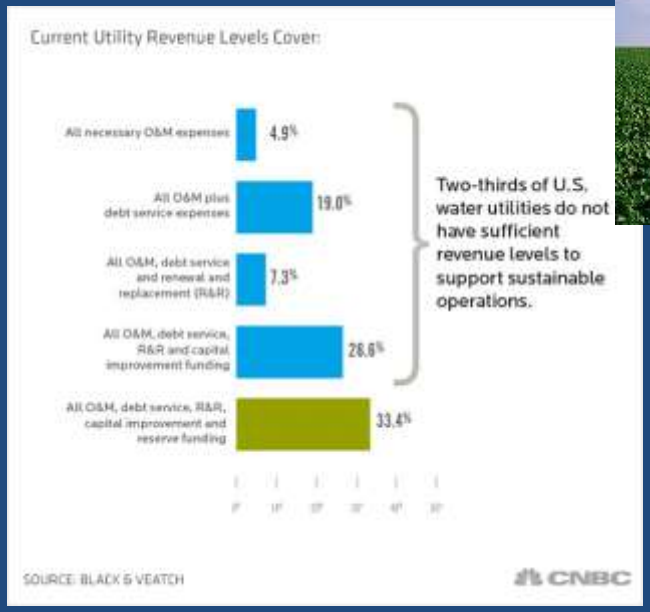
EMORY

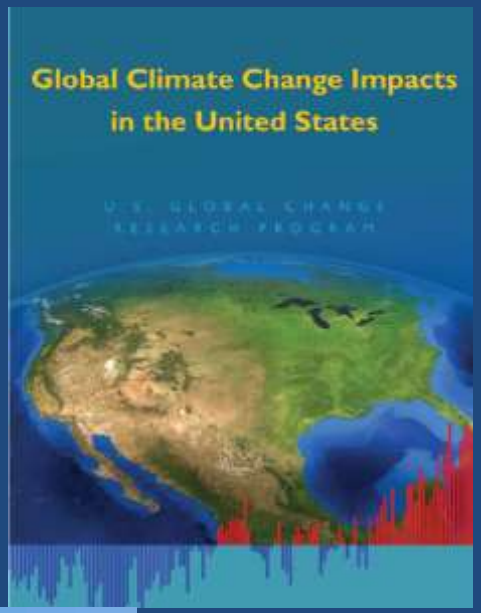
WATERHUB

Emory University WaterHub – Waste water reclamation

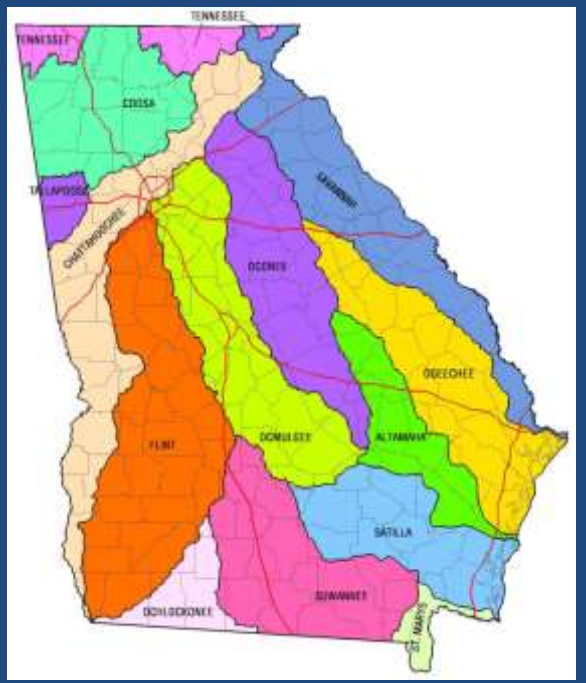
Learning Objectives:

- **Why? The cost of water**
- **Who? The team to assemble for the project**
- **What? The technology and the site impact**
- **Where? At Emory University!**
- **Woes? Trouble shooting and difficulties**





H_2O

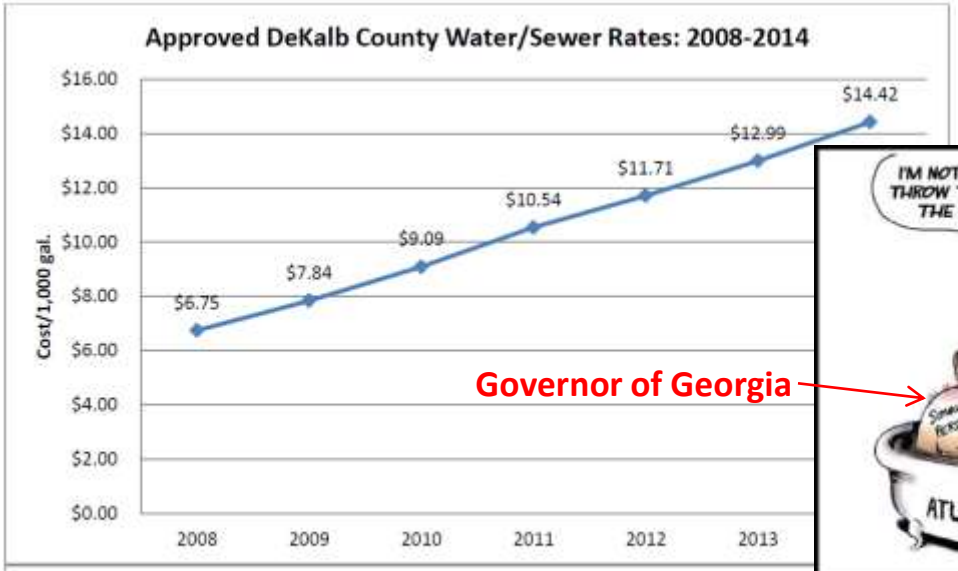


Emory University WaterHub – Waste water reclamation

Collaborate + Transform
AWA·NC
UNC Chapel Hill DUKE NC STATE 2015

Emory University WaterHub – Waste water reclamation

Collaborate + Transform
AWA·NC
UNC Chapel Hill DUKE NC STATE 2015



1. **Atlanta's watershed area is one of the smallest, with the city at the headwaters, not downstream.**

Governor of Georgia

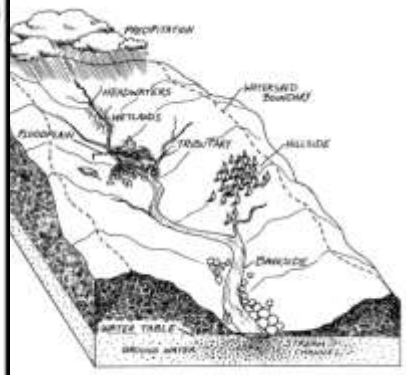
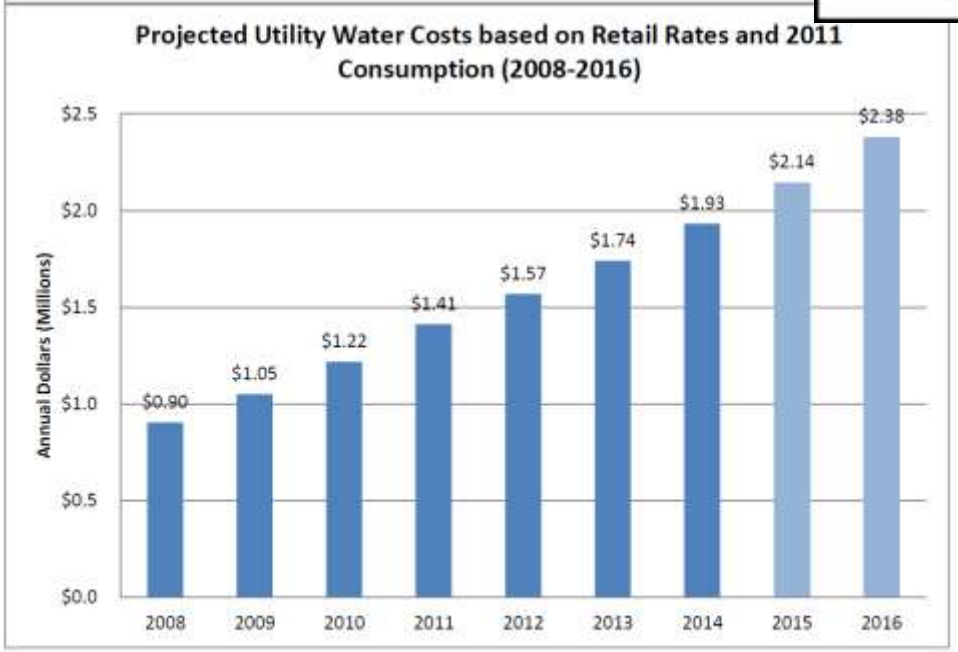


Figure 1.1 Cross section of a watershed



**Assumes 134 million gallons per year used at each respective water rate listed above. Estimates for FY2015 and FY2016 were produced based on an historical 11% increase in combined water/sewer rates annually

25 years of Water Wars

2. **Atlanta's rates have increased over the past decade to help pay for the $4 billion Clean Water Atlanta initiative, a federally mandated overhaul of the City's aging and deteriorated sewer systems. The rates are tiered to reward conservation. – 2015 City of Atlanta Web Site Sewer work is expected to continue through 2027**

2015 - $15.16 /1,000gal.

WHY?

Emory University WaterHub – Waste water reclamation

Collaborate + Transform
AUA·NC
UNC Chapel Hill DUKE NC STATE 2015

EMORY

WATERHUB

Public-private partnership between Emory University, Reeves Young, the development partner, and Sustainable Water, the technology provider.

REEVES CONTRACTING COMPANY

SUSTAINABLE WATER™

Emory VP

Emory PM

Who?

Emory University WaterHub – Waste water reclamation

Collaborate + Transform
AWA NC
UNC Chapel Hill DUKE NC STATE 2015

Timeline:

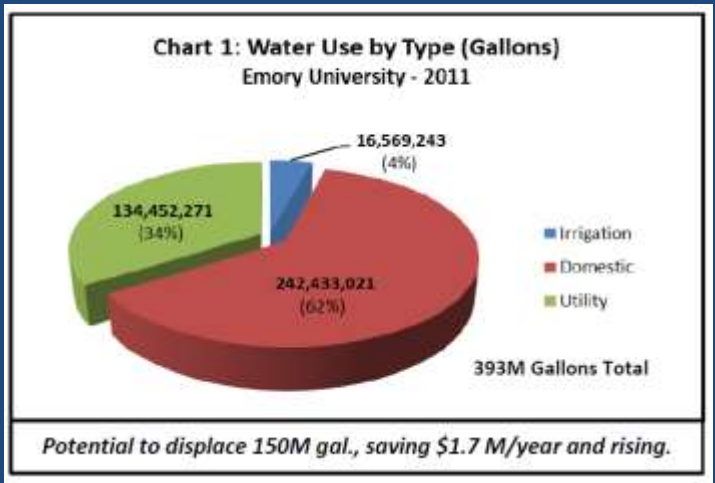
- 2011 AASHE conference attendance and learning
- 2012 WPA (water purchase agreement) negotiated – Emory buys back repurposed water at a lesser rate than County water ($14/k gall)
- 2013 legal issues required new approaches
- 2013 pipes placed to chiller and steam plants
- 2014 construction of greenhouse and vaults
- 2015 commissioning and April opening/water flowing

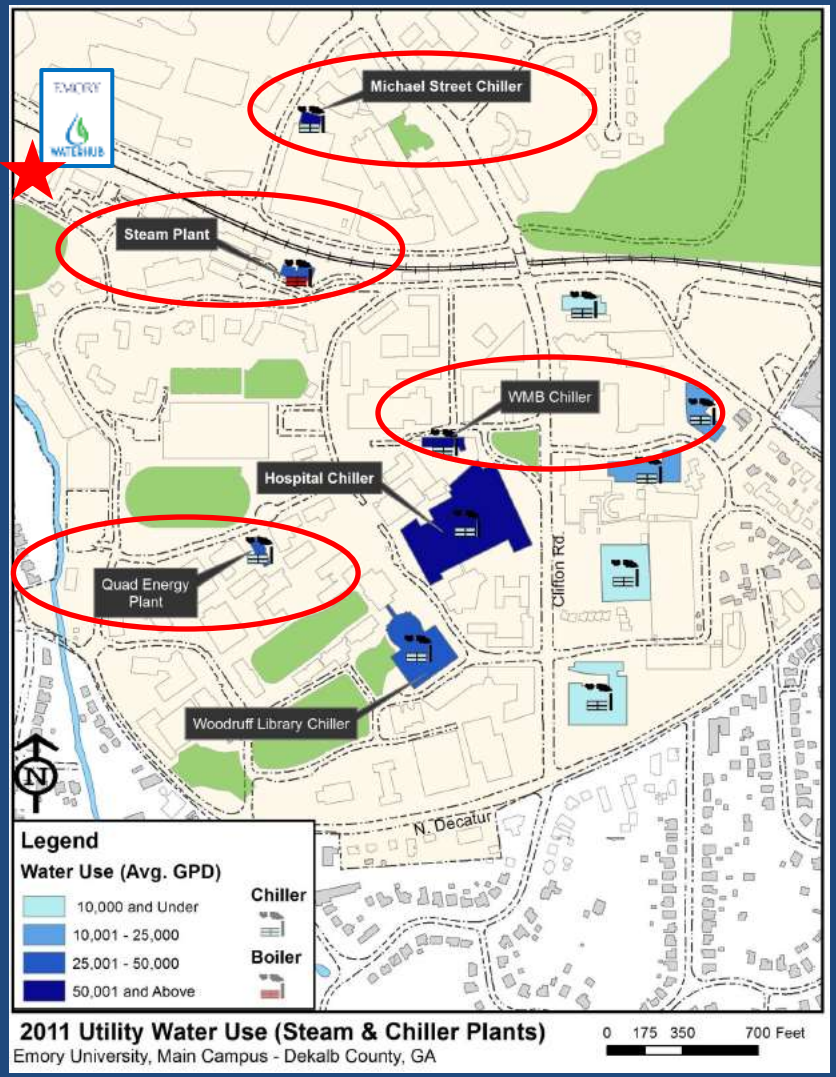
Up to 400,000 gallons/day; 146 million/yr. (nearly 40% of total water used on campus)

Reuse in chillers & boilers to heat and cool campus buildings (toilet flushing if excess)

Est. Millions in Cost Savings

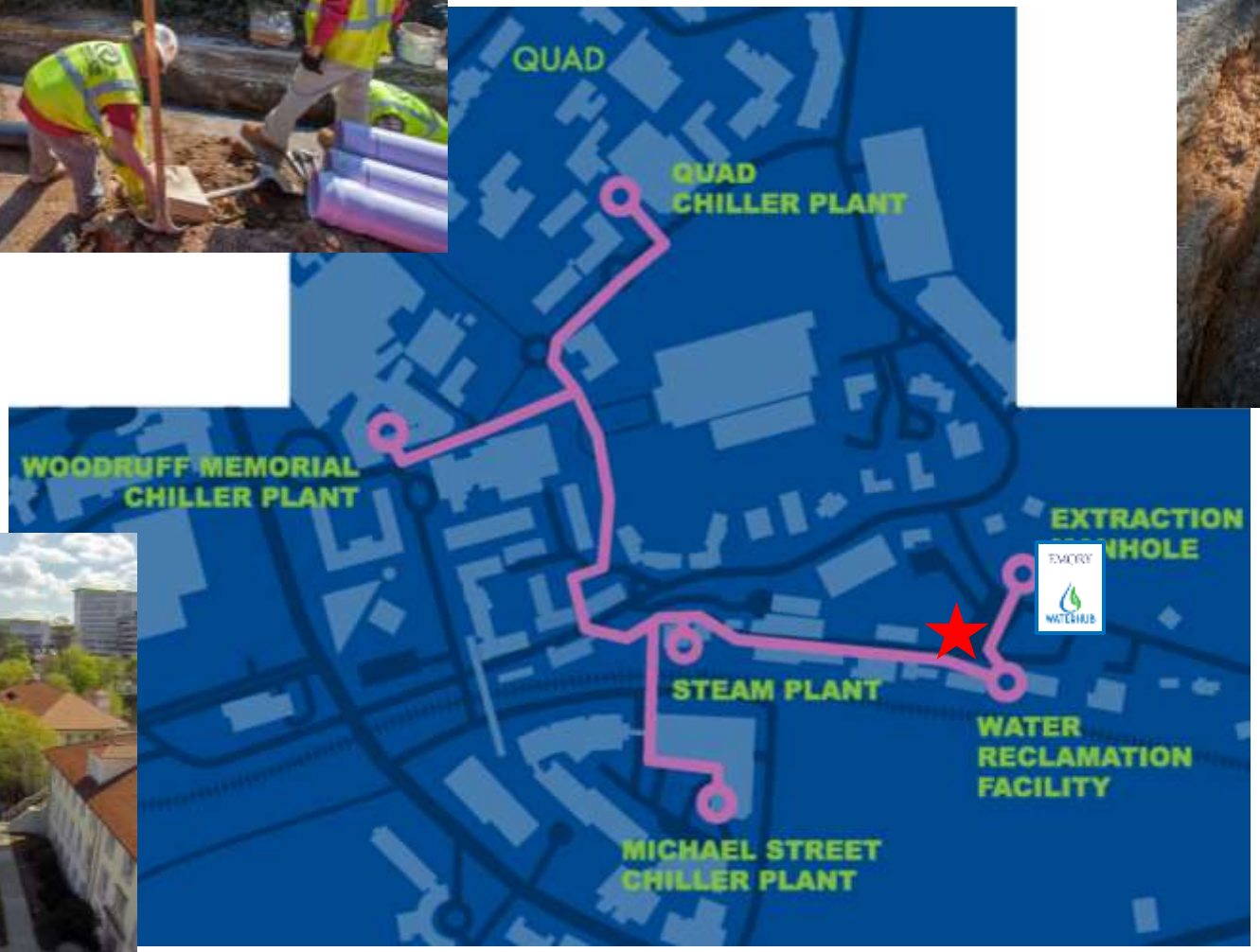
What?



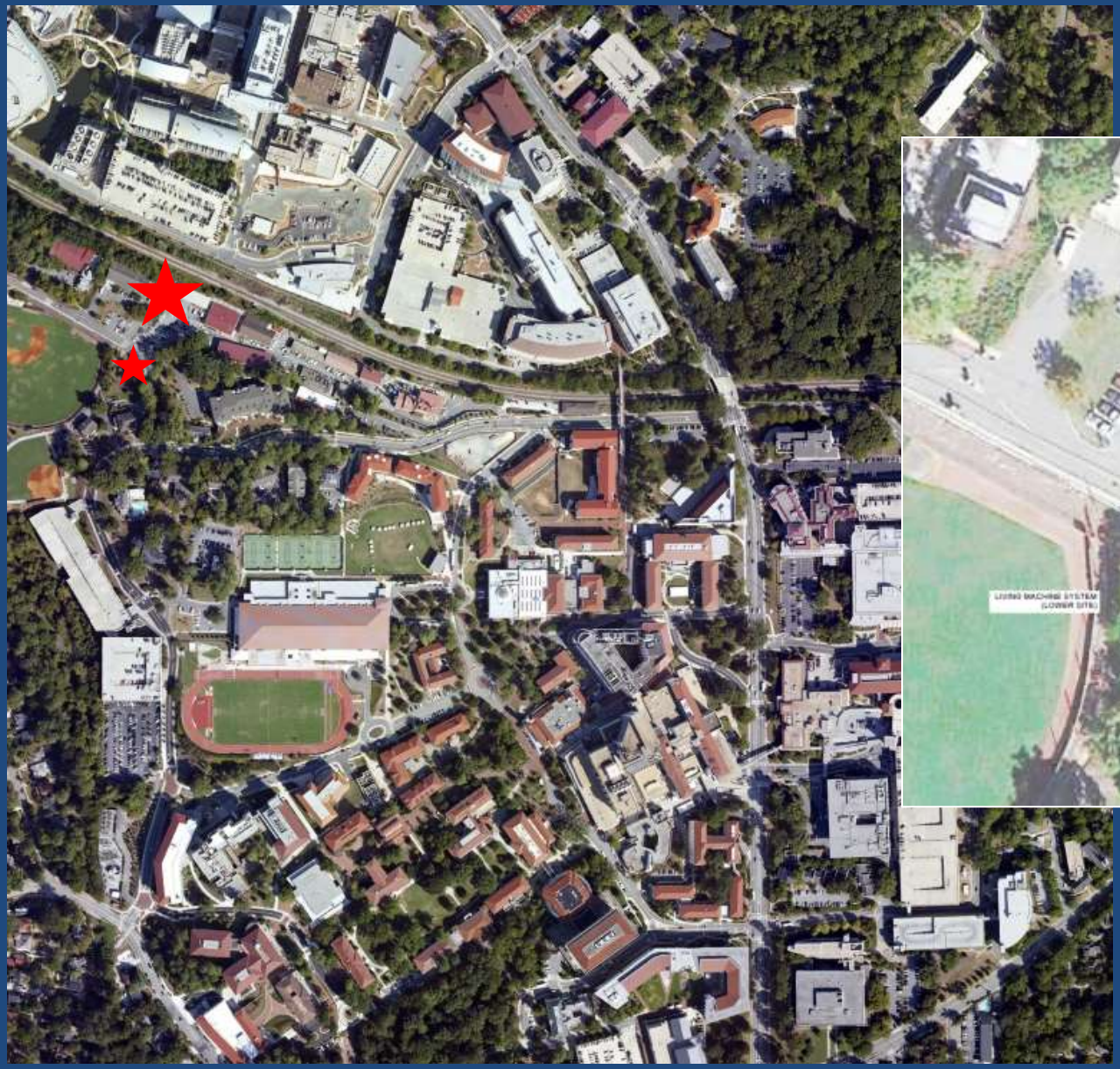


Where?

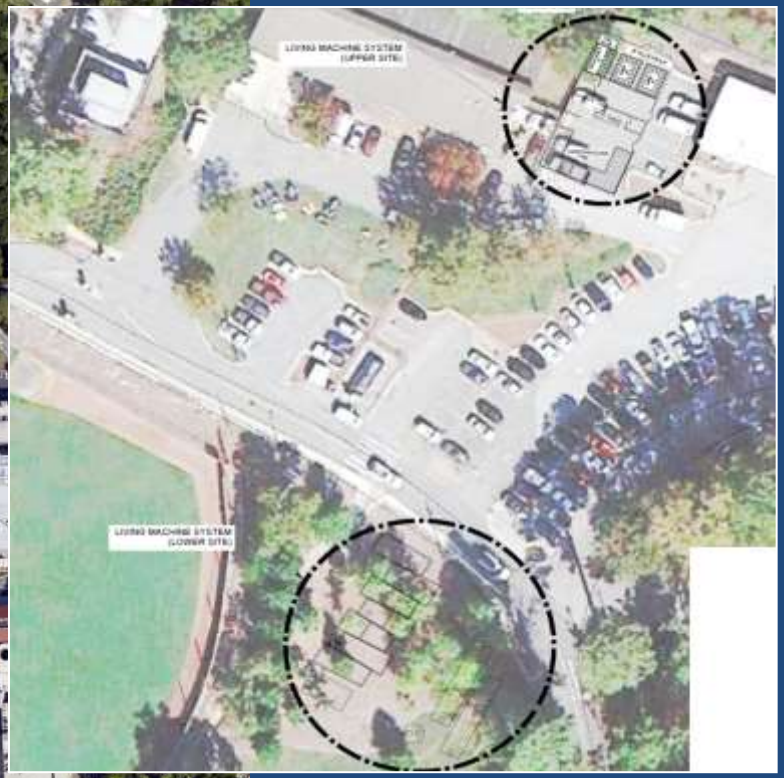
Emory University WaterHub – Waste water reclamation



Emory University WaterHub – Waste water reclamation



Greenhouse



Lower Site Location

Where?

Emory University WaterHub – Waste water reclamation

Where?

Emory University WaterHub – Waste water reclamation

Greenhouse

Shoehorned into the site

Lower Site Location

LIVING MACHINE® SYSTEM

Emory University

Atlanta, GA

Living Machine®

LIVING MACHINE SYSTEMS L3C

MASTER SITE LAYOUT

SP 101

Emory University WaterHub – Waste water reclamation

Greenhouse

Emory University WaterHub – Waste water reclamation

Collaborate + Transform
AWA·NC
UNC Chapel Hill DUKE NC STATE 2015

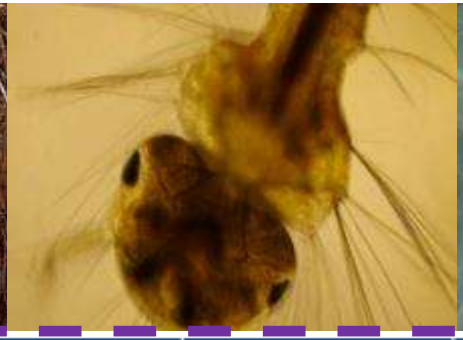
Lower Level Site

Emory University WaterHub – Waste water reclamation

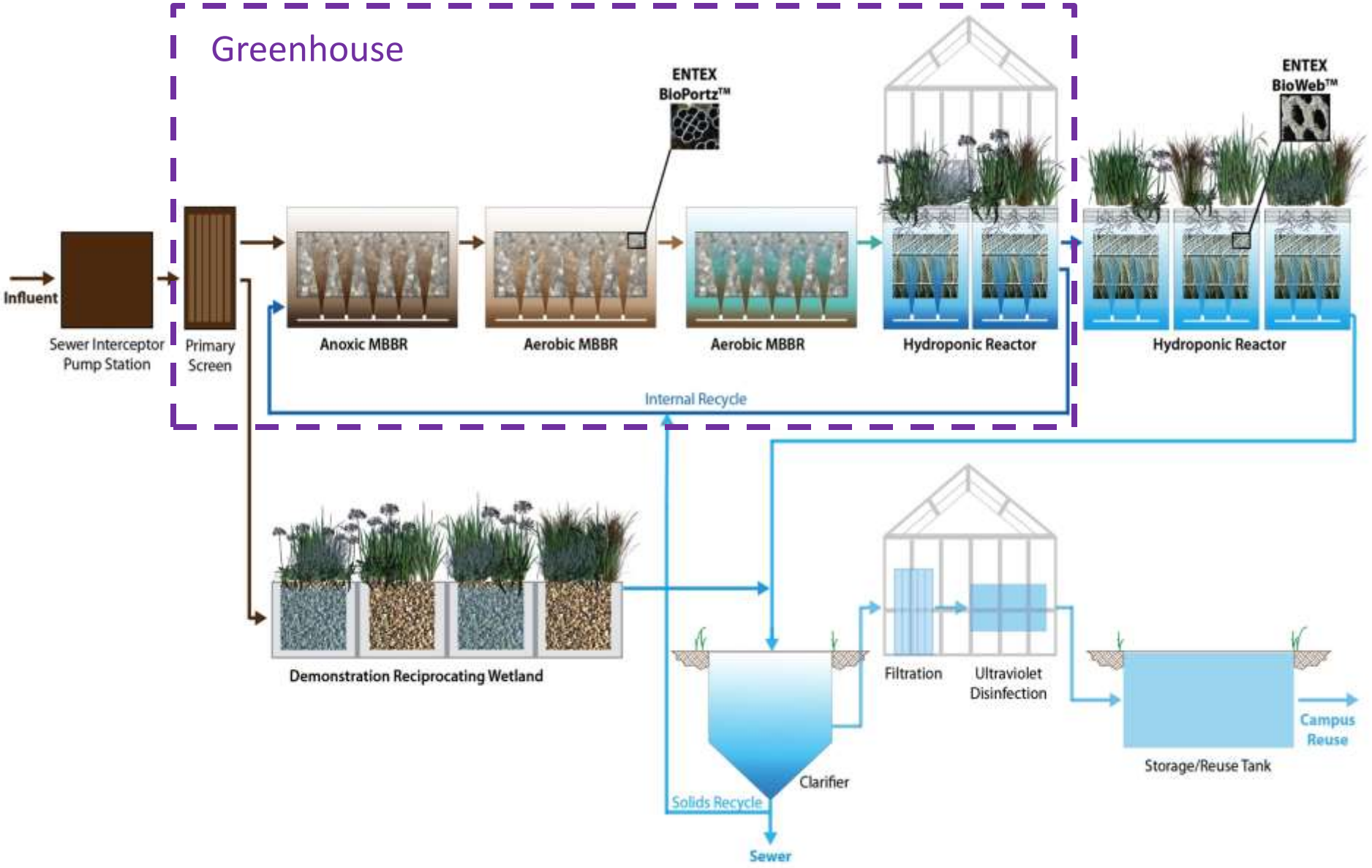
Sewerage processing 101 crib notes:

What?

Ecological Treatment Technologies

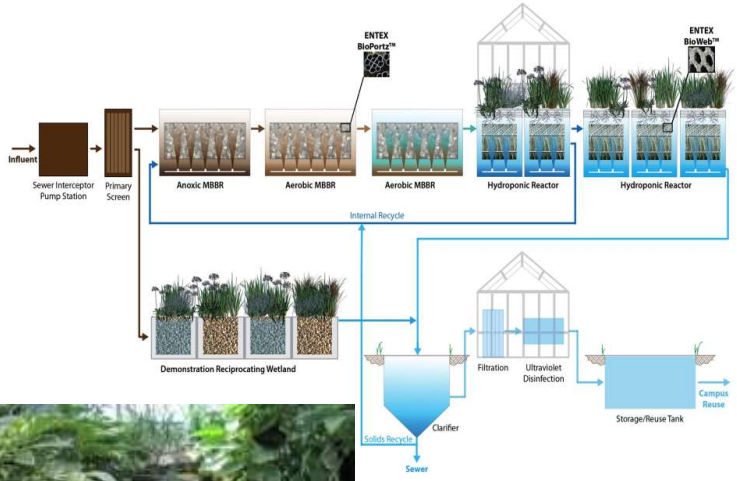



	ReCip® Tidal Wetlands	Hydroponic and Fixed Media	Moving Bed Bioreactor (MBBR)	Membrane Bioreactor (MBR)	Conventional Activated Sludge
Capital Expense	🟢	🟢	🟢	🔴	🟡
Operating Expense	🟢	🟢	🟡	🔴	🟡
Energy Efficiency	🟢	🟡	🟡	🔴	🟡
Effluent Quality	🟢	🟢	🟢	🟢	🔴
Footprint	🟡	🟢	🟢	🟡	🔴
Aesthetics	🟢	🟢	🟡	🔴	🔴



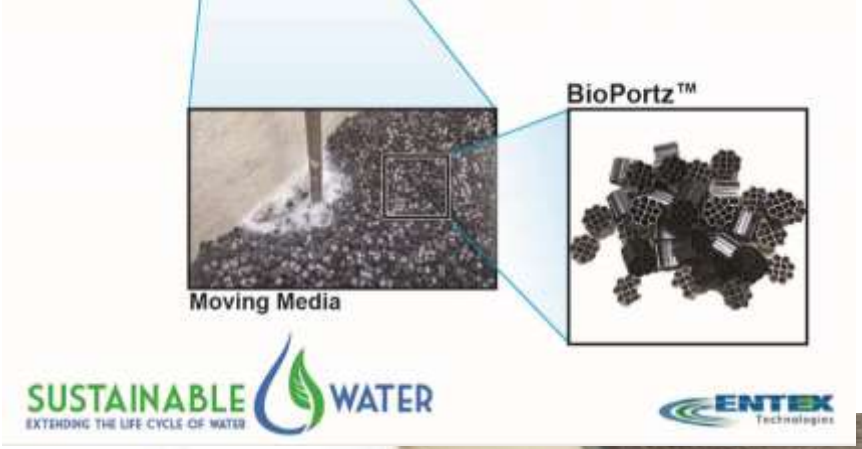
Emory University WaterHub – Waste water reclamation

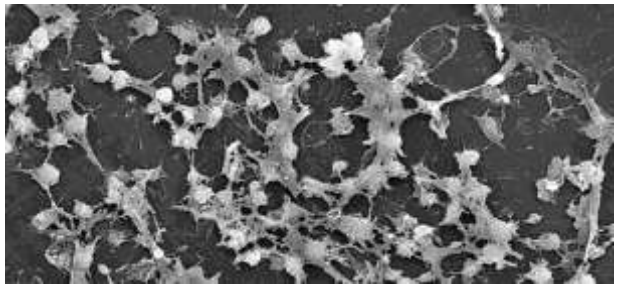
Greenhouse



Emory University WaterHub – Waste water reclamation

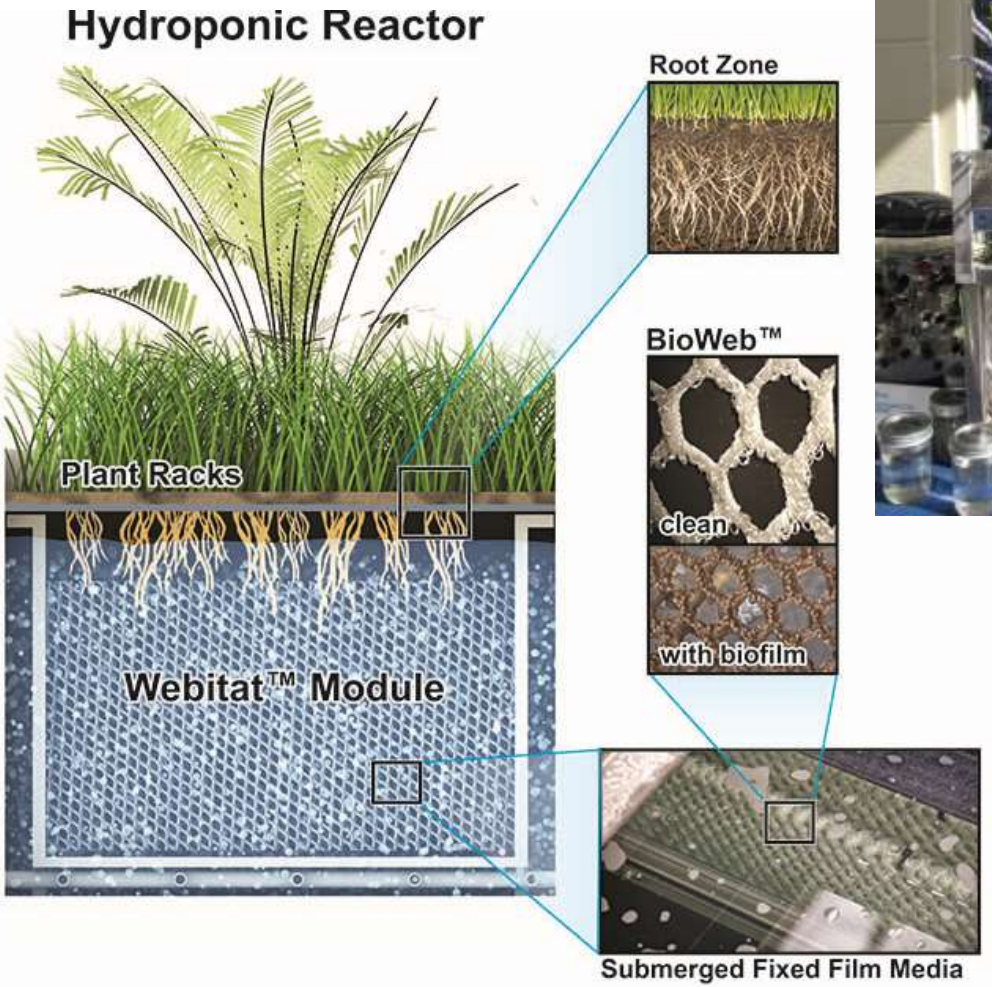
Emory University WaterHub – Waste water reclamation

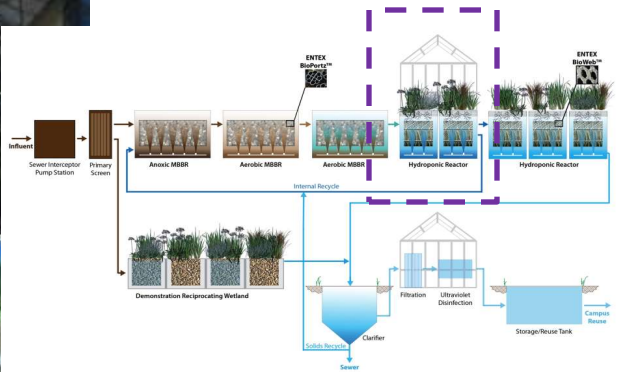


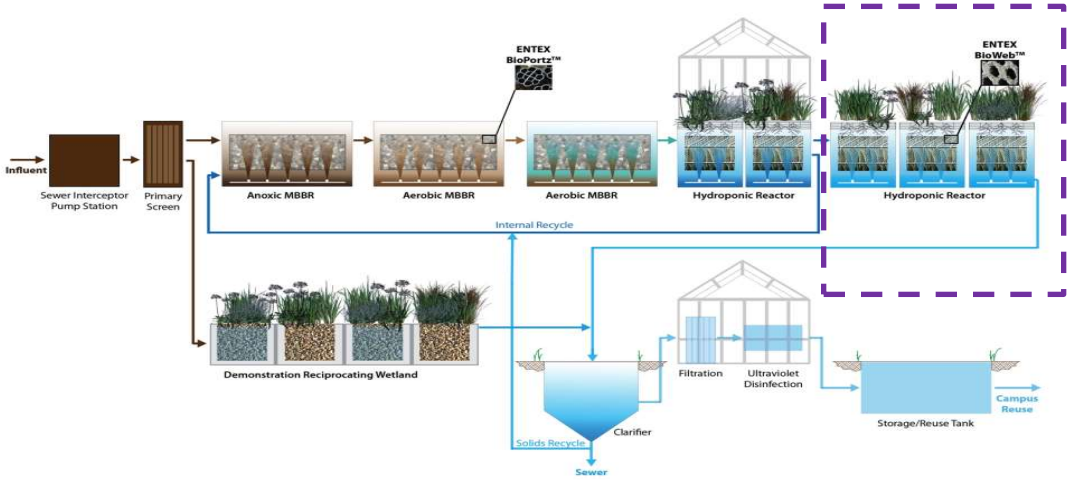


Biofilm bacteria

Fixed Media Solutions



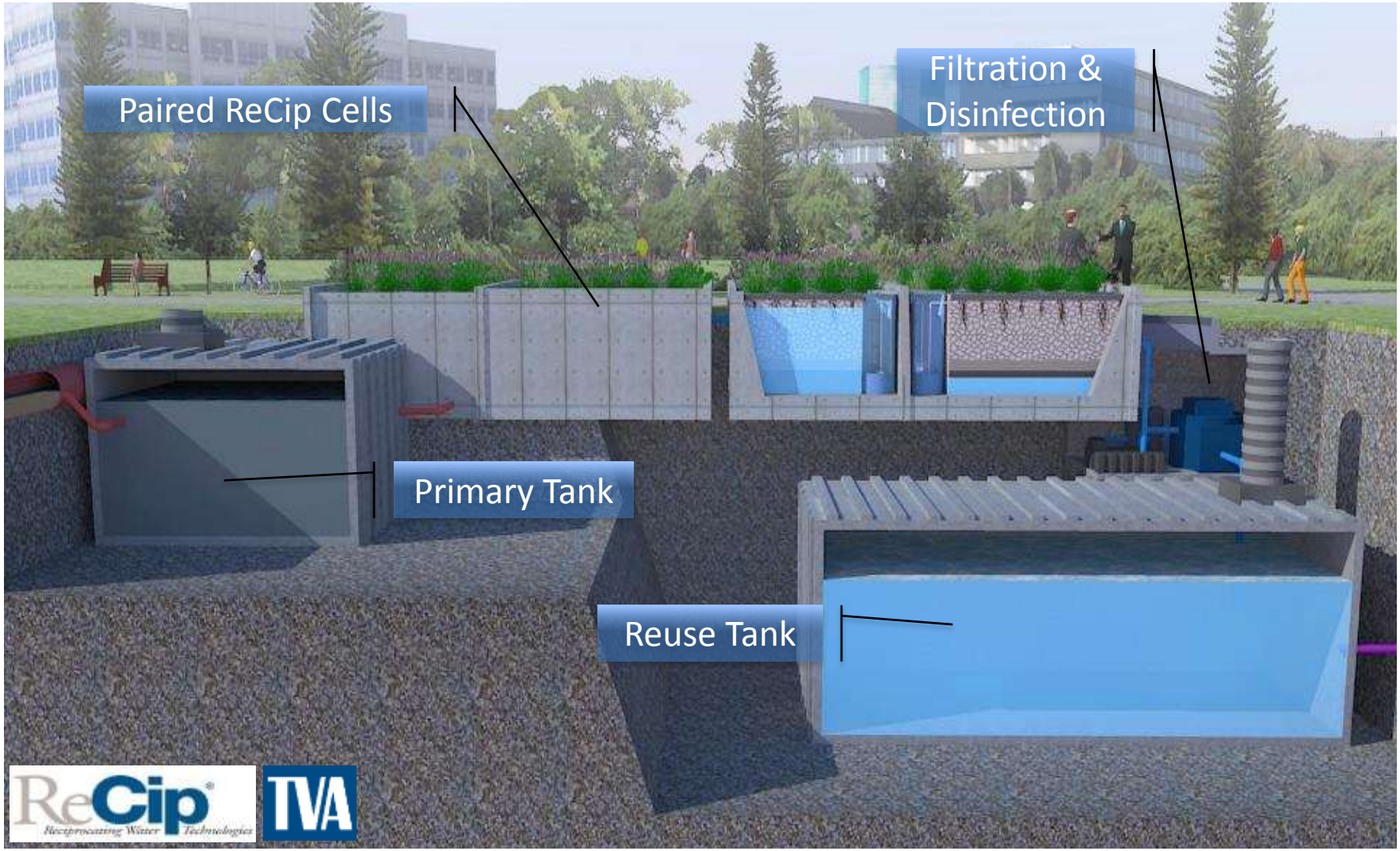




Emory University WaterHub – Waste water reclamation

Collaborate + Transform
AWWA-NC
60th Annual Conference
UNC Chapel Hill DUKE NC STATE 2015

Reciprocating Wetlands



Emory University WaterHub – Waste water reclamation

Lessons learned –

- Animal bedding issue; know what is coming out of your upstream buildings and when!

- Overcoming the “ick” factor

Woes?

Emory University WaterHub – Waste water reclamation

Multifunctional Educational Facility

Academics: Support curriculum design; facilitate the use of WaterHub as an active site for teaching and demonstration.

Passive Study: Will assist research groups interested in conducting tests, experiments etc. that do not impact the process and operations but still require use of the facility and Sustainable Water expertise.

Active R&D: Offer additional research and facilities.

Outreach: Work closely with student groups to change the way we understand sustainability and biodiversity, to change the way we view, use and live with water.

Emory University WaterHub – Waste water reclamation

Teaching and Learning Opportunities

Gina McCarthy, EPA visit 2/2015

"In addition to recycling millions of gallons of water a year, the WaterHub includes a Reciprocating Wetland demonstration unit which was purposefully created at Emory as a **research opportunity for The Center for Global Safe Water at Rollins School of Public Health. Data from the WaterHub will be used to help determine if similar facilities can be effectively utilized in developing countries."** *Emory Report April 14, 2015*

Emory University WaterHub – Waste water reclamation

YTD water reclaim – Michael St. plant 2,426,074 gals; Quad plant 119,125 gals **Questions?**