**Summary of Water Conservation Opportunities**

The Boerne Kendall County Water Committee (the “Committee”) was charged with, among other things, reviewing opportunities for water conservation in the City of Boerne and our region.  The following provides initial suggestions for City Council consideration.  The proposal is not comprehensive, nor does it exhaustively address the proposed opportunities from a cost, implementation, expected benefit or timing standpoint. Rather it provides Council a list of opportunities expected to collectively provide: (i) a meaningful impact on local water conservation; and (ii) a fundamental cultural shift that enhances the community’s appreciation for the importance of protecting our water quality, water availability, and limiting its waste.

Among the initial approaches that might be classified as “low hanging fruit,” the Committee recommends both a passive (i.e., interactive/informative website) and active (revision of ordinances, enhanced enforcement, etc.) methods that may be implemented with limited investment and in a relatively short time frame.

Community Education / Interaction

One of the most impactful means of enhancing current and proposed water conservation efforts is to raise the level of awareness and stress the importance of preservation of water supplies of all types in the community.  The Committee recommends adding an easily accessible multimedia platform tied to the City’s existing website and social media outlets, as well as those of other public and private entities such as the Cow Creek GCD, the Guadalupe-Blanco River Authority, & the Cibolo Center for Conservation.  Commonality and consistency between these sources of information, as it relates to conservation, will increase the potential impact on water consumers.

A vast majority of site links to useful and relevant resources are available on these websites and from the IT departments at New Braunfels Utilities, San Antonio Water System and the Austin Water Department.  Relevant topics for water consumers include proper watering techniques, means for leak and waste elimination, access to applicable ordinances and permitted days/times for irrigation, and the like.  For those customers interested in current events, partnering with those involved in conservation efforts, learning means to conserve water through technology (e.g., smart irrigation systems, flow metering) or mechanical means such as rainwater harvesting, similar sites provide links and tutorials designed to peak user interest and provide a starting place.

Other aspects of water conservation can be addressed on the website(s) as well.  Many state and federal government agencies provide resources addressing legal and practical issues concerning water use and conservation.[[1]](#footnote-1) Gardening and other landscape aficionados, such as the Hill Country Master Gardeners, provide helpful guidance on native plant selection, weed control, and other matters that favor conservation.  Third-party sites like these are commonly assembled by larger utilities and made accessible through their websites.

As the community’s conservation efforts take root, the website should mature into a more active platform.  It might be utilized to provide current information on available City or other rebate programs, contain a calendar identifying the date and time current events of interest are being held.  The website, or an app, could be modified to provide customers with the ability to report a leak, violation or other problem, or to calculate the customer’s current bill.

The following outline provides a broad overview of Multimedia Information/ Education Platform topics a dedicated webpage could cover:

1. Proper watering techniques – most people are not aware of the best practices for when and for how long their specific type of turf grass should be irrigated to be most effective for the health and growth of the lawn;
2. Elimination of leaks and other water waste – having in place programs, and possibly ordinances, that require periodic certification through onsite inspection of automatic irrigation systems would greatly impact water wasted during higher usage periods as would a simple water waste reporting system such as through a phone application;
3. Current City of Boerne, Cow Creek GCD, Kendall West Utilities, Ordinances – relating to conservation and drought management plans (DMPs), storm water control and other resource management;
4. Industry Group Links - American Water Works Association (AWWA), Texas Water Association (TWA), and Central Texas Efficiency Group each provide interactive and informative websites with useful information;
5. Governmental Agency Links - the Environmental Protection Agency (EPA)/Texas Water Development Board (TPWD) provide online resources helpful in identifying and addressing usage, quality and conservation resources;
6. News, Current Events, Pertinent Legal Issues – providing links, articles, commentary, and blog or comment areas for individual contributions covering current events, recent legal and technical developments and local issues of concern;
7. Partnerships Links – providing direct access to and information about existing conservation entities, e.g., – Hill Country Master Gardeners, Cow Creek Groundwater Conservation District, the Cibolo Center for Conservation, Guadalupe Blanco River Authority, etc.;
8. Rebate Programs – offering descriptions, forms and submission requirements for available rebate programs;
9. Online Bill Calculator – offering a simple interface that would allow customers to see their usage information and calculate the financial impact; raising customer awareness of the monetary value of conservation and efficient use of water resources; and
10. Other Opportunities:
11. Workshops on effective conservation in coordination with the City and other water entities;
12. Development of a water awareness and conservation curriculum for the Boerne ISD;
13. Establishing a formal recognition program for effective water use in the community (commercial, governmental, residential); and
14. Requiring new development projects to provide the City with a list of the best management practices for water conservation to be implemented in new projects.

The startup cost for a website and coordination with the websites of other water and conservation entities is expected to be nominal.   The Committee believes that education and information sharing are crucial to initiating a sustainable cultural shift necessary for conservation efforts to succeed.  Creating and maintaining such a website is an important and essential first step that will provide a primary point of communication to share information i with the public and, ultimately, may be used as a point of data collection and interaction for plan and process development.

Enhanced Requirements and Enforcement

The Committee also believes that there are city ordinances that could be modified in the near term to effect greater conservation of water resources.

One of these is to eliminate the weekend watering allowance in the current ordinance and drought management plan. Under current City of Boerne drought management ordinances, Stage 1 restrictions allow for watering on one weekday and one weekend day depending on the property address. Most cities and utilities in our region do not permit weekend watering day once the drought management plan has been implemented.  Taking this step makes identification of violators easy.  City personnel and concerned citizens could easily identify and report violations.  Also, weekend peak use, when residents are home and likely to use more water, should decrease overall demand during these periods.

A new ordinance or modifications to the existing rules limiting the type and percentage of turfgrass installed, based on proximity to the home and/or percentage of lot, would decrease irrigation requirements on a per user basis. For instance, some cities and utilities limit the amount of turfgrass that can be installed on a homesite. Typical restrictions are within 75’ of the home or no more than 50% of the lot. This type of requirement, coupled with limiting the types of turfgrass to hearty, low water consumption varieties can make a significant impact in future demand.

Increasing rates to target extreme usage, escalations during drought stages, and assessing penalties for recurring offenses would also provide new tools to control those using unreasonable quantities of water. Revenue from these violations can be used to fund rebate programs and other conservation efforts. Every water provider interviewed during the Committee’s research emphasized the importance of pricing and enforcement as an effective means for increasing awareness and funding other conservation efforts. To protect residential and commercial customers’ “essential” needs, the City would need to establish baseline usage levels designed to keep rates kept affordable for “lifeline” and “necessary” usage.  Escalating penalties/charges could then be assessed for high and extremely high consumption for irrigation or other nonessential purposes. Added revenue from extensive consumption could be used to fund enforcement, rebate programs, water harvesting, and other conservation efforts. Funds collected from these efforts should be held in a separate account from the operating budget and be used only for conservation-related programs.

Building code restrictions can also make a long-term impact.  For example, restricting irrigation sprinkler head locations to prevent strips and the likelihood of watering impervious cover will limit built-in water waste.  Similarly, the City might establish minimum soil depth requirements for new developments. Requiring a minimum of six inches of soil beneath turf provides the ability for greater water storage and root development, enabling grass to better endure hot weather and store moisture.

New requirements alone will not suffice.  The City will need corresponding mechanisms for enforcement of these requirements.  To this end, the City will need to educate customers and City personnel on the new requirements and foster a culture that supports education and enforcement.  Other utilities create customer hotlines or apps for reporting water waste (i.e., watering on the wrong days or wrong times, water running on streets and sidewalks, etc.).  The City of Southlake provides a form[[2]](#footnote-2) for this purpose on its website.2   Additional options may include a City staff mechanism for monitoring and reporting, by utilizing crews that are typically out in the community on a daily basis such as police, fire, code compliance, and utilities personnel.  Even though these representatives’ first priority is to accomplish their primary job function, other municipalities find this additional task to take a nominal amount of time that produces significant results.

Enhance Use of Automated Metering Information Systems (AMI)

 City of Boerne was an early adapter of AMI and the system is in place with daily information reporting back to the City's information management system. The AMI system could be utilized to provide timely feedback regarding leaks and water waste.

Some modifications would require programming changes in order to be implemented.  First, the City should consider establishing baselines for usage and track deviations from those to detect water losses on the distribution system.  Using this approach, the City can identify aberrant usage quickly and take action to identify the problem and resolve the overuse, whether due to breakage, abuse or otherwise. The City might also decide to establish goals and a timeline for water meter change out.  This program would ultimately give the City a uniform system to obtain comprehensive, real-time data used to monitor and address problem areas and planning.

To complement these programs and more fully utilize the existing AMI system, the City could develop a text, online and/or app-based interface.  This would allow customers to view their usage patterns and adjust behavior.  Further development of the existing platform might also enable the City to establish automated system alerts for usage anomalies (i.e. leak identification, irrigation issues, 24-hour a day consumption, etc.).  If a user interface or other communication method is developed to complement these enhancements, the City could establish direct communications with individuals or groups of customers to provide important information notices of violation, changes in water restrictions and the like.

Internet of Water and Modeling

The Committee recommends continuing and further development of its current data-driven efforts to develop practical tools to assist in decision making. The City recently retained the services of Vianey Rueda to prepare working models for water intake and use evaluation.  Simultaneously, the City agreed to support efforts to develop an Internet of Water to identify and develop usage information for the community’s water.

Potential Conservation Programs

Other providers find success in a variety of conservation programs that may benefit the City and its customers.  Revenue from the enforcement tools mentioned above could be used, in part, to subsidize part of the purchase price for the programs described below.

*Rebate Programs*

Handled correctly, other utilities are seeing results through rebate programs. One opportunity, the Water Irrigation System Evaluation (WISE) Program (an annual irrigation inspection for the largest users), is available at no cost to the City. WISE is a third-party water irrigation and inspection entity available in most Texas cities. It allows a city or water utility to provide these inspection services in the community without having to hire and train personnel. Customers simply contact the WISE vendor for a comprehensive review of the irrigation system that can be used to diagnose and propose solutions for existing system problems.

Another opportunity is support for customer purchase and installation of “smart” irrigation systems and other devices.  One type of these products, such as Flume and Rachio, is used to control irrigation through analysis of environmental and other factors.  Used appropriately, these irrigation tools have the potential to increase efficiency and potentially lower peak irrigation and consumption. However, irrigation tech upgrades require common sense use; since even those with up-to-date technology may increase water consumption if not correctly installed and monitored.

Rainwater harvesting provides another potentially useful tool for conservation. While these programs do not drastically impact water usage they tend to raise public awareness of the need to use best practices in water irrigation systems and provide an additional resource (rainwater) that also helps reduce runoff and drainage issues. A review of the plumbing code should be performed to identify and address any potential barriers within the code which might unduly restrict or prohibit rainwater collection.

New Braunfels and San Antonio Water System (SAWS) also maintain programs encouraging customers to replace turf grass lawns with artificial turf, native plants, permeable hardscapes and other solutions.  In turn, these utilities offer participating customers rebates following installation.  They find that these efforts to decrease or eliminate yards and grasses that require high levels of irrigation can provide for significant changes in total water consumption and lower long-term water needs of the community.

Most new construction already requires installation of low flow toilets, CEE washing machines, other water saving equipment.  Even though all toilets installed since 1994 are “low flow” some of the older, less efficient models remain. Incentivizing change of washing machines, toilets, faucets and similar items will likely have a minimal impact on overall conservation, but is another mechanism shown to raise community awareness and stress the benefits of water conservation.

*Community Program Opportunities*

Local Presentations, by third parties, City personnel, and conservation groups serve to increase community awareness and develop cultural change. Beginning with the website and extending with implementation of opportunities described in this memo, the City can create electronic and in-person forums for exchange of information and development of programs that will lead to the practical and cultural changes necessary to implement needed change. An organized program of making presentations on water conservation efforts and achievements enhances the general knowledge of the community regarding conservation efforts and emphasizes the focus on the need to conserve water.  That knowledge coupled with active participation from the City, industry authorities and customers will provide the “social” mechanism that assists adoption of a conservation mentality in the community.

*One Water Approach*

One Water is an integrated approach emphasizing that all water has value and should be managed in a sustainable, inclusive and integrative way. This includes:

1. A focus on achieving multiple benefits from water-related projects.
2. A systems approach that tackles problems based on the complete lifecycle of water as it progresses across the watershed, sub surface, and through infrastructure systems
3. Watershed-scale thinking and action that is respectful of natural ecosystems, geology and hydrology in an area.
4. Embracing right-sized, environmentally positive and lasting solutions. Inclusion of all stakeholders and stakeholder groups: utility, business, environmental, agriculture, etc. in water-related planning and decision making.

Many of the City’s existing policies would fit into a One Water framework, including Low Impact Development solutions that capture and filter stormwater, stream setbacks that preserve the environmental services of healthy waterways, development policies that preserve the healthy function of the recharge zone within the ETJ, and the reuse of water for irrigation.

Additional One Water solutions might include.[[3]](#footnote-3)

1. Polishing water for potable or industrial reuse by embracing new technologies or biofiltering effluent through constructed wetlands before treatment for contaminants and reintroduction to the water supply.
2. Encourage the creation of One Water buildings that collect and treat their own rainwater to use for drinking water and also reuse the greywater and stormwater for irrigation and non-potable purposes, such as toilet flushing.

*One Water Campus*

The Blue Hole Primary School in Wimberley is a shining example of a One Water campus. That campus was developed with water usage and conservation in mind from the ground up.  The school built in a rainwater and air conditioning condensate collection system that purifies the retained water for plumbing and irrigation.  This system treats onsite gray and black water and recycles it for use on campus.  These tools along with best management practices (native plant installation, permeable pavers, stormwater mitigation, etc.) make this project a financial success, saving an estimated $1 million and more than 237-acre feet of water over 30 years, while providing an example of good stewardship that is creating cultural change among students and their parents. The Wimberley School District is also using the project as an example that can be used in the commercial context as well. While this type of facility is unlikely to make financial sense for residential applications at this time, the school has proven its financial and practical viability in larger commercial or government projects. Under the right circumstances, the City, Kendall County, Boerne Independent School District or significant commercial developers could build with a similar plan.  Doing so would not only serve as a model for future local development, but also provide an added tool for effecting cultural change.

Continued Expansion of the Reclaimed Water Distribution System

The City partnered with two of the fastest growing developments on the east side of town to construct and expand the City’s retail reclaimed water distribution system. This is among the first of its kind in the State. In addition to the network of pipelines distributing potable water, a second complete reclaimed water distribution network is being installed as the developments progress. All automated systems in both developments use reclaimed water as their exclusive supply for landscape irrigation.

This project shows a dramatic reduction in annual potable water consumption at each participating property; between sixty to seventy percent. The developments are large enough that the cumulative reduction in these two neighborhoods alone dropped the overall system-side per-capita potable water consumption ten to twelve percent over the past three years.

It may not be economically feasible to extend this second water distribution network throughout the entire City. But continued expansion of the system in these two neighborhoods will reduce the overall potable water demand from the City’s wells and surface water resources, perhaps significantly. Opportunities to extend the system into other nearby neighborhoods or to large irrigation consumers such as recreational fields should be considered.

Implementation

While some of the suggestions in this memo might be handled with current staff and resources, the committee’s research suggests that implementing a successful conservation program requires dedicated staff with the experience, education and defined purpose of maintaining and improving the initiative.  Other utilities carefully monitor the practical and financial results with this type of staff and find their efforts to be worth the investment.

Given our neighbors’ experience, the substantial need for a comprehensive and living conservation plan, the Committee recommends that the City consider hiring a Utility Resource Conservation Coordinator.  Retaining someone for this position would expedite implementation of the plans the City decides to put in place and enable the programs to be carefully monitored and refined to maximize value.  In addition to oversight and implementation of community interaction projects, including the website, the new coordinator could enhance education and enforcement efforts, document program success and suggest modifications and assist with other utility conservation efforts, including electric and gas utility systems. Perhaps in the City’s upcoming 2023 Budget process, a new position could be added which would be focused on conservation efforts described above.

1. State agencies like TWDB have taken recent steps in this regard.  The agency notes that "[t]he emphasis on water conservation was revived in the 2022 State Water Plan. For the first time since it was first published in 1961, this plan featured a separate chapter on water conservation. This plan is also the first one to require regional water planning groups to establish a measurable goal to reduce per capita (per person) by municipal users. Nearly half of the 16 groups selected 140 gallons per person per day as the goal. Though water conservation is a management strategy to meet needs, the plan also reaffirmed the long-standing definition of conservation in the Texas Water Code as “the development of water resources.”  [↑](#footnote-ref-1)
2. *See* Form Center • Southlake, TX • Civic Engage (cityofsouthlake.com). [↑](#footnote-ref-2)
3. One Water Resource Links: [One Water Roadmap](http://uswateralliance.org/sites/uswateralliance.org/files/publications/Roadmap%20FINAL.pdf)  [One Water in the Texas Hill Country](https://hillcountryalliance.org/wp-content/uploads/2021/09/HCA_NWF_One_Water_Report_FINAL_SinglePage.pdf)  [Regulatory Impediments to Implementing One Water in Texas](https://gato-docs.its.txstate.edu/jcr:461305d9-e80e-47df-9b89-dc5b37c7193f)  and [The One Water School](https://www.onewaternews.com/the-one-water-school?fbclid=IwAR1kFgpDUC-RdQIndjrAPDvc--AF6Mahxu_zf-4PFTgb_tsVbr0Ktmjcp64). [↑](#footnote-ref-3)