



# WATER WORKFORCE WEBINAR SERIES

Preparing Your Workforce for the Future through  
Innovative Technology and Intelligent Systems

Office of Wastewater Management

Office of Water

U.S. Environmental Protection Agency

June 18, 2024

**We will start in a couple minutes.  
Thank you.**



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# Webinar Logistics

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- This webinar is being recorded
- Participants will be in listen-only mode
- To submit a question, use the Q&A function



- Webinar slides and recording information will be sent out to all participants following the webinar

# Water Sector Workforce at EPA

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- Reminders:
  - Check out our website for resources and updates:  
<https://www.epa.gov/sustainable-water-infrastructure/water-sector-workforce>
    - Workforce Initiative
    - Past Workforce Webinars
    - Workforce Case Studies
  - Stay tuned for information on our next webinar. If you are registered for this webinar you are automatically on the email list for future webinars!

# Having Audio Difficulties?

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- Call in to any of these phone numbers:

+1 669 254 5252

+1 669 216 1590

+1 646 828 7666

+1 551 285 1373

**Webinar ID: 160 475 4000**

# Opening Poll: Please indicate the sector that you work in:

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- Utility
- State or Local Government
- Federal Government
- Consultant
- Academia/Educator
- Military/Veterans
- Other

June 18, 2024

# Preparing Your Workforce for the Future through Innovative Technology and Intelligent Systems

**Jim Horne**, Sustainable Utilities Program  
Manager, U.S. EPA Office of Wastewater  
Management

# CREATING THE WATER WORKFORCE OF THE FUTURE WEBINAR SERIES

## Preparing Your Workforce for the Future through Innovative Technology and Intelligent Systems

As today's water sector utilities address an ever more complex series of challenges, expanded use of innovative technology, artificial intelligence, and various ways of creating intelligent water systems, hold great promise. At the same time, it is critical that utilities bring their employees into the discussions about the best use of these approaches and prepare them to effectively use these new tools. These discussions must be intentional and ongoing.

Please join us on June 18th to hear how one leading utility (Buffalo Sewer Authority) is embracing these new approaches and ensuring their workforce is prepared to use them. In addition, you will hear more about an important project from the Water Research Foundation to help utilities take the necessary steps to develop a truly intelligent water system to meet the needs of their communities.

This webinar is part of an ongoing webinar series hosted by EPA, in partnership with leading water sector organizations around the country. More information on this webinar series can be found at <https://www.epa.gov/sustainable-water-infrastructure/water-sector-workforce-webinars>

**ATTENDANCE IS FREE – REGISTER NOW!**

Register at:

[https://www.zoomgov.com/webinar/register/WN\\_fSYCpJXLT\\_2sm2hBQc4qrA](https://www.zoomgov.com/webinar/register/WN_fSYCpJXLT_2sm2hBQc4qrA)

JUNE 18, 2024  
2:30 – 4:00 PM Eastern Time

### Moderators:

- Jim Horne, U.S. EPA

### Speakers:

- OJ McFoy, P.E., General Manager, Buffalo Sewer Authority
- Prabhu Chandrasekeran, P.E., VP Intelligent Water National Practice Leader, Arcadis





June 18, 2024



## Speakers:

**OJ McFoy, P.E.**, General Manager,  
Buffalo Sewer Authority

**Prabhu Chandrasekeran, P.E.**, VP  
Intelligent Water National Practice Leader,  
Arcadis

**Webinar slides and recording will be sent to registrants within a week after the webinar.**

A nighttime photograph of the Buffalo skyline, with various buildings illuminated and their lights reflecting on a frozen body of water in the foreground. The sky is dark blue, and the water is a mix of blue and white from the ice and reflections.

**BUFFALO**  
SEWER AUTHORITY

**EPA Workforce  
Webinar Series:  
Buffalo, NY**

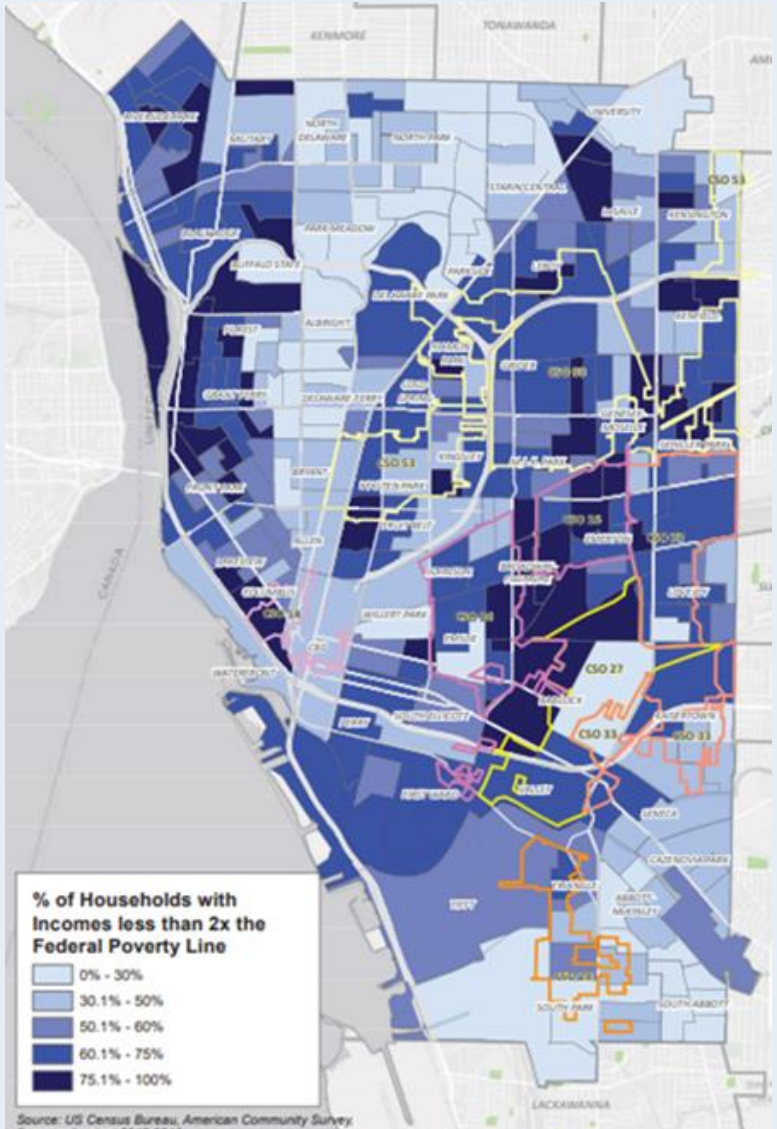
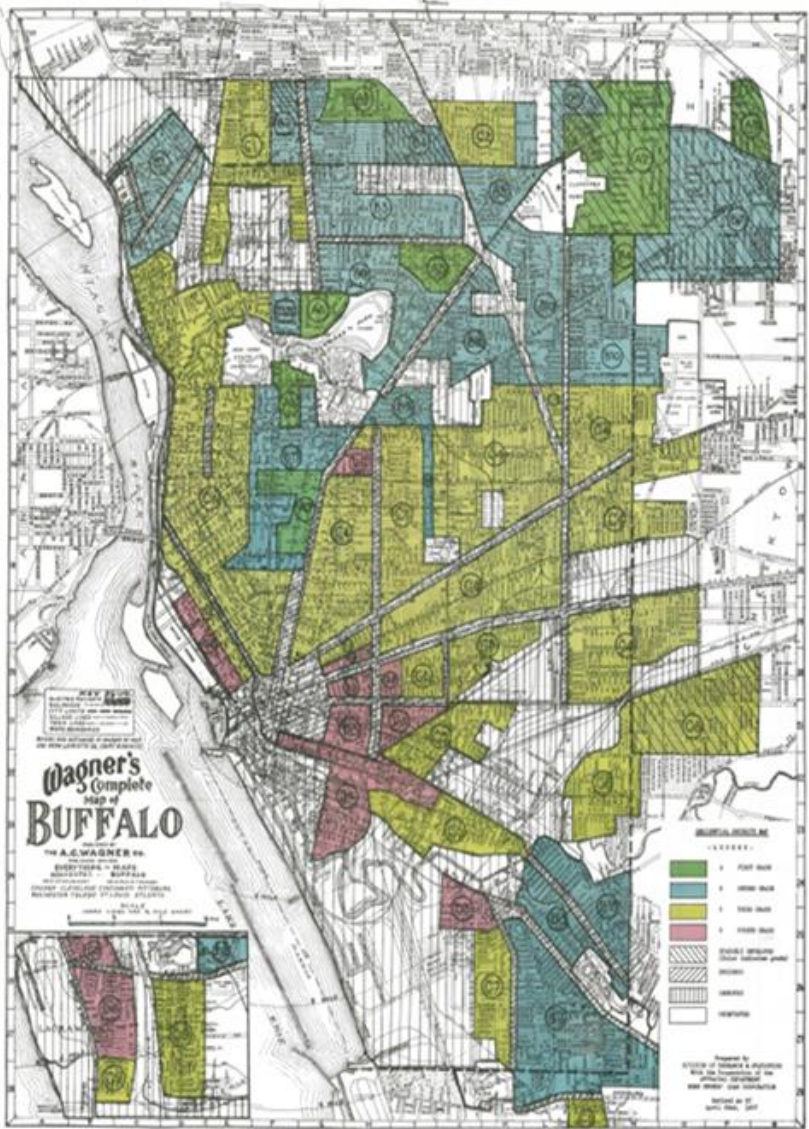
# BUFFALO

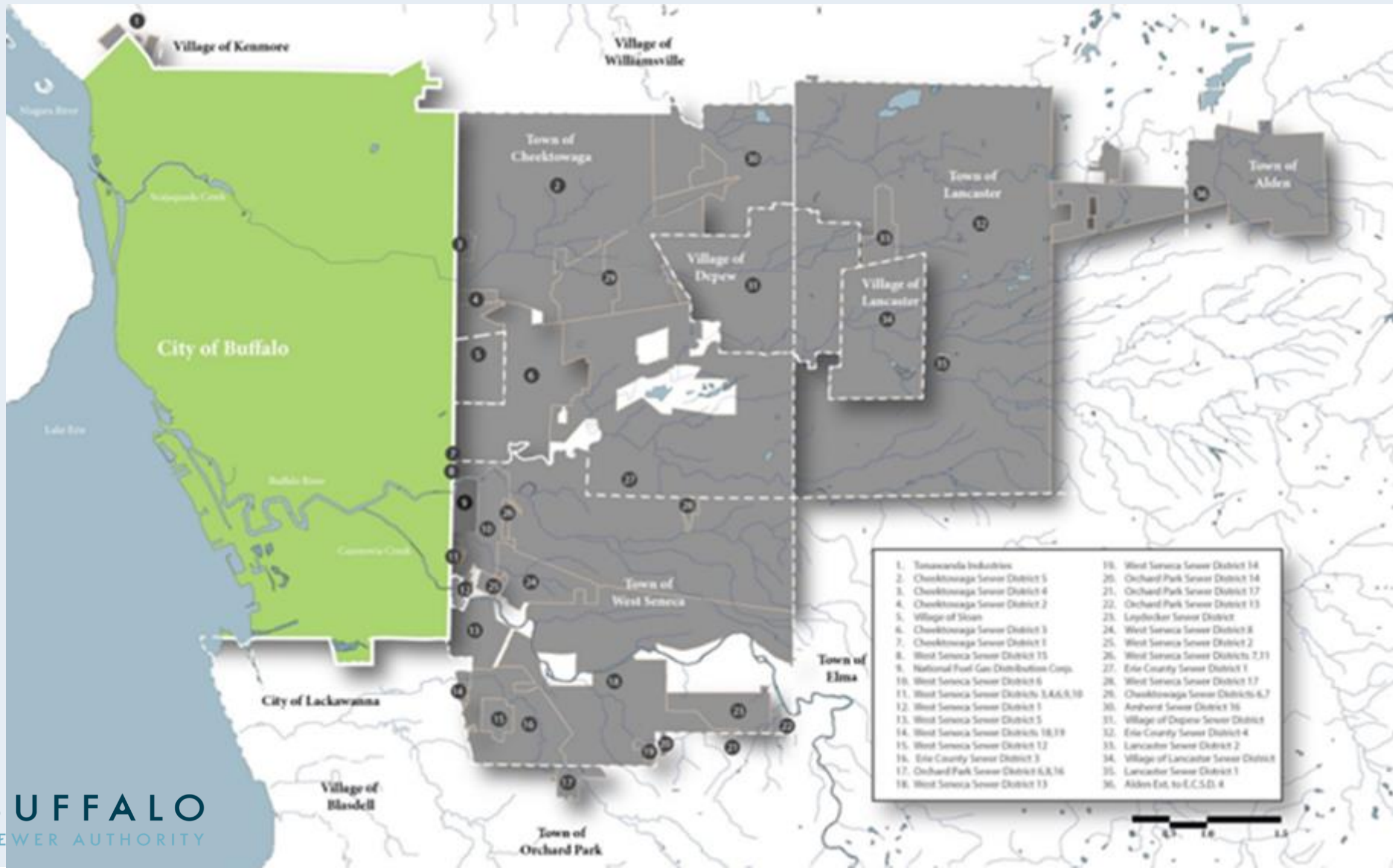
SEWER AUTHORITY



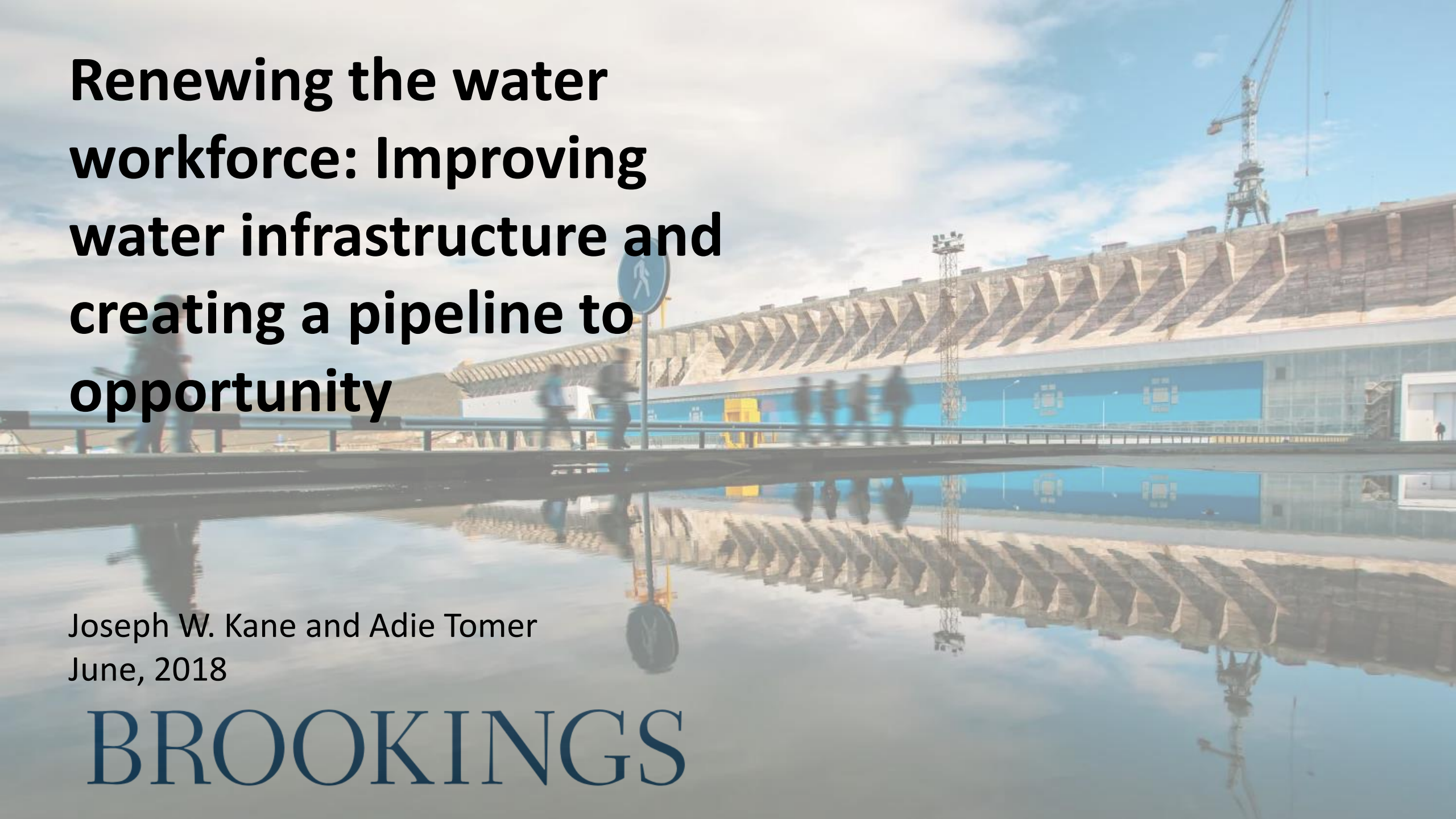
# BUFFALO

SEWER AUTHORITY





- |  |   |
|--|---|
| 1. Tonawanda Industries                  | 19. West Seneca Sewer District 14       |
| 2. Cheektowaga Sewer District 5          | 20. Orchard Park Sewer District 14      |
| 3. Cheektowaga Sewer District 4          | 21. Orchard Park Sewer District 17      |
| 4. Cheektowaga Sewer District 2          | 22. Orchard Park Sewer District 13      |
| 5. Village of Silvan                     | 23. Leyden Sewer District               |
| 6. Cheektowaga Sewer District 3          | 24. West Seneca Sewer District 8        |
| 7. Cheektowaga Sewer District 1          | 25. West Seneca Sewer District 2        |
| 8. West Seneca Sewer District 15         | 26. West Seneca Sewer Districts 7,11    |
| 9. National Fuel Gas Distribution Corp.  | 27. Erie County Sewer District 1        |
| 10. West Seneca Sewer District 6         | 28. West Seneca Sewer District 17       |
| 11. West Seneca Sewer Districts 3,4,5,10 | 29. Cheektowaga Sewer Districts 6,7     |
| 12. West Seneca Sewer District 1         | 30. Arden Sewer District 16             |
| 13. West Seneca Sewer District 5         | 31. Village of Depew Sewer District     |
| 14. West Seneca Sewer Districts 18,19    | 32. Erie County Sewer District 4        |
| 15. West Seneca Sewer District 12        | 33. Lancaster Sewer District 2          |
| 16. Erie County Sewer District 3         | 34. Village of Lancaster Sewer District |
| 17. Orchard Park Sewer Districts 6,8,16  | 35. Lancaster Sewer District 1          |
| 18. West Seneca Sewer District 13        | 36. Alden Exit to E.C.S.D. 4            |



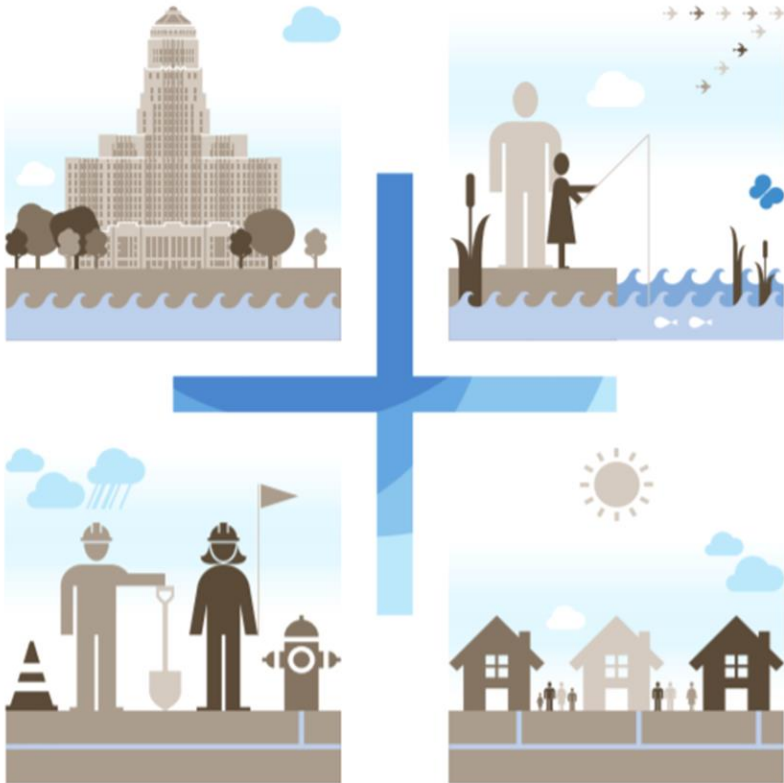
# Renewing the water workforce: Improving water infrastructure and creating a pipeline to opportunity

Joseph W. Kane and Adie Tomer  
June, 2018

BROOKINGS



**AN EQUITABLE WATER FUTURE**  
**Buffalo**



**BUFFALO**  
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**Multi-Year**  
Peer Reviewed process

**6 City-wide**  
workshops and meetings

**7 Cities**  
Atlanta, Buffalo, Camden,  
Cleveland, Louisville,  
Milwaukee, and Pittsburgh

# WE ALL DESERVE AFFORDABLE WATER

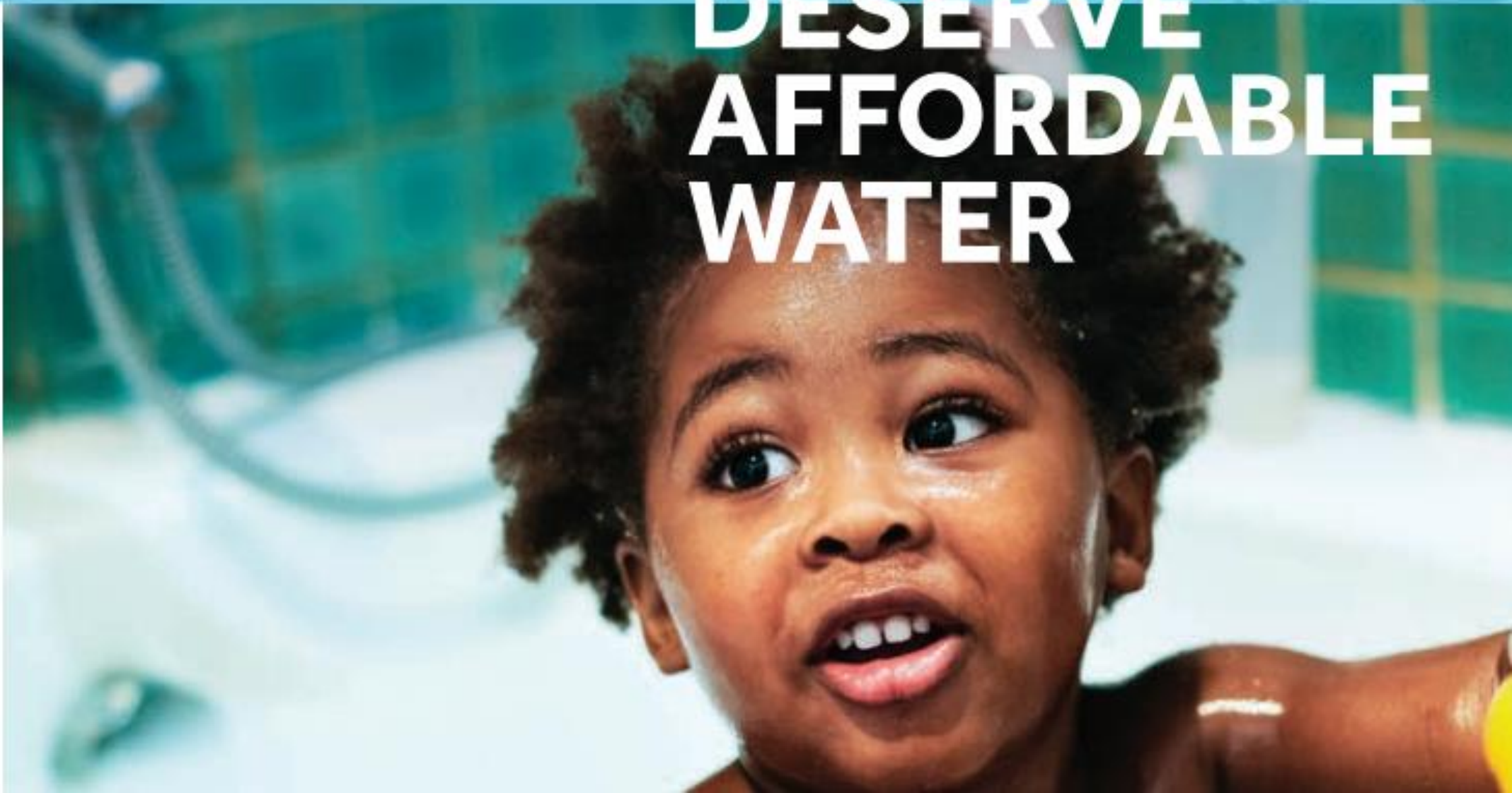
**BUFFALO**  
SEWER AUTHORITY

**BUFFALO**  
WATER

**CATHOLIC**  
CHARITIES

  
Community Foundation  
for Greater Buffalo

 **GROUNDWORK**  
Buffalo



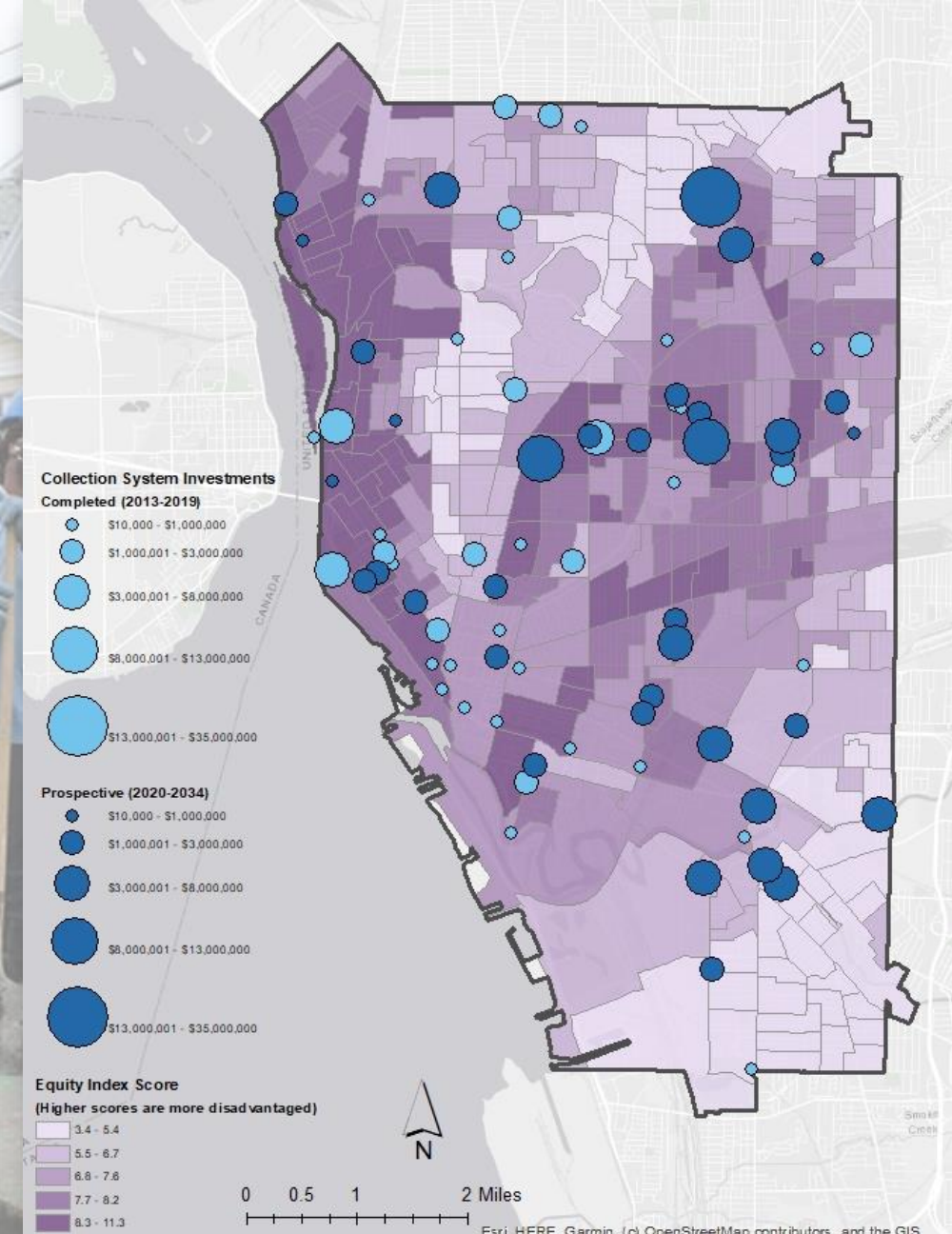




**WATER QUALITY**



# WATERFRONT



# INFRASTRUCTURE



CREATE CONNECTIONS. TRANSFORM TOMORROW. 2022

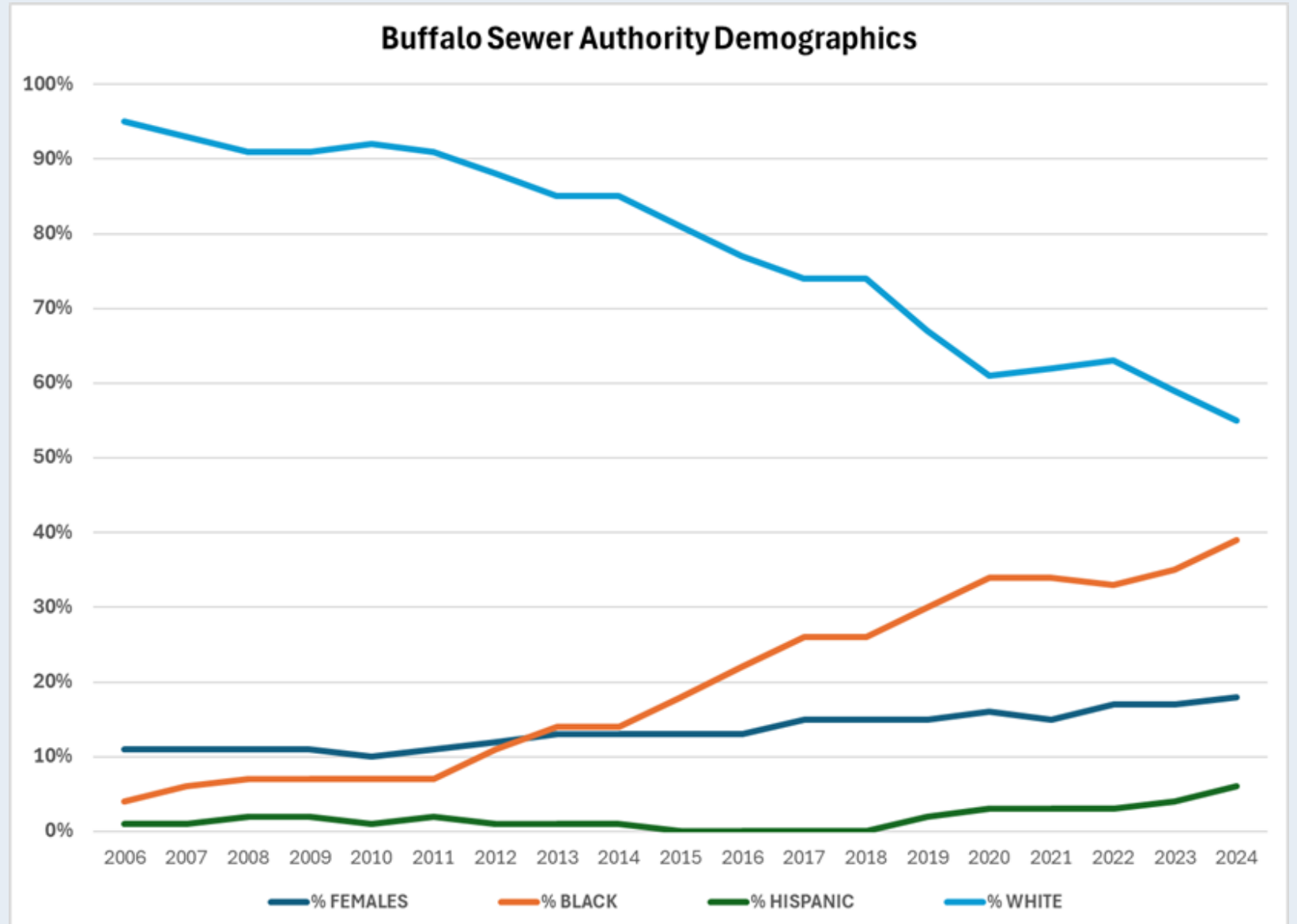


# WORKFORCE DEVELOPMENT

# BUFFALO

SEWER AUTHORITY

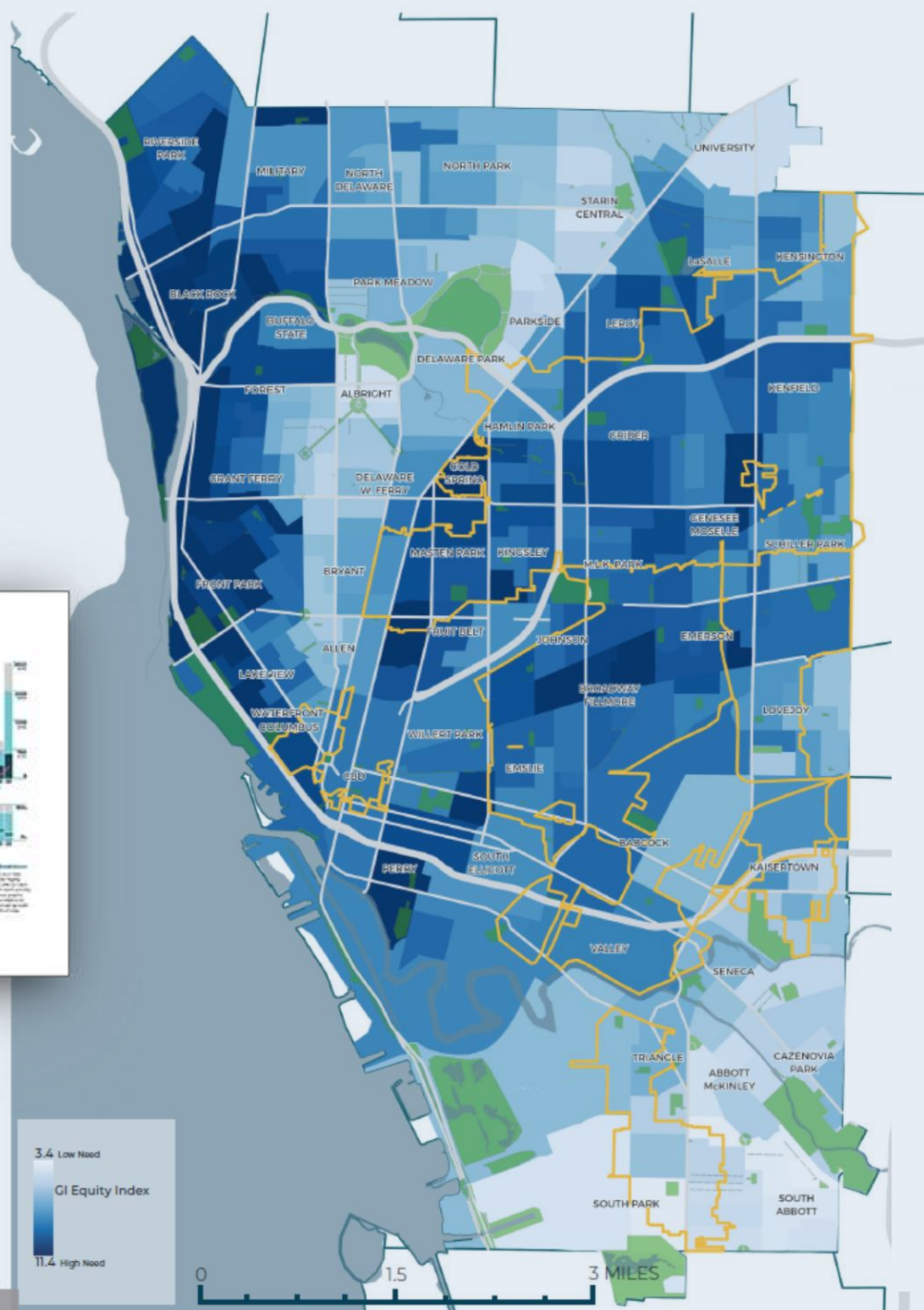
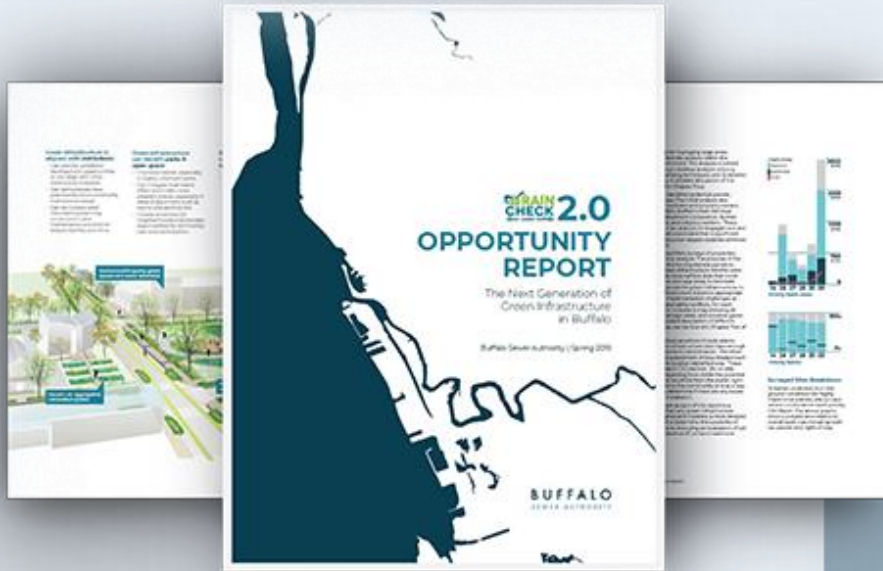
1. Workforce diversity increased 900%
2. Intentional recruitment
3. Professional development
4. Growth opportunities



# BUFFALO

## SEWER AUTHORITY

# PRIORITIZING EQUITY



### Socio-economic factors:

- Race and ethnicity
- Income
- Education attainment
- Young children
- Older adults
- Owner occupancy
- Limited English speakers
- Unemployment and labor force participation

### Built environment factors:

- Traffic proximity
- Ozone levels
- Particulate matter
- Access to public open space
- Tree canopy cover
- Impervious surface cover
- Vacant land
- Residential vacancy rates
- Commercial vacancy rates





**BUFFALO**  
SEWER AUTHORITY

**+ROBUST DATA  
DISCLOSURE**

**+3<sup>RD</sup> PARTY  
VERIFICATION**

**+METRIC TRACKING**

**+ENVIRONMENTAL &  
COMMUNITY IMPACT  
INDICATORS**

**ENVIRONMENTAL  
IMPACT  
BOND**

**\$50M**  
INVESTMENT  
IN  
GREEN INFRASTRUCTURE



# CERTIFICATIONS





**STEWARDSHIP**



# DATA-CENTRIC ANALYSIS



**BUILDING THE  
FUTURE**



# WATER WORX K-12

BUFFALO  
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ACEC ENGINEERING  
*Excellence*  
AWARDS



Environmental  
Finance  
**Bond Awards  
2022  
Winner**  
Green bond of the year  
– US muni bond

**36**  
Years of Excellence



**AWARDS**

EPA Water Workforce Webinar  
**Innovative Technology and  
Intelligent Systems**

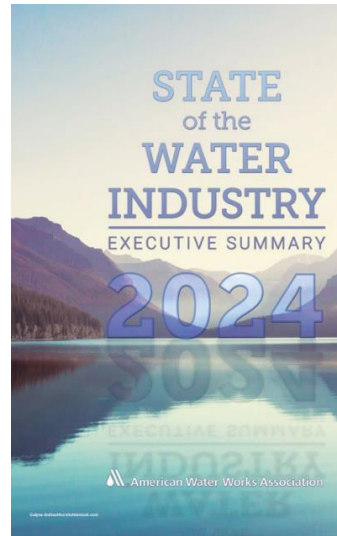
June 18, 2024

**Prabhu Chandrasekeran, PE**

Intelligent Water National Practice Leader, Arcadis U.S. Inc.  
[Prabhu.Chandrasekeran@arcadis.com](mailto:Prabhu.Chandrasekeran@arcadis.com)

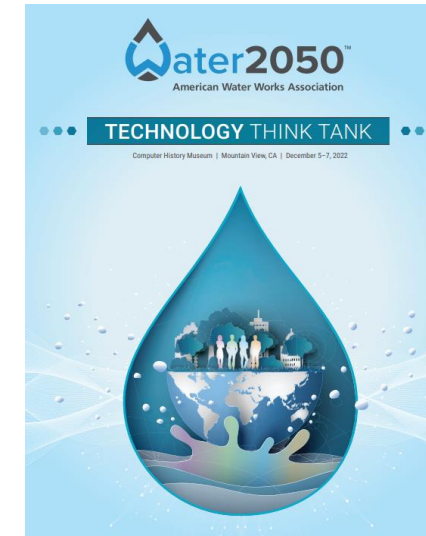


# Charting the Future of Water Industry in response to current and emerging trends



Innovation	Ranking
A secure cyber culture	Very Important
Adoption and advancement of new technologies	Very Important
A technology-savvy workforce	Very Important
Investment in innovation	Important
Expanded data network technology	Important
Advancements in material science	Important
Fit-for-purpose treatment technologies	Important
Generative artificial intelligence	Slightly Important
Robotics	Not Important
Augmented reality technologies	Not Important

Source: American Water Works Association



*"Let's create a structure and culture that embraces innovation and technology."*

*"Younger water professionals need inspiration for the industry to grow."*

*"The key takeaway is accessibility – making this technology accessible to all communities."*

*"Currently rollout of new cybersecurity technologies takes three to four years. This must speed up."*

*"Technology is moving at a pace that we cannot keep up with ... Structural changes and cultural changes are needed."*

Digital and AI Transformation is fundamentally about **people and organizational transformation** and the process of innovating (finding new ways of working) by continuously applying technology at scale for better business outcomes and experiences.



How to? ...

Preparing the Water Sector to Embrace Technology: Skillsets and Enterprise Management Approaches for the Digital Age

*(Water Research Foundation Project 5178)*

Quantifying the Impact of Artificial Intelligence/Machine Learning-Based Approaches to Utility Performance

*(Water Research Foundation Project 5189)*



# What is the current state of digital and AI transformation?

WRF 5189



# How can we **advance** the application of **Digital/AI**?



## Objectives

The purpose of this project is to survey the water industry and identify the use cases for artificial intelligence (AI) and machine learning (ML), quantify their benefits, and provide a framework for others to be able to make the same assessments about potential applications of their own. This project will demystify AI/ML and increase its adoption where it is appropriate.

## Approach

- 1. Current State Assessment** – Assess the current trends with AI/ML, conduct surveys/interviews with utilities/vendors to identify outcomes, metrics, and lessons learned.
- 2. Framework development** – Develop a web-based framework to assess the relevance, readiness, planning, and implementation of projects requiring AI/ML technologies
- 3. Framework demonstration and AI/ML implementation** – Match utilities with vendors by use case, demonstrate the framework, and implement AI/ML solutions at a subset of utilities.

## Project Team

**Principal Investigator:**  
Prabhu Chandrasekaran<sup>1</sup>, PE

**Co-Principal Investigators:**  
Katya Bilyk<sup>2</sup>, PE  
Dr. Sunil Sinha<sup>3</sup>

**Project Team:**  
Arcadis<sup>1</sup>, Hazen and Sawyer<sup>2</sup>, Virginia Tech SWIM Center<sup>3</sup>, Bluefield Research. Other technical advisors include Jim Cooper, Esteban Azagra, Dax Blake, Ben Stanford, Christopher Miller, Jose Porro and Oliver Grievson.

### Partnering Utilities:



### Partnering Vendors:

Aquasuite  
Blue Conduit  
Cobaltwater  
Confluency  
DHI  
Dynamita  
Fontus Blue  
HydroDigital  
Hyfi  
Kando  
Maia  
Neer  
Optimatics  
SewerAI  
Trinnex

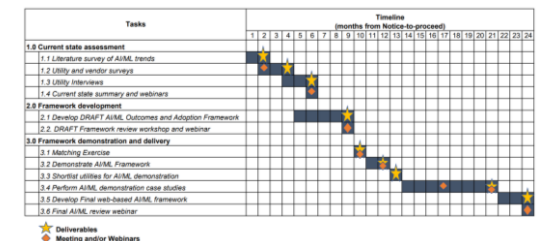
**GLWA contributed \$50K Cash**

## Application Potential & Benefits

We will assemble for the first time, a list of all available academic, vendor, and independently developed AI/ML solutions by use case. The AI/ML Outcomes and Adoption Framework will be a first of its kind guidance document for the water industry to assess the relevance, readiness, planning and implementation of AI/ML projects regardless of the size and the digital maturity of the organization.

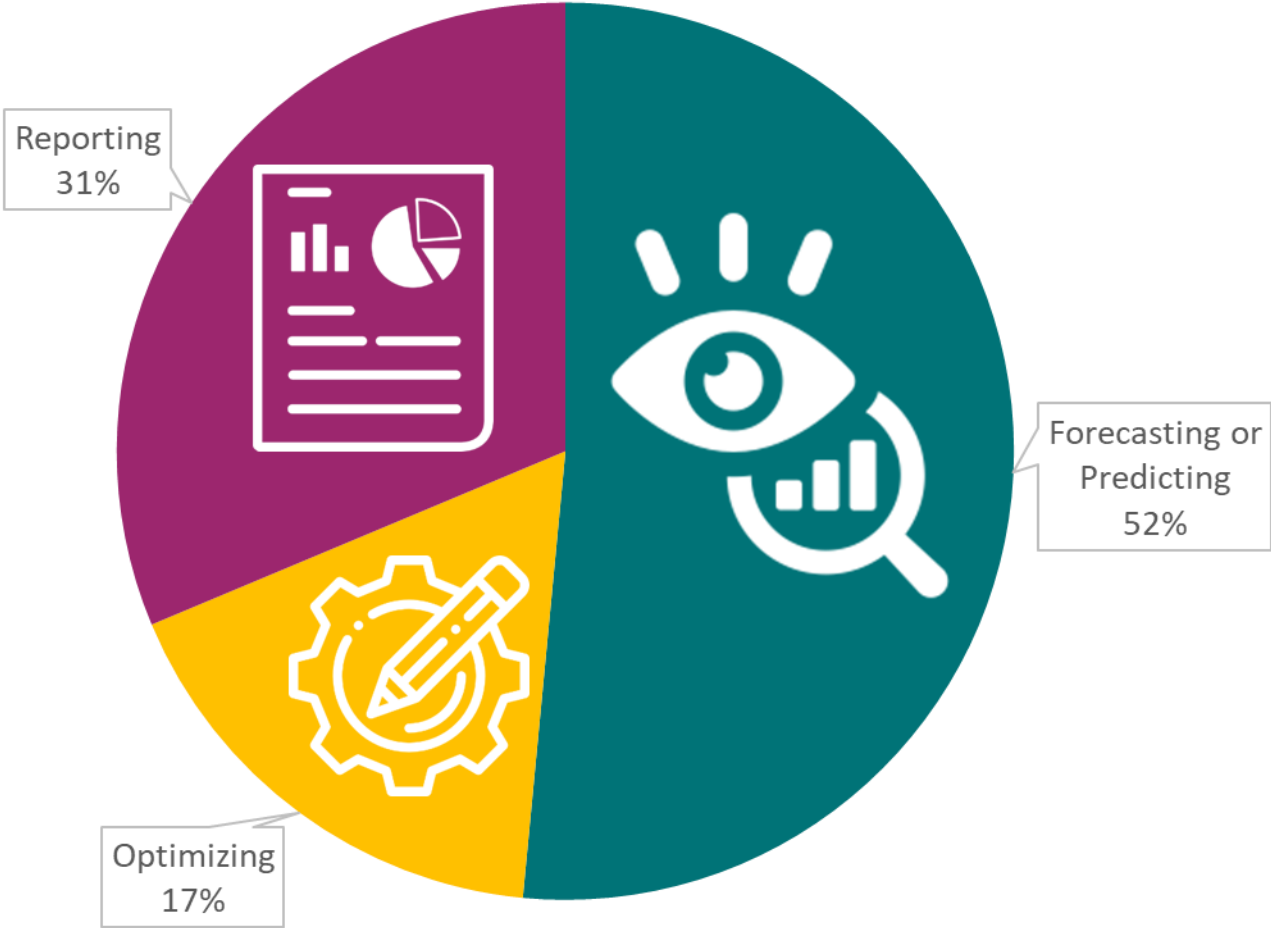
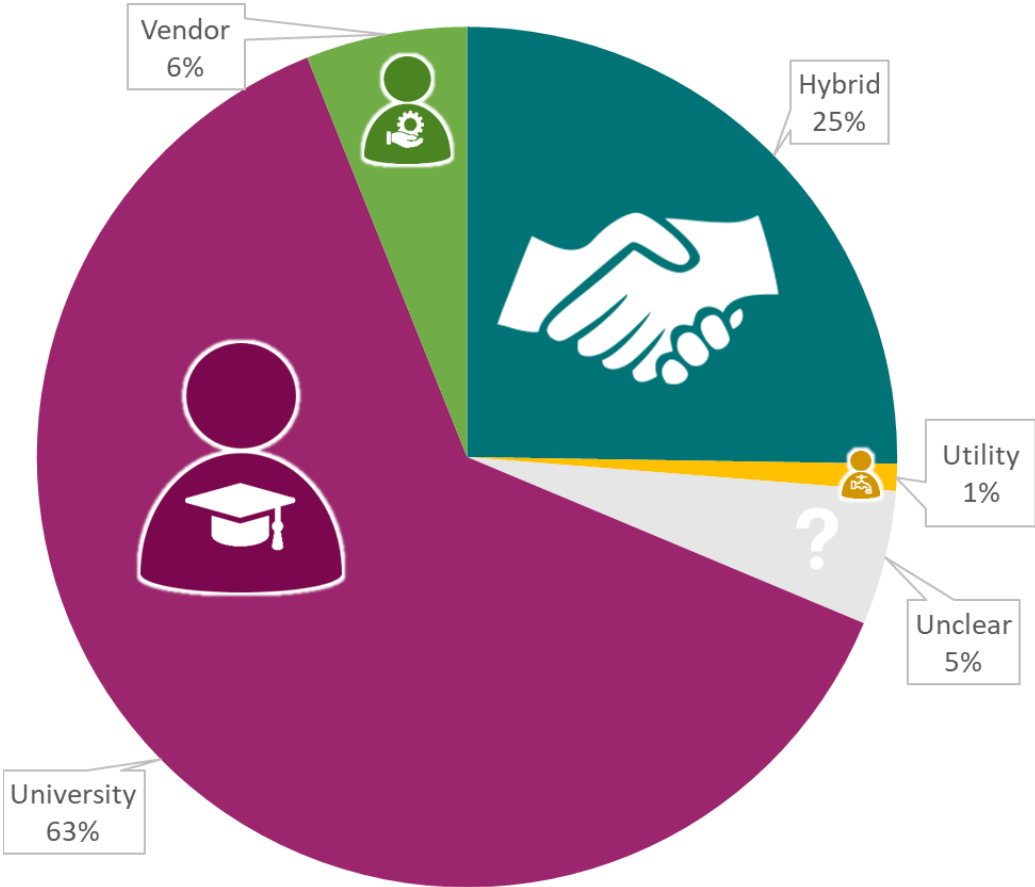
## Schedule

**18 Months**

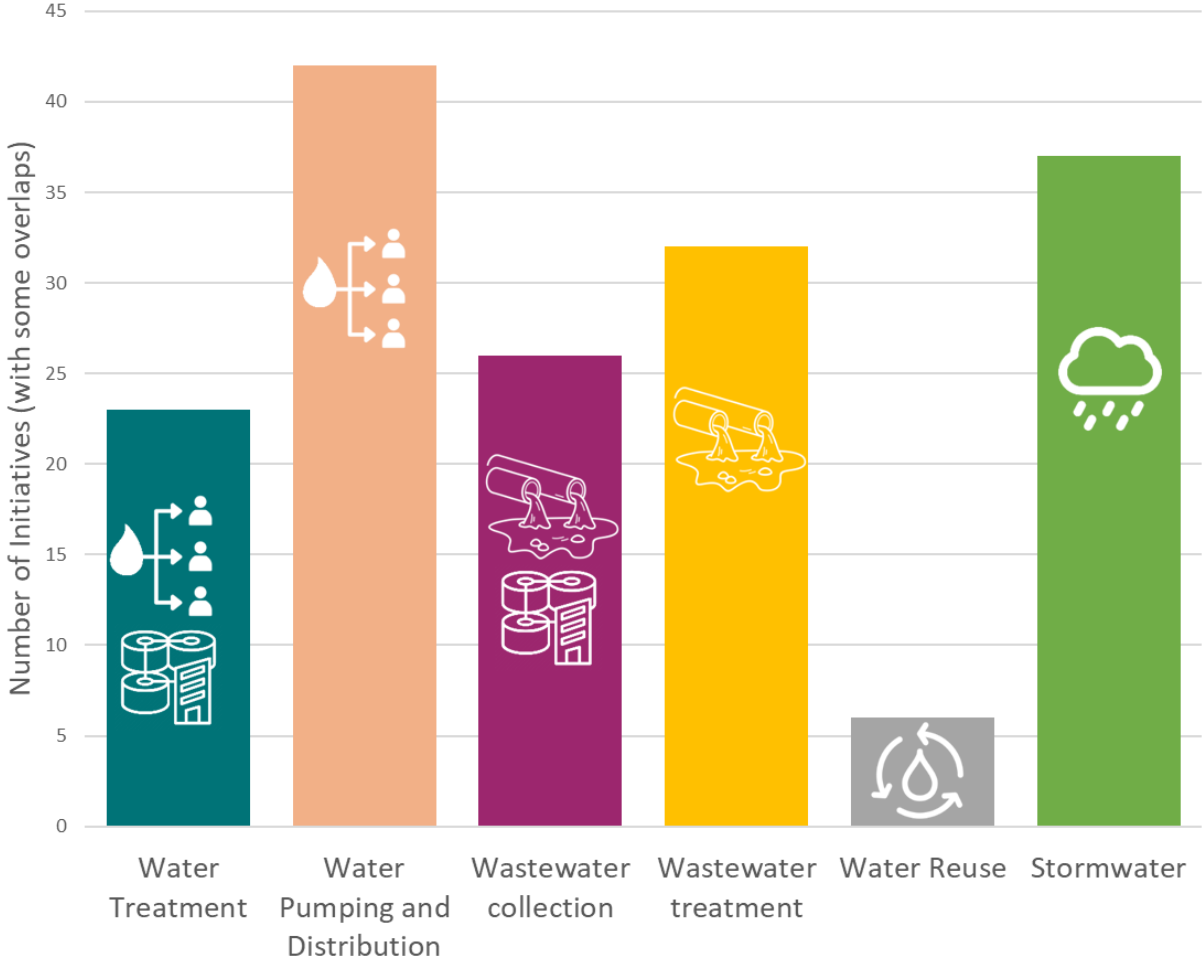


<sup>1</sup>Arcadis, <sup>2</sup>Hazen, <sup>3</sup>Virginia Tech, and Bluefield Research

# What did we learn from Literature Review?



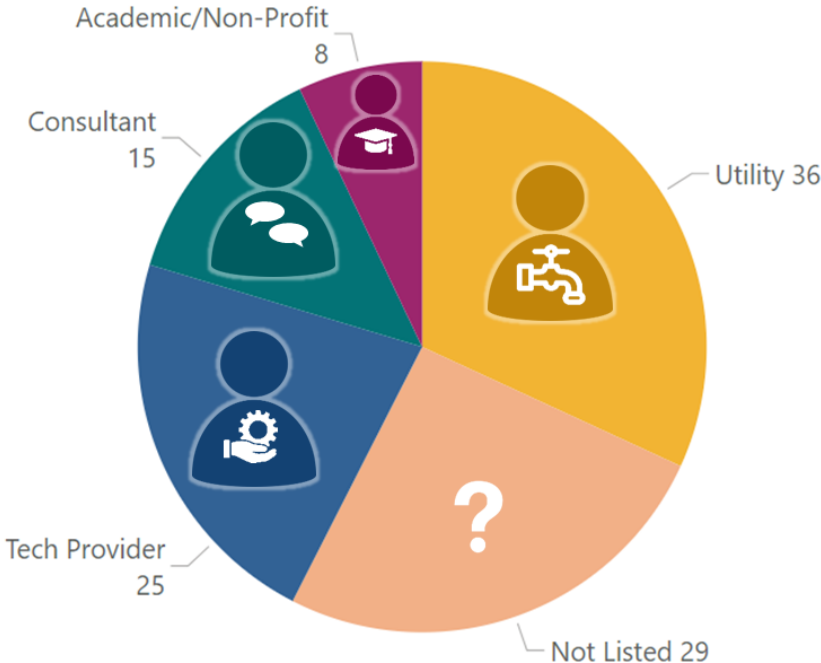
# What did we learn from Literature Review?



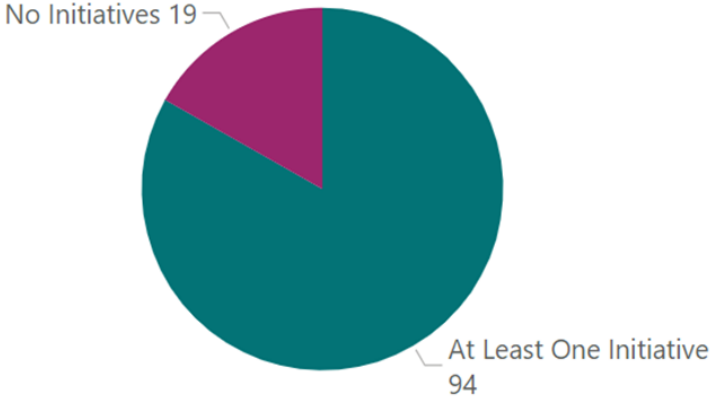
- Several initiatives interact with multiple asset systems
- Water pumping and distribution is most common
- Water reuse is least common
- Wastewater collection and stormwater frequently overlap

# What did we learn from Industry Survey?

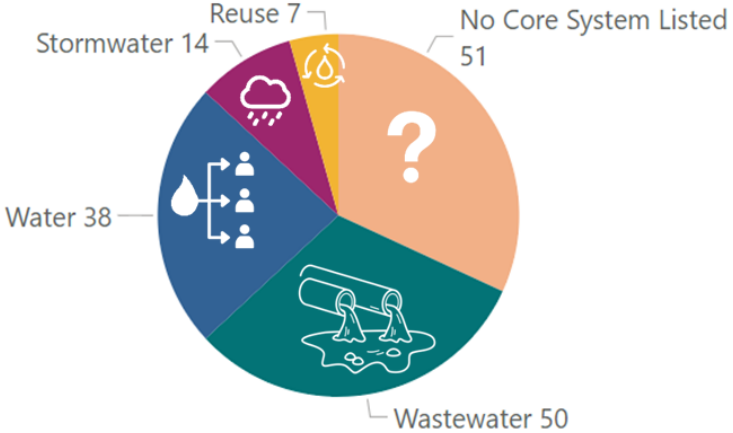
Responses by Organization Type

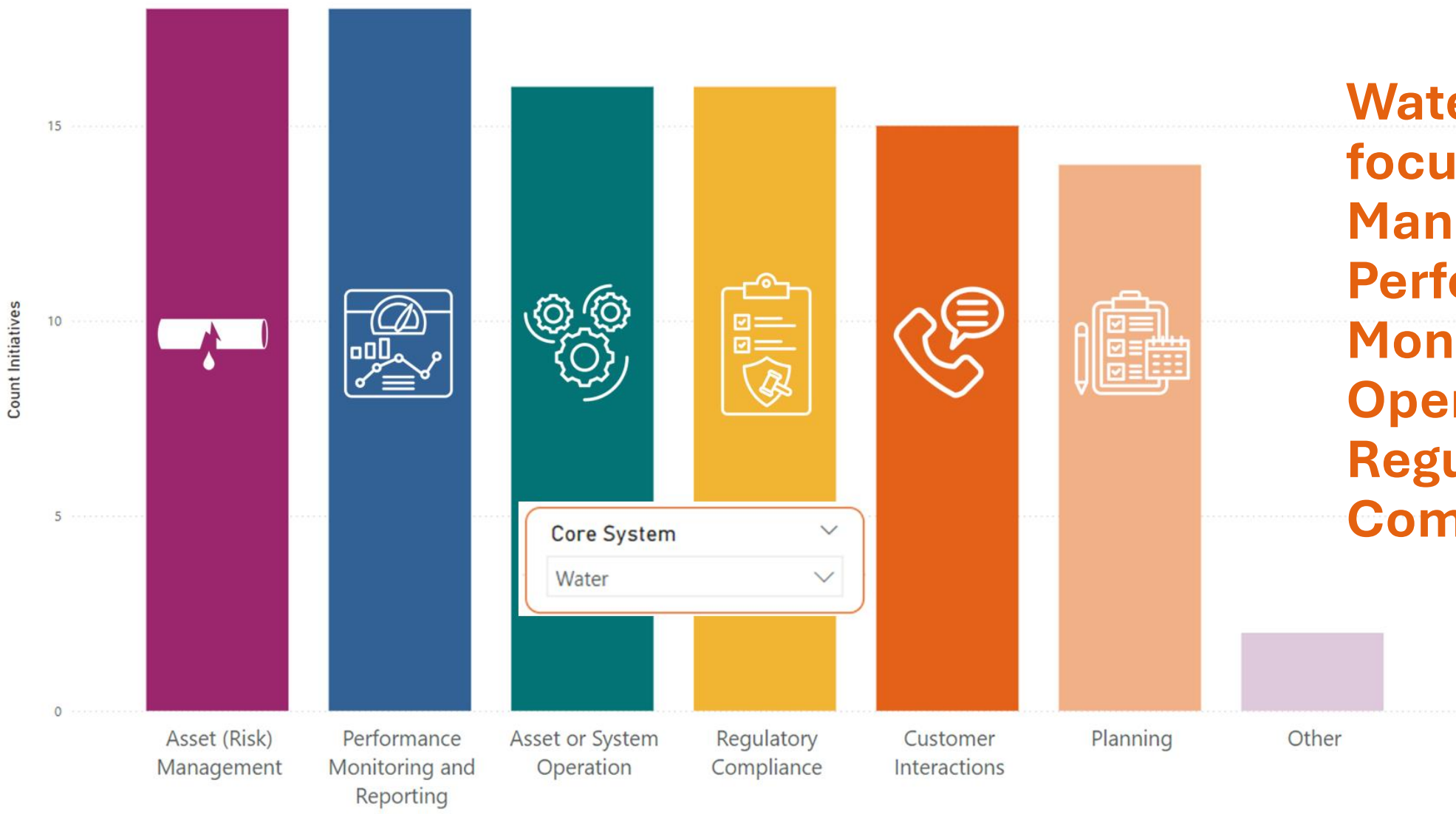


Responses by Initiative Pursuit



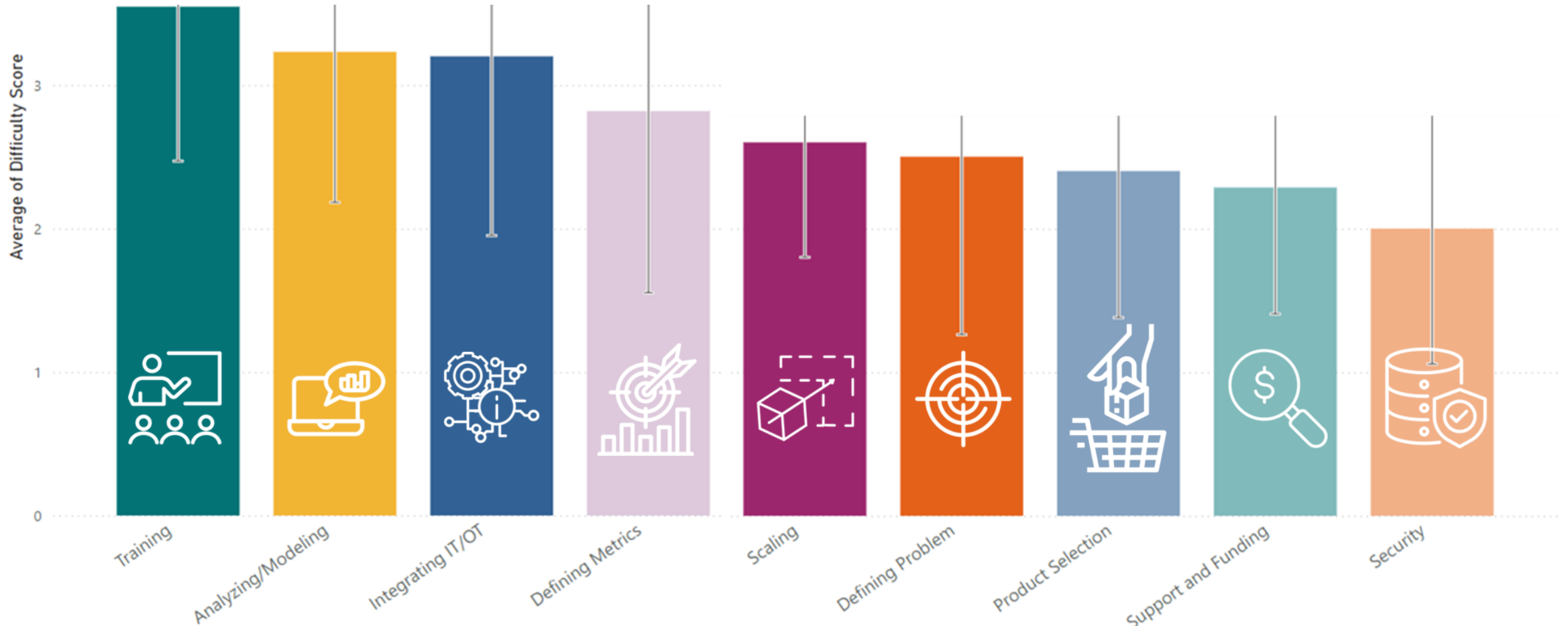
Initiatives by Core System





**Water Initiatives focus on Risk Management, Performance Monitoring, Operation, and Regulatory Compliance**

# Training, analyzing/modeling, and integrating IT/OT cause difficulty,



# Interviewing early adopters!



5. Why did you pursue this initiative? \*

What challenges were you hoping to solve? How does the initiative align with your strategic goals? What is/are your problem statement?

The initiative is aimed at reducing operator labor; hand-sampling 5-6 times per day is labor-intensive. The new process, with sensors and a data-driven model saves a lot of time and effort. The mechanistic model previously used was not sensitive enough to capture the highly dynamic changes in the system. Mechanistic models are good for design, but not for operation/optimization.

6. How do/did you expect this initiative to change day-to-day operations at your (or a client's) utility? \*

Reduce labor intensity, support operators in decision making. Consider it like google maps, guiding but not making decisions. Reduce chemical costs. Achieve more reliable performance.

7. Did a problem definition precede the decision to use AI/ML, or did you decide to pursue a project and find a problem to which it could be applied? \*

Problem came first

Project came first

It's unclear

I tried a mechanistic model and it wasn't sufficient

33. What has your experience with these challenges been? \*

	Haven't Attempted	Negligible Difficulty	Some Difficulty	Extreme Difficulty
Defining problem	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>
Support and funding	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>
Product selection	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>
Analyzing and modeling	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>
Integrating IT/OT	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
Security	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>
Scaling	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
Training	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>

42. What quantifiable metrics are you using to describe benefits? \*

Capital investments deferred

Operational cost savings

Staff time saved

System reliability

Example:  
Process optimization and control





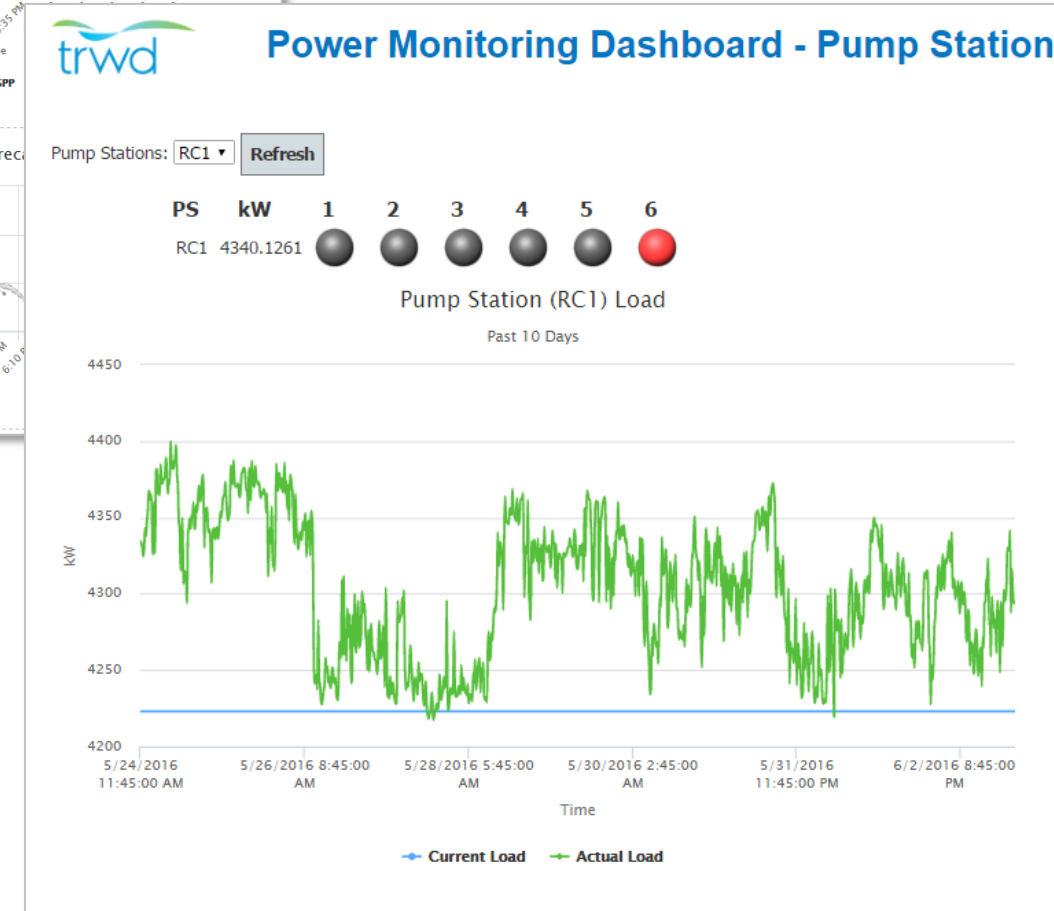
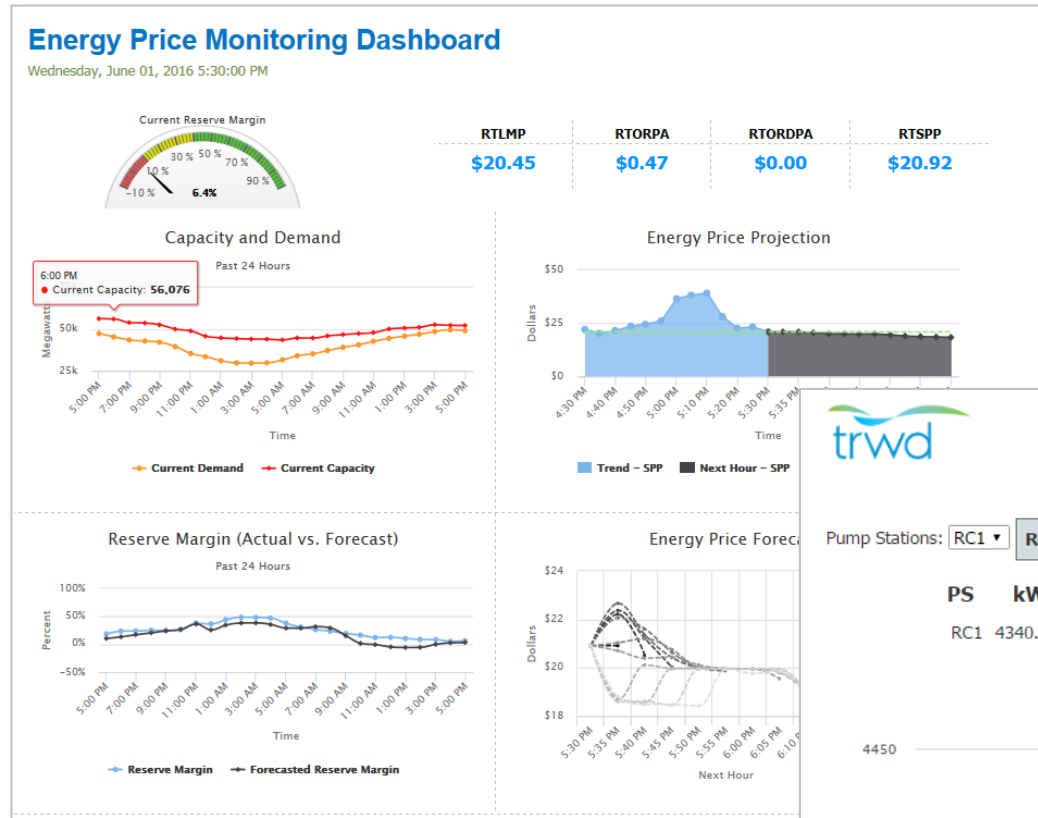
# Where can you leverage digital and AI in water?

WRF 5189 Case Studies



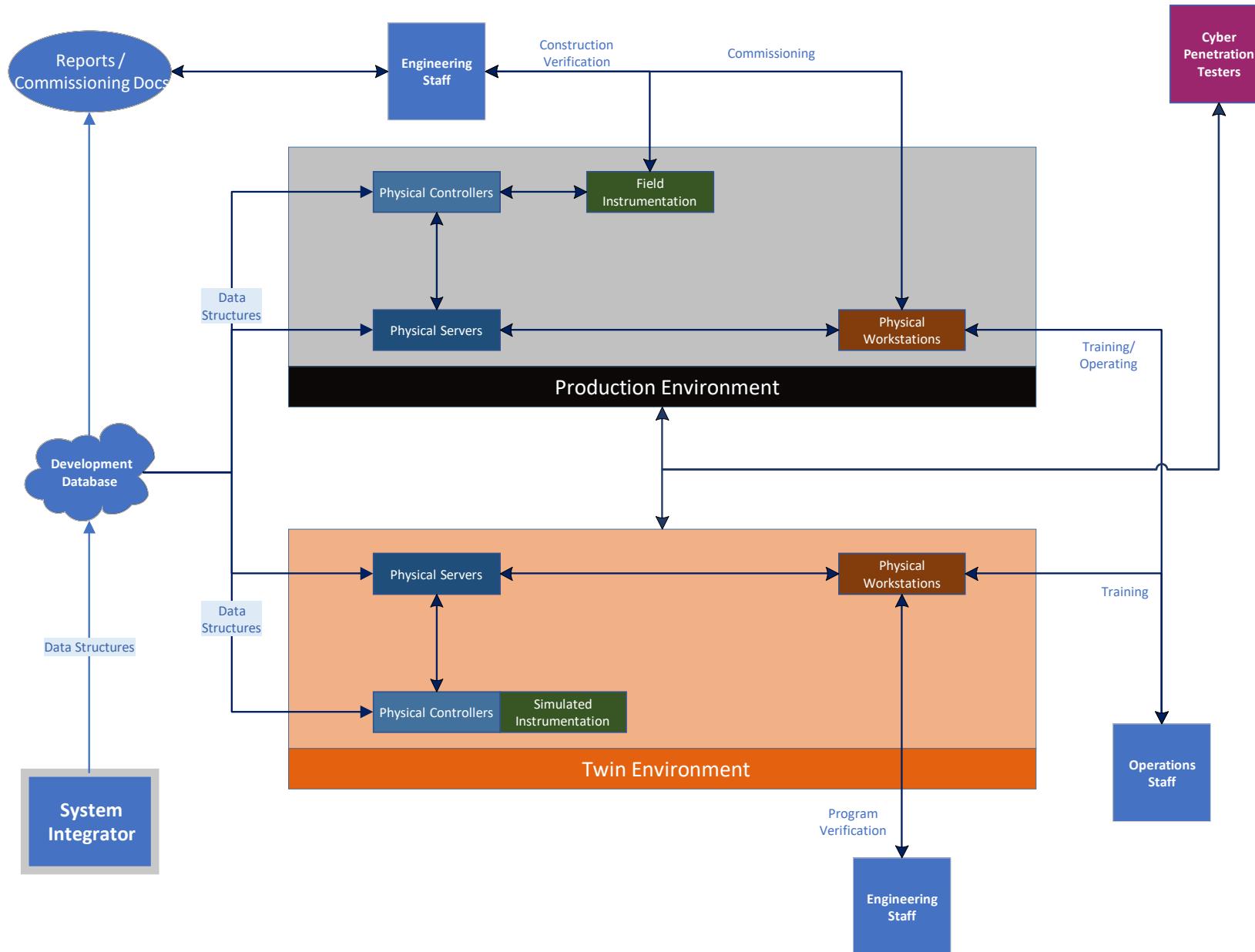
# Case Study 1: Energy Management System

- Optimize Operation of Assets for Energy Consumption using Machine Learning
- Data Warehouse of Operational and Public Data
- Decision Support Tool for Operational Scenario Planning



# Case Study 2: Water Treatment Process Twins

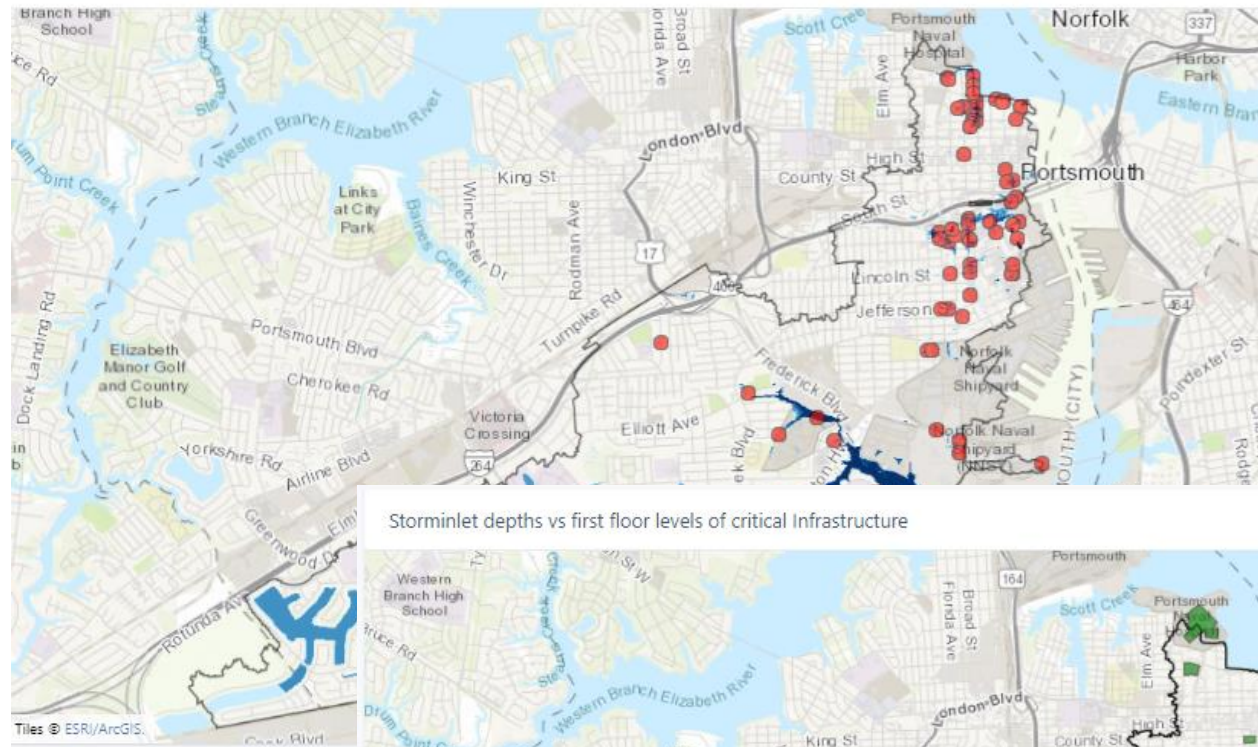
- New treatment plant
- Replicate a version of process control
- Testing operational changes
- Training operators



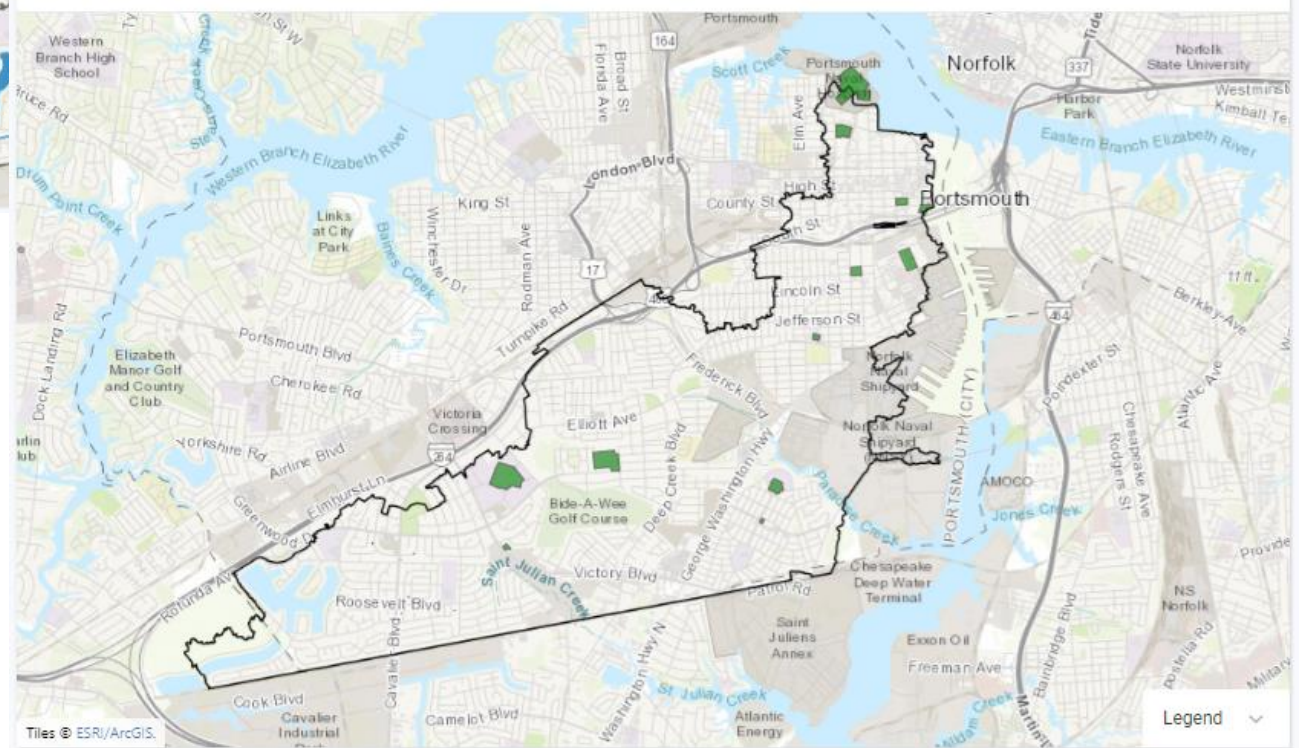
# Case Study 3: Watershed and stormwater management

- Real-time digital twin of the stormwater system
- Maintain readiness and mobilize resources during extreme weather conditions
- Integrate observational data, forecasts, machine learning algorithms, and a real-time mechanistic EPA-SWMM model

Portsmouth - SWMM model - Flooded inlets



Storminlet depths vs first floor levels of critical Infrastructure



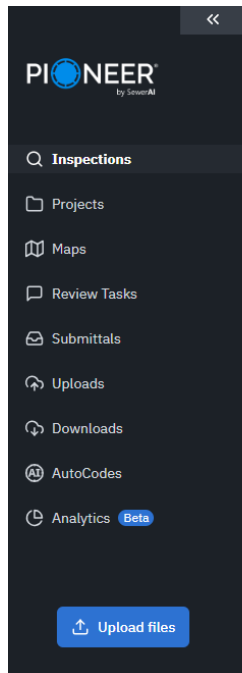


Complete "Rapid Deployment" Inspection Equipment



## Case Study 4: Rapid deployment of CCTV and AI- drive PCCP coding

- Portable CCTV Inspection Units
- Panoramic camera w/ virtual pan and tilt
- Defect coding using AI software (Sewer AI)
- Fast tracked manhole (utility entry) inspections
- Inspections completed in a fraction of the time and cost vs traditional MACP approach



### All Inspections

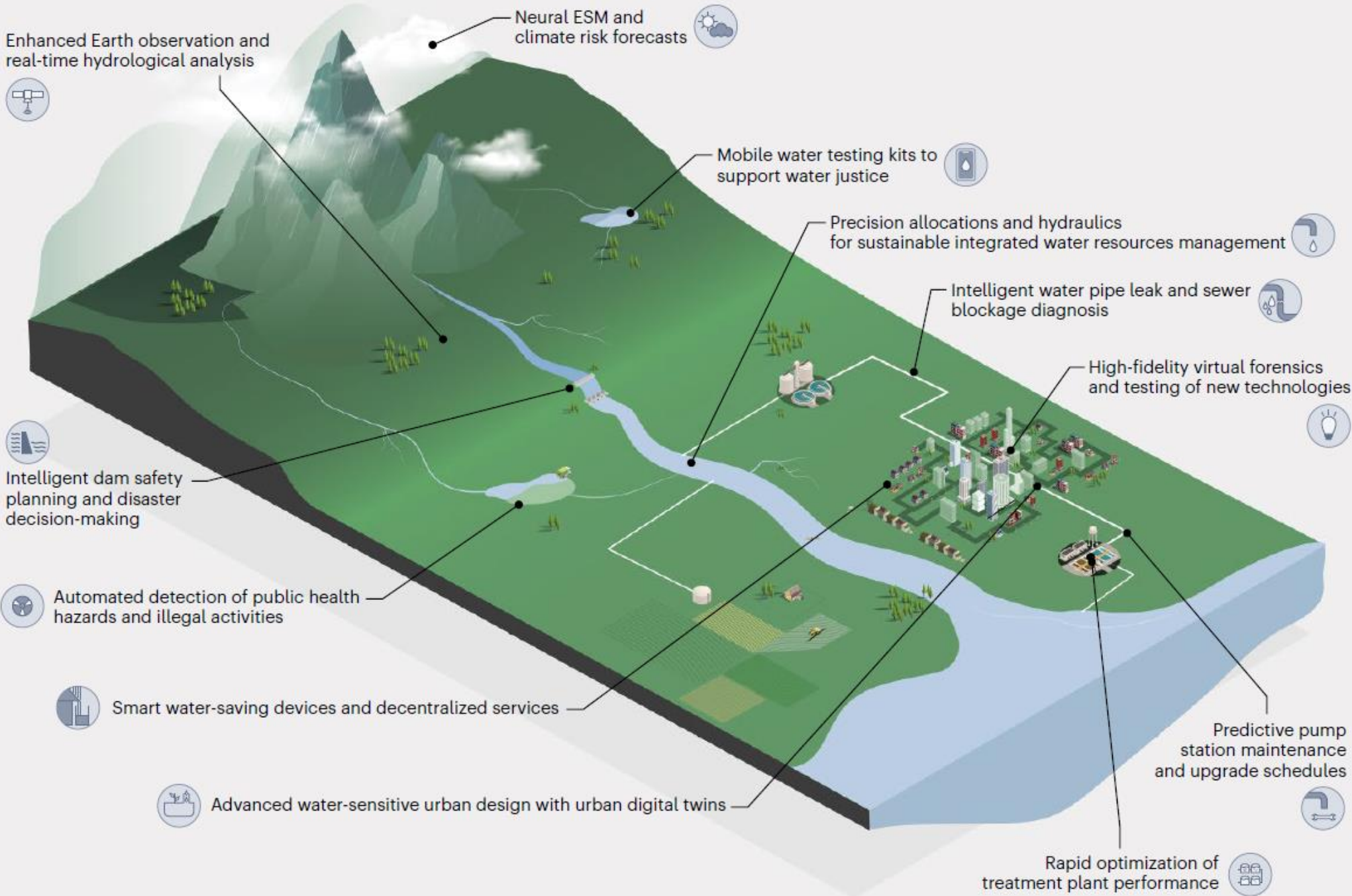
15 in Pioneer  
0 LF

15 AutoCode Complete  
15 total

Project (Pioneer) City Date From Date To Status (Pioneer) Pipe Segment Up MH Down MH Code

AutoCode 15 items Download 15 items Share

Project Name (Pioneer)	Inspection Date	Pipe Segment Reference	Street	City	Length Surveyed (ft)	Upstream MH
<input type="checkbox"/> Greensboro Manhole Inspection	Jul. 13, 2023		N/A	Greensboro		
<input type="checkbox"/> Greensboro Manhole Inspection	Jul. 13, 2023		Reynolds Ridge Circle	Greensboro		
<input type="checkbox"/> Greensboro Manhole Inspection	Jul. 13, 2023		Richardson Valley Way	Greensboro		



**Where else can you leverage digital and AI?**

# Copilots – Lots of claims and promises!



## How gen AI can help amplify industrial efforts

Carefully curated AI, when integrated on a comprehensive industrial automation platform, will accelerate the way users develop, deploy and optimize manufacturing and processing operations.

**Schneider Electric drives Generative AI productivity and sustainability solutions by integrating Microsoft Azure OpenAI**

## **ABB and Microsoft collaborate to bring generative AI to industrial applications**

### Generative artificial intelligence takes Siemens' predictive maintenance solution to the next level

- Enhancing proven machine learning capabilities with generative AI creates a robust, comprehensive predictive maintenance solution that leverages the strengths of both.
- Using a conversational user interface, manufacturers can take proactive actions easily, saving both time and resources.
- New generative AI functionality in Senseye Predictive Maintenance makes predictive maintenance conversational.

## **Beckhoff Previews LLM AI Integration in TwinCAT**

An early preview of Beckhoff's forthcoming TwinCAT Chat Client, which leverages the power of LLMs like ChatGPT, shows how the artificial intelligence technology can be used to simplify and accelerate the programming of automated systems.

**Note:** We are not recommending any one product or solution. News headlines are used to create awareness of trends in the use of Generative AI in industrial process control

# 1. Operator Assistance for Situational Awareness

Scenario: Real-time Operational Support

## Objective:

Help operators understand and respond to various water system events more effectively.

## Implementation:

- **Data Integration:** Combine data from SCADA systems, sensor networks, and historical records.
- **LLM Deployment:** Integrate Janet with a text-based interface to interact with operators.

## Example Interaction:

1. **Operator Command:** "What maintenance actions are recommended for the East Reservoir next month?"
2. **Janet Response:** "Based on the data, the East Reservoir has shown signs of increased sedimentation and minor structural stress. It's recommended to perform sediment removal and a structural integrity check. Last maintenance was performed 11 months ago, and similar conditions suggest this action could prevent future issues."



## Example Interaction:

1. **Operator Command:** "Hey Janet, what is the current status of pump station 3?"
2. **Janet Response:** "Pump station 3 is operating at 75% capacity with a slight increase in pressure detected over the last 10 minutes. Would you like to see the detailed pressure trend or check for potential issues?"
3. **Operator Command:** "Show me the pressure trend and check for potential issues."
4. **Janet Response:** "Here is the pressure trend for the last 24 hours. There is an anomaly detected that could indicate a blockage forming. I recommend scheduling a maintenance check."

**More Copilots in the Future**  
**Application of Generative AI for O&M**

**or an intern or junior engineer requiring supervision**





# How ready are the workforce and organization to advance adoption of digital and AI?

**WRF 5178**

# Project 5178 Preparing the Water Sector to Embrace Technology: Skillsets and Enterprise Management Approaches for the Digital Age



## Objectives

The project will develop a framework, that helps utilities of all sizes, including rural systems, that prepares the utility workforce with necessary skills, policies, procedures, and tools to make better decisions today for a more efficient, resilient, equitable, and sustainable tomorrow and improving the experiences of utility personnel, customers, and communities using technology.

## Approach

- 1. Current State Assessment** – Assess trends with digital transformation, conduct surveys and interviews with utilities, vendors, and students to understand their culture, technological, process, reskilling, upskilling needs of water workforce.
- 2. Framework development** – Develop a web-based framework to assess organizational readiness for digital transformation and develop effective processes including reskilling and upskilling for the Digital Age.
- 3. Framework demonstration and Delivery** – Test the readiness with utilities and their ability to create roadmaps for preparing their organization and its people for Digital Age.

## Project Team

**Principal Investigator:**  
Prabhu Chandrasekaran, PE

**Co-Principal Investigators:**  
Jason Carter, PE

**Project Team:**  
Other technical advisors include Lisa Thompson (WEF), Barbara Martin (AWWA), Adam Tank (Transcend), Chris Miller (University of Akron), Kristan VandenHeuvel (TWT), Catherine Curtis (SFPUC & Baywork), Stephanie Corso (Rogue Water), Shirley Ben-Dak (SWAN), Adam Krantz (NACWA), Ai Cho (Xylem), Christopher Gasson (GWI)

### Partnering Utilities:

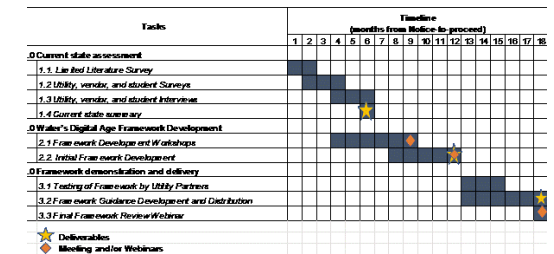


## Application Potential & Benefits

We will create for the first time a framework with a strong focus on enabling and empowering Water Workforce through reskilling and upskilling for age of digital/AI supported by policies and processes necessary for effective governance and delivery of digital transformation programs. In addition, this project will create a guidance for the effective use of this framework in conjunction with other ones developed under WRF 4097 (Innovation), WRF 5039, WRF 5189 (AI/ML), and WEF's WISE (Business Process centric)..

## Schedule

18 Months



# Target team (primary beneficiaries) and support team capacity, capability, confidence, and competence

21. Assess the **Target Team** for their **readiness** to embrace the proposed analytics, AI/ML, and decision support system.

[More Details](#)

■ Not adequate   ■ Somewhat Adequate   ■ Adequate



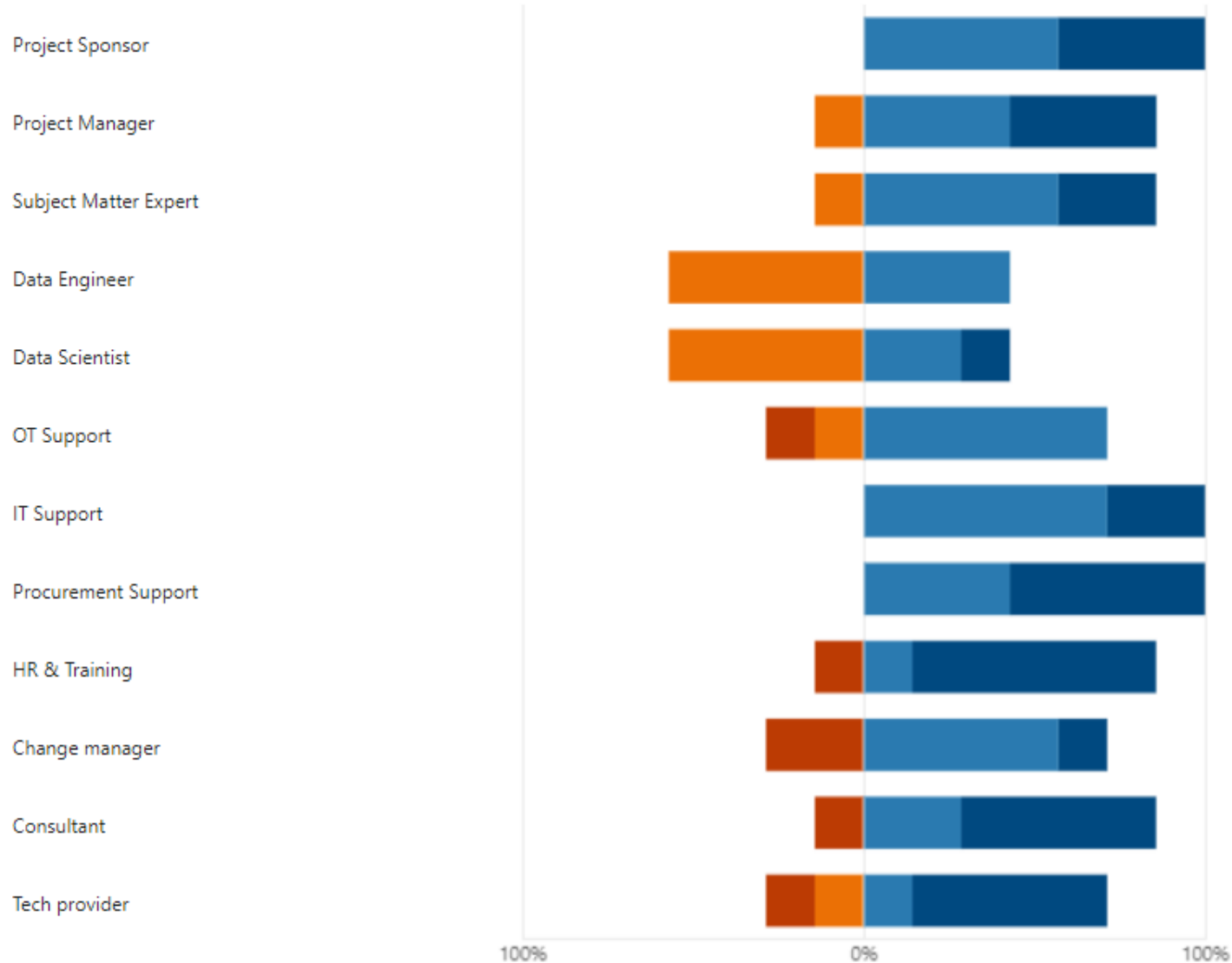
Source: Results from AWWA ACE 2024 workshop

23. Assess the **Support Team** for their **availability and readiness** to manage the delivery of proposed solution.

[More Details](#)



■ NA ■ Not available ■ Partially available ■ Fully available



# Target teams and support team capacity, capability, confidence, and competence

- Send individuals to training, hire a consultant to help you implement, purchase the proper equipment
- Change Manager, Consultant, Tech Provider, OT Support
- Not having data engineers and scientists in the team
- Leadership buy-in. Skilled staff.

Source: Results from AWWA ACE 2024 workshop

# How can we prepare the **workforce** for Digital and AI?



By 2022 everyone will need  
an extra

# 101

days of  
learning

Source: World Economic Forum

**Project Management Institute**

**85** completed certifications  
**3.51** average days to complete  
Median of **3 days**  
**100%** test to pass rate

**258** participants

**PLURALSIGHT**

**1420 hours** of total view time  
**162** skill ups  
**30%** Average skill growth  
Nearing 20/20/20/20 skill distribution

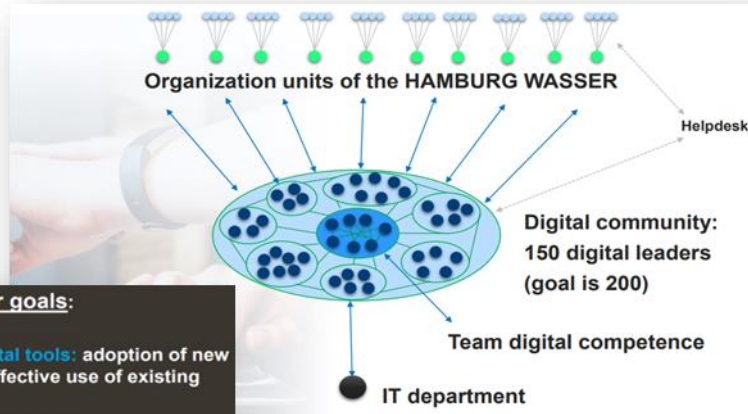
**100** Participants

**3 month** self-learning program

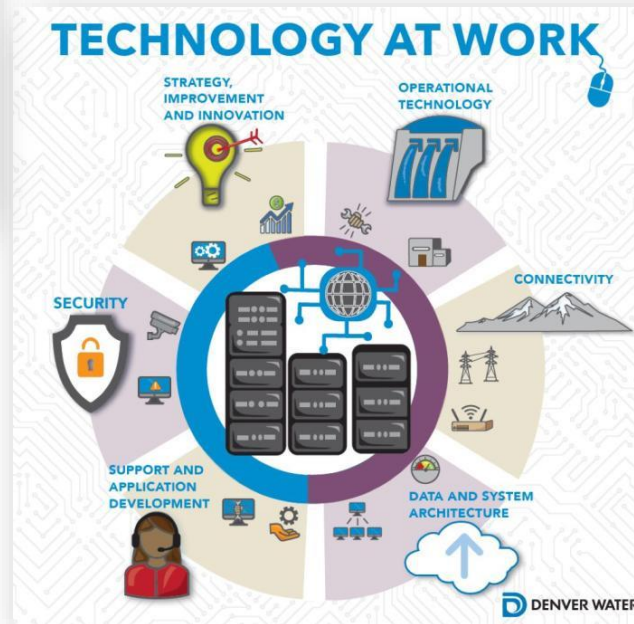
**50 Official** Certified Citizen Dev Champions

Enthusiasm to continue, learn and grow within Arcadis is enormous.

# How can we prepare the **organization** for Digital and AI?



- Our goals:**
- digital tools:** adoption of new & effective use of existing
  - digital skills:** explanation & support
  - digital mindset:** cultivating digital culture



SA Service Authority  
Exceptional Water Service

CUSTOMERS DEVELOPERS WHO WE ARE WHAT WE DO DOING BUSINESS

### Data Management Division

The Division of Data Management is responsible for optimizing use of the Service Authority's corporate data to support data-driven decision making by increasing the accessibility, accuracy, quality and timely delivery of data. The division provides business analytics, data visualizations and spatial applications that provide access to real-time information to inform planning and management of the organization's expanding infrastructure.

CALIFORNIA DATA COLLABORATIVE

Home Membership Tools Events About Us Let's Meet Member Login

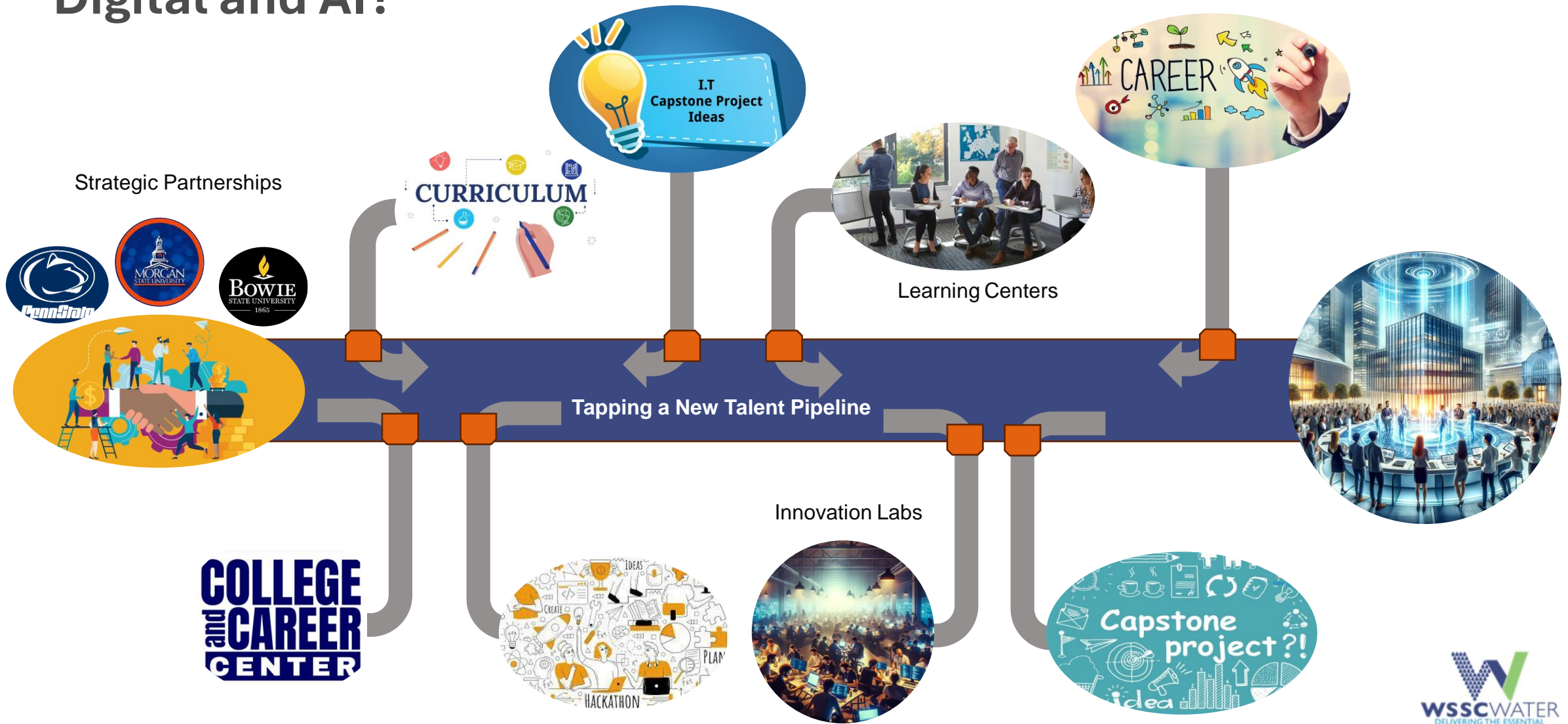
## About Us

### We're on a mission to empower the water industry with tools, community, & data

California Data Collaborative (CaDC) is a 501c3 nonprofit organization and network of water professionals collaborating to support the planning and analysis needed to ensure a reliable and resilient water supply in California.

We're building a community that creates open-source software, data, standards, and applied research to empower local water suppliers on the ground and put their data to use for planning and policy.

# How can we prepare the **organization** for Digital and AI?



## Water's Digital Age Framework

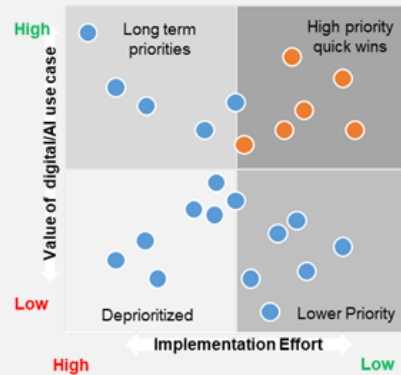
### Maturity Assessment

1



### Future of Work

2



### Future of Workforce

3

- Best practices & methodologies**
- ✓ Roles & Skills
  - ✓ Skills gap assessment
  - ✓ Reskilling & Upskilling
  - ✓ Branding & recruitment
  - ✓ Change management
  - ✓ Ecosystem management

### Links to other frameworks

5

- WRF 4097, 5039, 5189
- WEF's WISE
- And others as applicable

### Repeatable case studies

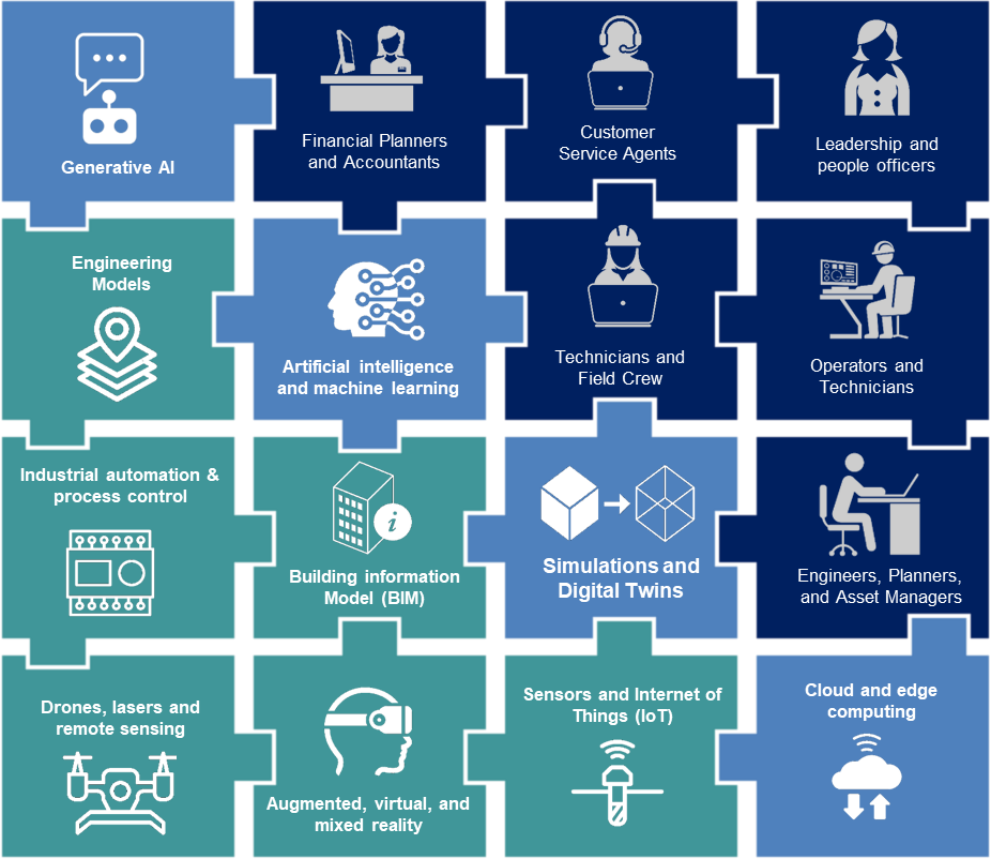


6

Web-based delivery with guidance



# Digital and AI show value and are worth exploring, but requires non-tech elements for sustainable results



Improve resiliency and environmental protection



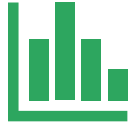
Cost savings and economic benefits



Better, faster analysis and improve decision making



Improve user experience



Better data management



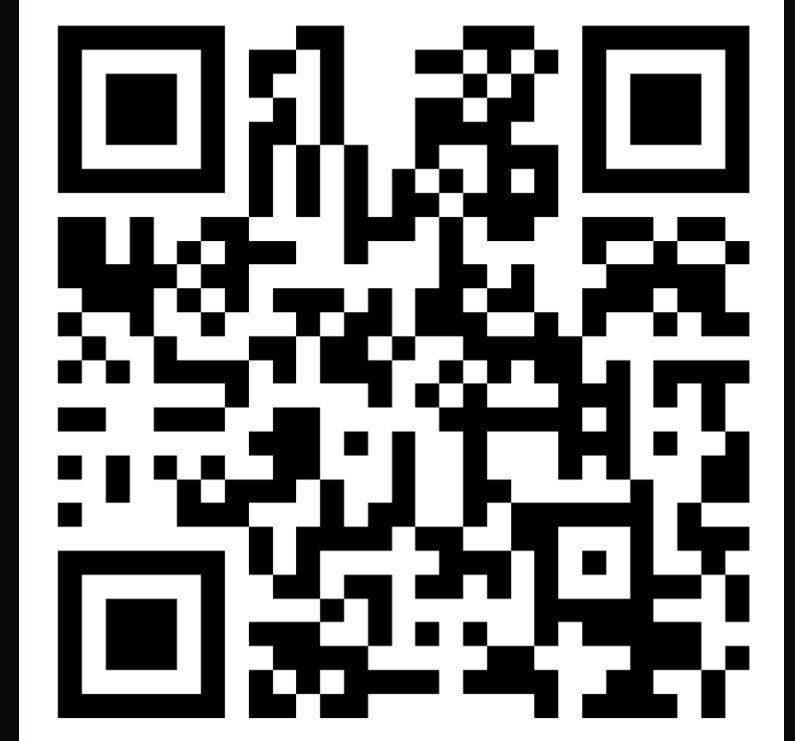
Workforce enablement

Technology is evolving exponentially and changing our world at an ever-accelerating pace but also offering opportunities to empower our workforce

# Thank you!

**Prabhu Chandrasekeran, PE**  
Intelligent Water National Practice Lead  
prabhu.chandrasekeran@arcadis.com

"We welcome your participation  
to be part of this research project"



 **ARCADIS**  
Improving Quality of **Life.**

# Q&A Session

**Webinar slides and recording will be sent to registrants in the next week.**



# Closing Poll

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On a scale of 1-10, with 10 being the best score and 1 being the worst, how would you rate today's webinar?

Thank you!

