Environmental Benefits of Recycling Wastewater at UConn

Implementing a Reclaimed Water Facility (RWF) to supply its Central Utilities Plant enables the University to direct its groundwater resources to the drinking water system, which will significantly ease demand on source waters. During peak seasons, UConn will reduce its potable water demand by up to 20%. Directing treated wastewater to the RWF will also significantly reduce the amount of effluent the water pollution control facility discharges to the Willimantic River.

UConn Facility Will Set the Standard for Future Reclamation Projects

Wastewater reuse is increasing in the United States and in other countries. The UConn RWF is one of only a few such facilities in New England. In addition, it will serve as a practical opportunity at a leading research institution to provide students with a living laboratory through which they can experience sustainable water treatment technology in action.

Why Reuse Wastewater?

Should water be used once then treated and discharged? According to the National Academy of Sciences, 32 billion gallons of municipal wastewater is discharged nationwide each day. Available technology provides us with the opportunity to treat wastewater for safe potable or nonpotable uses. Implementing water reuse solutions significantly reduces the strain on our nation's freshwater resources.

Reuse Preserves Freshwater Resources

Water reclamation projects have been more prevalent in the western United States where an arid climate and competing interests for water resources require extraordinary measures. In the Northeast, where water supplies have historically been plentiful, communities with an increasing population or industrial density are starting to experience water shortages. In addition, climate change may alter New England's fresh water supply. Rising temperatures, especially hotter summers, will have an impact on surface and groundwater resources. To address these challenges, organizations, communities, and government agencies are working to reduce the burden on water sources and challenged ecosystems.

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UConn Reclaimed Water Facility

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Reclaimed Water Facility

Treated effluent arrives at the RWF from the UConn WPCF and receives microfiltration and UV disinfection. Up to 1-MGD of non-potable water is stored and later pumped via 3/4 miles of distribution pipe to the CUP.

Central Utilities Plant

Reclaimed water is used in the CUP/CoGen power plant's (CUP) cooling towers and boilers. Reclaimed water may also be used for irrigating athletic fields and campus grounds in the future.

Campus Buildings

The CUP provides electricity, air conditioning, and heat to buildings on campus. By using reclaimed water at the facility, UConn saves between 250,000 and 450,000 gallons of potable water every day.

Water Pollution Control Facility

Treated effluent is pumped to the RWF, reducing discharge to the Willimantic River. Approximately 20 to 60% of the reclaimed water used at the CUP will return to the WPCF for retreatment.

About UConn

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Founded in 1881, the University of Connecticut is one of the nation's leading public research universities. The University's utilities systems at the main campus in Storrs, CT serve more than 26,000 people, providing services to more than 480 buildings.

UConn's Commitment to Sustainability

The University of Connecticut is consistently ranked as one of the greenest schools in the country. Among its many environmental sustainability initiatives, UConn is working to reduce water use on campus and protect the stream-flow in the nearby Fenton and Willimantic Rivers during seasonally dry periods while meeting its water supply requirements. Water reclamation expands and better utilizes the current water supply by matching reclaimed water with current and future non-potable system demands. The Reclaimed Water Facility will substantially extend drinking water resources by approximately 20%.

Source Supply Challenges

As the only public water supply within a 5-mile radius, the University not only provides water for the Storrs campus but also for more than 100 users in Mansfield, including Town Hall, E.O. Smith High School, and the growing downtown Storrs Center. The Fenton and Willimantic River wellfields are the University's two main water sources.

During a drought period in 2005, a portion of the Fenton River ran dry, which was in part attributed to the withdrawals from the Fenton wellfield. Streamflow monitoring and withdrawal management protocols were put in place and, as a result, about 1/3 of the water supply is typically unavailable at the same time peak demands are expected. The University sought a reliable alternative strategy to meet water needs. The solution was to design a sustainable water reclamation facility that would reduce the need to draw on local sources, provide a resource for meeting increased future demand, and preserve natural resources.

Wastewater Discharge? Reclaimed Water? What Does It All Mean?

In a typical municipal sanitary sewer system, wastewater flows through sanitary sewer pipes, arrives at a Water Pollution Control Facility (WPCF), and is processed through several stages to remove bacteria and other pollutants. Typically, the treated effluent is then discharged via an outfall to a local watercourse. In UConn's system, that discharge outfall is the Willimantic River.

A reclaimed water facility changes the flow of treated sewer water in the system. Instead of directing all of the effluent to the Willimantic River outfall, some discharge from the WPCF is pumped to UConn's Reclaimed Water Facility (RWF) to be cleaned through an advanced process for reuse as non-potable water.

RWF Treatment Process — Reclaimed Water for Non-Potable Use

The reclamation process consists of screening, microfiltration, and ultraviolet disinfection, which will allows UConn to divert a maximum of 1 million gallons of non-potable water each day to meet campus needs that do not require fresh water. The RWF first screens the wastewater received from the WPCF with self-cleaning strainers rated at 500 microns, then filters it through one of three three microfiltration trains each capable of treating 0.5 million gallons per day. The treated water is dosed with chlorine and ammonia throughout the process to prevent pathogen growth in the treatment, distribution, and storage systems.

The non-potable reclaimed water is stored in a 1-million-gallon capacity tank. Distribution pumps supply the water to the Storrs campus CUP/CoGen facility that provides electricity, air conditioning, and heat to buildings on campus, which previously used between 250,000 and 450,000 gallons of potable water daily. Reclaimed water will replace most of that demand. The University may also use reclaimed water for irrigating athletic and recreational fields in the future.

Potable vs. Non-Potable

Drinking water is referred to as potable water. Non-potable water does not meet the highest standards required for drinking water. Depending on its quality, non-potable water is safe and suitable for use in applications such as irrigation, toilets, or closed heating systems.

The non-potable water can be used directly in the CUP's cooling tower and chilled water system. Reclaimed water must be softened and demineralized through ion exchange and reverse osmosis filtration at the CUP before being used in its high-pressure boilers.

The reclaimed water system is a semi-closed loop. Some water is lost to evaporation, but as much as 20 to 60% of the used water returns to the UConn WPCF for retreatment.

About Woodard & Curran

WOODARD &CURRAN

Woodard & Curran is a 700-person, integrated engineering, science, and operations company. The firm is responsible for the operations and maintenance of UConn's RWF and operates a number of reclaimed water facilities throughout the country, including Water Conserv II in Winter Garden, Florida—the world's largest reclaimed water distribution system.

At the UConn RWF, Woodard & Curran will focus on reducing chemical use, managing power resources, and performing preventive maintenance and mechanical improvements. These measures will reduce operating costs and enhance sustainability.