HOUSTON
PUBLIC WORKS

WATER CONSERVATION PLAN

Effective Jul 1, 2019 – Jun 30, 2024

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INTRODUCTION

The Texas Water Development Board and the Texas Commission on Environmental Quality require utilities that provide treated water service to 3,300 or more connections to adopt a water conservation plan that meets the minimum requirements set forth in Title 30, Chapter 288 of the Texas Administrative Code, and to adopt an updated water conservation plan every five years. The 2019 City of Houston Water Conservation Plan (Plan) is the required five-year update to the 2014 City of Houston Water Conservation Plan and describes the City of Houston (Houston) water system and customer base, explains Houston's current conservation goals and targets, and discusses current and future programs to meet those goals and targets.

Houston provides water and wastewater service to its customers through the Houston Water service line of Houston Public Works. Houston Water strives to protect public health and the environment and provide superior customer service. Houston Water's goal is to provide all customers with drinking water that meets the State of Texas "superior" rating at pressures required to meet their daily needs. Houston is a large regional water supplier that provides both retail and wholesale service. Houston operates three water supply reservoirs, three water purification plants, 92 groundwater pumping stations, 142 ground water wells and over 7,000 linear miles of distribution pipeline across a four-county area consisting of more than 600 square miles, making Houston's water system one of the most complex water systems in the nation.

As of 2019, Houston provides treated water to approximately 2.4 million retail and wholesale customers and serves a total population of approximately 4.7 million. By 2070, this number is expected to reach 6.2 million.[1] To ensure that Houston can continue to provide treated water to this rapidly-growing region, customers must use water efficiently and conserve water when possible. The Texas Water Development Board emphasizes that water conservation is increasingly recognized as an integral part of water resource

[1] http://www2.twdb.texas.gov/ReportServerExt/Pages/ReportViewer.aspx?%2fProjections%2f2022+Reports%2fpop_County&rs:Command=Render

planning and management and plays an important role in meeting current and future water supply, utility infrastructure, and environmental needs.[2]

The State Water Plan, which details how Texas will address our state's growing water needs, calls for serious statewide conservation efforts to meet a quarter of Texas' future water needs.[3] Region H, the fast growing, mainly urbanized region in which Houston is located, has specific conservation goals articulated in the region's plan. The 2016 Region H Water Conservation Plan calls for 9.6% of future additional supplies to be met through municipal conservation and 15.7% to be met through irrigation (agricultural) conservation.[4] In an effort to meet these aggressive goals, Houston has implemented, and will continue to develop, a wide range of water conservation programs to educate and engage customers about the importance of water and what they can do to protect and preserve this essential resource.

[2]http://www.twdb.texas.gov/conservation/doc/StatewideWaterConservationQuantificationProject.pdf
[3]http://www.twdb.texas.gov/waterplanning/swp/2017/doc/SWP17-Water-for-Texas.pdf
[4]http://regionhwater.org/Reg_H_2016_RWP_20151116.pdf

REQUIRED WATER CONSERVATION PLAN CONTENT

A. Water System, Wastewater System, and Customer Use Characteristics

The water conservation plan must include evaluation of the water and wastewater system and customer use characteristics to identify water conservation opportunities and potential targets and goals. Completion of the Water Conservation Utility Profile, TWDB – 1965 as part of the evaluation is required and should be submitted with the Plan. The utility profile should include water sales and use for the following classifications: residential (both for single-family and multi-family), commercial, institutional, industrial, agricultural, and wholesale; as appropriate.

1. Houston Drinking Water System

Houston is a regional water supplier. Houston operates three water supply reservoirs, three water purification plants, 142 groundwater wells, 49 groundwater plants, 8 re-pressurization plants, and over 7,000 linear miles of distribution pipeline across a four-county area consisting of more than 600 square miles, making Houston's water system one of the most complex water systems in the nation. Eighty-five percent of Houston's municipal water supply is derived from Houston's three water purification plants, which have a combined production capacity of up to 640 MGD. These plants are the Northeast Water Purification Plant (rated at 80 MGD), which is located at Lake Houston and serves the northern region of Houston's service area; the East Water Purification Plant (rated at 360 MGD), which is located east of I-610 and west of Greens Bayou and serves the central region of Houston's service area; and the Southeast Water Purification Plant (rated at 200 MGD), which is located north of Clear Lake and serves the southeastern region of Houston's service area. These plants meter all water produced and pressurize water at between 80 and 90 psi. The remaining 15% of Houston's municipal water supply is provided by 142 groundwater wells, which have a combined production capacity of up to 200 MGD. Three of the wells are permitted by the Lone Star Groundwater Conservation

District, two of the wells are permitted by the Fort Bend Subsidence District, and the remaining 137 wells are permitted by the Harris-Galveston Subsidence District.

In 2018, Houston produced a total of 169.5 billion gallons of treated water, averaging 464 MGD daily. Total usage, by both retail and wholesale customers, was 143 billion gallons, averaging 392 MGD daily. A small portion of the total water produced, 439 million gallons, was used by Houston's water system for routine maintenance activities, such as line flushing. Non-revenue water totaled 17% of the overall production.

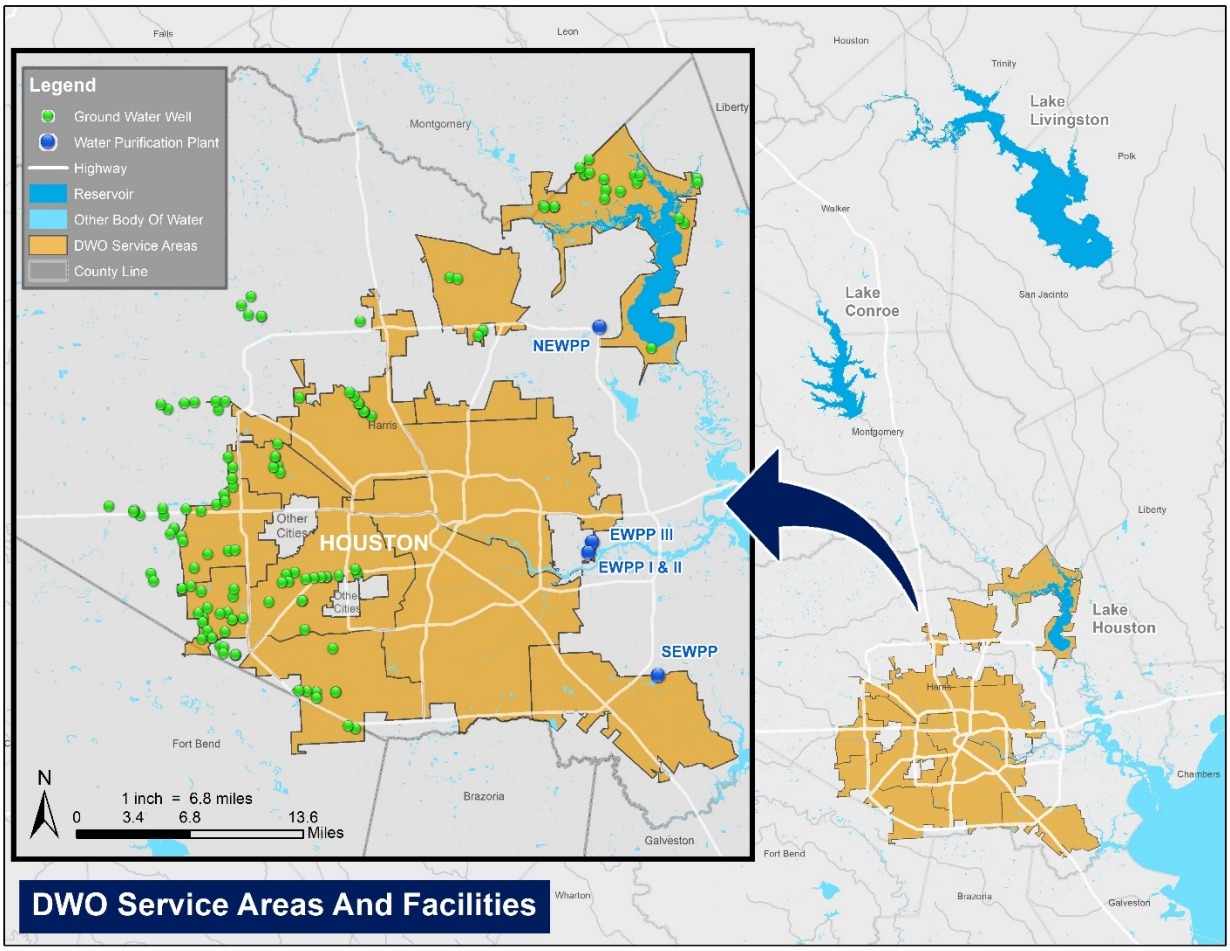


Figure 1. Map of Houston Water System Key Features.

2. Houston Wastewater System

Houston provides wastewater collection and treatment services to customers located inside Houston's service area. Houston also provides wastewater treatment services to municipal utility districts under contracts referred to as "wastewater subscriber agreements." Houston operates 39 wastewater treatment plants with a total permitted capacity of 564 MGD, 384 lift stations, and over 6,000 linear miles of collection pipeline. In 2018, Houston treated an average of 250 MGD of wastewater daily, which means there is capacity available to treat additional wastewater – and produce additional water for reuse.

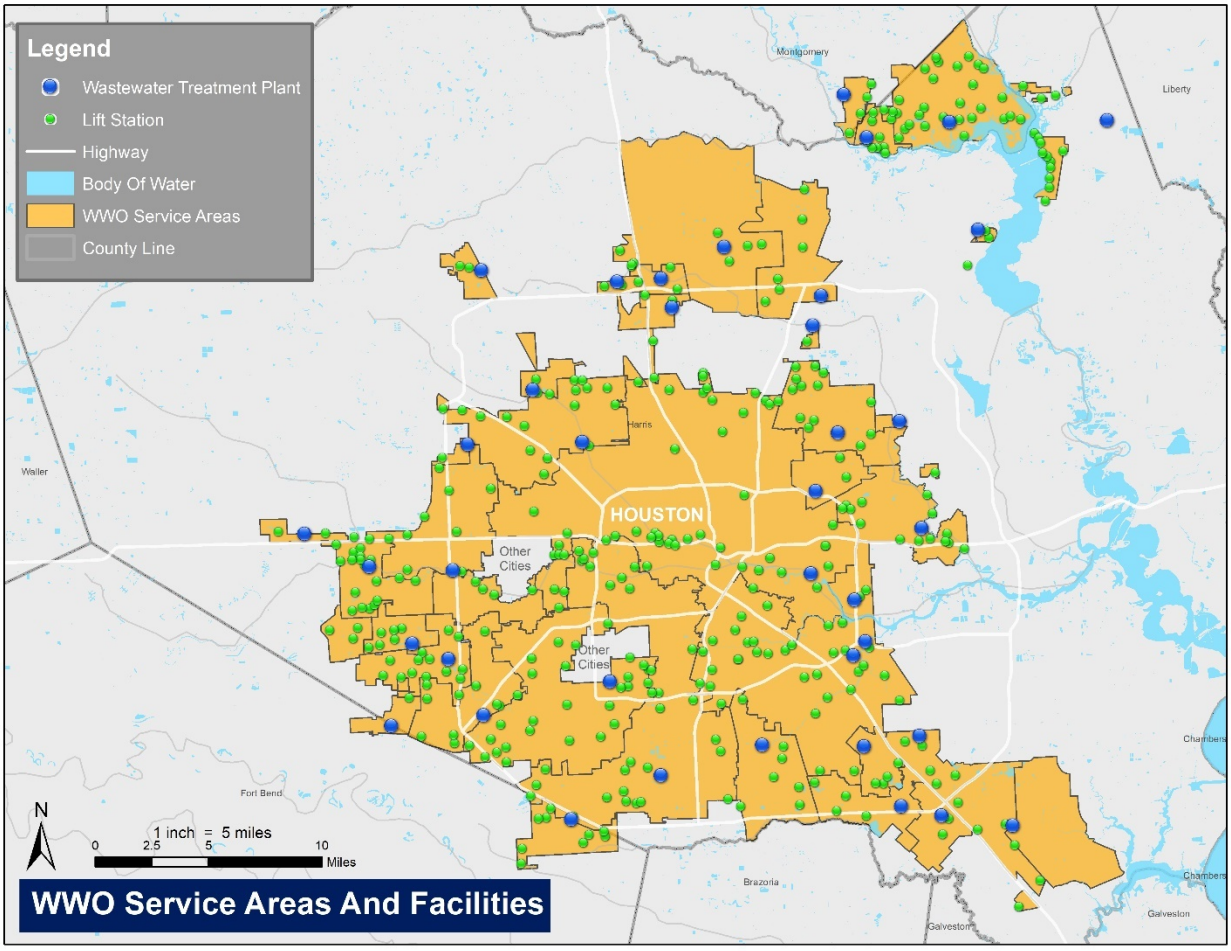


Figure 2. Map of Houston Wastewater System Key Features.

3. Houston Water Customer Use Characteristics

a. Wholesale Customers

Houston provides untreated, treated, and reclaimed water to wholesale customers by contract. As of 2019, Houston has 274 wholesale contracts, 68 of which are with cities, municipal utility districts, and regional water authorities for treated water service. In 2018, these treated water contract customers used a total of 53.7 billion gallons, averaging 147 MDG.

b. Retail Customers

As of 2019, Houston provides treated water to almost 480,000 retail customers within its municipal boundaries. In 2018, these customers used a total of 89.3 billion gallons, averaging 245 MGD. Retail usage is roughly divided in three equal parts between Single Family, Multi Family, and Industrial-Commercial-Institutional (ICI) customer classes.

Customer Class	Number of Connections	Total Annual Usage (in billion gallons)	Average MGD
Single Family	415,228	26.0	71.2
Multi Family	15,759	29.3	80.2
ICI	47,701	34.0	93.1
TOTAL	**478,688**	**89.3**	**244.5**

Table 1. Houston Retail Customer Usage by Customer Class, 2018

The remaining retail usage consists of irrigation meter accounts, use by City of Houston facilities, and other small-volume uses (emergency water, construction water, and unmetered esplanade irrigation).

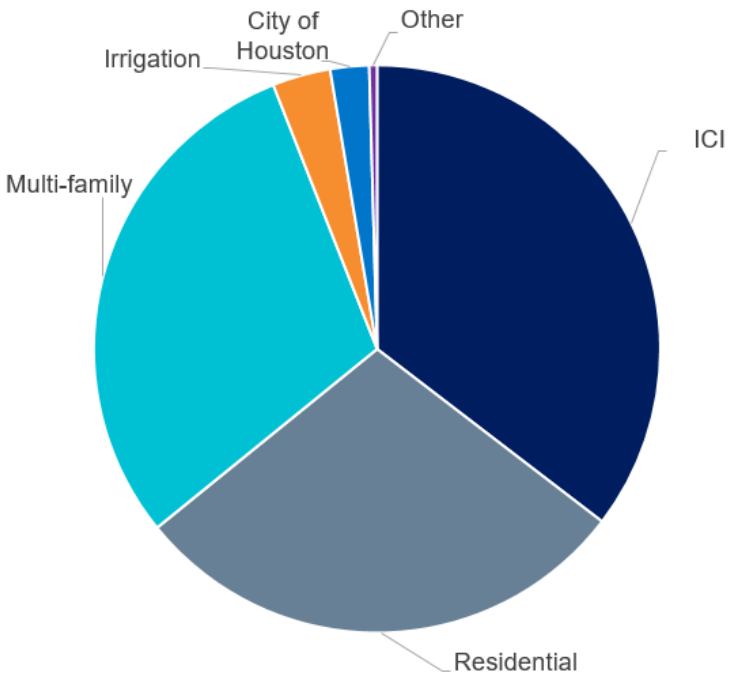


Figure 3. Houston Retail Customer Demand Shares, 2018

In 2018, the total gallons per capita per day (GPCD) among all retail classes was 136, with a five-year average (2014 – 2018) of 129. This GPCD is based on pumpage volumes and incudes all water that leaves Houston's water purification plants, including water loss. Evaluated separately, in 2018 the residential GPCD was 66, with a five-year average (2014 – 2018) of 62. The previous five-year average (2009 – 2013) was 68. This continues the downward trend seen over the last decade during which the residential GPCD has significantly decreased, reducing the total GPCD. Houston considers its five-year historic average of 129 to be healthy, as it falls well below the 140 total GPCD mark recommended by the 2004 Water Conservation Task Force Report[5] and is very close to the 125 total GPCD mark adopted by the Texas Living Waters Project in the 2016 Texas Water Conservation Scorecard.[6]

[5] http://www.twdb.texas.gov/conservation/resources/doc/WCITF_Leg_Report.pdf
[6] http://www.texaswaterconservationscorecard.org/

B. Five-Year and Ten-Year Water Savings Targets

The water conservation plan must include five-year and ten-year targets that are specific and quantified for water savings and include goals for water loss programs in gallons per capita per day, and goals for municipal use and residential use, in gallons per capita per day. A base use figure should be included to be able to calculate your savings. Consider state and regional targets and goals, local climate, and demographics. Consider the anticipated savings that can be achieved by utilizing appropriate best management practices and other conservation techniques.

Houston's 2014 Water Conservation Plan stated a total GPCD baseline of 144, with the goal of reducing this number by 1.6% every five years, thereby establishing a total GPCD five-year target of 141.7 by 2019, and a ten-year target of 139.4 by 2024.

As of 2019, Houston's total GPCD (and new baseline) is 129, based on the five-year historical average. This exceeds both the five and ten-year targets and is lower than expected. While water efficient fixtures and increasing conservation and water awareness among Houston's customers can be credited for some of this reduction, Houston also experienced higher than average rainfalls during this same time. From 2014 to 2018, Houston averaged over 62 inches of rain – well above the 30-year annual average of 50 inches. During this same period, Houston's residential GPCD averaged 62. Although local climate may have played a role in this rapid reduction of Houston's total GPCD, Houston also experienced a net population growth of 95,109 people during the same time. Because of this, Houston will continue implementing a water reduction target of 1.6% every five years, which is also consistent with the water use reduction target adopted by the Region H Water Planning Group.

To reduce its total and residential GPCDs further, Houston must reduce its water loss. Based on the last five years' average, Houston's water loss is approximately 19%. Houston plans to reduce water loss by 1% every year with the long-term target of 10% or less of water loss. This goal is reasonable given Houston's water loss trends in the last

decade, and the target is consistent with the water loss target adopted by the Region H Water Planning Group in the 2016 Region H Water Conservation Plan.[7]

	Historic 5-year average	2019 Baseline	5-Year Reduction Goal	10-Year Reduction Goal
Total GPCD	129	129	127	125
Residential GPCD	62	62	61	60
Water Loss GPCD	24	24	23	22
Water Loss Percentage	19	19	18	17

Table 3. Five-Year and Ten-Year Targets for GPCD and Water Loss Reduction

C. Implementation Plan

The water conservation plan must include a schedule for implementing the plan to achieve the utility's targets and goals.

Houston will continue, expand, and implement the following programs to achieve a 1.6% reduction in total GPCD and residential GPCD over the next five years.

1. Water Main Replacement Program

Aging water mains are a common problem and can lead to regulatory compliance issues, customer service issues, and water loss. Houston continues to invest in a comprehensive water main replacement program to address these issues. Work ranges from emergency repair or replacement of failing infrastructure to scheduled repair or replacement of aging infrastructure. The program relies on a water system needs assessment that considers each asset's design service life, by asset type, and the remaining service life of the asset since its installation, replacement, or last rehabilitation date. For treated water

[7] http://regionhwater.org/Reg_H_2016_RWP_20151116.pdf

distribution, pipe material is an important factor in determining service life. For example, based on Houston's experience with line breaks, small diameter asbestos-cement waterlines that were installed in the 1970s have a 40-year service life, whereas PVC waterlines have a 50-year service life.

Houston's water main replacement program is divided into two categories for purposes of capital improvement project programming: the water transmission system, and the water distribution system.

The water transmission system includes large diameter pipelines (16 inches and larger) and valves that move high volumes of treated water throughout Houston's service area, and large diameter pipelines that move untreated surface water to the three water purification plants. Houston's water transmission system has approximately 4.55 million linear feet of large diameter pipelines ranging from 16 inches to 120 inches in diameter. The water transmission system also includes seven major repump stations that re-pressurize the transmission system, and 156 storage tanks that provide water volume to meet average and peak day demands. Projects undertaken by Houston in the transmission system portion of the water main replacement program include the rehabilitation and replacement of large diameter water lines, valves, pumps, and storage tanks. Over the next five years, Houston plans to spend approximately $890,000,000 on capital improvement projects for the water transmission system.

The water distribution system includes the small diameter pipelines (less than 16 inches) that deliver treated water to homes and businesses. The water distribution system also includes customer meters and the fire hydrants for fire protection. Houston's water distribution system has approximately 32.6 million linear feet (6,170 miles) of small diameter pipeline, approximately 460,000 water meters, and over 61,000 fire hydrants. Projects undertaken by Houston in the distribution system portion of the water main replacement program include repair and replacement of small diameter lines to help improve water quality fire and protection within neighborhoods. Over the next five years, Houston plans to spend approximately $107,000,000 on capital improvement projects for

the water distribution system (referred to as the "Neighborhood Main Replacement Program").

More information on Houston's capital improvement program is available on Houston's website at: http://www.houstontx.gov/cip/.

2. Water Loss Program

Houston has implemented and continues to develop cost-effective strategies for reducing water loss. These include the following:

- Reducing water loss by using the Advanced Metering Infrastructure (AMI) network to detect leaks.

- Reducing water usage by City of Houston facilities other non-revenue users.

- Reducing water theft (*e.g.*, disconnecting bypasses and direct connects).

- Expediting shutoff of water meters where there is no account owner.

In 2016, Houston engaged the consulting firm of Black & Veatch to conduct a water loss audit and develop a revenue enhancement strategy. Black & Veatch conducted a desktop water audit that analyzed water distribution system data for 2015 using the AWWA M36 standard methodology and conducted a field review that included staff interviews. Black & Veatch concluded that, in 2015, Houston lost approximately 111 gallons per connection per day, with approximately 87 gallons in real losses (due to infrastructure issues, such as leakage), and 24 gallons in apparent losses (due to metering and billing issues). These levels are within the range of losses reported and published by peer utilities.

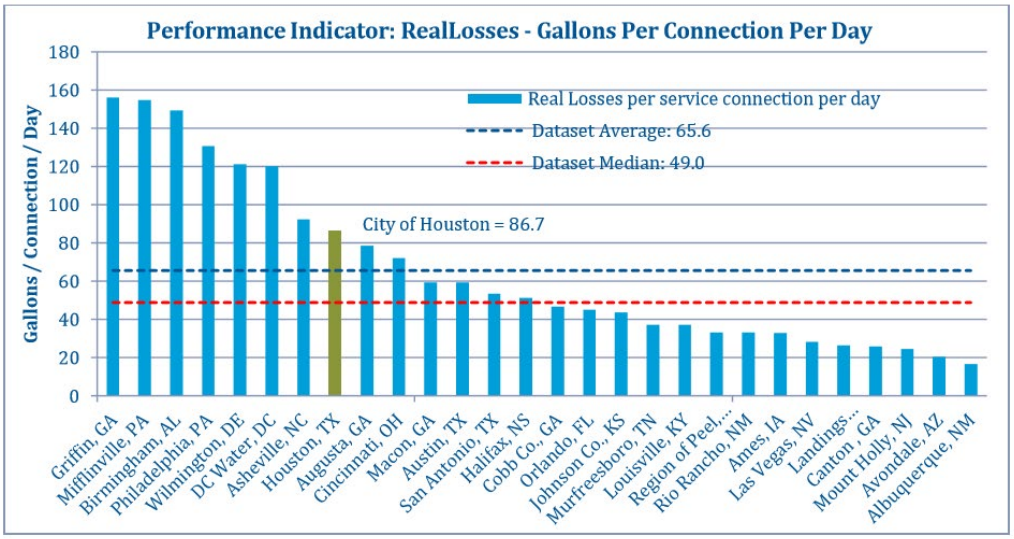


Figure 4. Real Losses: Houston and North American Benchmark Data (AWWA)

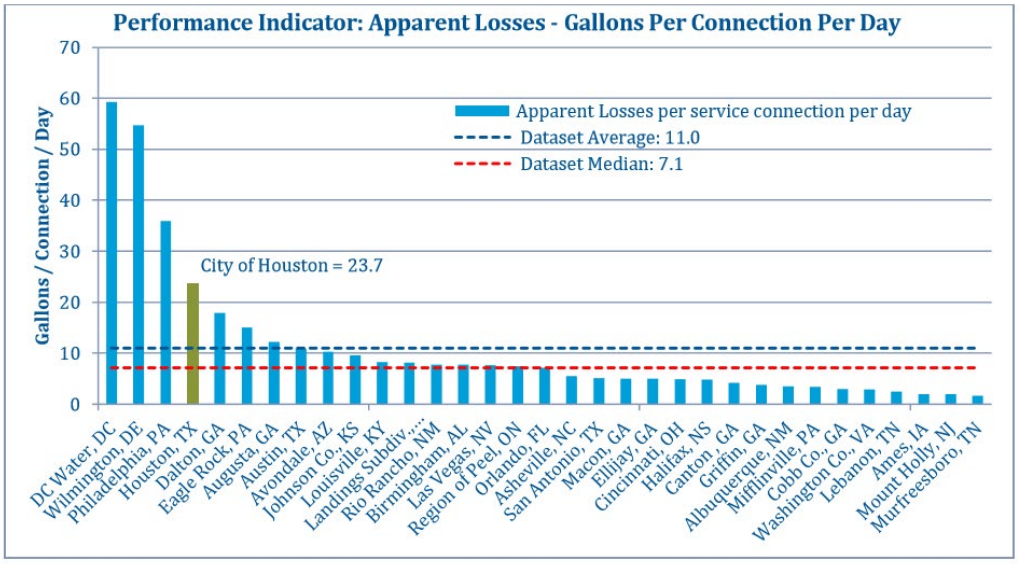


Figure 5. Apparent Losses: Houston and North American Benchmark Data (AWWA)

With the assistance of Black & Veatch, Houston identified ways to reduce non-revenue water through more accurate metering practices, improved record-keeping standards, and improved infrastructure. Houston has added dedicated staff to assist with data management and analysis, is undertaking an asset management project at key sites, and is investigating leak detection systems to be more proactive. Houston is also seeking to upgrade the existing AMI network, discussed below.

3. Consumption Awareness Program

Houston measures water consumption through an automated system that transmits water usage data via radio waves, also referred to as the AMI network. An attachment on the water meter sends a wireless signal that is picked up by one of the collecting devices located throughout the city, most often on utility poles. This information is transmitted to a central computer where the data can be accessed by Houston staff to generate alerts and create bills.

Using the AMI network, Houston developed the Consumption Awareness Program to provide customers with real-time usage information across multiple communication platforms. The Consumption Awareness Program allows customers to access their water consumption daily and to set alarms for high water usage and leak alerts. Customers can use the Consumption Awareness Program to identify uses and leaks that may result in water waste and bill increases, and to address those issues in real-time.

As of 2019, Houston has completed the first phase of Consumption Awareness Program implementation, which included the following activities:

- Converting 45% of retail customers to the AMI network as of February 2019.
- Creating a web portal for single family residential customers to access real-time water usage.
- Sending out more than 10,000 alerts since April 2018.
- Registering with the program a total of 14,254 accounts, 13,552 of which are single family residential.

Houston is now undertaking the second phase of implementation, which will include the following activities:

- Developing a web portal for multi-family and non-residential retail customers.

- Developing and implementing an information dissemination campaign to increase retail customer participation to 80%.

- Developing a more informative and user-friendly web portal for single family residential customers.

The second phase of the Consumption Awareness Program is currently tied to the strategic replacement of Houston's more than 20-year old Automatic Meter Reading (AMR) system with an AMI network (See AMI Network section below).

More information on the Consumption Awareness Program is attached at Appendix B and on Houston's website at: https://www.houstonwaterbills.houstontx.gov.

4. AMI Network

Ideally, Houston would read all retail customer meters by use of the AMI network. This would allow for more frequent readings (every 15 minutes) to assist Houston staff and customers with identifying usage trends in real time as compared to other meter reading methods (*e.g.*, every month for billing purposes). Unfortunately, the AMI network capacity has been declining over the last five years, primarily due to aging infrastructure and lack of resources. As of 2019, the AMI network reads between 45 – 50% of all retail meters throughout the city.

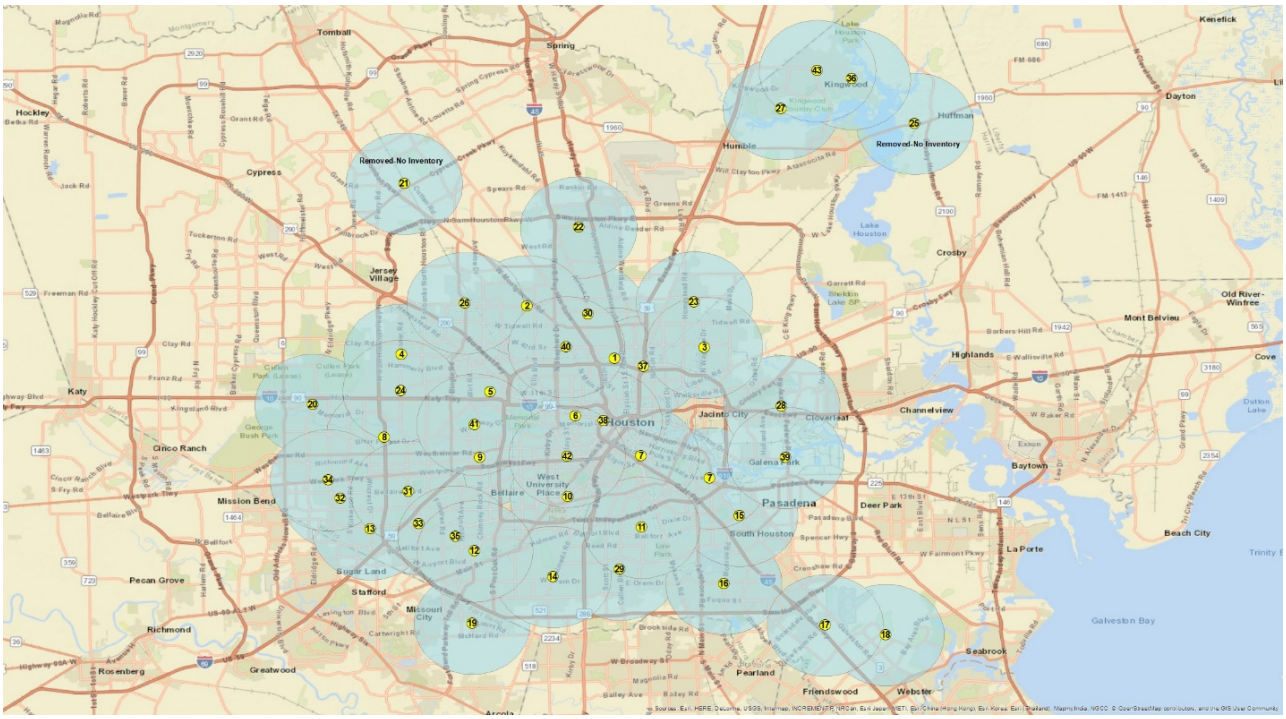


Figure 6. Current AMI Network Coverage 2019

Of the meters that cannot be read by use of the AMI network, roughly 90% are read by vehicle-mounted automated meter reading equipment and 10% are read manually.

Houston is currently planning to replace more than 95% of the existing automated meter reading system. As of today, the budget for replacement of the system is estimated at $50 million. The implementation of the AMI meter replacement project will phase in over 10-years and is tentatively scheduled to begin in late 2020. The replacement project will also include funding for establishing interconnectivity with Houston's current web portal, thereby facilitating utilization by all customers (residential multifamily, non-residential, etc.).

The AMI infrastructure will also provide the City and its customers with enhanced ability to monitor near real time water usage, forecast water consumption, and identify leaks earlier. Marketing of the conservation tools will be strategically aligned to coincide with

implementation of the AMI system. The marketing will be performed through direct mail, online advertisements, and social media posts from the City of Houston.

5. Mainline Leak Detection Program

Houston plans to enhance its mainline leak detection program using the AMI network. Future applications are under development with manufacturers. Functionalities will include pressure sensing, hydrant flow monitoring, and water quality sensing, among others. The key to long-term viability of this plan is interoperable end-point functionality and open architecture protocols.

6. Water Wise Building Standards

In 2011, Houston revised its plumbing and building codes. These revisions contributed to a gradual reduction in Houston's residential GPCD from a five-year average (2009 – 2013) of 68 to a five-year average (2014 – 2018) of 62, despite a net population increase of 95,109 people during this same period. Houston also added a section on low impact development to Houston's Infrastructure Design Manual. Low impact development can reduce the amount of treated water used for irrigation by utilizing stored rainwater and slowing runoff through use of green storm water infrastructure improvements. Houston will continue to rigorously enforce its plumbing and building codes and encourage the use of low impact development practices.

A copy of Houston's plumbing and building codes is available on Houston's website at: https://www.houstonpermittingcenter.org/building-code-enforcement.html.

A copy of Houston's Infrastructure Design Manual is available on Houston's website at: https://edocs.publicworks.houstontx.gov/documents/design_manuals/idm.pdf.

In 2004, Houston adopted Resolution No. 2004-15 establishing the U.S. Green Building Council's LEED (Leadership in Energy and Environmental Design) Green Building Rating System™ as a standard for new or replacement city-owned facilities and for major

renovation of city-owned buildings and facilities with over 10,000 square feet of occupied space. LEED™ provides a complete framework for assessing building performance and meeting sustainability goals. Based on well-founded scientific standards, LEED™ emphasizes state of the art strategies for various energy and environmental aspects of a building, including water savings.

An example of past, present and future LEED™ projects for city owned facilities can be found at https://www.houstontx.gov/generalservices/leed.html.

More information about the LEED™ standard is available on Houston's website at: https://www.houstontx.gov/generalservices/leed.html.

7. Houston PACE Program

Houston's Property Assessed Clean Energy (PACE) program is a proven financial tool that incentivizes Houston's commercial, industrial, and multifamily property owners to upgrade facility infrastructure with little or no capital outlay. The PACE program enables owners to lower their operating costs and use the savings to pay for eligible water conservation, energy efficiency, resiliency, and distributed generation projects. Owners gain access to private, affordable, long-term (typically 10-20 years) financing that is not available through traditional funding avenues.

The State of Texas authorized municipal and county PACE programs in 2013. Houston City Council adopted an ordinance establishing Houston's PACE program on November 4, 2015. To learn more about Houston's PACE program and cases to date, please visit https://www.texaspaceauthority.org/houston-pace/.

D. Method for Tracking Plan Implementation and Effectiveness

The water conservation plan must include a method for tracking the implementation and effectiveness of the plan. The method should track annual water use and provide

information sufficient to evaluate the implementation of conservation measures. The plan should measure progress annually and evaluate the progress towards meeting the goals.

1. Water Conservation Annual Report, Water Loss Audit Annual Report, Utility Benchmarking Tool

Historically, Houston has tracked the implementation and effectiveness of this Plan through the Water Conservation Annual Report and the Water Loss Audit Report, which are submitted to the Texas Water Development Board every year. In 2019, Houston began using the American Water Works Association Utility Benchmarking Tool as an additional tracking method. The Utility Benchmarking Tool tracks utility performance data and calculates performance indicators in areas such as organizational development, business operations, customer service, and water and wastewater operations. Per the American Water Works Association, these indicators are designed to help utilities improve their operational and managerial effectiveness. Benchmarking utility performance indicators will allow Houston to track its performance and compare its results to peers to identify areas for improvement.

2. Water Conservation Division

In 2019, Houston established a Water Conservation Division with Houston Water. This new division is directed by a Water Conservation Manager, who is responsible for implementing this Plan and developing programming that produces measurable outputs to help Houston reach its GPCD and water loss five-year and ten-year targets. In addition, the Water Conservation Manager is responsible for implementing Houston's Drought Contingency Plan, managing Houston Water's education and outreach team, working with drinking water operations staff to improve Houston's Water Loss Program, and coordinating efficiency efforts with other Houston city departments, such as the Houston Sustainability Office.

3. Dashboard Software Platform

Houston is negotiating a contract to pilot conservation software developed by a third-party vendor. This software platform will allow Houston and its wholesale customers to visualize and quantify the impacts of specific conservation and efficiency programming on retail and wholesale customer consumption behavior. With this information, Houston and its wholesale customers can make informed decisions regarding what programming to invest in, and more easily communicate the value of these programs to their ratepayers and elected officials. This comprehensive approach to conservation is critical to a large regional water supplier like Houston, which will be evaluating the software platform for the following benefits:

- Creation of a single data and communication hub for information on conservation activities throughout the retail and wholesale system.

- Regional reduction of peak-day, peak-season, and long-term demand on Houston's water system using highly advanced conservation analytics.

- Avoidance of transmission, treatment, distribution, and wastewater costs due to coordinated conservation programming across the retail and wholesale system.

- Deferment of plant expansion costs due to coordinated conservation programing across the retail and wholesale system.

Houston plans to license this software platform for up to three years beginning in 2019.

E. Master Meter

The water conservation plan must include a master meter to measure and account for the amount of water diverted from the source of supply.

Houston relies on several sources of water for its water supply: two surface water reservoirs in the San Jacinto River basin, Lake Houston and Lake Conroe; one surface water reservoir in the Trinity River basin, Lake Livingston; 142 groundwater wells; and wastewater effluent reuse. All water leaving Lake Houston and flowing into Houston's Northeast Water Purification Plant is measured and accounted for through an inflow meter. Houston's water stored in Lake Conroe is measured and accounted for by the San Jacinto River Authority, which manages Lake Conroe for the benefit of Houston pursuant to an operating agreement. Likewise, Houston's water stored in Lake Livingston is measured and accounted for by the Trinity River Authority, which manages Lake Livingston for the benefit of Houston pursuant to an operating agreement. All groundwater wells operated by Houston are metered. Any treated wastewater effluent sold to contract customers for reuse is metered at the customer's point of delivery.

F. Universal Metering and Meter Testing

The water conservation plan must include a program of universal metering of both customer and public uses of water, for meter testing, repair and for periodic replacement.

Section 47-4 of the City of Houston Code of Ordinances requires all water furnished and delivered through the Houston water distribution system to be metered. Meters must be maintained at an accuracy rate of 98-102% in accordance with the American Water Works Association benchmark.

In 2000, Houston began replacing small meters (5/8-inch to 2-inch meters) throughout the water distribution system. Houston monitors the accuracy and performance of small meters by analyzing data gathered through meter testing (performance-driven and through an annual sampling program) and reviewing consumption at various flow ranges to understand whether accuracy is affected by volume of water consumed within each range. Based on this information, small meters are mapped for replacement.

For large meters (3-inch meters and larger), Houston has a preventive maintenance program that schedules meter testing and calibration based on meter type and the volume of water that passes through the meter. Large meters are replaced as needed based on maintenance costs and manufacturer standards.

G. Measures to Determine and Control Water Loss

The water conservation plan must include measures to determine and control water loss (for example, periodic visual inspections along distribution lines; annual or monthly audit of the water system to determine illegal connections, abandoned services, etc.).

Houston uses a system of data analytics (run daily and monthly) coupled with field inspections to identify and control water loss and potential theft or water waste. In addition, Houston provides citizens with a direct telephone line to report perceived water theft or waste and enforces its ordinances prohibiting water theft and waste as necessary.

H. Water Loss Program

The water conservation plan must include a continuous program of leak detection, repair, and water loss accounting for the transmission, delivery, and distribution system in order to control water loss.

Houston has developed a data network based on meter readings that delivers a more robust Supervisory Control and Data Acquisition ("SCADA") view of the entire water distribution system. This data network was piloted in Houston's wastewater system to monitor for sanitary sewer overflows and has since been used to detect water main leaks in Houston's water system. Additional applications of the data network are being developed, including pressure sensing, hydrant flow monitoring, and water quality sensing. The key to the success of this data network is interoperable end-point

functionality and open architecture protocols. Houston is working with the American Water Works Association Research Foundation to develop industry specifications involving these data networks to ensure these features.

In addition, Houston is assisting with efforts to standardize water loss reporting to ensure that what is reported as water loss is consistent across municipal and wholesale providers throughout the State of Texas. Houston is reviewing how water is accounted for in uses such as community fire response, dead end line flushing, new line flushing, and general city uses, and has an active transient program that monitors uses by contractors.

I. Education and Information Programs

The water conservation plan must include a program of continuing education and information regarding water conservation. This should include providing water conservation information directly to each residential, industrial, and commercial customer at least annually, and providing water conservation literature to new customer when they apply for service.

1. Consumption Awareness Program

For customers to reduce their water use long term, they first need to understand how they use water. Houston developed the Consumption Awareness Program to provide customers with access to real-time usage information across multiple communication platforms. The Consumption Awareness Program helps customers see how they're using water, identify ways to save water (and money), and find leaks and stop water waste faster.

The Consumption Awareness Program communicates with customers through the Internet, email, text, and phone. Customers can access account billing information (such as current balance, due date, last payment received, and projected next bill) as well as usage information (such as current usage, meter read date, what they paid for their usage,

and neighborhood average usage). Hourly and daily usage data is available for 60 days, and monthly usage data is available for up to 18 months. In addition, customers can set alerts, including leak alerts, and choose how to be alerted: by email, text, or phone call.

More information on the Consumption Awareness Program and a description of the dashboard is attached at Appendix B.

2. Water Education and Outreach Team

Houston maintains a dedicated staff for water education and outreach programs within the Water Conservation Division of Houston Water. This education and outreach team is responsible for staffing the WaterWorks Education Center, presenting the annual WaterWorks Festival, and providing Project WET educator training and school and community outreach programs that support Houston's conservation goals.

3. WaterWorks Education Center

Opened in 2010, the WaterWorks Education Center hosts numerous school field trips and tours. Located near the shores of Lake Houston at the City of Houston's Northeast Water Purification Plant, the WaterWorks Education Center is a one-of-a-kind water destination whose mission is to promote water education, conservation and stewardship. The City of Houston's WaterWorks Education Center welcomes all educational groups to explore the wonders of water during a field trip designed to immerse them with a sense of wonderment and discovery about one of earth's most precious resources. The Center offers visitors an innovative environment for creative learning with interactive exhibits, demonstrations and tour. Visitors are not only able to tour the Education Center but also learn from experts, and education activities and take home flyers, activity books and general information regarding water conservation and education. The WaterWorks Education Center has had over 31,000 visitors from 2014 to 2018 and over 55,000 visitors since its inception.

Early Childhood	Elementary School	Middle School	High School	Higher Education	Adults	Total
2,302	19,600	1,399	1,688	365	5,689	**31,043**

Table 6. WaterWorks Education Center Attendance from 2014 to 2018.

More information is available on Houston's website at: https://www.publicworks.houstontx.gov/waterworks.

4. Annual WaterWorks Festival

For 25 years, Houston has hosted this annual event to showcase Houston's water conservation message. The event is geared toward school-aged children and young adults and has more than 50 sponsors and exhibitors reflecting a variety of careers in the public and private water and wastewater sectors. The event educates the community regarding Houston's high-quality drinking water, drinking water supply and wastewater treatment systems, water conservation and efficiency initiatives. Over the last five years, 9,247 elementary students and 1,217 adults attended this event.

5. Project WET

The WaterWorks Education Center is a host institution for Project WET (Water Education for Teachers), a curriculum taught in 8-hour workshops to help educators teach all grade levels on diverse water-related topics with objective, experiential, science-based water education. Project WET is a world leader in developing interdisciplinary, hands-on activities that integrate knowledge of water resources and issues into K-12 classrooms using simulations and critical thinking skills at the core of Next Generation Science Standards.

As a host institution, the WaterWorks Education Center has certified over 300 educators on Project WET.

6. School and Community Outreach Program

Houston Water's education and outreach team gives presentations to Houston area students throughout the school year. The team is available to present to all grade levels, in individual classrooms or assemblies, and tailors its message to include age appropriate activities and content. Educators can request a topic and activity from a wide variety of content from the Project WET curriculum. Students can participate in hands-on activities that support the *Texas Essential Knowledge and Skills* standards. On average, the education and outreach team gives presentations at more than 25 schools and school-related events each year.

7. Community Rain Barrel Sale

For several years now, Houston has offered a biannual rain barrel sale with rain barrels at a discounted rate. The goal of this program is to provide area residents (especially gardeners) with efficient tools to collect rainwater throughout the year, particularly during heavy rainfall events, so that they can conserve water (and money) during drier times. More than 2,000 rain barrels have been sold to date through the Green Building Resource Center (GBRC). Houston Water and GBRC are planning to join efforts to further expand and promote this event to make it more successful every year. For more information please visit http://greenhoustontx.gov/compostbinssale.html.

8. Native Plants Propagation Program

The Houston Parks and Recreation Department's (HPARD) Natural Resources Management Program began its native plant propagation program in May 2016 to produce locally-collected native grasses and wildflowers for installation into Houston's prairie restoration sites. Seeds are hand-collected from remnant and restored prairies around the Houston area and propagated by staff and volunteers in Houston's greenhouse. After one to two years of growing, the plants are installed in one of HPARD's five prairie restoration sites throughout the city during community volunteer events. The

program currently produces over 10,000 one-gallon pots per year of over 90 different species that are available for use in habitat restoration projects.

9. Native Plants Annual Sale

Since 2019, HPARD has partnered with the Houston Arboretum and Houston Audubon to offer an annual Spring native plant sale. Most plants available at nurseries are not native to the Houston area. The annual plant sale gives citizens the opportunity to purchase native plants that are adapted to the region's climate, which means they can tolerate Houston's weather extremes that can range from prolonged periods of heavy rainfall to dry spells. In addition, many of these plants attract birds, butterflies, bees, and other pollinators. The sale includes native grasses, shrubs, trees, and flowers (including milkweed). For more information visit https://houstonarboretum.org/events/.

10. Gulf Coast Water Conservation Symposium

Houston is an active participant in the annual Gulf Coast Water Conservation Symposium, a one-day regional event that presents information to water utilities and customers about water conservation legislation, planning, education, smart conservation investment, implementation strategies, and industry best practices. Houston Water employees serve on the Symposium's Steering Committee, help plan the Symposium, and help raise awareness of the event.

In 2019, the Symposium was titled "Water Efficient Future: Planning, Tools & Best Practices" and focused on new and improved tools currently available to water utilities to meet their water conservation goals. The Symposium also featured case studies that highlighted planning, redevelopment, and water conservation implementation efforts from cities large to small.

J. Water Rate Structure

The water conservation plan must include a water rate structure which is not "promotional," i.e., a rate structure which is cost-based and which does not encourage the excessive use of water. Include a copy of the rate structure.

Houston's water rate structure is cost-based and is not promotional. Water rates are based on an inclining block structure, and wastewater rates are based on total water use. Houston's objectives in rate structure design are that rates be based on the costs to serve, provide adequate and stable revenues, be equitable across customer classes and volume users, and be easy to implement and administer. Houston performs a cost-of-service study every ten years, and a study is underway in 2019.

A copy of Houston's current rates is attached at Appendix C. Current rates for 2019 and beyond are published on Houston's website at https://cohweb.houstontx.gov/FIN_FeeSchedule/default.aspx.

K. Implementation and Enforcement

The water conservation plan must include a means of implementation and enforcement, evidenced by adoption of the plan: (1) a copy of the ordinance, resolution, or tariff indicating official adoption of the water conservation plan by the utility; and (2) a description of the authority by which the utility will implement and enforce the conservation plan.

A copy of the Houston City Council ordinance adopting this Plan is attached at Appendix D.

Houston implements and enforces the regulatory aspects of this Plan through existing codes and ordinances. These include:

- Building and Plumbing Codes: www.houstonpermittingcenter.org/code-enforcement

- Chapter 47 – Water and Sewers, of the City of Houston Code of Ordinances: http://www.houstontx.gov/codes/index.html

- LEED Certification of City of Houston owned facilities (Resolution No. 2004-15): http://www.usgbc.org/Docs/Archive/General/Docs1981.pdf

L. Contract Customer Requirements

If the utility will utilize a project financed by the TWDB to furnish water or wastewater services to another supplying entity that in turn will furnish the water or wastewater services to the ultimate consumer, the requirements for the water conservation plan also pertain to these supplier entities. To comply with this requirement the utility shall: (1) submit its own water conservation plan; (2) submit the other entity's (or entities') water conservation plan; (3) require, by contract, that the other entity (or entities) adopt a water conservation plan that conforms to the TWDB's requirement and submit it to the TWDB. If the requirement is to be included in an existing water or wastewater service contract, it may be included, at the earliest of the renewal or substantial amendment of the contract, or by other appropriate measures.

All water supply contracts entered into after this Plan was first adopted require the customer (and its customers, if the entity is a wholesale provider) to adopt and implement a water conservation plan meeting the requirements of state law and that is at least as stringent as this Plan.

M. Region H Notification

The water conservation plan must include documentation that the regional water planning group for the service area of the utility has been notified of the utility's water conservation plan.

A copy of Houston's letter notifying Region H of Houston's 2019 Water Conservation Plan is attached at Appendix E.

N. Drought Contingency Plan

The water conservation plan must include a copy of the utility's drought conservation plan that meets the requirements of the TWDB's Water Conservation Plan Guidance Checklist, Form TWDB-1968 (Rev. 1/08/2013).

A copy of Houston's 2019 Drought Contingency Plan is attached at Appendix F.

O. Adoption

The water conservation plan must be formally adopted by the governing body of the entity. For a municipal water system, adoption would be by the city council as an ordinance, or a resolution by the utility's board of directors.

A copy of the Houston City Council ordinance adopting this Plan is attached at Appendix D.

P. Reporting Requirement

The water conservation plan must identify who will be responsible for preparing the annual report on the utility profile form TWDB-1965. Loan/grant recipients must maintain an approved water conservation program in effect until all financial obligations to the state have been discharged and shall report annually to the executive administrator of the TWDB on the progress in implementing each of the minimum requirements in its water conservation plan and the status of any of its customers' water conservation plan required by contract. The content and format for the annual reporting is included in the forms: Water Conservation Plan Annual Report; TWDB-1966 for retail water suppliers; TWDB-1967 for non-water suppliers; and TWDB-1969 for wholesale water suppliers.

Houston Water, through its Water Conservation Manager, will be responsible for preparing the Water Conservation Plan Annual Report, TWDB-1966 for retail water suppliers and TWDB 1969 for wholesale water supplies.

Appendix A
Water Utility Profile

A copy of the 2019 Utility Profile and Water Conservation Requirements for Municipal Water Use by Retail and Wholesale Public Water Suppliers, required by Texas Commission on Environmental Quality, is enclosed.

563Texas Commission on Environmental Quality
Water Availability Division
MC-160, P.O. Box 13087 Austin, Texas 78711-3087
Telephone (512) 239-4691, FAX (512) 239-2214

Utility Profile and Water Conservation Plan Requirements for Wholesale Public Water Suppliers

This form is provided to assist wholesale public water suppliers in water conservation plan development. If you need assistance in completing this form or in developing your plan, please contact the Conservation staff of the Resource Protection Team in the Water Availability Division at (512) 239-4691.

Water users can find best management practices (BMPs) at the Texas Water Development Board's website http://www.twdb.texas.gov/conservation/BMPs/index.asp. The practices are broken out into sectors such as Agriculture, Commercial and Institutional, Industrial, Municipal and Wholesale. BMPs are voluntary measures that water users use to develop the required components of Title 30, Texas Administrative Code, Chapter 288. BMPs can also be implemented in addition to the rule requirements to achieve water conservation goals.

Contact Information

Name:	City of Houston
Address:	611 Walker St., Houston, TX 77002
Telephone Number:	(832) 395-2198 Fax: (832) 395-2704
Water Right No.(s):	4261, 4277, 4963, 4965, 5807, 5808, 5827, 2925, 5762, 5826
Regional Water Planning Group:	Region H Water Planning Group
Water Conservation Division Manager:	Paula Paciorek Phone: (832) 395-2198
Form Completed By:	Christopher Varela; Mitchell Ramon, P.E.
Title:	Management Analyst IV; Water Planning Engineer
Signature:	Date: 06/7/2019

A water conservation plan for wholesale public water suppliers must include the following requirements (as detailed in 30 TAC Section 288.5). If the plan does not provide information for each requirement, you must include in the plan an explanation of why the requirement is not applicable.

Utility Profile

I. WHOLESALE SERVICE AREA POPULATION AND CUSTOMER DATA

A. *Population and Service Area Data:*

1. Service area size (in square miles):

   (Please attach a copy of service-area map)

   1,536

2. Current population of service area:

   2,529,487

3. Current population served for:

   a. Water 2,529,487

   b. Wastewater 115,270

4. Population served for previous five years:

Year	*Population*
2014	2,316,478
2015	2,359,080
2016	2,401,681
2017	2,444,283
2018	2,486,885

5. Projected population for service area in the following decades:

Year	*Population*
2020	2,572,088
2030	2,742,677
2040	2,875,206
2050	2,993,806
2060	3,101,898

6. List source or method for the calculation of current and projected population size.

   - Historical and future population by TWDB State Water Planning Data
   - Future water demand projections developed by TWDB, HGSD and City of Houston Water Planning
   - Service area of 635 square miles includes retail service area
   - Historical and projected populations are based on TWDB Region H planning data

B. *Customer Data*

List (or attach) the names of all wholesale customers, amount of annual contract, and amount of annual use for each customer for the previous year: **See attachment**

Wholesale Customer	*Contracted Amount (Acre-feet)*	*Previous Year Amount of Water Delivered (acre-feet)*
	See attachment	

II. WATER USE DATA FOR SERVICE AREA

A. Water Delivery

Indicate if the water provided under wholesale contracts is treated or raw water and the annual amounts for the previous five years (in acre feet):

Year	*Treated Water*	*Raw Water*
2014	167,606	237,666
2015	167,218	249,975
2016	177,033	245,272
2017	164,333	239,421
2018	167,014	249,259
Totals	843,204	1,221,592

B. Water Accounting Data

1. Total amount of water diverted at the point of diversion(s) for the previous five years (in acre-feet) for all water uses:

Year	2014	2015	2016	2017	2018
Month					
January	31,207	31,532	32,029	33,120	33,254
February	27,387	29,497	31,515	29,987	29,823
March	31,263	31,093	34,750	33,592	33,405
April	33,634	35,738	33,724	34,782	34,304
May	35,576	33,011	35,862	37,678	39,030
June	35,483	34,476	34,908	24,270	38,836
July	38,485	40,007	40,469	38,752	40,388

August	38,887	42,476	38,603	34,510	40,156
September	34,563	38,050	36,523	34,508	33,425
October	34,520	38,110	37,011	36,293	32,521
November	32,676	30,731	34,235	33,881	30,711
December	31,593	32,471	32,675	32,382	30,419
Totals	405,275	417,192	422,301	403,754	416,273

2. Wholesale population served and total amount of water diverted for **municipal use** for the previous five years (in acre-feet):

Year	*Total Population Served*	*Total Annual Water Diverted for Municipal Use*
2014	2,316,478	167,606.23
2015	2,359,080	167,217.83
2016	2,401,681	177,033.06
2017	2,444,283	164,333.17
2018	2,486,885	167,014.10

C. Projected Water Demands

If applicable, project and attach water supply demands for the next ten years using information such as population trends, historical water use, and economic growth in the service area over the next ten years and any additional water supply requirements from such growth.

III. WATER SUPPLY SYSTEM DATA

A. Projected Water Demands

List all current water supply sources and the amounts authorized (in acre feet) with each.

Water Type	*Source*	*Amount Authorized*
Surface Water	Lake Livingston, Southern Canal, Lake Houston, Lake Conroe, San Jacinto River, multiple bayous	1,657,029
Groundwater	Evangeline Aquifer and Chicot Aquifer	167,467
Other		

B. *Treatment and Distribution System (if providing treated water)*

1. Design daily capacity of system (MGD):

   905

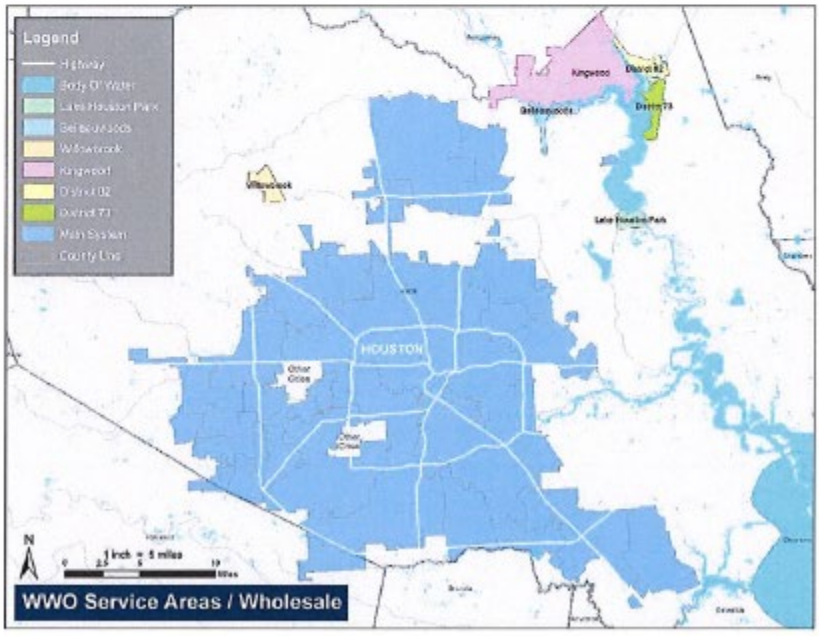
2. Storage capacity (MGD):

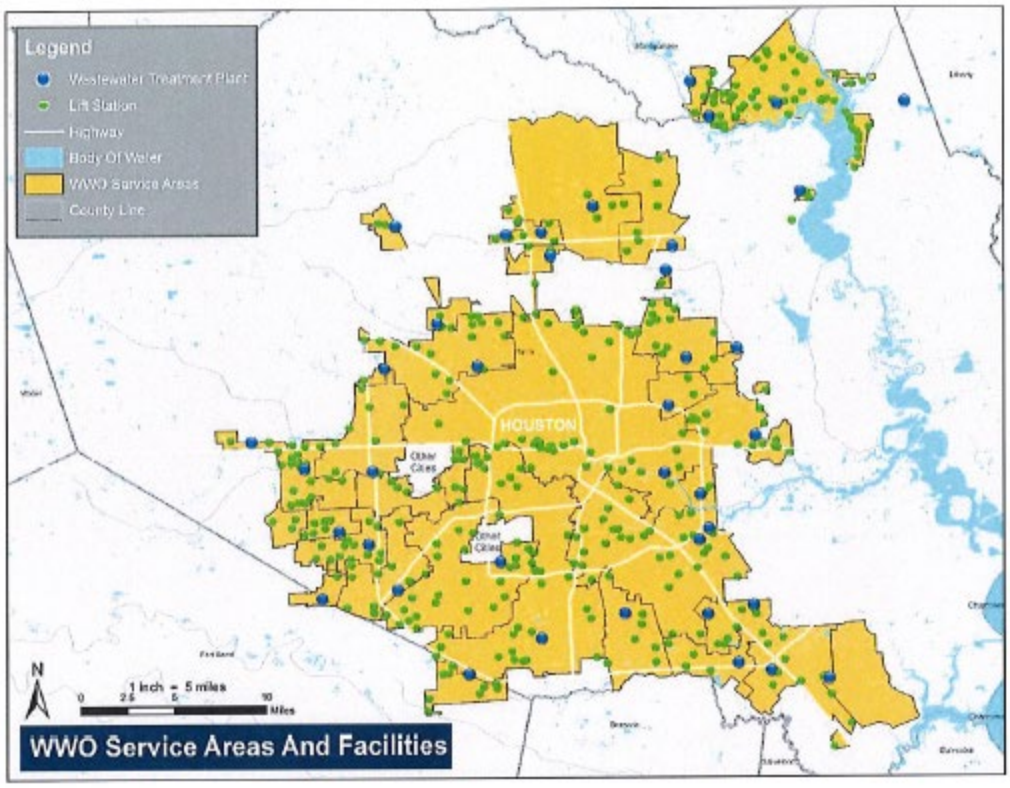
   a. Elevated 19.8

   b. Ground 192.9

3. Please attach a description of the water system. Include the number of treatment plants, wells, and storage tanks

Number of Facilities	Surface Water Treatment Plants	Groundwater Treatment Plants	Groundwater Wells	Ground Storage Tanks	Elevated Storage Tanks	Hydro Storage Tanks
TX1010013 - Main System	3	41	103	69	18	6
TX1011902 - WILLOW CHASE	-	4	5	7	1	5
TX1010348 - UD 5 - KINGWOOD	-	6	16	11	5	2
TX1011585 - DISTRICT 73	-	2	2	3	1	2
TX1011593 - DISTRICT 82 - Plantation Hills	-	1	2	2	-	1
TX1011594 - BELLEAU WOODS	-	2	1	2	-	2
TX1011587 - LAKE HOUSTON PARKS	-	1	1	-	-	2
Total	3	57	130	94	25	20





In areas with City of Houston wastewater service, wastewater is treated in one of 39 wastewater treatment plants using activated sludge processes. Treated effluent is disinfected with chlorination or UV light prior to being discharged to a water body - typically a bayou or ditch. The following facilities are owned and operated by the City of Houston (*operated by Inframark).

69th Street WQ0010495090 Houston Ship Channel/Buffalo Bayou Tidal in 1007

Almeda Sims WQ0010495003 Sims Bayou Above Tidal in 1007

Beltway WQ0010495111 HCFCD ditch D124-00-00 in 1007

*Cedar Bayou WQ0010495112 HCFCD ditch Q136-00-00 in 0902

Chocolate Bayou WQ0010495009 Sims Bayou Above Tidal in 1007

Clinton Park WQ0010495010 Houston Ship Channel/Buffalo Bayou Tidal in 1007

Easthaven WQ0010495065 Berry Creek in 1007

*Forest Cove WQ0010495149 unnamed ditch, thence to HCFCD ditch G-103-45-00 in 1002

FWSD 23 WQ0010495016 Halls Bayou in 1006

Greenridge WQ0010495110 unnamed drainage ditch, thence to HCFCD ditch C147-00-00 in 1007

Homestead WQ0010495023 Hunting Bayou in 1007

Imperial Valley WQ0010495101 HCFCD ditch P144-01-00 in 1016

Intercontinental Airport WQ0010495078 HCFCD ditch P140-00-00 in 1016

Keegans Bayou WQ0010495119 Keegans Bayou in 1017

*Kingwood Central WQ0010495146 unnamed ditch, thence to Ben's Branch in 1002

*Kingwood West WQ0010495142 unnamed ditch, thence to Evans Gully in 1004

Metro Central WQ0010495152 HCFCD ditch, thence to Horsepen Bayou in 1113

MUD 203 WQ0010495133 Greens Bayou Above Tidal in 1016

Northbelt WQ0010495122 HCFCD ditch P133-00-00 in 1016

Northeast WQ0010495077 Greens Bayou Tidal in 1006

Northgate WQ0010495100 Greens Bayou Above Tidal in 1016

Northwest WQ0010495076 Cole Creek in 1017

Park Ten WQ0010495135 HCFCD W487-0C-NW-01 in 1014

Sagemont WQ0010495075 Turkey Creek in 1102

Sims North WQ0010495002/TX0062201 Sims Bayou in 1007

Sims South WQ0010495002/TX0105058 Sims Bayou in 1007

Southeast WQ0010495079 HCFCD ditch A120-00-00 in 1102

Southwest WQ0010495037 Brays Bayou Above Tidal in 1007

Tidwell Timbers WQ0010495148 Greens Bayou Above Tidal in 1016

Turkey Creek WQ0010495109 Buffalo Bayou Above Tidal in 1014

Upper Brays WQ0010495116 Brays Bayou in 1007

WCID 47 WQ0010495050 Berry Bayou in 1007

WCID 76 WQ0010495150 Greens Bayou Above Tidal in 1016

WCID 111 WQ0010495095 Keegans Bayou in 1007

West District WQ0010495030 Buffalo Bayou Above Tidal in 1014

*West Lake Houston WQ0014650001 South Fork Harmon Bayou in 1002

Westway WQ0010495139 Brickhouse Gully in 1017

White Oak WQ0010495099 Whiteoak Bayou Above Tidal in 1017

Willowbrook WQ0010495126 HCFCD ditch P150-00-00

B. *Wastewater Data for Service Area (if applicable)*

1. Percent of water service area served by wastewater system: 5 %

2. Monthly volume treated for previous five years (in 1,000 gallons):

Year	2018	2017	2016	2015	2014
Month					
January	7787510	9130120	7594049	8130587	5717516
February	8587740	7351400	6298742	5729080	6047860
March	7688310	8556310	7808680	8870061	7199564
April	7076790	6454200	8734200	8909160	6081570
May	7185676	6897500	9233629	10853503	8237196
June	7376010	7583700	9779635	8806440	6663240
July	7965698	6850070	7299474	7247304	6946232
August	6818047	10351210	10018890	7127520	6888758
September	8874510	7747500	8112000	6918240	7614720
October	8696895	7048160	6663450	8221039	6723404
November	7678470	6581700	6264600	7599585	6512130
December	9298140	7484640	7110160	7825899	7830972
Totals	95033796	92036510	94917509	96238418	82463162

Water Conservation Plan

In addition to the description of the wholesaler's service area (profile from above), a water conservation plan for a wholesale public water supplier must include, at a minimum, additional information as required by Title 30, Texas Administrative Code, Chapter 288.5. Note: If the water conservation plan does not provide information for each requirement an explanation must be included as to why the requirement is not applicable.

A. *Specific, Quantified 5 & 10-Year Targets*

The water conservation plan must include specific, quantified 5-year and 10-year targets for water savings including, where appropriate, target goals for municipal use in gallons per capita per day for the wholesaler's service area, maximum acceptable water loss, and the basis for the development of these goals. Note that the goals established by a wholesale water supplier under this subparagraph are not enforceable. These goals must be updated during the 5-year review and submittal.

B. *Measuring and Accounting for Diversions*

The water conservation plan must include a description as to which practice(s) and/or device(s) will be utilized to measure and account for the amount of water diverted from the source(s) of supply.

C. *Record Management Program*

The water conservation plan must include a monitoring and record management program for determining water deliveries, sales, and losses.

D. *Metering/Leak-Detection and Repair Program*

The water conservation plan must include a program of metering and leak detection and repair for the wholesaler's water storage, delivery, and distribution system.

E. *Contract Requirements for Successive Customer Conservation*

The water conservation plan must include a requirement in every water supply contract entered into or renewed after official adoption of the water conservation plan, and including any contract extension, that each successive wholesale customer develop and implement a water conservation plan or water conservation measures using the applicable elements of Title 30 TAC Chapter 288. If the customer intends to resell the water, then the contract between the initial supplier and customer must provide that the contract for the resale of the water must have water conservation requirements so that each successive customer in the resale of the water will be required to implement water conservation measures in accordance with the provisions of this chapter.

F. *Reservoir Systems Operations Plan*

The water conservation plan must include a reservoir systems operations plan, if applicable, providing for the coordinated operation of reservoirs owned by the applicant within a common watershed or river basin. The reservoir systems operations plan shall include optimization of water supplies as one of the significant goals of the plan.

G. *Enforcement Procedure and Official Adoption*

The water conservation plan must include a means for implementation and enforcement, which shall be evidenced by a copy of the ordinance, rule, resolution, or tariff, indicating official adoption of the water conservation plan by the water supplier; and a description of the authority by which the water supplier will implement and enforce the conservation plan.

H. Coordination with the Regional Water Planning Group(s)

The water conservation plan must include documentation of coordination with the regional water planning groups for the service area of the wholesale water supplier in order to ensure consistency with the appropriate approved regional water plans.

Example statement to be included within the water conservation plan:

The service area of the _____ (name of water supplier) is located within the _____ (name of regional water planning area or areas) and _____ (name of water supplier) has provided a copy of this water conservation plan to the _____ (name of regional water planning group or groups).

I. Plan Review and Update

A wholesale water supplier shall review and update its water conservation plan, as appropriate based on an assessment of previous 5-year and 10-year targets and any other new or updated information. A wholesale water supplier shall review and update the next revision of its water conservation plan no later than May 1, 2009, and every five years after that date to coincide with the regional water planning group. The revised plan must also include an implementation report.

V. ADDITIONAL CONSERVATION STRATEGIES

Any combination of the following strategies shall be selected by the water wholesaler, in addition to the minimum requirements of 30 TAC §288.5(1), if they are necessary in order to achieve the stated water conservation goals of the plan. The commission may require by commission order that any of the following strategies be implemented by the water supplier if the commission determines that the strategies are necessary in order for the conservation plan to be achieved:

1. Conservation-oriented water rates and water rate structures such as uniform or increasing block rate schedules, and/or seasonal rates, but not flat rate or decreasing block rates;

2. A program to assist agricultural customers in the development of conservation, pollution prevention and abatement plans;

3. A program for reuse and/or recycling of wastewater and/or graywater;

4. Any other water conservation practice, method, or technique which the wholesaler shows to be appropriate for achieving the stated goal or goals of the water conservation plan.

VI. WATER CONSERVATION PLANS SUBMITTED WITH A WATER RIGHT APPLICATION FOR NEW OR ADDITIONAL STATE WATER

Water Conservation Plans submitted with a water right application for New or Additional State Water must include data and information which:

1. support the applicant's proposed use of water with consideration of the water conservation goals of the water conservation plan;

2. evaluates conservation as an alternative to the proposed appropriation; and

3. evaluates any other feasible alternative to new water development including, but not limited to, waste prevention, recycling and reuse, water transfer and marketing, regionalization, and optimum water management practices and procedures.

Additionally, it shall be the burden of proof of the applicant to demonstrate that no feasible alternative to the proposed appropriation exists and that the requested amount of appropriation is necessary and reasonable for the proposed use.

Type Name	Company Name	Contract Maximum	Contract Maximum Type	2018 Consumption
PDS - Anheuser Busch	Anheuser-Busch	78.19	MGM	1,020,004,000
PDS - GRP Taking City Water	City of Spring Valley	N/A		76,166,000
PDS - GRP Taking City Water	HCMUD 148	7	MGM	104,945,000
PDS - GRP Taking City Water	HCMUD 182	0.85	MGM	9,923,000
PDS - GRP Taking City Water	HCMUD 278	8		118,823,000
PDS - GRP Taking City Water	HCMUD 344 (Summerwood)	10		119,476,000
PDS - GRP Taking City Water	HCMUD 49	8.305		115,369,000
PDS - GRP Taking City Water	Pine Village Public Utility Dist	2.5		44,294,000
PDS - Non-Potable Water	Air Liquide America Corp.	23	MGD	6,521,079,000
PDS - Non-Potable Water	Air Products and Chemicals Inc	0.6	MGD	50,465,000
PDS - Non-Potable Water	American Acryl, L.P.	2	MGD	228,293,000
PDS - Non-Potable Water	Arco Chemical - CH 11	0.088	MGD	32,280,000
PDS - Non-Potable Water	Baker Petrolite Corp.	0.345	MGD	128,430,000
PDS - Non-Potable Water	Battleground Oil Specialty Terminal Company (BOSTCO)	0.009	MGD	28,635,000
PDS - Non-Potable Water	Battleground Water Company (INEOS)	27	MGD	6,210,275,000
PDS - Non-Potable Water	Bayer Material Science(Baychem - Mobay)	4	MGD	1,858,823,000
PDS - Non-Potable Water	Baytown Area Water Authority	20	MGD	5,230,382,000
PDS - Non-Potable Water	Bealine Service Co.	N/A		921,000
PDS - Non-Potable Water	Braskem American, Inc. (Aristech)	2	MGD	269,088,000
PDS - Non-Potable Water	Calpine Contruction Finance Co.	6	MGD	1,703,087,000
PDS - Non-Potable Water	Carpenter Chemical	0.0033	MGD	2,339,000
PDS - Non-Potable Water	Chem-Sep	0.003	MGD	1,231,000
PDS - Non-Potable Water	Chevron Phillips Chemical Co,	22.2	MGD	5,160,029,000
PDS - Non-Potable Water	City of Deer Park	7	MGD	1,556,202,000

PDS - Non-Potable Water	Clean Harbors Environmental	3.6	MGD	568,150,000
PDS - Non-Potable Water	D.B. Western - Texas - December 2010	0.72	MGD	141,548,000
PDS - Non-Potable Water	Deer Park Energy Center	8.5	MGD	2,068,844,000
PDS - Non-Potable Water	Dianal America			-
PDS - Non-Potable Water	Dixie Chemical	0.017	MGD	220,000
PDS - Non-Potable Water	Enterprise Prod. Operating (former Diamond Shamrock)	6.736	MGD	6,615,000
PDS - Non-Potable Water	Enterprise Products	7.9	MGD	1,169,027,000
PDS - Non-Potable Water	Enterprise Products - Valero Refining -Texas, LP (EOTT)	1.88	MGD	236,285,000
PDS - Non-Potable Water	Equilon Enterprises, LLC (Oiltanking)	1.6	MGD	6,355,000
PDS - Non-Potable Water	Equistar Chemicals (formerly Zeneca) CH 11	2.75	MGD	754,681,000
PDS - Non-Potable Water	Equistar Chemicals LP - CH 11 (Lyondell Chemical)	0.105	MGD	2,527,493,000
PDS - Non-Potable Water	Equistar Chemicals LP - CH 11 (Lyondell Chemical)	31.8	MGD	2,527,493,000
PDS - Non-Potable Water	Equistar Chemicals LP -CH 11 (1)	13	MGD	754,681,000
PDS - Non-Potable Water	Exxon Chemical Americas	4	MGD	1,256,452,000
PDS - Non-Potable Water	Exxon Pipeline	0.03	MGD	451,000
PDS - Non-Potable Water	Flint Hills Resources	4.3	MGD	1,177,495,000
PDS - Non-Potable Water	FMC Corporation	1	MGD	277,263,000
PDS - Non-Potable Water	G E O Specialty Chemicals (Hampshire)	0.373	MGD	84,579,000
PDS - Non-Potable Water	Gulf Coast Fractionators	2.022	MGD	672,370,000
PDS - Non-Potable Water	Gulf Coast Limestone	N/A		3,377,000
PDS - Non-Potable Water	Gulf Coast Waste Disposal Authority	0.24	MGD	44,375,000
PDS - Non-Potable Water	Haldor Topsoe	0.025	MGD	15,045,000
PDS - Non-Potable Water	Haltermann, LTD, Johann	0.25	MGD	88,320,000
PDS - Non-Potable Water	Harris County, Texas	0.1	MGD	260,000
PDS - Non-Potable Water	Hoescht Celanese	15.1	MGD	3,267,958,000
PDS - Non-Potable Water	Houston Fuel Oil Company	0.09	MGD	28,075,000

PDS - Non-Potable Water	Houston Refining, LP (Lyondell -Citgo) CH 11	20.9	MGD	5,092,004,000
PDS - Non-Potable Water	Industrial Terminals, L.P.	0.07	MGD	4,843,000
PDS - Non-Potable Water	IP INVESTMENTS, LLC	0.025	MGD	5,757,000
PDS - Non-Potable Water	Jindal United States Corp.	1.71	MGD	20,049,000
PDS - Non-Potable Water	Kaneka	N/A		5,000
PDS - Non-Potable Water	Kinder Morgan Liquid Terminal	0.26	MGD	4,797,000
PDS - Non-Potable Water	Lone Star NGL Mont Belvieu LP - L Dreyfuss (TX Eastern)(Conoco)	8.64	MGD	1,218,303,000
PDS - Non-Potable Water	Lone Star NGL Mont Belvieu LP - Louis Dreyfuss (TX Eastern)	0.358	MGD	21,822,000
PDS - Non-Potable Water	Lubrizol Corporation	1.46	MGD	576,283,000
PDS - Non-Potable Water	McKenzie Tank Lines	N/A		7,000
PDS - Non-Potable Water	Noltex, L.L.C.	0.72	MGD	2,053,000
PDS - Non-Potable Water	NRG Texas LP (Texas Genco, Inc)	1	MGD	133,920,000
PDS - Non-Potable Water	Occidental Chemical	12.6	MGD	2,788,717,000
PDS - Non-Potable Water	Odfjell Terminals (Houston) (Baytank)	0.2	MGD	40,000
PDS - Non-Potable Water	Oiltanking Houston Inc.	0.01	MGD	60,000
PDS - Non-Potable Water	ONEOK Hydrocarbon L.P.	10	MGD	490,419,000
PDS - Non-Potable Water	Oxytens (Old World Industries (Eisai)	0.288	MGD	1,264,000
PDS - Non-Potable Water	Pasadena Refining System, Inc	26.91	MGD	2,517,000
PDS - Non-Potable Water	Pasadena Refining System, Inc (Crown)	5.2	MGD	1,165,397,000
PDS - Non-Potable Water	Petrounited	0.015	MGD	27,783,000
PDS - Non-Potable Water	Pol-Tex International	0.05	MGD	6,902,000
PDS - Non-Potable Water	Poly-One Corporation	0.055	MGD	22,592,000
PDS - Non-Potable Water	Port of Houston Authority	0.033	MGD	30,683,000
PDS - Non-Potable Water	Praxair, Inc.	0.64	MGD	198,085,000
PDS - Non-Potable Water	Reagans USA, Inc. (Calgon)	0.04	MGD	20,000
PDS - Non-Potable Water	Rentech Nitrogen Pasadena, formerly Agrifos Fertilizer LP	2.2	MGD	675,020,000
PDS - Non-Potable Water	Rohm & Haas	0.304	MGD	93,168,000
PDS - Non-Potable Water	Shell Oil	32.5	MGD	6,846,092,000
PDS - Non-Potable Water	SSI Chusei USA	0.08	MGD	59,822,000

PDS - Non-Potable Water	Stolthaven Houston, Inc.	0.01	MGD	3,140,000
PDS - Non-Potable Water	Styrolution America LLC (name changed)	4.4	MGD	1,048,418,000
PDS - Non-Potable Water	Targa Midstream Services LP (Dynergy)	6	MGD	603,520,000
PDS - Non-Potable Water	Texas Brine Company	2	MGD	734,131,000
PDS - Non-Potable Water	Texas Molecular LLC	0.33	MGD	15,497,000
PDS - Non-Potable Water	Total Petrochemicals USA (FINA)	2	MGD	676,566,000
PDS - Non-Potable Water	TPC Group, LLC (formerly Texas Petrochemical)	10.6	MGD	2,333,572,000
PDS - Non-Potable Water	Trimac - DSI Transports, Inc. / Trimac	0.05	MGD	4,097,000
PDS - Non-Potable Water	Valero Refining Company-Texas	5.6	MGD	1,368,130,000
PDS - Non-Potable Water	Vulcan Construction Materials	0.0411	MGD	6,600,000
PDS - Non-Potable Water	W. Canning, Inc			36,000
PDS - Non-Potable Water	Zeon Chemical	0.025	MGD	245,000
PDS - Treated Water	Baybrook MUD 1	80	MGD	91,853,000
PDS - Treated Water	Central Harris County Regional Water Authority	2.12	MGD	600,767,000
PDS - Treated Water	Chimney Hill MUD	13.86	MGM	156,155,000
PDS - Treated Water	City of Bellaire	42	MGM	638,435,000
PDS - Treated Water	City of Bunker Hill Village	14.75	MGM	226,527,000
PDS - Treated Water	City of Friendswood	80	MGD	1,877,479,000
PDS - Treated Water	City of Galena Park	25.9	MGM	280,220,000
PDS - Treated Water	City of Hilshire Vlg.	3.138	MGM	45,723,000
PDS - Treated Water	City of Humble	0.7	MGD	332,648,000
PDS - Treated Water	City of Jacinto City	25	MGM	262,140,000
PDS - Treated Water	City of Jersey Village	22.5	MGM	458,787,000
PDS - Treated Water	City of Pasadena - East Plant	180	MGM	5,959,222,000
PDS - Treated Water	City of Pearland	40	MGM	1,012,282,000
PDS - Treated Water	City of South Houston	80	MGD	564,648,000
PDS - Treated Water	City of Southside Place	7.2	MGM	72,368,000
PDS - Treated Water	City of Webster	5	MGD	570,392,000
PDS - Treated Water	City of West University	32.75	MGM	465,374,000
PDS - Treated Water	Clear Brook City MUD	60.4	MGM	645,742,000
PDS - Treated Water	Clear Lake City	348.7	MGM	3,383,024,000

PDS - Treated Water	Emerald Forest Utility District -NHCRWA	0.3	MGM	14,056,000
PDS - Treated Water	Greenwood Utility District	24	MGM	331,590,000
PDS - Treated Water	Gulf Coast Water Authority (Galveston)	499.1	MGM	5,249,555,000
PDS - Treated Water	HCMUD 148 (NEW CUSTOMER)	7	MGM	104,945,000
PDS - Treated Water	HCMUD 158	15	MGM	185,004,000
PDS - Treated Water	HCMUD 220	1.45	MGM	11,683,000
PDS - Treated Water	HCMUD 23 (Consortium)	4.538	MGM	66,592,000
PDS - Treated Water	HCMUD 261 & Winfern Forest UD	8.038	MGM	94,615,000
PDS - Treated Water	HCMUD 372	10	MGM	189,938,000
PDS - Treated Water	HCMUD 402	1	MGM	81,671,000
PDS - Treated Water	HCMUD 406	1.2	MGM	127,948,000
PDS - Treated Water	HCMUD 420	3.6	MGM	40,009,000
PDS - Treated Water	HCMUD 421	2.625	MGM	87,857,000
PDS - Treated Water	HCMUD 461	0.399	MGM	8,346,000
PDS - Treated Water	HCMUD 5	10	MGM	52,250,000
PDS - Treated Water	HCMUD 55	1.3	MGD	459,090,000
PDS - Treated Water	HCMUD 6 (Consortium 5)	5.646	MGM	67,619,000
PDS - Treated Water	HCMUD 8	11.25	MGM	143,790,000
PDS - Treated Water	HCMUD 96	12	MGM	198,569,000
PDS - Treated Water	HCWCID 89	13.029	MGM	231,845,000
PDS - Treated Water	HCWCID 96 (Treated Water)	18.347	MGM	344,648,000
PDS - Treated Water	HCWICD - Fondren Road	7.47	MGM	91,345,000
PDS - Treated Water	La Porte Water Authority	130.1	MGM	1,483,335,000
PDS - Treated Water	Memorial Villages Water Authority	60	MGM	891,837,000
PDS - Treated Water	Montgomery County MUD 98	2	MGM	71,630,000
PDS - Treated Water	North Channel Water Auth	206	MGM	2,533,848,000
PDS - Treated Water	North Fort Bend County Water Authority	19.5	MGD	5,120,883,000
PDS - Treated Water	North Harris County Regional Water Authority	0.3	MGM	8,874,345,000
PDS - Treated Water	Regional Water Adv. Comm.	23	MGM	241,241,000

PDS - Treated Water	Rolling Fork Public Utility District	5.264	MGM	47,335,000
PDS - Treated Water	Sunbelt Fresh Water Supply District	8.166	MGM	135,632,000
PDS - Treated Water	Sunbelt Fresh Water Supply District -Northline	8.5	MGM	28,773,000
PDS - Treated Water	Sunbelt Fresh Water Supply District -Oakwilde	16.166	MGM	44,301,000
PDS - Treated Water	West Harris County Regional Water Authority	18.25	MGD	7,398,995,000
PDS - Treated Water	WHCMUD 16	0.21	MGM	2,179,000

Texas Commission on Environmental Quality
Water Availability Division
MC-160, P.O. Box 13087 Austin, Texas 78711-3087
Telephone (512) 239-4691, FAX (512) 239-2214

Utility Profile and Water Conservation Plan Requirements for Municipal Water Use by Retail Public Water Suppliers

This form is provided to assist retail public water suppliers in water conservation plan development. If you need assistance in completing this form or in developing your plan, please contact the Conservation staff of the Resource Protection Team in the Water Availability Division at (512) 239-4691.

Water users can find best management practices (BMPs) at the Texas Water Development Board's website http://www.twdb.texas.gov/conservation/BMPs/index.asp. The practices are broken out into sectors such as Agriculture, Commercial and Institutional, Industrial, Municipal and Wholesale. BMPs are voluntary measures that water users use to develop the required components of Title 30, Texas Administrative Code, Chapter 288. BMPs can also be implemented in addition to the rule requirements to achieve water conservation goals.

Contact Information

Name of Water Supplier:	City of Houston
Address:	611 Walker St, Houston, TX 77002
Telephone Number:	(832) 395-2198 Fax: (832) 395-2704
Water Right No.(s):	4261, 4277, 4963, 4965, 5807, 5808, 5827, 2925, 5762, 5826
Regional Water Planning Group:	Region H Water Planning Group
Water Conservation Division Manager:	Paula Paciorek Phone: (832) 395-2198
Form Completed by:	Trace Neighbors; Mitchell Ramon, P.E.
Title:	Customer Representative; Water Planning Engineer
Signature:	Date:06/10/2019

A water conservation plan for municipal use by retail public water suppliers must include the following requirements (as detailed in 30 TAC Section 288.2). If the plan does not provide information for each requirement, you must include in the plan an explanation of why the requirement is not applicable.

Utility Profile

I. POPULATION AND CUSTOMER DATA

A. *Population and Service Area Data*

1. Attach a copy of your service-area map and, if applicable, a copy of your Certificate of Convenience and Necessity (CCN).

   CCIN #: 9914

2. Service area size (in square miles): 635

   (Please attach a copy of service-area map): Attached

3. Current population of service area: 2,328,419 **(Source: City of Houston's Planning and Development, available at** https://www.houstontx.gov/planning/Demographics/)

4. Current population served for: **(City of Houston's Planning and Development, available at** https://www.houstontx.gov/planning/Demographics/)

   a. Water 2,328,419

   b. Wastewater 2,328,419

5. Population served for previous five years: **(Source: City of Houston Planning and Development** https://www.houstontx.gov/planning/Demographics/)

Year	*Population*
2014	2,233,310
2015	2,284,887
2016	2,319,603
2017	2,319,603
2018	2,328,419

6. Projected population for service area in the following decades: **(Source: Texas Water Development Board)**

Year	*Population*
2020	2,276,784
2030	2,485,827
2040	2,686,721
2050	2,886,800
2060	3,090,486

7. List source or method for the calculation of current and projected population size.

   1) **Historical and projected population by City of Houston's Planning and Development**

   2) **Future water demand projections developed by TWDB, HGSD and City of Houston Water Planning**

   3) **Service Area of 635 sq. mi includes retail service area.**

B. Customer Data

Senate Bill 181 requires that uniform consistent methodologies for calculating water use and conservation be developed and available to retail water providers and certain other water use sectors as a guide for preparation of water use reports, water conservation plans, and reports on water conservation efforts. A water system must provide the most detailed level of customer and water use data available to it, however, any new billing system purchased must be capable of reporting data for each of the sectors listed below. More guidance can be found at: http://www.twdb.texas.gov/conservation/doc/SB181Guidance.pdf

1. Quantified 5-year and 10-year goals for water savings:

	Historic 5-year Average	*Baseline*	*5-year goal for year*	*10-year goal for year*
Total GPCD	129	129	127	125
Residential GPCD	62	62	61	60
Water Loss GPCD	24	24	23	22
Water Loss Percentage	19	19	18	17

Notes:
Total GPCD = (Total Gallons in System ÷ Permanent Population) ÷ 365
Residential GPCD = (Gallons Used for Residential Use ÷ Residential Population) ÷ 365
Water Loss GPCD = (Total Water Loss ÷ Permanent Population) ÷ 365
Water Loss Percentage = (Total Water Loss ÷ Total Gallons in System) x 100; or (Water Loss GPCD ÷ Total GPCD) x 100

2. Current number of active connections. Check whether multi-family service is counted as ☒ Residential or ☐ Commercial?

Treated Water Users	*Metered*	*Non-Metered*	*Totals*
Residential	430,987	-	430,987
Single-Family	415,228	-	415,228
Multi-Family	15,759	-	15,759
Commercial	47,701	-	47,701
Industrial/Mining	187	-	187
Institutional	-	-	-
Agriculture	-	-	-
Other/Wholesale	-	-	-

3. List the number of new connections per year for most recent three years.

*Note: An error in the billing system in 2016 caused some discrepancies in the categorization of commercial, institutional and industrial accounts. Institutional accounts were omitted in this report due to data inconsistency.

** Houston Water currently has 274 wholesale contract agreements. This number of contracts have remained the same since 2014.

Year	2016* (from 2015 to 2016)	2017 (from 2016 to 2017)	2018 (from 2017 to 2018)
Treated Water Users			
Residential	36,087	-8,530	4,347
Single-Family	33,097	-8,312	4,162
Multi-Family	2,990	-218	185
Commercial	-42,784	2,921	664
Industrial/Mining	-42	172	15
Institutional	0	0	0
Agriculture	0	0	0
Other/Wholesale**	0	0	0

4. List of annual water use for the five highest volume customers (last 5 years' average):

Customer	*Use (1,000 gal/year)*	*Treated or Raw Water*
City of Houston Wastewater - 1890 Kress St	681,920	Treated
Confidential - 1	453,310	Treated
Confidential - 2	325,386	Treated
University of Houston	275,734	Treated
United States Gypsum Co.	214,939	Treated

II. WATER USE DATA FOR SERVICE AREA

A. *Water Accounting Data*

1. List the amount of water use for the previous five years (in 1,000 gallons).

   Indicate whether this is ☐ diverted or ☒ treated water.

Year	2014	2015	2016*	2017	2018
Month					
January	6,384,248	6,152,514	6,154,061	6,787,637	7,181,762
February	6,405,740	6,176,083	6,406,536	7,137,690	6,858,263
March	5,864,544	5,836,838	5,777,958	6,065,019	6,403,776
April	5,695,772	5,580,955	6,197,963	6,088,985	6,768,964
May	6,176,084	6,205,972	6,830,401	6,975,357	6,927,428
June	6,957,966	6,067,018	5,623,181	7,033,853	6,723,555
July	7,050,874	6,414,634	6,835,696	7,728,853	9,713,421
August	7,403,373	7,479,539	6,821,868	7,728,454	7,839,242
September	7,475,643	8,273,679	7,315,045	7,800,676	8,086,622
October	7,435,885	8,049,942	8,386,883	7,066,378	8,697,410
November	7,019,672	7,336,608	7,872,134	9,960,272	6,760,347
December	6,708,126	6,551,241	7,033,253	7,583,578	7,361,018
Totals	**80,577,963**	**80,124,978**	**81,254,979**	**87,956,752**	**89,321,808**

2. Describe how the above figures were determined (e.g. from a master meter located at the point of a diversion from the source or located at a point where raw water enters the treatment plant, or from water sales).

   Water use data for service area obtained from water sales.

   *Note: A change in the billing system in 2016 caused some discrepancies in the data.

3. Amount of water (in 1,000 gallons) delivered/sold as recorded by the following account types for the past five years.

*Treated water only.

Year	2014	2015	2016	2017	2018
Account Types					
Residential	49,669,922	49,632,952	50,578,985	52,398,140	55,749,599
Single-Family	24,257,032	24,077,579	25,043,534	25,504,557	25,981,331
Multi-Family	25,412,890	25,555,373	25,535,451	26,893,583	29,768,268
Commercial	30,676,271	30,477,345	31,292,662	28,815,864	33,325,846
Industrial	648,414	633,486	636,655	616,445	644,828
Institutional	-	-	-	-	-
Agriculture	-	-	-	-	-
Other/Wholesale*	54,660,821	54,642,127	57,806,391	57,688,560	53,725,548

4. List the previous records for water loss for the past five years (the difference between water diverted or treated and water delivered or sold).

Year	*Amount (gallons)*	*Percent %*
2014	21,504,587,897	20.00
2015	21,573,036,492	20.00
2016	18,992,885,144	18.34
2017	20,542,352,727	18.80
2018	19,567,399,391	16.87

B. Projected Water Demands

1. If applicable, attach or cite projected water supply demands from the applicable Regional Water Planning Group for the next ten years using information such as population trends, historical water use, and economic growth in the service area over the next ten years and any additional water supply requirements from such growth.

Retail Projected Demand											
Year	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Population	2,230,387	2,248,414	2,266,441	2,284,467	2,302,494	2,320,520	2,338,547	2,356,574	2,374,600	2,392,627	2,410,653
Demand (in 1,000 gallons)	126,808,300	128,275,600	129,783,050	130,925,500	132,071,600	133,250,550	134,495,200	135,750,800	137,002,750	138,254,700	139,510,300
Demand (MGD)	347	351	356	359	362	365	368	372	375	379	382

Source: Projected retail population and demand determined by TWDB, HGAC and City of Houston Water Planning.

III. WATER SUPPLY SYSTEM DATA

A. *Water Supply Sources*

1. List all current water supply sources and the amounts authorized (in acre feet) with each.

Water Type	*Source*	*Amount Authorized*
Surface Water	Lake Livingston, Southern Canal, Lake Houston, Lake Conroe, San Jacinto River, Multiple Bayous	1,657,029
Groundwater	Evangeline Aquifer and Chicot Aquifer	167,467
Other	-	-

B. *Treatment and Distribution System (if providing treated water)*

1. Design daily capacity of system (MGD): 905 **(Source: Drinking Water Operations 2018 Inventory)**
2. Storage capacity (MGD): **(Source: Drinking Water Operations 2018 Inventory (elev. & hydro))**
   a. Elevated 19.8
   b. Ground 192.9
3. If surface water, do you recycle filter backwash to the head of the plant?

   ☒ Yes ☐ No If yes, approximate amount (MGD): 12.26

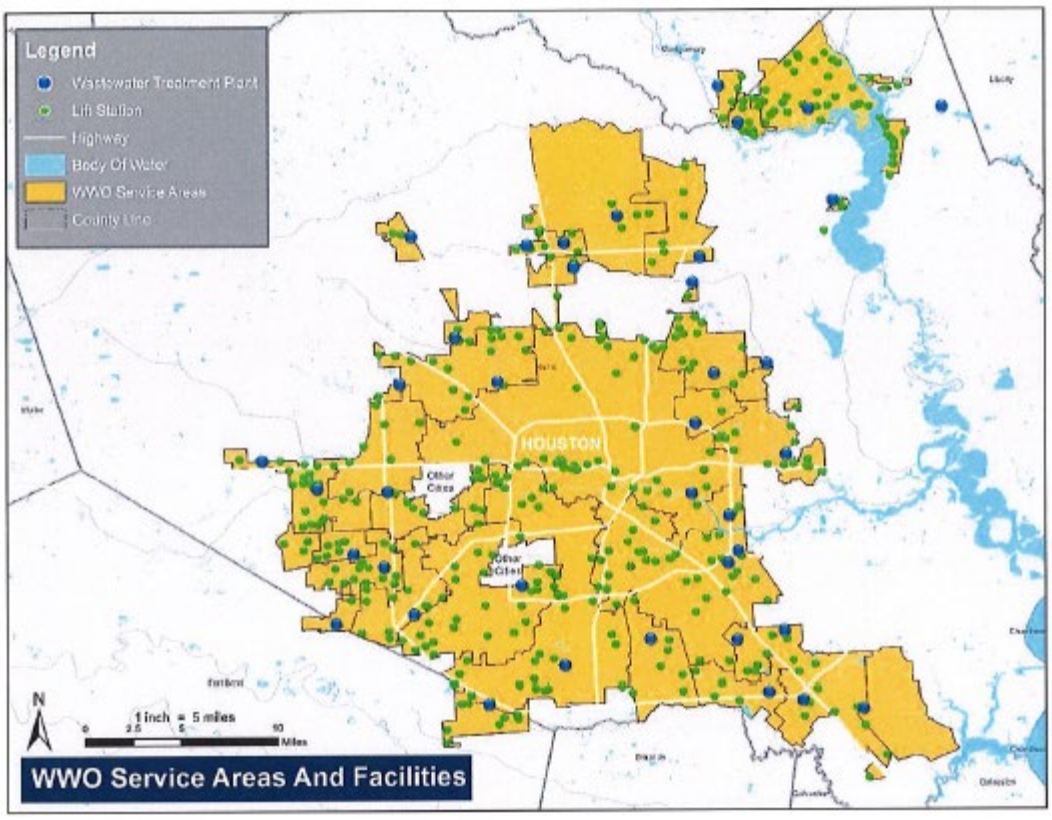
IV. WASTEWATER SYSTEM DATA

A. *Wastewater System Data (if applicable)*

1. Design capacity of wastewater treatment plant(s) (MGD): 563.713
2. Treated effluent is used for ☒ on-site irrigation, ☐ off-site irrigation, for ☒ plant wash-down, and/or for ☐ chlorination/dechlorination.

   If yes, approximate amount (in gallons per month): 1,764,210,000
3. Briefly describe the wastewater system(s) of the area serviced by the water utility. Describe how treated wastewater is disposed. Where applicable, identify treatment plant(s) with the TCEQ name and number, the operator, owner, and the receiving stream if wastewater is discharged.

Wastewater Operations Service Area and Facilities Map



In areas with City of Houston wastewater service, wastewater is treated in one of 39 wastewater treatment plants using activated sludge processes. Treated effluent is disinfected with chlorination or UV light prior to being discharged to a water body - typically a bayou or ditch. The following facilities are owned and operated by the City of Houston (*operated by Inframark).

69th Street WQ0010495090 Houston Ship Channel/Buffalo Bayou Tidal in 1007

Almeda Sims WQ0010495003 Sims Bayou Above Tidal in 1007

Beltway WQ0010495111 HCFCD ditch D124-00-00 in 1007

*Cedar Bayou WQ0010495112 HCFCD ditch Q136-00-00 in 0902

Chocolate Bayou WQ0010495009 Sims Bayou Above Tidal in 1007

Clinton Park WQ0010495010 Houston Ship Channel/Buffalo Bayou Tidal in 1007

Easthaven WQ0010495065 Berry Creek in 1007

*Forest Cove WQ0010495149 unnamed ditch, thence to HCFCD ditch G-103-45-00 in 1002

FWSD 23 WQ0010495016 Halls Bayou in 1006

Greenridge WQ0010495110 unnamed drainage ditch, thence to HCFCD ditch C147-00-00 in 1007

Homestead WQ0010495023 Hunting Bayou in 1007

Imperial Valley WQ0010495101 HCFCD ditch P144-01-00 in 1016

Intercontinental Airport WQ0010495078 HCFCD ditch P140-00-00 in 1016

Keegans Bayou WQ0010495119 Keegans Bayou in 1017

*Kingwood Central WQ0010495146 unnamed ditch, thence to Ben's Branch in 1002

*Kingwood West WQ0010495142 unnamed ditch, thence to Evans Gully in 1004

Metro Central WQ0010495152 HCFCD ditch, thence to Horsepen Bayou in 1113

MUD 203 WQ0010495133 Greens Bayou Above Tidal in 1016

Northbelt WQ0010495122 HCFCD ditch P133-00-00 in 1016

Northeast WQ0010495077 Greens Bayou Tidal in 1006

Northgate WQ0010495100 Greens Bayou Above Tidal in 1016

Northwest WQ0010495076 Cole Creek in 1017

Park Ten WQ0010495135 HCFCD W487-0C-NW-01 in 1014

Sagemont WQ0010495075 Turkey Creek in 1102

Sims North WQ0010495002/TX0062201 Sims Bayou in 1007

Sims South WQ0010495002/TX0105058 Sims Bayou in 1007

Southeast WQ0010495079 HCFCD ditch A120-00-00 in 1102

Southwest WQ0010495037 Brays Bayou Above Tidal in 1007

Tidwell Timbers WQ0010495148 Greens Bayou Above Tidal in 1016

Turkey Creek WQ0010495109 Buffalo Bayou Above Tidal in 1014

Upper Brays WQ0010495116 Brays Bayou in 1007

WCID 47 WQ0010495050 Berry Bayou in 1007

WCID 76 WQ0010495150 Greens Bayou Above Tidal in 1016

WCID 111 WQ0010495095 Keegans Bayou in 1007

West District WQ0010495030 Buffalo Bayou Above Tidal in 1014

*West Lake Houston WQ0014650001 South Fork Harmon Bayou in 1002

Westway WQ0010495139 Brickhouse Gully in 1017

White Oak WQ0010495099 Whiteoak Bayou Above Tidal in 1017

B. *Wastewater Data for Service Area (if applicable)*

1. Percent of water service area served by wastewater system: 100%

2. Monthly volume treated for previous five years (in 1,000 gallons):

Year	2014	2015	2016	2017	2018
Month					
January	5,717,516	8,130,587	7,594,049	9,130,120	7,787,510
February	6,047,860	5,729,080	6,298,742	7,351,400	8,587,740
March	7,199,564	8,870,061	7,808,680	8,556,310	7,688,310
April	6,081,570	8,909,160	8,734,200	6,454,200	7,076,790
May	8,237,196	10,853,503	9,233,629	6,897,500	7,185,676
June	6,663,240	8,806,440	9,779,635	7,583,700	7,376,010
July	6,946,232	7,247,304	7,299,474	6,850,070	7,965,698
August	6,888,758	7,127,520	10,018,890	10,351,210	6,818,047
September	7,614,720	6,918,240	8,112,000	7,747,500	8,874,510
October	6,723,404	8,221,039	6,663,450	7,048,160	8,696,895
November	6,512,130	7,599,585	6,264,600	6,581,700	7,678,470
December	7,830,972	7,825,899	7,110,160	7,484,640	9,298,140
Totals	**82,463,162**	**96,238,418**	**94,917,509**	**92,036,510**	**95,033,796**

Water Conservation Plan

In addition to the utility profile, please attach the following as required by Title 30, Texas Administrative Code, §288.2. Note: If the water conservation plan does not provide information for each requirement, an explanation must be included as to why the requirement is not applicable.

A. *Record Management System*

The water conservation plan must include a record management system which allows for the classification of water sales and uses in to the most detailed level of water use data currently available to it, including if possible, the following sectors: residential (single and multi-family), commercial.

B. *Specific, Quantified 5 & 10-Year Targets*

The water conservation plan must include specific, quantified five-year and ten-year targets for water savings to include goals for water loss programs and goals for municipal use in gallons per capita per day. Note that the goals established by a public water supplier under this subparagraph are not enforceable. These goals must be updated during the five-year review and submittal.

C. *Measuring and Accounting for Diversions*

The water conservation plan must include a statement about the water suppliers metering device(s), within an accuracy of plus or minus 5.0% in order to measure and account for the amount of water diverted from the source of supply.

D. *Universal Metering*

The water conservation plan must include and a program for universal metering of both customer and public uses of water, for meter testing and repair, and for periodic meter replacement.

E. *Measures to Determine and Control Water Loss*

The water conservation plan must include measures to determine and control water loss (for example, periodic visual inspections along distribution lines; annual or monthly audit of the water system to determine illegal connections; abandoned services; etc.).

F. *Continuing Public Education & Information*

The water conservation plan must include a description of the program of continuing public education and information regarding water conservation by the water supplier.

G. *Non-Promotional Water Rate Structure*

The water supplier must have a water rate structure which is not "promotional," i.e., a rate structure which is cost-based and which does not encourage the excessive use of water. This rate structure must be listed in the water conservation plan.

H. *Reservoir Systems Operations Plan*

The water conservation plan must include a reservoir systems operations plan, if applicable, providing for the coordinated operation of reservoirs owned by the applicant within a common watershed or river basin in order to optimize available water supplies.

I. *Enforcement Procedure and Plan Adoption*

The water conservation plan must include a means for implementation and enforcement, which shall be evidenced by a copy of the ordinance, rule, resolution, or tariff, indicating official adoption of the water conservation plan by the water supplier; and a description of the authority by which the water supplier will implement and enforce the conservation plan.

J. *Coordination with the Regional Water Planning Group(s)*

The water conservation plan must include documentation of coordination with the regional water planning groups for the service area of the public water supplier in order to ensure consistency with the appropriate approved regional water plans.

K. *Plan Review and Update*

A public water supplier for municipal use shall review and update its water conservation plan, as appropriate, based on an assessment of previous five-year and ten-year targets and any other new or updated information. The public water supplier for municipal use shall review and update the next revision of its water conservation plan not later than May 1, 2009, and every five years after that date to coincide with the regional water planning group. The revised plan must also include an implementation report.

VI. ADDITIONAL REQUIREMENTS FOR LARGE SUPPLIERS

Required of suppliers serving population of 5,000 or more or a projected population of 5,000 or more within the next ten years:

A. *Leak Detection and Repair*

The plan must include a description of the program of leak detection, repair, and water loss accounting for the water transmission, delivery, and distribution system in order to control unaccounted for uses of water.

B. *Contract Requirements*

A requirement in every wholesale water supply contract entered into or renewed after official adoption of the plan (by either ordinance, resolution, or tariff), and including any contract extension, that each successive wholesale customer develop and implement a water conservation plan or water conservation measures using the applicable elements in this chapter. If the customer intends to resell the water, the contract between the initial supplier and customer must provide that the contract for the resale of the water must have water conservation requirements so that each successive customer in the resale of the water will be required to implement water conservation measures in accordance with the provisions of this chapter.

VII. ADDITIONAL CONSERVATION STRATEGIES

Any combination of the following strategies shall be selected by the water supplier, in addition to the minimum requirements of 30 TAC §288.2(1), if they are necessary in order to achieve the stated water conservation goals of the plan. The commission may require by commission order that any of the following strategies be implemented by the water supplier if the commission determines that the strategies are necessary in order for the conservation plan to be achieved:

1. Conservation-oriented water rates and water rate structures such as uniform or increasing block rate schedules, and/or seasonal rates, but not flat rate or decreasing block rates;

2. Adoption of ordinances, plumbing codes, and/or rules requiring water conserving plumbing fixtures to be installed in new structures and existing structures undergoing substantial modification or addition;

3. A program for the replacement or retrofit of water-conserving plumbing fixtures in existing structures;

4. A program for reuse and/or recycling of wastewater and/or graywater;

5. A program for pressure control and/or reduction in the distribution system and/or for customer connections;

6. A program and/or ordinance(s) for landscape water management;

7. A method for monitoring the effectiveness and efficiency of the water conservation plan; and

8. Any other water conservation practice, method, or technique which the water supplier shows to be appropriate for achieving the stated goal or goals of the water conservation plan.

VIII. WATER CONSERVATION PLANS SUBMITTED WITH A WATER RIGHT APPLICATION FOR NEW OR ADDITIONAL STATE WATER

Water Conservation Plans submitted with a water right application for New or Additional State Water must include data and information which:

1. support the applicant's proposed use of water with consideration of the water conservation goals of the water conservation plan;

2. evaluates conservation as an alternative to the proposed appropriation; and

3. evaluates any other feasible alternative to new water development including, but not limited to, waste prevention, recycling and reuse, water transfer and marketing, regionalization, and optimum water management practices and procedures.

Additionally, it shall be the burden of proof of the applicant to demonstrate that no feasible alternative to the proposed appropriation exists and that the requested amount of appropriation is necessary and reasonable for the proposed use.

Appendix B

Consumption Awareness Program Dashboard Features

Features of Usage Calculator:

- USAGE SUMMARY - provides you with a dashboard of information about your water usage including reading status, actual usage, project usage for next bill, and usage comparison information.

- MONTHLY USAGE HISTORY - provides you with a chart and table of monthly usage and billed history for up to the past 18 months. This information is useful for reviewing your usage and charge trends across seasons as well as from month to month.

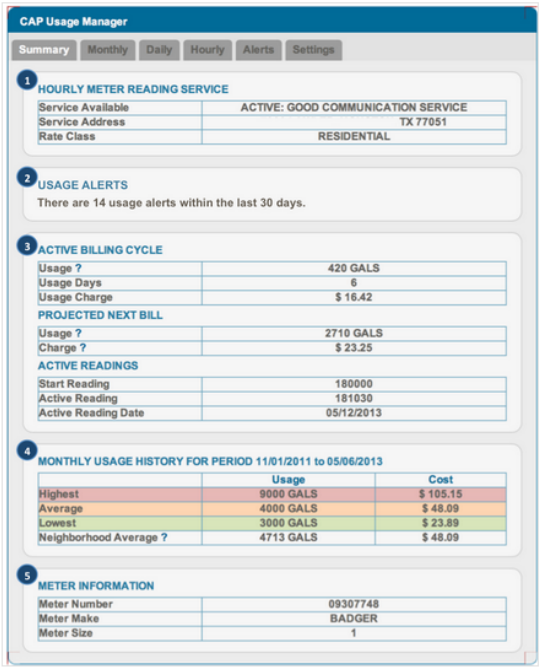
- DAILY USAGE HISTORY - provides you with up to 90 days of daily usage history useful for comparing usage by day of week or from week to week. The daily usage is also a good tool for quickly identifying when unexpected high usage began.

- HOURLY USAGE HISTORY - provides you with hourly usage for any selected day up to the past 90 days. This tool is helpful for associating usage to specific events in your home or business (i.e., irrigation use, bathroom use, appliance use, etc.).

- USAGE ALERT HISTORY - provides you with a history of usage alert notifications sent for your account.

- USAGE ALERT SETTINGS - provides you with options for custom daily, monthly, and leak threshold alert settings that can be delivered to your mobile phone as a text or app notification, email, or phone call.

USAGE SUMMARY



1. **HOURLY METER READING SERVICE** provides you with the current status of the hourly meter reading service, the service address of the account, and the rate class assigned to the account.
   See **Hourly Reading Communication** Status for more information on your status, possible reasons, and possible corrective actions.
2. **USAGE ALERTS** provides you with a summary count of the number of usage alert notifications that have been triggered for the account in the past 30 days.
3. **ACTIVE BILLING CYCLE USAGE** reports your actual water usage since your last billed reading (i.e., current billing cycle or usage for your next bill). The information includes the usage in gallons, the days of usage, and the approximate charge for this usage.

   Note that the usage includes unbilled usage from the previous cycle and actual usage for the usage days as of the last meter reading. You can view the last meter reading date and time by logging on to your account.

   PROJECTED NEXT BILL estimates what your bill could be if the current pattern of usage continues. The projection is based on actual usage plus an estimated daily usage over the remaining days in the billing month.

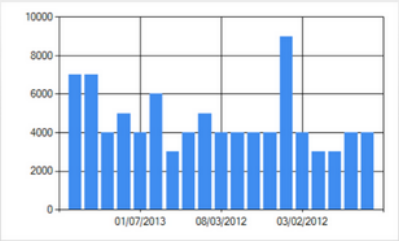
   If you have an unexpected high projection, you can take action to avoid this charge if you are early in the cycle. If not, you can still take action to avoid these charges on your future bills.
4. **USAGE HISTORY FOR PERIOD** provides you with a basis for comparing your usage to your past usage history to determine if it is normal or unusually high. Your average usage over the past 18-months shows you what's normal, the highest usage could reflect a month when you had a leak, and the lowest usage could reflect a month when you were away from home.
   Neighborhood Average provides you with a basis for comparing your usage to homes in your surrounding area. The average is based on active single family residential customers with meter sizes of 1-inch or smaller. The number of homes included in the average is reported below the comparison table.
5. **METER INFORMATION** provides you with useful information that can help when investigating possible meter reading issues.

MONTHLY USAGE HISTORY

CAP Usage Manager

Summary | Monthly | Daily | Hourly | Alerts | Settings

Monthly Consumption



Reading Date	Reading	Consumption (gallons)	Charges
05/06/2013	180000	7000	$ 84.64
04/04/2013	173000	7000	$ 78.00
03/06/2013	166000	4000	$ 47.68
02/06/2013	162000	5000	$ 56.27
01/07/2013	157000	4000	$ 47.68
12/06/2012	153000	6000	$ 66.97
11/05/2012	147000	3000	$ 25.47
10/04/2012	144000	4000	$ 47.68
09/05/2012	140000	5000	$ 56.27
08/03/2012	135000	4000	$ 47.68
07/05/2012	131000	4000	$ 47.68
06/05/2012	127000	4000	$ 47.72
05/03/2012	123000	4000	$ 52.32
04/03/2012	119000	9000	$ 92.19
03/02/2012	110000	4000	$ 44.09
02/03/2012	106000	3000	$ 23.68
01/05/2012	103000	3000	$ 23.68
12/03/2011	100000	4000	$ 44.09
11/01/2011	96000	4000	$ 44.09

1. **MONTHLY USAGE HISTOGRAM CHART** provides you with graphical representation of the distribution usage by month.

2. **READING DATE** provides you with meter reading date that was used for the corresponding billing period.
You can click the column heading title to sort the table. Click twice to reverse the order.

3. **READING** provides you with the meter reading (in thousands of gallons) recorded on the specified reading date. Your usage is charged in thousands of gallons and any usage in excess of a factor of one thousand will be charged in the next billing cycle.

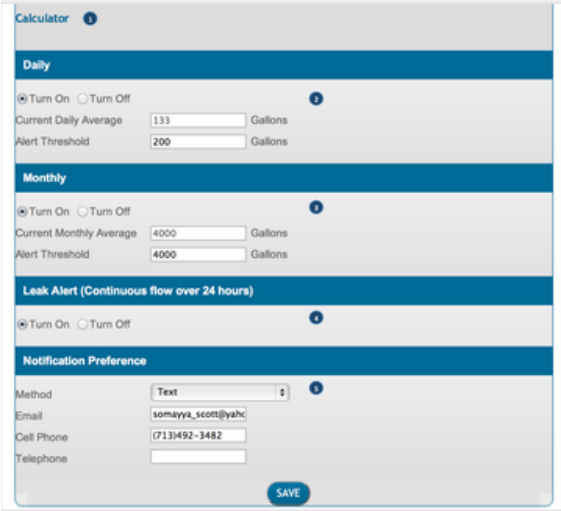
   You can click the column heading title to sort the table. Click twice to reverse the order.

4. **CONSUMPTION** provides you the billed usage for the corresponding billing month.

   You can click the column heading title to sort the table. Click twice to reverse the order.

5. **CHARGES** provides you with the amount that was actually billed for corresponding billing month.
You can click the column heading title to sort the table. Click twice to reverse the order.

USAGE ALERT SETTINGS



CALCULATOR provides you with a tool that can be used to determine what your daily and monthly water usage should be based on key factors impacting your household such as: the total number of people in your household, bathroom usage, number of loads typically washed or the frequency for yard watering, etc.

This tool will effectively estimate the expected daily, monthly and annual water consumption for your household and compare it to the average of similar households across the City of Houston.

DAILY USAGE THRESHOLD SETTING provides you with tool that monitors your daily water usage.

The Daily Alert feature includes the average daily consumption based on a rolling 12-month period. You can set the alert threshold by entering the consumption amount that you believe is unusually high for a given day. Review your daily consumption history to help determine an effective high consumption threshold.

1. Click the 'Turn On' option to turn on the notification.
2. Review the daily average for the past 12 months.
3. Select a usage alert threshold based on your desired notification needs.

- Set the threshold at twice your average if you want to be notified of unusually high usage or...
- Set the threshold to 10 if you have a vacant property where you want to be notified of any use.

MONTHLY USAGE THRESHOLD SETTING provides you with a tool that can be used to notify you when your projected month charge exceeds your monthly budget threshold.

The Monthly Alert feature includes the average monthly consumption based on a rolling 12-month period. You can set the alert threshold by entering the consumption amount that you believe is unusually high for a given month. Review your daily consumption history to help determine an effective high consumption threshold.

LEAK ALERT SETTING provides you with a tool that detects a continuous flow of water through your meter for 1 to 7 days (depending on meter type). This scenario typically indicates a leak for residential single family accounts but may not be an effective indicator for multi-family or commercial accounts.

Notification Preference allows you to choose a preferred method of notification (i.e., text, mobile app, email, or phone).

Appendix C

2018 WATER & SEWER RATES

A copy of the 2018 water and wastewater rates is enclosed. Current rates will be posted on Houston's website at: www.houstonwater.org

2018 WATER & SEWER RATES Effective date April 1, 2018

The basic service charge for both water and sewer is affected by the water meter size. For all classes that include sewer, the water consumption is used to determine the appropriate sewer consumption charge.

Single-Family Residential – TU 01, 02, & 03:

The basic charge for each meter size is listed below. For simplicity, this table adds volume and base charges together for 1,000 to 6,000 gallons. From 7,000 to 12,000 gallons the rate is $5.32 per 1,000 gallons, regardless of meter size. Starting at 13,000 gallons, the rate is $8.76 per 1,000 gallons.

Water Rates				
	5/8 or ¾" meters	1 inch meter	1.5 inch meter	2 or 3 inch meter
Basic charge, per meter size	$ 5.39	$ 6.67	$ 10.11	$11.91
The numbers below this line include both Base and Volume charges				
1,000 gallons	$5.54	$6.82	$10.26	$12.05
2,000 gallons	$12.62	$13.90	$17.34	$19.13
3,000 gallons	$13.04	$14.32	$17.76	$19.56
4,000 gallons	$24.67	$25.95	$29.39	$31.18
5,000 gallons	$29.57	$30.85	$34.29	$36.08
6,000 gallons	$34.46	$35.74	$39.18	$40.98
7,000 to 12,000 gallons	The total charge for 6,000 gallons + $5.32 per 1,000 gallons			
Over 12,000 gallons	The total charge for 12,000 gallons + $8.76 per 1,000 gallons			

Sewer Rates					
	5/8 or ¾" meters	1 inch meter	1.5 inch meter	2 inch meter	3 inch meter
Basic charge, per meter size	$11.45	$12.04	$13.94	$14.53	$26.02
The numbers below this line include both Base and Volume charges					
1,000 gallons	$11.64	$12.23	$14.13	$14.72	$26.21
2,000 gallons	$12.02	$12.61	$14.51	$15.10	$26.59
3,000 gallons	$12.32	$12.91	$14.81	$15.40	$26.89
4,000 gallons	$28.25	$28.84	$30.74	$31.33	$42.82
5,000 gallons	$34.01	$34.60	$36.50	$37.09	$48.58
6,000 gallons	$42.39	$42.98	$44.88	$45.47	$56.96
Over 6,000 gallons	The total charge for 6,000 gallons + $8.38 per 1,000 gallons				

EXAMPLES OF RESIDENTIAL BILLINGS:

		Water Charges	Sewer Charges
1,000 gallons, 5/8" meter Total/Month	**$ 5.54 Water + $ 11.64 Sewer = $ 17.18**		
7,000 gallons, 5/8" meter Total/Month	**$ 39.78 Water + $ 50.77 Sewer = $ 90.55**	$34.46 for 6,000 gallons plus 1,000 gallons at $5.32 = $39.78	$42.39 for 6,000 gallons plus 1,000 gallons at $8.38 = $50.77
14,000 gallons, 5/8" meter Total/Month	**$ 83.90 Water + $109.43 Sewer = $193.33**	$34.46 for 6,000 gallons plus 6,000 gallons at $5.32 plus 2,000 gallons at $8.76 = $83.90	$42.39 for 6,000 gallons plus 8,000 gallons at $8.38 = $109.43

Multi-Family – TU 14-19:

- 14 (duplex – 2 units)
- 15 (tri-plex – 3 units)
- 16 (quad-plex – 4 units)
- 17 (master-metered townhomes – any number of units)
- 18 (apartments — 5+ units)
- 19 (trailer parks)

Consumption is no longer included with the basic charge. The volume charges are applied to all usage.

Rate	Meter size (Inches)	Basic Water Charge	Basic Sewer Charge
Basic Charge (0 consumption)	5/8	$5.60	$9.85
	¾	$5.77	$9.85
	1	$6.94	$10.34
	1.5	$10.51	$12.00
	2	$12.37	$12.49
	3	$32.74	$22.38
	4	$44.62	$25.35
	6	$76.47	$36.22
	8	$199.68	$87.97
	10	$199.68	$106.92
Volume Charge	All	+ $4.31 per 1,000 gallons	+ $6.26 per 1,000 gallons

Commercial – TU 21-60:

Consumption is no longer included with the basic charge. The volume charges are applied to all usage.

Rate	Meter Size (Inches)	Basic Water Charge	Basic Sewer Charge
Basic Charge (0 consumption)	5/8	$ 5.60	$9.85
	3/4	$ 5.77	$9.85
	1	$ 6.94	$10.34
	1.5	$ 10.51	$12.00
	2	$ 12.37	$12.49
	3	$ 32.74	$22.38
	4	$ 44.62	$25.35
	6	$ 76.47	$36.22
	8	$ 199.68	$87.97
	10	$ 199.68	$106.92
Volume Charge	All	+ $4.42 per 1,000 gallons	+ $6.26 per 1,000 gallons

Industrial, No Surcharge – (WSC 6) TU 21-60, 61, 62:

Industrial rates include a monthly basic charge and volume charges for both water and sewer. No consumption is included with the basic charge for water or sewer. Some customers are billed for sewer only, based on readings from non-City of Houston water meters.

Rate	Meter Size (Inches)	Water Charge	Basic Sewer Charge
Basic Charge (0 consumption)	5/8	$ 5.60	$16.65
	3/4	$ 5.77	$16.65
	1	$ 6.94	$16.65
	1.5	$ 10.51	$16.65
	2	$ 12.37	$16.65
	3	$ 32.74	$22.18
	4	$ 44.62	$25.35
	6	$ 76.47	$36.22
	8	$ 199.68	$87.97
	10+	$ 199.68	$106.92
Volume Charge	All	+ $4.42 per 1,000 gallons	Up to 2,000 gallons at $3.85 per 1,000 gallons
			All over 2,000 gallons at $6.85 per 1,000 gallons.

Transient Meters – TU 71:

These accounts have rental fees, base charges and consumption charges.

Rate	Basic Water Charge		
	1"	2"	3"
Basic Charge/Rental Fee (0 consumption)	$18.68	$24.91	$31.13
Volume Charges	+$4.96 per 1,000 gallons		

Please refer questions to Krystal Jones at 832-395-6285, or fax to 713-371-1122.

Lawn/Outdoor Meters – TU 72:

No consumption is included with the basic charge. Volume charges are applied to all usage, but there are two rate tiers. The "defined quantity" marks the point where the tier changes, which is different for each meter size. Volumes up to the defined quantity are charged at the lower rate tier; volumes in excess of the defined quantity are charged at the higher rate tier.

Rate	Meter Size (Inches)	Basic Water Charge	Defined Quantity (First Tier of Volume Charges)
Basic Rate, per meter size, (plus first tier of volume charges)	5/8	$ 27.87	None – all consumption at 2nd tier
	3/4	$ 27.87	None – all consumption at 2nd tier
	1	$ 31.24	None – all consumption at 2nd tier
	1.5	$ 82.94	Up to 10,000: + $3.24 per 1,000 gallons
	2	$ 128.20	Up to 16,000: + $3.24 per 1,000 gallons
	3	$ 278.31	Up to 35,000: + $3.24 per 1,000 gallons
	4	$ 471.17	Up to 60,000: + $3.24 per 1,000 gallons
	6	$ 970.28	Up to 125,000: + $3.24 per 1,000 gallons
	8	$ 1403.13	Up to 180,000: + $3.24 per 1,000 gallons
	10	$ 1403.13	Up to 180,000: + $3.24 per 1,000 gallons
Volume Charges Second Tier (All meter sizes)	All consumption over defined quantity: + $7.46 per 1,000 gallons		

EXAMPLES OF LAWN BILLING:

5/8" Meter w/2,000 gallons		1" Meter w/12,000 gallons		3" meter w 60,000 gallons		6" meter w 60,000 gallons	
Basic:	$27.87	Basic:	$31.24	Basic:	$278.31	Basic:	$970.28
2nd tier: 2*7.26	$14.52	2nd tier: 12*7.46	$89.52	1st tier: 35*3.24	$113.40	1st tier: 60*3.24	$194.40
				2nd tier: 25*7.46	$186.50		
TOTAL:	$42.39	TOTAL:	$120.76	TOTAL:	$578.21	TOTAL:	$1164.68

Other Classes:

Industrial w/Surcharge – (WSC 9) TU 21-60, 61, 62, 63:

Industrial rates include a monthly basic charge and volume charges for both water and sewer. Some customers are billed for sewer only, based on readings from non-City of Houston water meters. These customers take their water from non-City of Houston sources and may choose to install a water meter of the type and standard approved by the department for the purpose of measuring the amount of water taken into such facilities. The water consumption indicated by such meter shall be the basis of determining the sewer charge. Rates are the same as if the water is from City of Houston source.

No consumption is included with the basic charge for water or sewer. While the basic charge for water and sewer is determined by meter size, the volume charge for sewer may vary based on the results of effluent testing.

Rate	Meter Size (Inches)	Water Charge	Basic Sewer Charge
Basic Charge (0 consumption)	5/8	$ 5.60	$16.65
	3/4	$ 5.77	$16.65
	1	$ 6.94	$16.65
	1.5	$ 10.51	$16.65
	2	$ 12.37	$16.65
	3	$ 32.74	$22.18
	4	$ 44.62	$25.35
	6	$ 76.47	$36.22
	8	$ 199.68	$87.97
	10+	$ 199.68	$106.92
Volume Charge	All	+ $4.61 per 1,000 gallons	See below

Additional surcharges for industrial sewer accounts are determined by application of a special formula to the results of effluent tests:

R= X + (BOD * 8.337 * Y/1000) + (SS * 8.337 * Z/1000)

Or R= Rate / TG as 47-122(b)(2)(b), whichever is greater

Where:

X = $4.61 per 1000 gallons, R= 8.337, Y= $0.7932 / lb., Z = $0.3131 / lb.

BOD = Five-day, 20 degrees Centigrade biochemical oxygen demand content of the waste delivered, in mg/l.

SS = Suspended solids content of the waste delivered, in mg/l.

Any questions on how the surcharges are calculated, or regarding prohibited discharges, should be referred to the Wastewater Operations Branch by calling (832) 395-5779 or by emailing allison.osborne@houstontx.gov.

Resale — TU 73:

These customers purchase water from the City of Houston for resale.

Rate	Meter Size (Inches)	Basic Water Charge
Basic Charge, per meter size (0 consumption)	5/8	$21.14
	3/4	$21.14
	1	$24.51
	1.5	$60.48
	2	$92.23
	3	$199.65
	4	$336.33
	6	$689.36
	8 and above	$998.62
Volume Charge (All meter sizes, all consumption)	$5.30 per 1,000 gallons	

Emergency Backup Service — TU 74:

The Contact Center at 713-371-1400 can answer routine questions about these accounts. To notify UCS of EBS use, fax the report to 832-395-5255.

Rate	Meter Size (Inches)	Basic Water Charge
Basic Charge, per meter size (0 consumption)	5/8,3/4	$ 8.03
	1	$ 11.42
	1.5	$ 16.85
	2	$ 22.43
	3	$ 46.98
	4	$ 74.57
	6	$ 144.05
	8	$ 213.39
	10+	$ 220.89
Volume Charge (All meter sizes, all consumption)	$8.20 per 1,000 gallons	

Un-Metered Fire Line Charge – TU 21-60, 75:

Un-metered fire lines are charged a flat fee every month, under the provisions of City of Houston Ordinance §47-64. These lines must be equipped with backflow prevention assemblies.

Corresponding size of the diameter of service line	Monthly Charge for Basic Service
5/8 inch	$14.66
3/4 inch	$14.66
1.0 inch	$14.66
1.5 inch	$58.39
2.0 inch	$86.11
3.0 inch	$86.11
4.0 inch	$86.11
6.0 inch	$95.92
8.0 inch	$163.73
10.0 inch	$220.88

Metered Fire Line Charge Only – TU 21-60:

These customers have their fire service isolated from the remainder of the water supply, and served through an independent meter. Normally they will have zero consumption, but a consumption charge applies if consumption occurs.

Rate	Meter Size (Inches)	Basic Water Charge
Basic Charge, per meter size (0 consumption)	5/8	$5.60
	¾	$5.77
	1	$6.94
	1.5	$10.51
	2	$12.37
	3	$32.74
	4	$44.62
	6	$76.47
	8 and above	$199.68
Volume Charge (All meter sizes, all consumption)	$4.42 per 1,000 gallons	

Un-Metered Sewer Only Customer – TU 81-82:

Special rates apply to sewer customers without City of Houston water or effluent meters. These are monthly rates, but will continue to be billed on a bi-monthly basis.

Class	Monthly Fee
Single Family Residential	$28.25
Duplex	$59.92
Multi-family (3+ units)	$35.04 per single family unit
Commercial	$66.13 per unit (defined in §47-1002)
Industrial	$66.10 per unit (defined in §47-1002)

Contract, Untreated and Reclaimed Water (TU 91):

Treated Water (TU 91) – contracted

	R1=	$3.064	/ TG	R2=	$3.739	/TG	N=	$0.760	/ TG	N=	$0.760	/TG
with airgap water: p * R1 + (p-m) * N1 without airgap = p* R2 + (p - m) * N2 (p: total water delivery in the month, M: minimum monthly water quantity in contract)												

Untreated Water (TU 91) – no contract

Consumption (/TG)	Per /TG
0 - 10,000	$1.7544
11,000-20,000	$1.5764
21,000-50,000	$1.4867
51,000-150,000	$1.3970
151,000 & up	$1.3521

Reclaimed/ Untreated Water (TU 91) – contracted

Surcharge (S)	Quantity Charge (/TG)
R= $0.7013 /TG	$0.7013

If (P – M) > 10% M, S = P * R * 5% (M; Max. Qty in contract)

If you have further questions on these accounts, contact Monique Pichon in Contract Water at (832) 395-6304 or Maria Carrillo 832-395-6220.

Contract Sewer:

These rates vary, based on whether the contracting district has participated in capital outlays.

If you have further questions on these accounts, contact Monique Pichon in Contract Water at (832) 395-3604 or Maria Carrillo 832-395-6220.

Agricultural and Rice Farmers (TU 91):

Agricultural - General

Quantity Charge (/MG)	**$143.11**

Agricultural - Rice

First Watering (/MG or /Acre)	**$143.11**
Additional Watering (/MG or /Acre)	**$26.03**

If you have further questions on these accounts, contact Monique Pichon in Contract Water at (832) 395-3604 or Maria Carrillo 832-395-6220.

Groundwater Reduction Plan (GRP) Participants:

GRP: R*P*Q where

- R is the base rate for contract treated water customer receiving water through airgap
- P is the percentage reduction for groundwater production required for GRP participant
- Q is the quantity of groundwater produced by the GRP participant during the month.

	R1=	$3.064	**/ TG**	**R2=**	$3.739	**/TG**	**N=**	$0.760	**/ TG**	**N=**	$0.760	**/TG**
with airgap water: p * R1 + (p-m) * N1 without airgap = p* R2 + (p - m) * N2 (p: total water delivery in the month, M: minimum monthly water quantity in contract)												

If you have further questions on these accounts, contact Veronica Osegueda at (832) 395-3080.

For additional reference, see chart on next page.

Fee Schedule

Name	Description	Statutory Authority	Amount	As Of
Water Rates	Untreated Water Sales No Contract Standard Rate for volume from 1,000 to 10,000 gallons, per 1,000 gallons	47-84(d)(1)	$1.7544	4/1/2018
Water Rates	Untreated Water Sales No Contract Standard Rate for volume from over 10,000 to 20,000 gallons, per 1,000 gallons (in addition to Volume Charge for the first increment of 10,000 gallons)	47-84(d)(2)	$1.5764	4/1/2018
Water Rates	Untreated Water Sales No Contract Standard Rate for volume from over 21,000 to 50,000 gallons, per 1,000 gallons (in addition to Volume Charges for the first increment of 10,000 gallons and for the second increment of 10,000gallons)	47-84(d)(3)	$1.4867	4/1/2018
Water Rates	Untreated Water Sales No Contract Standard Rate for volume from over 51,000 to 150,000 gallons, per 1,000 gallons (in addition to Volume Charges for the first increment of 10,000 gallons, the second increment of 10,000 gallons and the third increment of 30,000 gallons)	47-84(d)(4)	$1.3970	4/1/2018
Water Rates	Untreated Water Sales No Contract Standard Rate for volume over 151,000 gallons, per 1,000 gallons (in addition to Volume Charges for the first 10,000 gallons, the second increment of 10,000 gallons, the third increment of 30,000 gallons and the fourth increment of 100,000 gallons)	47-84(d)(5)	$1.3521	4/1/2018
Water Rates	Contract Untreated Water sold in excess of contract amount, per 1,000 gallons	47-85	$0.7013	4/1/2018
Water Rates	Contract Untreated Water for agricultural use, general agriculture, per 1,000 gallons	47-89(b)(1)	$143.11	4/1/2018
Water Rates	Contract Untreated Water for agricultural use, rice irrigation, rate for first watering, per acre of contracted land (if diverted through a meter on canal / conveyance system - per 1,000 gallons actually used)	47-89(b)(2)a	$143.11	4/1/2018
Water Rates	Contract Untreated Water for agricultural use, rice irrigation, Rate for each additional watering, per acre of contracted land (if diverted through a meter on canal / conveyance system - per 1,000 gallons actually used)	47-89(b)(2)b	$26.03	4/1/2018

Appendix D

Ordinance Adopting the 2019 Water Conservation Plan

A sample copy of the Houston City Council ordinance for the adoption of this Plan is enclosed in the next page. The sample copy will be replaced with the signed copy after the adoption of the Plan.

City of Houston, Texas Ordinance No. 2019-901

AN ORDINANCE AMENDING ORDINANCE NO. 2019-572; APPROVING THE 2019 WATER CONSERVATION PLAN FOR MUNICIPAL USES AND THE 2019 DROUGHT CONTINGENCY PLAN FOR THE CITY OF HOUSTON; PROVIDING FOR SEVERABILITY; MAKING VARIOUS FINDINGS AND PROVISIONS RELATING TO THE SUBJECT MATTER; AND DECLARING AN EMERGENCY.

* * * * *

WHEREAS, on June 19, 2019 by Ordinance No. 2019-463, City Council approved the 2019 City of Houston Water Conservation Plan and 2019 City of Houston Drought Contingency Plan, which is a required attachment to the Water Conservation Plan;

WHEREAS, the version of the 2019 Water Conservation Plan attached to Ordinance No. 2019-463 was not the final version uploaded to Novus and did not include several paragraphs and appendices;

WHEREAS, the version presented to City Council on July 31, 2019 included all material in the Water Conservation Plan approved by City Council on June 19, 2019, plus the following: Utility profile reports required by the State of Texas; Public comments received by the City during the public comment period; and Information on the City's PACE Program, Community Rain Barrel Sale Program, and Native Plants Propagation Program and Sale.

WHEREAS, the version presented to City Council on July 31, 2019 made no changes to the 2019 City of Houston Drought Contingency Plan, which was and is attached to the Water Conservation Plan as Appendix F.

WHEREAS, Texas Water Code Section 11.1271 requires that each holder of an existing permit, certified filing, or certificate of adjudication for the appropriation of surface water in excess of 1,000 acre-feet per year for municipal, industrial and other purposes must develop, submit and implement a water conservation plan meeting the requirements of the Texas Water

Code as well as the criteria developed by the Texas Commission on Environmental Quality (the "TCEQ"); and

WHEREAS, Texas Water Development Board ("TWDB") requires that Houston's Water Conservation Plan include a copy of Houston's Drought Contingency Plan that meets the requirements set forth in TWDB's Water Conservation Plan Guidance Checklist, Form TWDB-1968; and

WHEREAS, the City of Houston finds it advantageous to provide identical approval dates for both its water conservation plan and its drought contingency plan; and

WHEREAS, the City of Houston intends to comply with the requirements of Texas Water Code, the Texas Administrative Code, the TWDB and the Texas Commission on Environmental Quality ("TCEQ") regarding its Water Conservation Plan and Drought Contingency Plan; and

WHEREAS, after reviewing the City of Houston 2019 Drought Contingency Plan, contained under the 2019 Water Conservation Plan Appendix F, the TCEQ requested that the City of Houston add-text to Pages 100, 101 and 103 of the 2019 Water Conservation Plan, referencing required provisions for contract customer to ensure that the Plan is in compliance with Title 30 Texas Administrative Code Chapter 288, changes the City of Houston has made and now brings forward for City Council review and approval of the amended text;

NOW THEREFORE,

* * * * *

BE IT ORDAINED BY THE CITY COUNCIL OF THE CITY OF HOUSTON, TEXAS:

Section 1. That the findings contained in the Preamble of this Ordinance are determined to be true and correct and are hereby adopted as part of this Ordinance.

Section 2. The City Council hereby approves the complete 2019 Water Conservation Plan for Municipal Uses, which is attached hereto as Exhibit "A," and incorporated herein by reference.

Section 3. The City Council hereby approves the 2019 Drought Contingency Plan for the City of Houston, which is attached hereto as Exhibit "B", and incorporated herein by reference.

Section 3. This ordinance amends Ordinance No. 2019-572 as specified herein.

Section 4. If any provision, section, subsection, sentence, clause, or phrase of this Ordinance, or the application of same to any person or set of circumstances is for any reason held to be unconstitutional, void or invalid, the validity of the remaining portions of this Ordinance or their application to other persons or sets of circumstances shall not be affected thereby, it being the intent of the City Council in adopting this Ordinance that no portion hereof or provision or regulation contained herein shall become inoperative or fail by reason of any unconstitutionality, voidness or invalidity of any other portion hereof, and all provisions of this Ordinance are declared to be severable for that purpose.

Section 5. There exists a public emergency requiring that this Ordinance be passed finally on the date of its introduction as requested in writing by the Mayor; therefore, this Ordinance shall be passed finally on such date and shall take effect immediately upon its passage and approval by the Mayor; however, in the event that the Mayor fails to sign this Ordinance within five days after its passage and adoption, it shall take effect in accordance with Article VI, Section 6, Houston City Charter.

PASSED AND ADOPTED this 20th day of November, 2019.

APPROVED this _____ day of _____, 2019.

_____
Mayor of the City of Houston, Texas

Pursuant to Article VI, Section 6, Houston City Charter, the effective date of the foregoing Ordinance is NOV 2 6 2019.

_____
City Secretary/Assistant

Prepared by Legal Dept. _____)
(GHW/dg 10/28/2019) Senior Assistant City Attorney
(Requested by Carol Ellinger Haddock, P.E., Director, Houston Public Works)
(L.D. File No. 0631900178002)

AYE	NO	
✓		MAYOR TURNER
****	****	COUNCIL MEMBERS
✓		STARDIG
✓		DAVIS
✓		COHEN
✓		BOYKINS
✓		MARTIN
✓		LE
✓		TRAVIS
✓		CISNEROS
✓		GALLEGOS
✓		LASTER
✓		MARTHA CASTEX-TATUM
✓		KNOX
✓		ROBINSON
✓		KUBOSH
✓		EDWARDS
✓		CHRISTIE
CAPTION	ADOPTED	

CAPTION PUBLISHED IN DAILY COURT REVIEW DATE: NOV 2 6 2019

Appendix E

Letter to Region H

A sample copy of the notification letter to the Region H Water Planning Group is enclosed in the next page.

CITY OF HOUSTON
Houston Public Works

Sylvester Turner
Mayor

Carol Ellinger Haddock, P.E.
Director
P.O. Box 1562
Houston, Texas 77251-1562

832.395.2500
www.publicworks.houstontx.gov

July 28, 2019

Mr. Mark Evans
Chair, Region H Water Planning Group
3648 Cypress Creek Parkway #110
Houston, TX 77068

Re: 2019 City of Houston Water Conservation Plan

Dear Mr. Evans,

Enclosed please find a copy of the 2019 City of Houston Water Conservation Plan, which is submitted to the Region H Water Planning Group in accordance with 30 T.A.C. Chapter 288. This plan, which includes the 2019 City of Houston Drought Contingency Plan, is the required 5-year update to the 2014 City of Houston Water Conservation Plan. Additional copies have been provided to the Texas Commission on Environmental Quality and the Texas Water Development Board.

Best regards,

Sharon Citino
Planning Director
Houston Water

Cc: Yvonne Forrest, Deputy Director
Paula Paciorek, Water Conservation Manager

Appendix F

2019 Drought Contingency Plan

The 2019 Drought Contingency Plan is enclosed in the next page.

DROUGHT CONTINGENCY PLAN
CITY OF HOUSTON

CCN# 99144
PWS# 1010013

July 2019

Section 1 Declaration of Policy, Purpose, and Intent

The purpose of the Drought Contingency Plan (the "Plan") is to establish policies and procedures for the City of Houston to follow in case of a water shortage emergency. A water shortage emergency caused by drought or other uncontrollable circumstances that hinder the City of Houston's ability to meet water demand can range from mild to critical and can disrupt the normal availability of water supplies. Therefore, it is important that the City of Houston establish this procedure so that guidelines exist in the event that a water shortage emergency occurs. The City of Houston Code of Ordinances at Chapter 47, Article VII contains the policy regarding the actions the City of Houston will take in the event of a water shortage or emergency. Definitions of terms used throughout the Plan can be found in Section 47-249 of Article VII.

Section 2 Public Involvement

Opportunity for the public to provide input into the preparation of the Plan was provided by:
(check at least one of the following)

– Scheduling and providing public notice of a public meeting to accept input on the Plan
– Mailed survey with summary of results (attach survey and results)
– Bill insert inviting comment (attach bill insert)
– Other method: Not applicable. The Plan has not changed since its adoption by the Houston City Council in 2014.

Section 3 Public Education

The City of Houston will periodically provide the public with information about the Plan, including information about the conditions under which each stage of the Plan is to be initiated or terminated and the drought response measures to be implemented in each stage.

Drought plan information will be provided by:
(check at least one of the following)

– public meeting
– press releases
– utility bill inserts
– The Plan will be available on the City of Houston's websites.

Section 4 Coordination with Regional Water Planning Groups

The service area of the City of Houston is located within the Region H Water Planning Group. The City of Houston will mail a copy of the Plan to Regional H on June 13, 2019.

Section 5 Notice Requirements

Written notice will be provided to each customer **prior to implementation or termination of each stage of the water restriction program**. Mailed notice will be given to each customer 72 hours prior to the start of water restriction. If notice is hand delivered, the City of Houston understands it cannot enforce the provisions of the Plan for 24 hours after notice is provided. The written notice to customers will contain the following information:

1. the date restrictions will begin;
2. the circumstances that triggered the restrictions;
3. the stages of response and explanation of the restrictions to be implemented; and
4. an explanation of the consequences for violations.

The City of Houston will notify the TCEQ by telephone at (512) 239-4714, or electronic mail at watermon@tceq.state.tx.us prior to implementing Stage II and will notify in writing the Public Drinking Water Section at MC - 155, P.O. Box 13087, Austin, Texas 78711-3087 within five (5) working days of implementation including a copy of the City's restriction notice. The City of Houston will file a status report of its restriction program with the TCEQ at the initiation and termination of mandatory water use restrictions (i.e., Stages II through IV).

Section 6 Violations

With the exception of customers with water service contracts, in accordance with Section 54.001 of the Texas Local Government Code, any person who violates any provision of this article shall be guilty of an offense and upon conviction thereof, shall be punished by a fine of not less than $100.00 nor more than $2,000.00 for each violation. Each act of city water use in violation of this article shall constitute and be punishable as a separate offense. Each day that any violation continues shall constitute and be punishable as a separate offense. Unless another penalty is specifically provided by this Code or by state law, the penalty for violation of any provision of this article shall be as follows:

(1) **For violations of stage two water shortage,** the department may issue a written warning to a customer for a first-time violation. Any subsequent violations are subject to a fine of $100.00 to $2,000.00.

(2) **For violations of stage three water shortage**, the department may issue a written warning to a customer for a first-time violation. Any subsequent violations are subject to a fine of $500.00 to $2,000.00. Additionally, the director may monitor the water account of any customer who has been convicted of a violation of section 47-253. Daily monitoring may continue through the end of the existing water shortage period. The director may turn off city water if a customer has violated the authorized water use during a stage three water shortage on three separate instances within a 30-day period. Water service may be reinstated to a customer after a termination only upon a) payment of all applicable fines and any outstanding water service charges; and b) agreeing to the maximum rate in existence, regardless of the customer's billing rate class, for all future water service provided during the 12 months immediately following the termination and filing such agreement in writing with the department.

(3) **Violations of stage four water shortage** are subject to fines of $1,000.00 to $2,000.00. Additionally, all customers exceeding the allowed water usage during a stage four water shortage by ten percent or more shall pay a 20 percent surcharge for the current and two subsequent billing periods. The director may also turn off city water if a customer has exceeded the authorized water use during a stage four water shortage on three separate instances within a 30-day period. Water service may be reinstated to a customer after termination only upon a) payment of all applicable fines and any outstanding water service charges; and b) agreeing to the maximum rate in existence, regardless of the customer's billing rate class, for all future water service provided during the 12 months immediately following the termination and filing such agreement in writing with the department.

In the event that a customer with a water service contract engages in the unauthorized use of city water, the city shall have the right to pursue any and all rights and remedies

allowed under existing contracts with customers, and any and all remedies allowed under Texas law.

Section 7 Exemptions or Variances

The utility official may grant in writing a temporary variance for an otherwise prohibited water use if the utility official determines that:

(1) Failure to grant the variance would cause an emergency condition immediately threatening the life, safety, welfare, or fire protection of the public, the person requesting the variance, or the environment; or

(2) The applicant cannot comply with the prohibition for technical reasons; or

(3) The applicant agrees to implement alternative methods that will achieve the same or a greater level of reduction in water use.

An application for a variance shall be made in writing with the utility official and shall include the following:

(1) Name and address of the applicant;

(2) Purpose of water use;

(3) Specific provision(s) of this article from which the applicant is requesting relief;

(4) A detailed statement as to how the specific provision(s) of this article adversely affects the applicant or what damage or harm will occur to the applicant or others if the applicant complies with this article;

(5) Description of the relief requested;

(6) Period of time for which the variance is sought;

(7) Alternative water use restrictions or other measures the applicant is taking or proposes to take to conform to the provisions of this article and the compliance date; and

(8) Other pertinent information reasonably required by the utility official to determine whether the criteria of subsection (a) have been met.

No variance shall be retroactive or otherwise justify any violation of the prohibitions hereunder occurring prior to the issuance of the variance. A variance is valid for only the declared water shortage period in existence at the time of issuance and shall expire at the conclusion of the existing water shortage period. If the conclusion of the existing water shortage period is immediately followed by a newly declared water shortage period, consisting of either more or less threatening conditions, a new application for a variance must be filed in accordance with subsection (b) of this section. Notwithstanding the foregoing, a variance may be applied retroactively if issued to a residential customer who is a member of a family consisting of five or more persons living in a single residential unit served by a single water meter.

Section 8 Response Stages

STAGE I – ABNORMAL CONDITIONS (VOLUNATARY):

Target: Achieve a FIVE percent reduction in OVERALL water use.

Stage I will begin:

When the director finds that the city's water supply system is under stress because of lower than average annual rainfall, temperatures that are higher or lower than normal, or other circumstances.

Stage I will end:

When the director finds that the abnormal conditions leading to the declaration either no longer exist, have been mitigated, or have been escalated, and the director files a written declaration to that effect with the city secretary.

Utility Measures:

The director's declaration, which may cover all or a portion of the city's water supply system, shall be in writing and filed with the city secretary. City departments' water use reduction plans shall be implemented immediately upon the declaration of a stage one water shortage period and shall remain in effect until the conclusion of the water shortage period.

Voluntary Water Use Restrictions:

Unless otherwise stated in the declaration, all customers are requested to take the following voluntary water use restriction measures:

(1) Check for and repair all leaks, dripping faucets, and running toilets;

(2) Check for and correct excessive irrigation or uncorrected leaks that result in city water leaving the customer's property by drainage onto adjacent properties or public or private roadways or streets or gutters; and

(3) Irrigate between 7:00 p.m. and 5:00 a.m. of the following day on no more than two days per week in conformity with the following schedule:

a. Sundays and Thursdays for single-family residential customers with even-numbered street addresses; and

b. Saturdays and Wednesdays for single-family residential customers with odd-numbered street addresses; and

c. Tuesdays and Fridays for all other customers.

STAGE II - SEVERE CONDITIONS (MANDATORY):

Target: Achieve a TEN percent reduction in OVERALL water use.

The City of Houston will implement Stage II when, upon the recommendation of the director of the Public Works and Engineering Department, the mayor declares a stage two water shortage upon finding that one or more of the following conditions exist that may impact all or a portion of the city's water supply system:

Triggers:

(1) Combined total storage of surface water supply is less than 24 months, based on a calculated projection of monthly production of city water that includes historic production and information provided by customers;
(2) Combined total storage of surface water supply is less than 16 months, based on a calculated projection of current water production for the most recent 24-hour period;
(3) Current water production is 80 percent of the available treatment capacity;
(4) Loss of approximately 20 percent of available treatment capacity; or
(5) Water pressure readings of 45 pounds per square inch or less throughout all or material portions of the city's treated water distribution system.

Upon initiation and termination of Stage II, the City of Houston will mail a public announcement to its customers. Notice to TCEQ required.

Requirements for Termination:

A stage two water shortage ends when the mayor declares, based on the recommendation from the director that the severe conditions leading to the declaration either no longer exist, have been mitigated, or have been escalated, and the director files a written declaration to that effect with the city secretary.

Utility Measures:

City departments' water use reduction plans shall be implemented immediately upon the declaration of a stage four water shortage period and shall remain in effect until the conclusion of the water shortage period.

The second water source for City of Houston is: (check one)

- Inter-connection with other system
- Purchased water
- Other: Groundwater

Mandatory Water Use Restrictions:

During a stage two water shortage, unless otherwise stated in the declaration, all classes of customers are subject to mandatory restrictions of outdoor use. During a stage two water shortage, outdoor use shall be unlawful with the exception of the following time periods as specified in the declaration:

(1) Between 7:00 p.m. and 5:00 a.m. of the following day on no more than two days per week in conformity with the following schedule:
    a. Sundays and Thursdays for single-family residential customers with even-numbered street addresses; and
    b. Saturdays and Wednesdays for single-family residential customers with odd-numbered street addresses; and
    c. Tuesdays and Fridays for all other customers; or

(2) Between 7:00 p.m. and 5:00 a.m. of the following day on no more than one day per week in conformity with the following schedule:
    a. Saturdays for single-family residential customers with odd-numbered addresses;
    b. Sundays for single-family residential customers with even-numbered addresses; and
    c. Tuesdays for all other customers.

Any outdoor water use that results in city water leaving the customer's property by drainage onto adjacent properties or public or private roadways or streets or gutters shall be unlawful.

STAGE III – EXTREME CONDITIONS (MANDATORY):

Target: Achieve a TWENTY percent reduction in OVERALL water use.

Triggers:

The water utility will implement Stage III when any one of the selected triggers is reached that may impact all or a portion of the city's water supply system:

(1) Combined total storage of surface water supply is less than 18 months based on a calculated projection of monthly production of city water that includes historic production and information provided by customers;
(2) Combined total storage of surface water supply is less than 12 months, based on a calculated projection of current water production for the most recent 24-hour period;
(3) Current water production is 85 percent of the available treatment capacity;
(4) Loss of approximately 25 percent of available treatment capacity; or
(5) Water pressure readings of 40 pounds per square inch or less throughout all or material portions of the city's treated water distribution system.

Upon initiation and termination of Stage III, the City of Houston will mail a public announcement to its customers. Notice to TCEQ required.

Requirements for Termination:

A stage three water shortage ends when, upon the recommendations of the director and the mayor, the city council finds that the extreme conditions leading to the declaration either no longer exist, have been mitigated, or have been escalated, and the city council files a written declaration to that effect with the city secretary.

Utility Measures:

City departments' water use reduction plans shall be implemented immediately upon the declaration of a stage four water shortage period and shall remain in effect until the conclusion of the water shortage period. The Director shall apply any necessary curtailments consistently between classes of customers in accordance with Section §11.039 of the Texas Water Code.

Mandatory Water Use Restrictions:

During a stage three water shortage, all outdoor use shall be unlawful except that customers may use city water to continue production and protect inventory of their primary business products.

STAGE IV – EXCEPTIONAL CONDITIONS (MANDATORY):

Target: Achieve a THIRTY FIVE percent reduction in OVERALL water use.

Triggers:

The water utility will implement Stage IV when any one of the selected triggers is reached that may impact all or a portion of the city's water supply system:

(1) Combined total storage of surface water supply is less than 12 months, based on a calculated projection of monthly production of city water that includes historic production and information provided by customers;
(2) Combined total storage of surface water supply is less than six months, based on a calculated projection of current water production for the most recent 24-hour period;
(3) Current water production is 90 percent of the available treatment capacity; or
(4) Water pressure readings of 35 pounds per square inch or less throughout all or material portions of the city's treated water distribution system.

Upon initiation and termination of Stage IV, the City of Houston will mail a public announcement to its customers. Notice to TCEQ required.

Requirements for Termination:

A stage four water shortage ends when, upon the recommendations of the director and the mayor, the city council finds that the exceptional conditions leading to the declaration either no longer exist or have been mitigated, and the city council files a written declaration to that effect with the city secretary.

Operational Measures:

City departments' water use reduction plans shall be implemented immediately upon the declaration of a stage four water shortage period and shall remain in effect until the conclusion of the water shortage period. The Director shall apply any necessary curtailments consistently between classes of customers in

accordance with Section §11.039 of the Texas Water Code.

Mandatory Water Use Restrictions:

During a stage four water shortage, the following acts or omissions shall be unlawful:

(1) All outdoor use;

(2) Use of more than 4,000 gallons of city water per month by single-family residential customers;

(3) Use of more than 4,000 gallons of city water per month (used per unit, as provided in section 47-71 of City of Houston Code of Ordinance) by multifamily residential customers; and

(4) For all customers other than residential customers, failure to reduce use of city water by 15 percent of baseline usage, or any other percentage if recommended by the director and adopted by city council in the stage four water shortage declaration.

During a stage four water shortage, the director may authorize a ten percent rate reduction for water usage to customers for reductions of city water use by 20 percent or more than those restrictions set forth in subsection (d), except that the ten percent rate reduction shall not be available to customers whose average monthly usage during the preceding 12-month period was less than 4,000 gallons. The rate reduction for water usage shall be effective for the duration of the existing water shortage period.

Immediately upon the declaration of a stage four water shortage, the city may claim force majeure to all of its existing water service contracts consistent with the terms of such water service contracts and in accordance with applicable state law.

SYSTEM OUTAGE or SUPPLY CONTAMINATION

The City of Houston will notify the TCEQ Regional Office as soon as communication can be established.

Section 10 Contract Provisions

The City of Houston will include a provision in every wholesale water contract entered into or renewed after adoption of the plan, including contract extensions, that in case of a shortage of water resulting from drought, the water to be distributed shall be divided in accordance with Texas Water Code §11.039.

Appendix G

Public Comments on the 2019 Water Conservation Plan

Organization/ Citizen	Comment	Staff response
1. Citizen (anonymous) via Public Comment Period for the 2019 Water Conservation Plan Survey 5/28/2019 11:18 PM	A combination of marketing & communication and community outreach. Included in this would be a residential rebate program.	Thank you. We are currently evaluating a residential rebate program.
2. Citizen (anonymous) via Public Comment Period for the 2019 Water Conservation Plan Survey 5/23/2019 3:14 PM	Definitely need to consider educational materials in online site	Yes. We will be working on more visibility via a new Houston Public Works website with a Houston Water page that centralizes all the information about water in one place, including water conservation, quality, billing, regulation, drought contingency plan, tips, and more.
3. Citizen (anonymous) via Public Comment Period for the 2019 Water Conservation Plan Survey 5/21/2019 3:11 PM	Take action against consumers who do not fix their broken waterline after 36 hr. I have seen residents with water gushing down the street unrepaired for almost 10 days.	If you see a broken pipe, please notify Houston as soon as possible by calling Houston's Service Center at 3-1-1 or 713-837-0311. You can also report your request online at www.houston311.org. Reporting concerns via 3-1-1 is the fastest way to address your issue and track resolutions.
4. Citizen (anonymous) via Public Comment Period for the 2019 Water Conservation Plan Survey 5/21/2019 3:02 PM	Fix the leaks! I see leaks last for weeks	If you see a broken pipe, please notify Houston as soon as possible by calling Houston's Service Center at 3-1-1 or 713-837-0311. You can also report your request online at www.houston311.org. Reporting concerns via 3-1-1 is the fastest way to address your issue and track resolutions.
5. Citizen (anonymous) via Public Comment Period for the 2019 Water Conservation Plan Survey 5/21/2019 12:53 PM	Rainwater Harvesting rebates	Thank you. We are currently evaluating a residential rebate program.
6. Citizen (anonymous) via Public Comment Period for the 2019 Water Conservation Plan Survey 5/20/2019 10:55 PM	Reduced shared metered communities	Thank you for your suggestion.
7. Sierra Club Lone Star Chapter and National Wildlife Federation – 5/30/2019 via email	We understand that the state-required 2019 WCP has been prepared prior to the completion of the City's cost-of-service (water rate) study underway this year and that as a result of that timing, decisions about a major revamping of the WCP are being postponed until the results of that study are available and follow-up to the study is done. We also note that the City has hired a new Water Conservation Manager who now directs the Water	We appreciate your comments. We are currently evaluating water conservation programs that will best fit Houston and its current and future customers.

	Conservation Division created within Houston Water this year. Therefore, we acknowledge that the City's water conservation program is in flux at this time and that changes are on the horizon. Our comments on the draft 2019 WCP are made in that context, including suggestions that might shape the City's water conservation efforts moving forward and that might be incorporated into a revised plan later.	
8. Sierra Club Lone Star Chapter and National Wildlife Federation – 5/30/2019 via email	While we feel that there have been some improvements in the 2019 WCP from the previous 2014 Plan, and while we believe that several City of Houston activities and initiatives have the potential to enhance efficient water use and reduce per capita water consumption, we must note that Houston's water conservation efforts pale in comparison to that of many other major Texas cities, including Austin, Dallas, El Paso, and San Antonio. Houston is a great city, and it should be a leader – not a follower – in water efficiency and conservation.	We understand your concerns about Houston's water conservation programs not "matching up" to programs offered by other Texas cities. However, among the cities listed, Houston follows second to San Antonio with the lowest total (and residential) GPCD. Dallas, El Paso, Fort Worth, and even Austin currently have higher water use averages compared to Houston. Houston is currently working on improving its water conservation programs. Our goal is to become a leader in water conservation in the region, joining the efforts of other neighboring cities.
9. Sierra Club Lone Star Chapter and National Wildlife Federation – 5/30/2019 via email	In the **Introduction** to the Plan, Houston Water notes the municipal water conservation goals set by the Region H water plan and predicates its water conservation programs on helping the region to meet these goals. We applaud the City for seeking to develop and implement its programs using the Region H water conservation goals because we believe that those goals reflect the Regional Water Planning Group's recommendations for best management practices for water conservation. We encourage Houston Water to consider incorporating all of those best management practices, including reasonable limitations on outdoor landscape water use, into its water conservation program to enhance the chances for meeting the regional goals.	Yes. Houston is evaluating all water management strategies available – not only those recommended by the Region H Water Planning Group, but also new strategies being developed at the national and international level.
10. Sierra Club Lone Star Chapter and National Wildlife Federation – 5/30/2019 via email	On page 8, in the discussion of the Houston Wastewater System, the draft WCP notes the large "capacity available to treat additional wastewater – and produce additional water for reuse." Water reuse is one way, of course, for achieving greater water efficiency and reducing the demand for new water. **Are there any specific plans on the part of the City of Houston to implement additional reuse projects to take advantage of that capacity?** If so, the WCP should describe those plans and discuss how they might affect the City's water use.	Houston is currently evaluating future reuse projects (direct and indirect water reuse as well as gray water reuse) and has developed a Houston Water Reuse Task Force to assess water reuse opportunities. No details are currently available to add to the 2019 Water Conservation Plan.
11. Sierra Club Lone Star Chapter and National Wildlife Federation – 5/30/2019 via email	On page 9, in the discussion of Houston water retail customers, the draft WCP presents a table showing water usage by customer class as of 2018, and single family total annual usage and average MGD is roughly 29% of the total. Some studies done in Texas indicate that outdoor landscape watering is the largest single component of single-family water use. **Has the City conducted any study of water use by single family retail customers – or any study of water use by its multi family or commercial-industrial-institutional retail customers – to analyze types or patterns of water use that would allow Houston Water to target its water conservation efforts to get the most "bang for its buck?" If not, we would suggest that the**	Yes, we agree. There are lots of opportunities in this area, and Houston Water plans to work closely with other service lines, such as Customer Accounts Services (in charge of the Customer Awareness Program) as well as our GIS team to understand our customer base consumer patterns and determine the best programs for each type of customer. In addition, Houston Water will utilize studies already developed in this area to best inform the implementation of new programs.

	City contract for such a study or encourage research by one of Houston's academic institutions to generate the data that would allow more precise targeting of conservation efforts. San Antonio Water System has been successful in using such targeting to focus conservation efforts on large outdoor water users. It is possible that a preliminary step for Houston in this regard would be to use the data generated by participants in the Consumer Awareness Program to suggest possible targeting.	
12. Sierra Club Lone Star Chapter and National Wildlife Federation – 5/30/2019 via email	On pages 10-12, the draft WCP discusses the topic of Houston's **gallons per capita per day (GPCD)** in terms of total GPCD, residential GPCD, and water loss GPCD – in addition to water loss percentage. We appreciate the candid discussion of the context for the noted reductions in residential GPCD from the previous version of the WCP – namely the higher than average rainfalls during 2014-2018 that played a role in that reduction. We also appreciate the fact that the 2019 WCP uses a much lower baseline GPCD than the 2014 plan and that the City is committing to continued residential water reductions. However, we feel that **the target reduction of 1.6% over a five-year period is well below what could be achieved with an aggressive water conservation program aimed at residential water use**. Elements of such a program would include an active rebate or retrofit program to replace existing low efficiency toilets, clothes washers, and other water-using equipment with high-efficiency options and to assist low-income residents in repairing leaking pipes. The current efforts to address damages to residential properties from Hurricane Harvey and other flooding may ironically result in more water conserving fixtures in operation by retail residential water **customers, which could help lower GPCD. Again, another component of lowering residential** GPCD – a cost-effective one – would be reasonable limitations on outdoor water use.	As described on page 10 of the 2019 City of Houston Water Conservation Plan, Houston's current baselines (5-year historical averages) of 129 for the total GPCD and 62 for the residential GPCD fall into "the efficiency range," per the 2004 Water Conservation Task Force, which utilizes a target goal of 140 or less for the total GPCD. Therefore, Houston plans to implement the percentage of target reduction proposed in the 2019 Water Conservation Plan. We will revisit this percentage of target reduction during the development of the 2024 Plan.
13. Sierra Club Lone Star Chapter and National Wildlife Federation – 5/30/2019 via email	The GPCD and related discussion on pages 11-12 also covers the topic of water loss. **The draft notes that Houston's water loss is approximately 19% based on the last five years. The comparable figure in the 2014 WCP for five years previous to that plan's development was 14%, indicating that the City has lost ground in tackling this persistent issue.** **We believe that the 2019 WCP should explain why the City was not able to meet the 2014 WCP's five-year water loss reduction goal of 11.2%, indeed why the water loss percentage for 2014-2018 was 19% (and was approximately 17% for the year in 2018). One reason this would be important would be to better understand how realistic the 2019 WCP is in trying to reverse this situation and actually achieve a one percent reduction each year (5% over five years), which is a more aggressive scenario than the 2% reduction**	It is in Houston's best interest to reduce water loss. Houston is aware that there is room for improvement in this area. The size and age of Houston's transmission and distribution system make this system on of the most challenging and complex systems in the world. Houston Water has a team of experts in this field that determines Capital Improvement Projects on an annual basis (scheduled projects). Currently, 2% of Houston's pipeline system is scheduled to be replaced and/or rehabilitated annually. This is 140 miles of pipeline per year - in addition to emergency repairs. Houston Water has created an internal Water Loss Task Force to identify opportunity areas and improve (reduce) water loss percentages over the next years, with the goal of achieving 10% or less water loss.

	over five years that was anticipated in the 2014 WCP. **We realize and appreciate that on pages 12-15 of the draft 2019 WCP the efforts to address water loss through water main replacement (including the commitment of $107 million for capital improvement projects in the water distribution system), the Advanced Metering Infrastructure (AMI) network, dedicating staff to assist with data management and analysis, and other means are discussed. Presumably these will help Houston to achieve a reduction in water loss.** We think that it would be instructive for the WCP to include some examples of where the deployment of these actions and practices have reduced or eliminated specific water loss incidents. We note that the 1% annual reduction in water loss until reaching a water loss goal of 10% is in keeping with the current Region H water plan. There is a possibility, however, that the revised Region H water plan that will be completed in late 2020/early 2021 will actually set a long-term water loss goal of 5% rather than 10%. Indeed, a water loss of 10% for a municipal water system producing the volume of water that Houston does represents a major issue. We grant that tackling the water loss problem in Houston is and will be a costly enterprise. However, we also note that Houston is spending tens of millions of dollars to develop new water supplies, and perhaps some of those dollars would have been better spent addressing water loss. If these new water supplies come online without the City having made significant fixes to water distribution lines, the full benefits of those new water supplies will be decreased by ongoing water loss.	
14. Sierra Club Lone Star Chapter and National Wildlife Federation – 5/30/2019 via email	We applaud Houston for initiating its **Consumption Awareness Program**, and we note the progress in implementing the program. The draft WCP describes in general the next steps for what is termed "the second phase of implementation." The 2019 Plan would benefit from more detail about the time frame and milestones for these various second phase implementation activities and how they will specifically enhance the City's water conservation efforts. For example, what amount of dollars are budgeted for developing a web portal for multi-family and non-residential retail customers, what is the time frame for rolling out that web portal, and how will it be promoted to those categories of retail customers? The answers to these questions would provide the information to help evaluate how effective these efforts might potentially be in enhancing water use efficiency. The draft WCP discusses the potential for **the AMI network** to aid in gathering and disseminating information on retail customer water use but also notes the declining AMI network capacity due to "aging infrastructure and lack of resources." **The draft Plan states that: "As funds become available, Houston intends to replace obsolete AMI network infrastructure with the goal of having between 85-95% of retail meters read by the AMI network." That is**	The second phase of the Consumption Awareness Program is currently tied to the strategic replacement of Houston's 20+ year old AMR system with an AMI network. More than 95% of the existing automated meter reading system will be replaced. Procurement for the AMI is underway as the RFP should be released for prospective vendors to bid within the next 6 -12 months. Currently, the budget for replacement of the system is estimated at $50M. The implementation will phase in over 10 years and is tentatively scheduled to begin in late 2020. The replacement project will also include funding for establishing interconnectivity with Houston's current web portal thereby facilitating utilization by all customers (residential multifamily, non-residential etc.). The AMI infrastructure will also provide Houston and its customers with the enhanced ability to monitor near real time water usage, forecast water consumption, and identify leaks earlier. Marketing of the conservation tools will be strategically aligned to coincide with implementation of the AMI system. Marketing will be performed through direct mail, online advertisements, and social media posts from Houston. The proposed 10-year migration program to a new AMI network is a detailed plan that has been discussed with Houston's executive leadership. The budget is approximately $50M and is expected to go before City Council in Fiscal Year 2020 for approval.

	a laudable goal and intention, but what is the reality? Is there a detailed plan that prioritizes the parts of the infrastructure that need to be replaced, the cost estimate for that replacement, the preferred time frame for implementation? We understand that tackling this project will no doubt require City Council action, including commitment of funds, but is there a replacement plan that would be the basis for initiating that discussion with the City leadership?	Additional details on cost and implementation will be available upon completion of the request for proposal process and approval by City Council.
15. Sierra Club Lone Star Chapter and National Wildlife Federation – 5/30/2019 via email	We applaud Houston's use of new plumbing and building codes, which apparently contributed to the gradual reduction in residential GPCD. We also commend specifically Houston's addition of a section on **low impact development** (LID) to the City's Infrastructure Design Manual and the stated commitment to "encourage the use of low impact development practices." However, we believe that the WCP should include some detail about ***how*** – beyond the section in the Manual – the City will be encouraging LID.	Thank you for your suggestion.
16. Sierra Club Lone Star Chapter and National Wildlife Federation – 5/30/2019 via email	We support the City's commitment to establishing **LEED as the standard for new or replacement city-owned facilities and for major renovation of larger city-owned buildings and facilities**, which will directly and indirectly encourage water efficiency. We recommend that the 2019 WCP include some specific examples of the buildings that have been constructed or renovated since adoption of this standard and level of water savings from use of those standards over previous standards. In this and other sections of the WCP, the Plan will be enhanced by examples or metrics that make Houston Water's water conservation and related efforts more "real" and raise the level of confidence that the Plan is truly something that is being implemented.	We have added a website link to the Plan containing information on past and future LEED projects for Houston's facilities.
17. Sierra Club Lone Star Chapter and National Wildlife Federation – 5/30/2019 via email	We are pleased that Houston is seeking to pilot conservation software from a third party to evaluate and quantify how specific conservation and efficiency programs for retail and wholesale customers may advance achievement of Houston's conservation goals. We believe that there is substantial potential for the comprehensive approach possible through such software to dramatically affect water use and water demands in the region, for which Houston is a large wholesale supplier. We would be interested to know how within the City of Houston itself the new software will interact with the existing Consumer Awareness Program for retail customers so that the City may benefit from the data available from both these initiatives. The data enrichment from these and other sources certainly provide the foundation for better informed policy decisions at Houston Water, but all of this data need to be coordinated and processed in a way that aids both consumers and policy-makers, not just provide data for data's sake.	Thank you for your comments.
18. Sierra Club Lone Star Chapter and National Wildlife Federation – 5/30/2019 via email	With regard to the **water education and outreach** aspects of the Houston 2019 WCP, we recognize the significance of the City's Water Works Education Center, especially its value in teaching school children about water and the need to conserve. We have heard discussion in	At this point, there is no intention to move the WaterWorks Education Center to a different location. As noted in the Plan, the WaterWorks Education Center has received more than 30,000 visitors in the last 5 years and has proven to be a productive venue, which demonstrates its accessibility to the community.

	past years about moving the Education Center to a more central location in order to make it accessible to a wider and more diverse group of students. We would appreciate any update on that prospect in the 2019 WCP. However, while we appreciate the City's outreach to school children, we believe that a much more active education and outreach effort for adults is advisable as well. Much more progress is needed in making Houston a leader in water conservation in the near term, and that requires helping to shape the attitudes and actions of adult residential customers, decision makers at CII (Commercial-Industrial-Institutional) operations, and wholesale water supply customers. There are a multitude of water conservation public awareness programs available – such as the state's Water IQ program (also used by North Texas Municipal Water District) and San Antonio's water education materials – which could be tapped by Houston Water and used to educate adults on water wise practices and the need for them, especially with regard to outdoor landscape watering. Granted some of these materials may need to revamped somewhat for an audience for which flooding may be a more relevant concern at present than drought or saving water. Again, however, the long-term best interests of Houston and the region would be well-served by more aggressive promotion of water efficiency and conservation among the residents of the area. Moreover, there are many organizations – such as our own and the Texas Water Foundation – that stand ready to help in this education and outreach effort.	Thank you for your suggestion about the myriad outreach programs available at the state and national levels. We are aware of most of them and are currently assessing potential implementation of additional programs that would target adults from single and multi-family residential households, as well as other programs for commercial, institutional, and industrial accounts.
19. Sierra Club Lone Star Chapter and National Wildlife Federation – 5/30/2019 via email	Concluding Thoughts: Our groups understand the financial, physical, and other challenges that Houston faces in advancing water efficiency and conservation. We believe, however, that the current leadership at Public Works and Houston Water is committed to moving the City forward in this arena. Therefore, we support the adoption of the draft 2019 WCP – with a few tweaks and additional detail – as in effect a "down payment" to be followed by a series of additional measures and enhancements that will lead to a more comprehensive and successful program. We must be candid, however, in saying that a City that helped put a human being on the Moon is way behind the times (and other Texas cities) in its efforts on efficient water use. Houston needs to launch a water conservation initiative befitting of Space City.	Your comments are greatly appreciated and will be considered when developing future water conservation programs.