

# Water Supply Planning for Montgomery County

By Jace A. Houston  
Deputy General Manager, Administration

*Long-term water supply planning is not exciting. Possibly the only thing less exciting is reading an article about it. But it's important that each of us, as water users, stay informed about our water supplies and the efforts being made to plan for those supplies so that they are available long into the future.*

*The purpose of this article is to bring you up-to-date on the major water-supply planning work that is currently taking place in Montgomery County. About a year ago, I wrote an article (in question and answer format) that went into detail about the history and background of water supply issues for this area, so if you're interested in further reading, you can access this "Q&A Sheet" and several other useful documents on our website ([www.sjra.net](http://www.sjra.net)) under the "WRAP Project" tab.*

## Introduction and Background

Recent consumer research studies show that most people don't know where the tap water they use every day originates. In a recent study sponsored by the Lone Star Groundwater Conservation District (LSGCD), 49 percent of the Montgomery County water users surveyed stated that they did not know the source of their drinking water and 31 percent believed the source was surface water from Lake Conroe or Lake Houston.

In fact, 100 percent of the municipal drinking water used in Montgomery County comes from underground aquifers. The only surface water being used is for a few small irrigation customers and the electric generating facility near Lake Conroe.

Access to plentiful supplies of groundwater is a tremendous asset for a growing county. Groundwater is cheaper to treat and deliver than surface water. Generally, the only treatment required for groundwater is disinfection, and instead of installing long pipelines to deliver the water, utilities can simply install a groundwater well at the location where the water is needed.

However, as the population in Montgomery County has grown over the years, our demand for water has begun to exceed the amount our aquifers can sustainably yield. When this problem first began to become apparent, community leaders and elected officials in the county petitioned the Texas Legislature to create a groundwater conservation district. The result was the creation in 2001 of the Lone Star Groundwater Conservation District.

The purpose of the LSGCD is to study and manage the groundwater resources in Montgomery County. Studies conducted by the LSGCD confirmed the reports of many water suppliers in Montgomery County that water levels are declining at an alarming rate. Results of computer modeling of future reliance on groundwater showed continued

water-level declines and new problem areas for water suppliers in other parts of Montgomery County where water levels have not historically been a concern.

To begin reducing groundwater demand and encourage the conjunctive use of surface water along with groundwater supplies, the LSGCD has adopted regulations that require certain groundwater users in the county to conduct long-term planning. The planning must outline each users future water demands and state how the user will begin converting a portion of their demand to alternative water supplies such as surface water. This plan is called a Water Resources Assessment Plan (WRAP).

The LSGCD has established a regulatory target to reduce groundwater withdrawals in Montgomery County to 64,000 acre-feet per year (afpy) by January 2015. For reference, the current amount of groundwater use in the county is approximately 75,000 afpy.

The LSGCD's new regulations only apply to large volume groundwater users (LVGU) in the county, which are defined as groundwater well permittees that currently produce 10 million gallons or more of groundwater annually. Well owners using groundwater solely for an individual single-family residence or for agricultural use are not included in the definition of LVGU. There are approximately 201 LVGUs in Montgomery County, including everything from large municipal systems to smaller public and private utilities, individual industries, businesses, golf courses, and homeowner associations.

The LSGCD's regulations allow LVGUs, if they desire, to join together and submit a single joint WRAP. A joint WRAP provides a cost-effective option to meet the LSGCD's requirements by leveraging the economic benefits of regionalization and economy of scale. Following this approach, the SJRA developed a Joint WRAP proposal and offered it to all groundwater users within the county.

The key benefit of joining multiple users into a regional WRAP is the ability to achieve cost savings by utilizing a "group compliance" concept in which some customers are converted to surface water while other customers continue to use groundwater exclusively. As a group, the customers meet the regulatory requirements of the LSGCD without incurring the cost to physically deliver surface water to every customer. In addition to cost savings, this regional approach also stabilizes aquifer levels across the county, which ultimately is the primary goal of the LSGCD.

From mid-February to late-August of 2008, the SJRA conducted an extensive public information campaign to provide all 201 LVGUs in Montgomery County with detailed information about the SJRA's proposed Joint WRAP. Currently, 198 of the 201 LVGUs in Montgomery County have joined this Joint WRAP.

#### Key Elements of the SJRA Joint WRAP

The LSGCD rules require that certain information be submitted in a WRAP, including information related to:

- a) Projections of future population and water demand;
- b) Descriptions of raw water supply sources;
- c) Description of infrastructure requirements;
- d) Timelines for construction of necessary projects;
- e) Description of costs and financing methods;
- f) Preliminary engineering for the 2015 system;
- g) Conceptual engineering for future phases through 2045; and
- h) A copy of the written agreements for participants in a Joint WRAP.

The SJRA is in the process of finalizing the Joint WRAP and incorporating public comments received from the 198 participants in the program. The WRAP is due to the LSGCD by March 2, 2009. The following is a summary of the key data presented in this report.

The following table shows the projections of future population and water demand for Montgomery County, and the next table shows the projected water demand for the SJRA's Joint WRAP participants (i.e. the total county demand minus the three entities who chose not to participate in the SJRA Joint WRAP).

**Montgomery County Population and Water Demand Projections**

	2015	2025	2035	2045
Population	479,872	617,300	775,479	967,800
Water Demand (afpy)	89,543	113,716	137,435	166,175

**Total Water Demand (afpy) for SJRA Joint WRAP Customers**

	2007	2015	2025	2035	2045
Total County Demand	70,633	89,543	113,716	137,435	166,175
WRAP Participant Demand	70,385	89,209	113,290	136,877	165,453

Raw Water Source Study

The Joint WRAP also addresses the source of water proposed to meet future water demands. The SJRA conducted a "Potential Source Study" that investigated nine alternative water supply sources. The study, completed in December, 2008, was designed to identify potential alternative water sources available to Montgomery County, evaluate those potential sources, and select a source to be used as the basis for the SJRA Joint WRAP.

Nine alternatives were evaluated as part of the SJRA's study, and the study recommended that the permitted yield of Lake Conroe be utilized to supply surface water in Montgomery County prior to the conveyance of water from additional sources into the county and that a long-term water supply contract with the City of Houston be executed in a timely manner. A copy of this study is available on the SJRA's website.

### Conversion to Surface Water

Obviously, the key goal of the LSGCD's regulations is to reduce the withdrawal of groundwater to an amount that is within the sustainable yield of the aquifers in Montgomery County, which the LSGCD has determined is 64,000 afpy.

The table below outlines the amount of surface water that will be needed to meet the LSGCD's requirements. For comparison purposes, the permitted yield of Lake Conroe is 100,000 afpy.

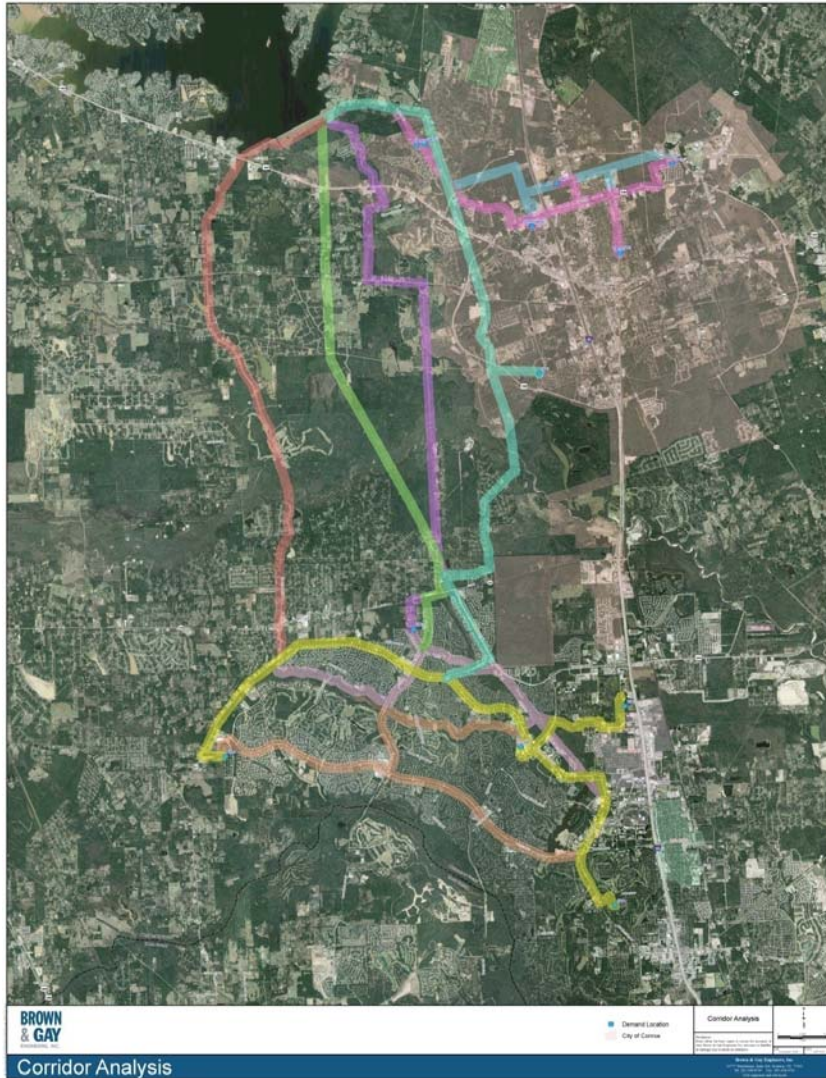
#### **Surface Water Required (afpy)**

	2015	2025	2035	2045
Existing and Future Customer Demand	89,209	113,290	136,877	165,453
Entergy's Estimated Surface Water Demand	7,033	8,452	10,054	12,007
Allowable Groundwater Use	62,446	64,000	64,000	64,000
Estimated Treated Surface Water Required	19,730	40,838	62,823	89,446

### Infrastructure Requirements and Costs

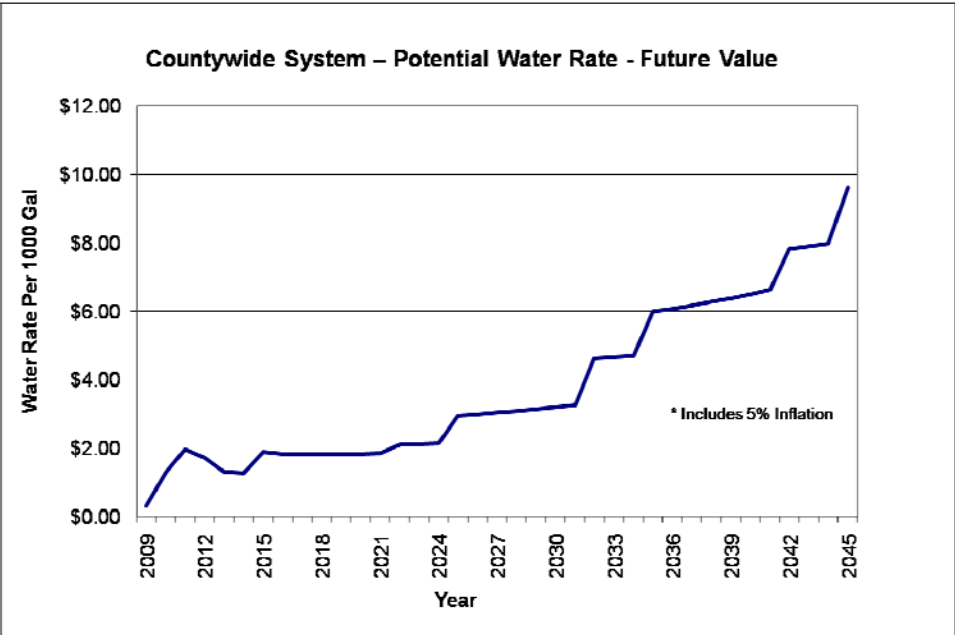
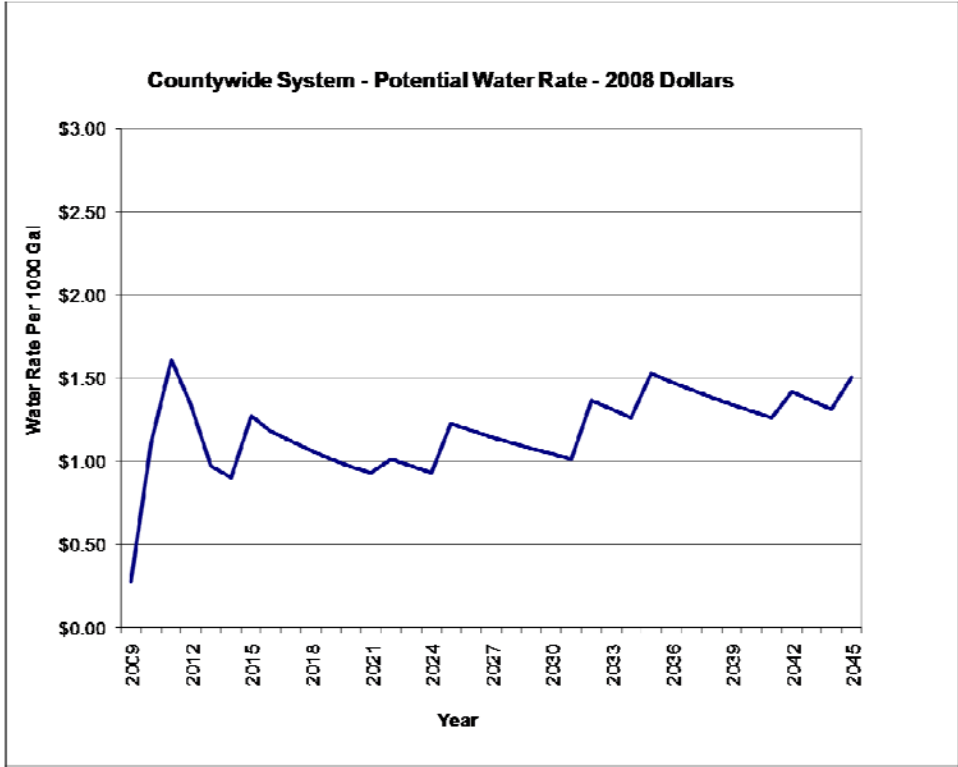
Based on the amount of treated surface water required, the SJRA has studied alternative pipeline systems and conducted hydraulic modeling to further quantify the infrastructure requirements for the treatment plant and transmission lines. At this early planning stage, it is impossible to nail down final pipeline routes, but an extensive routing analysis was conducted to help narrow the pipeline corridors and provide more certainty in the cost estimates.

The figure below shows one set of pipeline routes that were studied as part of the development of the Joint WRAP.



The question that is most frequently asked when discussing future water supply projects is “What will this cost me?” For purposes of the Joint WRAP, preliminary cost estimates have been developed for the project. The first phase is intended to come online in 2015 at a total cost of approximately \$500 million, which includes the first phase of the treatment plant, transmission and distribution lines, raw water reservation fees, engineering, legal, land acquisition, and various other costs. Rough cost estimates were also developed for future phases of the project.

The following charts show the estimated future costs of the total project converted to a water rate. The first chart is in 2008 dollars, and the second chart includes an allowance for inflation.



The average household water demand for a typical single-family residence is 10,000 gallons per month, so a rough estimate of the monthly impact to the typical residential water bill for the first ten years of the project is an increase of about \$20 per month.

Conservation and Reuse

I hope to expand on the topics of conservation and reuse in future articles, but I do want to note that both of these strategies play a key role in the SJRA's planning efforts. By reducing the total demand for water within the county through conservation and reuse, we can reduce the amount of water we must treat and lessen the impact on our raw water supplies. This in turn delays the time at which we must secure additional supplies, which saves a tremendous amount of money for all the ratepayers in the county.

Studies show that outdoor irrigation generally makes up over 60 percent of the typical residential water use, so there's a great potential to save water and extend the use of our current water supplies.

#### Getting More Information

The SJRA's Joint WRAP is due to the LSGCD no later than March 2, 2009. For additional information, monitor our website at [www.sjra.net](http://www.sjra.net). Information about this project is included on the "WRAP Project" page.