BEST PRACTICE 1: Metering, Conservation-Oriented Rates and Tap Fees, Customer Categorization Within Billing System

- Foundational, Informational, Support, and Management best practice
- Utility operations - implemented by water utilities
- Customer participation – specific action by customers, not required for implementation

Overview

This multi-faceted best practice impacts the way utilities charge new customers when they join the system, bill their existing customers for the water they use, and understand who their customers are and which customers might best benefit targeted suggestions to improve their water efficiency.

Metering - Measuring use and billing customers for what they use is fundamental to all water conservation efforts. Colorado already has a mandatory metering requirement for systems with more than 600 taps (CRS 37-97-103). Customers who pay for how much water they use, consume less water. Adoption of smart meters, that can be used to notify customers of leaks and provide real time consumption information, is also encouraged.

Rate structure - A number of conservation-oriented pricing systems have been successfully implemented across the US including: water budget-based rates, increasing block rates, and seasonal rates. Utilities in Colorado that have implemented conservation-oriented rate structures include: Denver Water, Durango, Boulder, Fort Collins, Colorado Springs, Glenwood Springs, Aurora, and many others.

Tap or connection fees - Tap fees can be developed based on anticipated future demand. By tying tap fees to more efficient fixtures, developers are encouraged to implement water conserving fixtures and landscapes from the very beginning. Linking tap fees to water budgets will insure that the low demands projected when tap fees are paid will actually be observed over time.

Customer categorization and information - To effectively plan, implement and evaluate conservation more precise categorization of customers is highly encouraged. Residential customers can be categorized as single family or multi-family. Multi-family should include the number of units served by each tap. Non- residential customers can be categorized based on North American Industry Classification System (NAICS) codes. Having this information in the utility billing and customer information system is tremendously useful. This is not a water saver by itself, but is a foundational improvement that benefits a program over the long haul, and makes planning and evaluation more effective. This is very important if water budgets are going to be used.

Why a Best Practice?

Metering – The cliché is true, we cannot manage what we do not measure. Numerous studies have documented the conserving impacts of metering. Meters enable utilities to bill customers based on their actual consumption and provide customers with direct feedback on their water

use. Likewise, submetering also provides valuable information for customers about their water use. Smart meters, which report data at daily or even hourly intervals, can help detect leaks and enhance customer's ability to manage their water use.

Conservation-oriented rate structure – How a utility bills its customers for water impacts utility revenue and demand. Conservation-oriented rate structures serve two fundamental purposes; one theoretical and one practical. Theoretically, conservation-oriented rates can link excess water use to the cost for new supplies (the marginal cost) which provides a strong price signal to the customer. Practically, conservation rates allow the utility to maintain revenue stability even as they encourage conservation by recovering capital costs from heavy users.

Tap or connection fees – An important goal of water conservation programs is to ensure that new buildings and new customers added to a water system are efficient right from the start. Traditional tap fees base system connection charges on the size of the water meter – which may be a reasonable approach if peak demand is the only consideration. Conservation-oriented tap fees base part of the connection charge on the anticipated demand at the site. Developers typically do not use water once construction is complete and therefore they do not see a savings from implementing conservation measures. However, if developers face tap fees based on anticipated water use, they do have an incentive to install conserving fixtures and landscapes. New customers that install water efficient fixtures and appliances will have smaller future demands and as a result should pay a lower connection fee. Under an equitable policy where new customers pay their fair share of water system development costs, anticipated demand is an important parameter to include in tap fee calculations which in turn encourages more efficient use. Linking tap fees to water budgets ensures that the demands used for calculation of the tap fees will be the demands used for future water billing on the property, and that water use over the budgets established in the tap fee process will include the appropriate capital cost for new water.

Customer categorization and information – Targeting water conservation initiatives at the customers who have the greatest potential to save (i.e. to the least efficient users in a customer class) makes sense. But utilities often have precious little information about their customers, particularly in the diverse CII category. Collecting and maintaining basic classification information on each customer served by a utility using the established North American Industry Classification System (NAICS) greatly enables targeting efforts and conservation program design. Coupling an understanding of who customers are (NAICS classification) with measured consumption (metered billing) provides powerful tools for water utilities seeking to improve efficiency. Important customer information extends beyond categorization. Accurate contact information is also critical customer information when communicating water savings suggestions to high water users. Geographic information systems (GIS) are another important element of customer information that can aid in identifying inefficient water use. The customer categorization and information effort is not a water saver by itself, but represents a fundamental improvement in utility management that benefits a program over the long haul.

State Statutory and Planning Requirements

Metering – Metering of all customers is required in Colorado as of 2005 for all systems serving more than 600 taps. Colorado Revised Statutes 37-97-103 "Water Metering Act" has the following key provisions:

- "Every water service supplier providing water in this state shall provide a metered water delivery and billing service to its customers…"
- "Billing of such water services based on the metered service shall begin no later than ninety days from the date of the installation of the meter."

Conservation-oriented rate structure - Colorado statute requires that all covered entities (water providers that deliver more than 2,000 acre-feet per year) file a water conservation plan with the Colorado Water Conservation Board (CWCB). Entities that do not have an approved plan on file are not eligible to receive grant funding from the State. Under this statute, one of the water saving measures and programs that must be considered in a conservation plan is, "Water rate structures and billing systems designed to encourage water use efficiency in a fiscally responsible manner." [CRS 37-60-126 (4)(a)(VII)].

The statute goes on to state, "The department of local affairs may provide technical assistance to covered entities that are local governments to implement water billing systems that show customer water usage and that implement tiered billing systems." [CRS 37-60-126 (4)(a)(VIII)].

Tap or connection fees – There are no Colorado statutory or planning requirements related to tap or connection fees.

Customer categorization and information - There are no Colorado statutory or planning requirements related to customer categorization and information.

Applicability

Metering – Universal metering as described in this best practice is implemented by water providers on the service lines of their customers. Water meters should be regularly read and maintained on a regular schedule by the water provider to ensure accuracy.

Rate structure – Conservation-oriented rate structures are implemented by water providers. The regular bills sent by the provider are the most direct way in which the provider communicates with its customers. The rate structure impacts both provider and customer directly. Revenues to the utility are determined via the rate structure as are fees paid by all customers.

Tap or connection fees – Tap fees, as described in this best practice, are implemented by the water providers and apply to new customers joining the water system who are seeking a new connection(s).

Customer categorization and information – Collecting customer information is a best practice implemented by the water provider, but one that requires contact with the customer in order to obtain categorical information.

Implementation

Metering – Selecting, installing, testing, and maintaining water meters is standard utility practice that has been implemented in some form since the earliest days of public water supply in

Egypt, China, Babylon, and Rome. The specific details of implementing this practice are beyond this scope of this best practices document. Those seeking to learn more about meters and metering should refer to the AWWA Manual of Water Supply Practice M6 – *Water Meters – Selection, Installation, Testing and Maintenance* (AWWA 1999).

Rate structure – Conservation-oriented rate structures are implemented by utility staff and their designated contractors. Utility rate structures are often formulated with multiple objectives including: revenue adequacy, fairness to customers, understandability, and demand reduction. Typically there is a structured public process whereby utility customers including citizens and businesses can have direct input into the selection and development of the rate structure. The utility billing system software and hardware must be able to accommodate the desired rate structure design. The following resources are recommended as a starting point for those seeking to implement or improve a conservation-oriented rate structure:

- American Water Works Association. 2000. *Principles of Water Rates, Fees, and Charges.* AWWA Manual M1. Denver, Colorado.
- Beecher, J.A. and P.C. Mann. 1991. *Cost-Allocation and Rate Design for Water Utilities.* American Water Works Association Research Foundation. Denver, Colorado.
- Mayer, P.W. et. al. 2008. *Water Budgets and Rate Structures: Innovative Management Tools*. American Water Works Association. Denver, Colorado.
- Raftelis, G.A. 2005. *Water and Wastewater Finance and Pricing: A Comprehensive Guide, 3rd Edition*. CRC Press. New York, New York.
- Western Resource Advocates, et al. 2004. Water Rate Structures in Colorado: How Colorado Cities Compare in Using this Important Water Use Efficiency Tool. Western Resource Advocates. Boulder, Colorado.

Traditional ratemaking for water utilities involves three discrete, logical steps (Beecher and Mann 1991; Raftelis 2005, Mayer et. al. 2008):

Step 1: Identify costs and water agency revenue requirements.
Step 2: Allocate costs to types of water usage.
Step 3: Design rates for each type of water usage to recover costs from customers.

Steps 1 and 2 combined account for the cost of service analysis portion of the rate process and will not be discussed further here. Step 3 is where the rate structure is selected and the actual rates and charges set. Ratemaking is an enormous topic and is a more appropriate subject for a full length book rather than a brief description. A few key concepts related to conservation-oriented rates are presented here.

> Rate structures, like utilities, are unique. It is almost impossible to find two water utilities that have the exact same rate structure and pricing. This is because each utility has its own distinct revenue requirements and objectives for its rate structure.

There are three primary varieties of conservation-oriented rate structure:

- **Increasing block rates** – higher prices are charged as consumption increases as shown in Figure 4-1. Block sizes are fixed for each customer class. For example a residential customer might pay $2 per 1,000 gallons (kgal) for the first 5 kgal each month, $4 per kgal for any usage between 5 and 15 kgal, and $8 per kgal for any usage above 15 kgal. Colorado utilities implementing increasing block rates include: Denver Water, Fort Collins Utilities, Colorado Springs Utilities, City of Glenwood Springs, City of Grand Junction, and many others. This is probably the most popular rate structure form in Colorado.

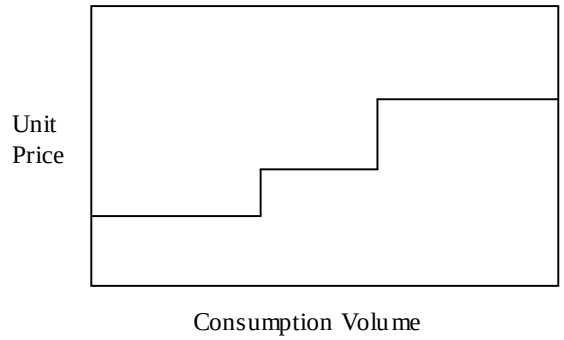

Figure 4-1: Increasing block rate structure

- **Water budget-based, individualized rates –** a variation of increasing block rates where the block size is defined by an empirical determination of efficient use for each customer using customer specific characteristics such as irrigable area as shown in Figure 4-2. Colorado utilities implementing water budget-based rates include: Centennial Water and Sanitation District, City of Castle Rock, and City of Boulder.

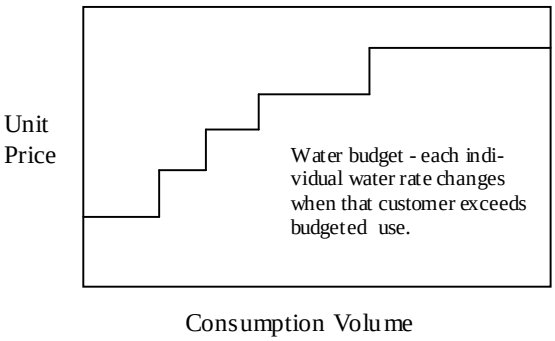

Figure 4-2: Water budget-based rate structure

- **Seasonal rates** – higher prices are charged during periods of scarcity (typically summer and fall to more efficiently allocate water in times or shortage and to encourage reduced demand) as shown in Figure 4-3. Denver Water, City of Castle Rock, Colorado Springs, Fort Collins, and Durango are examples of utilities that have incorporated some element of seasonal rates into their increasing block rate structures.

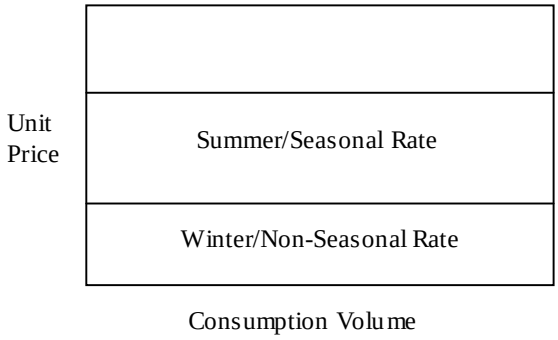

Figure 4-3: Seasonal rate structure

Key Conservation Considerations When Selecting and Designing a Rate Structure – Most of the literature on selecting and designing rates focuses on revenue requirements and cost of service evaluation. The following are important considerations related to water efficiency.

- **Sizing blocks appropriately** – Increasing block rate structures will not achieve desired conservation results if the blocks are not properly sized (i.e. if the blocks are too large). For residential customers, the size of block 1 should be based on an efficient level of monthly (or bimonthly) indoor use. Reasonable block 1 sizes range from 3 to 8 kgal per month. The smaller the block size, the more potent the conservation price signal. The beauty of water-budget-based rates is that the blocks sizes are tailored to each customer in the system. When sizing blocks for an increasing block rate structure (without water budgets) it is more difficult to send a fair and effective conservation price signal for individual customers.
- **Make block price differential meaningful –** Many increasing block rate structures have very small differences in rate between each block. For example, a rate structure that charges $2.20 per kgal in block 1 and $2.40 per kgal in block 2 will not send much of a price signal to customers since the difference in rate is so small as to be trivial. A rate structure such as the one in this example is little improvement (from a conservation standpoint) over a uniform rate. Setting the block rates is a complicated process that must by necessity include a cost of service analysis, but it should be possible to make the block price differentials significant enough to send a meaningful price signal to customers when their usage moves them into a higher rate block. One measure of a meaningful price signal is a positive slope in the average price curve. The steeper the positive slope, the stronger the price signal. The average price curve should be examined for any rate structure under consideration. With a water budget-based system, where blocks are sized based on customer-specific information, it is possible to employ more dramatic block price differentials in a more equitable manner since water use over the budgets is charged at marginal rates, or penalty rates for excess use, as specified in the water waste ordinance. Marginal rates are based on the cost of the most expensive water in the system, and penalty rates are fines for excess use, and are not linked to costs directly. Some utilities use revenue from high tiers to fund conservation programs

efforts directed at the customers who use water in the high tiers. The issue of revenue stability must also be carefully considered when setting differential block prices.

- **High fixed service charges can ensure utility revenue, but may weaken intended conservation effects –** Utilities that set a high fixed service charge each billing period will generally have a more stable revenue stream, however if more money is collected via fixed charges, less can be collected via the variable rate. Fixed service charges can offset the conservation incentives of increasing rates (Michaelson, et. al. 1998).
- **Billing cycles and the ability to track water use can influence customer rate response –** Customers should be provided regular information on how much water they use as well as some context for understanding the relative efficiency of their usage through comparisons with historic use and established benchmarks (what they could or should be using). Bimonthly or quarterly billing cycles are far less successful at influencing customer behavior than monthly billing. Providing customers easy access to their account and consumption information via regular billing, smart meters with remote readers, or even internet access will better encourage conservation behavior (WRA 2004). Monthly billing with understandable billing documents that clearly show the volume consumed and, if possible, comparisons with previous usage and usage by other similar customers is ideal.

Tap or connection fees – Connection fees are set by the water utility and apply to developers seeking new water service and occasionally to customers who intend to significantly change the usage patterns at an existing site. Utilities may have differing objectives when establishing their connection fee structure, but generally the idea is for new customers to pay the full buy-in costs associated with joining an existing water system. The buy-in costs should be thought of as covering both water resources and facilities costs. Water resources costs are normally based on the annual volume of water required to serve the new customers and the value associated with that amount of water. These normally include water rights, raw water contracts, reservoir storage costs and other raw water facilities. The facilities costs are based on the percent of the treatment and distribution capacity of the system that will be required to serve the new customer. These are normally based on peak day use of the customer and peak day capacity of the system.

In order to be both fair and accurate it is important for tap fees to consider both annual volumes and peak demand for their new customers. If peak demands are the only factor used for setting tap fees then they provide no incentive for investing in efficiency. Obviously, customers with lower peak flow demands are less expensive for a utility to serve from a facilities perspective, but if only peak demand is used to set tap fees then inequitable situations will occur when customers with low peak demands but high volumetric usage pay smaller tap fees than customers with high peak demands and low volumetric use. Tap fees will incent developers to underestimate demands. Utilities should carefully review anticipated demands before approving.

> This tap fee concept is essentially the same as requiring new customers to dedicate water rights to the utility based on anticipated future demand.

Utilities have the opportunity to ensure that new buildings and new customers added to a water system are efficient right from the start by developing conservation-oriented tap fees where part of the connection charge is based on the anticipated annual water demand at the site. This

provides a built in incentive for new customers to equip their facilities with water efficient fixtures and appliances and landscaping so they can save money on their connection fee.

Tap fees can be alternative to rebates and other incentives for new construction. If both types of programs are implemented by a utility, the programs must be designed to work in concert.

Implementation of a tap fee structure that considers both anticipated peak flows *and* anticipated annual demands requires a utility to develop a methodology for estimating future demands for new customers. This is much the same as establishing a water budget for a site and utilities that have implemented water budget-based rates can link water budgeting for tap fees with establishing the water budget to be used for billing purposes. Water budgets also provide an important mechanism for insuring that low demands estimated for the tap fees carry over into actual low demands during normal use.

The City of Westminster is a leader in the utilization of volumetric and flow rate based tap fee structures. A copy of the tap fee ordinance from Westminster in included at the end of this best practice description.

Customer categorization and information – Many utilities already have basic customer classification information. At the most basic level utilities distinguish between residential and non-residential customers. An improvement over the basic level is to distinguish between single-family residential, multi-family residential (with the number of units served per tap included), dedicated irrigation, commercial, industrial and municipal water users.

To effectively benchmark and target water conservation to the customers with the greatest potential to conserve, more detailed classification is recommended, particularly in the non-residential sector. The established North American Industry Classification System (NAICS nee SIC) provides a uniform numerical classification system that is ready for utilities to use. NAICS offers several levels of specificity (for example – restaurants can be further subdivided into fast food restaurants, French Restaurants, Chinese Restaurants, etc.). NAICS codes are created and maintained by the U.S. Census Bureau. References and files may be obtained through the Census Bureau website (www.census.gov/eos/www/naics/).

Adding a NAICS code classification, as appropriate for each customer requires the ability to add at least one new field to the utility customer database. Most importantly, this field must be populated. For residential and irrigation-only customers, the code assignment process can often be accomplished quickly because utilities already know who these customers are at the desired level of precision. For the commercial and municipal sectors, classifying each customer may require significant effort including surveys, telephone calls, site visits, and web research. Once established, the classification of new customers can be handled by customer service personnel when each account is set up.

Water Savings and Other Benefits

Range of Likely Water Savings: Varies

Metering – Studies on the impacts of metering have found significant water savings for metered customers vs. unmetered customers. Since metering in Colorado is required by statute these savings may have been fully realized already. Typical water savings achieved through metering are in the range of 10 – 40% reduction in residential demand with more recent studies showing a 15% reduction (Mayer 2004, Porges 1957, Hanke and Flack 1968, Hanke 1970, Flechas 1980). However, these savings will not be realized if customer meters are not being read and billed appropriately. Separate metering and billing of irrigation accounts and multi-family apartments has also been shown to be an effective conservation measure resulting in measurable water savings.

Rate structure – The water savings achieved from implementing a new rate structure depend greatly upon the design and rates of both the new and the old rate structures. One key to determining savings is that much of the excess water use in a system is associated with a small number of customers. Consequently, conservation based rate structures are able to reduce average water use while impacting a relatively small number of customers. However, utilities must be careful to ensure revenue stability when implementing rate structures. Utilities that implement water budget-based rate structures can anticipate demand reductions on the order of 10 – 30% based on the experience other utilities (Mayer, et. al. 2008).

Tap or connection fees – Recent studies have found that water efficient new buildings and landscapes can use 30 – 70% less water than comparable standard buildings and landscapes constructed without concern for water efficiency. Conservation-oriented tap fees also have the benefit of equity and fairness to both new and existing customers in that they base charges on the anticipated demands of new customers and the burden of water service they place on a water system that has already been bought and paid for by existing customers. Tap fees based solely on meter size or anticipated peak demand may achieve only a portion of this level of equity. Agencies must be aware that offering customers savings on their tap fees for conservation efforts can create an incentive to under-estimate demands. This is why if these types of incentives are offered for tap fees they should be linked to water budgets or some method to ensure that the promised reductions in demand actually occur.

Customer categorization and information – Customer categorization by itself is not a water conservation measure. However, the ability to identify similar customers and to compare their water demands against each other and established benchmarks provides utilities with a powerful targeting tool for directing limited conservation resources to the customers who have the most potential to conserve. Utilities that have a better understanding of who their customers are and the nature of their water needs are better able to provide a high level of service. As water utilities evolve and adapt to the inevitable changes and challenges of the 21st century, customer level information will play an increasingly important role as utilities strive to meet the water needs of an ever changing customer base.

How to Determine Savings

When examining changes in water use due to broad scale efforts such as metering or rate structure changes it is important to make corrections for changes in climate, population, and customer composition. Other factors such as special events that occur in one year but not another could also impact results.

Metering – Water savings from metering can be measured by comparing treatment plant production records before and after metering is implemented, corrected for changes in climate and population.

Rate structure – Water savings from a change in rate structure can be measured by comparing demands before and after implementation of the rate structure. Ideally at least one full year of data after the rate structure has gone into effect should be obtained, but comparisons of monthly demands can be made. Corrections for differences in climate, population, and possible other factors should be considered.

Tap or connection fees – Conservation-oriented tap fees result in customers joining the water system with smaller water demands than they would have otherwise. Direct measurement of the impact of conservation-oriented tap fees is not feasible, but it is possible to compare demands against what might have happened without the conservation tap fee incentive.

Customer categorization and information – No direct and measurable water savings are achieved through improved customer categorization, but this effort can greatly improve the efficacy of many other conservation efforts.

Savings Assumptions and Caveats

Lifespan of Best Practice

- **Metering** – Meters must be regularly tested, maintained, and replaced. A meter in the field should last 15 years or more although automated meter reading (AMR) meters often have batteries that must be replaced every five years. Older meters tend to lose accuracy. Under-reporting (particularly at low flows) is more common than over-reporting.
- **Rate structure** – Not applicable. A utility rate structure does not have a fixed lifespan. A rate structure stays in place until a utility decides to change or replace it.
- **Tap or connection fees** – Not applicable. A utility tap fee structure does not have a fixed lifespan. A tap fee structure stays in place until a utility decides to change or replace it.
- **Customer categorization and information –** Customer categorization information must be maintained and updated, but does not have a set lifespan.

Utility Savings Perspective

- **Metering** – Metering reduces total water demand and makes customers accountable for their water use. Since all customers in Colorado who are part of a utility with 600 connections or more are supposed to be metered there should be little or no water savings available from metering at this time. However, there may be potential savings from individually metering

apartments and condo units, provided the installation costs do not outweigh the benefits for some utilities.

- **Rate structure/individualized rates** – A well designed conservation-oriented rate structure provides a utility with stable and sufficient revenue while helping to ensure that customers use water efficiently by charging them higher rates for higher use. Flat-rate storm water fees may dampen the effects of rate structures. Utilities that implement water budget-based rate structures can anticipate demand reductions on the order of 10 – 30% based on the experience of other utilities (Mayer, et. al. 2008). A lot depends upon the circumstances of the utility and in particular the differences between the old and new rate structure may impact overall demand changes. Wastewater charges should also be considered, as in some cases they are higher than water rates and may be the real price driver for inefficient customers.
- **Tap or connections fees** – A conservation-oriented tap fee structure provides incentive for customers to join the water system at a better level of water efficiency and can result in 30 – 70% less water use than in comparable buildings and landscapes constructed without concern for water efficiency. From the utility perspective this helps slow the growth of demand in the water system and can result in reduced capital expenditures over time.
- **Customer categorization and information –** The measure does not save water by itself, but enables targeting of water conservation initiatives at the customers who have the greatest potential to save (i.e. to the least efficient users in their class). From the utility perspective, customer categorization can make other conservation efforts more cost effective.

Customer Savings Perspective

- **Metering** – Metering provides customers essential information about the amount of water they use each billing period. This helps customers to make rational water use behavioral decisions and may encourage physical efficiency improvements. However, in a number of cases including many multi-family and commercial properties water bills are paid by an accountant or someone completely separate from the property itself. In these cases the people that actually use water on the site are not provided any information about their consumption patterns or the cost of that consumption. This is an information gap that utilities and customers alike may seek to overcome in the future.
- **Rate structure** – The rate structure directly impacts how much a customer pays each month for water and wastewater service and consequently may influence people to try and use less water in some circumstances. When customers use more water they pay more for the water they use. However, because the water bill only arrives once a month the linkage between higher consumption and rates is not always obvious. Additional information, such as comparisons with previous consumption, neighboring properties, or established benchmarks (what a customer could or should be using) provides useful context. Research has shown that customers frequently respond to comparisons which show their consumption to be different from their neighbors or the "social norm" (Beckwith 2009).
- **Tap or connection fees** – Customers can directly benefit from conservation-oriented tap fees. Conservation-oriented tap fees result in lower connection charges for developers who commit to installing water efficient fixtures and landscaping during the construction process. This also results in lower water bills for eventual customers than they would have received with a less efficient property. The actual cost savings to the customer is determined by the specific tap fee structure and water rate structure in place.

- **Customer categorization and information –** No direct water savings for customers are associated with customer categorization. But if water agencies implement improved customer categorization and then utilize this information to better target water conservation programs, customers should realize benefits.

Society Perspective

- **Metering** – Metering assures that all customers are responsible for the water they use, providing equity and accountability.
- **Rate structure** – A well-designed conservation-oriented rate structure accomplishes several key societal goals: stable and sufficient revenue for the community water system; a fair and effective price signal that encourages conservation and ensures that those who use more water and thus place a higher cost burden on the system pay their fair share; a mechanism for providing useful feedback to customers about their water demand patterns.
- **Tap or connection fees** – Communities can benefit from the water savings achieved through conservation-oriented tap fees. Conservation-oriented tap fees help ensure that new customers who join the water system pay their fair share of the system development charges based upon the real demands they will place upon the system. This encourages new customers to join the system at a greater level of efficiency.
- **Customer categorization and information –** The societal benefits of improved customer categorization and information hinge on the utilization of this system to improve targeting of water conservation efforts.

Goals and Benchmarks

Metering – 100% metering is the law in Colorado. As such, metering of all water use is the goal and the benchmark.

Rate structure – The goal should be for every utility in Colorado to have a well designed conservation-oriented rate structure that provides stable and sufficient revenue.[4]

Tap or connection fees – Conservation-oriented tap fees are more important in growing communities where significant numbers of new customers are joining the water system each year. Colorado utilities should have the goal of developing fair and reasonable tap fees that encourage water efficiency during the construction process and which ensure that new customers pay their fair share of system and water resources development costs.

Customer categorization and information – All water providers should know who their customers are and should understand what volume of water use constitutes "reasonable" or "typical" consumption for that type of customer.

[4] Conservation-oriented rate structure = inclining block, water budget, or seasonal rate structure as described earlier in this best practice.

Costs

Utility Costs

Metering – Meters are part of a water utility's infrastructure and costs for installing, maintaining, repairing, and replacing meters are usually part of annual budgets which are in turn funded through water sales to customers. Water meters themselves range in cost from under $50 to thousands of dollars depending upon the size, type, and quality of the meter. AMR infrastructure is more expensive initially, but can be cost effective over time if meter reading costs can be reduced or eliminated.

Rate structure – The cost of implementing a water conservation-oriented rate structure varies depending upon many factors including:

- Cost of service study that often precedes implementation of a new rate structure.
- Customer information and billing system – is new billing software and/or hardware required to implement the proposed rate structure? Can the current billing system be adapted to incorporate proposed changes?
- Data requirements – is additional data required to establish the new rate structure? Water budget-based rate structures can have significant one-time data development costs, although many utilities have found the data necessary to establish water budgets is cheaply (or freely) available from already existing geographic information systems (GIS) coverage or county tax assessor records.
- Customer information – customers must be informed and educated about upcoming changes to water rates and charges and rate structures. Utilities should budget staff time and money for the important task of informing customers about any changes to the rate structure.
- Customer service – some rate structures such as water budgets, may have ongoing customer service requirements. When implementing water budget-based rates it is common for utilities to establish a review process whereby customers may request to have their assigned budget altered and can apply for a variance (because of errors, circumstances unforeseen by the utility, etc.). Many utilities that implement water budget-based rates experience a higher number of review requests during the first year or two after implementation. Once customers become accustomed to the rate structure requests for reviews stabilize at a minimal level. Water budget reviews are usually managed by customer service personnel and increased staffing levels may be required in the months following implementation.

Most of the water budget-based rates have been implemented "in house" by utility staff with limited outside hired help, but some implementations are more expensive. Documented implementation costs range from free (in-house development using existing hardware and software) to more than several million dollars (consultant developed cost of service analysis and rate structure and new billing hardware and software) (Mayer et. al. 2008).

Tap or connection fees – Implementing a new tap fee structure usually requires significant research and planning to ensure that the fees will cover all necessary costs and are equitable for both new and existing customers. A cost of service study often accompanies implementation of

a new tap fee structure. The cost of implementing a conservation-oriented tap fee structure is difficult to predict and will vary depending upon the current structure and the significance of the changes proposed.

Customer categorization and information – Categorizing customers using the NAICS should be relatively inexpensive for small utilities with few customers and limited categorization diversity. Large water utilities with a diverse customer base will likely find the process more expensive and time consuming particularly if a large survey or data collection effort must be undertaken. Utilizing existing data, such as county tax assessor records or commercially available databases of commercial enterprises, may expedite the process. The cost of adding additional fields to the billing database to accommodate customer categorical information should also be considered.

Customer Costs

Metering – Meter purchase and installation costs are not directly billed to customers except in rare circumstances. From the customer perspective the most significant impact of metering is that they are accountable to pay for the measured amount of water used rather than paying a fixed fee for an unlimited amount.

Rate structure – When a conservation-oriented rate structure is implemented, customers with lower water use will likely see their monthly bill[5] decline, but high demand customers may experience a significant increase in water costs. This is exactly the intent of a conservation-oriented rate structure – to charge higher rates for higher use with the goal of incenting customers to adopt more water efficient behaviors and to install more efficient fixtures and appliances. Customer costs will of course vary depending upon the rate structure implemented and all of the factors that go into determining the monthly bill for each specific customer.

Tap or connection fees – The idea of conservation-oriented tap fees is for utilities to base connection charges on the anticipated future peak and total demand at the site. Developers wishing to pay a lower tap fee can agree to implement water efficiency measures as part of the building construction process. From the customer perspective, this will reduce the initial cost of joining the water system (the tap fee), and the ongoing monthly cost of water service.

Customer categorization and information –There are no customer costs associated with utility customer categorization.

Examples

Metering

Colorado Revised Statutes 37-97-103 "Water Metering Act" requires all utilities in Colorado to be fully metered as of January 1, 2009. Examples of fully metered water utilities can be found all across Colorado.

[5] Monthly billing is a best practice. Bimonthly or quarterly billing does not convey a price signal as effectively.

Rate structure

Several rate structure examples are provided below to demonstrate the different rate forms discussed in this best practice. The actual water rates cited below were accurate as of January 2010, but utility rates change annually in many places.

Increasing block rate structure – Glenwood Springs

Glenwood Springs is a fully metered community and currently bills its customers on a monthly basis using a three tier increasing block rate structure. This rate structure has been in place since January 2000. The City's rate structure provides for 5,500 gallons of water per month in tier 1, an additional 12,000 gallons of water per month in tier 2, and all monthly usage greater than 17,500 gallons is billed at the tier 3 rate as shown in Table 4-1. Separate rate structures apply to bulk water purchases and raw water customers.

Glenwood Springs billing system and water rates

The City utilizes a computerized billing system and is in the process of upgrading the entire metering infrastructure to the Badger Orion AMI system. This system enables frequent remote interrogation of water meters. The City is already taking advantage of this capability to help identify leaks and abnormal usage in the sites where the meters have been installed. The meter replacement project will be implemented over a 4 to 5 year time frame.

The standard (not bulk or raw water) schedule of rates and charges for water customers in Glenwood Springs is shown in Table 4-1. In this rate structure, Tier 2 represents a 33% increase over Tier 1 and Tier 3 represents a 33% increase over Tier 2. The rates themselves are set based on the cost of service requirements of the City.

Table 4-1: Glenwood Springs water rates and rate structure, 2009

Rate Tier	Water Rate Per 1,000 gallons
Tier 1 – up to 5,500 gallons/month	$1.76
Tier 2 – from 5,501 – 17,500 gallons/month	$2.34
Tier 3 – over 17,500 gallons/month	$3.11
Fixed monthly service fee	$10.25/month

Increasing Block Rate and Seasonal Rate Structure – Fort Collins Utilities, Colorado

All Fort Collins Utilities water customers are metered. Historically, residential customers paid a set rate per 1,000 gallons regardless of water use. Since January 2003, single-family and duplex water rates are tiered. For many years, commercial customers have had a two-tier water rate. Beginning in 2003, commercial and multi-family customers are billed seasonal rates–with higher rates from May through September. Commercial rates still have a second tier for higher water use. Table 4-2 presents the 2010 residential water rates and rate structure utilized by Fort Collins. In this rate structure, for single-family accounts, Tier 2 represents a 33% increase over Tier 1 and Tier 3 represents a 15% increase over Tier 2.

Table 4-2: Fort Collins residential water rates, 2010

		Single-Family	Duplex
	Base Charge	$ 13.21	$ 15.51
Tier	**Tier Size**	**$/1,000 gal.**	**$/1,000 gal.**
1	0-7,000 gal	$ 2.04	
	0-9,000 gal		$ 1.97
2	7,001-13,000 gal	$ 2.35	
	9,001-13,000 gal		$ 2.26
3	Over 13,000 gal	$ 2.70	$ 2.60

In Fort Collins, multi-family customers have a seasonal increase in rates. The volume charge is 25% greater during the five lawn-watering months (May - September) than in the other months (October - April) as shown in Table 4-3. These seasonal rates are due to peak demand for irrigation.

Table 4-3: Fort Collins multi-family seasonal water rates, 2010

Multi-Family Water Rates	**Winter (Nov-Apr)**	**Summer (May-Oct)**
Base Charge (per account)	$13.10	$13.10
Additional per dwelling unit	$4.37	$4.37
Volume Charge per 1,000 gallons	$1.90	$2.38

Increasing Block Rate and Modified Water Budget Rate Structure – Aurora Water

Aurora Water meters all customers and in 2010 utilized an increasing block rate structure for single-family residential customers (and multi-family up to 4 units); and an allocation based rate structure (essentially a modified water budget) for large multi-family, commercial, and irrigation only customers. Aurora Water's single-family residential rate structure is presented below in Table 4-4.

Table 4-5 shows Aurora Water's commercial rates which are allocation based. Each commercial customer is given an annual allocation which is the higher of 2005 and 2006 total annual consumption plus an additional 25% allowance. Aurora's water rates start at a high level which means water customers will be confronted with a substantial bill even if their usage is low. However, the relatively small price differential between Tier 1 and Tier 2 may not alert customers who exceed their allocation. Furthermore, water budgets based on historical use (such as Aurora's) are inherently less conservation-oriented since customers who have historically used water inefficiently are rewarded with a high allocation and customers who conserved water in the past are given a lower allocation. Empirically derived water budgets, as presented below for Centennial Valley, Castle Rock, and Boulder, are generally considered superior from a water conservation perspective.

Table 4-4: Aurora Water residential water rates and base charges, 2010

Residential, Single Family, Multi Family (1-4 units)		
Usage Tier	**Cost/1,000 gal. Monthly Use**	
Tier 1	$5.27	Up to 20,000 gallons
Tier 2	$6.00	20,001 to 40,000 gallons
Tier 3	$7.50	More than 40,001 gallons
Base Charges That Apply to All Customer Classes		
Meter Size	**$/month**	
5/8” & 3/4"	$12.06	
1” & 1 1/4”	$17.77	
1 1/2"	$27.31	
2”	$38.74	
3”	$69.23	
4”	$103.53	
6”	$198.81	
8”	$465.60	

Table 4-5: Aurora Water commercial water rates, 2010

Commercial	
Cost/1,000 gal. Monthly Use	
Tier 1	$5.67 up to 100% of allocation
Tier 2	$6.24 greater than 100%
Annual allocation = the higher of 2005 and 2006 total consumption, plus 25 percent allowance. A 10 percent surcharge will be applied for consumption over the annual allowance.	

Water Budget-Based and Seasonal Rate Structure - Centennial Water and Sanitation District

In response to the drought in 2002, and to encourage water conservation, Centennial Water and Sanitation District and the Highlands Ranch Metro District implemented an innovative water budgeting concept for water customers. The rate structure includes progressively higher tiered rates over the allotted budget to encourage conservation. The method of computing residential bimonthly water bills is based on an indoor and outdoor allocation component. The indoor residential component is based upon average wintertime usage and may be adjusted for household population. The outdoor irrigation component allows residents an amount tailored to their individual lot size which is allocated across the irrigation season based on historic climate conditions. The indoor non-residential budget is based on meter size. The outdoor irrigation component allows non-residential customers an amount tailored to their lot size if a separate irrigation-only meter is installed. The 2009 water rates for the Centennial Water and Sanitation District are shown in Table 4-6.

Table 4-6: Centennial Water and Sanitation District water rates, 2009

	Residential		Non-Residential	
	Summertime	**Wintertime**	**Indoor**	**Irrigation**
		(non-irrigation)	**Only**	**Only**
Usage of Budget	per 1,000 gallons			
Up to 100%	$2.55	$2.55	$2.55	$2.55
100 to 120%	$3.50	$3.50	$3.50	$4.00
120 to 140%	$5.25	$3.50	$3.50	$7.00
140% and over	$7.90	$5.80	$5.80	$12.00
Water service availability fee = $25 per bimonthly period.				

Water Budget-Based and Seasonal Rate Structure – Town of Castle Rock

The Town of Castle Rock implemented a water budget-based rate structure with a seasonal component in 2009. Water budgets in Castle Rock are based on an indoor and outdoor component. The indoor component of the water budget for each customer is sized from the average winter monthly consumption (AWMC) use at the site (i.e. the average of monthly consumption between Nov. – Feb.). The outdoor component of each customer's water budget is based on the landscape area at the property. The 2010 residential water rates for Castle Rock are shown in Table 4-7 and Table 4-8 and the non-residential water rates are shown in Table 4-9.

Table 4-7: Town of Castle Rock residential water rates, 2010

Table 4-8: Town

	Irrigation Season, 4/1 - 10/31	**Winter Season, 11/1 - 3/31**
Block	**$ per 1,000 gallons**	
Block 1 (Up to 100% of AMWC)	$2.44	$2.44
Block 2 (>100% of AMWC and up to 100% of outdoor budget)	$4.24	$4.24
Block 3 (Above AMWC + Outdoor budget)	$7.04	N/A

AMWC = average monthly winter consumption

of Castle Rock water service charges, 2010

Meter Size	**Monthly Charge**
3/4"	$13.52
1"	$14.33

Table 4-9: Town of Castle Rock non-residential water rates, 2010

Category and Block	Irrigation Season, 4/1 - 10/31	Winter Season, 11/1 - 3/31
	$ per 1,000 gallons	
Irrigation		
Block 1 (Up to 100% of budget)	$5.98	NA
Block 2 (>100% of budget)	$9.01	NA
Multi-Family		
Block 1 (Up to 100% of AMWC)	$2.51	$2.51
Block 2 (>100% of AMWC and up to 100% of outdoor budget)	$4.61	$3.33
Block 3 (Above AMWC + Oudoor budget)	$6.94	NA
Commercial		
Block 1 (Up to 100% of AMWC)	$2.51	$2.51
Block 2 (>100% of AMWC and up to 100% of outdoor budget)	$4.52	$3.46
Block 3 (Above AMWC + Oudoor budget)	$6.81	NA
Water Service Charge		
Meter Size	**Monthly Charge**	
3/4"	$13.52	
1"	$14.33	
1.5"	$15.93	
2"	$19.15	
3"	$27.19	
4"	$41.67	
6"	$88.35	
8"	$173.63	

AMWC = average monthly winter consumption.

Water Budget-Based Rate Structure – City of Boulder

The City of Boulder established a water budget-based rate structure in 2007. In Boulder, budgets are established by customer type: single-family residential, multi-family residential, irrigation only and commercial/industrial accounts. For most customers, the annual water budget is the sum of the indoor and outdoor water allocations for a particular month.

- ***Single-Family Residential Accounts***
  Monthly water budget = indoor allotment (7,000 gallons for a family of four) + outdoor allotment (based on customer-specific irrigable area and seasonal watering needs).
- ***Multi-Family Residential Accounts***
  Monthly water budget = indoor allotment (4,000 gallons per dwelling unit with 1-2

bedrooms) + outdoor allotment (based on customer-specific irrigable area and seasonal watering needs). Dwelling units that have more than two bedrooms may receive an additional 1,000 gallons per month, but the total indoor allocation per dwelling unit may not exceed 7,000 gallons per month, which is the equivalent of five bedrooms.

- ***Irrigation-Only Accounts***
  Monthly water budget = outdoor allotment (based on customer-specific irrigable area and seasonal water needs).
- ***Commercial/Industrial/Institutional (CII) Accounts***
  CII customers may choose from the following options:
    - **Average Monthly Use (AMU)** - This is the default option. The AMU budget is calculated using the historical average of 12 consecutive months of water use for that account, so that every month's water budget is the same. Customers can apply to change the timeframe used for the 12-month average. (The default timeframe is January through December 2005.)
    - **Historical Monthly Use (HMU)** - The HMU budget is calculated using a rolling three-month average for each individual month. For example, the average of the past three January's use would be next year's January budget.
    - **Indoor/Outdoor** - The Indoor/Outdoor budget is similar to the single-family budget in that it is comprised of both an indoor and an outdoor water allocation. The indoor allocation is based on the most recent Average Winter Consumption (AWC), which is the average water use for that account for December through March. The outdoor allocation is calculated based on irrigable area, including right of way, and seasonal watering needs.
    - **Efficiency-Standard** - This option allows for a specific customized water budget. The customer must hire a professional engineer to evaluate and recommend a personalized indoor budget, which then must be reviewed and approved by the City. The customer will be charged a fee for the City review.

Boulder's water rates are shown in Table 4-10.

Table 4-10: City of Boulder water budget-based rates, 2009/2010

Billing Block	Rate per 1,000 gallons	% of budget
Block 1	$2.06 (3/4 the base rate)	0% - 60%
Block 2	$2.75 (the "base rate")	61% - 100%
Block 3	$5.50 (2 x base rate)	101% - 150%
Block 4	$8.25 (3 x base rate)	151% - 200%
Block 5	$13.75 (5 X base rate)	Greater than 200%

Tap or Connection Fees

The idea of conservation-oriented tap fees is for utilities to base connection charges on the anticipated future peak and total demand at the site. Developers wishing to pay a lower tap fee can agree to implement water efficiency measures as part of the building construction process. From the customer perspective, this will reduce the initial cost of joining the water system (the tap fee), and the ongoing monthly cost of water service.

In the example below from the City of Westminster, tap fees are based on a variety of factors including the type of business, the size of the business, and the proposed irrigated area. Staff from Westminster regularly work with new customers who upon learning about their impending tap fee find significant ways to reduce demands through improved plumbing fixtures and landscape efficiency so that they can obtain a lower tap fee from the City.

City of Westminster Non-Residential Tap Fee Calculation Instructions

- Rather than basing non-residential tap fees on the size of the tap Westminster has determined that a more equitable method would be to base the fee on the type, size and historical usage of similar businesses.
- A non-irrigation tap fee contains three components;
    1. The Water Resources Charge
    2. The Treated Water Investment Charge
    3. The Connection Charge
- The first step is to determine the business type.
- The size of the facility is then calculated based on the type of business. For example if the business is a motel the usage is based on the number of units while a restaurants usage is based on square footage.
- The size is then multiplied by the unit use per year.
- The sum (total usage per year) is then divided by 140.000, which is the amount of a base service commitment (SC).
- The result is the number of service commitments required which is then multiplied by the Water Resources Charge per SC. The product is the Water Resource Charge portion of the Tap Fee for the facility. The Water Resources charge is directly related to the cost of the City to purchase raw water rights to supply the required annual amount of water to the customer's tap.
- The customer requests a specific tap size based on fixture unit calculations. The building Division reviews the tap size based on the plumbing code and develops a final tap size.
- The Treated Water Investment Charge is based on the tap size and listed on the Tap Fee chart. The water tap size, and resulting maximum flow needs, directly impact the sizing of the City facilities and the Treated Water Investment portion of the tap fee recovers the related portion of that investment.
- Finally the connection charge is applied based on the size of the tap. The connection charge covers the actual costs to the City to calibrate and install the commercial water meter.
- The three portions of the fee are added to produce the total Tap Fee.

Irrigation Water

- Any lot with irrigated area over 40,000 square feet (SF) would require a separate irrigation tap.
- The irrigation portion of the Tap Fee is to be calculated for separate irrigation taps, and where irrigation is included in the domestic tap. *The fee is calculated by*

multiplying the irrigated area by the per square foot cost for both low and high water areas.

- The tap fee for irrigation is based on water need. High water use areas (turf) are based on a need of 18 gallon per square foot per year. Low and medium water areas are based on a need of 9 gallons per square foot per year.
- Based on the flow needed for irrigation, the tap is sized and the connection charge is added to the square foot charge for the total irrigation tap fee. Irrigation taps should be sized based on actual pressure needs since there is very little tap fee impact from irrigation tap sizes.
- Irrigation taps on the City's Reclaimed Water system are billed at 80% of the potable tap rate.
- For lots under 40,000 square feet, the square foot charge is added to the potable tap fee and the tap is sized to include irrigation needs.

Sewer Tap Fee

- The sewer tap fee is calculated based on the water tap size. Metro sewer tap fees apply for the portion of Westminster generally south of 92nd Ave. Westminster sewer tap fees apply for areas generally north of 92nd Ave. Metro performs regional studies that determine the amount of wastewater produced based on water tap size installed, which is why the sewer tap fee is based on the water tap size.

City of Westminster Tap Fee Ordinance

8-7-3: WATER TAP FEES AND CREDITS: (1129 1217 1311 1365 1456 1527 1664 1788 2097 2123 2257 2298 2440 2634 2956 3281 3306)

(A) FEE CALCULATION:

1. An applicant for a water tap shall pay the fees set forth hereinafter, the total of which shall be known as the Water Tap Fee, or those portions that are applicable to the type of tap required by this Chapter. The Water Tap Fee or portions thereof are due and payable upon issuance of the water tap utility permit unless earlier paid as provided in Section 8-7-2(C). The Water Tap Fee may consist of the following individual fees.
    a. Water resources fee, being the share of the cost to provide adequate raw water supply to be utilized by the tap;
    b. Treated water investment fee, being the share of the utility system related to treating and distributing water to be utilized by the tap;
    c. Meter connection fee, being the actual City cost for installation of a meter with electronic remote readout device, when applicable; inspection of the tap, service line and meter pit installation; meter testing, when applicable; account and billing activation and other administrative procedures;
    d. and, when applicable, a fire connection fee, being that charge associated with a tap providing fire protection.

2. Water taps, water tap lines, and meters for the same service shall normally be the same size. If otherwise approved and/or required by the City, the tap and meter may be of different sizes in which case the fee for the meter size shall be paid. Water taps cannot be issued prior to building and/or tap entitlement approval. Any exceptions must be approved by the City Manager, i.e., conversion from well to the City water system, pursuant to Section 8-7-15.

3. The base water tap fees are as follows*:

Water Resources Fee	$6,435.00
Treated Water Investment Fee	$7,880.00
Meter Connection Fee	This connection fee is based on installed meter size and assessed on a per meter basis. See connection fee chart below.
Fire Connection Fee	$161.00

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*On April 1st of each year, the Water Tap Fee and its individual components shall be automatically increased in accordance with the Consumer Price Index (CPI) for the previous calendar year as established for the Denver metropolitan area. The meter connection fee may also be adjusted separately at any time, when necessary, to reflect the full cost of said connection to the City

4. The connection fees based on meter size are as follows:

METER SIZE (INCHES)	CONNECTION CHARGE*
5/8"	$283
3/4"	$283
1"	$226
1-1/2"	$226
2"	$283
3"	$340
4"	$396
6"	$453
8"	$511

5. The water resources and treated water investment portions of the tap fee for City owned facilities may be implemented at rates below 100% at the direction of the City Manager or his designee.

(B) RESIDENTIAL WATER TAPS: The following regulations apply to residential water taps:

1. The Water Tap Fee is based on a standard 5/8"meter size (commonly called a 5/8" by 3/4" meter) and is assessed on a per-dwelling-unit basis. One single-family

detached dwelling unit served by a standard 5/8" meter has an assumed average annual water usage of 140,000 gallons per year.

2. The ratio of the average annual water usage of each dwelling unit type to the water usage of a single-family detached unit establishes the service commitment factor (SC factor). The service commitment factors are listed in the following chart:

Residence Type	Single Family Detached	Mobile Home Space	Single Family Attached Unit	Multi-Family Unit	Attached Senior Housing Unit
SC factor	1.0	1.0	0.7	0.5	0.35

3. The residential tap fees shall be calculated by applying the respective SC factor to both the water resources fee and the treated water investment fee on a per unit basis plus the applicable meter connection fee, on a per meter basis, plus any applicable fire connection charge. If a tap and meter larger than the standard 5/8" meter is requested for any residential unit, the tap fees shall be calculated using the non-residential treated water investment calculation and SC factor in subsection (C)2 below.

4. No additional tap fees are required for landscaped areas on residential properties that are irrigated by the water tap for the individual unit or units. Tap fees for landscaped areas on or adjacent to residential properties, such as common areas, private parks and play areas, medians, and right-of-way strips, not irrigated by individual units shall be assessed as provided hereinafter under subsections (C) or (D).

5. Tap fees for clubhouses, swimming pools, and other common buildings or structures shall be assessed as provided hereinafter under subsections (C) or (D).

(C) NON-RESIDENTIAL WATER TAPS: The following regulations apply to non-residential water taps:

1. The City shall review and evaluate each applicant's requested water tap and meter size, and may adjust the requested tap and/or meter size if it determines the projected water usage will be greater than that requested.

2. Every meter size has a corresponding service commitment factor (SC factor) that is based upon multiples of a single-family detached dwelling unit's usage characteristics. The treated water investment fee portion of the tap fee shall be calculated by multiplying the treated water investment fee, in subsection (A)3 above, by the respective SC factor in the following chart:

METER SIZE (INCHES)	Treated Water Investment SC Factor
5/8"	1.0
3/4"	1.5
1"	2.5
1-1/2"	5.0
2"	8.0
3"	17.5
4"	30.0
6"	62.5
8"	90

3. The water resource fee portion of the tap fee shall be calculated based upon the estimated annual consumption, business type, and tap size required using methods and estimates developed by the Public Works and Utilities Department to determine the appropriate water resources service commitment factor, which shall be multiplied by the water resources fee in subsection (A)3 above.

4. All non-residential developments that contain an irrigated area less than 40,000 square feet, which area is served by the water tap and meter for the building, shall pay the irrigation tap fees calculated pursuant to subsection (D)4 below, in addition to the Water Tap Fee for the building.

(D) IRRIGATION WATER TAPS: The following regulations apply to taps for irrigation:

1. Separate irrigation taps and meters shall be required for all residential developments other than a development whose land area consists entirely of single-family detached lots. A separate irrigation tap and meter is not required for non-residential developments having less than 40,000 square feet of irrigated area.

2. Irrigation tap fees are required based on the area and type of landscaping. Landscape types are defined as either standard or low-water as determined by the Community Development Department.

3. An irrigation water tap shall be used only for irrigation purposes. Each irrigation water tap shall be assigned a service address and billing account in the name of the property owner or manager.

4. The irrigation tap fee consists of the meter connection fee plus the following square footage fees based upon landscape type:
   A. $1.43 per square foot for standard landscaping requiring an annual application of more than ten (10) gallons of water per square foot;
   B. $0.72 per square foot for low water landscaping requiring an annual application of up to and including ten (10) gallons of water per square foot.

(E) FIRE PROTECTION:

1. For any water tap which is intended to also provide fire protection, the fire connection fee shall be included in the total water tap fee in the amount provided for in subsection (A) 4 of this Section.

2. For any size tap that is determined by the City Manager, or his designee, to provide solely fire protection, only the fire connection charge shall be collected. The applicant for a fire protection tap shall furnish all materials and labor as specified by the City, including any device required to detect any use of water for purposes other than fire protection.

(F) CONSTRUCTION WATER METERING: If any water is required for construction purposes, construction water meters must be installed, deposits collected as per Section 8-7-10, and water usage billed at commercial rates as per Section 8-7-7(D). It is prohibited to install any by-pass or jumper to provide water service without the installation of a water meter as per Section 8-7-12.

(G) PROVISION OF MATERIALS AND LABOR: For all water taps, the applicant shall furnish all labor and all materials as specified by the City except as provided by this paragraph. The City shall provide the applicant with a list of required materials and approved suppliers at the time of application. The City shall provide all 5/8" by 3/4" meters. All other meter sizes shall be provided by the applicant as specified by the City at applicant's sole cost and must be tested for accuracy by the City before installation. After payment of all required fees and charges, the City shall install all meters.

(H) TAP CREDITS:

1. Upon issuance of a tap permit for the first new service tap, a tap fee credit shall be given in an amount to be calculated by subtracting the cost of the current water resources fee and treated water investment fee of the original tap from the current value of the water resources fee and treated water investment fee of the first new service tap.

2. Treated water service commitment credits shall be calculated based on the tap size of the former tap. Water resource service commitment credits shall be calculated based on the most recent ten (10) year average annual water consumption through the former water tap.

3. The amount of credit shall be fixed at the issuance of the first new service tap and may be used for payment for additional service taps that are used on the same property.

4. When a credit is used for full or partial payment for a new water tap, all other applicable charges shall be assessed using the then current fee schedule in effect.

5. In no instance shall cash refunds be granted.

6. No credit shall be given for the meter connection fee or fire connection fee portions of the Water Tap Fee.

7. If any tap is installed and completed without receiving a utility permit and the proper inspection and approval by the city, no tap fee credit shall be given.

8. If a demolition or vacation of a unit results in an abandonment of an associated water tap as defined in Section 8-7-5, no tap fee credit shall be granted at the time a new tap permit is issued.

9. Any service commitments associated with water taps to serve buildings demolished in established urban renewal areas may be transferred as tap credits to an urban renewal authority or the City for use in approved redevelopment projects within that same urban renewal area.