

Version DRAFT



## 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. The last ten years of focused conservation under an ambitious plan to reduce per capita water use by 22 percent has helped us learn a lot about conservation and our customer's needs. The Water Efficiency Plan describes the evolution from just focusing on water savings and toward helping our customers to meet their water needs in the most efficient ways. The Water Efficiency Plan will continue to lead our customers and the nation through thought leadership; proven reliability of reduction in water demand; and tactics that move individual customers toward water efficient use and ensure that efficient customers remain efficient.

### **Thought leadership**

To date we have accomplished much of our goal to move water use to 165 gallons per capita per day or less by 2016. We will continue to monitor water use over the next several years to ensure that the savings are lasting and we are able to factor them into our long-term planning. Our next goal will be measured not by per capita use targets, but by measuring the number of customers that are using water efficiently. A gallons per capita day measurement is also unsophisticated, and does not tell the full story of how our customers are changing fixtures, landscapes and water use practices. With this Water Efficiency Plan Denver Water will focus on the customer and will measure actual customer efficiency—not just reductions to overall system water demand.

The plan describes how we set benchmarks for water use efficiency and tactics to attain them. Developing water use benchmarks creates a way for 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. These benchmarks are attainable and if all Denver Water customers were at these levels we would be leaders in efficiency compared to other in the United States. For example attaining 40 gallons per person per day indoors would be a third less per person than other utilities based on a 2016 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. Water efficiency can enhance work being done to combat urban issues such as heat islands and storm water runoff and 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 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. 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 identified as significant influencers or leaders for other sectors or customers, such as breweries.

The first of these customers 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.

### **What this Plan is not**

While this plan sets out to refocus our efforts to be more specific 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. The Integrated Resource Plan is doing 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, and at what quality is needed to meet a need.

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 a 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.

### **Results**

The Water Efficiency Plan will achieve the following over the next five years:

- Maintain the acre-feet of water savings from the last 10 years.
- Create an additional 3,000 acre-feet of water savings from residential customer efficiency:
  - Maintain current 49% and increase to 55% of Single Family Customers meet indoor benchmark;
  - Maintain current 65% and increase to 75% of Single Family Customers meet outdoor benchmark;
  - Maintain current 41% and increase to 46% of Multifamily Customers meet indoor benchmark; and
  - Maintain 60% and increase to 63% of Multifamily Customers meet outdoor benchmark.
- Engage with commercial, industrial and institutional customers to create benchmarks and tactics to attain additional water efficient customers, and an estimated additional 1,000 acre-feet of water savings.
- Enhance livability and customer satisfaction with landscape health and aesthetics documented through customer surveys and research projects.
- Maintain a cost-per-efficient customer standard for programs.

Every customer is important to the long-term success of Denver Water's Water Efficiency Plan, and every customer sector will be targeted to move more customers to efficient use. This plan envisions accomplishing these goals by working with all of Denver Water's customers, albeit in a more targeted way.

### **Next Steps**

This draft Water Efficiency Plan and Working Group recommendations will be put out for a 60 day comment period. A final plan will be presented for Board Approval after comments are taken and if appropriate incorporated into the document. The final step is to implement the plan and update the Board annually.

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.

# Water Efficiency Plan Benchmarks and Program Development

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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 that our lives are built on. 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 the only way we can share this resource and 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 Waters can achieve better results by educating, incentivizing and engaging customers about ways to move to more efficient use than by mandating changes.

The end goal of this approach is a resilient water system that can withstand 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 just 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.

## 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 over 355 square miles with 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 type and use as customers see themselves.

Staff anticipates that around 20% of all changes for indoor use and around 10% of outdoor will come from passive saving such as the impacts of plumbing codes, ordinances, and standards that improve the efficiency of water use. These conservation savings are called “passive” savings because the utility did not actively fund or implement programs that produce these savings. While the remaining move to efficient use will come from active programs which are funded and managed by Denver Water. The usefulness of the construct of active and passive savings will also be challenged as staff works to update ordinances, partner with entities on land use planning and market programs through alternative channels.

## BUDGET AND STAFF RESOURCES

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

1. Hierarchy of prioritization based on Foundational, Accelerated change and Transformational tactics.
2. Staff capacity to perform tasks – When does work occur? Which staff member is accountable? Do they have the knowledge and skills to accomplish the goal?
3. Past performance of tactic- Did the tactic move customers to efficient use? What was the cost per efficient customer?
4. Multiple customer types served – Does the tactic support multiple customer types?
5. Maintains customers at efficient use - Without this tactic will customers move back to inefficient use?

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 September 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 (WEWG) with stakeholders from key interest groups. The WEWG 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.

#### 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 investment 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 foundational 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.** Changing 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 can help 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 mitigating livability issues.
- **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 be 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 class 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. 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.

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## SINGLE-FAMILY RESIDENTIAL INDOOR WATER EFFICIENCY

50 GCD Current

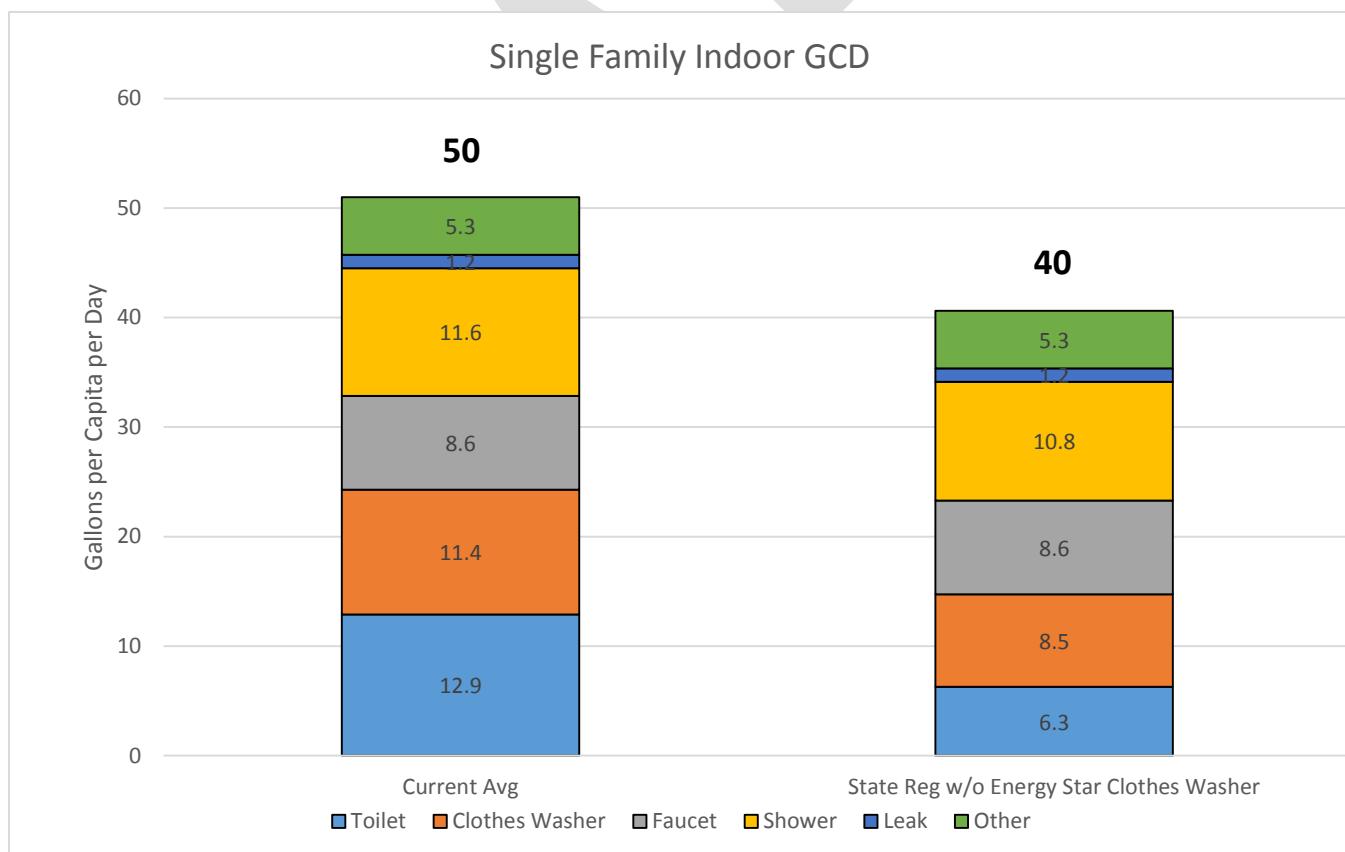
40 GCD Benchmark

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 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<sup>1</sup>. The table below shows an average 50 GCD household's water use<sup>2</sup> compared to benchmark efficient water use.



<sup>1</sup> Estimated use with current State required, WaterSense fixtures

<sup>2</sup> 2012 Residential End Use Report

## *Methodology for benchmark*

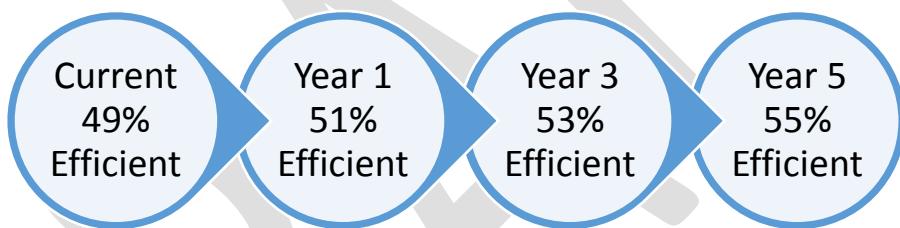
Denver Water maintains monthly water use for each SFR customer account and calculates gallons per household per month. Indoor water use is calculated based on Average Winter Consumption (AWC), which indicates indoor use, absent irrigation.

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:

$$\text{Gallons per household per month} / 30 \text{ days} / 2.7 = \text{Gallons per Capita Day (GCD)}$$

## *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*



65% of customers are informed of their indoor water use



Move 10,000 homes to efficient water use



920 AF of water savings achieved

Priority	Opportunity	Tactic	Year 1	Year 3	Year 5		
Foundational	Communicate efficient use	Provide timely and specific water use feedback	Ask people per household for rebates and audits	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		
	Increase efficient products	SDC credit-single-family development	Explore feasibility	Pilot at single-family developments	Evaluate effectiveness and make recommendation to continue or modify		
		Income Qualified Retrofits	Continue current income qualified 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		
		Implement rebates for most efficient indoor fixture technology	Assess needs				
			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			
Accelerate Change	Change behavior	Educate customers about most efficient indoor fixture technology	Research graywater systems and programs				
			Determine feasibility of graywater pilot (e.g. SDC)				
		Community Based Social Marketing Approach to change behavior	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				
			Continue educating public through all media outlets, including youth education about behavioral changes that lead to indoor water efficiency (e.g. shorter showers)				
			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		

## SINGLE-FAMILY RESIDENTIAL OUTDOOR WATER EFFICIENCY

16 GPSF (median  
of 12- 30 gpf)

12 GPSF  
Benchmark

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 residential properties.

### *Water efficiency benchmark*

The benchmark for outdoor use is 12 GPSF (gallons per square foot) 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 use 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

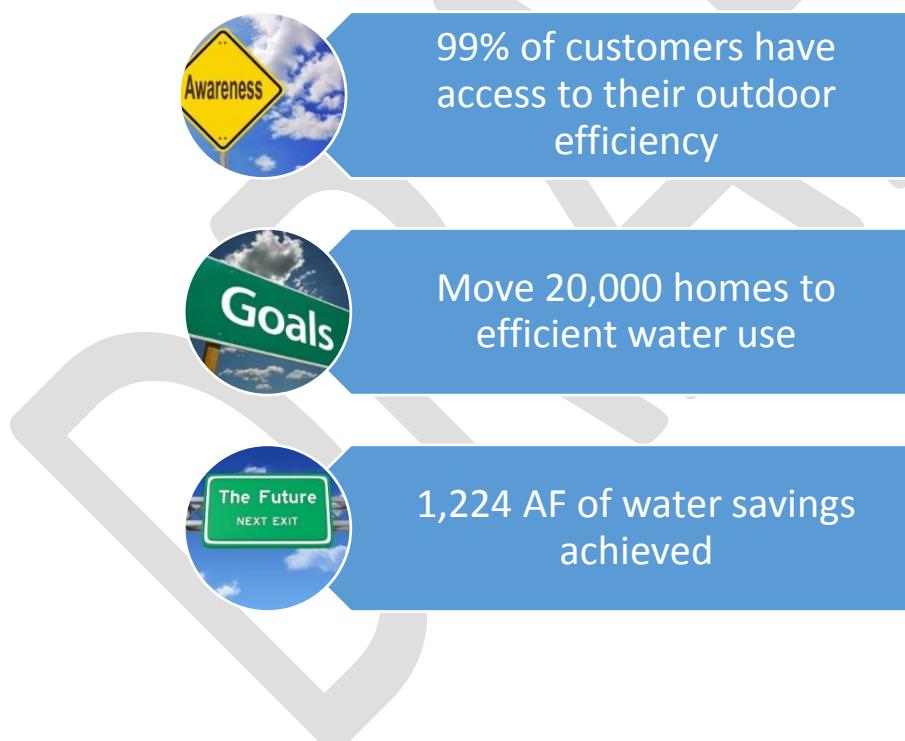
\*Based on a random sample of 425 homes in 2015

### *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. If through improved customized landscape data, we determine a need to change the method, we will establish a new ratio and goal based on the new benchmark.



### *Water Efficiency Plan expectations*



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		
	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
		Income Qualified 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	
Accelerate Change	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
	Engage Partners	Partner with UCD, Denver Parks and Forest Service to evaluate tree water use in Denver	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	Reevaluate outdoor efficiency of homes with champion trees	Publish findings
		Research potential implications on heat island effect	Perform research review	Additional research if necessary	

## MULTIFAMILY RESIDENTIAL INDOOR WATER EFFICIENCY

52 GCD Current

40 GCD Benchmark

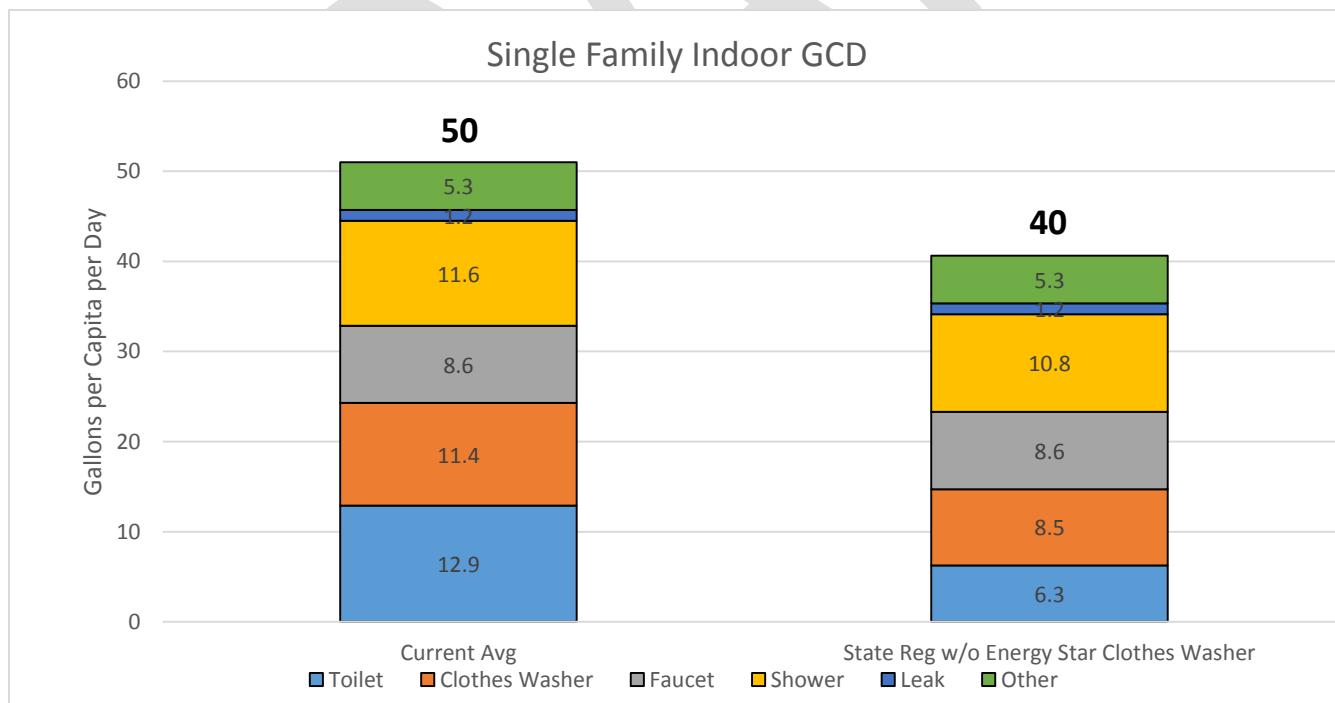


Multifamily residential (MFR) customers make up the second largest water demand of Denver Water's customer accounts after single-family residential customers with 13 percent of system wide use. MFR properties have multiple units on a single meter and in many cases multiple meters at a single property. 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<sup>3</sup>. The table below shows an average 50 GCD SFR household's water use<sup>4</sup> 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).



<sup>3</sup> Estimated use with current State required, WaterSense fixtures

<sup>4</sup> 2012 Residential End Use Report

## *Methodology for benchmark*

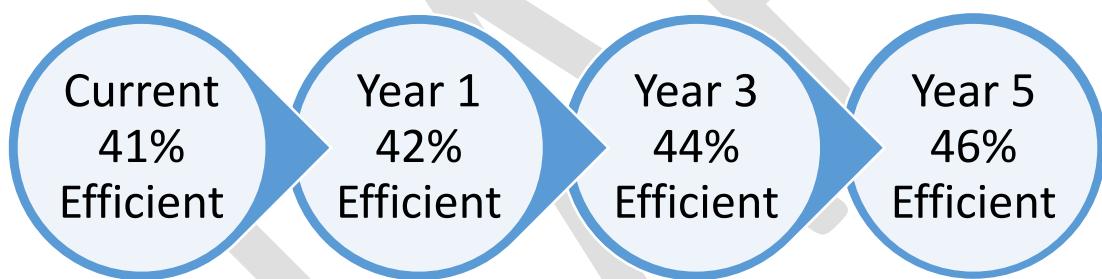
Denver Water maintains monthly water use for each MFR customer account and calculates gallons per property per month. Indoor water use is calculated based on Average Winter Consumption (AWC), which indicates indoor use, absent irrigation and any water based cooling systems.

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 41 percent of MFR 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 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*



Pilot methodology to bridge communication gap



46% of customers at or below benchmark



625 AF of water savings achieved

	<i>Opportunity</i>	<i>Tactic</i>	<i>Year 1</i>	<i>Year 3</i>	<i>Year 5</i>
<b>Foundational</b>	<i>Communicate efficient use</i>	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
	<i>Customer specific education</i>	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
<b>Accelerate Change</b>	<i>Increase efficient products</i>	Continue rebates for WaterSense fixtures	Estimate 1,600 UHET direct installs and 700 UHET rebates per year		
		Income qualified 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
	<i>Increase efficient development</i>	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
<b>Transform</b>	<i>Understand customer Views</i>	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
	<i>Engage partners</i>	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.
	<i>Perform research</i>	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

## 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. Conservation's definition of 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, the outdoor use is a function of subtracting average winter use 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 are a significant number of properties that do not appear to irrigate at all. The most inefficient irrigators skew the results significantly, potentially due to data errors or extreme over irrigation.

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%

### *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

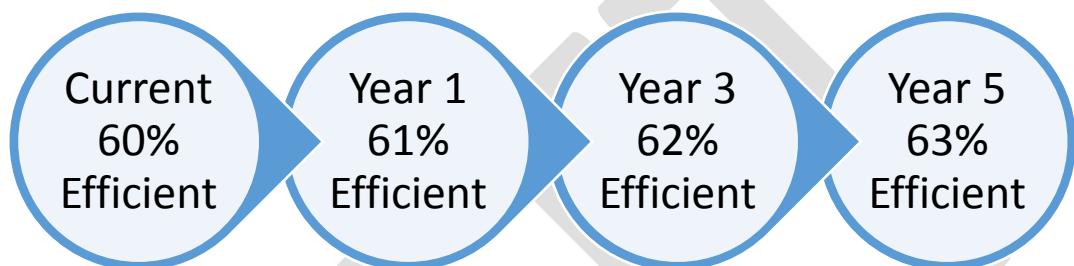
20 GPSF (median of 12-30 gpf)

12 GPSF Benchmark

*\*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*

Currently 60 percent of MFR customers meet or are below the 12 GPSF benchmark. The Water Efficiency Plan has one-, three- and five-year metrics. Monitoring and evaluation will be done monthly for tactics. For larger properties that meet water budget 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*



For large properties, add all to water budget. For smaller develop effective methodology.



63% of customers at or below benchmark



236 AF of water savings achieved

	<b>Opportunity</b>	<b>Tactic</b>	<b>Year 1</b>	<b>Year 3</b>	<b>Year 5</b>
<b>Foundational</b>	<i>Communicate efficient use</i>	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
		Technical support for organizations	Continue to provide technical support to entities, including water savings calculations, staff trainings and presentations to stakeholders		
	<i>Customer specific education</i>	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		
		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
	<i>Increase efficient products</i>	High efficiency rotary nozzles	Continue incentive for high efficiency rotary nozzles		
		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		
		SDC efficiency credit	Continue pilot	Evaluate and make recommendations	Evaluate, keep, modify or discontinue
<b>Accelerate Change</b>	<i>Perform research</i>	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
	<i>Engage Partners</i>	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

## PUBLIC SPACES OUTDOOR

Unknown Benchmark

Benchmark and action

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 25 percent is used indoors. Currently public spaces use on average 13 gallons per square foot annually. Because of their visibility, they have the ability to model their efficient use of water on sites throughout the service area.

### *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 models and reflect the value of water in the semi-arid west.

For public spaces, the benchmark calls for a customized site-by-site water use target based on landscape use typology that rolls into a total water use and total area water bucket.

### *Methodology for benchmark*

The benchmark for public spaces will be determined by combining the landscape typology and use, based on the area of each use. Aesthetic areas of turf grass will not be given the same water allocation as recreational turf grass. All sites for each entity will be combined to determine the water efficiency of each organization, referred to as the “water bucket approach.”

### Example water budget (benchmark)



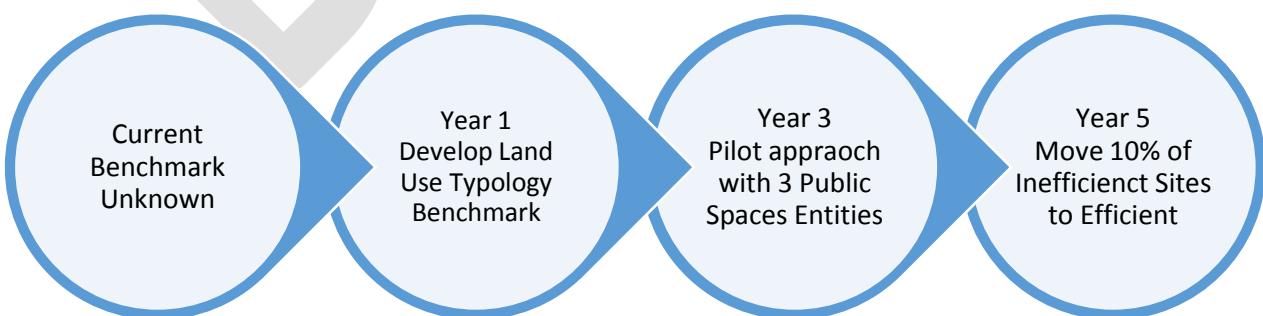
Color	Landscape Use	Landscape Type	Area (sqft)	Gallons/Sqft	Gallons
	Athletic	Turf grass	66,173	22	1,455,806
	Recreational	Turf grass	30,481	18	548,658
	Garden	Community Garden	2,769	9	24,921
	Aesthetic	Turf grass	72,195	9	649,755
	<b>TOTAL</b>		<b>171,619</b>	<b>15.6</b>	<b>2,679,139</b>

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. Expected outcomes:



	<i>Opportunity</i>	<i>Tactic</i>	<i>Year 1</i>	<i>Year 3</i>	<i>Year 5</i>		
<b>Benchmarking</b>	<i>Create benchmark</i>	Identify public spaces	Outreach out to public spaces	Update data — add sites			
		Determine benchmark by landscape use typology	Present philosophy at meeting, develop stakeholder group	Present results of stakeholder group and pilot with 3 public space organizations	Evaluate, keep, modify or discontinue		
		Landscape use data	Develop additional GIS layer with use typology	Pilot process with 3 public space organizations	Evaluate, keep, modify or discontinue		
<b>Foundational</b>	<i>Communicate efficient use</i>	Water efficiency reports	Develop process to provide efficiency data to public spaces (Denver Parks)	Expand to all customers			
	<i>Celebrate successes</i>	Public faming	Continue to highlight success of public space organizations				
		Awards/recognition	Continue to recommend public space organizations and their staff for awards/recognition				
<b>Accelerate Change</b>	<i>Increase efficient development</i>	SDC efficiency credit	Continue pilot	Evaluate and make recommendations	Evaluate, keep, modify or discontinue		
		Explore cap and trade system	Research approach and feasibility	Make recommendations	Evaluate, keep, modify or discontinue		
	<i>Increase efficient products</i>	Identify/develop funding sources for public spaces	Research alternative funding sources	Develop report on funding options, including local successes	Support customers in applying for funding opportunities		
		Promote existing rebates	Continue to promote existing rebates to customers, including presenting current rebates at annual meeting				
	<i>Understand customer views</i>	Annual public space meeting	Continue to hold the annual public space meeting				
		Engage with key stakeholders (i.e. CASDEM, arborists, designers)	Research additional groups to interview	Participate in external working groups			
		Perform research	Continue to monitor and participate in studies relating the effects on livability impacts				
		Tree health, recycled water, synthetic turf grass, stormwater	Develop program (rules and requirements)	Implement	Continue to add sites		
<b>Transform</b>	<i>Engage Partners</i>	Variance program (private public spaces)		Continue to add sites			
		Technical support for public space organizations		Continue to provide technical support to public space entities, including water savings calculations, staff trainings, presentations to stakeholders, data logger and consultations			

## COMMERCIAL, INDUSTRIAL AND INSTITUTIONAL

Commercial, industrial and institutional (CII) customers use a sizable portion of water, but how this group uses water is not currently well understood. Since CII customers are lumped together as “all other water use,” we will methodically work with them to understand unique sub-sectors and set benchmarks.

Overall, CII customers make up approximately 33 percent of total use. Of this usage, 20 percent is commercial and 4 percent is industrial. The bulk of Institutional water use is in Public Spaces (9%) and can be found in that section. Denver Water is currently identifying CII sub-sectors and collecting, organizing and verifying data on each.

### *Water efficiency benchmark*

We decided a sub-sector must account for at least one percent of nonresidential water use, approximately 750 acre-feet per year. From previous AWWA studies and EPA technical documents, we have a good understanding of which sub-sectors will likely account for more than one percent of nonresidential water use.

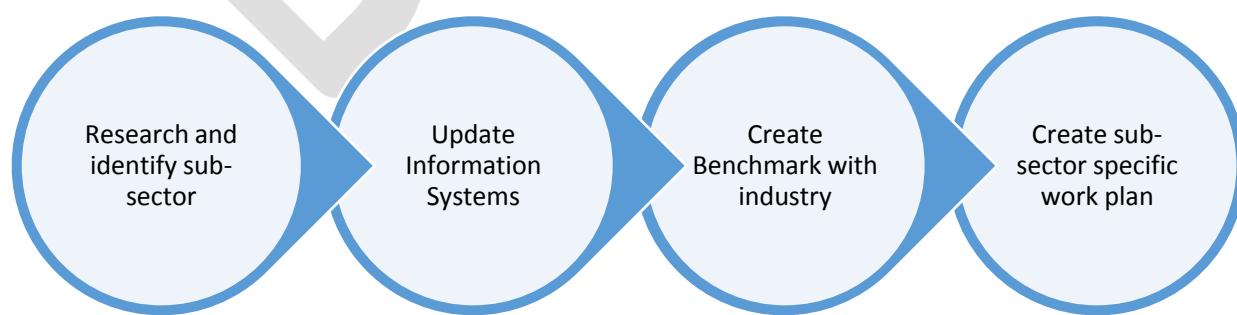
Denver Water is primarily concerned with the Water Use Intensity (WUI) of each customer as compared to peers within a sub-sector. To accurately reflect an acceptable WUI, we must know management practices, industry groups, metrics and key influencers for each sub-sector. For example, water usage per building square footage may work well for office buildings, whereas water usage per meal may be the most appropriate metric for restaurants. Once we understand a customer's barriers to efficiency, we can pilot projects to evaluate the best method toward efficient use.

### *Methodology for benchmark*

If a proposed CII sub-sector accounts for one percent of nonresidential water use it will be noted as a valid sub-sector and go through the following process to determine an industry specific benchmark.

### *Desired progression toward benchmark*

Each sub-sector will have different benchmarks and associated tactics and programs that are used to move the customer group toward water use efficiency. However, after creating a benchmark we must communicate what efficient water use looks like for specific sub-sectors and how an individual customer compares to efficient use. If it is not possible to get this information on the current bill the same information can be included in a monthly or quarterly report sent to the owner, bill payer, and/or property manager.



## *Water Efficiency Plan expectations*



Benchmark any CII sub-sector that make up more than 1% of non residential water use



65% of each sub-sector at or below industry specific benchmark



Communicate what efficient water use is to each CII sub-sector

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
<b>Benchmarking</b>	Hospitality/Hotel	Complete	In Progress	Year 3
	Food and Beverage Production	Complete	In Progress	Year 3
	Office	In Progress	In Progress	Year 1
	Community Association	In Progress	Year 1	Year 3
	Service Stations / Auto	Complete	Year 3	Year 3
	Restaurants	In Progress	Year 3	Year 3
	Retail	Not Started	Year 3	Year 5
	Health Care	Not Started	Year 1	Year 3
	Grocery	Not Started	Year 3	Year 5
	Industrial Production	Not Started	Year 3	Year 5
	Warehouse	Not Started	Year 5	
	Church/ House of Worship	Not Started	Year 3	Year 5
	Mixed Use	Not Started	Year 5	
	Entertainment Venues	Not Started	Year 5	-

	Opportunity	Tactic	Year 1	Year 3	Year 5
<b>Foundational</b>	<i>Customer specific education</i>	High Bill / Irrigation Audits	Continue for customers upon request, approximately 100 per year. Include field verification of landscape typology.		
<b>Accelerate Change</b>	<i>Increase efficient products</i>	Irrigation equipment rebates	1100 Continue incentive for high efficiency rotary nozzles, 40 ET controllers		
		Indoor Fixture rebates	Continue approximately 750 UHET and HET flush valve and 0.125 gallons per flush urinals per year		

## DENVER WATER PRACTICES

Many of the opportunities and tactics implemented in this plan will have complementary work done within Denver Water on policies and our own water use practices. 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*

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.
- Meter all Denver Water facilities, record reads into customer billing system and report our own 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.
- Add variances for public spaces.
- Opportunities for additional emergency reductions beyond outdoor restrictions.

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).
- Providing tiered rates for all customers by implementing a tiered rate structure for irrigation-only accounts using a water budget approach.

### *Desired progression toward goal*



## APPENDICES

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## APPENDIX A – Water Efficiency Working Group Recommendations

### Water Efficiency Work Group Final Recommendation Report March 22, 2017

#### I. Introduction

Denver Water formally convened the Water Efficiency Work 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

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

Kristen Fefes Landscape Industry Associated Landscape Contractors of Colorado	Amber Valdez Diverse Communities Valdez Public Affairs
Jonathan Wachtel Planning and Sustainability City of Lakewood	Alyssa Quinn Distributor Platte Canyon Water and Sanitation
Laurel Mattrey Large Irrigator Denver Public Schools	

## 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 us 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
Income Qualified 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

**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 at all. 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
Income qualified 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 (GSPF) 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 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 GSPF. It should be noted that there was strong debate in the Work Group about whether a range was appropriate and whether the 12 GSPF 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 use of 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've presented focus on metered water use efficiency, provided by Denver 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.

## APPENDIX B – Year-1 Work Plan

**Available with final version**

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## APPENDIX C – Barriers and Benefits

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