DENVER WATER

Water Efficiency Plan

EXECUTIVE SUMMARY

Denver Water faces many challenges—population growth, a warming climate, periodic drought, competition for water resources, security threats, and a changing regulatory and political environment. Ensuring that our customers maximize water efficiency is a significant part of our long-term water supply strategy. Doing so will sustain our vibrant metropolitan area. Denver Water has long been a proponent of conservation and environmental stewardship. As we transition from a conservation-focused plan to a Water Efficiency Plan, we recognize that our customers are our top priority—and our partners—to achieve water use efficiency. This Water Efficiency Plan is the evolution from focusing solely on water savings to helping our customers meet their water needs in the most efficient way. This plan continues to lead our customers and the nation through thought leadership; proven reliability of reduced water demand; and tactics that move individual customers to water efficient use and ensure that water efficient customers remain efficient.

Results

The Water Efficiency Plan will achieve over 3,000 Acre Feet (AF) of savings and move more than 30,000 customers to efficient use through the prioritized selected tactics below to work with all of Denver Water's customers, albeit in a more targeted way.

Tactic / Program	5 Year Cost	5 Year AF Savings	$/AF
Communicate Efficient Use	$ 192,960	720	$ 268
Informational Water Budget	$ 296,820	510	$ 582
SDC Efficiency Credit for New Construction	$ 535,920	385	$ 1,392
Water Budget Based Rates	$ 404,175	255	$ 1,585
Denver Parks IGA	$ 372,750	42	$ 8,875
SFR High Bill Audits	$ 476,300	275	$ 1,732
SFR Indoor Rebates	$ 1,200,000	300	$ 4,000
MFR Outdoor Rebates	$ 42,805	35	$ 1,223
MFR Indoor Audits	$ 276,480	135	$ 2,048
MFR Indoor Rebates	$ 155,465	59	$ 2,635
Watersense Challenge	$ 1,285,697	427	$ 3,011
CII Rebates	$ 226,905	105	$ 2,161
Garden in a Box	$ 360,494	30	$ 12,016
SFR Outdoor Rebates	$ 440,387	62	$ 7,103
Low Income Retrofits	$ 539,400	58	$ 9,300
TOTAL / AVERAGE	**$ 6,806,558**	**3,398**	**$ 2,003**

This plan will also;

- Maintain the acre-feet of water savings from the last 10 years, continue to engage with commercial, industrial and institutional customers to create benchmarks and tactics to attain additional water efficient customers.
- Enhance livability and customer satisfaction with landscape health and aesthetics documented through customer surveys and research projects.
- Continue to improve selected tactics both in cost per acre foot and customers moved to efficient use.

Thought leadership
We have accomplished our goal to move water use system-wide to 165 gallons per capita per day or less by 2017. We must continue to monitor water use to ensure that the savings are reliable, and we are able to factor them into our long-term planning. Our next goal will be measured not by system-wide per capita day use targets, but by measuring the number of customers that are using water efficiently. By doing this, we can tell the full story of how our customers are changing fixtures, landscapes and water use practices. This Water Efficiency Plan will focus Denver Water on the customer and will measure actual customer efficiency—not just reductions to overall system water demand.

This plan describes how we set benchmarks for water use efficiency and tactics to attain them. Developing water use benchmarks allows Denver Water to identify individual customers that are already water efficient and those who need assistance to achieve water efficiency. Targeted, customer centric outreach based on use per occupant or irrigated area will lead to more specific recommendations, and quicker results and more effective programs than in the past. These benchmarks are attainable for customers, and if all Denver Water customers were at these levels, we would be leaders in efficiency compared to other communities in the United States. For example, attaining 40 gallons per person per day indoors would be one-third less per person than other utilities, based on a 2016 Water Research Foundation Residential End Use study.

Water use efficiency also incorporates community values for health, safety, and wellbeing by recognizing that there is an expected and efficient water use that also maintains a highly livable city. It is not just about reducing water use at all costs; there is an expected and efficient amount of use that our customer need. Water efficiency can enhance work being done to combat urban issues such as heat islands and storm water runoff, and can support recreational community spaces.

Stakeholder process
To set benchmarks and develop tactics to attain them, Denver Water used a strategic stakeholder process. The Water Efficiency Working Group (Working Group) provided input, guidance, and recommendations throughout the process and developed a residential benchmark for indoor use of 40 gallons per resident per day and outdoor use of 12 gallons per square foot of irrigable landscape annually. The Working Group also recommended tactics that move customers to benchmark use and maintenance at those levels.

The Working Group's recommendations have been set based on currently achievable levels of use that maintain livability. Residential indoor use of 40 gallons per resident per day is achievable with current use habits and readily available water efficient plumbing fixtures; In fact, 49 percent of our customers have already done so. Attaining a 12 gallons-per-square-foot benchmark for residential landscapes is also attainable—in fact more than half of our customers have already achieved this benchmark. But moving customers toward the benchmark means a greater focus on changing landscapes, amending soil and paying attention to irrigation practices so water efficiency is achieved while balancing healthy trees and landscapes.

Because of the significant diversity of customer sectors within the commercial, industrial and institutional customer class (CII), the Working Group could not set benchmarks for all these customer types and associated water uses. However, the Working Group outlined a process to develop benchmarks for CII sectors—such as manufacturing or lodging—that comprise more than 1 percent of the total CII water use (33%) or those sectors identified as significant influencers or leaders for other sectors or customers, such as breweries.

The first of these CII sectors to go through the benchmarking process will be outdoor water use for schools and parks—also referred to as Public Space customers. This effort will start by forming a working group with members from this customer sector to define landscape use typology and associated water use benchmarks.

Following a public Denver Board of Water Commissioners meeting to receive feedback, a draft plan was placed on denverwater.org as a means of seeking public feedback. In addition, members of the Working Group returned to their individual stakeholder groups to gather additional feedback on the draft plan.

What this Plan is Not
While this plan sets out to focus our efforts more specifically with every customer by defining efficient use and tactics to attain and maintain those gains, it has a five-year horizon that will allow us to adapt to changing

conditions. This plan does not take a long-term view or look at the broad picture of resource and infrastructure planning. Denver Water has an Integrated Resource Plan dedicated to long-term planning and the two plans are coordinated.

Another important note is that the benchmarks are voluntary and are not tied to a rate structure. Denver Water's current rate structure of inclining blocks provides equity and a consistent message that encourages water efficiency because higher use equals higher costs.

This is also not an implementation plan for One Water approaches for using alternative water sources throughout the service area. But the concepts of efficient use can be a foundation for One Water projects where projects start by addressing how much water is needed to accomplish a goal while also addressing water quality needed.

This plan also does not attain all of the recommendations of the Working Group. These recommendations were larger in scope or required additional resources to fully accomplish than what is possible in five years. But these ideas are captured in Appendix A as higher-level concepts to help guide Denver Water's work. Denver Water will continue to build knowledge and relationships to better realize these next level recommendations.

Approach

The previous 10-year conservation plan was predictive—it diagnosed customer water use and predicted what would happen next. This Water Efficiency Plan goes beyond predictive to prescriptive—it is essentially a plan to make it happen. Doing this is a change in how conservation programs work and why they matter for the long-term management of water utilities. We currently recognize that other aspects of our water infrastructure require maintenance—dams need repairs and pipes must be replaced. Maintenance is required to make true efficiency gains too. Making this transition will take time as it requires new metrics such as cost per efficient customer instead of cost per acre foot reduced.

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INTRODUCTION

A NEW VISION OF EFFICIENCY

Water use is an essential part of our urban and suburban environments. Whether we use water for bathing, cooking, flushing toilets or to irrigate play areas and landscapes, water is the foundation upon which our lives are built. In the natural environment, water provides cooling effects and habitat. And our economy relies on an efficient, reliable water source for food and beverage production and much more.

Conservation focuses on reducing water use, but efficiency focuses on the economic, social and environmental aspects of water use. By using water efficiently, Denver Water customers share in the stewardship of our environment, where we keep natural water flows in streams and rivers to benefit recreation and wildlife. Water efficiency at its core protects and extends a scarce natural resource—water efficiency is how we share this resource to have enough for all uses and applications.

Efficiency also means balance with the urban systems of a growing economy and supporting jobs, parks and the recreational amenities that make a city livable. The term “livability” is used throughout this plan to describe quality-of-life attributes that contribute to the well-being of residents and visitors in our service area. Customer-specific chapters provide more details on water use benchmarks and tactics to help move toward a water-efficient system that embraces livability.

This plan defines efficiency benchmarks based on current customer use and adoption of best technologies or practices to focus on where customer use is balanced. This approach promotes targeted awareness and action to help move customers to benchmark use and support customers who have already achieved efficiency.

Benchmarking for efficient use provides the ability to segment and market educational and incentive programs to customers based on individual water use and property features. This is also a more efficient use of resources by sending the right message and right program to the right customer.

The benchmarks defined in each customer specific section of the plan are strictly voluntary customer water use goals. Denver Water can achieve results by educating, incentivizing and engaging customers about ways to move to more efficient use. Denver Water can also learn the best way to implement policies that ensure customers start with efficient water use and that water waste comes with consequences.

The end goal of this approach is a resilient water system that can withstand the impacts of a warming climate, drought and economic variability. By recognizing efficient water use, not just reduced water use, Denver Water can connect customers to their water use and help every customer use only what they need during normal operations and during drought.

MARKETING EFFICIENT WATER USE

The Use Only What You Need campaign was part of the success in getting customers to use less water. There remains an opportunity to build better awareness about why it is important, and the role customers play in securing our water future. Also, communicating what is efficient water use for customers’ households and businesses is key to further engagement.

Beginning in 2018, we will create a more holistic, long-term view of water through our communications and marketing efforts. This shift requires us to communicate more directly with audiences using not only paid advertising, but rather an integrated approach that combines traditional and social media, content journalism, direct mail, face-to-face contact and other channels, with the goal of being heard and understood in today’s hyper-mediated communication landscape. Specific strategies are currently in development as part of the organization’s Integrated Marketing and Communications Plan.

However, customers who are early adapters of water savings and are already efficient are often the first ones that seek out other tactics to participate in. These customers are motivated to use water efficiently. But the downside is that there is little water efficiency to be gained by including these customers in tactics that are truly aimed at

getting inefficient customers to efficiency. For example, in the past if a customer wanted an audit of their water use, we would perform one, regardless of their efficiency level. In this plan, we will refocus resources to motivate inefficient customers to change their behavior or participate in a tactic. Each chapter of the plan shows examples of this market segmentation and messages aimed at different efficiency levels.

SCOPE OF THE PLAN

The Water Efficiency Plan covers the combined service area, including fixed contracts receiving treated water, City and County of Denver, Total Service, Read and Bill and Master Meter customers (unless an entity has its own conservation plan approved through the Colorado Water Conservation Board). These distinct entities span more than 355 square miles with a population of 1.4 million people. Denver Water has a billing relationship with end-use customers within Denver, Read and Bill and Total Service contract areas, but does not have this in Master Meter and all Fixed Contracts areas. This is an opportunity to partner with over 25 entities on data sharing, program evaluation and customer service around efficient water use.

The plan is divided into chapters based on customer and water use types. There is also a section on internal Denver Water practices for our own properties. The chapters are not specific to billing classification used for rates; rather, they identify customer type and water use from the perspective of the customer.

BUDGET AND STAFF RESOURCES

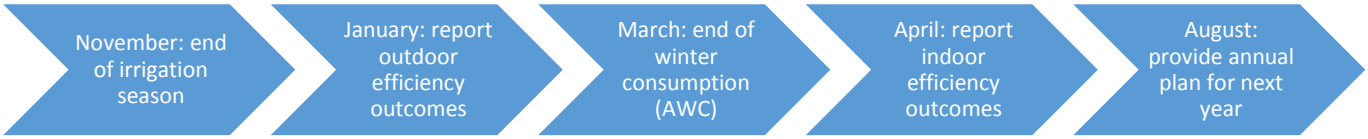
Over the five-year span of this plan, Denver Water will create annual budgets for Board approval using a zero base process prioritizing each tactic based on the following criteria:

1. Tactic shows measureable change in water use;
2. Tactic prioritized as Foundational, Accelerated change or Transformational opportunities;
3. Past performance of tactic to move customers to efficient use;
4. Cost per efficient customer;
5. Multidimensionality of the tactic to support multiple customer types; and
6. Tactic maintains customers at efficient use and is necessary to keep customers at efficiency.

This plan provides a framework, overall vision and milestones needed to attain specific goals. To keep the Board informed of program management, staffing, and budgets, a yearly work plan will be delivered in August of the prior year for approval. The work plan will include a breakdown of projects and milestones, staff responsible, budgets and any dependencies with internal or external partners. The 2018 plan can be found in Appendix B.

SHARING RESULTS

Success will be reported in two ways: measuring inputs monthly and outcomes annually. Monthly measurements are based on activities completed per customer type and use such as rebates or irrigation audits, and milestones completed for reports or pilots. An annual report will also be completed by April showing progress for efficient customers by count and percentage moved or maintained the previous year. This plan will be updated starting in year four (2020) and an updated five-year plan will be provided in 2022.



STAKEHOLDER PROCESS AND TRANSPARENCY

Denver Water defined efficient water use (by customer type and use), and tactics to attain customer water efficiency through a strategic public process. This process included forming the Water Efficiency Working Group (Working Group) with stakeholders from key interest groups. The Working Group met monthly from May 2016 to March 2017. They provided input and questioned assumptions on information gathered by staff on customer use data, current and potential programs, and to help inform tactics and benchmarks. These discussions shaped the outcomes of the final product through many aspects (tactics, marketing, and goals setting), and these are

reflected in subsequent chapters. The tactical and marketing ideas raised by the group need vetting through a process of identifying barriers and piloting approaches prior to scaling up. The WEWG recommendations, presentations and minutes can be found in Appendix A.

Following a public Denver Board of Water Commissioners meeting to receive feedback, a draft plan was placed on denverwater.org as a means of seeking public feedback. In addition, members of the Working Group returned to their individual stakeholder groups to gather additional feedback on the draft plan. Specific groups that reviewed the draft plan include Denver Water's distributors, Citizens Advisory Committee, and staff from the Colorado Water Conservation Board. Comments and suggestions from this public comment period are documented in Appendix A.

SELECTION CRITERIA FOR TACTICS

The variety of efficiency methods available to water utilities is extensive and well documented. While many methods provide an opportunity for reducing demand, we selected those that optimize moving customers toward efficiency and maintaining it once achieved. We also considered livability and maximizing limited program resources.

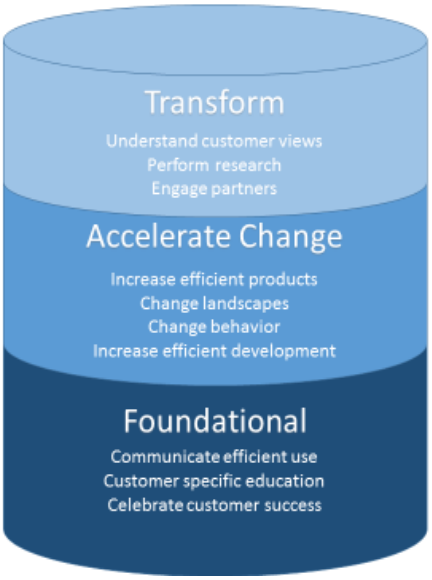
BARRIERS AND OPPORTUNITIES

The majority of Denver Water residents strive to be good stewards of our natural resource, according to our 2016 Marketing Segmentation study. The most common reason our customers gave for reducing water use was to help the environment. But to become efficient users of water, inefficient customers have many barriers to overcome. These barriers can be perceived or real and by understanding them, Denver Water can be an agent to assist customers in making changes that lead to using water efficiently.

Some broad barriers to customer participation are:

- **Social barriers.** Customers face pressure to conform to community standards for landscapes and fixtures where being at the cutting edge can cause unwanted attention.
- **Economic barriers.** Changes can cost money or time and the return on investment may not cover the initial cost for many years.
- **Knowledge barriers.** Customers may receive a bill (single-family residential) or never see a bill (multifamily or commercial) but rarely do they know expected water use based on landscape area or number of residents.

Denver Water has opportunities to overcome these and other barriers to change. These opportunities can be categorized and used to prioritize work. These broad categories are called those *Foundational* to other opportunities, those opportunities that *Accelerate Change* to more efficient use and lastly those opportunities that *Transform* our approach to water efficiency.



Foundational — Providing feedback to customers on their water use and how others are finding success is foundational to this effort. This interaction is done through a variety of channels from web sites to onsite audits, which can lead to changing water using products and practices, and lead to long-term permanent changes in water use. This includes continuing to engage efficient customers to maintain efficiency and using their knowledge and experiences as positive examples. We can:

- **Communicate efficient use.** To achieve efficiency goals, our customers must know their own water use and where they could become more efficient. This

includes a strong awareness message that explains why efficiency is important to the customer and society—from new residents to long-term property owners. By creating subgroups based on being above or below the benchmark, we can communicate specific and timely information to help our customers make informed decisions.

- **Customer specific education.** Many customers need dedicated expertise for finding leaks or identifying landscape changes. Getting an expert to walk the property or present options to an HOA board and provide in-depth recommendations about their specific property can motivate customers to act.

- **Celebrate customer success.** Denver Water has a unique opportunity to share stories about customers who achieve success as a positive tool to reward the change and engage others in similar actions.

Accelerate Change — Awareness is the first step to getting action, but we also have the opportunity to engage in actions that move customers to efficiency. These are typically thought of as financial incentives or rebates that reduce the cost barriers, but these opportunities can also be in the form of socialized commitments to change behavior or policies affecting product purchases or landscape choice. We can:

- **Increase efficient products.** Increasing access to and encouraging customers to change fixtures or irrigation products can be a simple way to gain efficiency without giving up performance. Engaging customers through incentives and educational materials increases product installations while also transforming the marketplace to offer more efficient products. Policy can also lead to changes in what products are available. Internal business practices can increase best technology of indoor fixtures, metering and graywater installation.

- **Change landscapes.** Low or zero water use landscape alternatives can be paired with turf to create a balanced, livable landscape. There are many options to help customers achieve sustainable, low-water landscapes instead of defaulting to turf as the primary land cover or xeric plants as the only alternatives.

- **Change behavior.** Even with the most efficient fixtures or landscapes in place, water use habits drive water use. Educating customers on how they use water indoors and outdoors helps move them to efficient use.

- **Increase efficient development.** New development or redevelopment of a site provides a great opportunity to install efficient fixtures, landscapes and graywater systems.

Transform — By building off foundational opportunities, and those that accelerate change, we have the ability to transform our approach to water-use efficiency. Effectively using a benchmarking process long-term requires knowing when the benchmark should be revised due to changes in customer perceptions, technology or even the climate. Understanding customer perceptions also allows us to identify and mitigate potential impacts to livability. We can:

- **Understand customer views.** Overcoming barriers involves knowing the desires and challenges of different customer types. This may require surveys, partnerships with industry groups and analysis of use trends to better set benchmarks and evaluate tactics. Through connecting with customers to understand community values and how water efficiency balances with livability, we can make better recommendations and offer approaches that move customers to efficient use while maintaining livability.

- **Perform research.** Formal research on tactics and customer experiences helps inform, guide and re-frame practices. We want to know what works in our service area, and why, so we continue to achieve goals.

- **Engage partners.** Denver Water can attain water efficiency goals—faster and at a lower cost—while maintaining livability through strategic partnerships with city planners, landscape professionals, the environmental community, elected officials and community groups.

Examples of opportunities can be found in the customer-specific sections with associated tactics and a timeline of implementation. Further explanation of how understanding barriers can benefit customers and our opportunities to address them can be found in Appendix C.

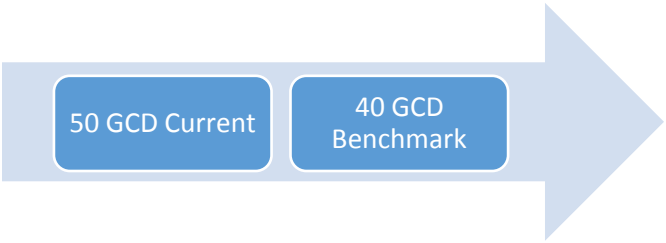
DEFINITIONS

This plan uses technical or trade specific terms, acronyms and abbreviations that may require additional explanation. The definitions below strive to clarify when this occurs.

AMI	Advanced Metering Infrastructure. Metering technology that allows Denver Water and customers the ability to read water use through a meter in smaller increments of time (one hour versus one month) and review water use with a shorter lag (one day versus one month) through a network of smart meters.
AWC	Average Winter Consumption, based on water use billed in January, February and March when irrigation is not occurring. AWC is an indicator of indoor water use.
CII	Commercial, Industrial and Institutional customers, also referred to as non-residential. Commercial accounts include water users that provide or distribute a product or service, such as hotels, restaurants, office buildings, commercial businesses or other places of commerce. Industrial accounts consist of water users that are primarily manufacturers or processors of materials. Institutional accounts are water-using establishments dedicated to public service, including schools, courts, churches, hospitals, and government facilities.
Customer	Person or people using and/or paying for water from Denver Water.
Customer Sector	A further subdivision of a larger customer type into like businesses or housing types.
Customer Type	A grouping of customers based on similar site characteristics such as Single Family Residential, Multifamily Residential, Public Spaces and Commercial, Industrial, Institutional.
One Water	A concept that breaks down traditional barriers between drinking water, wastewater and stormwater management by espousing using the right water quality and the right quantity to perform the task.
GCD	Gallons per capita per day. The total amount of water used divided by the population of a residence, property or region.
GPSF	Gallons per square foot. Defines the amount of water used by a landscape over an irrigation season or year of use. This is what is required in addition to natural precipitation.
Graywater	A portion of the water used in a residential, commercial or industrial building that may be collected after the first use and put to a second beneficial use. Sources may include water discharged from bathroom and laundry-room sinks, bathtubs, showers and laundry machines.
MFR	Multifamily residential customers refer to those that reside in apartments or condominiums. They are unique in configuration of one meter to many customers. These customers often do not receive a direct bill from Denver Water.
Public Spaces	Areas owned and operated for the use and enjoyment of the public, regardless of affiliation or membership.

SFR	Single-family residential customers unique in meter configuration of one meter to one unit.
Water conservation	Any action that reduces water use or water loss.
Water efficiency	Minimization of the amount of water used to accomplish a function, task or result without giving up performance or livability.

SINGLE-FAMILY RESIDENTIAL INDOOR WATER EFFICIENCY

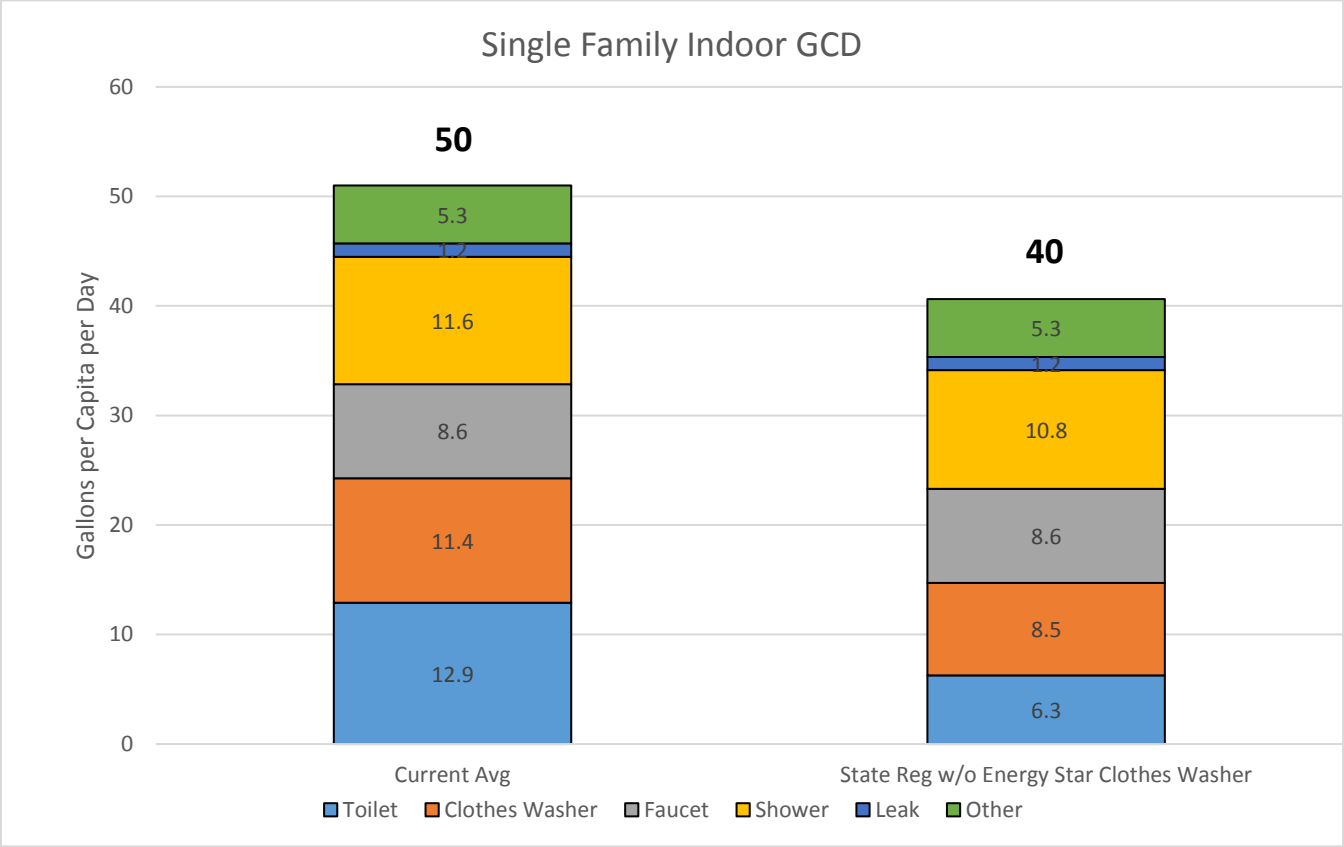


Single-family residential (SFR) customers make up the majority of Denver Water's customer accounts. Indoor water use by these customers makes up about 30% of annual water demand on Denver Water's system. SFR customers reside in standalone, individually metered, residential properties.

For these customers, indoor water use is defined as all water consumption that occurs within the home and excludes water used for irrigation. Currently SFR customers have an average use of 50 gallons per capita day (GCD).

Water efficiency benchmark

Indoor water use is essential for health and well-being. Maintaining a home with adequate water for consumption, bathing, cleaning and personal hygiene requires 40 GCD[1]. The table below shows an average 50 GCD household's water use[2] compared to benchmark efficient water use.



[1] Estimated use with current State required, WaterSense fixtures
[2] 2012 Residential End Use Report

Methodology for benchmark

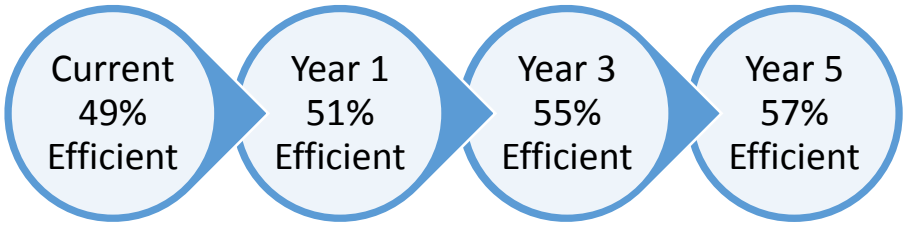
Denver Water maintains monthly water use for each SFR customer account and calculates gallons per household per month. Indoor water use is calculated based on Average Winter Consumption (AWC), which indicates indoor use, absent irrigation.

Today, there are 201,581 SFR customer accounts in Denver, Total Service and Read and Bill areas. Census data for our service area indicates an average of 2.7 residents per single family residence. Denver Water uses the average number of residents per household as a proxy since it does not currently track the number of household occupants. Calculation of GCD is as follows:

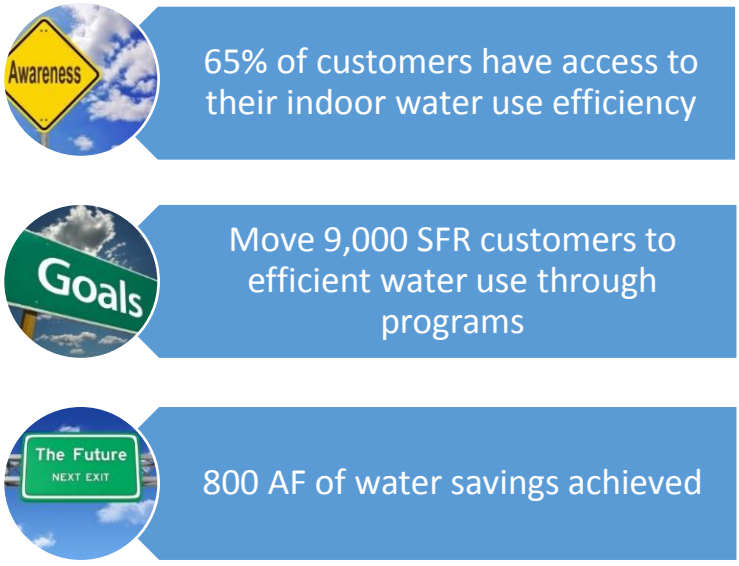
Gallons per household per month / 30 days / 2.7 = Gallons per Capita Day (GCD)

Desired progression toward benchmark

Currently 49 percent of SFR customers meet or are below the 40 GCD benchmark. The Water Efficiency Plan has one-, three- and five-year metrics. Monitoring and evaluation will be done yearly in April after AWC is calculated to determine whether tactics are moving customers toward the benchmark and ensuring that those already there retain efficiency. Expected outcomes for progression are as follows:



Water Efficiency Plan expectations



Selected Tactics

Communicate Efficient Use – The ability to perform two way communication to a customer allows Denver Water to target specific programs and messages to in-scope customers. This approach also allows a broad spectrum of customers to input information about number of customers and, number and type of fixtures which helps tailor messages and programs. To bring this approach to reality, we will need to pursue a competitive bid for an IT solution in 2018 and reevaluate in 2020.

Five year outlook

- Water savings 290 AF
- Cost per acre feet $ 270

High Bill Audits – Identifying leaks and understanding where problems and opportunities is not always easy and some customers need assistance. Indoor audits provided at no cost to customers help move customers already but can be more effective by providing one or two next steps and following up with the customer afterwards. Costs can be better managed by only focusing on highly inefficient customers.

Five year outlook

- Water savings 165 AF
- Cost per acre feet $1,700

Indoor Rebates – The most effective indoor rebate for the past ten years has been UHETs. With a WaterSense labeled toilet flushing 1.1 gallons per flush or less customers do not sacrifice performance for water efficiency. This tactic has an additional measure of success – change to the market place from less than 5% of toilets sold in big box stores (Denver Metro area) to over 15%. Staff will monitor this aspect on annual basis through phone surveys and site visits.

Five year outlook

- Water savings 300 AF
- Cost per acre feet $4,000*

*By making modifications to the marketing and outreach efforts to focus on inefficient customers and by reducing to a maximum of two toilets per customer a $4,000 cost per acre-feet can be attained.

Low Income retrofits – This program overcomes the financial barrier of purchasing and paying for installation of water saving products (UHETs, Showerheads and faucet aerator) for low income customers. The contract for services also includes education on behavior and fixing leaks.

Five year outlook

- Water savings 53 AF
- Cost per acre feet $9,300

*By making modifications to the marketing and outreach efforts to focus on inefficient customers the effective cost per acre-feet can be reduced to $7,700.

Selected Tactics Work Plan

Priority	*Opportunity*	**Tactic**	**2018**	**2020**	**2022**
Foundational	*Communicate efficient use*	**Provide timely and specific water use feedback**	Select vendor through RFP to implement in June 2018 – 20% participation	Full implementation and continued outreach – 65% participation	Evaluate and recommend next Iteration and
		High bill water audits	Continue to perform approximately 200 audits per year focused on customers over 55 GCD		
Accelerate Change	*Increase efficient products*	**Low income Retrofits**	Continue current low income indoor Retrofits	Approximately 1,000 audits and 1,200 toilet retrofits per year	
		Implement rebates for most efficient indoor fixture technology	Issue approximately 6,000 UHET rebates per year		

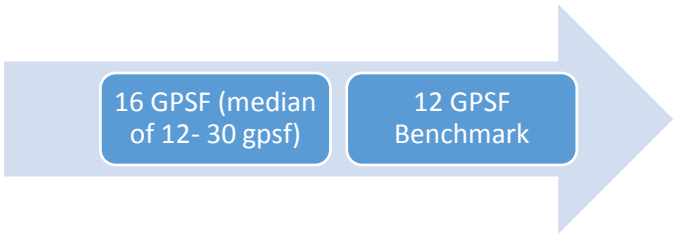
Targeting Outreach for Single Family Residential Indoor Tactics

To increase participation of inefficient customers while recognizing and encouraging efficient customers, we need to connect the right customer to the best action (sometimes a selected tactic or an action that does not need Denver Water support). The table below shows customer segmentation based on how close they are to the established efficiency benchmark with a targeted message and delivery method pointing them toward a selected action.

Example of market segmentation to target outreach for Single Family Residential customers:

Efficiency level	Key message	Delivery method	Action	Influencer group
All	Sign up for the customer portal or phone app	Email, call center, website, bill, new customer kit	Access efficiency level and input household population	Customers in pilot
<40 GCD	Well done! Keep up the great work.	Bill, phone app or web portal	Maintain	SFR customers who found and fixed a leak
40 to 55 GCD	Get an Ultra High Efficiency Toilet (UHET)	Email, text, direct mail, call center	UHET rebate	Story about neighbors like you with most efficient technology
> 55 GCD	Check for leaks	Letter, direct outreach, self-identify	Self-audit/staff audit	Call Center staff
	If toilets are above 1.6 gpf get a UHET	Time of audit	UHET rebate	Field staff

SINGLE-FAMILY RESIDENTIAL OUTDOOR WATER EFFICIENCY



Single-family residential (SFR) customers make up the majority of Denver Water's customer accounts. Outdoor water use by these customers makes up about 20% of annual water demand on Denver Water's system. SFR customers reside in standalone, individually metered residential properties.

Water efficiency benchmark

The benchmark for outdoor use is 12 gallons per square foot (GPSF) of pervious area of each property annually. Out of the 201,581 single family residential homes, 65 percent are at or below, and 35 percent are above this benchmark. The median use is 16 GPSF for customers between 12 and 30 GPSF.

GPSF Efficiency Range	Number of Homes	% of Total
<5	51,500	28%
5-12	66,995	36%
12-18	37,662	20%
18-30	23,134	12%
>30	5,819	3%

16 GPSF median

Methodology for benchmark

The vast majority of SFR homes do not have dedicated meters for irrigation, therefore the amount of consumption considered to be outdoor use is a function of subtracting average winter consumption from total consumption measured from April through November.

Since the GPSF measurement does not account for actual landscape types, the following averages are used in the calculation, this is not intended as a turf-only benchmark:

*18% of pervious area – no irrigation (sidewalks, rock, mulch etc.)

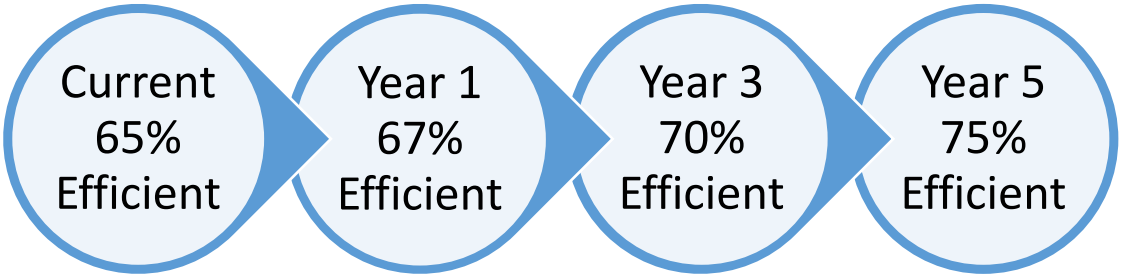
*29% of pervious area – alternative landscape types (xeriscape, native, low-use) – 9 GPSF

*53% of pervious area – bluegrass turf – 18 GPSF

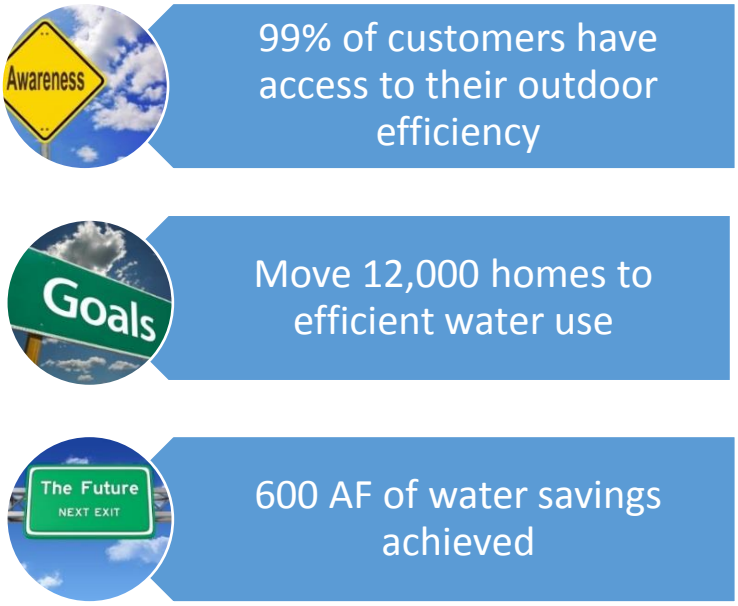
**Based on a random sample of 425 homes in 2015*

Desired progression toward benchmark

The five-year goal to move the ratio of efficient to non-efficient customers is 10 percent, resulting in a ratio of 75 percent efficient to 25 percent inefficient by 2022. This is based on the current method of measuring efficiency.



Water Efficiency Plan expectations



Communicate Efficient Use – Provide timely and customer water use feedback: The ability to perform two way communication with customers will allow Denver Water to target specific programs and messages to in-scope customers. Specific programs can be targeted to users based on their efficiency level. This targeted approach will help Denver Water obtain greater water use reductions at a lower cost. To bring this approach to reality Denver Water will need to pursue a competitive bid for an IT solution in 2018 and reevaluate in 2020. Denver Water will also reach out to new customers to sign up for this two way communication platform in order to receive information regarding efficient use.

Five Year Outlook

- Water Savings 430 AF
- Cost Per Acre Foot $ 270

High Bill Audit - Offer audits for inefficient customers to check irrigation clock settings and identify issues and leaks in the irrigation system. Improve the existing outdoor audits by making sure that the customer understands the existing issues and leave them with specific recommendations of what needs to be done to fix the system and follow up with the customer to make sure these fixes have been made.

Five Year Outlook

- Water Savings 110 AF
- Cost Per Acre Foot $ 1,700

Outdoor Irrigation Rebates – Incentivize installation of ET Irrigation Controllers and High Efficiency rotary nozzles. The rebate programs for efficient irrigation products have seen water use increases after installation likely due to the reestablishment of landscapes or due to weather differences between the baseline year and the evaluation year (The weather factor for 2016 was 16% higher than 2013). To obtain the expected water savings, Denver Water will increase education of what efficient irrigation use should look like.

Five Year Outlook

- Water Savings 62 AF
- Cost Per Acre Foot $ 7,100*

*By making modifications to the marketing and outreach efforts to focus on inefficient customers the effective cost per acre-feet can be reduced to $6,400.

Garden in a Box landscape change - landscape program offers customers a 25% discount on a pre-packaged xeric garden kit and educational material. This program has not shown great water savings likely due to establishment irrigation of new landscapes and weather differences between the baseline year and the evaluation year (the weather factor for 2016 was 16% higher than 2013). Customers that self-select for garden in the box also tend to like gardening and have expectations of having very high quality plant material on their properties. We will transform this program to be targeted to customers that are very close to being efficient. We will also need to weather normalize saving numbers so that we are not affected by yearly weather trends.

Five Year Outlook

- Water Savings 30 AF
- Cost Per Acre Foot $ 12,000

Selected Tactics Work Plan

Priority	*Opportunity*	**Tactic**	**2018**	**2020**	**2022**
Foundational	*Communicate efficient use*	Provide timely and customer water use feedback	Select delivery method to provide targeted messaging	Full implementation and continued outreach - increase to 65% participation. Encourage new customers to participate	Evaluate and make recommendation of next iteration of water use feedback
	Customer specific education	High bill irrigation audit	Continue for customers upon request but limit to inefficient customers, approximately 1,000 per year		Implement Irrigation High Bill follow up and proactive outreach for outdoor inefficient outdoor use.
Accelerate Change	*Increase efficient products*	Rebates for efficient irrigation products	Continue incentives for efficient irrigation products	Evaluate program and make recommendation	Increase education of what efficient outdoor irrigation looks like when customers receive
	Change landscapes	Landscape change pilot programs	Offer 100 design sessions and seminars	Evaluate effectiveness of landscape change design program	Expand program or discontinue
		Garden in A Box landscape program	Continue Garden in A Box program, approximately 1,000 per year		

Targeting Outreach for Single Family Residential Outdoor Tactics

To increase participation of inefficient customers while recognizing and encouraging efficient customers, we need to connect the right customer to the best tactic. The table below shows customer segmentation based on how close they are to the established efficiency benchmark with a targeted message and delivery method pointing them toward a selected action.

Example of market segmentation to target outreach for Single Family Residential customers:

Efficiency Level	Key Message	Delivery Method	Action	Influencer group
All	Sign up for the customer portal or phone app, email	News, Social Media, Email, Call Center, Bill	Sign up and get customer input of % irrigated area	Customers in pilot area
0-4.9 gpsf	Extremely low if you have a landscape how does it look to you?	Bill, phone app or web portal	Maintain if they have a landscape, watch for rebound if not	Customer with great xeriscape consistently under 5 gpsf
5-11.9 gpsf	Keep it up, if you like your landscape we like your efficient ways	Bill, phone app or web portal	Maintain efficiency level, keep paying attention	Customer that pays attention to the weather and manages
12-17.9 gpsf	Close - Irrigation Efficiency Rebates, Garden in a box	Email, text, direct mail	Clock management, ET irrigation clock and rotary nozzle rebate, Garden in a box	Past Garden in a box customers
18-30 gpsf	Check for leaks and manage your irrigation system	Targeted email, letter, or self-identify	Check clock run times, self-audit irrigation system	Customers that identified irrigation leaks and fixed themselves
>30 gpsf	Look for leaks and cut down on how long you irrigate	Targeted email or letter	Sign up for efficiency report, irrigation audit with action follow up	Customer with consistent massive irrigation leak that fixed leaks

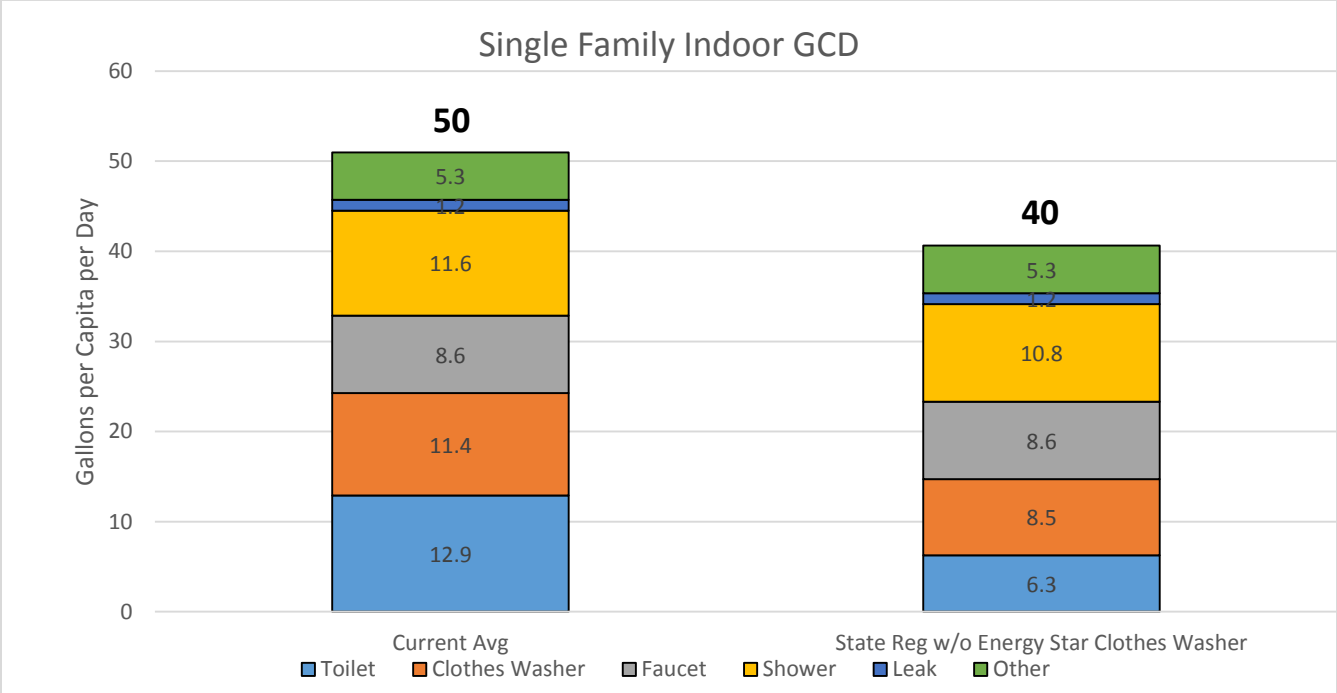
MULTIFAMILY RESIDENTIAL INDOOR WATER EFFICIENCY

Multifamily residential (MFR) customers make up the second largest water demand of Denver Water's customer accounts after single-family residential customers with 13 percent of system-wide use. MFR properties have multiple units on a single meter and in many cases multiple meters at a single property. These range from duplexes to skyscrapers with hundreds of units where multiple tenants share a meter. Disconnect between billed water use and the end-use customer can be a major barrier to change.

For these customers, indoor use is defined as all consumption within the property and excludes water for irrigation or cooling. Currently MFR customers use an average of 52 gallons per capita day (GCD).

Water efficiency benchmark

Indoor water use is essential for health and well-being. Providing a home with adequate water for consumption, bathing, cleaning and personal hygiene requires 40 GCD[3]. The table below shows an average 50 GCD SFR household's water use[4] compared to benchmark efficient water use. In our experience, MFR does not deviate from SFR significantly unless a clothes washing machine is present in each unit. The average use per person is similar but with multifamily, the gap between the lowest and highest users is more pronounced (units occupied by just one person tend to even out the very inefficient units).



[3] Estimated use with current State required, WaterSense fixtures
[4] 2012 Residential End Use Report

Methodology for benchmark

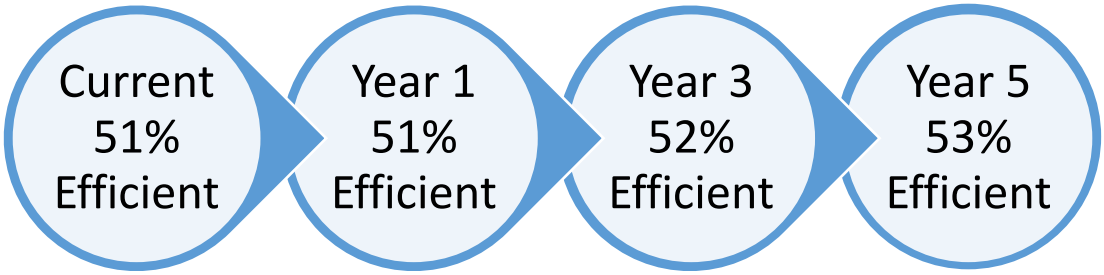
Denver Water maintains monthly water use for each MFR customer account and calculates gallons per property per month. Indoor water use is calculated based on Average Winter Consumption (AWC), which indicates indoor use, absent irrigation and any water based cooling systems.

Today, there are 12,245 MFR properties in Denver, Total Service and Read and Bill service areas. Within those properties there are 194,320 units. Census data for our service area indicates an average of 2.2 residents per unit. Denver Water uses the average number of residents per unit as a proxy since it does not currently track the number of household occupants. Calculation of GCD is as follows:

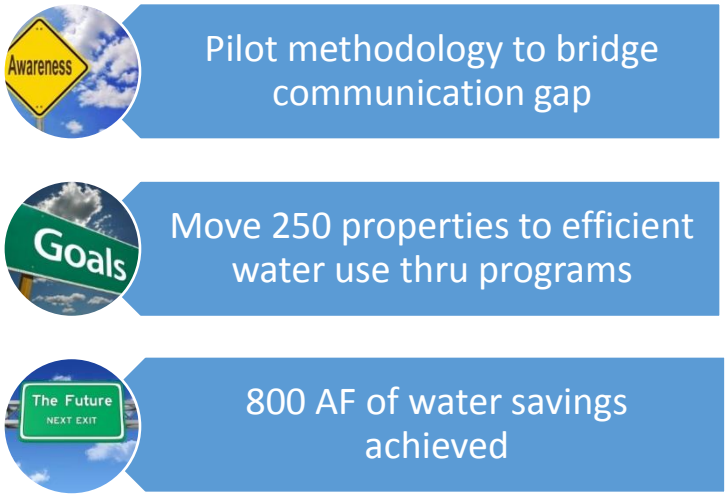
Gallons per property per month/ # of units / 30 days / 2.2= Gallons per Capita Day (GCD)

Desired progression toward benchmark

Currently 51 percent of MFR customer properties meet or are below the 40 GCD benchmark. The Water Efficiency Plan has one-, three- and five-year metrics. Monitoring and evaluation will be done yearly each April after AWC is calculated to determine whether tactics are moving customers toward the benchmark and ensuring that those already there retain that efficiency. Expected outcomes for progression are as follows:



Water Efficiency Plan expectations



Selected Tactics

Indoor Water Audits – Multifamily housing with higher than typical water use per unit can benefit from professional advice and guidance to increase water use efficiency. The audit team identifies leaks, makes recommendations for toilet retrofits throughout the property as they replace aerators and shower heads.

Five year outlook

- Water savings 135 AF
- Cost per acre feet $2,050

Indoor Rebates – Rebates are a typical way to motivate customers to purchase and install the most efficient fixtures. Rebating for the most efficient fixtures also moves the market and pressures the industry to continue pushing the envelope of water efficiency. The number of rebated High Efficiency Toilets tends to fluctuate significantly year to year for multi-family properties. However, with a concerted effort to do more outreach to this customer group (linked with indoor audits), we anticipate an increase in the number of rebates.

Five year outlook

- Water savings 59 AF
- Cost per acre feet $2,600*

*By making modifications to the marketing and outreach efforts to focus on inefficient customers the effective cost per acre-feet can be reduced to $2,400.

WaterSense Challenge Retrofit Program- Multifamily homes that fit a profile of high water use per unit, high occupancy and a lower number of bathrooms per unit meet the criteria for the WaterSense Challenge program. The program aims to eliminate the barriers to working with multifamily properties and to retrofit fixtures. This program pays for fixtures (toilets, aerators and showerheads), assists with the labor costs, provides dumpster and assists with the logistics to implement these changes. This program has shown huge successes in a sector which historically has not invested in these upgrades.

Five year outlook

- Water savings 427 AF
- Cost per acre feet $3,000

Low Income Retrofits – Using an already established lists of customers receiving government support for electricity and heating bills to identify participants we pay a contracted third party to retrofit customer's toilets, showerheads, and aerators to ultra-high efficiency products. Although successful at reducing use, it is utilized at a lower rate than single family and has seen very few participants after 2015.

Five year outlook

- Water savings 5 AF
- Cost per acre feet $9,300*

*By making modifications to the marketing and outreach efforts to focus on inefficient customers the effective cost per acre-feet can be reduced to $7,700.

SDC Efficiency Credit – New construction is an opportunity to build sites that are water efficient from conception. This program pushes engineers and designers to install the highest efficiency fixtures, landscape designs and irrigation technology. This pilot provides staff experience to best present a package of policies and/or incentives to engage new development and redevelopment in building efficiently.

Five year outlook

- Water savings: 135 AF
- Cost per acre feet: $1,400

Selected Tactics Work Plan

Priority	Opportunity	Tactic	2018	2020	2022

Foundational	*Communicate efficient use*	Improve mass multifamily communication methodology	Subcategorize properties into like groups. Assess previous communication/ market efforts	Pilot communication method to reach the least efficient customers	Based on pilot results, expand communication methodology to entire customer class
	Customer specific education	Indoor water audits and efficiency consultations	Continue to work with customers upon request. Estimate 40 properties per year	Begin to target inefficient customers proactively	Based on experiences have recommendation to continue, alter, or end program
Accelerate Change	*Increase efficient products*	Continue rebates for WaterSense fixtures	Estimate 1,400 UHET direct installs and 200 UHET rebates per year		
		Low income retrofits	Continue program as is, research opportunity to expand eligibility criteria. Estimate 20 direct install properties		Evaluate needs for income qualified program, change if needed
	Increase efficient development	Assess state of new development	Support SDC credit pilot for multifamily and mixed use development		Examine possible code changes and produce report with findings

Targeting Outreach for Multifamily Residential Indoor Tactics

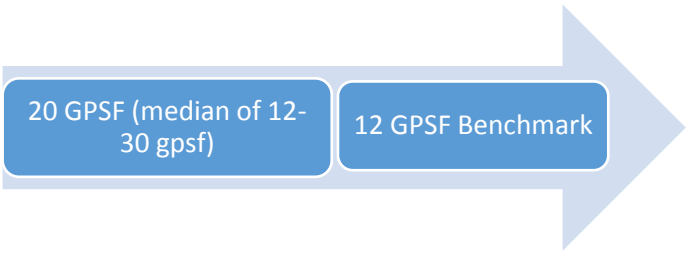
To increase participation of inefficient customers while recognizing and encouraging efficient customers, we need to connect the right customer to the best tactic. The table below shows customer segmentation based on how close they are to the established efficiency benchmark with a targeted message and delivery method pointing them toward a selected action.

Multifamily customers (owners, residents and property managers) have historically utilized Denver Water programs at a much lower rate compared to single family homes. Conservation has begun the process to identify and benchmark customers that will provide us with data to better understand different segments of this population. We need to identify barriers to participation such as differences between rental properties and owned residences. We will draw upon the success and methodology of the WaterSense Challenge tactic to implement it to the population as a whole. It is also important to note there may be significant movement in this group if we are able to gather better occupancy data.

Example of market segmentation to target outreach for Multifamily Residential customers:

Efficiency level	Key message	Delivery method	Tactic	Influencer group
<40 GCD	Communicate they are doing well, keep it up	Bill, phone app or web portal. Possibly publishing messaging in industry publications.	Maintain your good practices	Industry professionals who are doing well.
40 to 55 GCD	Get a UHET	Email, text, direct mail	UHET rebate	Neighbors like you who changed fixtures
> 55 GCD	Check for Leaks	Letter, direct outreach, self-identify	Provide dye tabs and resources for third party leak detection	Call Center staff, Property Managers at other facilities
	If toilets are above 1.6 gpf get a UHET	Time of audit	UHET rebate	Field staff

MULTIFAMILY RESIDENTIAL OUTDOOR



Multifamily residential (MFR) customers make up the second largest use of Denver Water's customer accounts after single-family residential customers and outdoor use is approximately 4% of system wide use. MFR properties have multiple units on a single meter and in many cases multiple meters at a single property. Multifamily includes duplexes, row houses and apartment and condominium complexes.

The majority of MFR properties do not have dedicated meters for irrigation and those that do still pull some irrigation use from non-irrigation taps. Therefore, determining outdoor use is a function of subtracting average winter consumption from total consumption measured from April through November. One of the most significant challenges of communicating efficiency to multifamily customers is that property managers, owners, tenants and other decision makers often have varying access to water bills and communication from Denver Water. Communicating efficiency to the right person is challenging.

Water efficiency benchmark

The benchmark for outdoor use is 12 GPSF of pervious area annually. Out of the 12,245 properties, 60 percent are at or below and 40 percent are above this benchmark. The median use is 20 GPSF annually. Included in the efficient cluster is a significant number of properties that do not appear to irrigate at all. The most inefficient irrigators skew the results significantly due to extreme over irrigation on small irrigable areas.

GPSF Efficiency Range	Number of Properties	% of Total
<5	3,823	31%
5-12	3,549	29%
12-18	1,944	16%
18-30	1,651	13%
>30	1,276	10%

20 GPSF median

Methodology for benchmark

Since the GPSF measurement does not account for actual landscape types, the following averages are used in the calculation, this is not intended to be a turf-only benchmark:

*18% of pervious area – no irrigation (sidewalks, rock, mulch etc.)

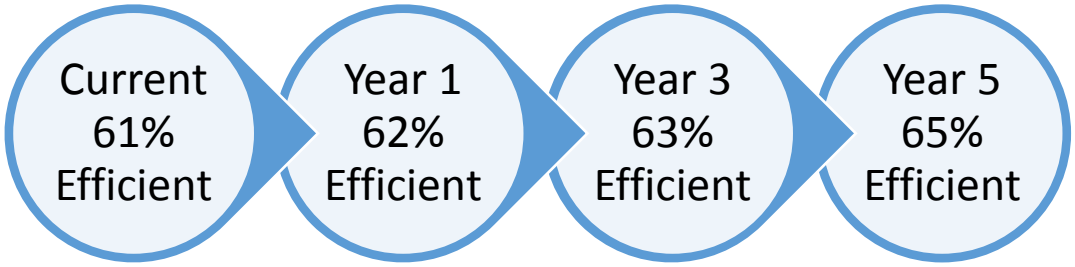
*29% of pervious area – alternative landscape types (xeriscape, native, low-use) – 9 GPSF

*53% of pervious area – bluegrass turf – 18 GPSF

**Based on a random sample of 425 single-family homes in 2015. We believe this is still a reasonable comparison for multifamily as an average and a way to prioritize the highest users.*

Desired progression toward benchmark

The five-year goal to move the ratio of efficient to non-efficient customers is 4 percent, resulting in a ratio of 61 percent efficient to 65 percent inefficient by 2022. Monitoring and evaluation will be done monthly for tactics. For larger properties that meet voluntary water budget reporting requirements, staff will add as many properties as possible. At the end of the year, we will measure the number of customers who irrigated efficiently and compare to our starting point of 60 percent. Expected outcomes for progression are as follows:



Water Efficiency Plan expectations

Selected Tactics

The prioritization method of selecting the most effective tactics that demonstrate measurable customer movement to efficient use. Since Multifamily outdoor only makes up 4% of total water use many of the tactics to move customers to efficient use have been deselected, so that time and resource can be better spent with customer groups with higher potential savings.

Informational Water Budget - Communicate Efficient Use**:** Provide customers with ½ acre or more of irrigable space an informational water budget that conveys what efficient use should be when considering indoor, outdoor, and cooling tower usage for a property. The water budget reports will be updated as better landscape classification GIS layers become available. This program will also target specific programs and messages to inefficient customer on ways they can become more efficient.

Five Year Outlook

- Water Savings 130 AF
- Cost Per Acre Foot $ 580

Outdoor Rebates – Rebates for efficient irrigation products: Continue the incentives for ET Irrigation Controllers and High Efficiency rotary nozzles.

Five Year Outlook

- Water Savings 35 AF
- Cost Per Acre Foot $1,200*

*By making modifications to the marketing and outreach efforts to focus on inefficient customers the effective cost per acre-feet can be reduced to $800. This will need to be evaluated for return on invested staff time and resources.

SDC Efficiency Credit - Increase Efficient Development – New construction in an opportunity to build sites that are water efficient from conception. This program pushes engineers and designers to install the highest efficiency fixtures, landscape designs and irrigation technology.

Five Year Outlook

- Water Savings 98 AF
- Cost Per Acre Foot $1,400

Selected Tactics Work Plan

Priority	*Opportunity*	**Tactic**	**2018**	**2020**	**2022**
Foundational	*Communicate efficient use*	Water budget reporting	Continue to grow participation. Research needs for increasing capabilities to add landscape typography	New water budget participants receive new format. 25% existing have been updated/converted to new reporting	100% converted to new format. Proactive outreach to inefficient customers similar to SFR outdoor.
Accelerate Change	Increase efficient products	Rebates for efficient irrigation products	Continue incentives for efficient irrigation products	Evaluate program and make recommendation	Increase education of what efficient outdoor irrigation looks like when customers receive
	Increase efficient development	SDC efficiency credit	Continue pilot	Evaluate and make recommendations	Evaluate, keep, modify or discontinue

Targeting Outreach for Multifamily Residential Outdoor Tactics

To increase participation of inefficient customers while recognizing and encouraging efficient customers, we need to connect the right customer to the best tactic. The table below shows customer segmentation based on how close they are to the established efficiency benchmark with a targeted message and delivery method pointing them toward a selected action

Multifamily customers (owners, residents and property managers) have historically utilized Denver Water programs at a much lower rate compared to single family homes. Conservation has begun the process to identify and benchmark customers that will provide us with data to better understand different segments of this population. We need to identify barriers to participation such as differences between rental properties and owned residences. We will draw upon the success and methodology of the WaterSense Challenge tactic to implement it to the population as a whole. It is also important to note there may be significant movement in this group if we are able to gather better occupancy data.

Example of benchmark used for targeted Multi Family Outdoor

Efficiency Level	**Key Message**	**Delivery Method**	**Action**	**Influencer group**
All	Sign up for the customer contact thru portal, app or email	News, Social Media, Email, Call Center, Bill	Sign up and get customer input of % irrigated	Customers receiving information
0-4.9 gpsf	Extremely low do you have a landscape, if so great job	Bill, phone app or web portal	Maintain if they have a landscape	Customer with great xeriscape consistently under 5 gpsf
5-11.9 gpsf	Keep on keeping on	Bill, phone app or web portal	Maintain efficiency level	Customer that pays attention to the weather and manage accordingly
12-17.9 gpsf	Close - Irrigation Efficiency Rebates, Garden in a box	Email, text, direct mail	Clock management, ET irrigation clock and rotary nozzle rebate, garden in a box	Story on inefficient customer that had irrigation clock running each zone twice
>18-30 gpsf	Check for leaks	Targeted email, letter, or self identify	Check clock run times, self audit irrigation system	Story of customer that identified irrigation leaks and fixed themselves

PUBLIC SPACES OUTDOOR

Public spaces include parks, schools, universities, civic buildings, open spaces, medians, greenbelts, the Denver Zoo, Denver Botanic Gardens and government-owned properties open and accessible to the public. They also include privately-owned sites that act as public spaces, such as land owned by a local church and used for public events and sports.

Public spaces represent approximately 9 percent of overall water demand, of which 75 percent is used primarily for irrigation and the other 25 percent is used indoors. Currently public spaces use on average 13 gallons per square foot outdoors annually. Because of their visibility, they have the potential to be models of efficient water use. Indoor water use for public spaces, for example water used inside a school, will follow the Commercial, industrial and institutional (CII) methodology.

Water efficiency benchmark

Maintaining beautiful, functional and livable public spaces for the community to use and enjoy requires water. By matching land use typology to water use and irrigating efficiently, these sites become highly livable models and reflect the value of water in the semi-arid west. Land use typology means how the area is used. Examples of land use typologies are athletic turf fields, general recreation areas and community gardens.

Methodology for benchmark

For public spaces, the benchmark calls for a customized site-by-site water use target based on landscape use typology. For example athletic fields may have a water use goal of 22 GPSF and community gardens 9 GPSF. By aggregating the areas and associated water use a site water budget can be calculated. For owners of multiple sites, Denver Public Schools for example, an aggregate water use budget for all sites can be developed. This approach is referred to as a “water bucket approach” and allows water mangers the ability to move water from one site to another without exceeding the overall water use target.

Example Water Use Target for School Site

Key	Landscape Use	Current Landscape Type	Area (sqft)	Target Gallons/Sqft*	Target Gallons*	Recommendation
	Athletic	Turf grass	66,173	22	1,455,806	Maintain
	Recreational	Turf grass	30,481	18	548,658	Maintain
	Garden	Community Garden	2,769	9	24,921	Maintain
	Aesthetic	Turf grass	72,195	9	649,755	Convert Turfgrass to Community Garden or Native Grass
	TOTAL		171,619	15.6	2,679,139	

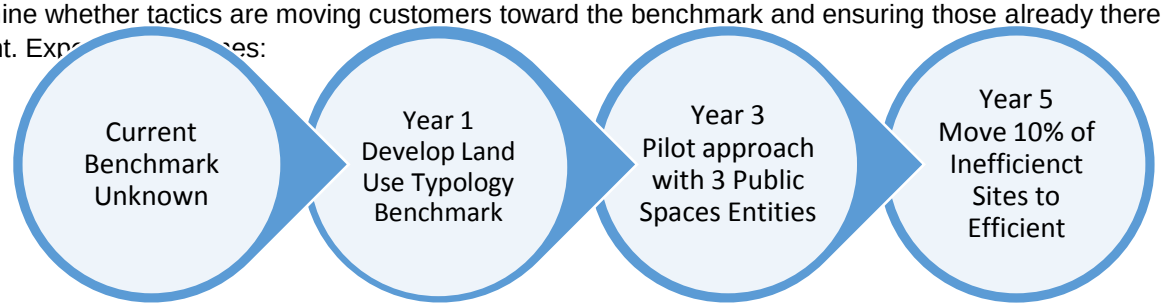
*Target Gallons/sqft and Target Gallons are goals based on the Landscape Use not the current landscape

If then the weather factor was 1.17 as it was in 2016, the water use target for irrigating this site would be calculated by multiplying the total target by the weather factor.

*In 2016, the target for this site would have been 2,679,139 gallons * 1.17 = 3,134,593 gallons.*

Desired progress toward benchmark

The Water Efficiency Plan has one-, three- and five-year goals. Monitoring and evaluation will be done annually to determine whether tactics are moving customers toward the benchmark and ensuring those already there remain efficient. Exp...es:



Water Efficiency Plan expectations

Develop Public Space Benchmark

Move 160 customers to efficient water use

700 AF of water savings achieved

Selected Tactics

The prioritization method of selecting the most effective tactics that demonstrate measureable customer movement to efficient use and attain acre feet savings from each priority level shows four clear priorities.

Informational Water Budgets – A stakeholder group will be engaged to provide recommendations on a list of landscape use typologies and their associated gallons per square foot target, e.g. athletic fields (22 GPSF or aesthetic areas (GPSF). Leveraging this data individual site water use targets will be developed and reports communicating the consumption of water at this site compared with the target.

Five year outlook

- Water savings 380 AF
- Cost per acre feet $580

Water Budget Based Rates – Rates have proven to be a useful tool to reduce water use. Connecting irrigable area to tiered rates provides a new level of credibility and feedback to customers on their water use compared with the expected irrigation need. These price signals should motivate organizations to implement their own solutions to sites exceeding the water budget.

Five year outlook

- Water savings 100 AF
- Cost per acre feet $1,600

SDC Efficiency Credit – New construction in an opportunity to build sites that are water efficient from conception. This program pushes engineers and designers to install the highest efficiency fixtures, landscape designs and irrigation technology.

Five year outlook

- Water savings 152 AF
- Cost per acre feet $1,400

Denver Parks IGA – Central Control systems are invaluable tools to proactive water managers. Central Control and AMI systems help with leak identification and help adjust irrigation applied based on weather conditions.

Five year outlook

- Water savings 42 AF
- Cost per acre feet $8,900

Selected Tactics Work Plan

Priority	*Opportunity*	**Tactic**	**2018**	**2020**	**2022**
Foundational	*Communicate efficient use*	**Water Efficiency Reports**	Develop the landscape use typologies and water use targets	Complete pilot with 3 public space organizations	Evaluate, keep, modify or discontinue
		Water Budget Based Rates	Develop Scope and outreach	Implement and evaluate	
Accelerate Change	*Increase efficient products*	**SDC Efficiency Credit**	Continue current pilot	Evaluate, keep, modify or discontinue	
		Denver Parks IGA	Complete CC and AMI rebates for Denver Parks	Seek new opportunities	Evaluate, keep, modify or discontinue

Targeting Outreach for Public Space Tactics

To increase participation of inefficient customers while recognizing and encouraging efficient customers, we need to connect the right customer to the best tactic. The table below shows customer segmentation based on how close they are to the established efficiency benchmark with a targeted message and delivery method pointing them toward a selected action.

Example of market segmentation to target outreach for Public Space customers

Efficiency level	**Key message**	**Delivery method**	**Key action**	**Influencer group**
All	Provide customized site efficiency report	Email, direct interaction	Utilize the data and communicate to necessary staff, Water Budget rates	Parks and Schools using best technology
<Site GPSF Target	Doing well, keep it up	Email, direct interaction	Maintain	Water Manager using tracking system
>Site GPSF Target - Landscape matches use typology	Irrigation system issues may exist	Email, direct interaction	Adjust Irrigation settings/fix leaks, CC/AMI	Water Managers improving system
>Site GPSF Target - Landscape does not match use typology	Landscape change needed	Email, direct interaction	Convert areas of landscape	Leaders in landscape conversion

COMMERCIAL, INDUSTRIAL AND INSTITUTIONAL

Commercial, industrial and institutional (CII) customers use a sizable portion of water in a wide variety of ways. Overall, CII customers make up approximately 24 percent of total use. A common practice among water utilities is to lump CII customers into a single rate classification which is the case at Denver Water. Over the past two years Conservation has made huge strides in identifying and classifying CII customers into categories suitable to create benchmarks and measure water use efficiency. The Multi-Family and Public Space sections in this plan were made possible through this effort. Based on recommendations from AWWA, and staff knowledge, we have created a list of expected sectors and are working to classify the remaining CII customers into these categories.

Water efficiency benchmark

In order to create an efficiency benchmark, we must be able to analyze water use against available property characteristics. For example, water usage per building square foot may work well for office buildings, whereas water usage per hotel room will work better for hotels. Benchmarks will be completed after customers in a given sector and identified and recorded in our billing system.

Methodology for benchmark

If a proposed CII sector accounts for one percent of nonresidential water use it will be noted as a valid sector and be documented in our billing system with the necessary property characteristics. Each sector will have different benchmarks and associated tactics and programs that are used to move the customer group toward water use efficiency. Many sectors will require engagement with the specific industry to determine the best methodology.

	CII Sub-sector	**Research and identify sub-sector**	**Update Denver Water information systems**	**Engage with industry to set benchmarks**	**Create sub-sector specific work plan**
Benchmarking	*Hospitality/Hotel*	Complete	In Progress	Year 3	Year 3
	Food and Beverage Production	Complete	In Progress	Year 3	Year 3
	Office	In Progress	In Progress	Year 1	Year 3
	Community Association	In Progress	Year 1	Year 3	Year 3
	Service Stations / Auto	Complete	Year 3	Year 3	Year 3
	Restaurants	In Progress	Year 3	Year 3	Year 3
	Retail	Not Started	Year 3	Year 5	Year 5
	Health Care	Not Started	Year 1	Year 3	Year 3
	Grocery	Not Started	Year 3	Year 5	
	Industrial Production	Not Started	Year 3	Year 5	Year 5
	Warehouse	Not Started	Year 5		
	Church/ House of Worship	Not Started	Year 3	Year 5	Year 5
	Mixed Use	Not Started	Year 5		
	Entertainment Venues	Not Started	Year 5		-

Desired progression toward benchmark

The progression towards the benchmark listed in this plan is based on our current knowledge of CII sectors and available tactics. As more sectors are completed and engaged, we will use existing tactics or develop new ones when necessary. For all sectors, communicating efficient use through the bill or other communication methods will be foundational.

Water Efficiency Plan expectations

Benchmark CII sub-sector greater than 1% of non residental water use

260 AF of water savings achieved

Selected Tactics

The prioritization method of selecting the most effective tactics that demonstrate measureable customer movement to efficient use and attain acre feet savings from each priority level shows four clear priorities.

Communicate Efficient Use - In order to communicate efficient, use we must compile the necessary data for each CII customer and classify them into appropriate groups. Once this is complete, we can create benchmarks and determine the best delivery method for each group.

Five year outlook

- Classify and benchmark all CII customers within 5 years. The communication of efficiency will depend on staff time available to work with individual CII groups as benchmarks are completed.

Increase Efficient Products – Denver Water offers a variety of rebates for water efficient commercial/industrial equipment. While savings can be significant, the number of potential customers is much smaller than the pool of residential customers. Due to the lower participation numbers for these rebates, the cost and savings have been combined into one measure. We are unable to calculate efficiency numbers because classifying and benchmarking are not complete.

Five year outlook

- Water savings 105 AF
- Cost per acre feet $2,200

Water Budget Based Rates for Irrigation – Budget based rates will primarily affect customer groups where dedicated irrigation meters are found such as community associations and to a lesser extent houses of worship and hotels. There are approximately 425 sites with 2,500 meters that are dedicated for irrigation use. Of these sites, 166 are inefficient.

Five year outlook

- Water savings 155 AF
- Cost per acre feet $1,600

Selected Tactics Work Plan

	Opportunity	**Tactic**	**2018**	**2020**	**2022**
Foundational	*Communicate Efficient Use*	Provide timely and specific water use feedback	Collect necessary data to communicate efficient use to CII customers		
	Customer specific education	High Bill / Irrigation Audits	Continue for customers upon request, approximately 100 per year. Include field verification of landscape typology.		
Accelerate Change	*Increase efficient products*	Irrigation equipment rebates	Continue incentive for high efficiency rotary nozzles, ET controllers, UHET, HEU, Flushometer, Sub Meters, Warewash and Commercial HE Laundry. Approximately 2,000 per year.		
Transform	*Price signal for excessive use*	Water Budget Rates for Irrigation	Create water budget based rate for large Irrigation Customers		

Targeting Outreach for Commercial, Industrial and Institutional Tactics

To increase participation of inefficient customers while recognizing and encouraging efficient customers, we need to connect the right customer to the best tactic. This starts by understanding the customer and setting benchmarks through customer engagement. While we lack this today with CII Denver Water can continue to market efficiency programs albeit in a less targeted manner. The table below shows customer segmentation based on use with a targeted message and delivery method pointing them toward a selected action.

Example of market segmentation to target outreach to CII customers:

Efficiency level	**Key message**	**Delivery method**	**Action**	**Influencer group**
All	Price signal for excessive outdoor use	Bill	Monitor outdoor water use	Highlight $ savings from efficient outdoor water use
Indoor CII	Upgrade Fixtures	Bill, Web Portal, Industry Advertisements	Install efficient equipment	Hotel installs efficient laundry
Inefficient Outdoor CII	Reduce outdoor use to efficient level	Email, direct mail	Install efficient equipment	Highlight successful irrigation retrofit
Efficient Outdoor CII	Keep it up	Email, direct mail	Monitor water use	Highlight efficient CII customers

DENVER WATER PRACTICES

Many of the opportunities and tactics implemented in this plan will have complementary work done within Denver Water on our own water use practices and policies. Denver Water can lead the way for customers by breaking down barriers and learning by doing. These practices do not have a defined benchmark or significant water savings like others, but will lead to long-term results.

Water efficiency practices and policies

Metering technology continues to evolve, and we can use best technology and practices in the following three areas:

- Meter individual owner-occupied multifamily units to provide tenants their own water bills.
- Consider implementation of Advanced Metering Infrastructure (AMI) to all customer types, AMI has the potential to transform how Denver Water communicates efficient use to customers with feedback in near real time.
- Meter all Denver Water facilities, record meter reads into customer billing system, and report our own water use efficiency.

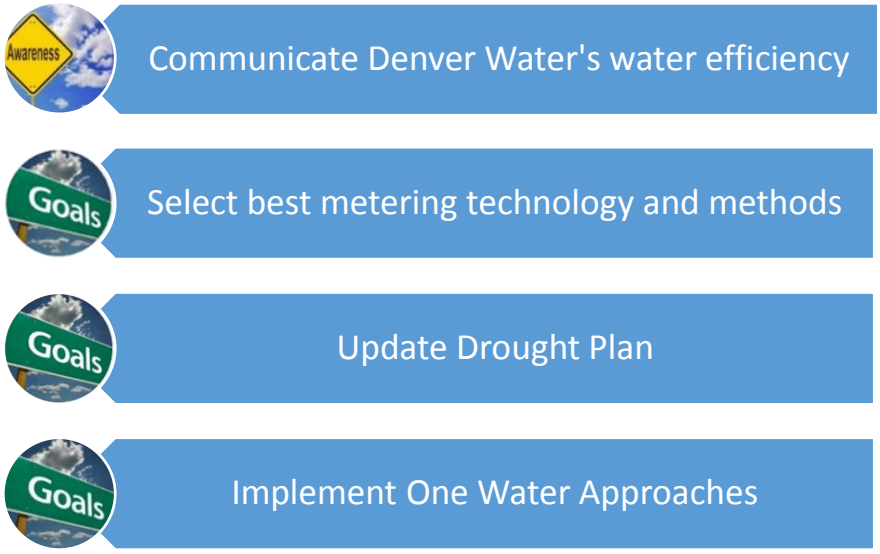
Updates to the existing Drought Response Plan occur annually. We have the ability to link changes in water efficiency to drought response through:

- Changes in water use that affect reduction capabilities.
- Adding variances for efficient public spaces.
- Realizing opportunities for additional emergency reductions from indoor use.
- Consideration of appropriate drought surcharges for customers that significantly above efficiency benchmark.

Moving toward One Water approaches by:

- Working with cities and the state on graywater policies allowing customers to install systems.
- Using all means to incorporate rain water, graywater, stormwater and black water use on Denver Water's Operations Complex Redevelopment (OCR) and considering these uses for other future facilities.

Desired progression toward goal



APPENDICES

APPENDIX A – Water Efficiency Working Group Recommendations

Water Efficiency Work Group Final Recommendation Report
May 10, 2017

I. Introduction

Denver Water formally convened the Water Efficiency Working Group (WEWG or the Work Group) on May 25, 2016. The purpose of the WEWG is to bring recommendations to the Denver Water Board of Commissioners on how to define efficient use, identify benchmarks, and create tactics to improve consumer water efficiency.

The WEWG was informed of the 2007 Tap-Smart Plan and its evolution through 2016 culminating in the successful 22 percent reduction in water use below the pre-2002 drought baseline. The Work Group discussed and was presented with research that included:

- Current customer water demand patterns and behaviors over the last 10 years;
- Different models of efficiency frameworks including percentage reductions, benchmarking and product scoring systems
- Specific tactics and methods of achieving efficiency for different customer types and water uses;
- An overview of Denver Water's marketing efforts; and
- How Denver Water's rate structure impacts water consumption.

The WEWG represents a broad constituency of Denver Water service levels, customers and stakeholders including school districts, environmental and west slope interests, homebuilders, commercial building owners, large irrigators, school districts, the City and County of Denver, suburban cities, Denver Water's distributor customers and residents.

Drew Beckwith
Environmental Interest
Western Resource Advocates

Hunter Causey
West Slope and Citizens Advisory Committee
Colorado River District

Tom Cech
University/Research
One World One Water – Metropolitan State University of Denver

Kristen Fefes
Landscape Industry
Associated Landscape Contractors of Colorado

Jonathan Wachtel
Planning and Sustainability
City of Lakewood

Laurel Mattrey
Large Irrigator
Denver Public Schools

Sonrisa Lucero
Denver Mayor Hancock's Office of Sustainability
City and County of Denver

Jeannie Renne-Malone
Commercial
ProLogis

Amanda Schoultz
Denver City Council/Resident
Aide to Denver City Councilman Chris Herndon

Amber Valdez
Diverse Communities
Valdez Public Affairs

Alyssa Quinn
Distributor
Platte Canyon Water and Sanitation

II. WEWG Recommendations Summary

The WEWG Water Efficiency Plan recommendations for consideration by the Board of Water Commissioners are summarized below.

1. Denver Water should transition from a conservation-based percent reduction plan to a water efficiency plan based on benchmarks for each customer type and water use.

2. The water efficiency benchmark for Single Family Residential Indoor customer use should be 40 gallons per capita day (GCD).

3. The water efficiency benchmark for Single Family Residential Outdoor customer use should be 12 gallons per square foot (GPSF) of pervious area based on typical landscape make up of 18% non-irrigated; 29% alternative landscaping and 53% bluegrass turf.

4. The water efficiency benchmark for Multi-Family Residential Indoor customer use should be 40 gallons per capita day (GCD).

5. The water efficiency benchmark for Multi-Family Residential Outdoor customer use should be 12 gallons per square foot (GPSF) of pervious area based on typical mix of landscape that includes non-irrigated, alternative and bluegrass turf.

6. The water efficiency benchmark for Public Spaces Outdoor customer use should be individualized by typology and use.

7. The water efficiency benchmark for Commercial, Industrial and Institutional customer use should be based on individual water use type and CII sub-sector.

III. WEWG Activities

The WEWG met on nine separate occasions to discuss and consider the items in Table 1. For each meeting, Denver Water staff prepared and presented a variety of information. At each meeting, the working group learned a different customer type and water use including the current state of water use, best practices, Denver Water's current programs and successes and lessons learned. Working Group members discussed and recommended an initial benchmark and tactics at the beginning of the next meeting after having a chance to consult others in their field. Heather Bergman of Peak Facilitation Group served as the meeting facilitator throughout the WEWG process. Denver Water staff also offered make-up sessions to accommodate Work Group members who were unable to attend the scheduled meetings and ensured informed recommendations.

Table 1 WEWG Meetings and Agenda		
MEETING	DATE	AGENDA
1	May 25, 2016	Introduction
2	July 21, 2016	Single Family Outdoor
3	Aug. 18, 2016	Single Family Indoor
4	Sept. 15, 2016	Multi-Family Indoor and Outdoor
5	Oct. 20, 2016	Public Spaces (Parks and Schools)
6	Nov. 17, 2016	Commercial Indoor and Outdoor
7	Dec. 15, 2016	Denver Water Properties and Practices
8	Jan. 19, 2017	Review recommendations and provide feedback
9	Feb. 16,2017	Special Topics: Low Income, Denver Water Properties

IV. WEWG Water Efficiency Plan Benchmark and Tactic Objectives

During their meetings, the WEWG participated in a discussion to determine the benchmark and tactic objectives important in the consideration of Water Efficiency Plan design. The following objectives became key drivers for choosing an approach:

- The ability to communicate specific and meaningful feedback about water use to customers;
- Proven success in moving customers toward efficient use and maintaining efficiency once achieved;
- Adaptable to both non-drought and drought conditions;
- Avoids unintended consequences to livability;
- Applicable to customer types and water uses;
- Measurable outcomes, not just the actions;
- Adaptable to a One Water future; and
- Cost and resource effective for Denver Water and its customers.

Use of these objectives was a key component in evaluating alternative benchmarks and tactics. Sometimes certain objectives became more important than others, but it should be noted that all objectives were considered and were instrumental in the WEWG's evaluation—no objective was ignored.

V. WEWG Recommendations on Transitioning from a Conservation Based Percent Reduction Plan to a Water Efficiency Plan Based on Benchmarks

The Work Group reviewed several methods including percent reductions, benchmarking and product scoring systems and selected benchmarking as the best alternative. Benchmarking for efficiency is an innovative approach for water utilities, but has been used for years by other resource management industries that recognize the need to measure to an expected use. A benchmarking approach provides the ability to segment and market educational and incentive programs to customers based on individual water use and property features. Benchmarking involves comparing customers to their peers in the same way that customers see themselves, and prioritizes services to those with more need while creating efficiencies by reducing staff time and costs while accomplishing the goal.

The end goal of this approach is a resilient water system that can withstand impacts of a warming climate, drought and economic variability through nimble, low or no regrets strategies. Connecting customers to their water use in a meaningful way includes them as part of the water system and ultimately provides value to the system allowing them to act as an asset during normal operation and emergencies alike.

The benchmarks as defined are voluntary customer water use goals and can be achieved while maintaining a highly livable urban environment.

VI. The water efficiency benchmark for Single Family Residential Indoor customer use should be 40 gallons per capita day (GCD).

Denver Water's current average SFR Indoor water use is 50 GCD. The WEWG reviewed a broad range of research on water consumption behavior and available technology, and gained an understanding of natural replacement of inefficient fixtures and appliances and new development that is already efficient. The WEWG determined that 40 GCD was an appropriate water efficiency benchmark. This provides enough for sanitation and consumption purposes while maintaining livability and an efficient water use per person. Indeed more than half of households in Denver Water have achieved this goal already.

Tactics to Continue	New Tactics
High bill water audits	Provide timely and specific water use feedback
Low Income Retrofits	Efficiency touch point in new customer kit
Rebates for most efficient indoor fixture technology	High bill indoor follow-up outreach
	Proactive outreach for inefficient indoor use
	Efficiency touch point in new customer kit
	High bill indoor follow-up outreach
	SDC credit for single-family development
	Implement public-facing calculator for indoor fixture retrofits on website
	Community Based Social Marketing Approach to change behavior

VII. The water efficiency benchmark for Single Family Residential Outdoor customer use should be 12 gallons per square foot (GPSF) of pervious area based on typical landscape made up of 18% non-irrigated; 29% alternative landscaping and 53% bluegrass turf.

The WEWG spent the majority of its time discussing outdoor water use efficiency benchmarking and through consensus determined that 12 gallons per square foot (GSPF) is an appropriate benchmark. Denver Water presented its data on how much water customers currently use per square foot and the average customer already uses 12 GPSF. It should be noted that there was strong debate in the Work Group about whether a range was appropriate, and whether the 12 GPSF was enough to maintain healthy turf grass.

In the end, the Work Group established that this voluntary benchmark was appropriate for landscapes that include a variety of both non-irrigated, alternative landscape types (such as xeriscape or native), and bluegrass turf. It was also established that this benchmark requires attention to landscape health and aesthetic value.

Tactics to Continue	New Tactics
Seasonal Water Saver program	Provide timely and custom water use feedback
High bill irrigation audit	Efficiency touch point in new customer kit
Evaluate ET irrigation controller rebate	High bill irrigation follow-up outreach
High-efficiency rotary nozzles	Proactive outreach for inefficient outdoor use
Evaluate potential for new product incentives	Public faming
Garden in A Box program	Graywater systems
	Low-income outdoor program
	Evaluate current City landscape codes and ordinances
	Personalized landscape design sessions
	Landscape change seminars
	Denver Water maintenance landscape replacements
	Partner with UCD, Denver Parks and Forest Service to evaluate tree water use in Denver
	Evaluate risk of rebounds in outdoor water use
	Evaluate tree health at efficient homes
	Research potential implications on heat island effect

VIII. The water efficiency benchmark for Multi-Family Residential Indoor customer use should be 40 gallons per capita day (GCD).

Multi-family residential consumers are a large and growing demand for Denver Water, unlike single family residential customers, multi-family properties have multiple units with a single meter so water use is difficult to calculate on a per household basis. That said, indoor water use by this consumer type does not differ from single family customers much. Water is used for the same sanitation and consumption activities. Thus, the WEWG felt that a water efficiency benchmark of 40 GCD was appropriate.

Tactics to Continue	New Tactics
Improve mass multifamily communication methodology	Graywater/ reuse opportunities
Indoor water audits and efficiency consultations	Assess state of new development
Rebates for WaterSense fixtures	Define multifamily subgroups
Low Income retrofits	Research metering opportunities
Build relationships with industry	Recommend policies that progress efficiency goal
Build relationships with the municipalities and distributors	
Develop one-to-one metering for dense development	

X. The water efficiency benchmark for Multi-Family Residential Outdoor customer use should be 12 gallons per square foot (GPSF) of pervious area based on typical mix of landscape that includes non-irrigated, alternative and bluegrass turf.

As with the Single Family Residential discussion, the WEWG spent considerable time discussing outdoor water use efficiency benchmarking and through consensus they determined that 12 gallons per square foot (GSPF) is an appropriate benchmark. Denver Water presented its data on how much water customers currently use per square foot and the average customer already uses 12 GPSF. It should be noted that there was strong debate in the Work Group about whether a range was appropriate and whether the 12 GPSF was enough to maintain healthy turf grass.

In the end, through consensus the Work Group established that this voluntary benchmark was based on the principle that landscapes are not generally 100 percent turf area and that Multi-Family residential recommendations.

Tactics to Continue	New Tactics
Water budget reporting	Proactive outreach for inefficient outdoor use
Technical support for organizations	Efficiency touch point in new customer kit
Evaluate ET irrigation controller rebate	High bill irrigation follow-up outreach
High efficiency rotary nozzles	Targeted and high bill irrigation audit/consultations
Research possible new rebates	Evaluate risk of rebounds in outdoor water use
SDC efficiency credit	Further classification of customer type
Develop further understanding of customer	

XI. The water efficiency benchmark for Public Spaces Outdoor customer use should be individualized by typology and use.

The WEWG discussed that the majority of public spaces used for parks and schools in Denver Water's service areas were already water efficient. Indeed, these sites were some of the first to convert to a water efficiency ethic, motivated by both being a living efficiency example in the community and by lower water costs. These sites also vary extensively by typology and by use. Native areas near a walking path don't need to be irrigated after establishment while a bluegrass turf soccer field requires higher levels irrigation to ensure a safe playing surface. Thus, the WEWG determined that each public space will receive its own specific water efficiency benchmark. The small number of public space sites and Denver Water's extensive history of working with the professional managers managing these sites allows work at this individualized level.

Tactics to Continue	New Tactics
Water efficiency reports	Public faming
SDC efficiency credit	Awards/recognition
Promote existing rebates	Explore cap and trade system
Annual public space meeting	Identify/develop funding sources for public spaces
Technical support for public space organizations	Engage with key stakeholders (i.e. CASDEM, arborists, designers)
	Evaluate tree health, recycled water, synthetic turf grass, stormwater
	Variance program (private public spaces)

XII. The water efficiency benchmark for Commercial, Industrial and Institutional customer use should be based on individual water use type and CII sub-sector.

Commercial, Industrial and Institutional customers are highly individualized, yet there is the ability to segment this customer type into sub-sectors and benchmark them against others within the subsector. The WEWG discussed the water use intensity of each customer to compare to their peers within the sub-sector. The WEWG believes that this customer type should be the focus of significant research to better understand these customers, form new partnerships and lead the water industry in how Denver Water defines CII water efficiency. At this time, the WEWG recommends that Denver Water work individually with CII customers to determine water efficiency benchmarks.

Tactics to Continue	New Tactics
High Bill / Irrigation Audits	Improve efficiency benchmark to define associated water use goals
Irrigation equipment rebates	
Indoor fixture rebates	

XI. Other Considerations

In addition to the recommendations on water efficiency benchmarking and tactics, the WEWG would like the Board to be aware of the other considerations that the WEWG discussed. The Working Group also sees value in continuing work on;

Alternative sources - The recommendations we sees value in continuing work on;enchmarking and tactics, the WEWG wer Water. Other sources of water including, but not limited to storm water, rain water and graywater should be considered in further plans as reliance on these sources of water continue to grow.
Collaborating on Policies - Denver Water should strongly consider drafting policies in coordination with municipalities, that would allow water efficient polices to be put in place to affect water use.
Communicating to Customers -The development of these metrics and efficiency benchmarks are relatively technical. It is essential to communicate this information in a way that is discernable and inspiring to the community. Connecting the positive outcomes of water use, including livability, is essential.
Motivation for Efficient Water Use -It is essential for Denver Water to understand why customers may be motivated to use water efficiently. By disaggregating the community, Denver Water may find that customers may be motivated by environmental benefits, reduced bills, social norms, etc. A connection to efficient use of water and the benefits should be built and communicated to customers.
Connecting Water Efficiency to the Denver Water System -The WEP and Integrated Resource Plan are being developed concurrently. Currently the thought is that the more water we can conserve, the longer we can push out large capital projects and water rights acquisitions. This connection needs to be made stronger.

Formal written comments from public review period received through website:

1.

Western Resources Advocates is grateful for the opportunity to provide comments on Denver Water's Water Efficiency Plan. As a participating member of the Water Efficiency Working Group (WEWG), we were very pleased to see the group's recommendations adopted in full. The associated goals and tactics are well thought out, and seem to strike the right balance between being ambitious and achievable. We support the proposed Water Efficiency Plan.

Because water savings in outdoor water use is so important, we support the variety of programs aimed at educating, assisting and providing financial support to improve the efficiency of landscape irrigation. One program not listed was a "cash for grass" type of program that incentivizes the conversion of turf landscapes to lower water using landscapes. These programs can be very effective at saving water, and should be considered. Also, landscaping codes can be one of the most effective ways to control outdoor watering, but was not listed in the Public Space Outdoor program section. This would be a strong addition to the list of programs already planned for this sector.

In addition, we would like to offer the following comments and recommendations related to reuse and graywater. Denver is currently leading the state in terms of advancing graywater, with the City of Denver currently being the only local government in the state to have passed a graywater ordinance which is required by the state as a precursor to graywater use. As such, we are glad to see information on graywater included in the Water Efficiency Plan (WEP).

In addition, Denver Water has long been, and continues to be, a leader in water reuse in Colorado. While the WEP groups "Graywater/reuse" together, the few items listed appear to be focused on graywater rather than reuse. Denver Water's Recycled Water Program staff are working to make important progress on several fronts regarding reuse including involvement in a collaborative project to advance potable reuse regulations, working to expand the uses allowed for non-potable reclaimed water, and outreach and education to increase acceptance of water reuse.

We strongly recommend including input from your Recycled Water Program to get their thoughts on additional tactics to advance reuse that could be included in the WEP as Denver looks to the future. Denver Water has committed to increase its reuse significantly over time so reuse should be recognized in the WEP for the important role it will play in ensuring Denver Water's water supplies are used efficiently and effectively.

2.

There is no reference to the 129 gcd by 2050 goal from Metro Roundtable. I understand that this plan is aimed at moving away from gcd as a benchmark and also has a 5 year horizon, but I do think it could be helpful to see how this plan helps achieve that goal.

3.

Other than a goal of 165 gallons per day per individual, I don't see much meat in this plan. There is a need to differentiate high density apartment consumption from single family residential areas which have gardens, developed landscapes and xeriscape conversions. There could probably be more emphasis and direction for application of improved irrigation techniques. They can link better with the CSU-Stockyards-Water study development partners.

4.

WaterSmart's comments are based on direct experience working with efficiency planning staff at over 60 utilities in 13 states across the country. As a quantitatively oriented, mission-driven organization devoted

to applying behavioral science for sustainable water management, WaterSmart applauds DW for its long-term planning efforts, experimental design approach and commitment to shifting from a conservation orientation to an efficiency orientation. We see the future in your plan. The following comments are intended to support your efforts. The following paragraphs are suggestions to improve the Draft Plan.

• On page 6, the Draft Report states "The majority of Denver Water residents strive to be good stewards of our natural resource, according to our 2016 Marketing Segmentation study." This statement fails to take into account what is known in the field of behavioral science as the 'Say-Do distinction' — that people might say one thing, and be motivated to do another. Research in the field of behavioral science has found that only 1 in 10 people actually change their behavior to save the environment, even though they may say otherwise. Similarly, only 1 in 10 people changes behavior to save money. However, 8 in 10 actually change behavior because of the social cues and social norms of how people around them behave. We agree that communicating more frequently about how a customer's actual usage compares to the benchmark is effective. And, importantly, that benchmark should be set for the number of occupants and irrigated area. Comparisons to households with similar attributes provides credibility in these comparisons.

• The Draft Report does address the frequency of meter readings and communications. Behavioral science research, and WaterSmart's own findings, support the conclusion that more granular and frequent water use data contributes to greater behavioral efficiency improvements. In one randomized control trial in a large California city, households that were fitted with smart meters providing hourly consumption data improved efficiency by 50% more compared to households with meter reads every two months. More frequent data and communications of that data matter. The Draft Report should consider including upgrades to the meter reading system.

• The Draft Report does not address ways to stop or reduce residential leakage. WaterSmart's primary research has found that every single household is likely to experience at least one leakage event every year. Significantly, 1 in 5 homes is likely to have a leak at any given time. The contributions of leaks to water efficiency is large and should be addressed as part of the Foundational communications strategy. WaterSmart utilizes an OmniChannel communications approach that can send personalized leak alerts to any individual customer via text, email, voice or print automatically when a leak is detected. WaterSmart also provides customers with an online leak resolution tool available on mobile devices. Results across 20,000 leak alerts indicate that 55% of households receiving a leak alert solved the leak themselves, and 80% reported their gratitude to the utility for sending those leak alerts.

• "Customer Specific Education" is one of the Foundational actions in the Draft Report. The methods identified in the Draft Report are potentially very costly by relying on technical support and staff trainings, new customer kits, and on-site audits. Today, software can target personalized, timely and relevant messages to specific customers at a small fraction of the cost of face-to-face interactions. We suggest that software be included as a tactic and/or outreach method in the Foundational actions list.

• Draft Report lists the opportunity "Communicate efficient use" using the tactic "Provide timely and specific water use" [Table p. 12]. Outreach of this information does not begin until Year 3 and doesn't scale until Year 5, when a pilot phone app will be evaluated. As a Foundational approach, this appears to be too little too late especially when personalized, scalable approaches have been proven across hundreds of utilities. WaterSmart alone is currently in use by 60 water utilities that includes digital, emailed reports of customized water use as compared to benchmarks that demonstrate 2-5% water efficiency improvements per year (using a randomized control trial methodology). This is a proven, cost effective approach, so it seems that waiting until year 3 to conduct a small trial is too conservative. We would suggest implementing an interactive customer portal in year one and then ramp up participation over the next 5 years with the following schedule: ◦ Year 1: Launch customer portal to enable all customers' access through an opt-in program. Program would include water consumption information and opt-in to leak alerts and high bill alerts. ◦ Year 3: Initiate targeted outbound digital communications with

comparative water use information and water efficiency recommendations to high outdoor water users. ◦ Year 5: Expand targeted outbound communication to continue driving water efficient behaviors to all households and other account types such as commercial, institutional, industrial and irrigation-only customers. Thank you for considering the suggestions that can increase the effectiveness of Denver Water's communications and messaging programs. By including these suggestions, Denver Water will be incorporating modern, proven tools that can increase customer satisfaction and drive more efficient water use behaviors.

APPENDIX B – 2018 Work Plan

2017 Strategy	Expected Participation												
Tactic	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	total
WaterSense Challenge		160			480		480				480		1600
Communicate efficient use SFR indoor and outdoor				100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000
MF Audits	100	200	200								100	300	900
SDC efficiency credit				3			3			5		4	15
Informational Water budget	550	550	550	550	550	550	550	550	550	550	550	550	550
SFR Indoor - UHET rebates	250	500	300	300	250	250	300	200	300	400	500	700	4250
MFR Rebates Indoor - UHETs	10	10	20	20	20	20	20	20	20	20	20	10	210
Water Budget Rates													staff time
High bill water audits	20	30	30	40	50	50	100	150	200	250	50	30	1000
SFR Outdoor Rebates - Nozzles & Controllers	100	100	100	150	150	150	150	200	150	125	200	100	1675
MFR Rebates outdoor - irrigation nozzles and clocks	2	5	5	5	10	10	50	50	10	5	5	5	162
Income Qualified audit and retofits	32	20	20	150	100	50	50	75	75	75	50	50	747
Landscape Change - Garden in a box					500	500							1000
CII Rebates -	10	10	10	20	30	30	30	10	10	20	20	20	220
Denver Parks IGA			1										Payment

2017 Strategy		2018 Budget												
Tactic	Business Unit / Type of expense	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Program
WaterSense Challenge	Materials	$ -	$ 14,720	$ -	$ -	$ 44,160	$ -	$ 44,160	$ -	$ -	$ -	$ 44,160	$ -	$ 147,200
	Services	$ -	$ 12,800	$ -	$ -	$ 38,400	$ -	$ 38,400	$ -	$ -	$ -	$ 38,400	$ -	$ 128,000
Communicate efficient use SFR indoor and outdoor	IT integration	$ -	$ -	$ -	$ 7,000	$ 7,000	$ 7,000	$ 7,000	$ 7,000	$ 7,000	$ 7,000	$ 7,000	$ 7,000	$ 63,000
	Services	$ -		$ 8,500										$ 8,500
	Outside Printing	$ -	$ -	$ -	$ 800	$ 800	$ -	$ 800	$ -	$ -	$ 800	$ -	$ -	$ 3,200
MF Audits	Materials	$ 1,500	$ 3,000	$ 3,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 1,500	$ 4,500	$ 13,500
	Freight		$ 75									$ 75		$ 150
SDC efficiency credit	Services	$ -	$ -	$ -	$ 85	$ -	$ -	$ 85	$ -	$ -	$ 85	$ -	$ 85	$ 340
	Materials	$ -	$ -	$ -	$ 1,000	$ -	$ -	$ 1,000	$ -	$ -	$ 1,000	$ -	$ 1,000	$ 4,000
Informational Water budget	Services		$ 2,000	$ 10,000	$ 5,000	$ 5,000	$ 5,000	$ 5,000	$ 5,000	$ 5,000	$ 5,000	$ 5,000	$ 5,000	$ 57,000
SFR Indoor - UHET rebates	Reimbursement	$ 37,500	$ 75,000	$ 45,000	$ 45,000	$ 37,500	$ 37,500	$ 45,000	$ 30,000	$ 45,000	$ 60,000	$ 75,000	$ 105,000	$ 637,500
MFR Rebates Indoor - UHETs	Reimbursement	$ 1,500	$ 1,500	$ 3,000	$ 3,000	$ 3,000	$ 3,000	$ 3,000	$ 3,000	$ 3,000	$ 3,000	$ 3,000	$ 1,500	$ 31,500
Water Budget Rates	Staff time only	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
High bill water audits	Materials	$ 360	$ 540	$ 540	$ 720	$ 900	$ 900	$ 1,800	$ 2,700	$ 3,600	$ 4,500	$ 900	$ 540	$ 18,000
	Freight				$ 50			$ 50						$ 100
SFR Outdoor Rebates - Nozzles & Controllers	Reimbursement	$ 15,000	$ 15,000	$ 15,000	$ 22,500	$ 22,500	$ 22,500	$ 22,500	$ 30,000	$ 22,500	$ 18,750	$ 30,000	$ 15,000	$ 251,250
MFR Rebates outdoor - irrigation nozzles and clocks	Reimbursement	$ 100	$ 250	$ 250	$ 250	$ 500	$ 500	$ 2,500	$ 2,500	$ 500	$ 250	$ 250	$ 250	$ 8,100
Income Qualified audit and retofits	Materials	$ 3,776	$ 2,360	$ 2,360	$ 17,700	$ 11,800	$ 5,900	$ 5,900	$ 8,850	$ 8,850	$ 8,850	$ 5,900	$ 5,900	$ 88,146
	Services	$ 6,624	$ 4,140	$ 4,140	$ 31,050	$ 20,700	$ 10,350	$ 10,350	$ 15,525	$ 15,525	$ 15,525	$ 10,350	$ 10,350	$ 154,629
Landscape Change - Garden in a box	Services (gardens)	$ -	$ -	$ -	$ -	$ 12,500	$ 12,500	$ -	$ -	$ -	$ -	$ -	$ -	$ 25,000
	Services				$ 31,000									$ 31,000
CII Rebates	Reimbursement	$ 1,800	$ 1,800	$ 1,800	$ 3,600	$ 5,400	$ 5,400	$ 5,400	$ 1,800	$ 1,800	$ 3,600	$ 3,600	$ 3,600	$ 39,600
Denver Parks IGA	Reimbursement	$ -		$ 368,000										$ 368,000
														$ 2,077,715

APPENDIX C – Barriers and Benefits

Social Science Approach and Community Based Social Marketing (CBSM)

Social Sciences is broadly defined as the scientific study of human society and social relationships. This field of study has a beneficial connection to the mission of Denver Water and can aid Denver Water in the development of programs. Community-based social marketing (CBSM) is a very specific approach that utilizes Social Sciences research and techniques to promote behavior changes. Denver Water will utilize this research and approach to bring on new programs designed to promote the efficient use of water throughout our community.

Community-based social marketing is an attractive alternative to information-intensive campaigns. In contrast to conventional approaches, community-based social marketing has been shown to be very effective at bringing about behavior change. Its effectiveness is due to its pragmatic approach. This approach involves: carefully selecting the behavior to be promoted; identifying the barriers and benefits associated with the selected behavior; designing a strategy that utilizes behavior-change tools to address these barriers and benefits; piloting the strategy with a small segment of a community; and, finally; evaluating the impact of the program once it has been implemented broadly.

PILOTING

Frequently programs are not pilot-tested prior to being implemented broadly. Without conducting a pilot we cannot be confident that the program will change behavior or do so cost-effectively.

CBSM Process

STEP 1: SELECTING BEHAVIORS: Whether the purpose of campaign is to reduce waste, enhance energy or water efficiency, alter transportation choices, protect a watershed or reduce CO2 emissions, there are nearly always a wide array of behaviors that may be promoted. For example, if the purpose was to reduce residential energy use, this goal might be achieved by encouraging the installation of insulation in an attic, installing and setting a programmable thermostat or taking shorter showers. Similarly, there are numerous behaviors that could be encouraged related to water use, transportation, waste reduction, etc. The first step of community-based social marketing is to determine which of these behaviors should be promoted.

STEP 2: IDENTIFYING BARRIERS AND BENEFITS: If any form of sustainable behavior is to be widely adopted, barriers that impede people from engaging in the activity must first be identified along with what would motivate them to act. Community-based social marketers begin by identifying these barriers and benefits using a combination of literature reviews, observations, focus groups, and survey research. The barriers they identify may be internal to the individual, such as lack of knowledge regarding how to carry out an activity (e.g., composting), or external, as in structural changes that need to be made in order for the behavior to be more convenient (e.g., organizing carpooling amongst employees).22 Community-based social marketers recognize that there may be multiple internal and external barriers to widespread

participation in any form of sustainable behavior and that these barriers will vary for different individuals. For example, personal safety is more likely to be a concern to women as they consider using mass transit than it is for men. In contrast to the Attitude-Behavior and Economic Self-Interest perspectives just discussed, community-based social marketers attempt to remove as many of these barriers as possible. Social science research indicates that the barriers that prevent individuals from engaging in one form of sustainable behavior, such as adding insulation to an attic, often have little in common with the barriers that keep individuals from engaging in other forms of sustainable behavior, such as carpooling.23 Further, this research demonstrates that even within a class of sustainable activities, such as waste reduction, very different barriers emerge as being important.24 For example, different barriers exist for recycling, composting, or source reduction. Since the barriers that prevent individuals from engaging in sustainable behavior are activity-specific, community-based social marketers begin to develop a strategy only after they have identified a particular activity's barriers and benefits. Once these barriers and benefits have been identified, they develop a social marketing strategy to remove the barriers and enhance the benefits.

STEP 3: DEVELOPING STRATEGIES: Social science research has identified a variety of "tools" that are effective in changing behavior. These tools include approaches such as gaining a commitment from an individual that they will try a new activity, such as biking to work, or developing community norms that encourage people to behave more sustainably. The techniques that are used by community-based social marketers are carried out at the community level and frequently involve direct personal contact. Personal contact is emphasized because social science research indicates that we are most likely to change our behavior in response to direct appeals from others.

STEP 4: PILOTING: Prior to implementing a community-based social marketing strategy, it is piloted in a small portion of a community. Given the high cost of implementing many programs, it is essential to know that a strategy will work before it is implemented on a large scale. Conducting a pilot allows a program to be refined until it is effective. Further, a pilot allows other possible methods for carrying out a project to be tested against one another and the most cost-effective method to be determined. Finally, conducting a pilot can be a crucial step in demonstrating to funders the worthiness of implementing a program on a broad scale.

STEP 5: BROAD-SCALE IMPLEMENTATION AND EVALUATION: The final step of community-based social marketing involves ongoing evaluation of a program once it has been implemented in a community. In conducting an evaluation, community-based social marketers emphasize the direct measurement of behavior-change over less direct measures such as self-reports or increases in awareness. The information gleaned from evaluation can be used to refine the marketing strategy further as well as provide evidence that a project should receive further funding.

Reference:

http://www.cbsm.com/pages/guide/fostering-sustainable-behavior/

APPENDIX D – Decision Matrices and Not Selected Tactics

Methodology for Savings, Cost, Number of Customers Moved and Ranking

To generate the data needed for this analysis and work plan Conservation compared program performance to the population of customers we did not work with. To do so Conservation used 2015 program participants as our sample. Conservation compared the customer's efficiency in 2014 to 2016 (a representation of before and after our program was implemented). For outdoor programs Conservation took weather factors into consideration in our analysis.

Savings: Savings estimates are derived from the observed increases in efficiency between 2014 and 2016. We took the average savings from increases in efficient customers and multiplied that by the estimated customers we will work with to estimate a one year AF savings. Conservation then multiplied that number by five to provide a five year AF reduction. For more information on how we calculated the customer efficiency benchmarks refer to those sections in the main document write up.

Cost: The cost inputs for each program vary by program but is based off of actual dollar amounts spent by each program as well as staff time cost estimates. The program costs includes fixtures, instillation costs (when applicable), and any contract administration costs. For example, fixture cost could be the rebate amount paid by Denver Water, cost per showerhead, aerator or other item used in the program. Some programs include cost set by contractors (for example, WaterSense Challenge has instillation charges for each install). The cost of Conservation staff time was determined by averaging the salary of workgroups in Conservation (such as field technicians, administrative services, or conservation specialists). Conservation then took those cost per hour estimates and multiplied it by an FTE estimate. If a program was touched by multiple sub-workgroups all those staff times were added up (for example specialists analyze and provide data to our field technicians before they head to an audit). Non-conservation time (such as marketing or customer care) was not included in the cost.

Number of customers moved: The number of customers moved was a combination of what was observed in 2015 and updated if the program structure was likely to change. We did not assume that every customer contact resulted in success. For example, not all customers who received a toilet rebate were inefficient. We only used the number of customers where the rebate actually moved in estimating the customers moved total. We added additional customers moved if we decided there would be targeting (added cost in staff time as well). Conservation did build into our cost assumptions that we would work with some customers even if they did not move.

Ranking System: To determine the best programs we ranked each program to all others in terms of: dollar per AF saved, the 5 year AF savings, dollar per customers moved. The lower a ranking the better a program (lower per customer cost, higher 5 year AF reduction). This ranking ensures the highest number of customers are impacted for the lowest dollar amount. We cut programs off at a score of 50 or above (about 5 out of 20). However, Denver Parks IGA was an exception since there is already a contract in place and there are additional requirements that benefit Denver Water not included in the rebate for the central control system (program cost).

Other Note: 'SFR Cash for Grass" was unique in our analysis. Denver Water does not currently have this program. However, it was mentioned in the public comments and we wanted to make sure to address it. We examined examples from other utilities (including Aurora, CO and Los Angeles, CA) to estimate a rebate amount, cost per square foot conversion, and participation rate. Conservation assumed a customer would be moving from an efficient 12 gpsf to a 3 gpsf use (mixed xeriscape) at the end of the instillation. We utilized feedback from other utilities to make staffing estimates. For a service area of our size with our water/ environmental conditions we did not deem the program prudent (especially given the poor score in the options matrix).

Single Family Indoor Draft Tactics:

Priority	*Opportunity*	**Tactic**	**2018**	**2020**	**2022**
Foundational	*Communicate efficient use*	**Provide timely and specific water use feedback**	Track # of people per household for program participants	Pilot phone app to 20,000 customers, work to obtain # of people per household	Evaluate and recommend scalable approach to reach all SFR customers
		Efficiency touch point in new customer kit	Research feasibility, select alternatives	Pilot selected alternatives	Reach 80% of new customers
		High bill water audits	Continue to perform approximately 1,000 audits per year		
	Customer specific education	High bill indoor follow-up outreach	Pilot outreach methods for customers that remain inefficient	Evaluate outreach methods and make recommendation	Follow up with 100% of audits not attaining efficiency
		Proactive outreach for inefficient indoor use	Pilot outreach methods, Evaluate and recommend method	Outreach to at least 500 inefficient customers per year	
		Implement public-facing calculator for indoor fixture retrofits on website	Determine feasibility of calculator	Pilot on website	Evaluate performance
Accelerate Change	*Increase efficient products*	**SDC credit-single-family development**	Explore feasibility	Pilot at single-family developments	Evaluate effectiveness and make recommendation to continue or modify
		Low income retrofits	Continue current low income indoor retrofits	Approximately 1,000 audits and 1,200 toilet retrofits per year	
				Explore additional measures and tactics	Research feasibility of leak repairs, pilot partnerships
					Assess needs
		Implement rebates for most efficient indoor fixture technology	Issue approximately 6,000 UHET rebates per year		
			Research other efficient indoor fixtures for future rebates	Ongoing recommendation on new fixtures, discontinued fixtures and dollar amount changes to rebates	
			Research graywater systems and programs		Determine feasibility of graywater pilot (e.g. SDC)

		Educate customers about most efficient indoor fixture technology	Continue marketing program to broad audience using water bill, website, traditional and social media, ad campaigns, youth education, public events, consultations and awareness campaigns about efficient indoor fixtures		
	Change behavior	Education and outreach for behavior change	Continue educating public through all media outlets, including youth education about behavioral changes that lead to indoor water efficiency (e.g. shorter showers)		
		Community Based Social Marketing Approach to change behavior	Determine barriers and motivations for indoor water use habits	Pilot Community Based Social Marketing approaches to facilitate indoor water use habit changes	Evaluate and recommend best approach

Measurable but Not Selected Tactics

SDC credit for Single Family development is not being pursued as an incentive due to anticipated low numbers of in-scope customers, high cost per acre foot and a majority of homes built will be at or below 40 GCD due to current State standards for plumbing fixtures. This is an area of opportunity that can be realized through a policy change, this will be brought forward to the Board with recommendation for multifamily development based on lessons learned from the SDC credit.

Gray Water Systems is not being considered at this time as the City and County of Denver is in a rules making process and no other local cities or counties have started. Gray water implementation needs a separate level of attention to best determine in-scope customers and products.

Single Family Outdoor Draft Tactics:

Priority	*Opportunity*	**Tactic**	**Year 1**	**Year 3**	**Year 5**
Foundational	Communicate efficient use	**Provide timely and custom water use feedback**	Pilot phone app, offer to 20,000 customers	Evaluate and recommend scalable approach to reach all SFR customers	Implement approach
		Efficiency touch point in new customer kit	Research feasibility, select alternatives	Pilot selected alternatives	Reach 80% of new customers
	Customer specific education	High bill irrigation follow-up outreach	Pilot outreach methods for customers that remain inefficient	Evaluate outreach methods and make recommendation	Follow up with 100% of audits not attaining efficiency
		Proactive outreach for inefficient outdoor use	Pilot outreach methods	Evaluate proactive outreach	Implement recommend action for 1,000 inefficient customers per year
		Seasonal Water Saver program	Continue Water Saver program, approximately 2,500 education stops per year		
		High bill irrigation audit	Continue for customers upon request, approximately 1,000 per year		
	Celebrate customer success	Public faming	Continue marketing program to broad audience using water bill, website and traditional and social media outlets to advertise, ad campaigns, youth education		
Accelerate Change	*Increase efficient products*	Evaluate ET irrigation controller rebate	Pilot education program for homes that receive the rebate	Evaluate program and make recommendation	Reevaluate the incentive amount or discontinue
		Increase Graywater systems	Research feasibility or gray water systems for outdoor water use	Make recommendation of graywater system incentive or SDC credit	Implement graywater program or discontinue
		Low Income outdoor	Evaluate potential outdoor retrofits	Pilot outdoor retrofit program	
		High-efficiency rotary nozzles	Continue incentive for high-efficiency rotary nozzles		
		Evaluate potential for new product incentives	Evaluate potential new product types	Implement new incentive	
	Increase efficient development	Evaluate current City landscape codes and ordinances	Create master list of entities with current codes and year drafted	Partner with at least 3 cities to draft model ordinances	Implement ordinances
	Change landscapes	**Personalized landscape design sessions**	Complete 100 design sessions with residential homes	Evaluate effectiveness of landscape change design program	Expand program or discontinue
		Garden in A Box landscape program	Continue Garden in A Box program, approximately 1,000 per year		

		Landscape change seminars	Complete seminars with a capacity of 100 customers	Evaluate effectiveness of landscape change seminars	Expand program or discontinue
		Denver Water maintenance landscape replacements	Evaluate alternative landscaping when replacing turf due to maintenance	Pilot program	Expand program or discontinue
Transform	*Engage Partners*	Partner with UCD, Denver Parks and Forest Service to evaluate tree water use	Draft data sharing agreement, provide technical assistance	review reports and final papers	Implement findings into appropriate tactics
	Perform research	Evaluate risk of rebounds in outdoor water use	Continue monitoring rebound risk	Perform survey and evaluate landscapes of low use households	Continue monitoring rebound risk
		Evaluate tree health at efficient homes	Evaluate efficiency of homes with champion trees	Revaluate outdoor efficiency of homes with champion trees	Publish findings
		Research potential implications on heat island effect	Perform research review	Additional research if necessary	

Deselected Alternatives

Customer specific education – Seasonal Water Saver program: Discontinue the educational Water Saver Program. Analysis of this program shows that it does a good job generating positive public relations for identifying and responding to water wasters. However, this program has not generated water savings. Even after contacting and educating inefficient customers they have shown little or no change towards being inefficient customers. Denver Water believes that it would be best to try new programs to move these customers to efficient use. This may be a beneficial program in drought years more from a public relations stand point than water savings.

Increase efficient products – Increase graywater systems: graywater has the potential to generate a lot of water reuse and savings of potable water, but it is not currently well established or cost effective as a retrofit option. Denver Water will continue to research the feasibility of implementing graywater retrofit systems in the future. Market adoption of these products is not ready at this time.

Change Landscapes - through Cash for grass (large scale turf replacement) was not selected due to two major considerations: cost and applicability to our service area. Municipalities that have implemented this type of program have provided anywhere from $0.25-2.00 per sqft of turf removed. We do not believe the lower end of this scale would be a true incentive for people to change their landscape; rather, it would be a subsidy for those already deciding to take that action. On the higher end, we do estimate it would incentivize some to remove their grass for low water plant material. However, at $75,000 per AF it would be a very expensive program that would be utilized by a small number of customers. The second deterrent is that Denver Water heard from other utilities that this kind of program is time intensive for staff and difficult to run well. To do well, we would need to have dedicated staff for design approval, inspection, as well as processing. Other large municipalities in California have had major issues with fraud and a multitude of failed post-install inspections.

Multifamily Indoor Draft Tactics:

	Opportunity	**Tactic**	**Year 1**	**Year 3**	**Year 5**
Foundational	*Communicate efficient use*	Improve mass multifamily communication methodology	Subcategorize properties into like groups. Assess previous communication/ market efforts	Pilot communication method to reach the least efficient customers	Based on pilot results, expand communication methodology to entire customer class
	Customer specific education	Indoor water audits and efficiency consultations	Continue to work with customers upon request. Estimate 40 properties per year	Begin to target inefficient customers proactively	Based on experiences have recommendation to continue, alter, or end program
Accelerate Change	*Increase efficient products*	Continue rebates for WaterSense fixtures	Estimate 1,600 UHET direct installs and 700 UHET rebates per year		
		Low income retrofits	Continue program as is, research opportunity to expand eligibility criteria. Estimate 20 direct install properties		Evaluate needs for low income program, change if needed
	Increase efficient development	Graywater/ reuse opportunities	Educate customers, partners and ourselves on graywater research and opportunities	Explore graywater feasibility and make connections with regulatory and research partners	Research dual plumbing opportunities. Determine the feasibility of a graywater pilot like an SDC credit
		Assess state of new development	Support SDC credit pilot for multifamily and mixed use development		Examine possible code changes and produce report with findings
Transform	*Understand customer Views*	Define multifamily subgroups	Collect information and determine subgroups within multifamily	Take these subcategories and determine how to apply it to create better targeting and programs	
		Build relationships with the industry	Initiate conversations with apartment management companies, industry groups, and relevant organizations	Identify industry best practices and gaps to working with industry to create guides for multifamily properties	Use best practices in relevant tactics
	Engage partners	Build relationships with the municipalities and distributors	Partner with Community Relations to understand our service area's multifamily profile	Partner with distributors on efficiency initiatives and targeting.	Have a relationship and proactive dialogue with Denver, suburban municipalities and distributors

		Recommend policies that progress efficiency goal	Continue with status quo, continue to assist customers meet the requirements by SB-103	Research Denver Water bylaws and existing policies and how they apply to indoor MFR	Report on what other utilities are doing with indoor MFR codes and new development.
	Perform research	Research metering opportunities	Begin researching what technologies exist and what opportunities there are for metering	Propose a pilot or incentive if the research shows opportunity	Make recommendations to conservation based on pilot results
		Develop one to one metering for dense development	Finalize pilot phase, research efficiency outcomes from metering	Report on number of in scope properties achieving one to one metering	Initiate scope for next one to one metering

Measurable but Not Selected Tactics

Gray water plumbing pilot: given the limited availability of staff time as well as regulatory roadblocks gray water and other alternative water systems will not be analyzed nor proposed for this customer group at this time.

Multifamily Outdoor Draft Tactics:

	Opportunity	**Tactic**	**Year 1**	**Year 3**	**Year 5**
Foundational	*Communicate efficient use*	**Water budget reporting**	Continue to grow participation. Research needs for increasing capabilities to add landscape typography	New water budget participants receive new format. 25% existing have been updated/converted to new reporting	Continue to evaluate program, 100% converted to new format
	Customer specific education	Technical support for organizations	Continue to provide technical support to entities, including water savings calculations, staff trainings and presentations to stakeholders		
		High bill irrigation follow-up outreach	Pilot outreach methods for customers who remain inefficient	Evaluate outreach methods and make recommendation	Implement method of outreach or discontinue
		Proactive outreach for inefficient outdoor use	Compile list	Pilot outreach methods	Evaluate proactive outreach
		Efficiency touch point in new customer kit	Research approach	Pilot selected alternatives	Implement/recommend action for all new customers or discontinue

		Targeted and high bill irrigation audit/consultations	Continue for customers upon request, approximately 30 per year for multifamily outdoor. Also allows for field verification of landscape typology. Great face-to-face contact method		
Accelerate Change	*Increase efficient products*	Evaluate ET irrigation controller rebate	Pilot education program for homes that receive the rebate	Evaluate program and make recommendation	Reevaluate the incentive amount or discontinue
		Rebates for efficient irrigation products	Continue incentive for high efficiency rotary nozzles and ET irrigation controllers		
		Research possible new rebates	Keeping up to date on new technology. Research other rebate programs across the country/world. Pilot at least one new rebate or incentive based upon researched new technology		
	Increase efficient development	**SDC efficiency credit**	Continue pilot	Evaluate and make recommendations	Evaluate, keep, modify or discontinue
Transform	*Perform research*	Evaluate risk of rebounds in outdoor water use	Continue monitoring rebound risk	Perform survey and evaluate landscapes of low use properties	Continue monitoring rebound risk
		Further classification of customer type	Research sub-categories based on property type characteristics	Have understanding of these characteristics to enhance other tactics	Continue evaluations
	Engage Partners	Develop further understanding of customer via relationships	Develop relationships within associations/industry via presenting at conferences, interviewing property managers. Interview developers, landscape architects and contractors	Initiate an informal working group with interested interviewees to evaluate efficiency benchmark and challenges	Have at least one pilot program in place derived from these stakeholder group meetings

CII Draft Tactics:

Measurable but not Selected Tactics

Incentive Contracts – Only a handful of contracts are completed each year. While these contracts offer the protection of only paying incentives when savings are verified, they are time intensive and difficult to manage. Many times the contracts require the installation of a sub meter on a specific industrial process and manual reads communicated by the customer. In some cases, customers identified that they were intending to complete the equipment upgrades/replacements regardless of the incentive.

APPENDIX E – Monitoring and Evaluation for Moving Customers to Efficient

Monitoring and evaluating programs is an important part of program management. Denver Water prides itself in being a customer centric and data driven organization which strives to use our resources wisely through continuous improvement. Monthly and annual monitoring inform which tactics should be modified, continued or discontinued which is reflected in yearly work plans and budgets.

Monthly monitoring

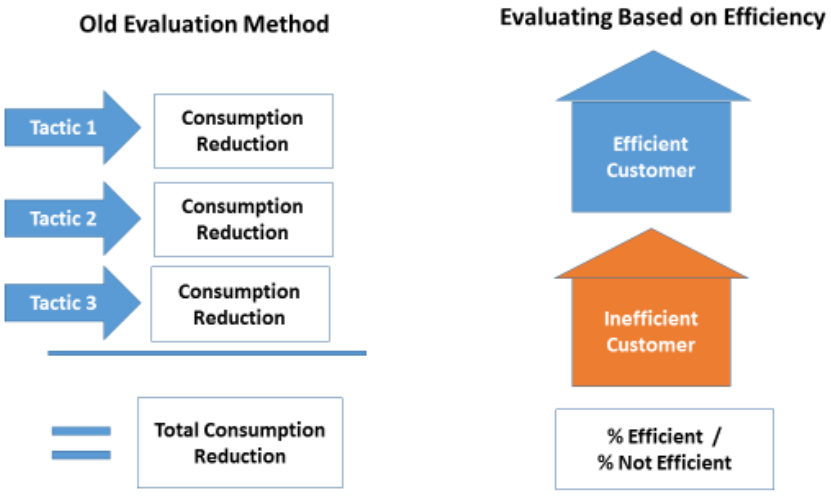
Progress will be monitored for tactics on a monthly basis. This measure will be a count of completed actions for each active tactic. The count will be broken into two categories, Inefficient Customers, and Efficient Customers, based on the classification that will be performed in the annual evaluation. By breaking tactics out this way we can monitor if our efforts are reaching the right customers.

Example:

	Inefficient Customers	Efficient Customers
High efficiency toilet rebates processed	*Tactic Count*	*Tactic Count*
Garden in a box installations	*Tactic Count*	*Tactic Count*
High bill Audits completed	*Tactic Count*	*Tactic Count*

Annual monitoring

Evaluation of customer efficiency will occur on an annual basis. Historically progress towards conservation goals have been measured solely through estimated or observed reductions in consumption based on individual tactics. Evaluating by measuring efficiency is a complete shift in thinking and places the focus on the performance of our customers rather than the performance of a tactic. By benchmarking and measuring every customers' efficiency, we can track progress through changes in the ratio of efficient vs inefficient customers. With this method we can predict and measure reductions in consumption and also gain insight into how much water there is left to save through efficiency gains.



The monthly summary of tactics will be totaled and included in the annual evaluations. There will be two periods in which evaluations are complete. For indoor specific use, the evaluation will be completed in April of each year based on the winter consumption in Jan-Mar of that same year. For outdoor specific use, the evaluations will be completed in January based on the irrigation period of Apr-Nov the previous year.

In addition to the ratio of efficient vs inefficient customers and the tactic summaries, each annual evaluation will include a narrative which summarizes the active tactics and provides insight into other influences such as weather, drought and economic impacts.

Evaluation of individual tactics

While no longer the focus, individual tactics will still undergo periodic evaluation to ensure viability. These evaluations will be performed as needed and included in each annual report when applicable.

Defining and summarizing customers

Customers will be defined and configured in our billing system as well as our GIS system to provide placeholders for the characteristics required for benchmarking. Measuring efficiency for a customer requires us to rethink the definition of a customer. In the past, a customer was synonymous with a meter but this definition does not fit with how the characteristics of a customer are derived. In the figure below, there are 24 meters that provide service to 1 multi-family customer. The characteristics of this single customer are not applicable to the consumption of just one meter, but the total consumption of all the meters, therefore, the count of customers in monthly and annual evaluations will be based the number of customers, not the number of meters.

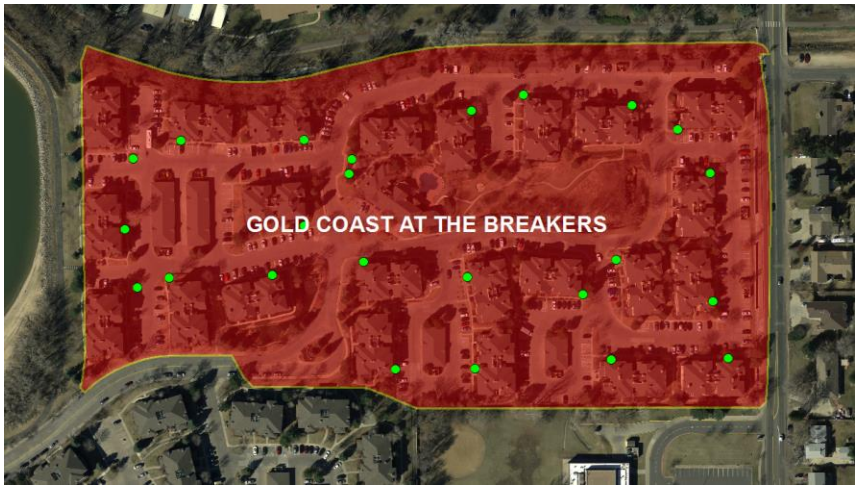


Figure 1 One Multi-Family customer with 24 meters