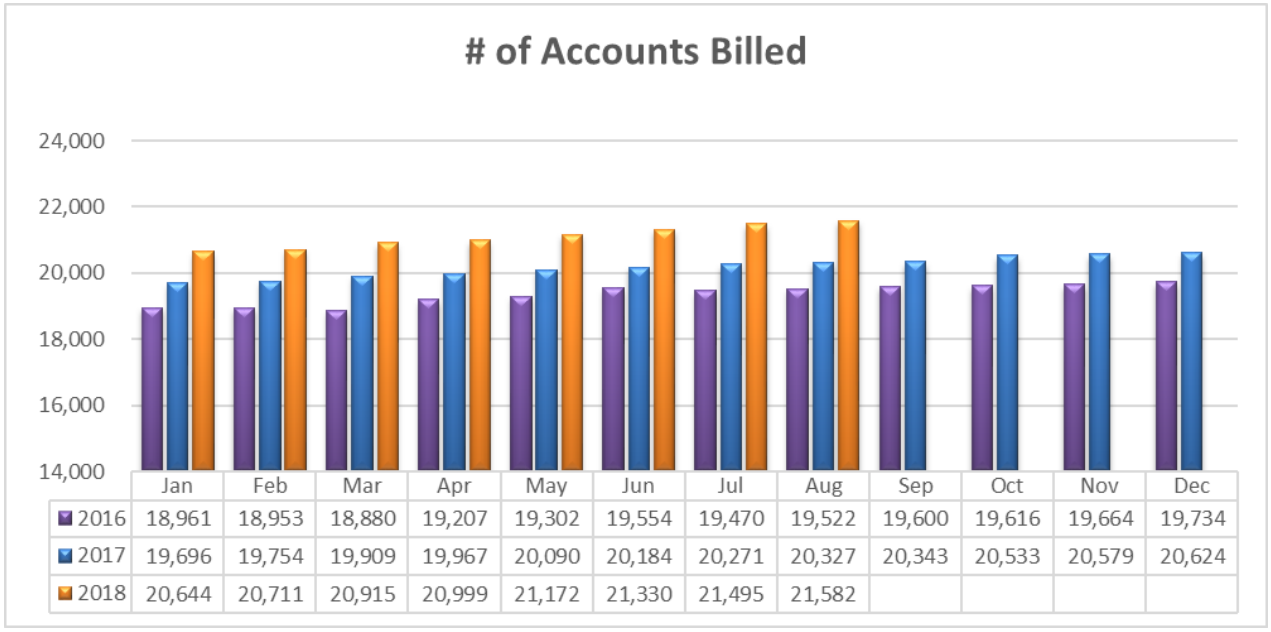
By: Anne Glassman, Business Solutions Manager

Our Business Solutions Team continues to track a host of statistics and data as we continue to evaluate our levels of service and look for efficient ways to improve on these levels.



Updated quarterly - Data reported quarter ending 6/2018

The number of customers enrolled in paperless billing has remained steady at 57 percent over the last several months.

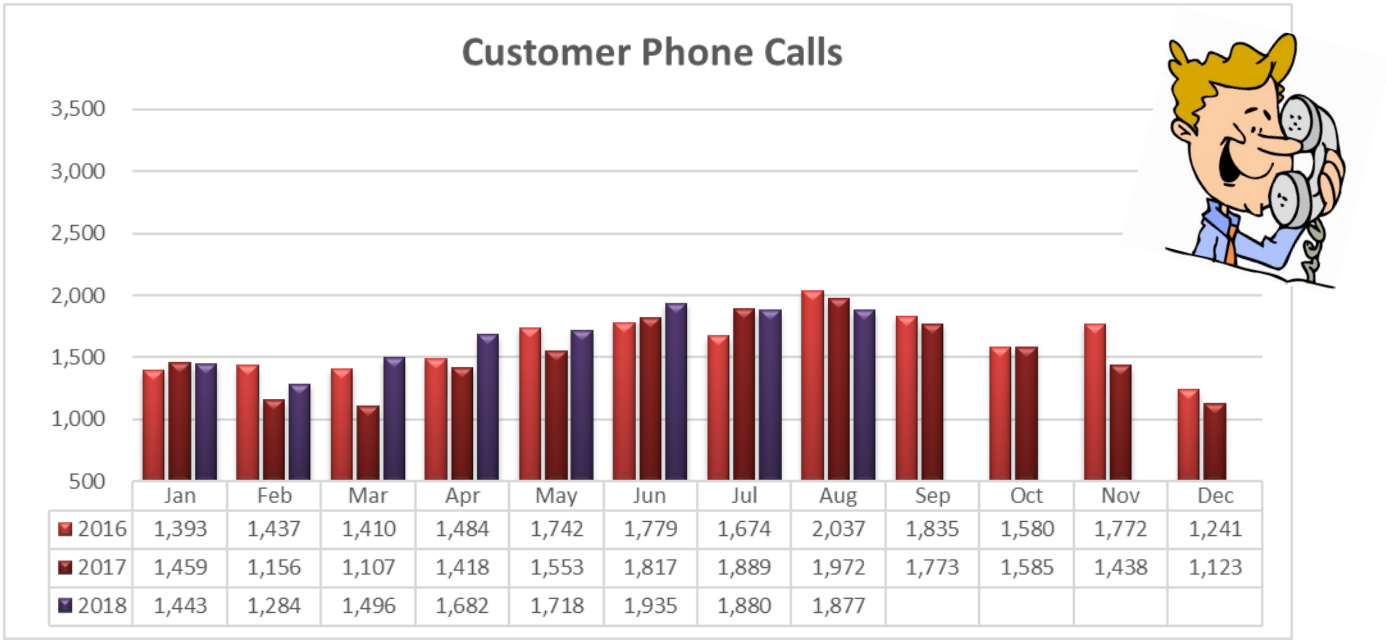


	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2016	18,961	18,953	18,880	19,207	19,302	19,554	19,470	19,522	19,600	19,616	19,664	19,734
2017	19,696	19,754	19,909	19,967	20,090	20,184	20,271	20,327	20,343	20,533	20,579	20,624
2018	20,644	20,711	20,915	20,999	21,172	21,330	21,495	21,582				

The number of accounts billed continues to increase year over year due to new residential and commercial growth.

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2016	376	336	361	378	379	392	372	416	400	345	434	256
2017	318	287	327	388	347	378	330	411	329	349	298	325
2018	411	348	355	400	417	369	390	424				

Walk-in customers are higher this time of year due to the irrigation season, specifically watering restrictions, water wiser workshops, and overall general water conservation questions.



	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2016	1,393	1,437	1,410	1,484	1,742	1,779	1,674	2,037	1,835	1,580	1,772	1,241
2017	1,459	1,156	1,107	1,418	1,553	1,817	1,889	1,972	1,773	1,585	1,438	1,123
2018	1,443	1,284	1,496	1,682	1,718	1,935	1,880	1,877				

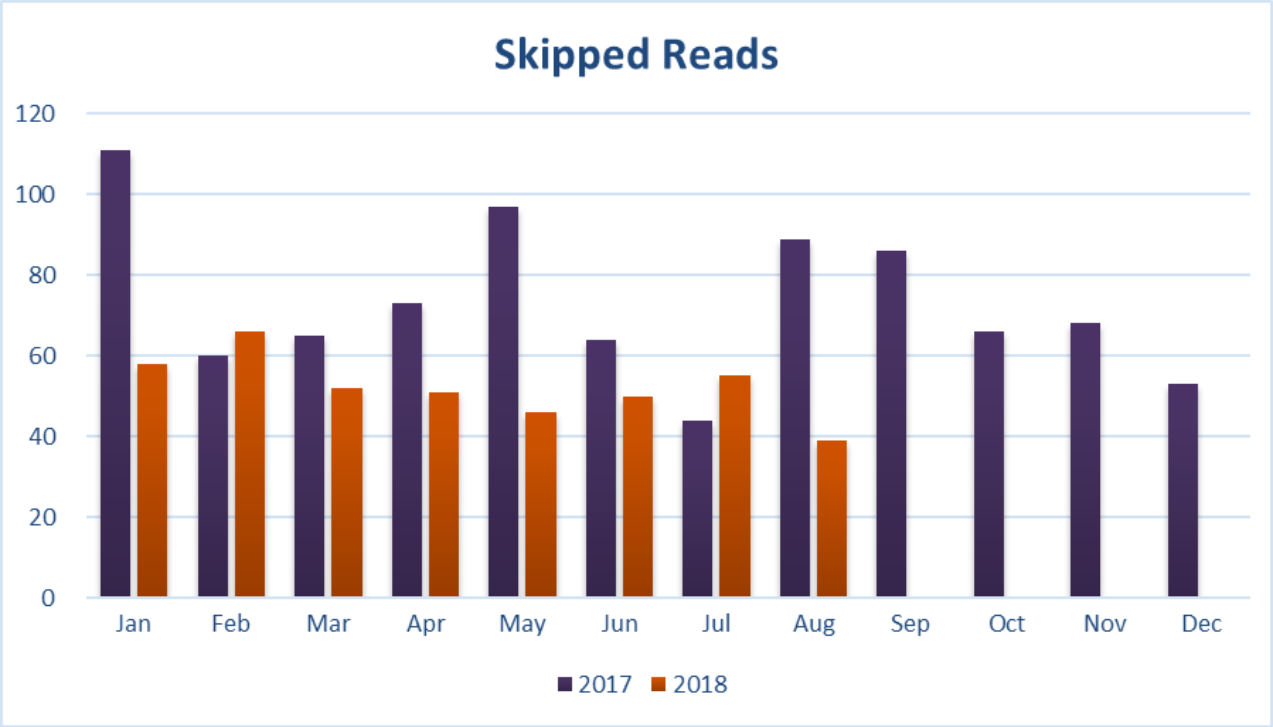
Customer phone calls are higher this time of year due to the irrigation season, specifically watering restrictions, water wiser workshops, and overall general water conservation questions.

METERS

Skipped Reads

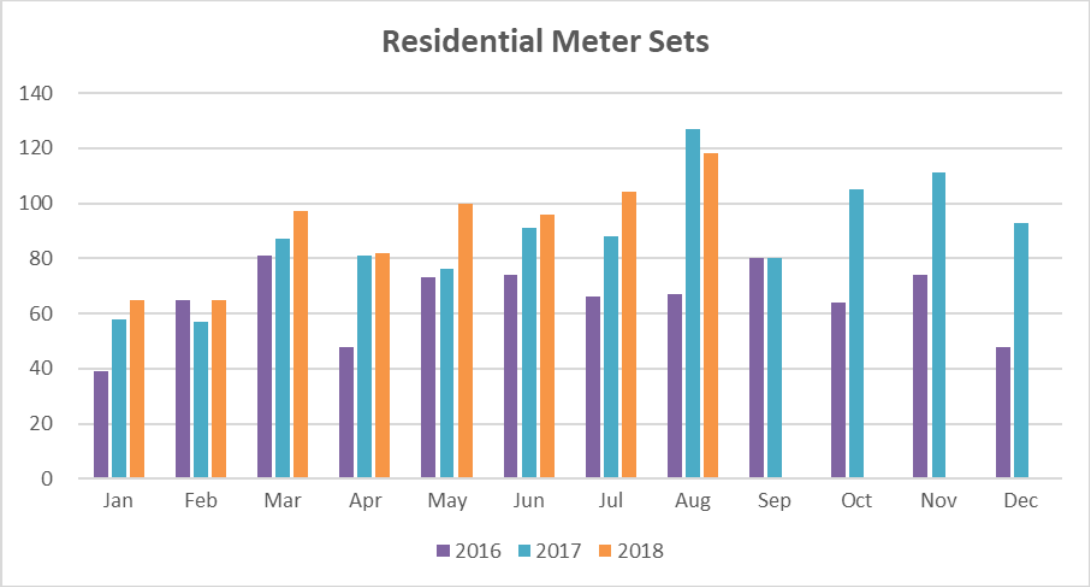
The American Water Works Association (AWWA) standard for skipped reads is 2 percent, so at 0.18 percent in August, we still continue to stay well below the industry average. This is a result of continued maintenance and repair efforts on meter infrastructure.

Record Setting Month!
39
skipped reads - an all-time low



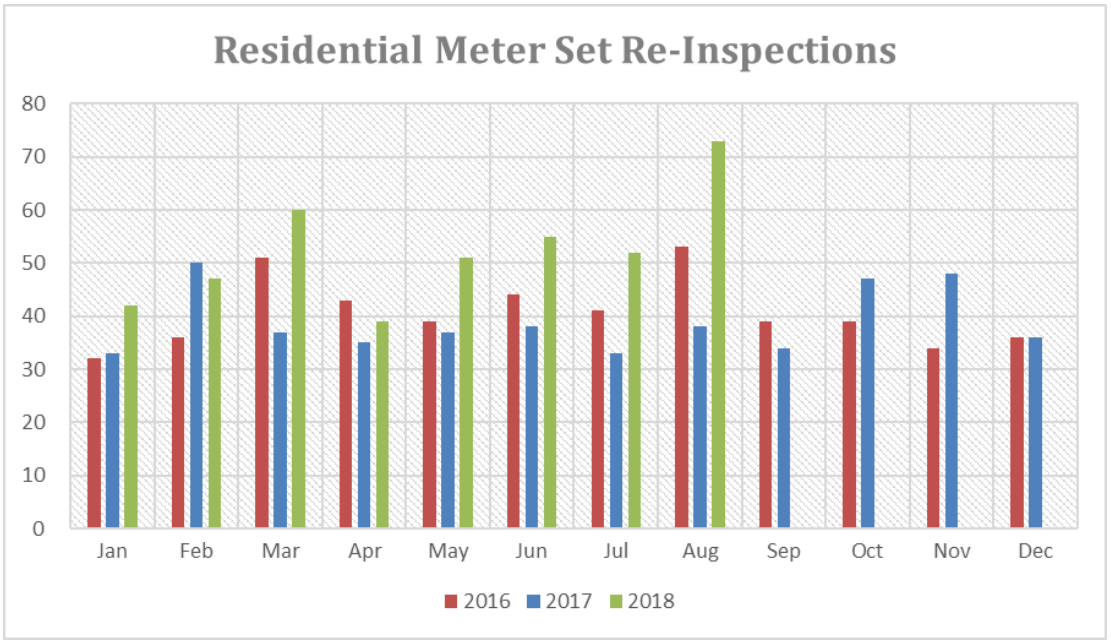
WHY IS THIS IMPORTANT?

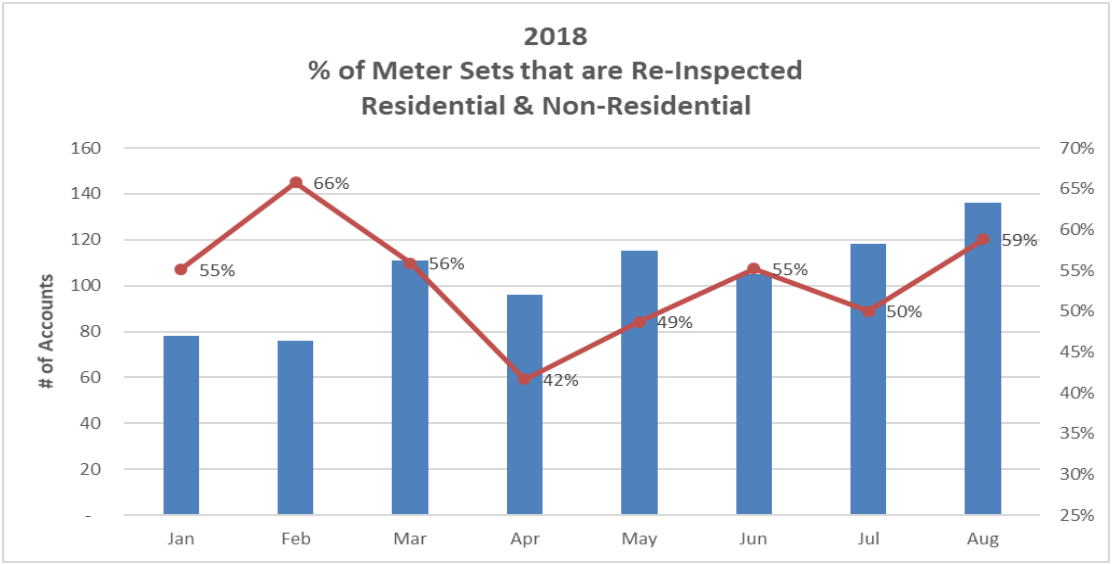
It is a strong indication of the level of preventative maintenance being done by our team. A skipped read is indicative of a problem with the metering infrastructure (i.e. battery, wiring, etc.). Fewer skipped reads means more properly working meters, which is good for all our customers.



Residential meter sets continue to remain high due to new residential development.

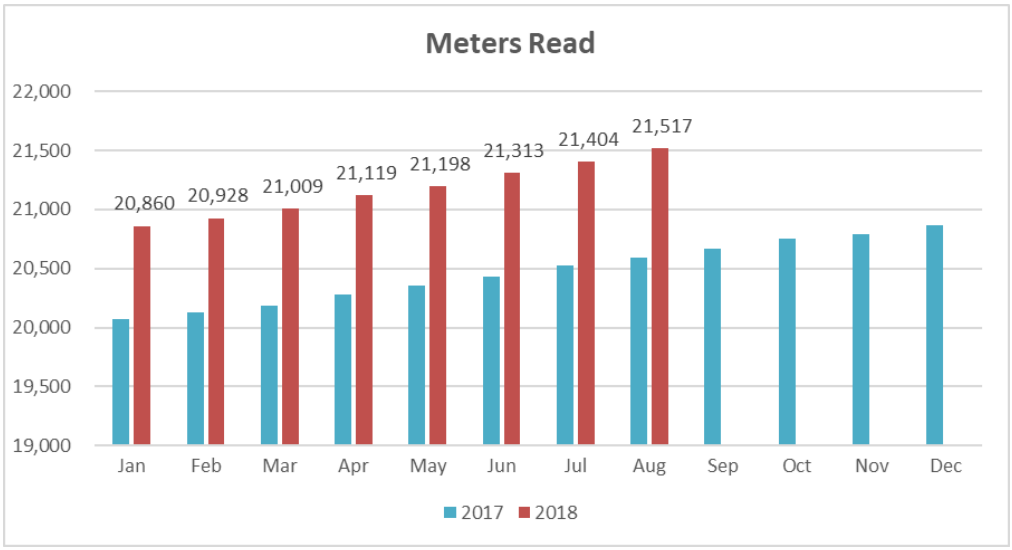
Residential meter set re-inspections in August are up as a result of the increase in residential meter sets. On average, 54% of the meter sets require at least one re-inspection from the initial inspection.





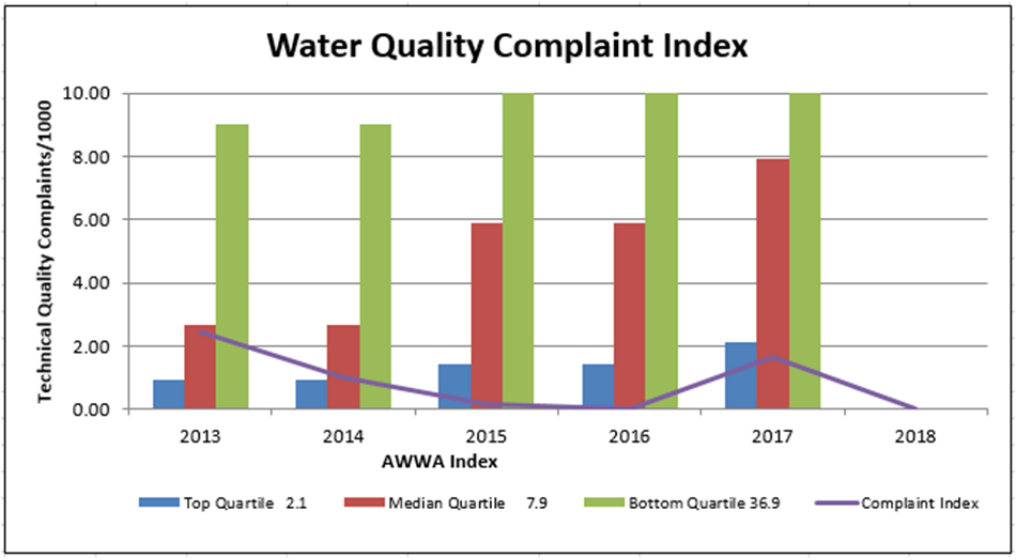
Meter Sets

Month-to-Date 118
Year-to-date 727



The meters read continues to increase month-to-month due to new residential and commercial accounts, with a significant increase year-over-year.

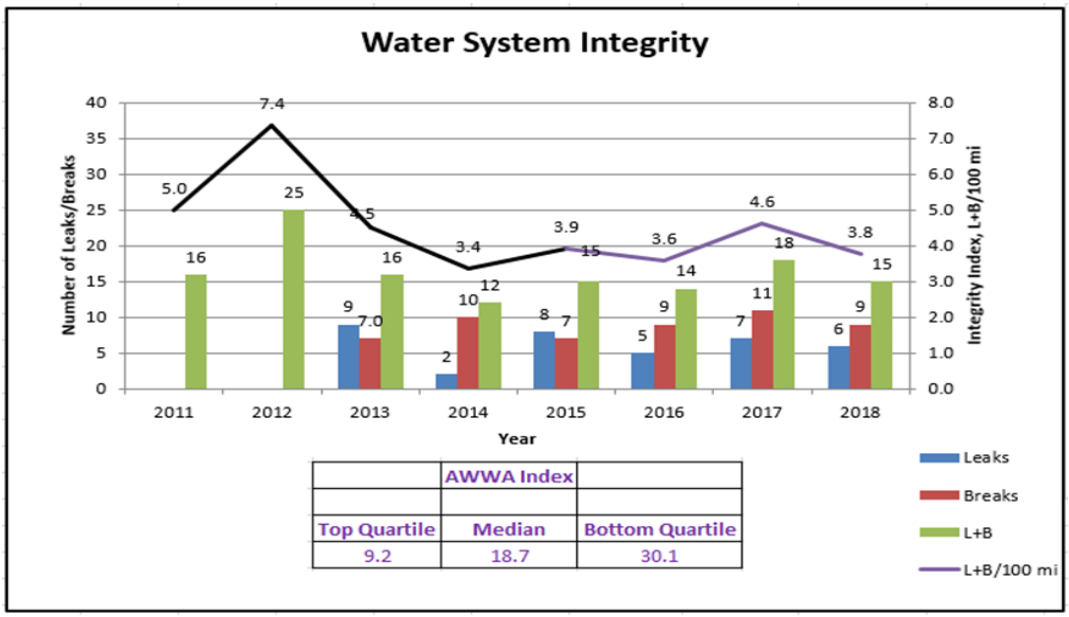
Water Quality Complaints



The Water Quality Complaint index shows that we are doing very well in this category; rating in the top quartile since 2015 according to the American Water Works Association. There were no water quality complaints in August 2018.

*For more information, view the current water quality report at CRgov.com/**waterqualityreport**.*

Water System Integrity



	AWWA Index	
Top Quartile	Median	Bottom Quartile
9.2	18.7	30.1

As the Water System Integrity chart indicates we have consistently remained in the top quartile for water system integrity based on American Water Works Association benchmarking since 2011. There were three water system integrity issues in August.

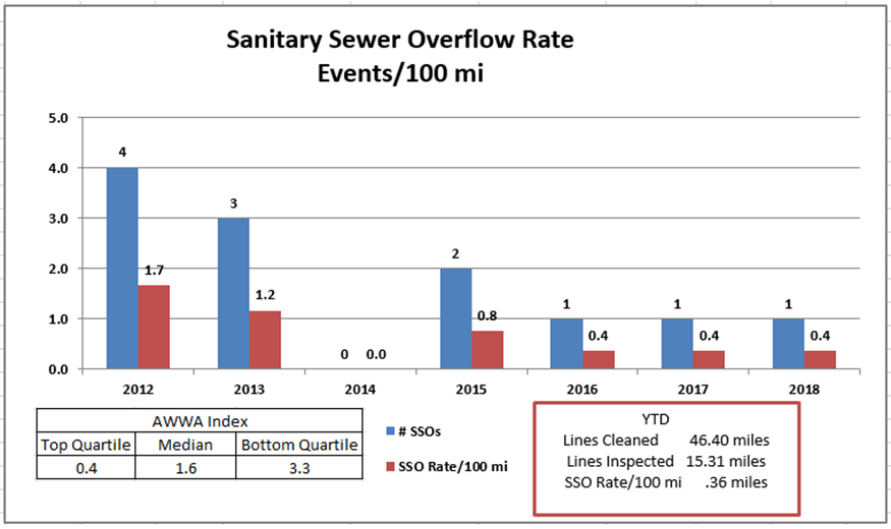
Sanitary Sewer Overflows

We are tracking in the Top Quartile in the Sanitary Sewer Overflow Rate since 2014, according to the American Water Works Association, showing one incident for the year. There were no sanitary sewer issues in August.

How do we avoid overflows?

Our team runs a camera through the sewer mains to look for problems. When problems are identified, they are cleared with a high pressure water jet. So far, we have cleaned and inspected 46.4 and 15.31 miles, respectively.

The goal this year is to clean and video approximately 33 percent of the collection system or about 90 miles.



August Levels of Service

Drinking Water Compliance
Castle Rock Water will deliver water that meets or exceeds both Primary Drinking Water Regulations and Secondary Maximum Contaminant Levels 100% of the time.
Seventy routine samples were completed. All samples were within the parameters set forth by the Safe Drinking Water Act and Colorado Drinking Water Standards. Our annual Consumer Confidence Report is available to view at CRgov.com/waterquality.

Pressure Adequacy
< 1% of our customers will experience less than 43 pounds per square inch (psi) of pressure at the meter during normal operations.
There were no water pressure issues in August.

Sewer System Effectiveness
<1% of our customers will experience a sewer backup caused by the utility's sewer system per year.
There were no issues in August.

Drinking Water Supply Outages
<5% of our customers will experience water outages for one or more events totaling more than 30 hours/year.
There was a main break in The Woodlands. It was a pinhole leak caused by corrosion in a 6" ductile iron pipe. The main was shut down for a few minutes while the repair was completed.

There were also two repairs done in Founders Village. One was a planned valve repair on a main, which put twenty houses out of water for less than an hour. The other was an irrigation service line repair, which put two homes out of water for less than four hours.

Before you start a project, call 811. Whether you are planning to do it yourself, or hiring a professional, we'll help you do it safely. The local 811 Call Center will contact Castle Rock Water. We will schedule a time to come out to locate public water and wastewater lines in the road and in your project area.

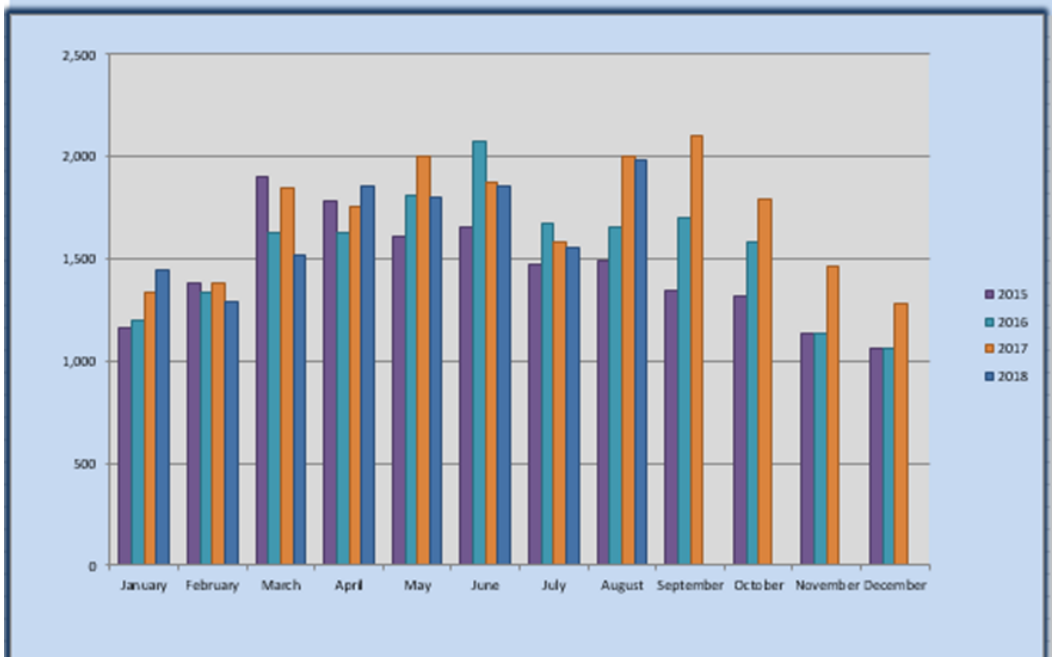
The graphs below show our monthly utility locates and a chart showing the year-to-year comparison

ANNUAL UTILITY LOCATES

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
January	577	475	617	1,190	1,289	1,162	1,199	1,334	1,442			
February	521	485	538	1,094	1,093	1,383	1,334	1,378	1,293			
March	660	552	818	1,437	1,349	1,906	1,625	1,851	1,514			
April	838	681	1,025	1,482	1,552	1,784	1,631	1,760	1,856			
May	853	863	985	1,541	1,531	1,609	1,809	2,002	1,801			
June	969	844	982	1,314	1,399	1,654	2,075	1,872	1,854			
July	680	582	859	1,350	1,392	1,477	1,675	1,582	1,556			
August	901	723	1,123	1,476	1,468	1,494	1,651	2,001	1,986			
September	880	723	1,029	1,240	1,373	1,343	1,701	2,102				
October	715	688	1,155	1,501	1,376	1,314	1,579	1,792				
November	536	518	1,041	1,072	866	1,134	1,131	1,460				
December	415	405	925	1,005	1,043	1,063	1,059	1,277				
Totals	8,545	7,539	11,097	15,702	15,731	17,323	18,469	20,411	13,302			

811 Know what's below. Call before you dig.

4 Year Locate Trend



Castle Rock Water's locate requests from 811 have continued to rise, year over year. Our locating team has correctly marked all locate requests. To date, there has not been damage to lines as a result of incorrect locate marks.