THE WATER TOWER
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ARDURRA

Lake Lanier Watershed 5-Year Research Plan Implementation Update

Steve Leo, Ardurra Group, Inc.
Kristan VandenHeuvel, The Water Tower
SESWA Annual Conference October 7, 2021

Agenda

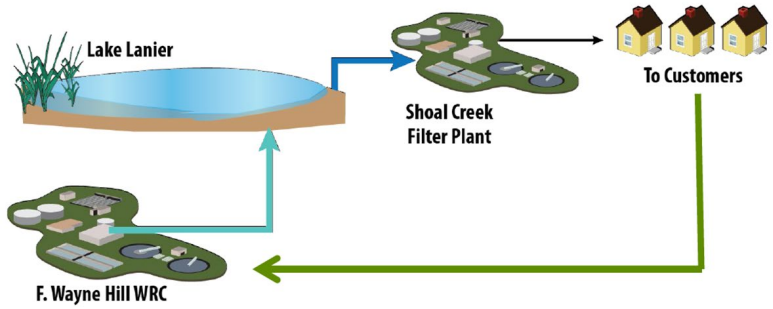
- Background and Need
- Plan Development Process
- Stormwater Research Projects
- Plan Implementation
- Next Steps

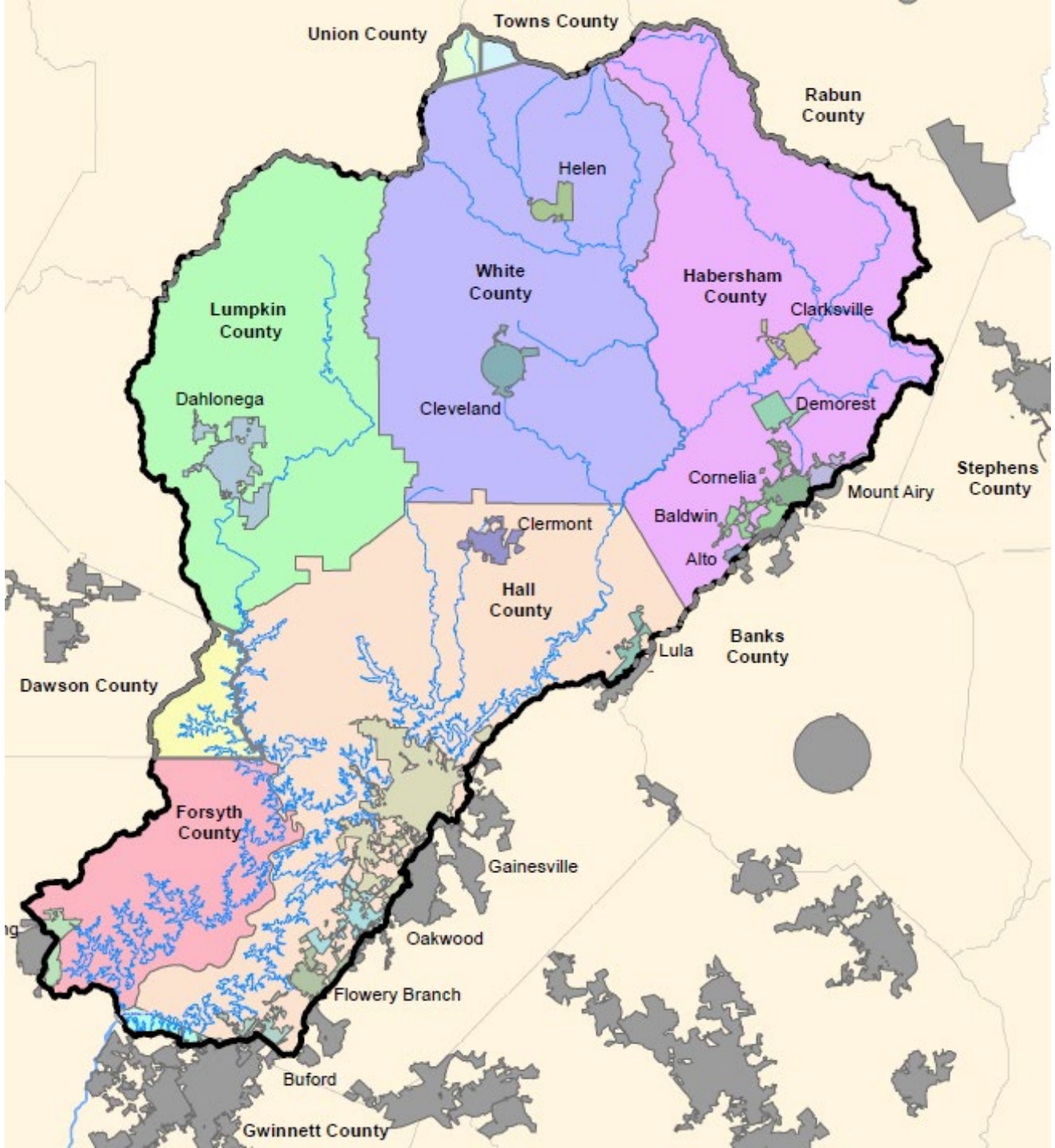
Lake Lanier Watershed: Need for a Coordinated Research Plan

Steve Leo, Ardurra

Northern Georgia's Urban Water Cycle

- Lake Lanier
- Communities surrounding the Lake rely on it for both discharge of treated effluent and source water for drinking purposes
  - Potable Reuse through Reservoir Augmentation
- Drives careful planning, monitoring, and protection of Lake Lanier and its watershed





Project Goals and Need for Plan

- Great work has been done by multiple entities in the past for the benefit of the Watershed, however these efforts are often completed in silos
- This effort aims to create a coordinated, multi-year plan that will benefit multiple stakeholders in the Lake Lanier Watershed area
- Working with Gwinnett County DWR to create the Plan

Ultimate Goal:

*Create a multi-year research agenda of **applied research projects** based on stakeholder and technical expertise to maintain and improve the Lake Lanier Watershed through a utility perspective and water quality lens*

Plan Development Process

Steve Leo, Ardurra

Project Team

The Water Tower/Gwinnett County Dept. of Water Resources

- Tyler Richards, Director, Gwinnett County DWR
- Melissa Meeker, CEO, The Water Tower
- Kristan VandenHeuvel, Strategic Director of Research and Engagement, The Water Tower

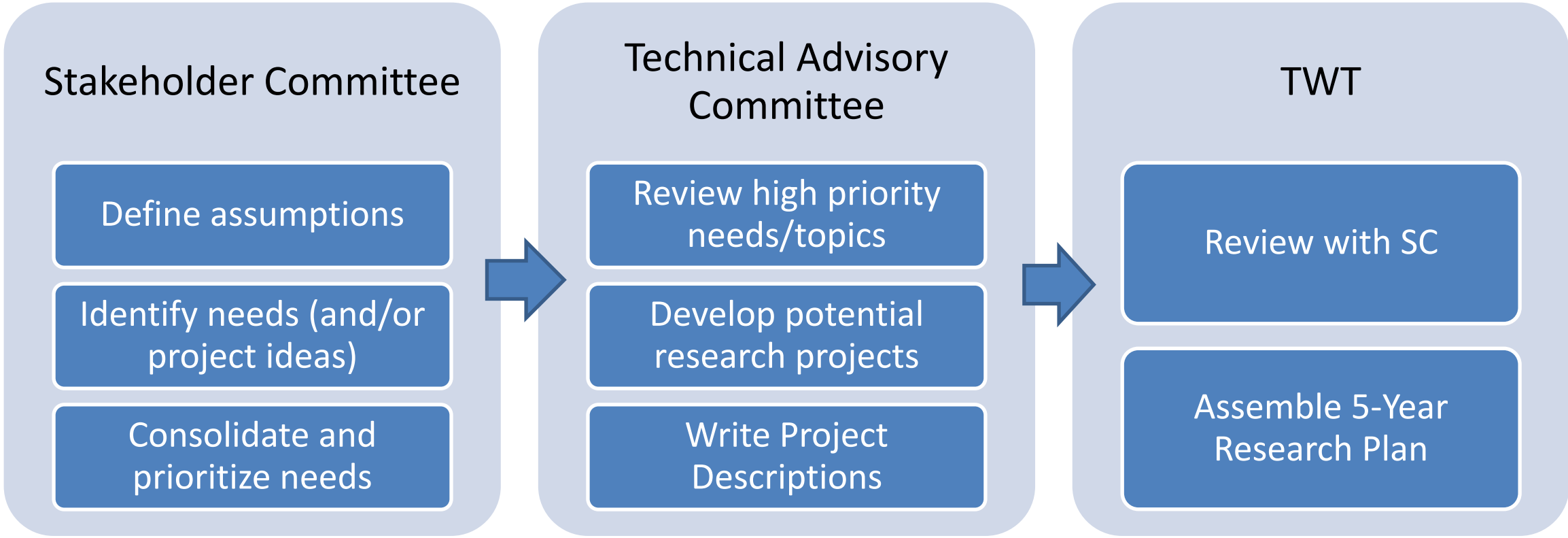
Ardurra (formerly Constantine Engineering)

- Steve Leo, Client Services Manager

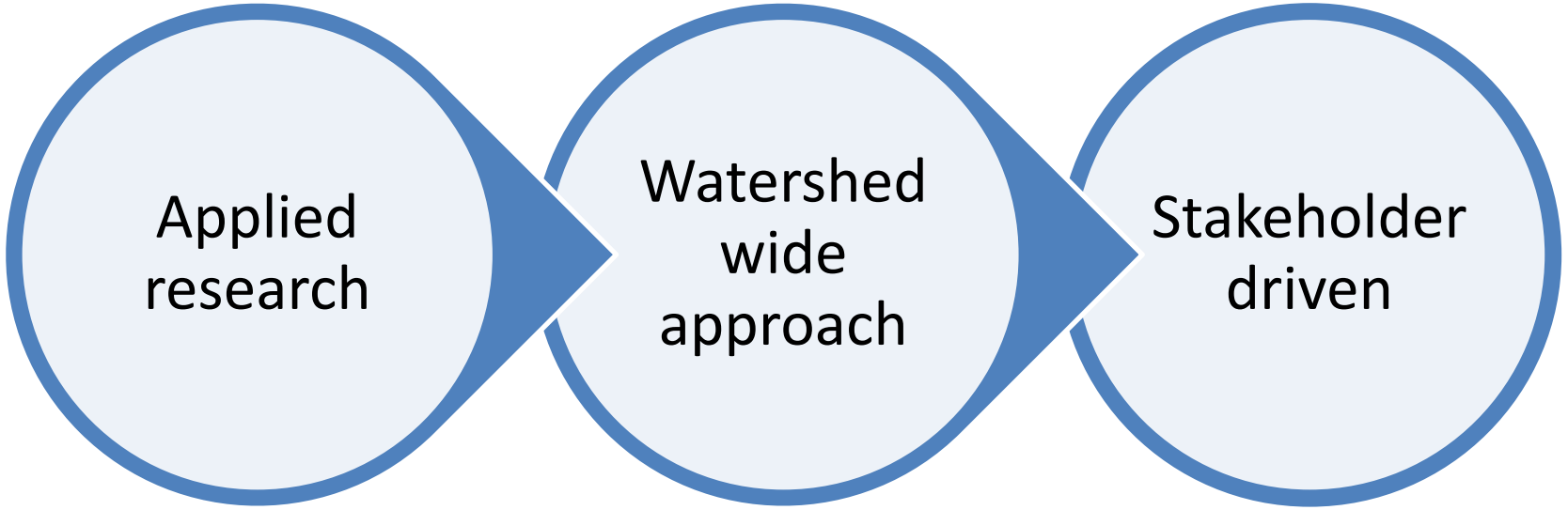
Carollo Engineers

- Jeff Mosher, Principal Technologist and Vice President
- Eva Steinle-Darling, Reuse Innovation Lead and Vice President

Research Plan Approach



Plan Assumptions



Role of Stakeholder Committee

Input from multiple stakeholder groups to see the full picture

- Utilities/Governments
- Regulators
- Environmental groups

Stakeholder Committee: Identify ***questions*** and ***challenges*** that need to be addressed regarding Lake Lanier and the Lanier Watershed

- What keeps you up at night?
- What is the biggest challenge your organization is facing regarding Lake Lanier?

Stakeholder Organizations

- Selection Process: Come one and all!!!
- 22 organizations in total
- Planning Organizations (2)
- Counties/W&SA (7)
- Cities within the Watershed (7)
- Regulatory Agencies (1)
- Environmental Groups (2)
- Other Organizations (3)

Stakeholder Committee

- Planning Organizations
  - Metropolitan North GA Water Planning District
  - Georgia Mountains Regional Commission
- Local Government – Counties
  - Athens Clark County – Public Utilities
  - Forsyth County – Water and Sewer
  - Forsyth County – Health Department
  - Gwinnett County – Water Resources
  - Hall County – Public Works
  - Lumpkin County W&S Authority
  - White County Water Authority
- Local Government Cities
  - City of Alto
  - City of Clarksville
  - City of Cleveland
  - City of Cornelia
  - City of Dahlonega
  - City of Gainesville
  - City of Oakwood
- Other Orgs
  - US ACOE – Lanier Management Office
  - Lake Lanier Association
  - Georgia Forestry Foundation

Role of Technical Advisory Committee

Translate input from the stakeholders on challenges to ***develop applied research project descriptions*** to address the issues defined by the stakeholders

- Academia
- Consulting firms
- Utilities
- Other orgs

Virtual TAC Workshops

- Worked together and in small groups to develop project descriptions

Technical Advisory Committee: Selection Process

- Selection Process much more selective
- Identified pre-determined list of disciplines to be represented
- Requested feedback from Stakeholders
- Reviewed research backgrounds
- Considered past work in the watershed
- Long list to Short list
- 18 members

TAC Member Disciplines

- Lake ecology and limnology
- Water resources and hydrology
- Watershed planning and modeling
- Water, wastewater, and recycled water treatment
- Best management practices
- Water quality (nutrients, CECs, etc.)
- Stormwater and nonpoint source water quality management
- Algal and harmful algal blooms
- Environmental and climate impacts
- Water policy and regulations

TAC Members

Ashwin Dhanasekar	Water Research Foundation
Todd Rasmussen	University of Georgia - Warnell School of Forestry
Gail Cowie	Albany State University - GA Water Planning and Policy Center
Ching-Hua Huang	Georgia Tech
Brigette Haram	Gwinnett County DWR
John Joiner	USGS
Dan Calhoun	USGS
Denise Funk	Brown and Caldwell
Erik Rosenfeldt	Hazen and Sawyer
Doug Baughman	Hazen and Sawyer
Brian Skeens	Jacobs
Brian Watson	Tetra Tech
Laurie Hawks	Hawks Environmental
Brian Bledsoe	University of Georgia – Institute for Resilient Infrastructure Systems
Alan Wilson	Auburn University - School of Fisheries, Aquaculture, and Aquatic Sciences
Tina Jerome	Natural Resources Conservation Service - USDA
Katura Wright	Natural Resources Conservation Service - USDA
Gary Hankins	Natural Resources Conservation Service - USDA

Stakeholder/Technical Advisor Engagement

- Initial Survey
  - Role
    - Solicit critical topics and identity potential research areas
    - Develop priority issues for TAC
- Online Meetings
  - 3 Initial meetings with Stakeholders
  - 4 meetings with Technical Advisors – Develop Project Descriptions
  - Presentation of Project Descriptions to SC – survey to gauge interest
- Plan Development

Outcome of the Research Plan

32 Applied Research Project Concepts on timely, stakeholder-driven topics

Non-Point Sources (8)

Water Quality and Monitoring (7)

Nutrients (7)

Stormwater (4)

Other (6) including Land Use, Policy, Outreach, and Water Reuse

Highly Rated Projects: Stakeholder Committee

Rated "Very High Interest" by Stakeholders

Project Number	Project Description	Topic Area
N-003	Lake Lanier Watershed Nutrient-Algae-HABs Working Group	Collaboration
N-007	Improved Information for EPD Base Nutrient Modeling Tool	Modeling
NPS-001a	Improved Modeling of Non-Point Sources in Lake Lanier Watershed (Phase 1)	Modeling
NPS-001b	Improved Modeling of Non-Point Sources in Lake Lanier Watershed (Phase 2)	Modeling
NPS-005	Analysis of Land/Locations for Suitability of BMPs	BMPs
O-001	Lake Lanier Water Quality Outreach Program (Phase 1)	Communications
P-001	Innovative Solutions for Nutrient Management	Poultry Industry
SW-001	Fecal Bacteria Source Tracking in the Watershed	Water Quality and Monitoring
SW-002	Effectiveness of BMPs for First Flush Events (initial surface runoff of a rainstorm)	BMPs
WQ-001a	Watershed Monitoring Techniques – Current Assessment and Roadmap for the Future (Phase 1)	Water Quality and Monitoring
WQ-001b	Watershed Monitoring Techniques – Implement Roadmap (Phase 2)	Water Quality and Monitoring
WQ-003	Assess Lake Lanier Water Quality (and Eutrophication) based on Transparency Measurements (Secchi Disk Depths)	Water Quality and Monitoring
WQ-007	Predictive Modeling of Harmful Algal Blooms (HABs)	WQ and Monitoring

Project Description: N-003

Lake Lanier Watershed Nutrient-Algae-HABs Working Group

- Objectives
  - Organize and launch working group; engage a range of stakeholders; coordinate activities
- Background
  - Issues are complex and wide ranging; existing activities are uncoordinated; coordination and collaboration is needed; would assist in developing trust; identified benefits; extension of stakeholder group effort
- Research Approach
  - Form the group; develop organizational structure; create a vision; gather information; develop an action plan; coordinate activities; develop funding strategies
- Deliverables
  - Group membership list; participation guidelines; administration support; action plan; track outcomes
- Estimated Budget
  - <$15,000/year

Project Description: O-001

Lake Lanier Watershed Outreach Program

- Objectives
  - Develop a watershed wide outreach program aimed at improving water quality; specific to the watershed
- Background
  - Focus areas would include sediments, nutrients, trash/debris; acknowledged existing MS4 Permitting activities and materials; support MS4's and target homeowners and construction sites; focused messaging is needed
- Research Approach
  - Define and clarify drivers, goals, objectives; identify partners; Clarify Target Audiences; Create, package and distribute messages; develop operating plan; identify performance and effectiveness assessment metrics
- Deliverables
  - Final Report; Model Program; Outreach Materials
- Estimated Budget
  - $75,000 (Phase 1)

Project Description: SW-001

Fecal Bacteria Source Tracking

- Objectives
  - Identify major sources of fecal contamination; determine most appropriate Microbial Source Tracking (MST) approach for the Lake Lanier Watershed
- Background
  - Source identification leads to prioritized management strategies; Acknowledged library dependent and independent approaches; Acknowledge existing work of North Georgia Water Resources Partnership
- Research Approach
  - Review state of the science and ID best method; identify already known hotspots – 303d listings, monitoring data, beach closure reporting; develop and implement MST program
- Deliverables
  - Report; Dataset
- Estimated Budget
  - Dependent on final scope

Project Description: SW-002

Effectiveness of BMPs for First Flush Events

- Objectives
  - Evaluate Structural BMPs ability to remove nutrient loads from first flush; Evaluate enhancements or adjustments to BMPs to increase effectiveness
- Background
  - First flush carries the major load of nutrients; Infiltration practices are becoming more common; Acknowledged BMPs developed and offered by various sources; Urban and Ag
- Research Approach
  - Use SWAT (Soil Water Assessment Tool) to assess BMPs; Model responses of BMPs to different sized events; Review NRCS Program Practices for BMPs; Recommend BMPs for various circumstances
- Deliverables
  - Final report with findings and recommendations
- Estimated Budget
  - Dependent on final scope

Lessons Learned

- It really is possible to run a project like this over Zoom!!
- Utilizing a pre-meeting survey to catalyze conversation amongst a large group on a zoom call was very important
- Bringing in technical experts with diverse but relevant expertise enhanced output and promoted collaboration

Poll Question

Which of the following challenges is the Lake Lanier 5 Year Research Plan trying to address?

a. Collate past research projects completed on Lake Lanier to inform what future work might be needed
b. Develop a coordinated multi-year plan to benefit Lake Lanier Watershed stakeholders
c. Provide a better understanding of how to manage and protect water quality in lake Lanier
d. Obtain consensus amongst stakeholders on priorities for applied research projects
e. All of the above

Next Steps for the Plan

Kristan VandenHeuvel, TWT

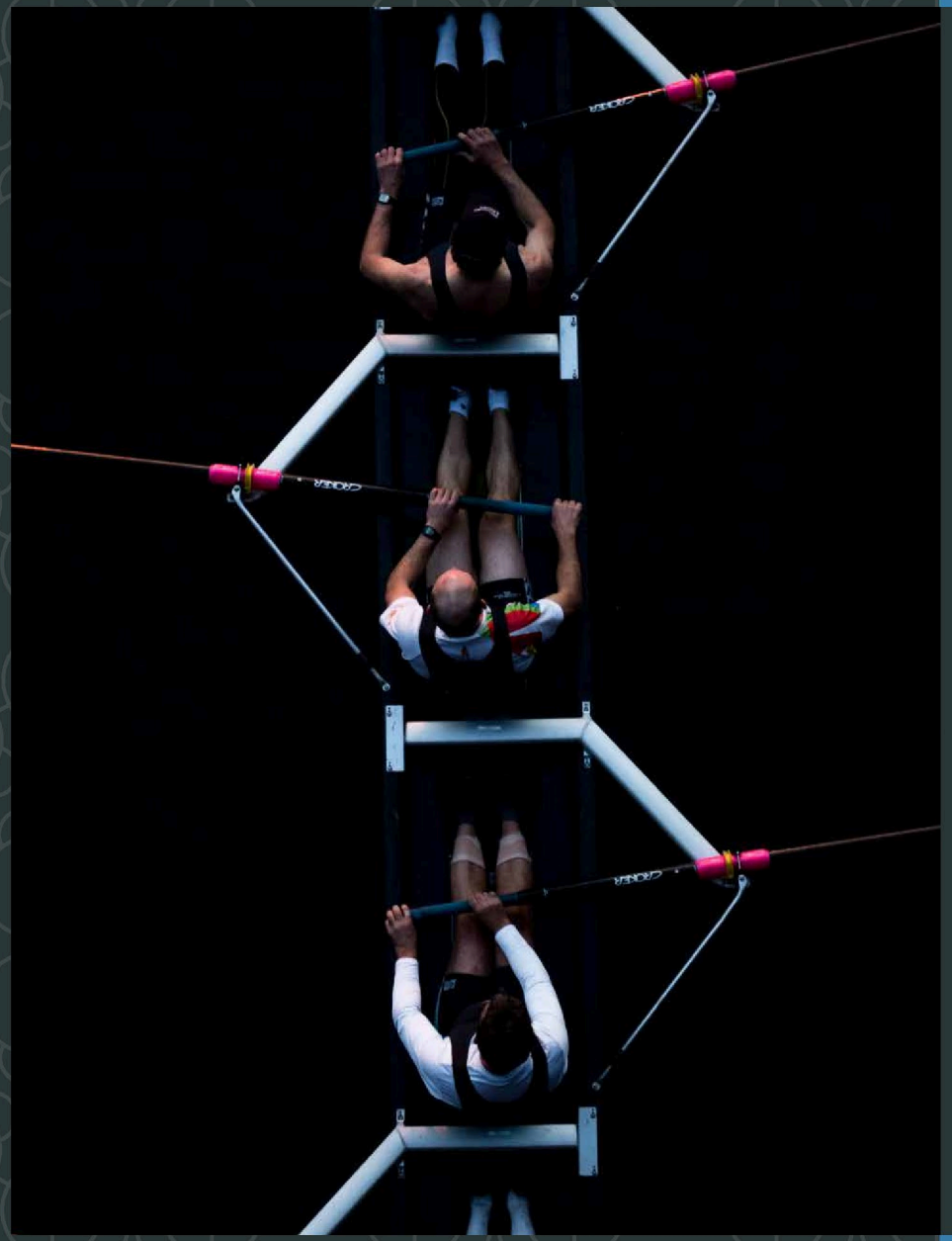
Research Plan: Next Steps

- Funding for projects will be crowdsourced
  - Q3-Q4 2021
  - Stakeholders
  - Nonprofit, Public, and Private Grants
  - VC interested in Environmental Ventures
- Projects will be competitively bid, overseen by a third-party advisory committee, and managed by TWT
  - Starting Q3 2021
  - RAC Recommendations for 2021 Projects

Download the Plan on TWT Website: theh2otower.org/five-year-research-plan
Or by scanning this QR code with your smartphone camera:

Provide Feedback on the Plan

- The Lake Lanier Watershed 5-Year Research Plan is a "living document" and we greatly appreciate your input on the plan
- TWT RAC will reevaluate projects and priorities each year to address emerging/hot topics based on their expertise, stakeholder input, etc.
- Interested individuals may complete the survey via the URL or scan the QR code to the left using your smartphone to:
  - Provide feedback
  - Express interest in funding/co-funding a project
  - Volunteer for a Project Advisory Committee
  - Designate your top 3 most important, timely projects



THE FUTURE OF WATER DOESN'T HAPPEN WITHOUT COLLABORATION

View from The Water Tower

Our Mission

To be a **thriving ecosystem of water innovation** fueled by imagination, informed by research, and powered by pioneers.

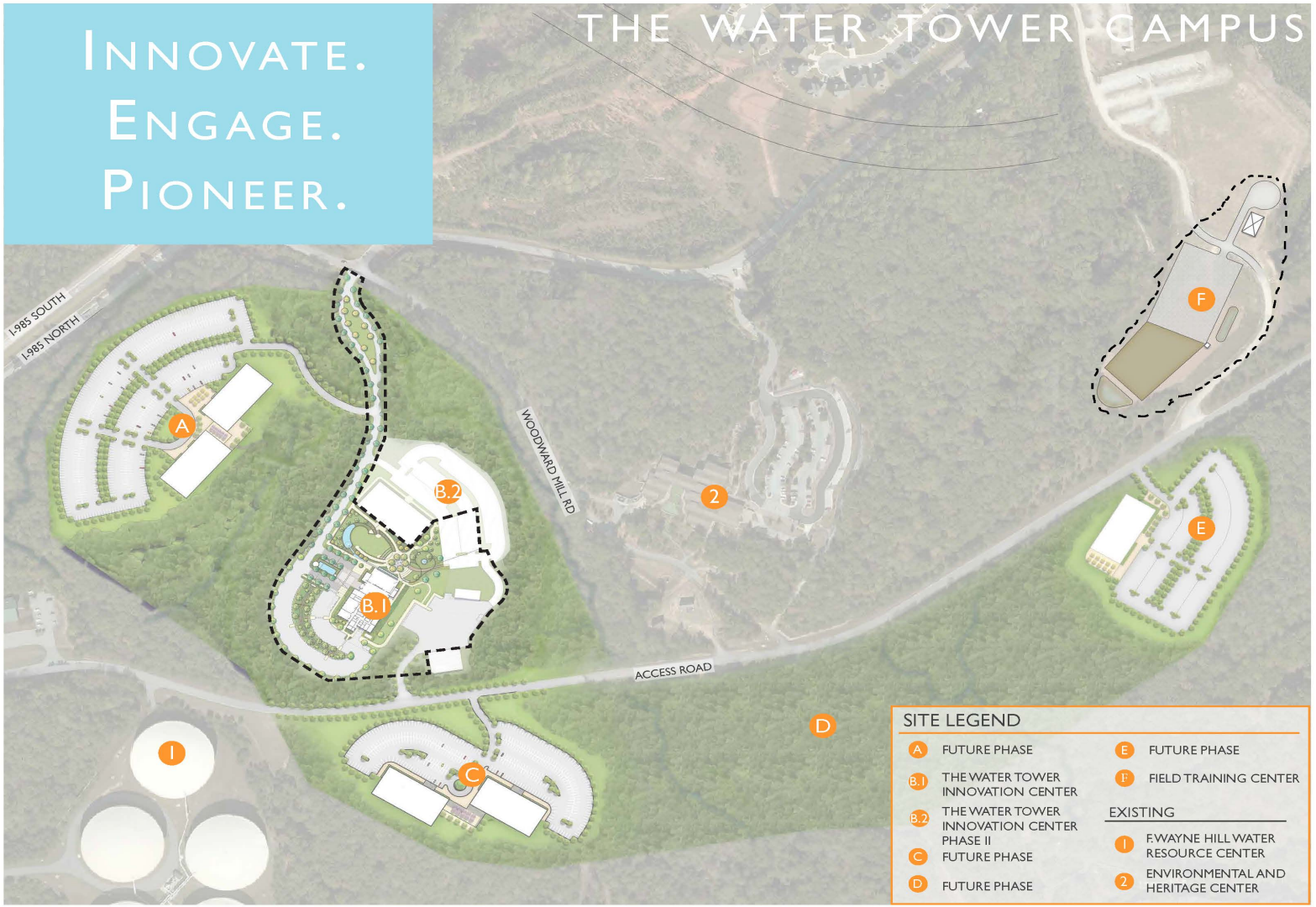
Our Objective

Create a campus and an ecosystem to reimagine the future of water - with the public and private sectors of the water industry - via applied research, technology innovation, workforce development, and community engagement.

Our Vision

To be the **go-to organization for all things water innovation** and help private and public entities be more innovative and the public appreciate the value of water.

The Water Tower Campus



- Focused on four keys pillars
  - Applied Research
  - Technology Innovation
  - Workforce Development
  - Community Engagement
- Phase One - office, lab and meeting space. (B.1)
- Field Training Center (F)
- Ph. 2 Office Building/Parking (B.2)
- Out-parcels (A,C,D,E)

REEVES YOUNG

TWT Site September 2021

Gresham Smith

TWT Collaborators

Founding Partners

Gresham Smith

Gwinnett Water Resources

SIEMENS Ingenuity for life

MUELLER

JEA

Innovation Partners

GWWI

TETRA TECH

Georgia State University

Georgia Association of Water Professionals

Georgia Gwinnet College

ARDURRA

AQAIX DIGITIZING WATER FINANCE

VT

go:hub by Global Omnium

Gwinnett County Public Schools

ResilientH2O Partners Innovative Tech | Integrated Risk Mitigation

REEVES YOUNG

kamstrup

Global WaterWorks

Georgia Center for Opportunity

AECOM

Product Donors

OnSyte Septic Service

MUNICIPEX

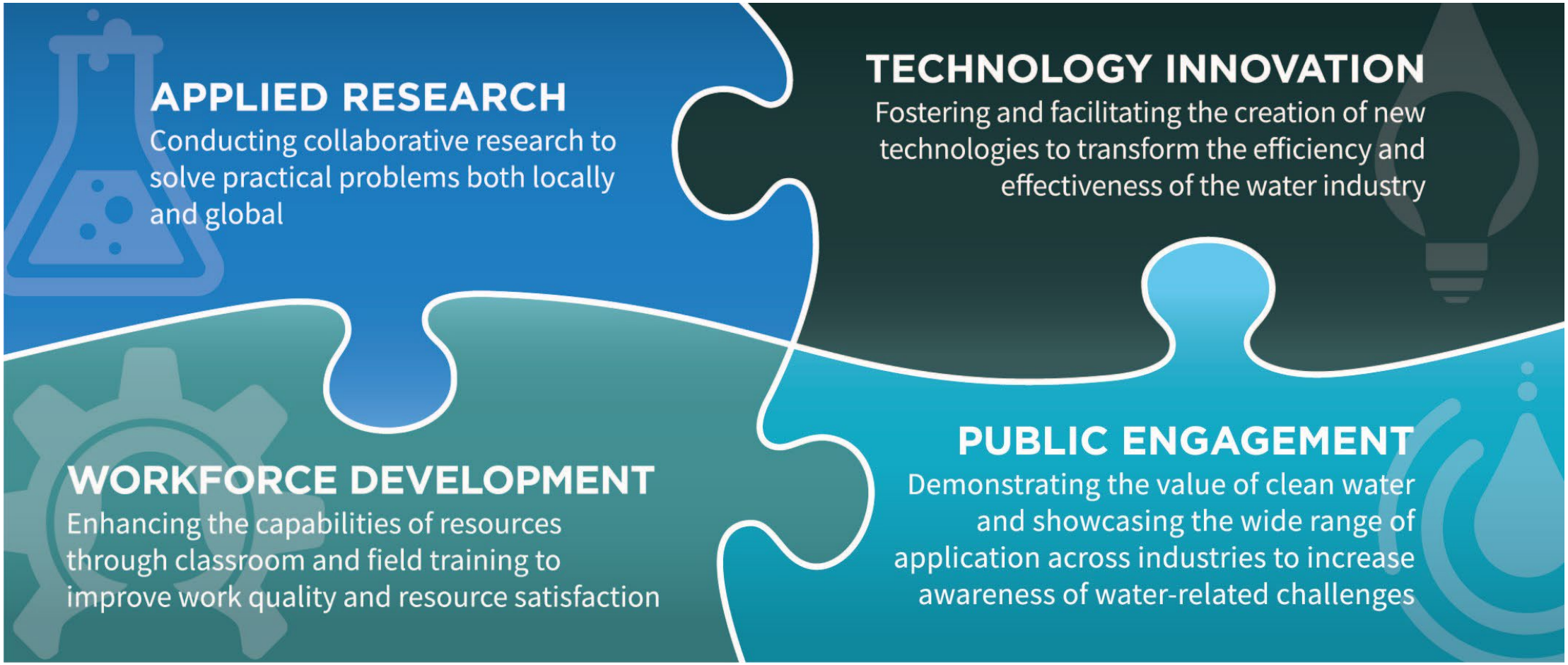
INFILTRATOR water technologies

MUELLER

SIEMENS Ingenuity for life

SAFE-T-COVER

Four Key Pillars: Working Together



APPLIED RESEARCH

- world-class facilities
- real-world application and test conditions
- strategic and collaborative partnerships

The Water Tower Applied Research Program

- Goal: Conduct research to advance the science of water technologies that can be applied to real-world challenges faced by utilities – locally, regionally and nationally
- Planning for The Water Tower's applied research program began in 2020 with the development of the Lake Lanier Watershed Five Year Research Plan. Lessons learned from this initial planning process will be used to establish a process to expedite future planning.

Action Items:

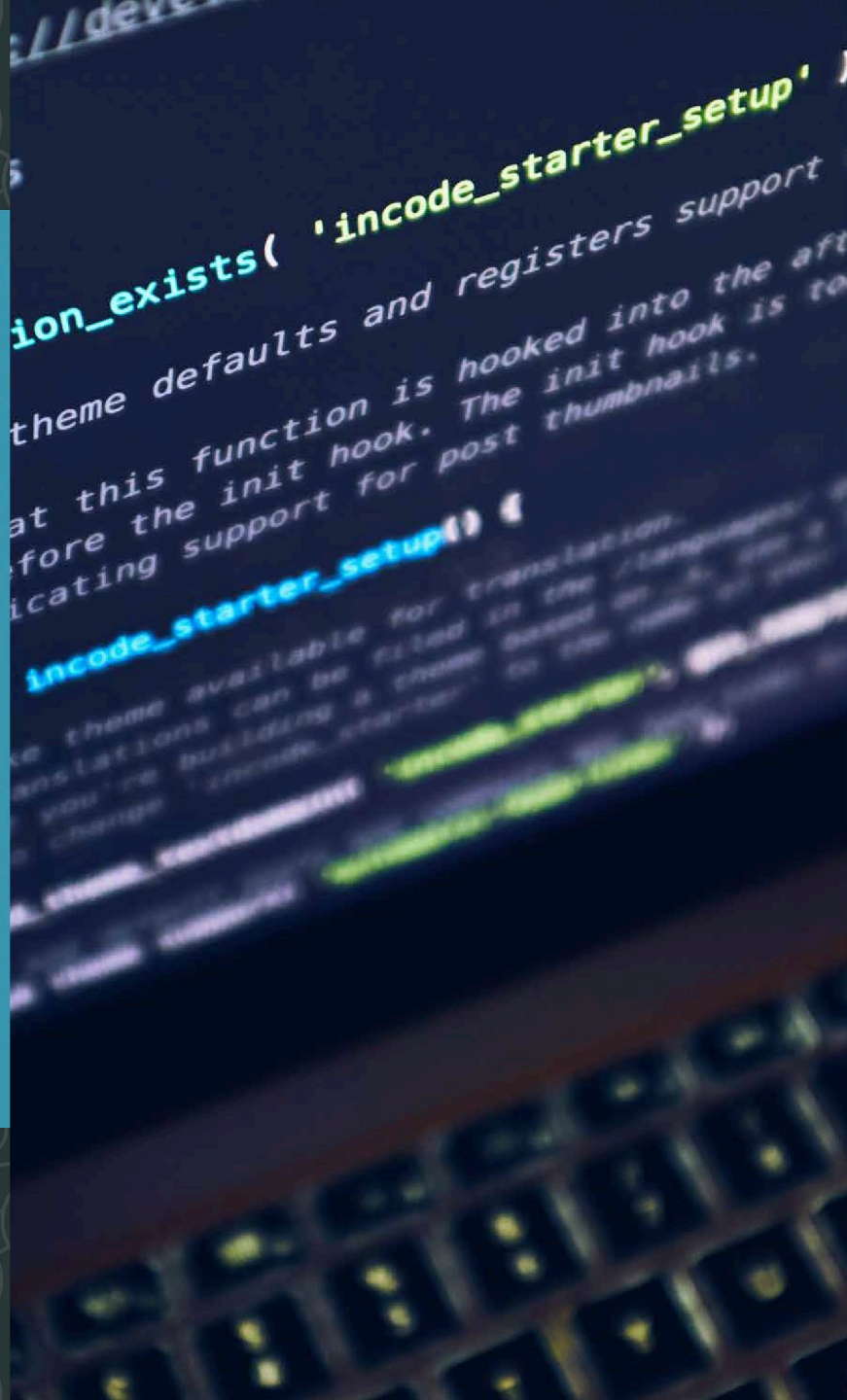
- Build the Research Advisory Committee (RAC) ✓
- Implement the Lake Lanier Five Year Research Plan
- Identify Funding for Key Research Projects

Types of Research

- TWT participates in various “types” of research efforts
  - TWT-managed RFPs
    - >$25,000 will be procured using a competitive RFP process
    - Overseen and directed by the TWT Research Advisory Committee
      - 2021: Lake Lanier Watershed 5 Year Research Plan projects
  - TWT-led projects
  - Joint proposals supporting innovation partners
  - TWT/GC collaboration projects (WRF, EPA, DOE, etc)
  - Technology R&D projects

TECHNOLOGY INNOVATION

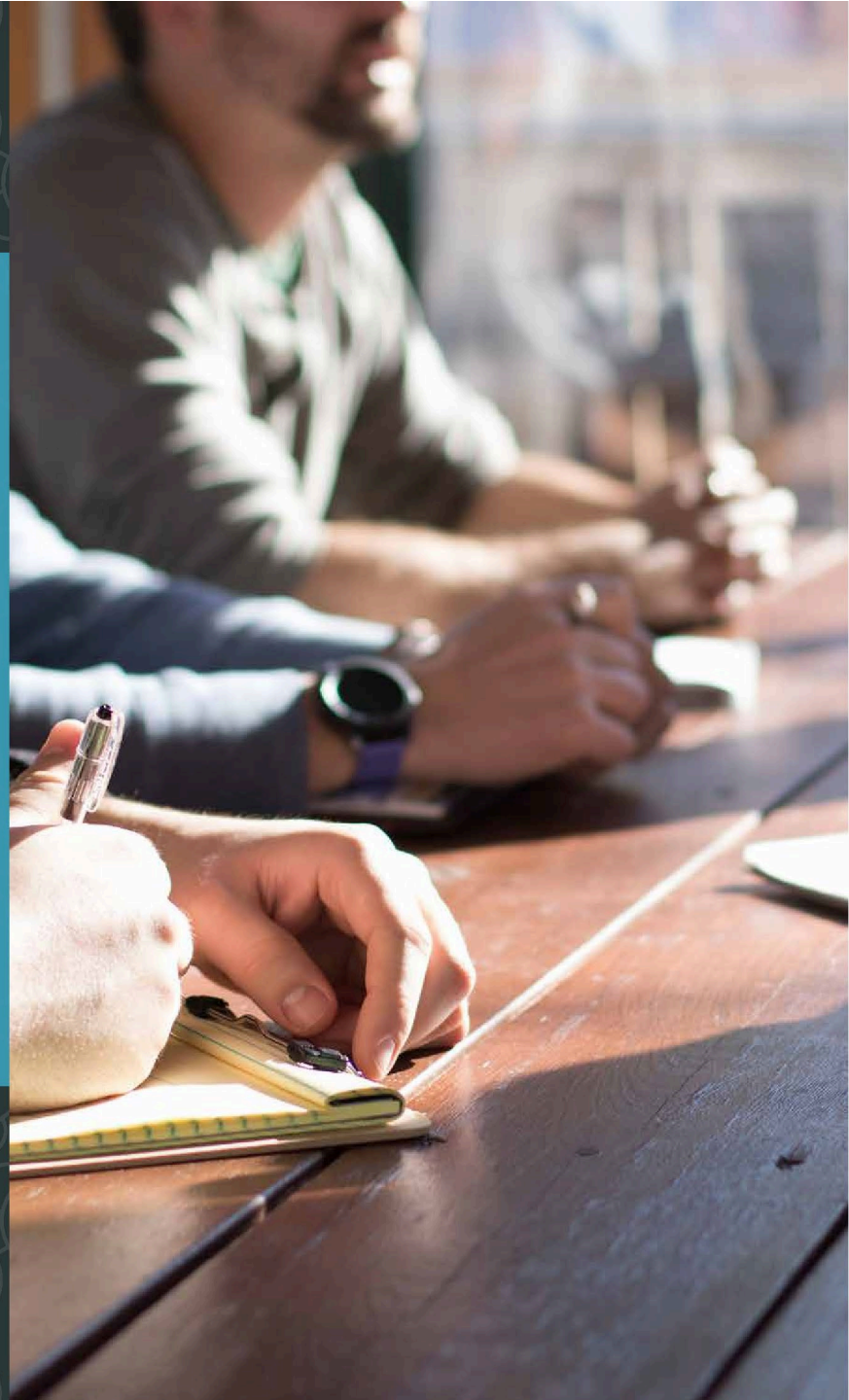
- demonstration and validation
- workspace and support
- connections critical for deployment



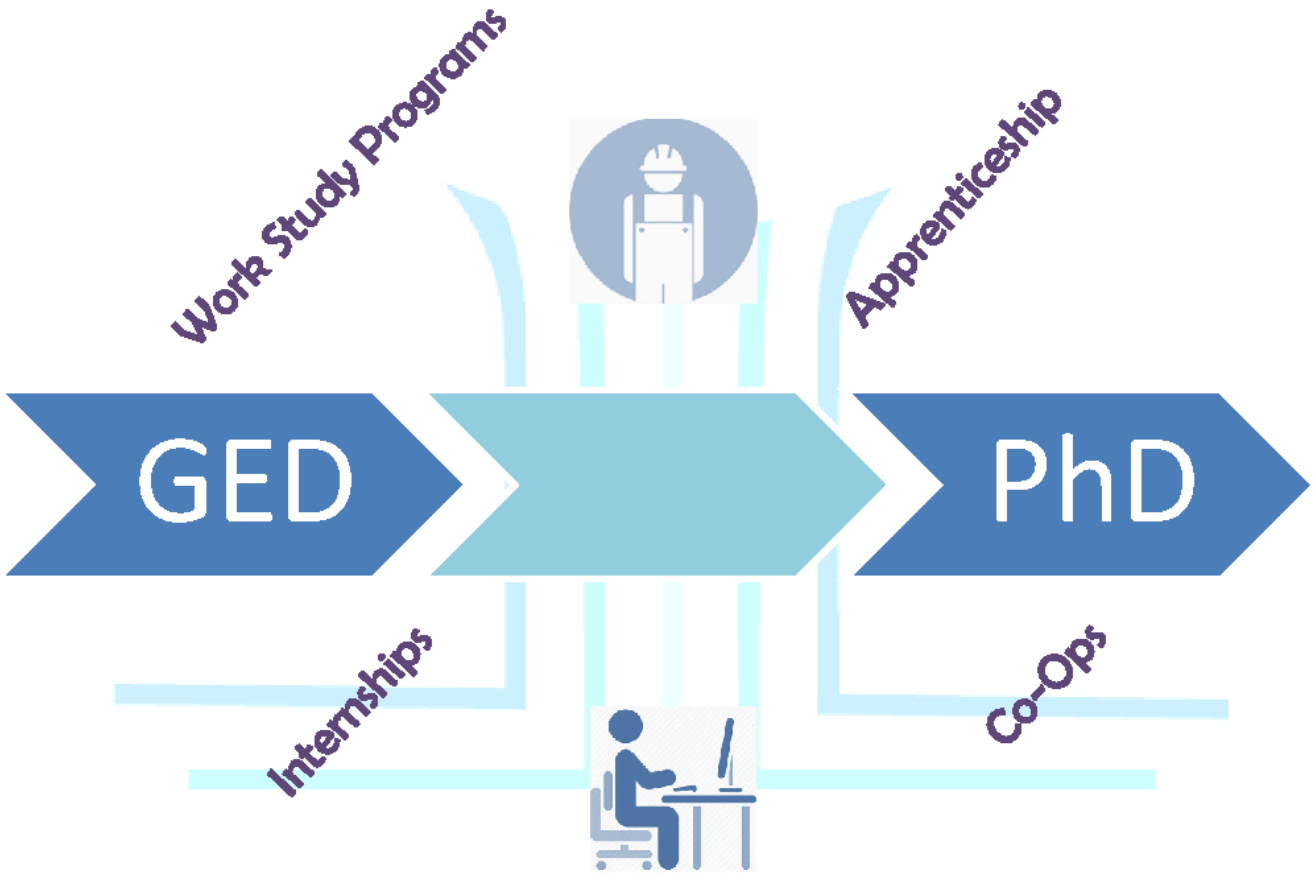

• Primary Influent
• Secondary Effluent
• Advanced Treated Reuse
• Digital Twin/APIs

WORKFORCE DEVELOPMENT

- in-the-field and other specialty water-industry training
- career pipeline through recruitment
- internships and apprenticeships



Workforce Pipeline to benefit The Water Tower ecosystem



COMMUNITY ENGAGEMENT

- peers
- partners
- public

Engage the Community

Be a beacon of community engagement, serving as a forum for the public to connect and learn about the ***value of water***

Priorities for 2021-2022:

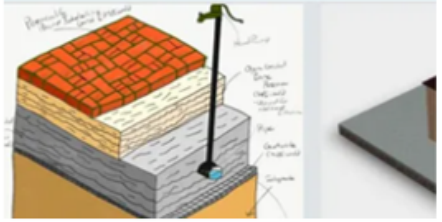
- Book Club
- Networking Events
- Educational Water Videos
- Workshop at GCPS Science Fair
- Water Innovation Leadership Summit
- Virtual scavenger hunt (Science4Georgia)
- Science Tales & Trails
- GC Spring and Fall Fest
- TWT Job Shadowing (HS teachers, principals & college students)

Digital Learning Materials

21 Videos

Job Shadowing and Career Fairs

Student Design Competition



Tour F. Wayne Hill Water Resources Center

Virtual Book Club

W3 Networking

1498 Followers

82 Likes and Followers

1185 Followers

2538 Video Views

264 Followers

~1000 website views/month

Water Innovation & Leadership Summit

- 1 Day Event geared toward high school students
- Student-driven event (students involved in marketing, video production, STEAM)
- International speakers on water related topics and careers in the industry
- Hands-On Career Fair – sampling, operations, lab
- Leadership and team building activities
- Resume workshop
- Seeking Grant funding/Sponsors for transportation

Spring 2022
TWT Campus

Upcoming Events

- **Annual “Watering Hole” Golf Tournament**
  - Scramble, putting contest, golf clinic
  - October 21, 2021 at Lanier Islands Legacy Golf Course
- **Demo Day**
  - Connecting utilities and vendors on the latest innovations in water, wastewater, stormwater, & reuse technology
  - November 16, 2021 at TWT Campus in Buford

More information available at www.theh2otower.org

Thank you!

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Don't forget to provide feedback on the Research Plan! Scan QR code: