



CUSTOMER CHARACTERISTICS ANALYSIS

2018 RATES AND FEES STUDY

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BUSINESS SOLUTIONS TEAM

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EXECUTIVE SUMMARY

As a part of the annual Rates and Fees Study, Castle Rock Water conducts an in-depth analysis of accounts in service to determine customer characteristics and consumption patterns. We start off looking at the most current billing data for FY2017. From there, we break down the number of accounts by meter size and customer class. The Town's Development Services Department provides the number of accounts by customer class that are forecasted for FY2018 and FY2019.

Consumption data by customer class and meter size is then analyzed over a 3 year period to obtain an average, taking into consideration weather patterns and rainfall variances by year. The most current 3 year average (2015-2017) is then compared to the 3 year averages calculated in past years, going back as far as 2012. Average consumption is also analyzed down to the level of consumption in the winter months (without irrigation) and summer months (with irrigation).

This 3 year average consumption is then used to calculate a meter equivalency factor. The Town implemented an actual use meter equivalency schedule for assessing monthly service charges for water, wastewater, and water resources in 2010. Analysis of three years of water consumption by meter size serves as the basis for the actual use equivalencies. Equivalency factors are calculated by establishing the average use for all $\frac{3}{4}$ " meters as the base unit and then dividing the average use for larger meter sizes by the average use for the $\frac{3}{4}$ " meters.

Customer data for the last three years (2015-2017) is then analyzed to determine an average representative customer by customer class. One customer per class from the data sample that best represents the customers in that customer class is then selected. This data is then used to represent the comparison of adopted rates versus proposed rates on a typical customer's annual bill.

Billed usage by tier from 2012-2017 by customer class is analyzed to see if customers are staying within their budgeted tiers. The purpose of this data analysis is also to see if customers are conserving water and avoiding Tier 3 - excessive and Tier 4 - surcharge (over 40,000 gallons per month).

As part of this study, we also took a closer look at the customers with a .67 SFE to see if their consumption patterns were meeting the intent of the program, to use a 3rd less water than an average $\frac{3}{4}$ " residential customer. Additional information such as .67 SFE accounts by irrigated area also help to understand the larger irrigated accounts that typically consume larger amounts of water and may not be meeting the intent of the program.

This year's study includes a new analysis section for analyzing Tier 2-4 consumption, Kentucky Blue grass budget analysis, water wiser customer usage, irrigation season schedule analysis, Town account usage, bulk water usage, and actuals comparison to growth projections.

Like the water fund, we also chart the number of accounts from the latest 2017 billing data plus growth projections for customers who are being provided water resources and wastewater services. Stormwater Single Family Equivalents (SFE's) are also calculated using the latest 2017 billing data plus growth projections.

Much of the information contained in this analysis is used in the rate making process. Key inputs and how they are used in the financial rate making model will be identified in the individual sections of this report.

WATER ENTERPRISE FUND

NUMBER OF ACCOUNTS BY METER SIZE & CUSTOMER CLASS

Table 1 below shows the number of accounts by meter size and customer class using 12 months of billing data (Jan17-Dec17). This shows that 20,472 customers were receiving water service during this capture period. The FY2016 accounts based on 12 months of billing data (Jan16-Dec16) showed 19,593 customers were receiving water service. There are 879 more accounts in FY2017 than FY2016. The number of accounts by meter size are key inputs into the system development fees model. These are then converted into Single Family Equivalents (SFE's) which are used to determine existing versus new system capacities and are used in the calculations within the cost of service models.

TABLE 1: ACCOUNTS BY METER SIZE & CUSTOMER CLASS (FY2017)

Meter Size	Residential	Multifamily	Commercial	Bulk	Irrigation	Multifamily Indoor Use Only	Commercial Indoor Use Only	Total
5/8"	908	-	-	-	23	3	6	940
3/4"	17,938	14	128	82	131	99	117	18,509
1"	20	25	69	-	99	80	85	378
1.5"	-	55	50	-	128	100	71	404
2"	-	15	25	-	81	41	44	206
3"	-	2	5	-	7	-	14	28
4"	-	1	-	-	2	-	2	5
6"	-	-	2	-	-	-	-	2
Total	18,866	112	279	82	471	323	339	20,472

Chart 1 below shows the growth in residential accounts from 2011-2017 and the projected growth for 2018-2019. The projected growth for FY2018 and FY2019 remains strong at 700 permits forecasted for 2018 and 600 for 2019. The growth projections are provided by the Town's Development Services Department. Since 2013, the average number of accounts that have been added per year is approximately 800.

CHART 1: RESIDENTIAL ACCOUNTS 2011-PROJECTED 2019

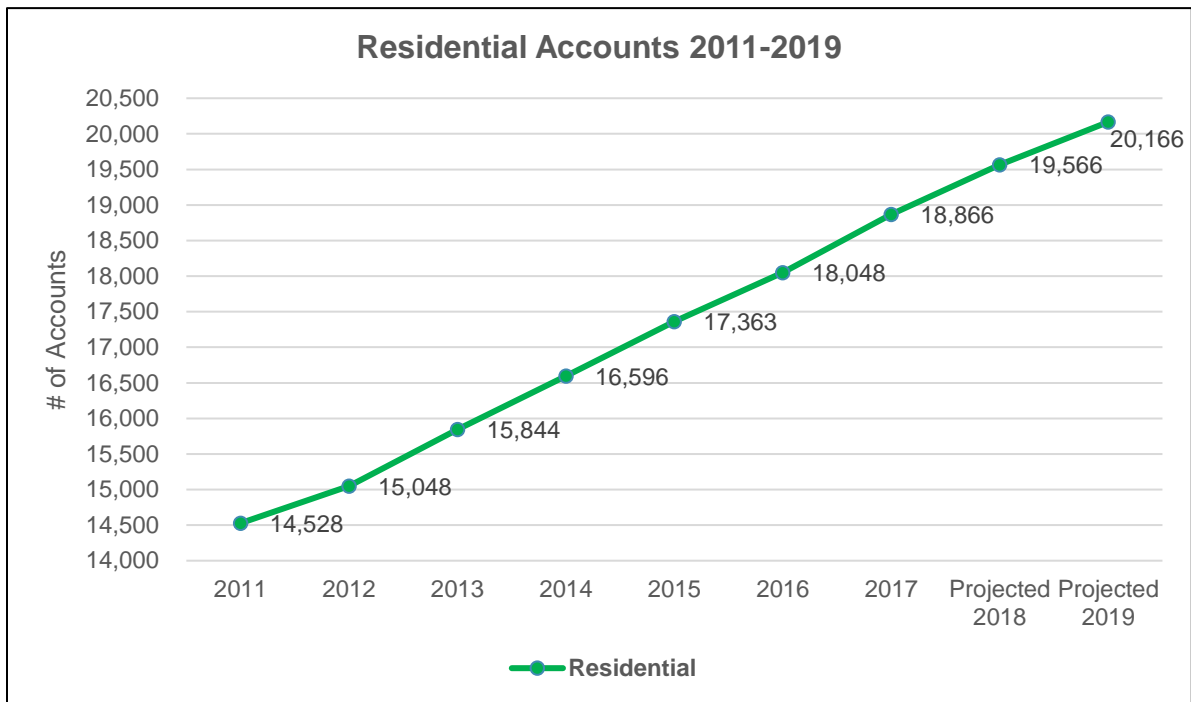
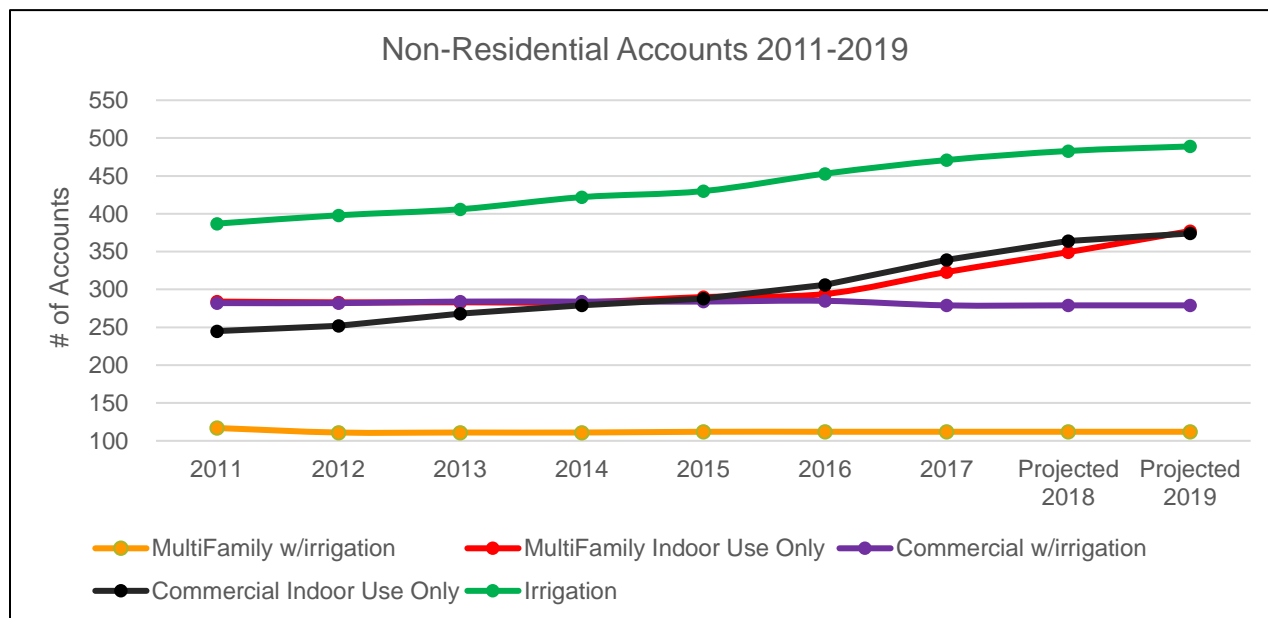


Chart 2 shows the number of non-residential accounts from 2011-2017. Although multi-family indoor use only has remained flat over the last several years, growth projections for this type of account indicate a significant increase in FY2018 and FY2019. A significant increase in commercial indoor use only is also projected for FY2018 and FY2019.

CHART 2: NON-RESIDENTIAL ACCOUNTS 2011-PROJECTED 2019



Castle Rock Water projects FY2019 water accounts by using FY2017 billing data plus the projected growth for FY2018 and FY2019. The FY2019 water accounts are projected to equal 21,797, (20,166 for residential and 1,631 for non-residential). Growth is projected for the following customer classes:

2018 Projected Accounts by Customer Class:

84	Residential (.67 SFE)
616	Residential (1 SFE)
26	Multi-Family
25	Commercial
12	Irrigation
763	Total

2019 Projected Accounts by Customer Class:

72	Residential (.67 SFE)
528	Residential (1 SFE)
28	Multi-Family
10	Commercial
6	Irrigation
644	Total

Total growth of 763 accounts is projected for FY2018 and 644 for FY2019 for a total of 1,407 projected for the water fund thru FY2019.

ACTUAL VERSUS PROJECTED GROWTH 2013 TO 2017

CRW has seen significant growth over the last several years. The projections received each year from development services are important components to the rates models and revenue projections when looking at needed rate increases. When looking at future projections it is also important to look at how closely the past projections have compared to the actuals each year. The charts below show the actual versus projected permits from 2013 to 2017 for residential, multifamily and commercial classes.

CHART 3: RESIDENTIAL
ACTUAL VS PROJECTED GROWTH
2013-2017

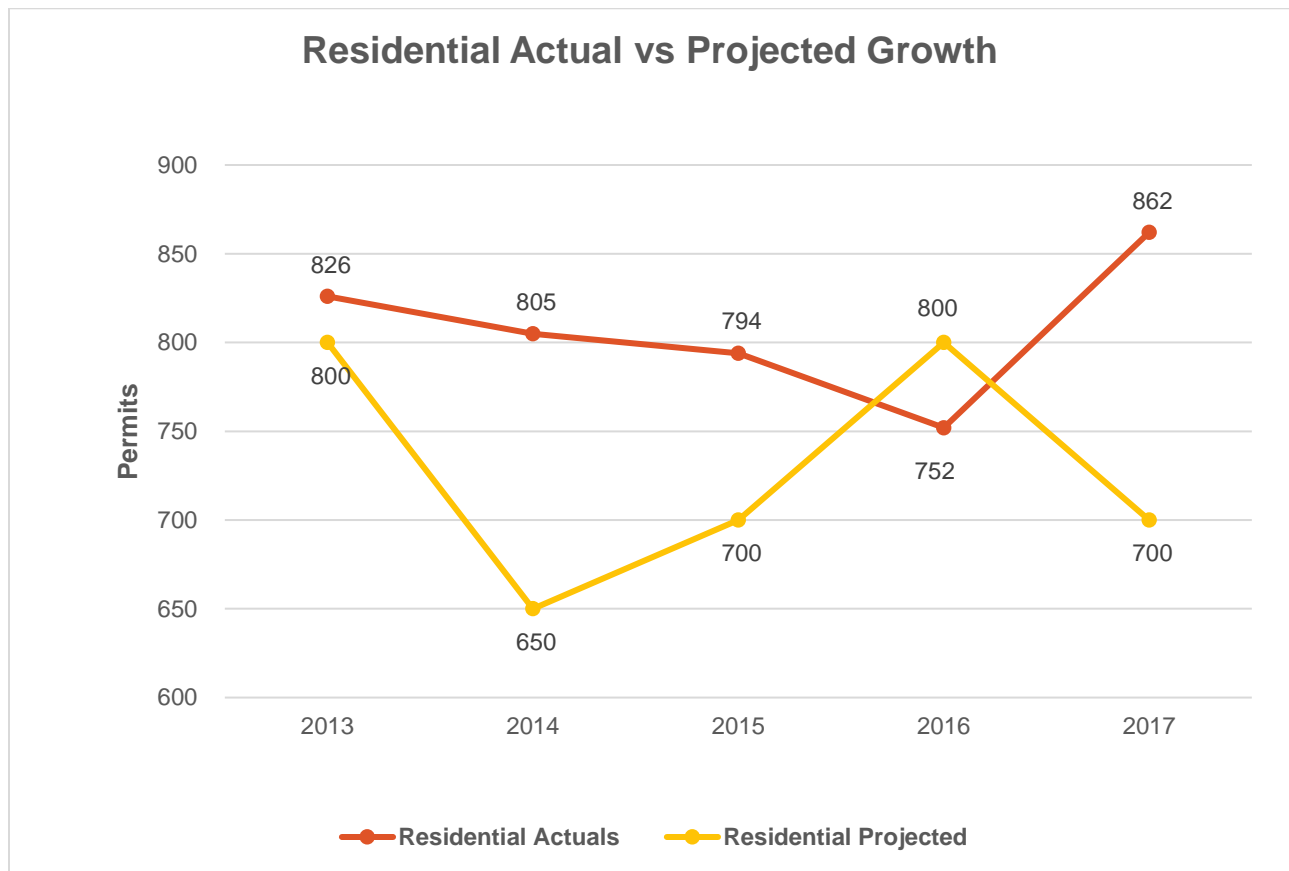


CHART 4: MULTIFAMILY
ACTUAL VS PROJECTED GROWTH
2013-2017

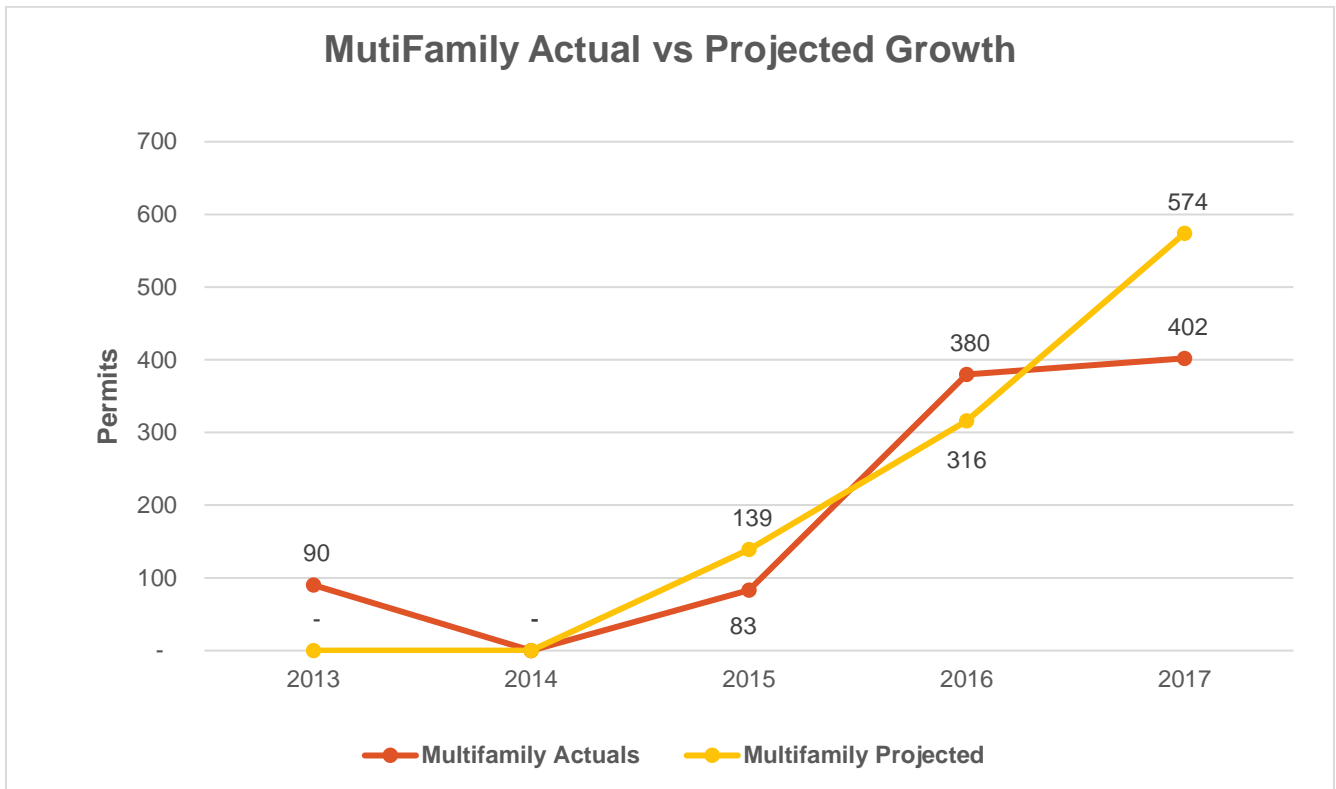
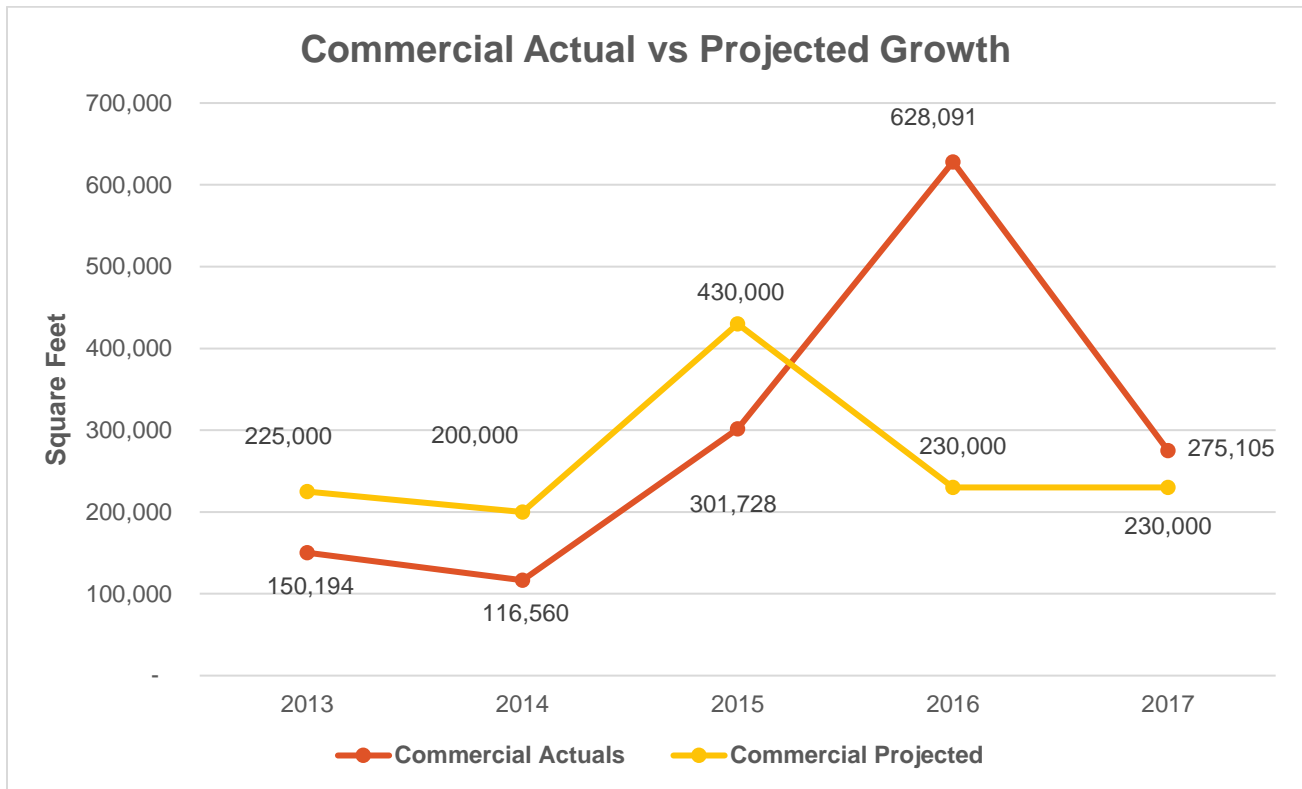


CHART 5: COMMERCIAL
ACTUAL VS PROJECTED GROWTH
2013-2017



3 YEAR AVERAGE CONSUMPTION DATA BY CUSTOMER CLASS

Table 2 shows the 3 year average monthly consumption by meter size and customer class for 2015-2017 billing data. Table 2A shows the breakdown of the residential meter sizes shown in Table 2 and their individual applicable 3 year averages. Chart 6 shows the 3 year average monthly consumption for all residential meter sizes, including 5/8" through 1". Although the number of 1" residential meters is very small at 20 accounts, the impact to the overall average is significant.

TABLE 2: 3 YEAR AVG MONTHLY CONSUMPTION
BY CUSTOMER CLASS & METER SIZE (2015-2017)

Meter Size	Residential	Multifamily	Commercial	Irrigation	MultiFamily	Commercial
					Indoor Use Only	Indoor Use Only
5/8"	5.37	-	-	37.06	3.86	2.21
3/4"	7.48	20.78	9.40	31.75	3.21	8.24
1"	17.86	33.69	30.27	68.04	13.55	31.14
1.5"	-	71.87	60.14	138.59	43.71	43.11
2"	-	91.45	69.12	76.21	76.58	69.62
3"	-	319.67	163.15	466.42	-	86.53
4"	-	394.08	-	619.57	-	1,311.81
6"	-	-	752.97	-	-	-

TABLE 2A: 3 YEAR AVG MONTHLY CONSUMPTION
RESIDENTIAL ONLY METER SIZES (2015-2017)

Residential Accounts					
Meter Size	2011-2013	2012-2014	2013-2015	2014-2016	2015-2017
5/8"	5.35	6.19	5.70	5.44	5.37
3/4"	7.21	7.73	7.30	7.30	7.48
1"	11.42	13.14	14.17	21.26	17.86
Average	7.99	9.02	9.06	11.33	10.24
Weighted Average	7.12	7.66	7.23	7.23	7.39

CHART 6: 3 YEAR AVG MONTHLY CONSUMPTION
ALL RESIDENTIAL ACCOUNTS

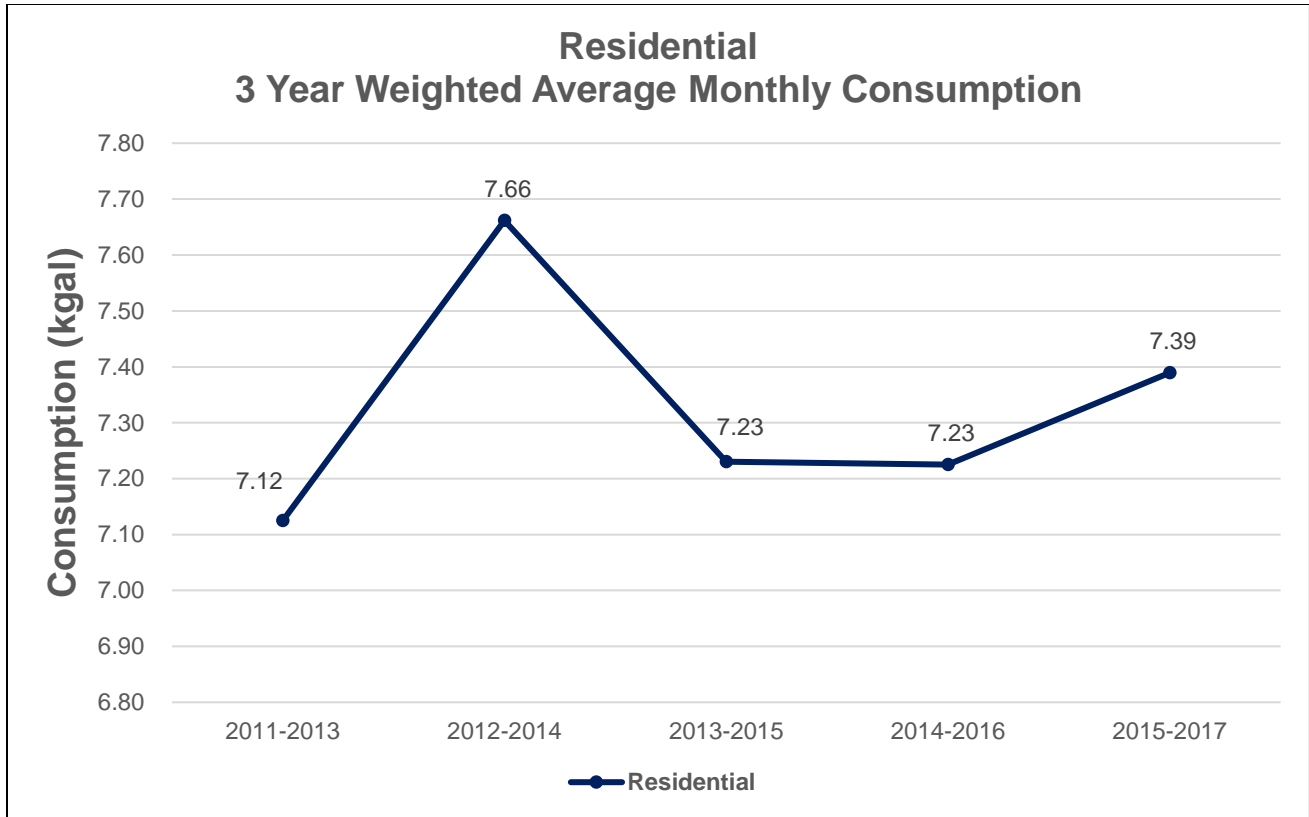
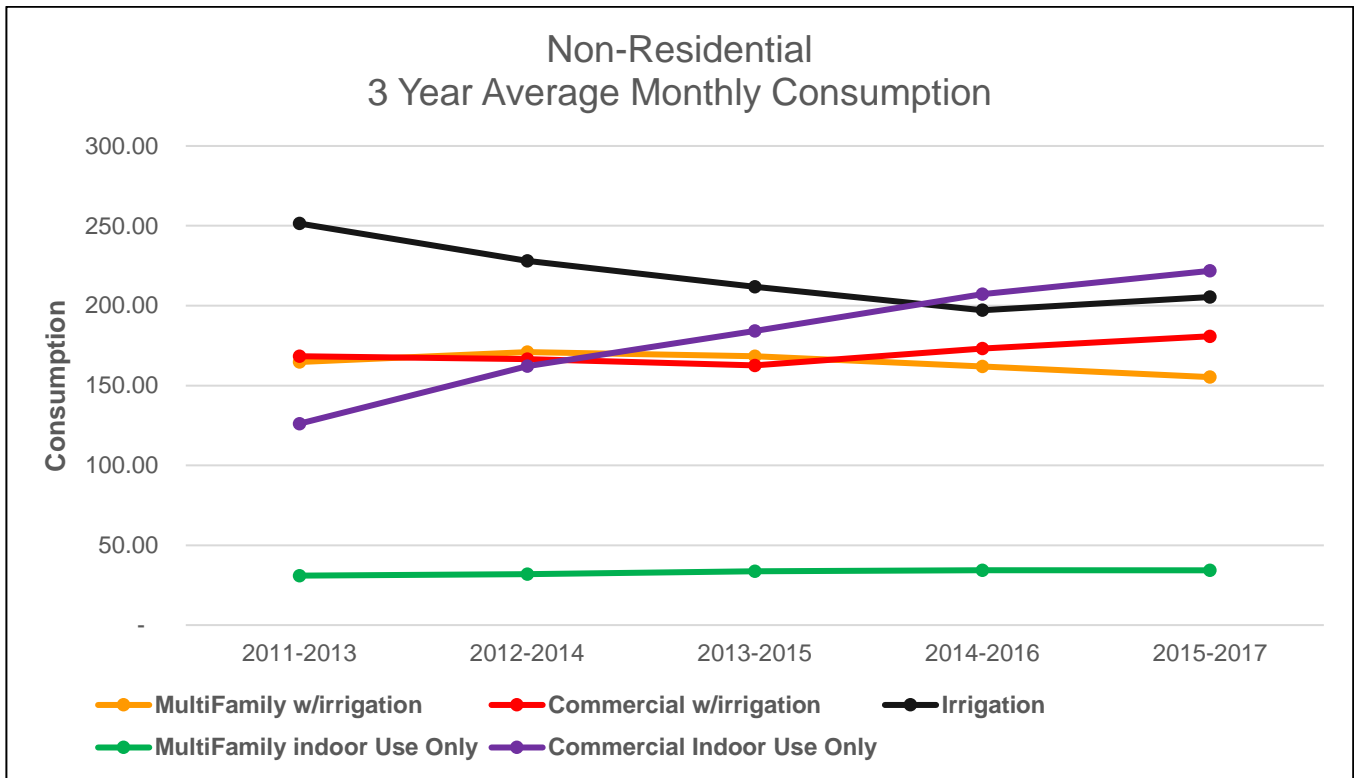


CHART 7: 3 YEAR AVG MONTHLY
CONSUMPTION FOR ALL NON-RESIDENTIAL
ACCOUNTS



The 3 year average monthly consumption shown above in Chart 7 is for all non-residential meter sizes combined. While multifamily and commercial with irrigation accounts are fairly steady, irrigation usage is slightly trending down, which is a good sign. Commercial Indoor Use Only is increasing primarily as a result of the increase in commercial indoor accounts with meters in the 1" to 3" range. Commercial indoor accounts increased by 51 from FY2015 to FY2017 due to the development within Castle Rock.

Chart 8 shows that the 3 year average intervals for comparison have stayed flat for the ¾" and a slight decrease for the 1" meters. The 1.5", 2" and 3" meters have shown a slight increase from the 2014-2016 three year average compared to the 2015-2017 three year average.

CHART 8: 3 YEAR AVG MONTHLY
CONSUMPTION BY METER SIZE ¾" to 3"
ALL CUSTOMER CLASSES

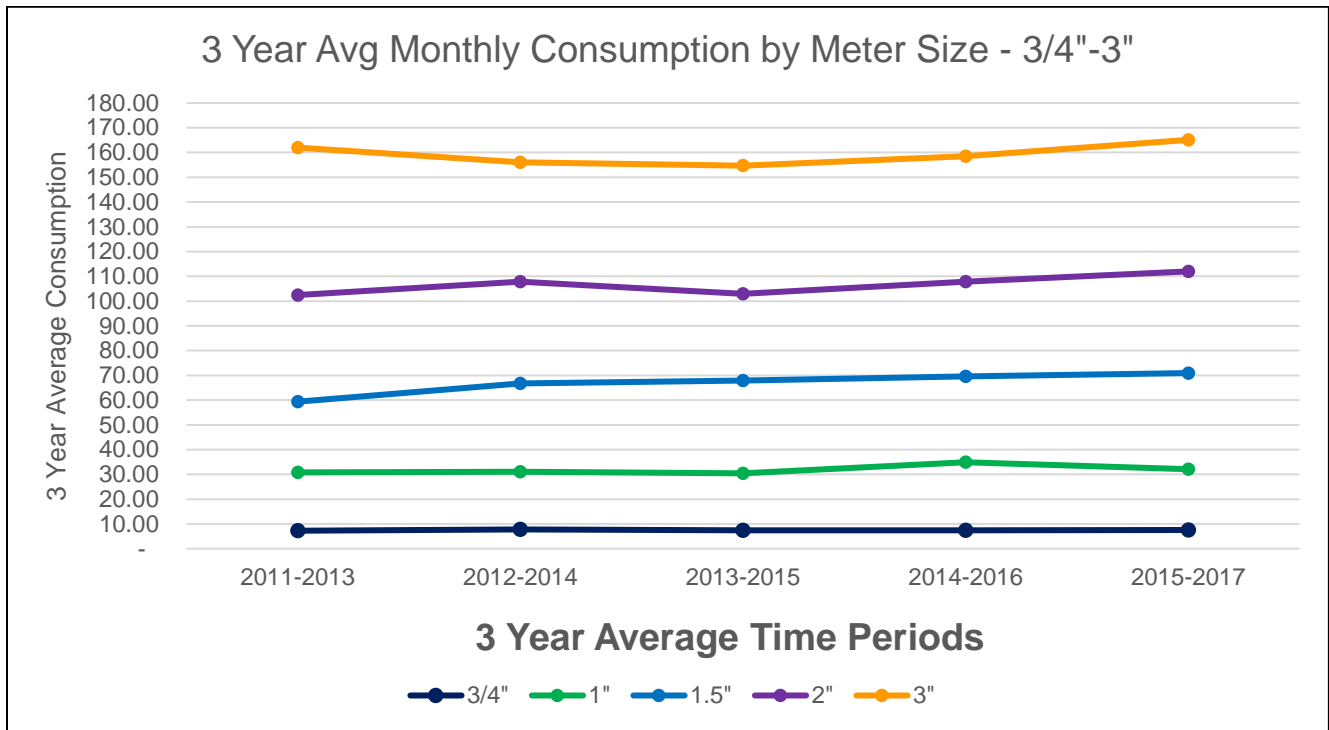
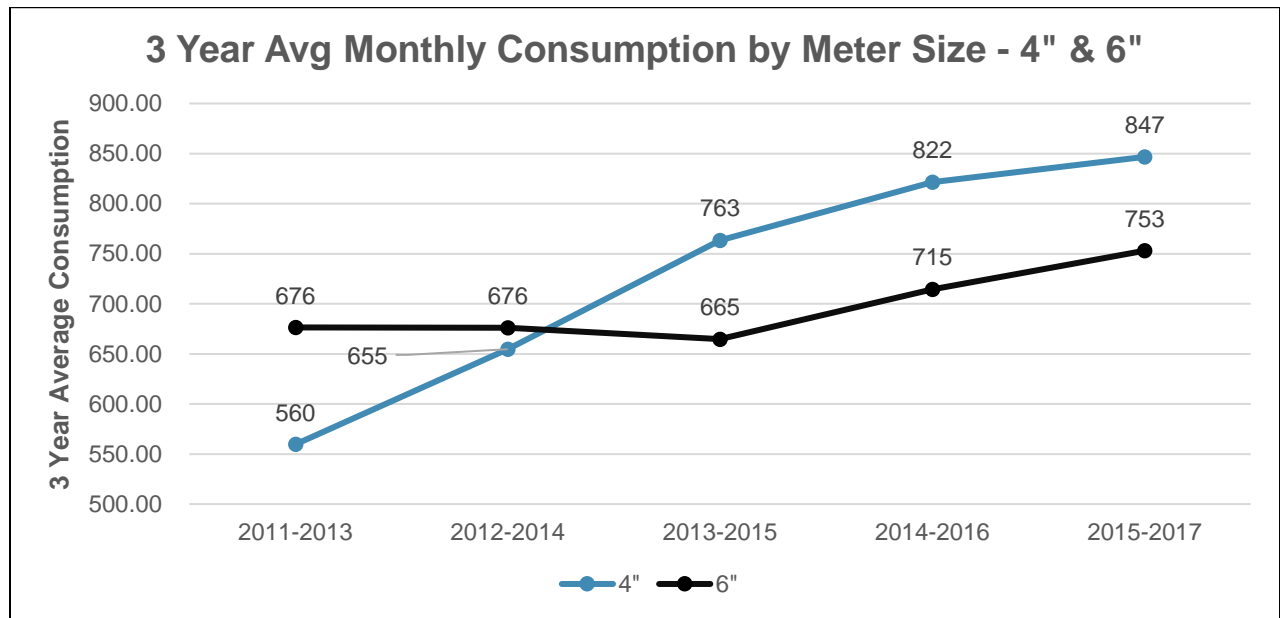


Chart 9 below indicates that the average consumption for the two 6" meters in service is trending upwards after a downward spike in the prior three year average (2013-2015). We currently have five 4" meters in service, four active meters and one redundant meter for medical purposes. The increase in the 2013 and forward consumption pattern is a result of the 4" medical facility meter that was installed in 2013.

CHART 9: 3 YEAR AVG MONTHLY CONSUMPTION BY METER SIZE - 4" and 6"



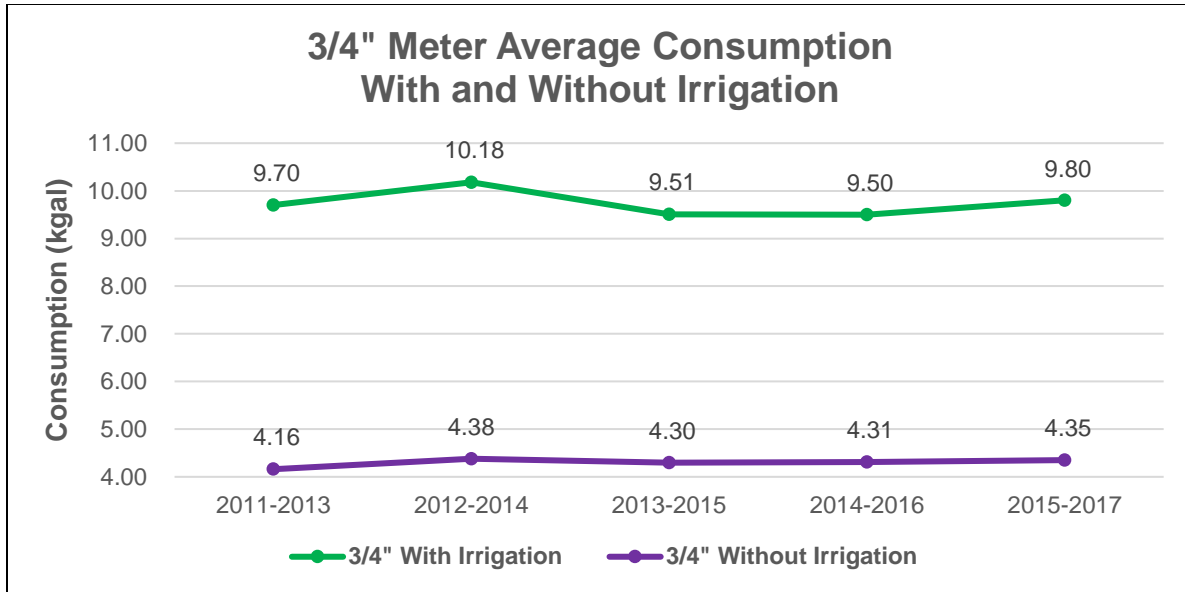
3 YEAR AVERAGE CONSUMPTION WITH & WITHOUT IRRIGATION

The data in Table 3 shows the average monthly consumption by meter size for all customer classes combined. This shows that the monthly consumption in many cases almost doubles between the summer "With Irrigation" and the winter "Without Irrigation" seasons.

TABLE 3: 3 YEAR AVERAGE MONTHLY CONSUMPTION BY METER SIZE
ALL CUSTOMER CLASSES (2015-2017)

Meter Size	With Irrigation	Without Irrigation
5/8"	7.47	3.43
3/4"	9.80	4.35
1"	39.05	19.70
1.5"	85.22	43.09
2"	134.78	62.97
3"	204.22	99.72
4"	842.70	852.33
6"	886.90	565.47

CHART 10: 3 YEAR AVG MONTHLY CONSUMPTION BY METER SIZE ¾"
ALL CUSTOMER CLASSES



While analyzing the 3 year average consumption data CRW determined that they wanted to relook at the methodology that was used in these figures. In the past these averages were calculated based on taking an average of each individual account for the three year time period and then taking an average of these amounts to get the final numbers. For this rate study it was determined that the averages would be more accurate if they would be based on only taking the total consumption per account based on the number of periods of usage in the study, thus eliminating one average calculation. All of the years have been recalculated using this new methodology.

CHART 11: 3 YEAR AVG MONTHLY CONSUMPTION BY METER SIZE 1"
ALL CUSTOMER CLASSES

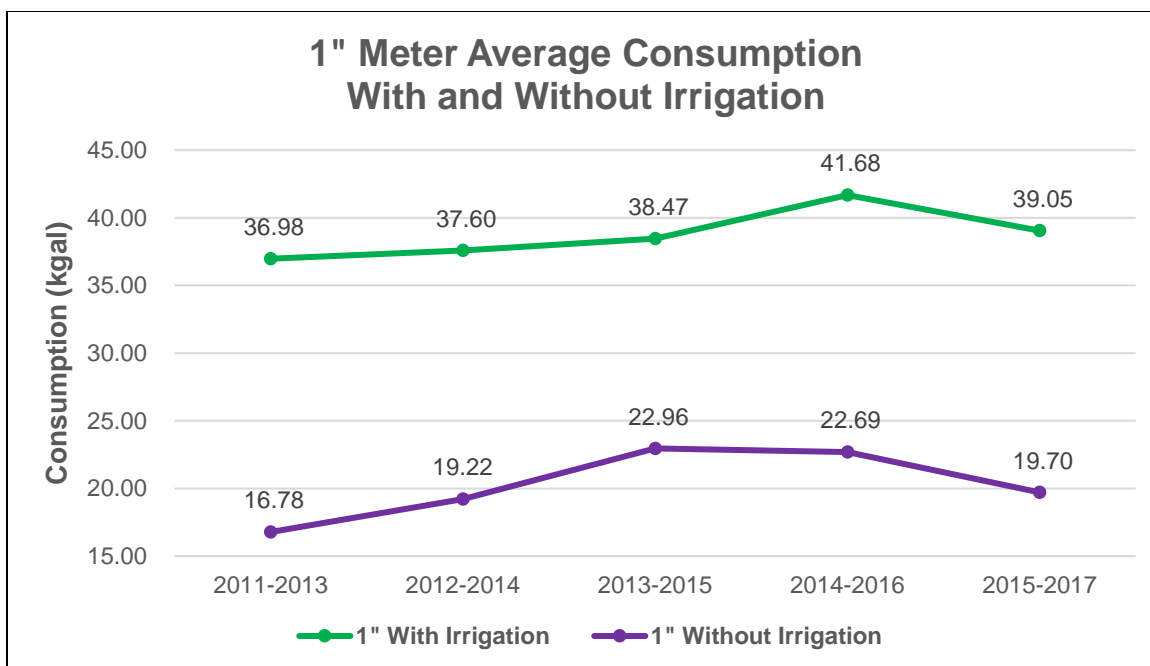


CHART 12: 3 YEAR AVG MONTHLY CONSUMPTION BY METER SIZE 1.5"
ALL CUSTOMER CLASSES

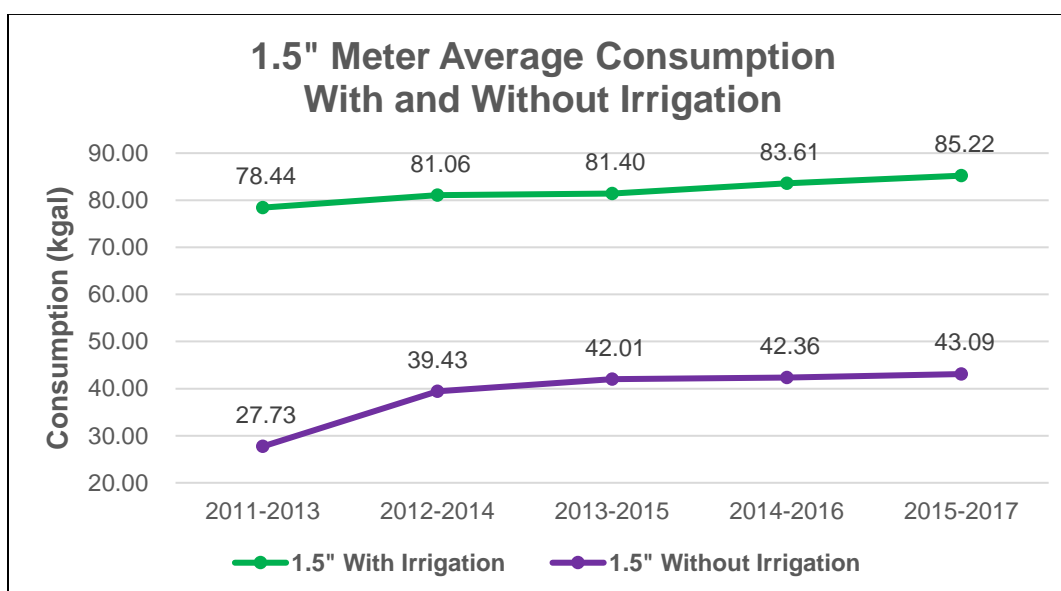


CHART 13: 3 YEAR AVG MONTHLY CONSUMPTION BY METER SIZE 2"
ALL CUSTOMER CLASSES

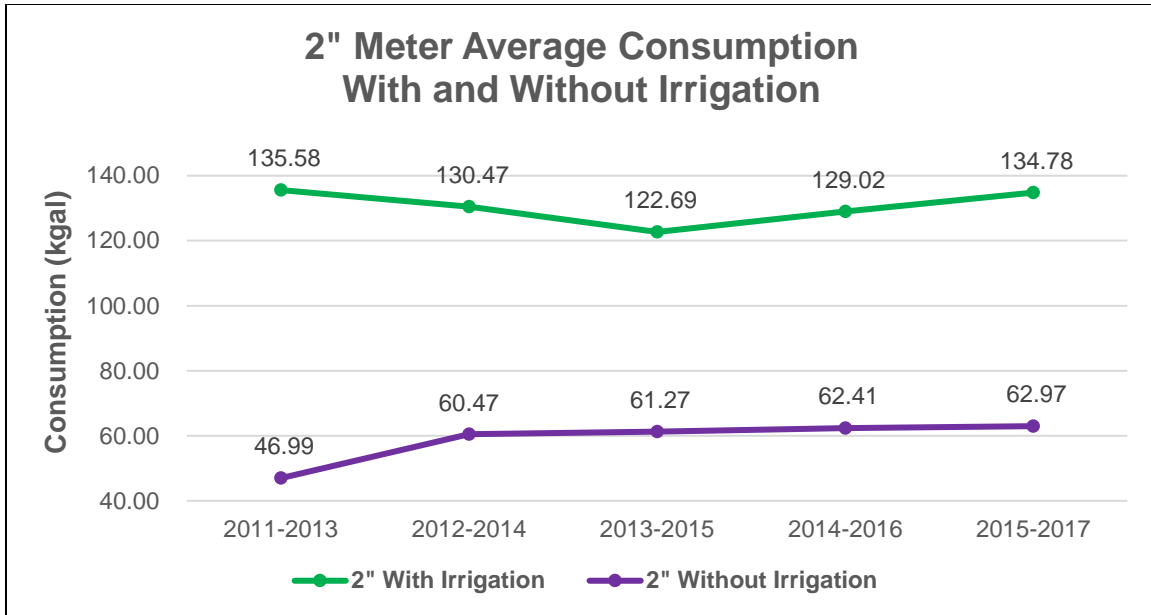


CHART 14: 3 YEAR AVG MONTHLY CONSUMPTION BY METER SIZE 3"
ALL CUSTOMER CLASSES

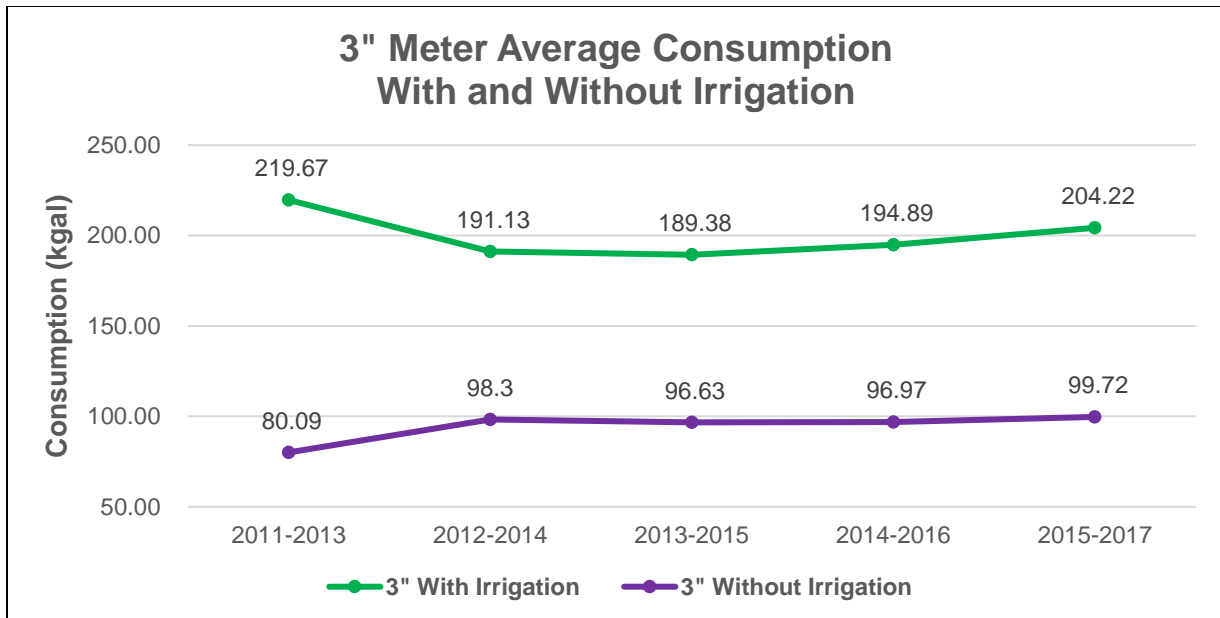


CHART 15: 3 YEAR AVG MONTHLY CONSUMPTION BY METER SIZE 4"
ALL CUSTOMER CLASSES

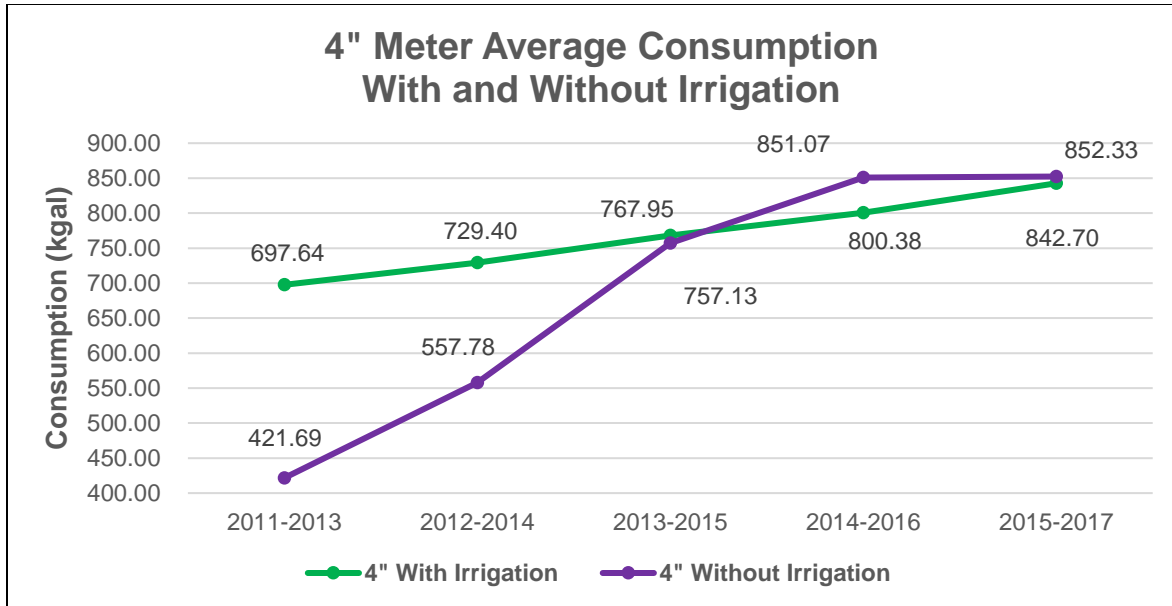
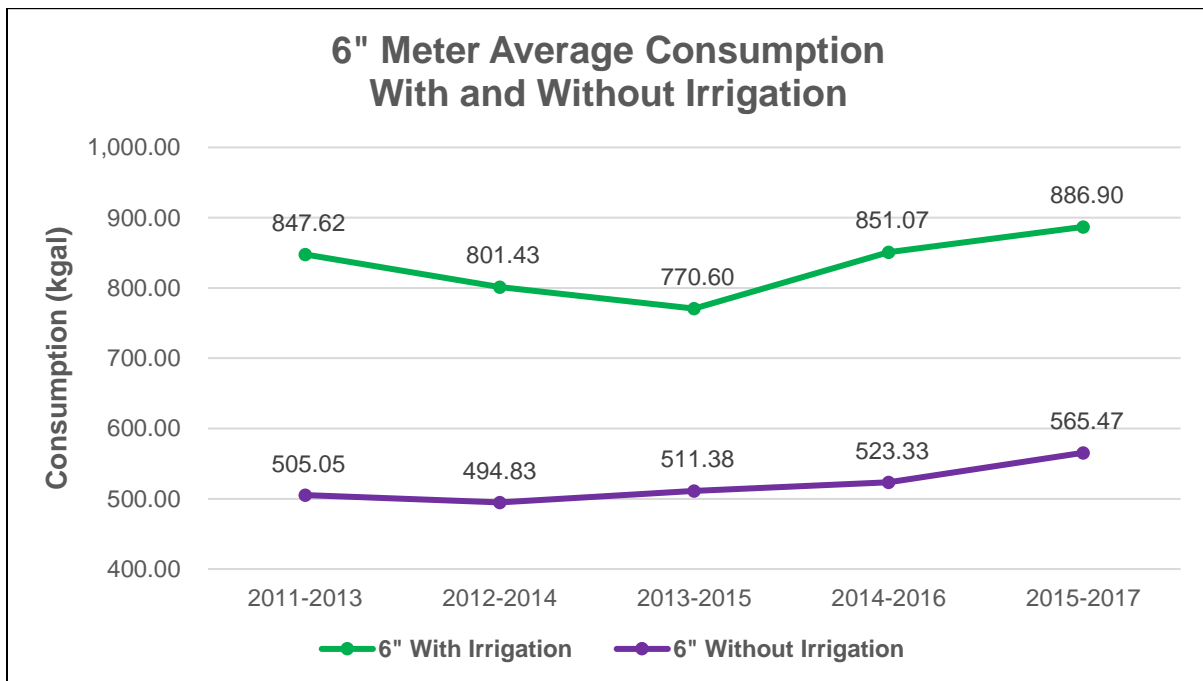


CHART 16: 3 YEAR AVG MONTHLY CONSUMPTION BY METER SIZE 6"
ALL CUSTOMER CLASSES



EQUIVALENCY FACTORS

There are two different types of equivalency factors. The first is the hydraulic capacity method which is based on the relative capacity of different meter sizes and meter types utilized to deliver water. These can also be based on the relative potential demands of different customers. Based on the characteristic hydraulic demands, a single family meter size of ¾" is designated as the base for one SFE. The maximum flow rate of water through the meter in gallons per minute (gpm) becomes the unit of comparison. The maximum flow rate demanded by new customers is compared to the base demand in order to determine the equivalency ratio. For example, if the base single family residential customer requires 30 gpm and a commercial customer requires 200 gpm, the equivalency ratio equals 6.67. The second method is the actual use equivalency factor, which is based on the relative average monthly water usage of CRW's customers. CRW uses the second method using actual use equivalency factors.

Table 4 calculates equivalency factors by customer class and meter size based on a ¾" single family residential customer. This is what is used to calculate Single Family Equivalents (SFE) in the system development fees model and is used to allocate the meter related costs recovered in the cost of service model by meter size. It takes the number of accounts times the actual use equivalency factors to come up with the existing SFE's.

TABLE 4: ACTUAL USE EQUIVALENCY FACTORS
(BASED ON 3 YEAR AVG. 2015-2017)

Meter Size	Residential	Multifamily	Commercial	Irrigation	MultiFamily Indoor Use Only	Commercial Indoor Use Only	Equivalency Factor
5/8"	0.72	-	-	4.95	0.52	0.30	0.79
3/4"	1.00	2.78	1.26	4.24	0.43	1.10	1.01
1"	2.39	4.50	4.05	9.09	1.81	4.16	4.29
1.5"	-	9.60	8.04	18.52	5.84	5.76	9.48
2"	-	12.22	9.24	10.18	10.23	9.30	10.08
3"	-	42.71	21.80	62.32	-	11.56	22.06
4"	-	52.66	-	82.78	-	175.28	113.13
6"	-	-	100.61	-	-	-	100.61

CHART 17: EQUIVALENCY FACTORS USED IN THE 2017
RATES AND FEES STUDY

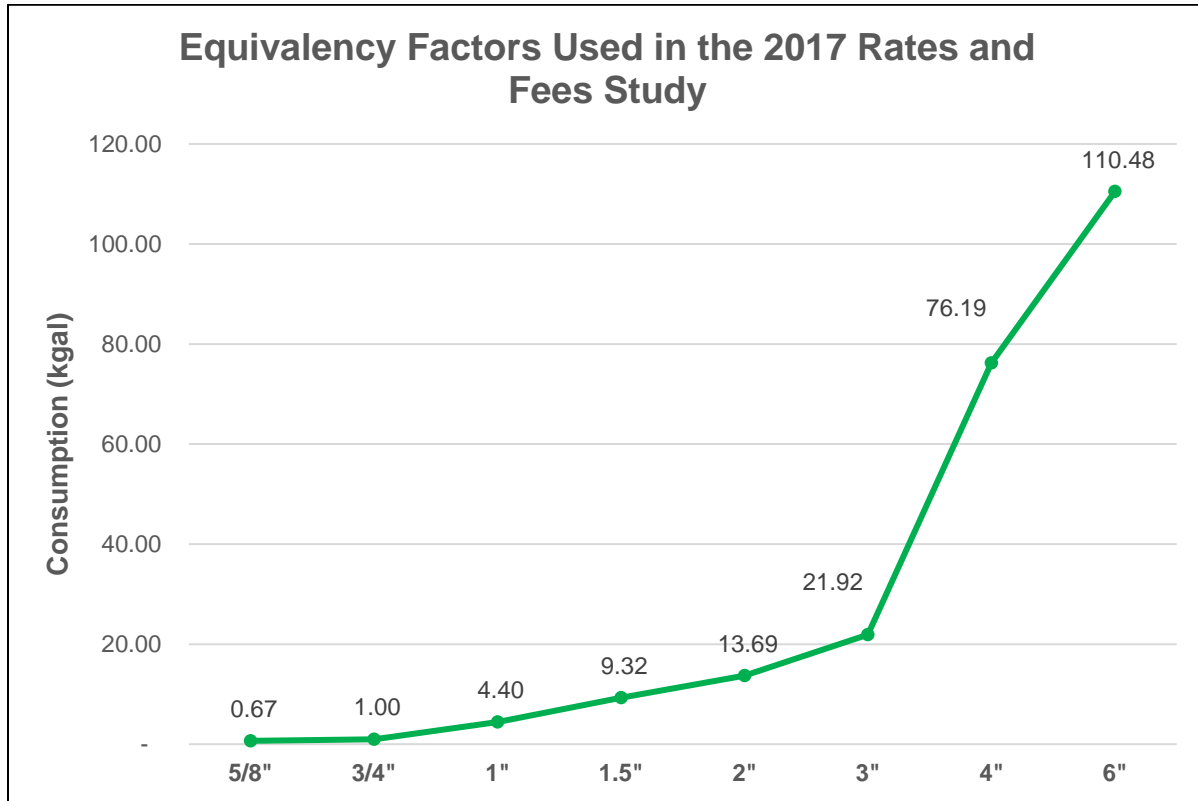


CHART 18: EQUIVALENCY FACTORS 2017 STUDY
USED VS 2018 STUDY CALCULATED

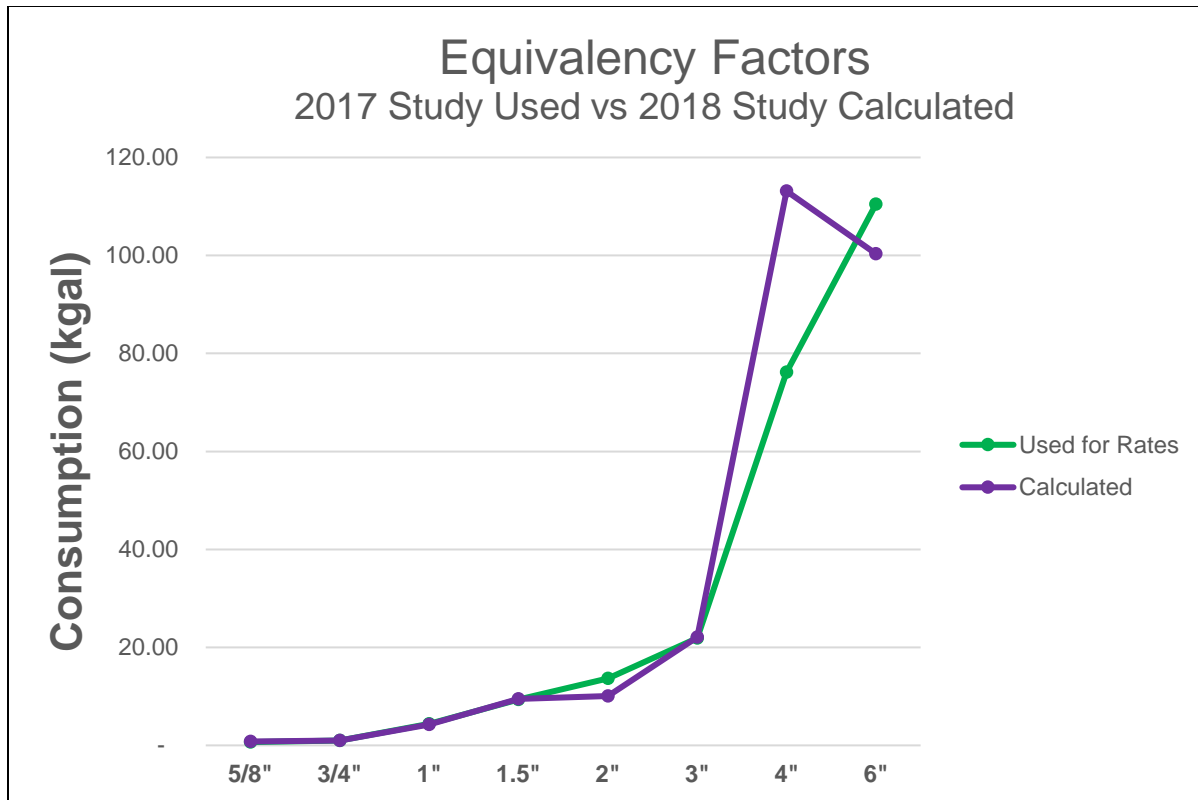
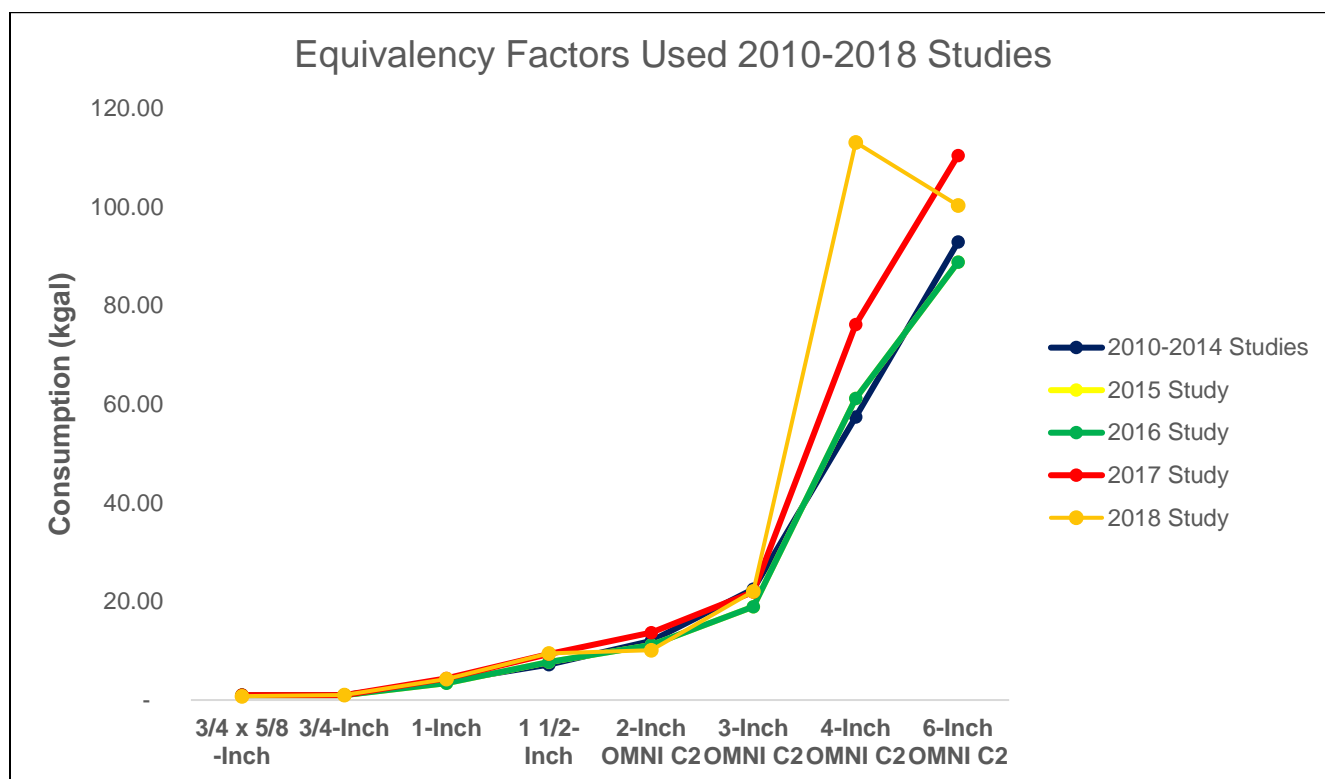


Chart 19 shows the equivalency factors that have been used over time from the 2010 to the 2018 rate and fees studies.

CHART 19: EQUIVALENCY FACTORS USED 2010-2018 RATES AND FEES STUDIES



REPRESENTATIVE CUSTOMER BY CUSTOMER CLASS

Customer data for the last three years 2015-2017 was analyzed to determine an average representative customer by customer class that is used to represent the comparison of adopted rates versus proposed rates on a customers' typical annual bill. The process included the following steps:

- Calculate and report the average consumption, total consumption, and consumption for irrigation season and winter season based on most recent billing data (Jan17-Dec17).
- Select the most common meter size within each customer class and associated average consumption based on customer class and meter size.
- Select one customer per class from the data sample with both irrigation and winter period consumption to be a representative customer for each customer class.
- Customers with atypical consumption have been removed from the calculation as they skew the average calculation for a representative customer by class.

Results of the representative customer analysis are shown in Table 5. Average Winter Monthly Consumption (AWMC) is calculated for each customer by taking the average water

consumption in the months of November, December, January and February without including the highest of the four month's consumption. This represents the amount of water for indoor use (Tier 1) and the amount of wastewater treated each month. The AWMC is reset annually on the April statement. For new customers, until an individual AWMC is established, the customer class average is assigned for water and a \$36/SFE monthly fee is charged for wastewater. During this study period, for single-family residential customers, the average AWMC is 5,000 gallons (water available at Tier 1) and the monthly wastewater charge is \$36/SFE. Irrigation does not typically have winter consumption, however as shown below there is a small amount that is consumed due to leaks, winterization late or early in the season.

**TABLE 5: REPRESENTATIVE CUSTOMER BY CLASS BASED
ON 2017 BILLING DATA**

Customer Class	Meter Size	Total Consumption (kgal)	Average Monthly Consumption (Jan- Dec 2017) (kgal)	Average Winter Monthly Consumption (kgal)	Average Irrigation Monthly Consumption (kgal)
Residential	3/4"	88.04	7.66	4.36	9.97
Multifamily (with irrigation)	1.5"	915.44	71.87	50.20	87.35
Commercial (with irrigation)	3/4"	114.43	9.67	6.97	11.48
Irrigation	3/4"	351.41	29.86	9.59	31.02
Multifamily Indoor Use Only	3/4"	116.08	3.13	3.14	3.13
Commercial Indoor Use Only	3/4"	79.31	8.34	7.72	8.77

CONSUMPTION BY TIERED STRUCTURE

To compare the total water usage by tier over time, the following tables were prepared from data captured for the years 2015-2017. The comparison shows overall changes in customers' consumption patterns and will be used to evaluate the composition of rate revenue by tier for current and future studies. Billed usage is shown by customer class and tier. Revenues from billed usage in Tier 4 are directed to water conservation programs accounted for separately in the Water Resources Fund.

TABLE 6: BILLED USAGE BY CUSTOMER CLASS
BY TIER JANUARY 2017-DECEMBER 2017

Class	Tier 1	Tier 2	Tier 3	Total	Tier 4
Commercial	104,081	-	41,431	145,512	-
Commercial w/ Irrig	76,358	31,030	22,385	129,773	-
Irrigation	-	272,850	43,966	316,816	-
MultiFamily	86,229	-	13,557	99,786	-
MultiFamily w/ Irrig	58,995	20,022	12,141	91,158	-
Residential	893,970	621,406	125,093	1,640,469	11,913
Total Kgals	1,219,633	945,308	258,573	2,423,514	11,913
Block % of Total	50%	39%	11%	100%	

TABLE 7: BILLED USAGE BY SEASON BY CUSTOMER CLASS
BY TIER JANUARY 2017-DECEMBER 2017

Winter Season					
Class	Tier 1	Tier 2	Tier 3	Total	Tier 4
Commercial	42,903	-	11,546	54,449	-
Commercial w/ Irrig	30,510	-	5,253	35,763	-
Irrigation	-	-	3,734	3,734	-
MultiFamily	35,458	-	4,404	39,862	-
MultiFamily w/ Irrig	23,443	-	2,941	26,384	-
Residential	340,821	-	44,562	385,383	502
Total Kgals	473,135	-	72,440	545,575	502
Block % of Total	87%	0%	13%	100%	

Irrigation Season					
Class	Tier 1	Tier 2	Tier 3	Total	Tier 4
Commercial	61,178	-	29,885	91,063	-
Commercial w/ Irrig	45,848	31,030	17,132	94,010	-
Irrigation	-	272,850	40,232	313,082	-
MultiFamily	50,771	-	9,153	59,924	-
MultiFamily w/ Irrig	35,552	20,022	9,200	64,774	-
Residential	553,149	621,406	80,531	1,255,086	11,411
Total Kgals	746,498	945,308	186,133	1,877,939	11,411
Block % of Total	40%	50%	10%	100%	

CHART 20: ALL COMMERCIAL ANNUAL BILLED
USAGE BY TIER 2012-2017

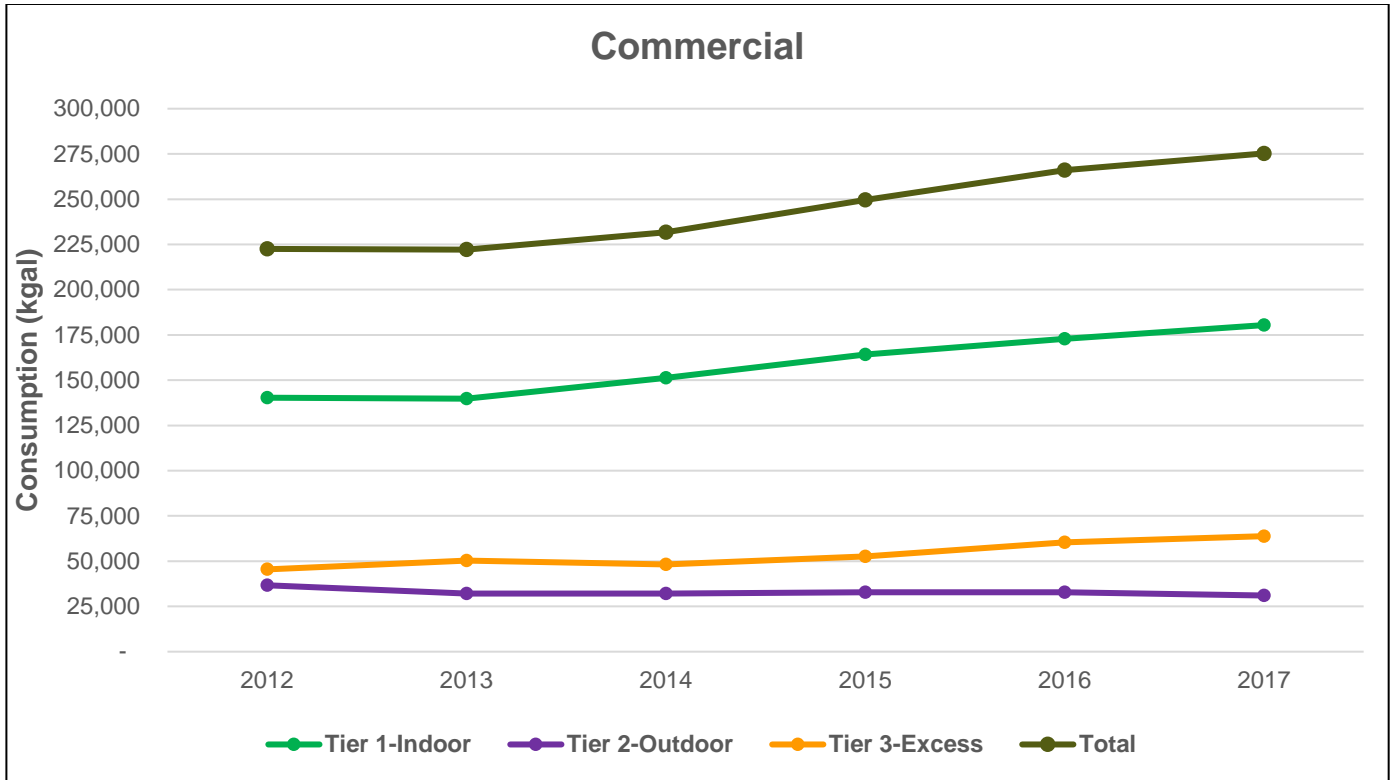


CHART 21: ALL MULTIFAMILY ANNUAL BILLED
USAGE BY TIER 2012-2017

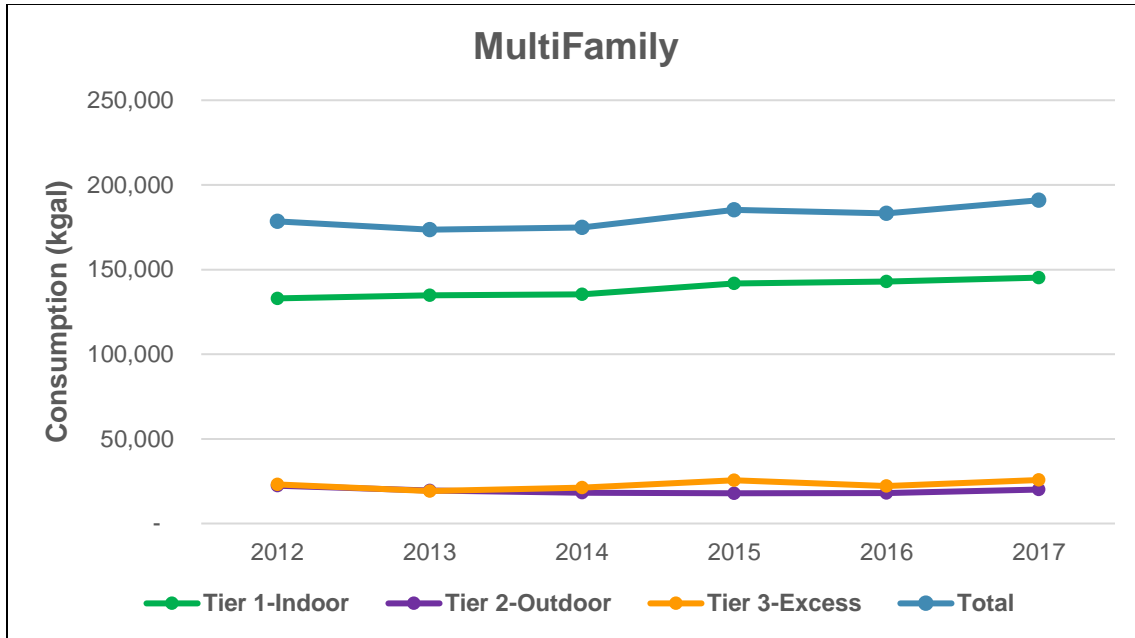


CHART 22: IRRIGATION ANNUAL BILLED USAGE BY TIER 2012-2017

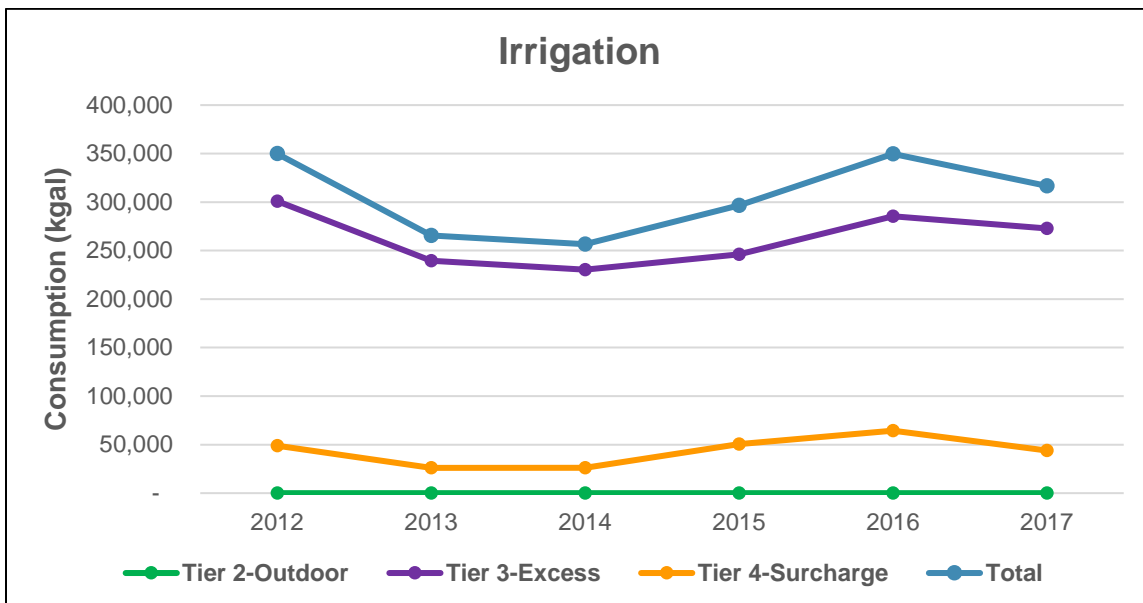


CHART 23: RESIDENTIAL ANNUAL BILLED
USAGE IN TIERS (1-3) 2012-2017

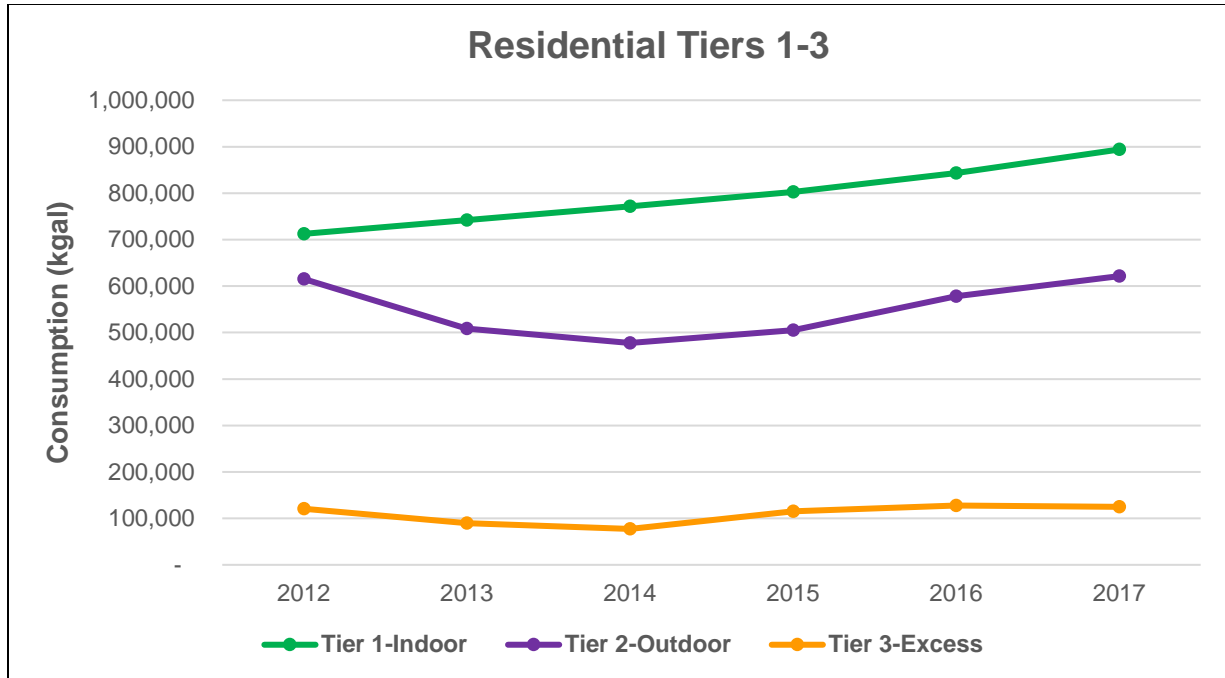
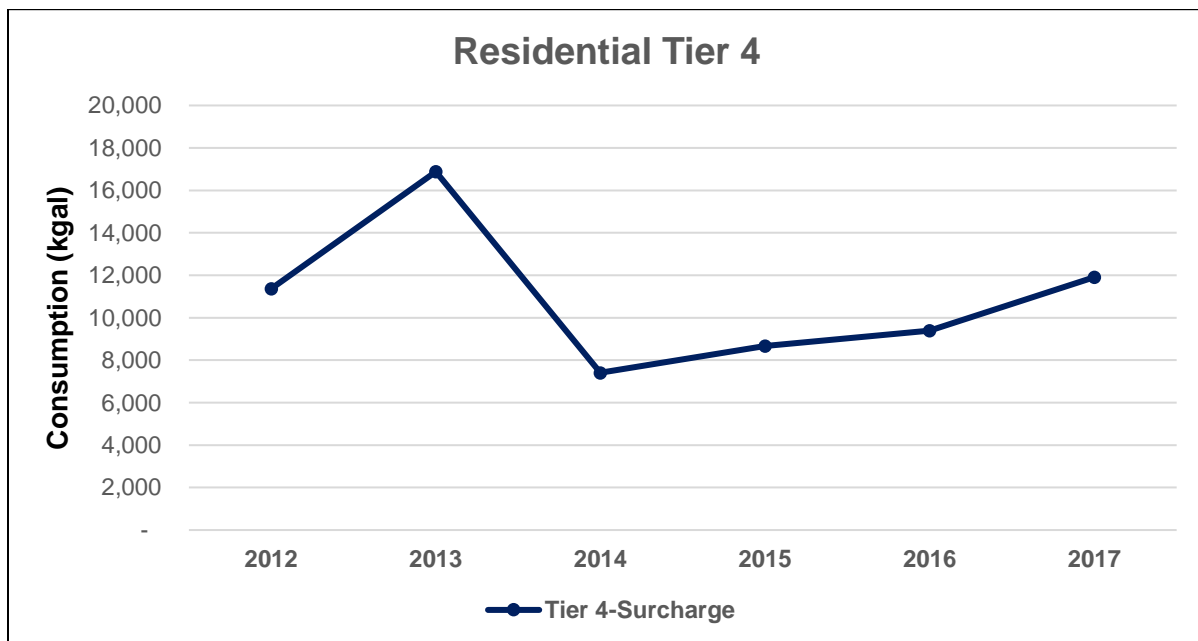


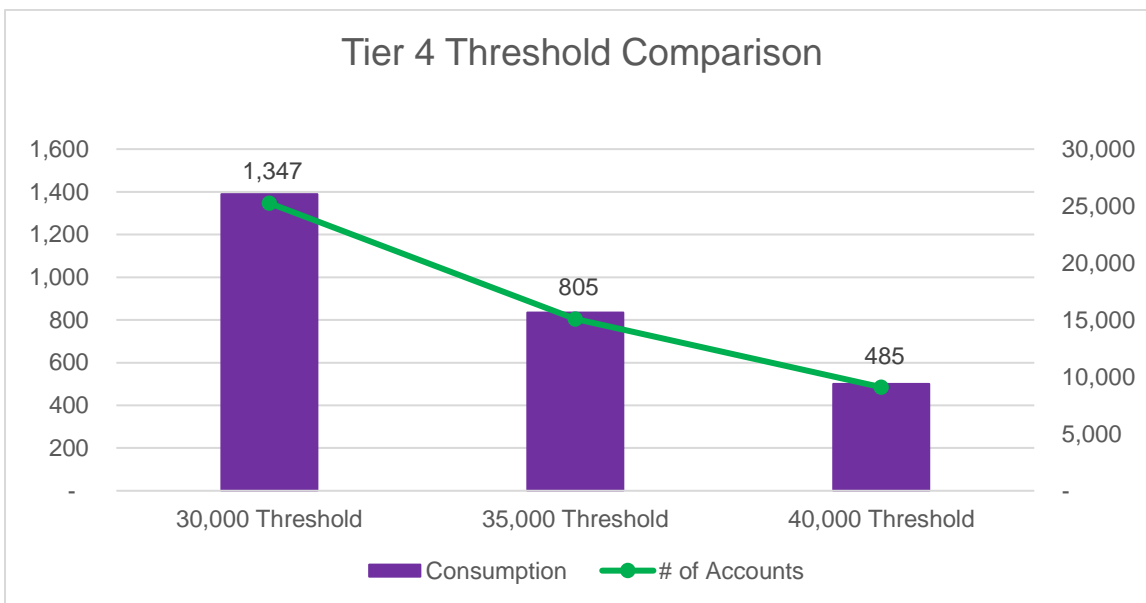
CHART 24: RESIDENTIAL ANNUAL BILLED USAGE IN TIER 4 (2012-2017)



Charts 20-24 show that growth is resulting in consistent annual increases in total indoor use for commercial, multi-family and residential. The good news is that irrigation and Tier 2 and Tier 3 water use are staying fairly level across all customer classes. Tier 4 usage is almost non-existent at this point. Castle Rock Water analyzed the impact on accounts if the Tier 4 was reduced to a cap of 30,000 gallons or 35,000 gallons rather than 40,000 gallons that is currently in place.

The analysis showed that in 2016 there were 485 residential customers who were at or over the 40,000 gallons per month threshold at least once during the January 2016-December 2016 capture period. We then took the same data and lowered the threshold to 35,000 gallons which then impacted 805 residential customers. The same data was then used to lower the threshold to 30,000 gallons, which impacted approximately 1,347 customers. In conclusion, the reduction of the 40k gallon surcharge threshold to 30k only impacted approximately 7.5% of the residential customers and accounted for 2.7% of the total residential consumption. Most of the consumption that is charged in Tier 4 surcharge is the result of a leak, which then based upon Castle Rock Water's leak policy, if the leak is found and repaired is credited to the customer's account. Below is a chart showing this impact.

CHART 25: TIER 4 THRESHOLD COMPARISON



The analysis also looked at the Tier 3 usage to show how many users used Tier 3 only once or twice in the year versus how many used the tier consistently throughout the year. The data shows that during irrigation season 65% of the customers only hit Tier 3 once or twice and 84% of the customers only hit Tier 3 once or twice in the winter season.

TABLE 8: TIER 3 CUSTOMER USAGE

Tier 3	# Users	# Users 1 or 2 Month	# Users 3 or More Months	% of Users 1 or 2 Months	% of Users 3 or More Months
Residential-IRR	6,227	4,027	2,200	65%	35%
Residential-WIN	10,913	9,129	1,784	84%	16%
Total	17,140	13,156	3,984	77%	23%

The average consumption for these customers was 4.11 kgals in the irrigation season and 2.12 kgals in the winter season.

TABLE 9: TIER 3 AVERAGE CONSUMPTION

Tier 3	Avg Consumption	Avg Consumption 1 or 2 Months	Avg Consumption 3 or More Months
Residential-IRR	5.11	4.11	6.92
Residential-WIN	2.21	2.12	2.64
Total	7.32	6.23	9.56

For consistent Tier 3 customers, the irrigation consumption averaged 6.92 kgals and 2.64 kgals for the winter season. Overall 8% of the annual consumption and 14% of the annual revenues were captured in Tier 3.

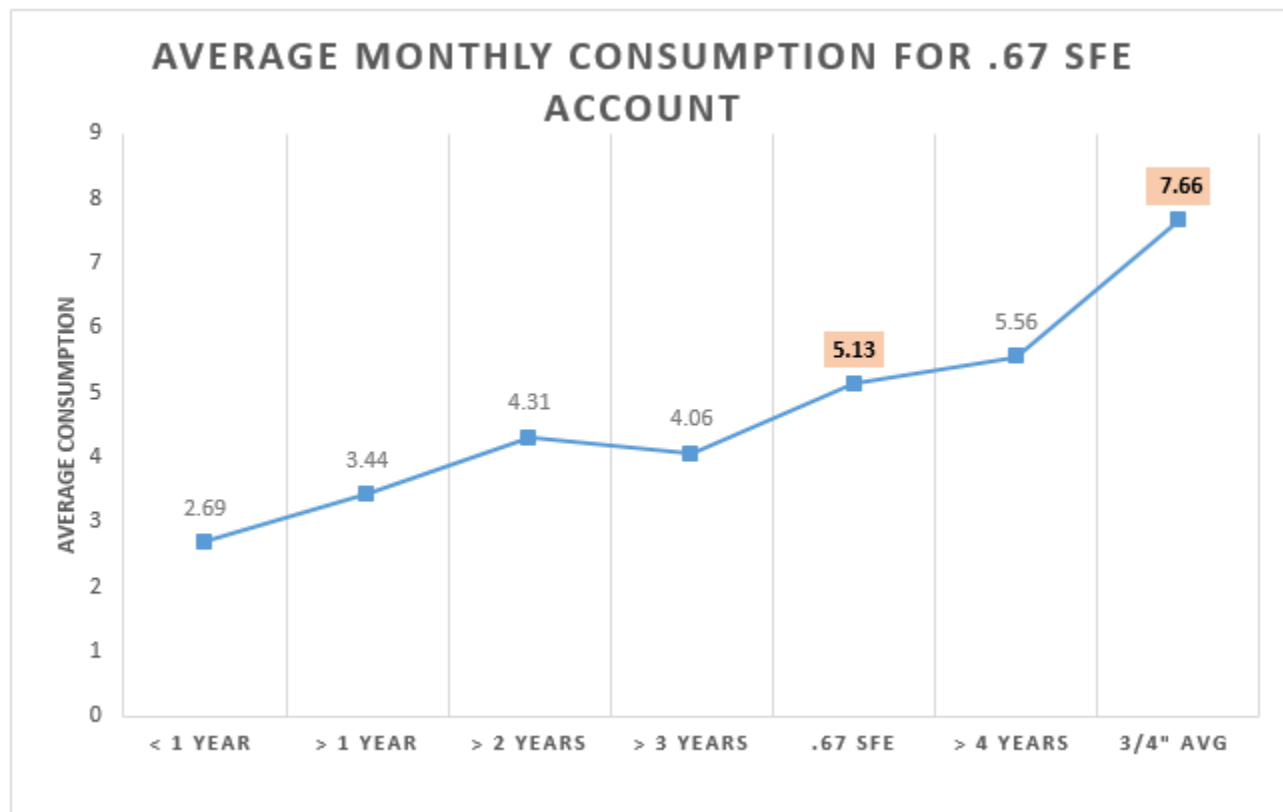
TABLE 10: ANNUAL CONSUMPTION AND REVENUES BY TIER

Residential Tier	Consumption		Revenues	
Tier 1	843,282	54%	\$ 2,319,023	36%
Tier 2	578,084	37%	\$ 3,115,861	49%
Tier 3	127,662	8%	\$ 912,143	14%
Tier 4	9,388	1%	\$ 75,855	1%
Total	1,558,416	100%	\$ 6,422,882	100%

5/8" ACCOUNTS - .67 SFE

Castle Rock Water evaluated these accounts to determine performance relative to the goal of 67% of average residential use. Chart 26 shows mixed results. More detailed evaluation showed that certain homebuilders were not meeting the intent, while others were. Administrative changes were made to the approval process which should increase performance of these accounts over time. The 7.66 is the average monthly consumption for a 3/4" residential account or 1 SFE, whereas the 5.13 is the monthly consumption that a .67 SFE account should be using.

CHART 26: .67 SFE ACCOUNTS CONSUMPTION BY YEAR



IRRIGATION USAGE BASED ON WATERING SCHEDULES

Each Irrigation season Castle Rock Water puts out a residential watering schedule. This schedule assigns a circle, diamond or square to each resident based on the last digit of their address. New for 2018 will be a watering schedule for the non-residential customers which assigns watering days based on being on the east or west side of I-25. Given the importance of the watering schedules, CRW has tracked the usage of customers by year by schedule.

Below are charts that show the residential and non-residential irrigation season water use from 2012 to 2017 based on the assigned symbols. For residential customers circle and diamond customers have very similar usage for all the years, where the square customers have slightly higher usage than the other two sets of customers. One reason for this is the number of customers for each schedule. Square has the most at 7,327 customers, circle is second with 5,870 customers and diamond has the least with 5,671 customers for 2017. Circle and diamond have a similar amount of customers where square has approximately 1,500 more customers than each of the other two groups.

With the non-residential customers, the west side appears to be smaller or have less usage each year than the east side customers. The east side has more customers at 990 than the west side at 553 customers for 2017. Overall this information can help us to track water consumption patterns for each customer group and can help CRW to determine if the schedule breakouts need to be reevaluated in the future or if the water usage patterns work.

CHART 27: RESIDENTIAL IRRIGATION SEASON USAGE BY WATERING SCHEDULE

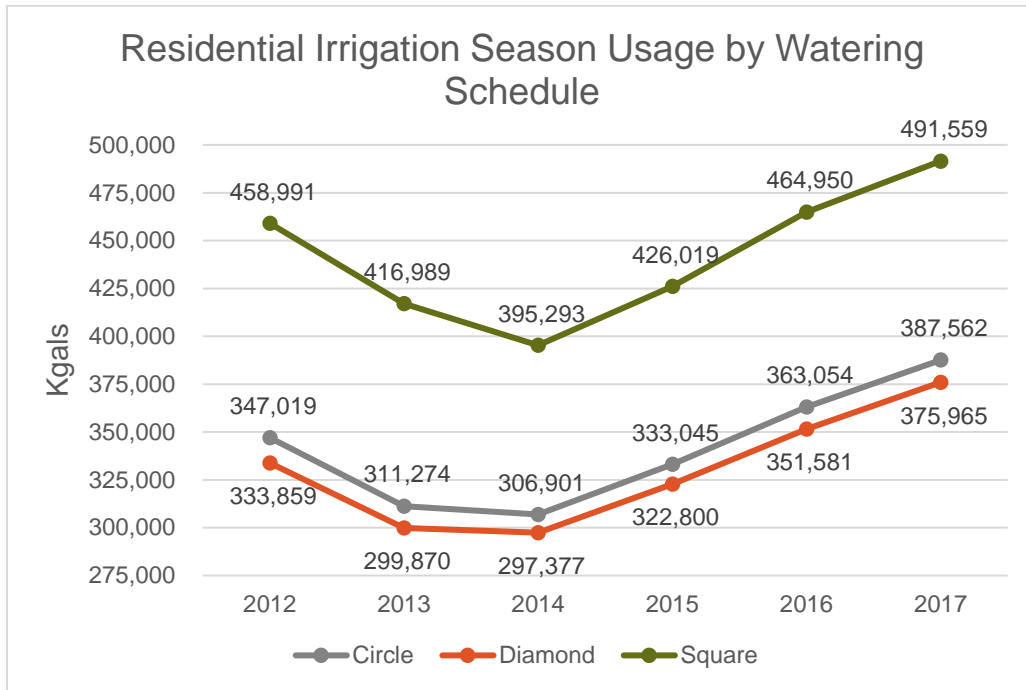
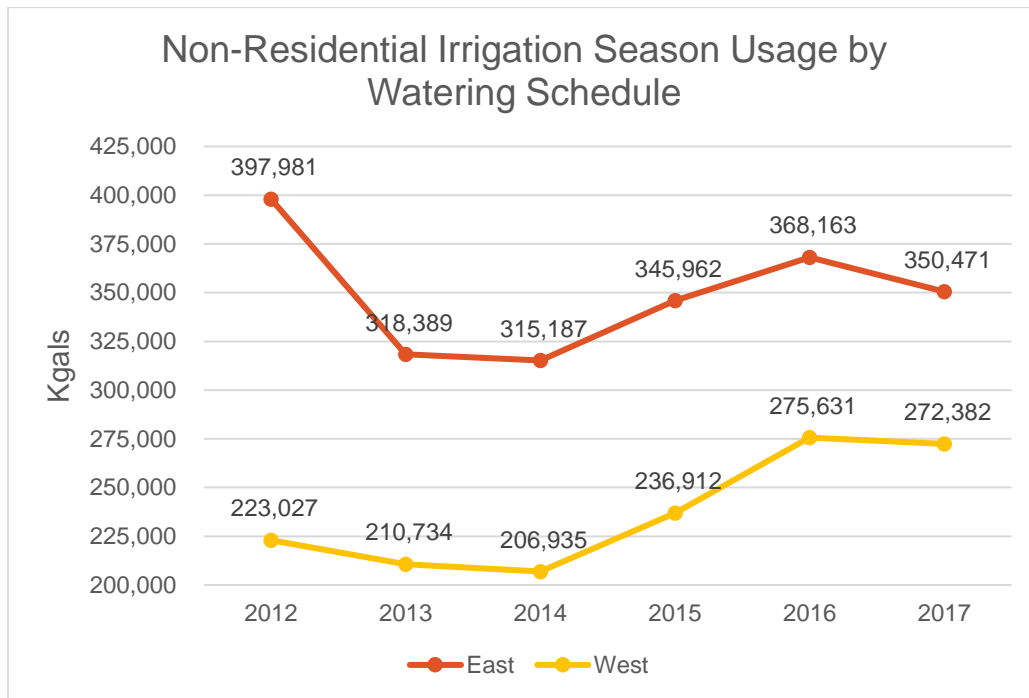


CHART 28: NON-RESIDENTIAL IRRIGATION SEASON USAGE BY WATERING SCHEDULE



WATER WISER CUSTOMERS

Each year CRW offers Water Wiser classes for its residents. The purpose of the class is to help educate residents about watering more efficiently. It also helps to educate on water conservation and more efficient landscaping ideas. As a water wiser customer you are allowed to water any day versus following the every third day watering schedule. However, residential customers must still water between the hours of 8:00 p.m. and 8:00 a.m.

In order to see the success of the program, CRW has completed some analysis on the water wiser accounts. In order to analyze these customers, CRW looked at three different data sets. These three customer sets were customers who had water use for 12 months before they obtained their water wiser status and 12 months of use after they became a water wiser. The other two data sets were for customers with 24 months and 36 months of data before and after completing the water wiser program. The table below shows the before and after water wiser average usage.

**TABLE 11: BEFORE AND AFTER WATER WISER
AVERAGE USAGE**

# of Months Before and After Water Wiser	Average Usage Before Water Wiser Class	Average Usage After Water Wiser Class	% of Customers to Decrease Usage After Water Wiser Class
36 Months	9.9	8.3	73%
24 Months	9.0	8.2	66%
12 Months	8.6	8.2	60%

The chart shows that overall the average consumption has been decreasing for customers after taking the water wiser class. In general when looking at the individual accounts for the 36 months of data 73% of people have decreased their average usage, which means that 27% of users still have increased their average usage despite attending a water wiser workshop. This data shows that as we add more months the data is improving. At 12 months of usage it shows that only 60% of users decreased their use and at 24 months this increased to 66%. From this data there is still some improvements that can be made for 27% of the water wiser customers.

NON-RESIDENTIAL IRRIGATION BUDGETS

Castle Rock Water looked at non-residential irrigation accounts to determine if these accounts fell within the landscaping guidelines for using a hybrid grass versus a Kentucky blue grass. It was discovered that 498 out of the total 876 accounts were started from 2004 to 2017, which means that the landscaping for the customers property was designed to and installed to meet a water budget significantly lower than the standard. CRW determined the impact of lowering the budgets based on the hybrid grass requirements versus the higher budgets that are in place currently for Kentucky blue grass. The impact is a loss of revenue of \$119,553 in Tier 3 in the last year alone.

As shown in Table 14 below, out of the 498 accounts needing a budget adjustment 308 or 62% of them would be affected by a higher annual bill during irrigation season. For the commercial with irrigation customers 72 or 42% will have a budget adjustment. The individual account difference ranges from \$62 to \$388 annually for the top 25 affected customers. For the irrigation customers 214 or 70% would have budgets adjusted and would result in an annual impact between \$1,047 up to \$6,211 for the top 25 affected individuals. Lastly, with the multifamily with irrigation customers 22 or 54% are impacted and these individual impacts range from \$2 to \$1,212 annually.

TABLE 12: NON-RESIDENTIAL ACCOUNTS

Customer Class	# Accounts 2004-2017	# Accounts Before 2004
Commercial with Irrigation	152	132
Irrigation	305	176
MultiFamily with Irrigation	41	70
Total	498	378

TABLE 13: KENTUCKY BLUE GRASS BUDGET VERSUS HYBRID BUDGET

Customer Class	Total Irrigation Budget - Kentucky Blue Grass (kgal)- Based on 30 inches	Total Irrigation Budget - Hybrid Grass (kgal)-Based on 19 inches	Difference in Budgets
Commercial with Irrigation	25,890	16,387	9,503
Irrigation	373,371	233,742	139,629
MultiFamily with Irrigation	10,713	6,755	3,958
Total	409,974	256,884	153,090

TABLE 14: ACCOUNT BUDGET DIFFERENCES

Customer Class	Total Irrigation Budget - Kentucky Blue Grass (kgal)- Based on 30 inches	Total Irrigation Budget - Hybrid Grass (kgal)-Based on 19 inches	Total 30 Inch vs. 19 Inch Budget Difference (kgal)	Actual 2017 Water Consumption (kgal)-Tiers 2-3	Billmaster Total Consumption Charges	Hybrid Total Charges	Difference in Total Charges	# of Accounts 2004-2017 with Differences in Charges	# Accounts 2004- 2017 With No Changes
Commercial with Irrigation	25,890	16,387	9,503	13,229	76,157	\$ 80,766	\$ 4,609	72	80
Irrigation	373,371	233,742	139,629	182,948	1,478,130	\$ 1,583,990	\$ 105,860	214	91
MultiFamily with Irrigation	10,713	6,755	3,958	9,739	52,468	\$ 61,552	\$ 9,084	22	19
Total	409,974	256,884	153,090	205,916	1,606,756	\$ 1,726,308	\$ 119,553	308	190

IMPACT OF IRRIGATED AREAS

Chart 29 shows the number of residential accounts by irrigated area. Chart 30 shows the average monthly consumption by irrigated area. As you would expect the more irrigated area the more the average consumption is used per month. Chart 31 shows total usage by irrigated area for commercial accounts. Chart 32 shows average monthly consumption for commercial accounts by irrigated area.

CHART 29: RESIDENTIAL ACCOUNTS BY IRRIGATED AREA

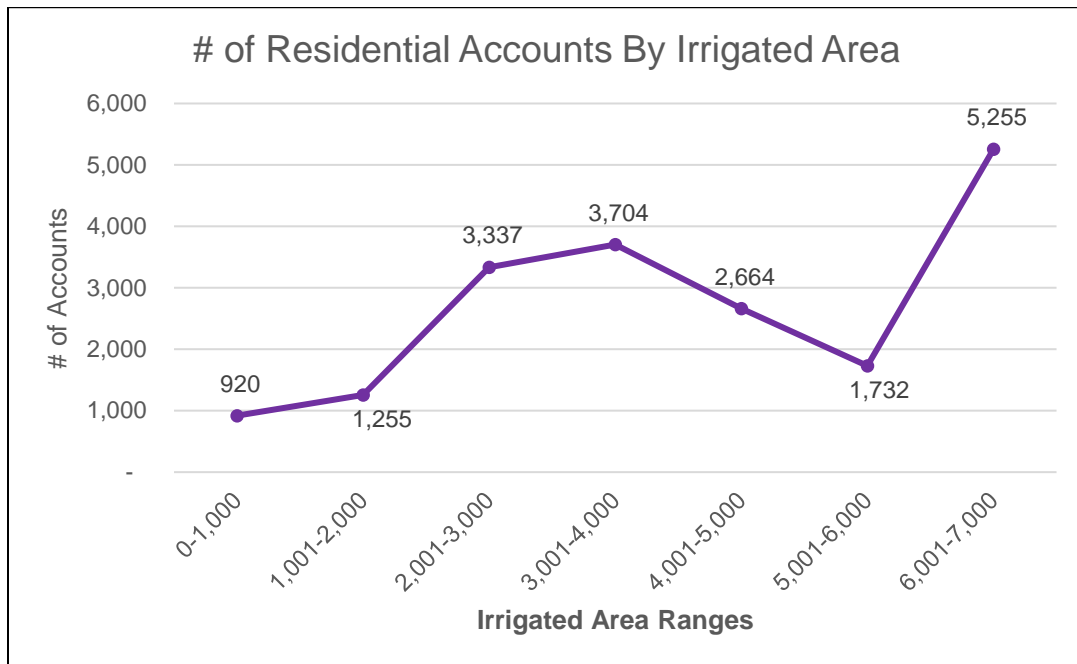


CHART 30: RESIDENTIAL AVERAGE MONTHLY CONSUMPTION BY IRRIGATED AREA

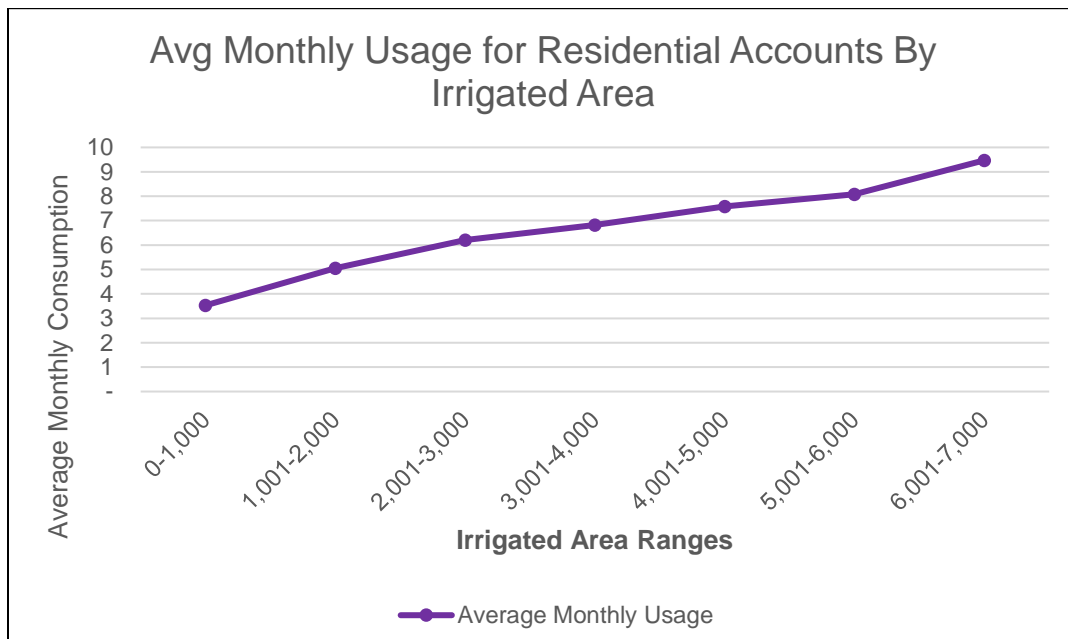


CHART 31: COMMERCIAL ACCOUNTS BY IRRIGATED AREA

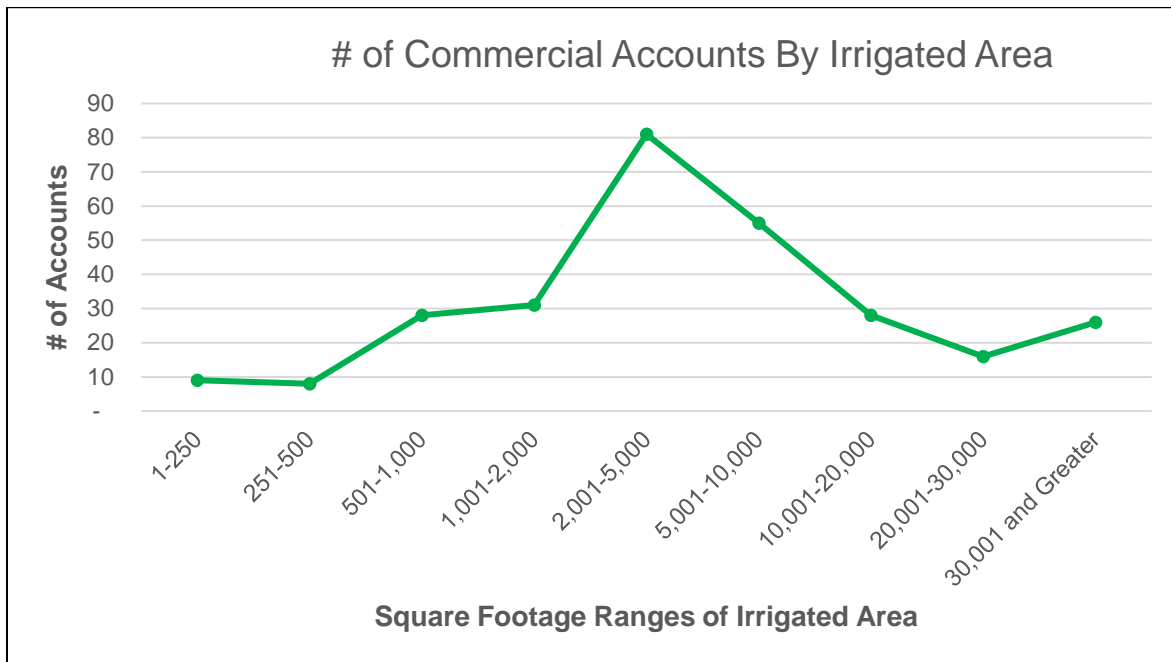


CHART 32: COMMERCIAL AVERAGE MONTHLY CONSUMPTION BY IRRIGATED AREA

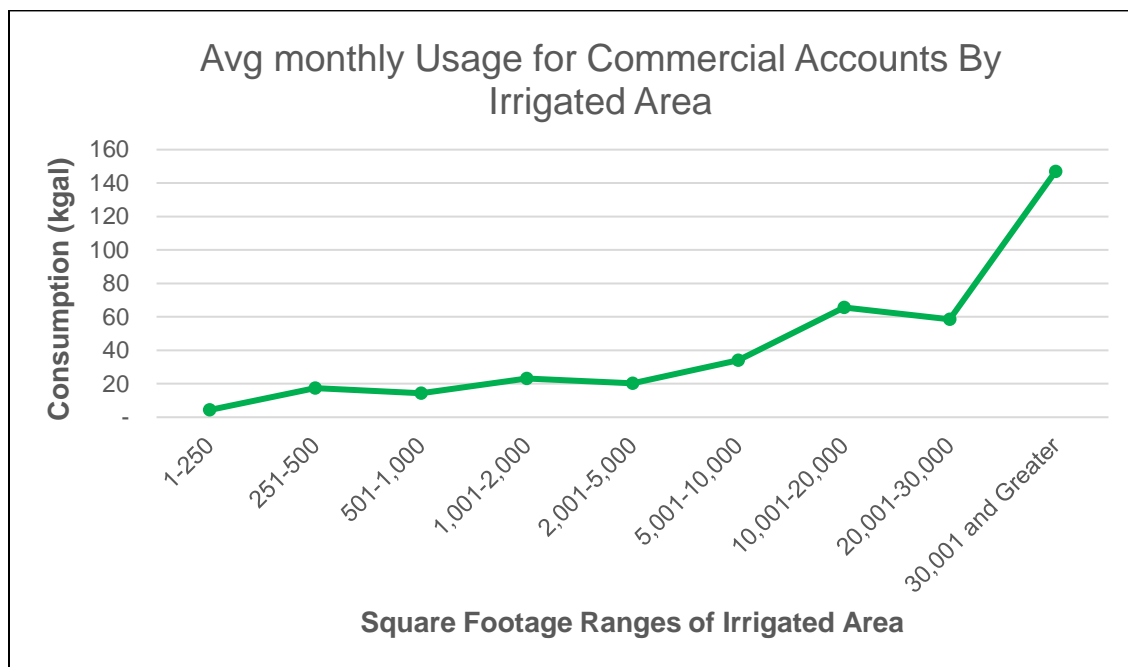


Chart 33 shows the average monthly consumption for all HOA accounts combined.

CHART 33: All HOA’s AVERAGE MONTHLY CONSUMPTION

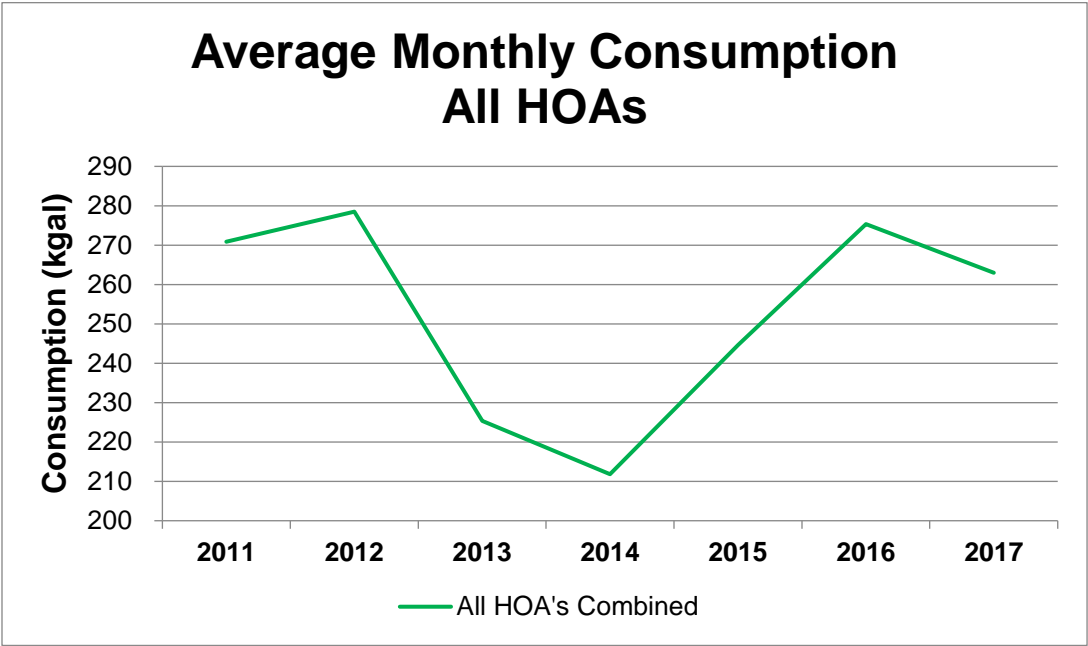
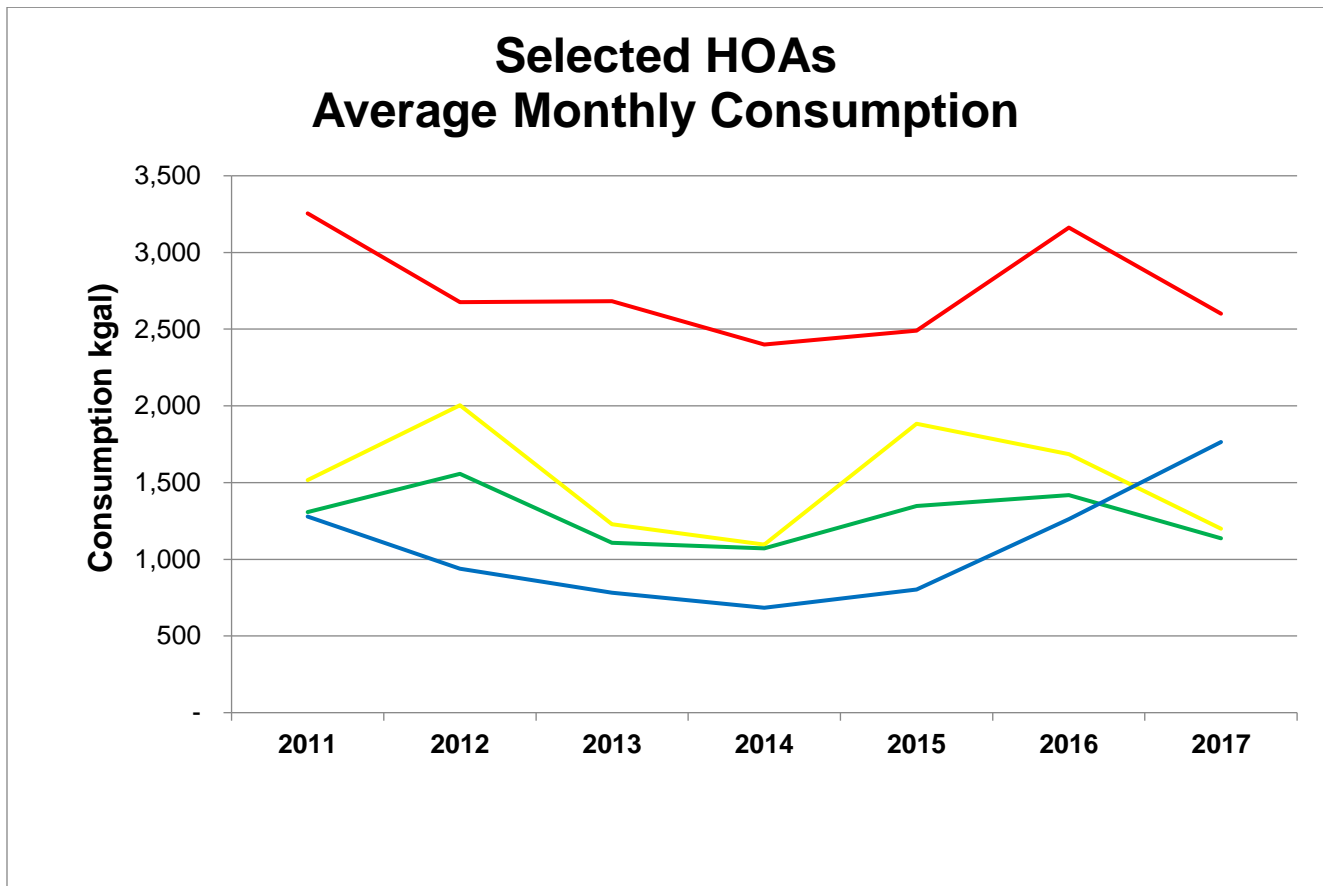


Chart 34 shows four HOA’s that were selected at random to show the average monthly consumption patterns for these user types.

CHART 34: SELECT HOA's AVERAGE MONTHLY CONSUMPTION



MONTHLY CONSUMPTION BY SUBDIVISION

CHART 35: MEADOWS AVERAGE MONTHLY CONSUMPTION

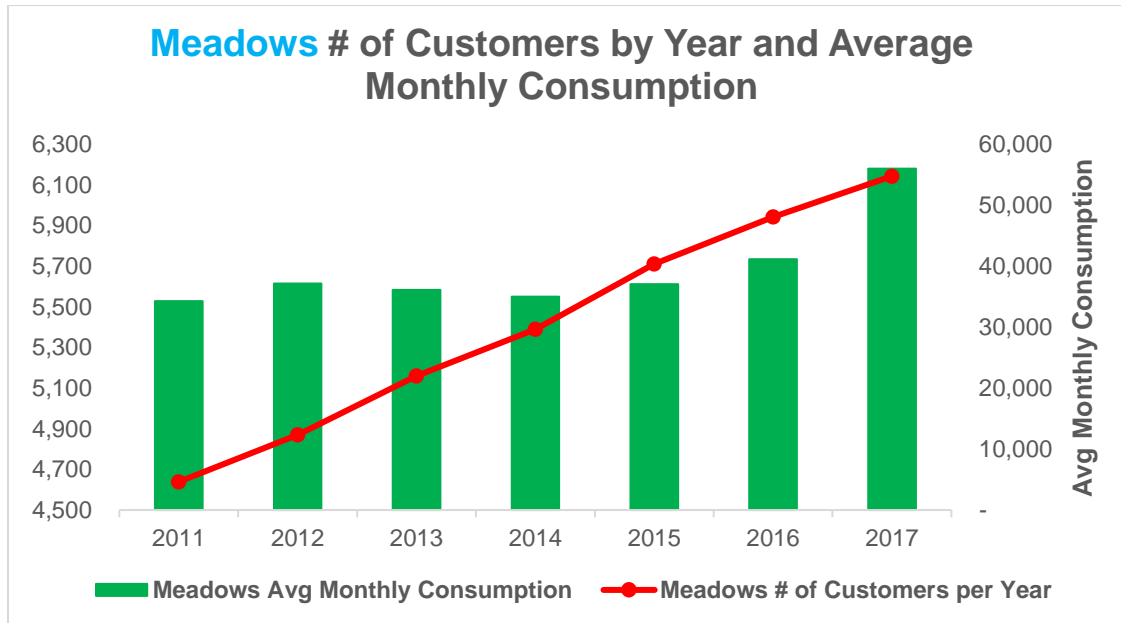


CHART 36: MEADOWS RESIDENTIAL ACCOUNTS BY IRRIGATED AREA

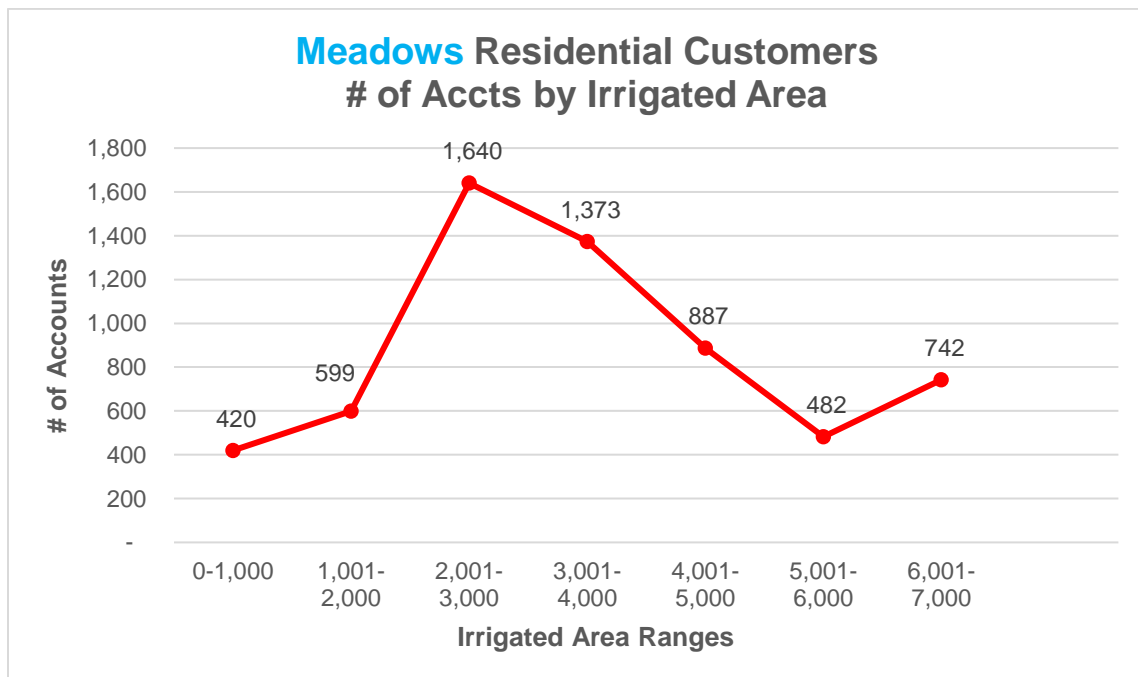


CHART 37: FOUNDERS AVERAGE MONTHLY CONSUMPTION

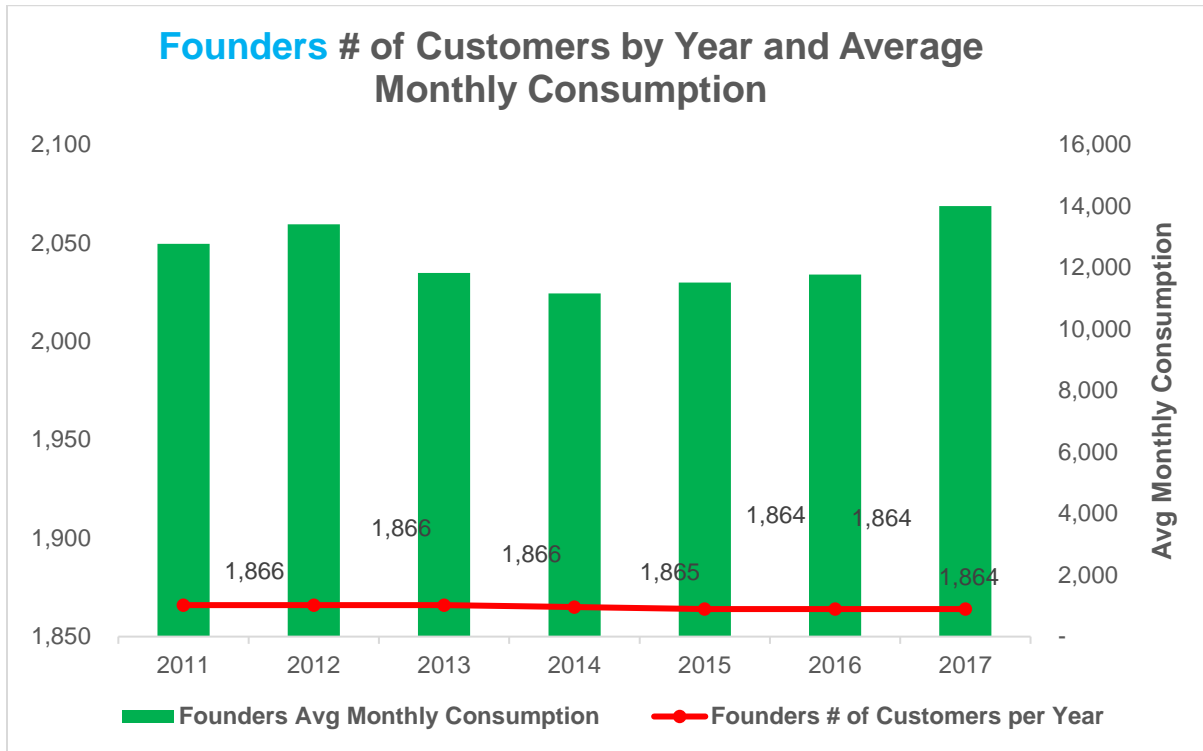


CHART 38: FOUNDERS RESIDENTIAL ACCOUNTS BY IRRIGATED AREA

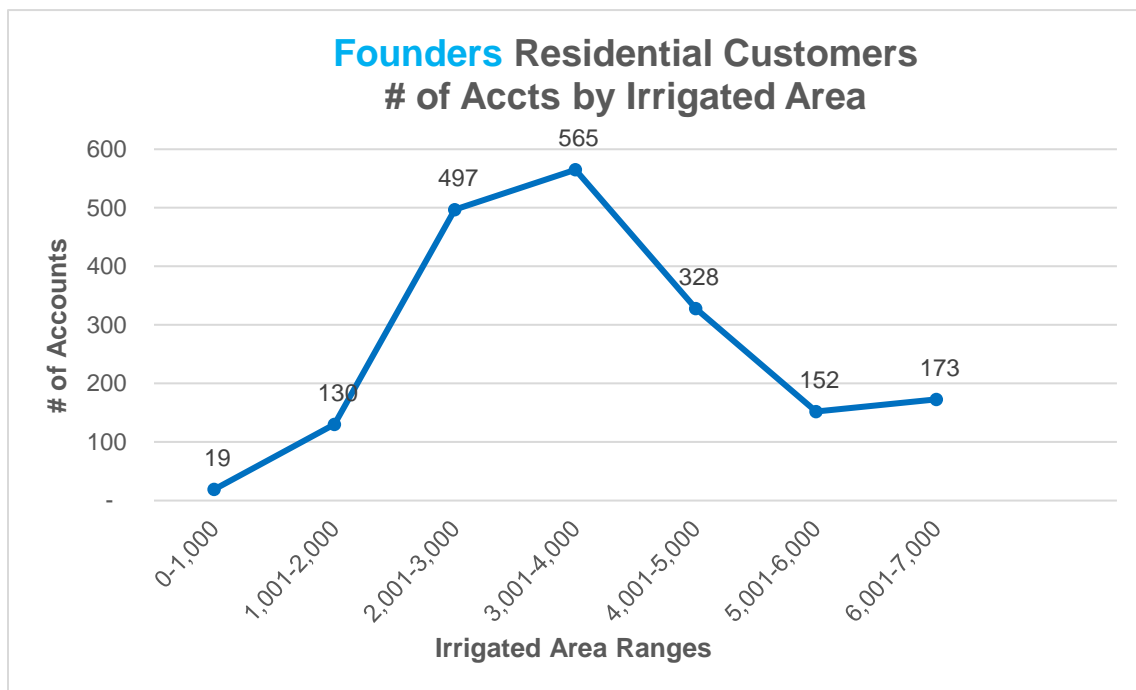


CHART 39: PLUM CREEK AVERAGE MONTHLY CONSUMPTION

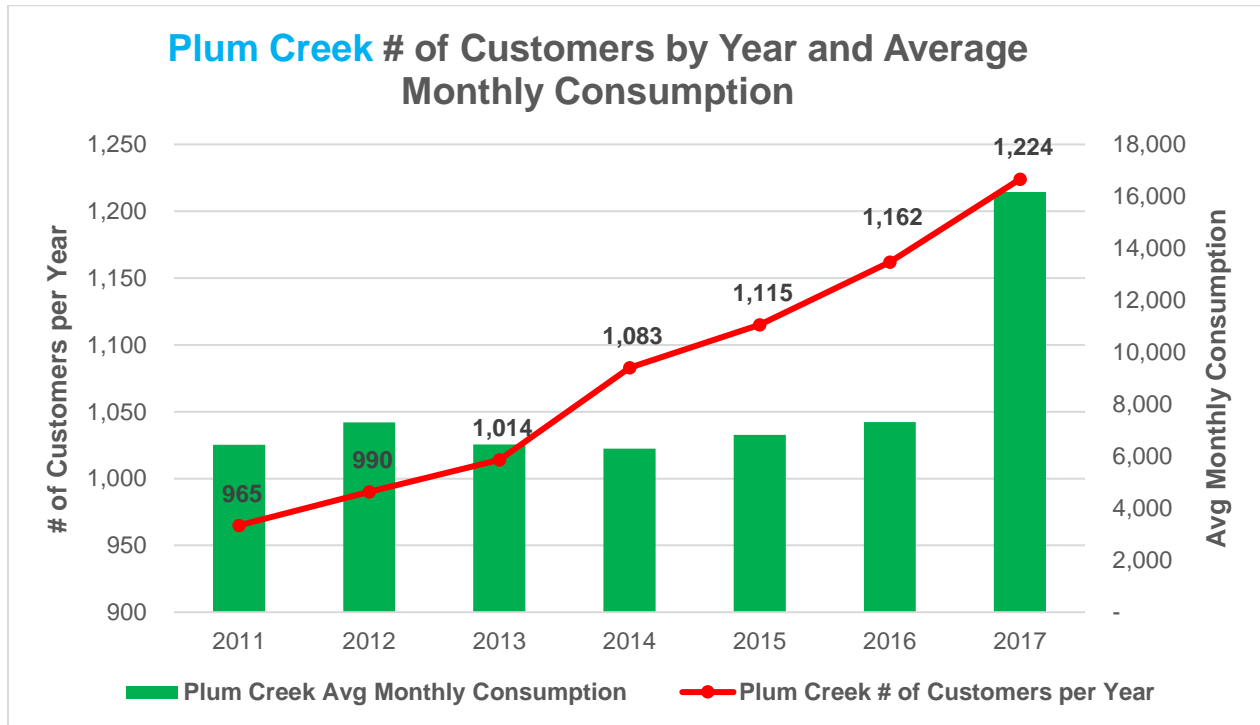
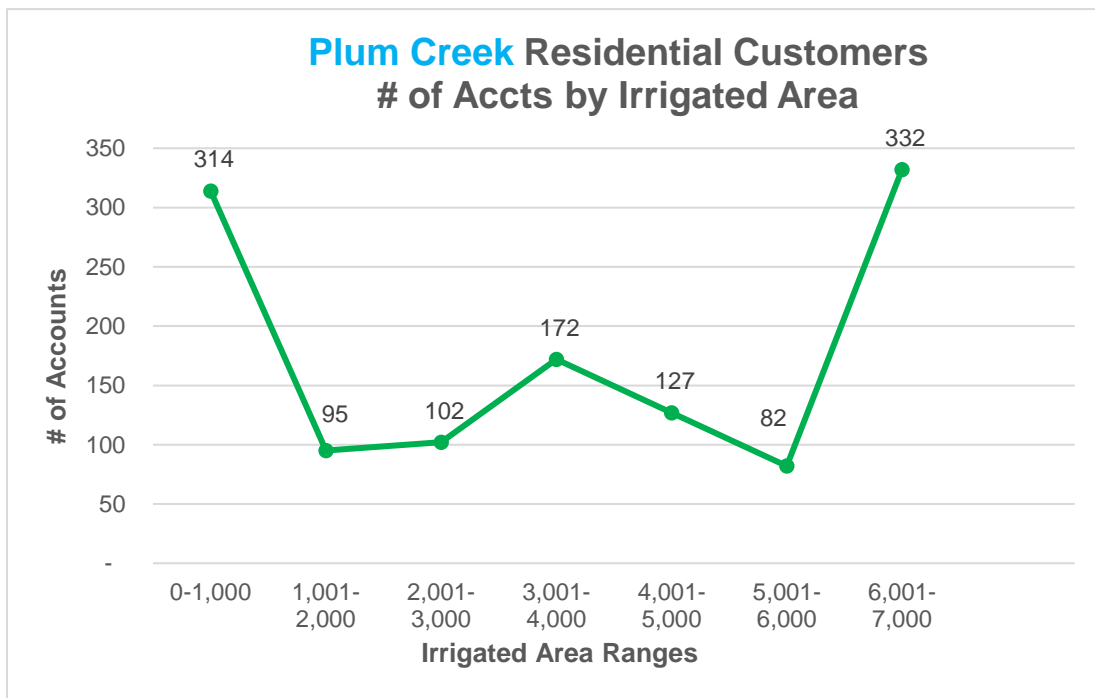


CHART 40: PLUM CREEK RESIDENTIAL ACCOUNTS BY IRRIGATED AREA



BULK ACCOUNTS

CRW has both bulk hydrant accounts and bulk station accounts. CRW tracks the number of accounts and annual usage for these account types each year. The charts below show the bulk hydrant and bulk station accounts and usage from 2011 to 2017. These accounts vary from year to year based on the need and demand of the customers using the program.

CHART 41: BULK HYDRANT AND STATION ACCOUNTS 2011-2017

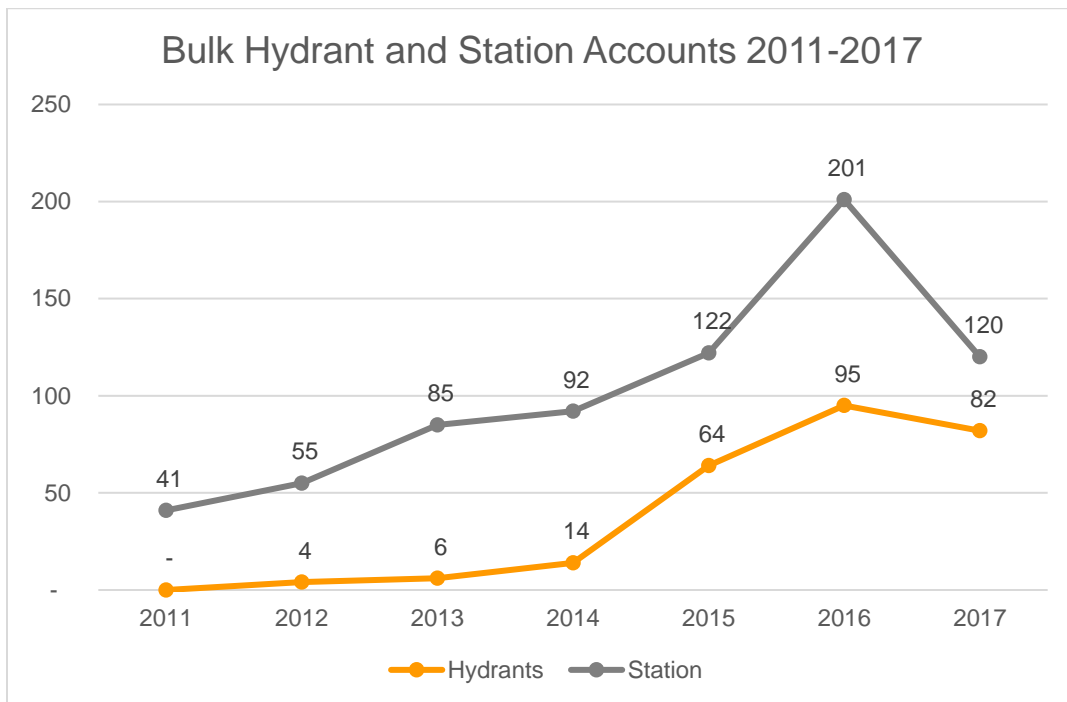


CHART 42: BULK HYDRANT ACCOUNT USAGE 2011-2017

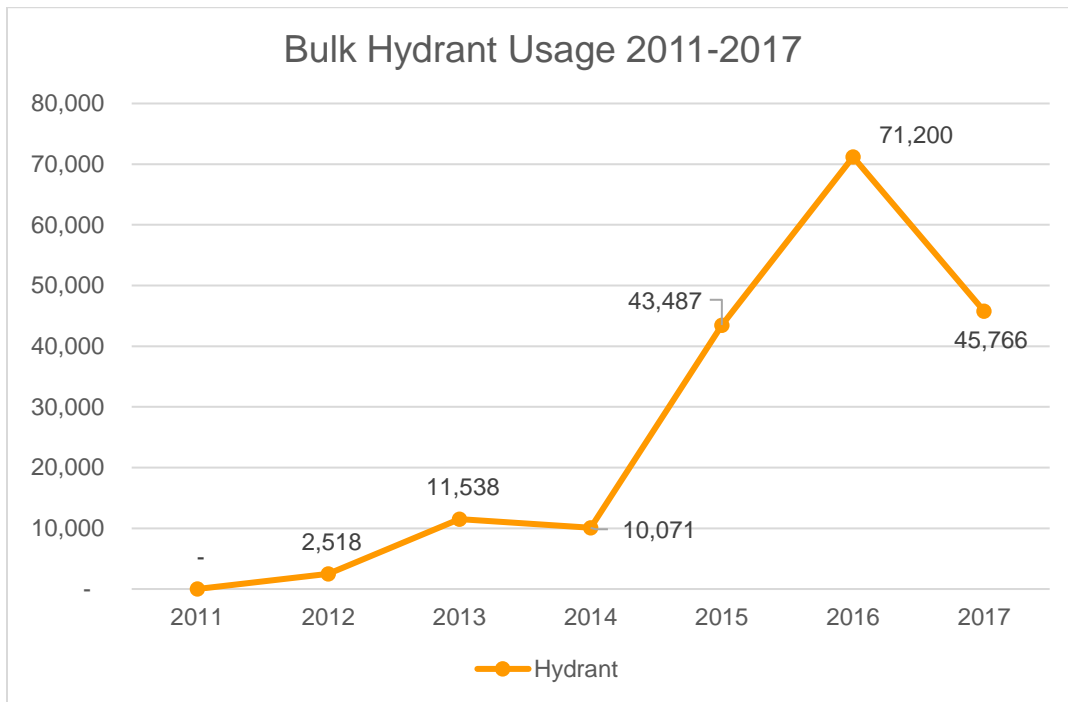
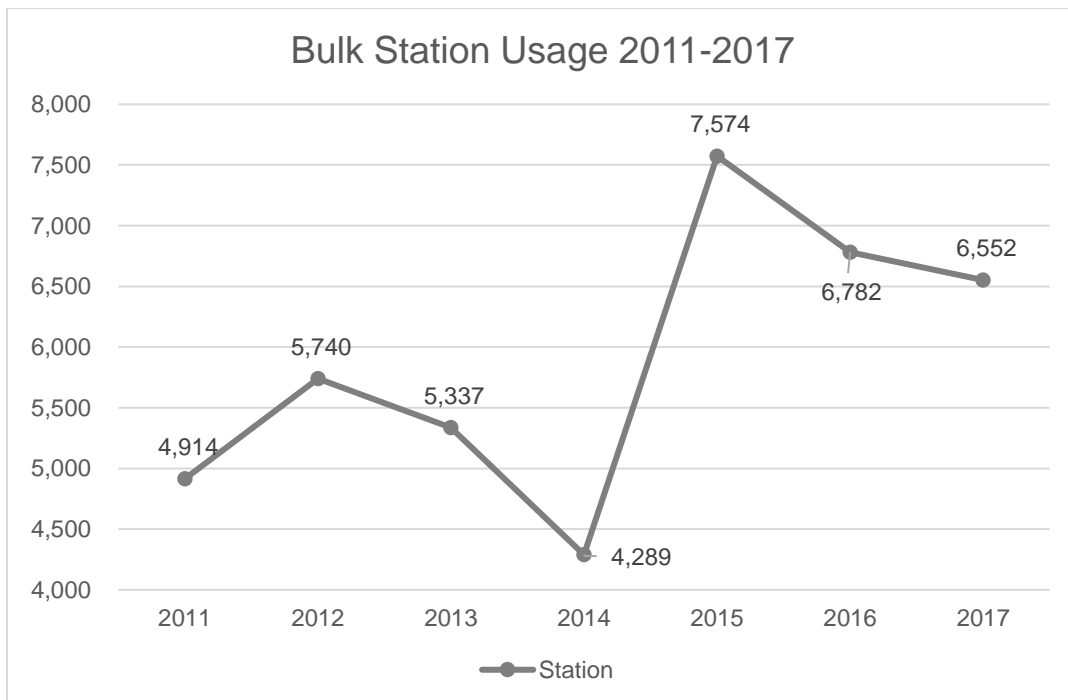


CHART 43: BULK STATION ACCOUNT USAGE 2011-2017



TOWN ACCOUNT CONSUMPTION

Below is a chart showing overall town consumption from 2012 to 2017. From 2016 to 2017 consumption dropped significantly, due to better usage management and tighter watering restrictions.

CHART 44: TOWN CONSUMPTION BY YEAR

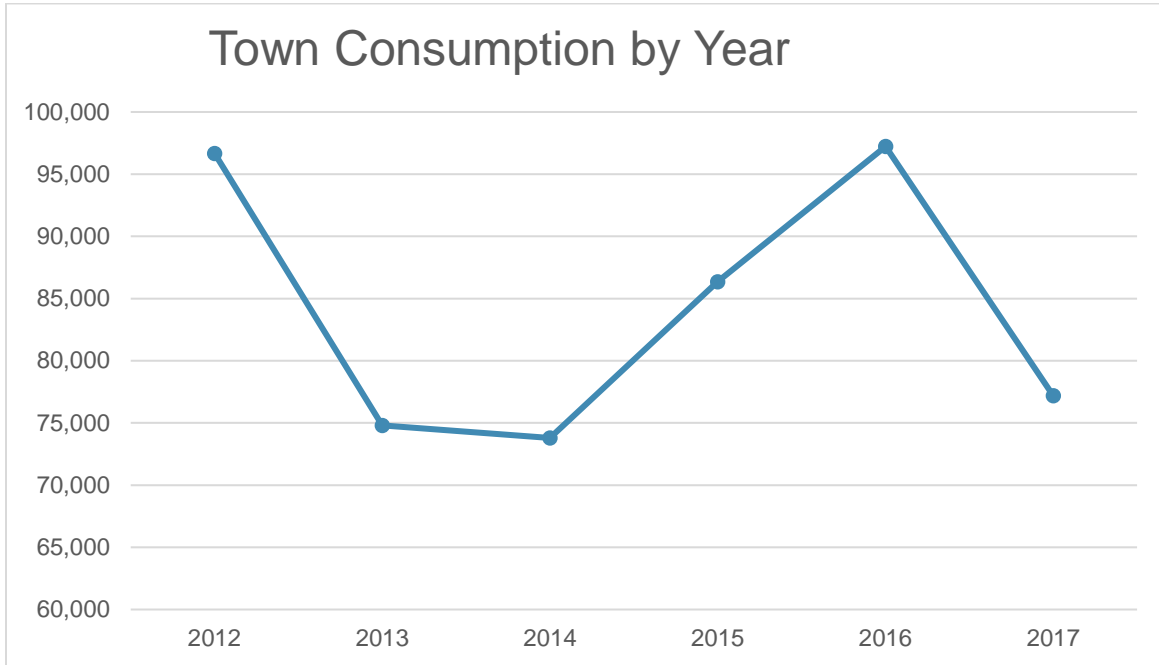


TABLE 15: TOWN CONSUMPTION BY YEAR AND DEPARTMENT

Department	2012	2013	2014	2015	2016	2017
CRW	918	1,087	2,078	2,238	1,544	693
Facility Maintenance	0	0	0	0	0	22
Fire	937	1,209	1,164	1,274	1,117	861
Golf Course	365	342	340	379	385	325
Parks	85,461	63,324	63,467	75,079	87,041	66,867
Police	340	258	326	340	231	210
Rec Center	7,431	7,243	5,299	5,308	5,586	6,246
Service Centers	1,051	698	830	898	789	771
Streets	0	0	0	0	0	416
TownHall	160	147	154	165	172	172
Treatment Plants	0	496	133	682	361	604
Total Consumption	96,663	74,804	73,791	86,363	97,226	77,187

WASTEWATER ENTERPRISE FUND

NUMBER OF ACCOUNTS BY METER SIZE & CUSTOMER CLASS

Table 16 shows the number of accounts by meter size and customer class using 12 months of billing data (Jan17-Dec17). This shows that 19,742 customers were receiving wastewater service during this capture period. The FY2016 accounts based on 12 months of billing data (Jan16-Dec16) shows that 18,866 accounts were receiving wastewater service. There are 876 more accounts in FY2017 than FY2016.

There are approximately 648 less customers receiving wastewater service than water service due to irrigation customers who don't have wastewater and a few customers who have their own septic thus not utilizing the Town's wastewater services.

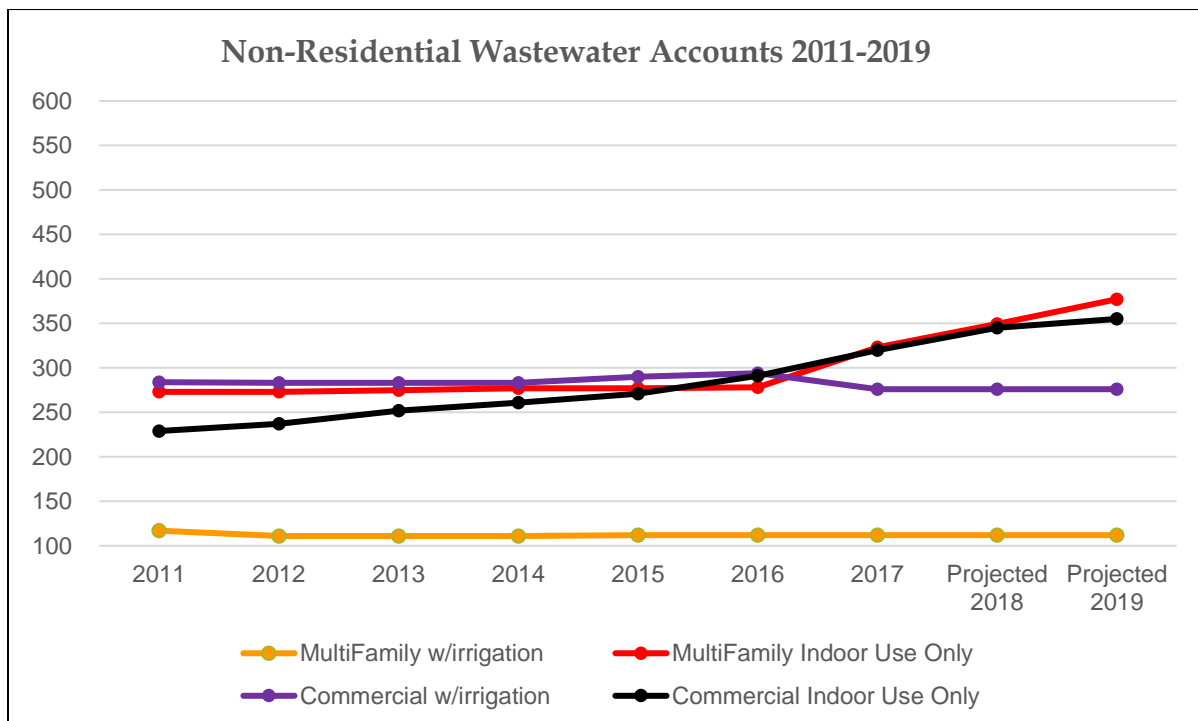
TABLE 16: ACCOUNTS BY METER SIZE & CUSTOMER CLASS (FY2017)

Meter Size	Residential	Multifamily	Commercial	MultiFamily Indoor Use Only	Commercial Indoor Use Only	Total
5/8"	908	-	-	3	6	917
3/4"	17,784	14	129	99	106	18,132
1"	19	25	67	80	80	271
1.5"	-	55	48	100	71	274
2"	-	15	25	41	43	124
3"	-	2	5	-	13	20
4"	-	1	-	-	1	2
6"	-	-	2	-	-	2
Total	18,711	112	276	323	320	19,742

CHART 45: RESIDENTIAL ONLY ACCOUNTS 2011-PROJECTED 2019



CHART 46: NON-RESIDENTIAL ACCOUNTS 2011-PROJECTED 2019



Castle Rock Water projects FY2019 wastewater accounts by using 2017 billing data plus projected growth for FY2018 and FY2019. The FY2019 wastewater accounts are projected to equal 21,131 (20,011 for residential and 1,120 for non-residential). Growth is projected for the following classes:

2018 Projected Accounts by Customer Class:

84	Residential (.67 SFE)
616	Residential (1 SFE)
26	Multi-Family
25	Commercial
751	Total

2019 Projected Accounts by Customer Class:

72	Residential (.67 SFE)
528	Residential (1 SFE)
28	Multi-Family
10	Commercial
638	Total

Total growth of 751 accounts is projected for FY2018 and 638 for FY2019 for a total of 1,389 projected for the wastewater fund thru FY2019.

WATER RESOURCES ENTERPRISE FUND

NUMBER OF ACCOUNTS BY METER SIZE & CUSTOMER CLASS

Table 17 shows the number of accounts by meter size and customer class using 12 months of billing data (Jan17-Dec17). This shows 20,379 accounts being served by the water resources enterprise fund. The FY2016 accounts based on 12 months of billing data (Jan16-Dec16) showed 19,579 water resources accounts. There are 800 more accounts in FY2017 than in FY2016.

TABLE 17: ACCOUNTS BY METER SIZE AND CUSTOMER CLASS (FY2017)

Meter Size	Residential	Multifamily	Commercial	Bulk	Irrigation	MultiFamily Indoor Use Only	Commercial Indoor Use Only	Total
5/8"	907	-	-	-	23	3	6	939
3/4"	17,941	14	132	82	131	99	113	18,512
1"	20	25	69	-	99	80	84	377
1.5"	-	55	50	-	123	100	71	399
2"	-	15	25	-	76	41	44	201
3"	-	2	5	-	6	-	14	27
4"	-	1	-	-	2	-	1	4
6"	-	-	2	-	-	-	-	2
Total	18,868	112	283	82	460	323	333	20,461

CHART 47: RESIDENTIAL ACCOUNTS 2011-PROJECTED 2019

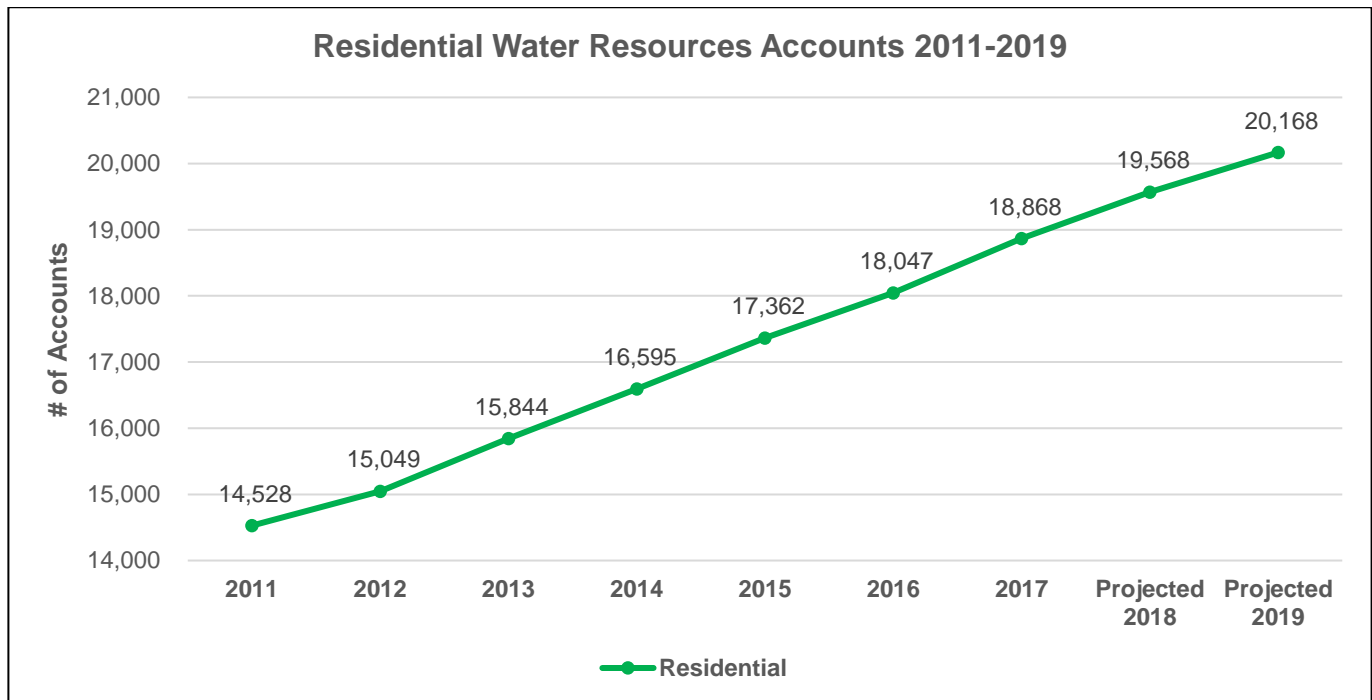
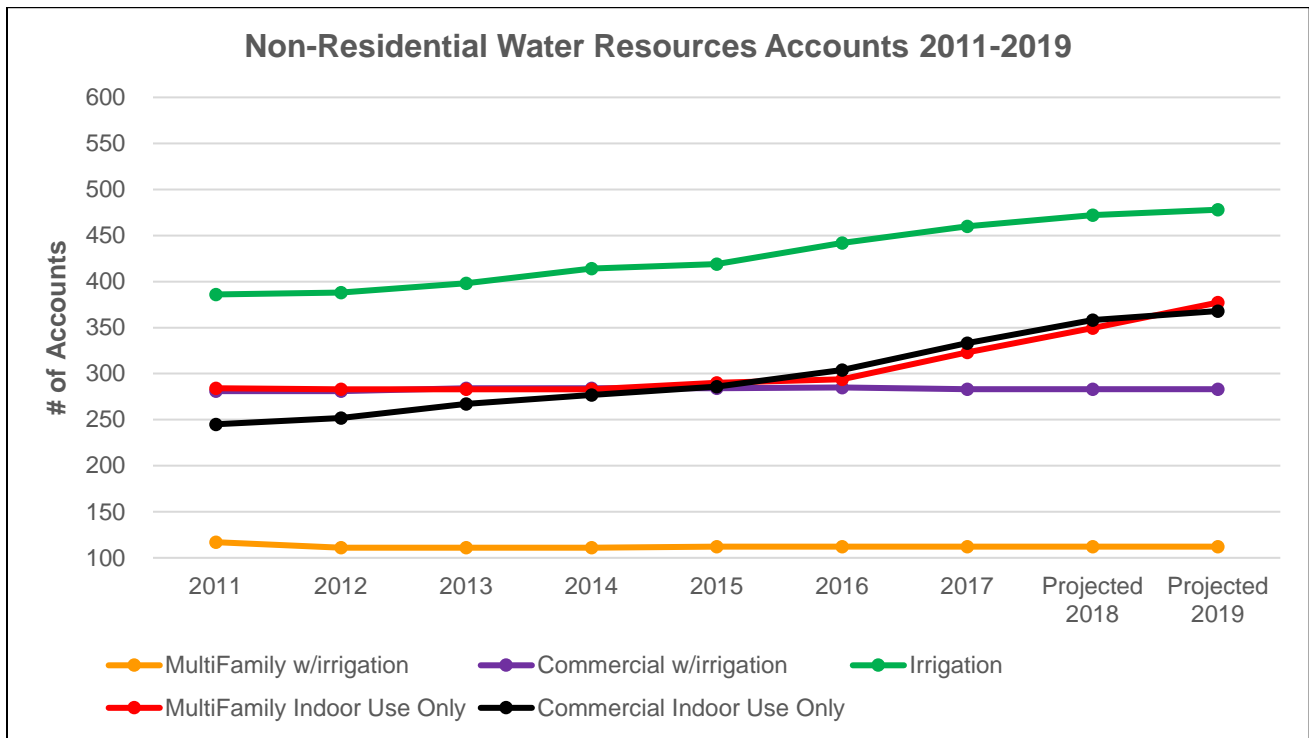


CHART 48: NON-RESIDENTIAL 2011-PROJECTED 2019



Castle Rock Water projects FY2019 water resources accounts by using 2017 billing data plus projected growth for FY2018 and FY2019. The FY2019 water resources accounts are projected to equal 21,786 (20,168 for residential and 1,618 for non-residential). Growth is projected for the following classes:

2018 Projected Accounts by Customer Class:

84	Residential (.67 SFE)
616	Residential (1 SFE)
26	Multi-Family
25	Commercial
12	Irrigation
763	Total

2019 Projected Accounts by Customer Class:

72	Residential (.67 SFE)
528	Residential (1 SFE)
28	Multi-Family
10	Commercial
6	Irrigation
644	Total

Total growth of 763 accounts is projected for FY2018 and 644 for FY2019 for a total of 1,407 projected for the water resources fund thru FY2019.

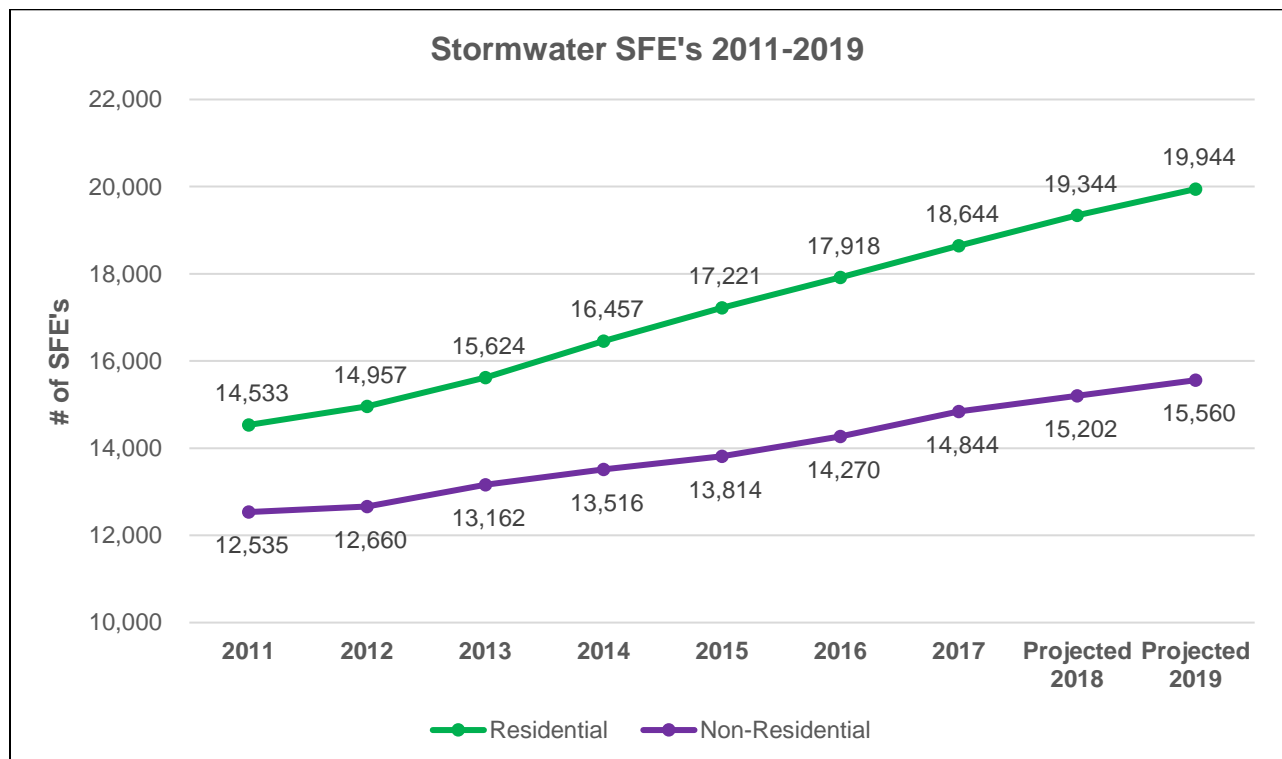
STORMWATER ENTERPRISE FUND

Table 18 shows stormwater average monthly SFEs based on 12 months of billing data (Jan17-Dec17). This shows that 33,488 SFE's were receiving stormwater services during this capture period. The FY2016 billing data (Jan16-Dec16) showed 32,188 SFE's receiving stormwater services. There are 1,300 more SFE's in FY2017 than FY2016.

TABLE 18: STORMWATER SFE'S (JAN 17-DEC 17)

Total Monthly SFE's	
Residential	18,644
Non-Residential	14,844
Stormwater SFE's	33,488

CHART 49: SFE'S 2011-PROJECTED 2019



Castle Rock Water shows FY2019 projected stormwater SFE's based on 12 months of billing data (Jan17-Dec17) plus projected growth for FY2018 and FY2019. The FY2019 stormwater SFE's are projected to equal 35,604 (19,944 for residential and 15,560 for non-residential). Growth is projected for the following classes:

2018 Projected Accounts (SFE's)

700	Residential
98	Detached in Cherry Creek Basin
602	Detached in Plum Creek Basin
358	Commercial in the Plum Creek Basin
1058	Total

2019 Projected Accounts (SFE's)

600	Residential
84	Detached in Cherry Creek Basin
516	Detached in Plum Creek Basin
358	Commercial in the Plum Creek Basin
958	Total

Total growth of 1,058 SFEs are projected for the stormwater fund in FY2018 and 958 for FY2019.