



City of Woodbury



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Organization Background

The City of Woodbury is a suburb in the southeastern Twin Cities Metro Area. Established in 1967, Woodbury is the largest city in Washington County and the 9th largest city in the state, with 67,855 residents as of 2015. Woodbury prides itself on its water conservation goals and is striving to mitigate increasing water demands as a result of a steadily increasing population.



“This internship gave me an excellent opportunity to make a positive impact on a thriving and progressive community. I gained valuable experience working in water conservation and irrigation best practices, developed a deepened understanding of city infrastructure, and created meaningful working relationships with the city staff.” ~ NL

Project Background

The City of Woodbury established a “Flat Water Use by 2030” goal in 2014 to meet increasing water demands. This means that Woodbury plans to draw only as much water from the aquifer in 2030 as was drawn in 2014. To accomplish this, Woodbury is focusing on implementing water conservation best management practices in all areas of municipal water use. Water used for irrigation represents a significant portion of this total water use during the spring and summer, making it a focus area for improvement. The project is focused on reducing residential irrigation water use, with a goal of developing a pilot program designed to distribute and evaluate the effectiveness of smart irrigation controllers to determine if large-scale distribution of these controllers in the future would be cost-effective.

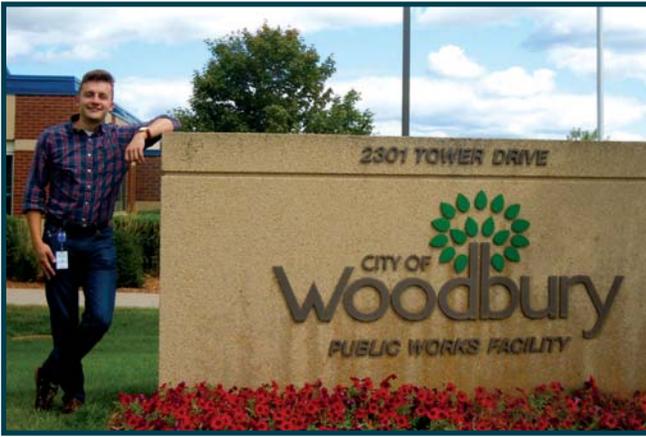
large and steadily growing population, a significant opportunity exists to optimize water efficiency practices and contribute to sustaining the capacity of the aquifer.

Woodbury manages the municipal water utilities for the majority of properties within the City (private wells were not included in the scope of this project). In addition, Woodbury is responsible for enforcing watering policies. The current policy prohibits residential landscape irrigation of any kind between noon and 5pm

Incentives To Change

The City of Woodbury pumps water on a peak-demand basis. Currently, the city has 18 wells in operation and is in the process of constructing a 19th well. Evaluation of groundwater use trends shows that current use rates with projected population growth may compromise the long-term sustainability of the Prairie du Chien-Jordan aquifer. As Woodbury grows and water demand increases, more wells may need to be built to meet these demand increases. Building new wells not only represents a substantial cost for the city, but also causes additional strain on the aquifer. Improving water efficiency practices reduces the need to build more wells. Given Woodbury’s





every day and also follows an odd/even structure that only allows odd numbered properties to water on odd calendar days and vice-versa.

SOLUTIONS

The City developed a plan and budget to fully subsidize the purchase and distribution of 100 Rachio IRO 2nd generation smart irrigation controllers to residents that submitted an application and qualified. Qualification was based on objective information on their current irrigation system; this information was used to determine if significant savings could be realized.

Smart irrigation controllers optimize water use in two ways that traditional clock-based controllers cannot. Clock based controllers irrigate on a schedule set by the user. The run times per zone, start times, and dates programmed into the controller are fixed unless changed manually. Smart controllers use advanced scheduling based on lawn characteristics (soil composition, slope of lawn, vegetation, shade, etc.) and also utilize local weather data. Smart controllers automatically skip irrigation if a predetermined precipitation threshold is predicted to be exceeded by a weather forecast. The controller used in this pilot program also estimates water usage and savings.

The first stage of the project involved enrollment of residents and distribution of smart controllers. The city

used social media and email notifications to citizen groups connected to city environmental news to inform residents of the opportunity. The intern and city staff developed an application that consisted of a participation agreement with prerequisite criteria, a survey to obtain details about residents' current irrigation system, and additional optional participation methods. Based on the program agreement, residents were responsible for the installation of their new controller.

The second stage involved live-monitoring of water consumption through Rachio's cloud-based technology and conducting irrigation audits to evaluate system performance and calculate water usage. This information was ultimately used to determine total savings. To calculate actual water savings per unit, five irrigation audits were conducted. An irrigation audit is a systematic process of determining the distribution uniformity of each zone in an irrigation system. Distribution uniformity is a measure of how evenly an irrigation system distributes water over a zone. A zone is defined as a section of the irrigated property based on location of sprinkler heads and the area covered. A precipitation rate, or the average output of water by the system, is also determined during an audit. The savings data from the five audits was averaged and extrapolated to estimate the savings for all 100 units.

Continue Purchasing and Distributing Smart Controllers to Qualifying Residents

Based on the audits, clock-based controllers each used approximately 74,490 gallons per year. The average annual savings upon implementing the smart controllers was approximately 37,074 gallons per year each or a 50% savings. It is recommended that Woodbury continue to purchase and distribute smart controllers to realize additional savings. It is also recommended that the city follow up via survey with current pilot program participants in one year to get additional feedback on the controllers and to verify the amount of water saved per household.

	Implementation Cost	Annual Water Savings (Gal)	Annual Cost Savings (Per 100 Residents)	Status
Purchase and distribute smart controllers	\$15,000	3,000,000	\$2,640	Implemented
Continue to purchase and distribute smart controllers	\$15,000	3,000,000	\$2,640	Recommended

*Over a 5 month irrigation season