



The WaterHub® at Emory University

A More Resilient Campus Through Water Reclamation & Reuse

In the last decade, Atlanta has witnessed numerous water-related stresses including severe drought, EPA Consent Decrees to resolve critical infrastructure failures, and an extended political dispute over water rights in the so-called “Tri-State Water Wars.” As a result of these challenges, Emory University set out to explore ways to minimize its impact on community water resources and the environment with a more strategic and impactful water management solution: **campus-wide water reclamation and reuse**.

With an extensive district energy system supplying steam heat and chilled water to campus, the University has significant process water demands that equate to nearly 40% of campus water use. A majority (85%) of this water is used by the steam plant and five campus chiller plants. These utility plants offered an opportunity to displace a significant portion of the campus potable water footprint with a reliable and sustainable source of water.

The WaterHub® at Emory University is designed to integrate into the existing campus framework using two small parcels near Chappell Park Field. Up to 400,000 gallons of wastewater is mined directly out of the campus sewer system daily. Water is cleaned to Georgia Reclaimed Water Standards through an energy efficient, ecoengineered treatment process supported by solar (PV) energy production. The system has 50,000 gallons of clean water storage capacity, providing N+1 redundancy for campus district energy systems. Recycled water is distributed to multiple utility plants and select dormitories for toilet flushing via a 4,400 linear foot “purple pipe” distribution system.

The WaterHub® reduces Emory’s draw of potable water by up to 146 million gallons annually. Since its commissioning in May 2015, the WaterHub® has processed over 350 million gallons of water. In addition to its function as a water reclamation system, the WaterHub® is designed to promote research and community outreach, enhancing the concept of the campus as a living, learning laboratory. With built-in lab space and easy access ports for water quality testing, the facility enables research in a variety of topics. The lower site also includes a demonstration reciprocating wetland system (ReCip®) as a showcase to visitors interested in other sustainable treatment technologies.

ABOUT H₂O INNOVATION

H₂O Innovation is a pioneering designer and manufacturer of membrane systems, specializing in water, wastewater, and water reuse treatment for municipal and industrial customers.



Location

Atlanta, Georgia

Client

Emory University

Footprint

3,200 ft² GlassHouse
1,600 ft² Outdoor
landscaping

Project Type

Domestic Sanitary
Wastewater Reclamation
& Reuse

Hydraulic capacity

400,000 Gallons Per Day

Commercial Operation

2015

End Uses

Boiler Make-Up
Cooling Tower Make-Up
Toilet Flushing

Technologie Applied

Hydroponic with Submerged
Fixed-Film Reactors
Reciprocating Wetland

Project Awards

16 State, Regional &
National Award Titles

Technology & Design

The WaterHub[®] at Emory is an adaptive, ecological, campus-wide water recycling system designed to treat domestic sanitary sewage for beneficial reuse. Wastewater is mined from a 18" sewer line near the lower site and then pumped to the upper site where it enters a rotating drum screen before entering the moving bed bio-reactor (MBBR) system. The process design combines submerged fixed-film hydroponic reactors with a MBBR as an initial treatment step. After primary treatment, water passes through a small clarifier, a disk filter, and a dual-stage disinfection system consisting of ultraviolet (UV) light and an oxidizing agent (chlorine).

The hydroponic reactors utilize plants and their root systems to mimic and maximize natural treatment efficiencies associated with oxygen diffusion and habitat creation. Below the root zone is an artificial media, called BioWeb[®], that extends the submerged fixed-film surface area for higher levels of microbial incubation. The system is designed to provide a high hydraulic throughput with a small physical footprint, and low energy demands. Along with outdoor hydroponic reactors, the lower site also boasts a small 5,000 GPD reciprocating wetland system, which is used by the University for demonstrative and research purposes.

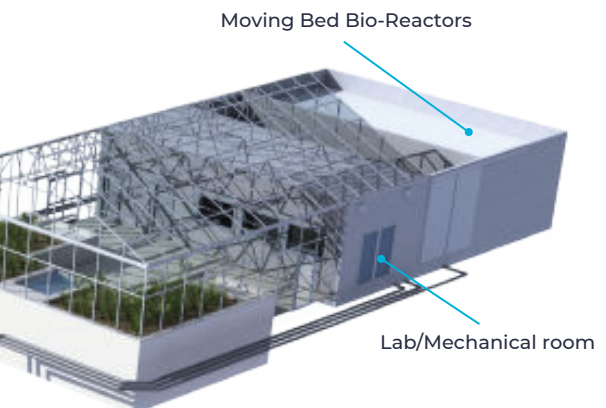
WaterHub[®] Design Parameters

Parameter	Influent (mg/L)	Effluent (mg/L)
BOD	266	<5
Turbidity	n/a	<3
TSS	350	<5
TKN	65	<5

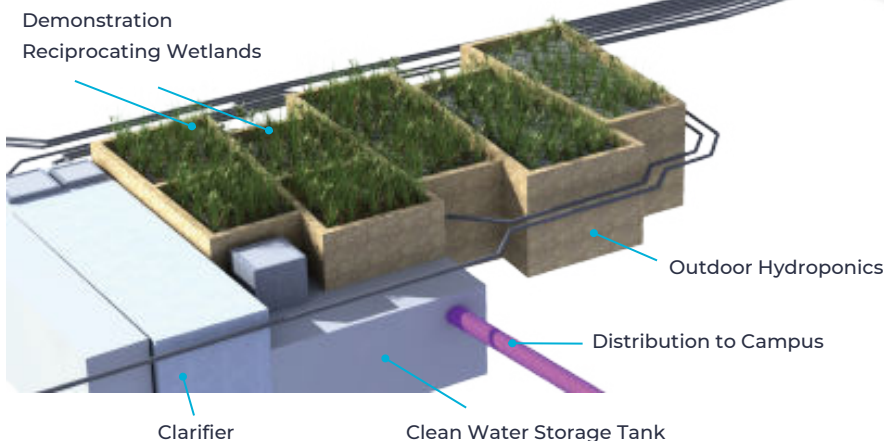
Glasshouse (Upper Site)



Outdoor Hydroponics



Outdoor Reactors (Lower Site)



Tour inside WaterHub[®]