

Enhanced Source Control Through Smart Sensor Technology

January 28, 2020



Joshua Balentine
Senior Associate, Project
Manager

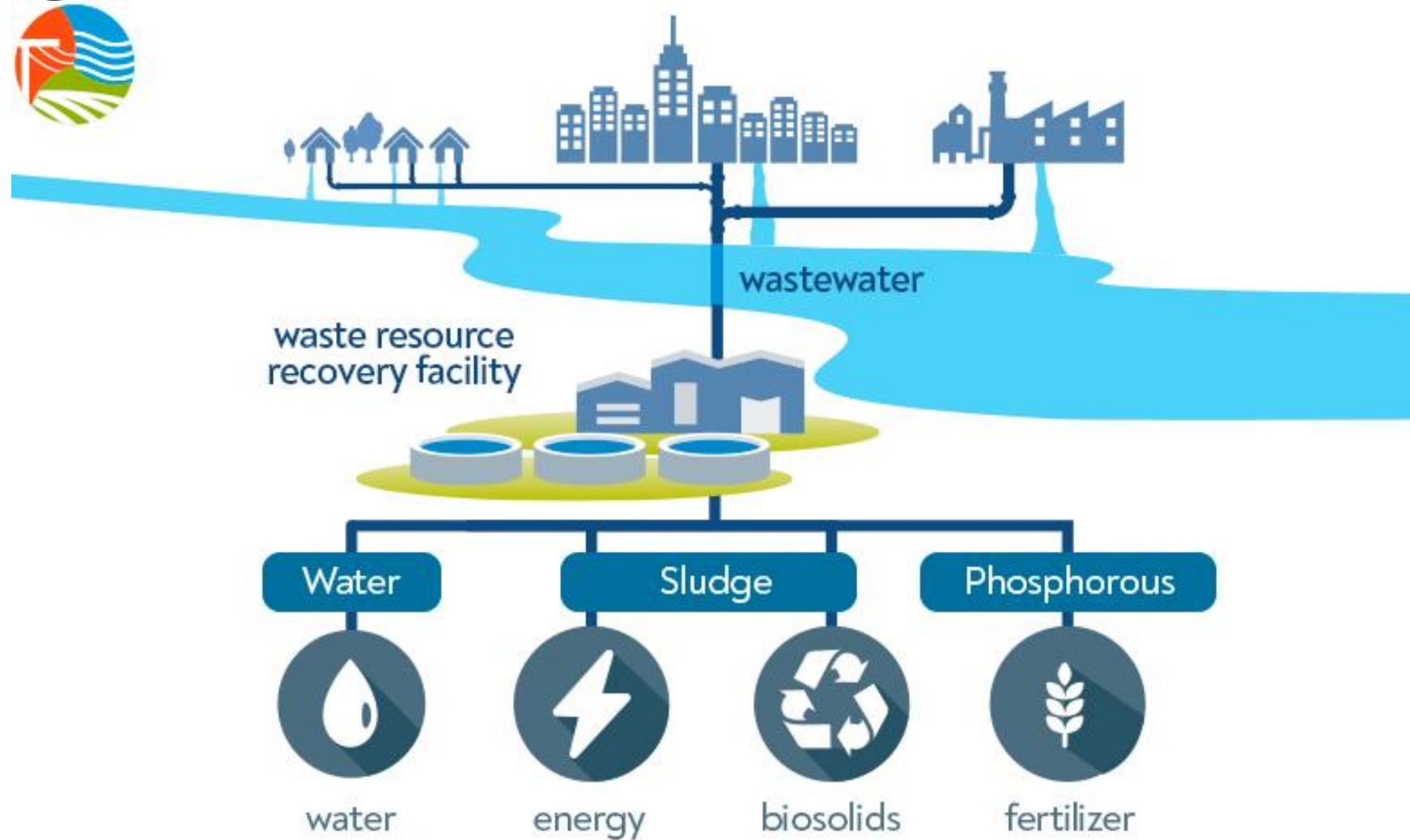
Pretreatment Program Objectives

- Objectives of the Pretreatment Program:
 - Prevent the introduction of pollutants into POTWs which will cause interference
 - Prevent the introduction of pollutants into POTWs which will cause pass through
 - To improve opportunities to recycle and reclaim municipal and industrial wastewaters and sludges

Pretreatment Program Monitoring Requirements

- These objectives are ensured by the following minimum source control requirements:
 - Control authority sampling once per year
 - Control authority inspections once per year
 - Industrial User sampling twice per year
- In cases of more frequent sampling
 - City in most cases doesn't have access to real-time meters
 - City may not received the data until the next month
 - Continuous and monthly data may be generalized not showing full impact of discharge

Paradigm Shift



What is Enhanced Source Control?

- Monitoring Industries more frequently
- Monitoring for emerging contaminants
- Installing smart sensor network at industries
- Installing smart sensor network in the collection system

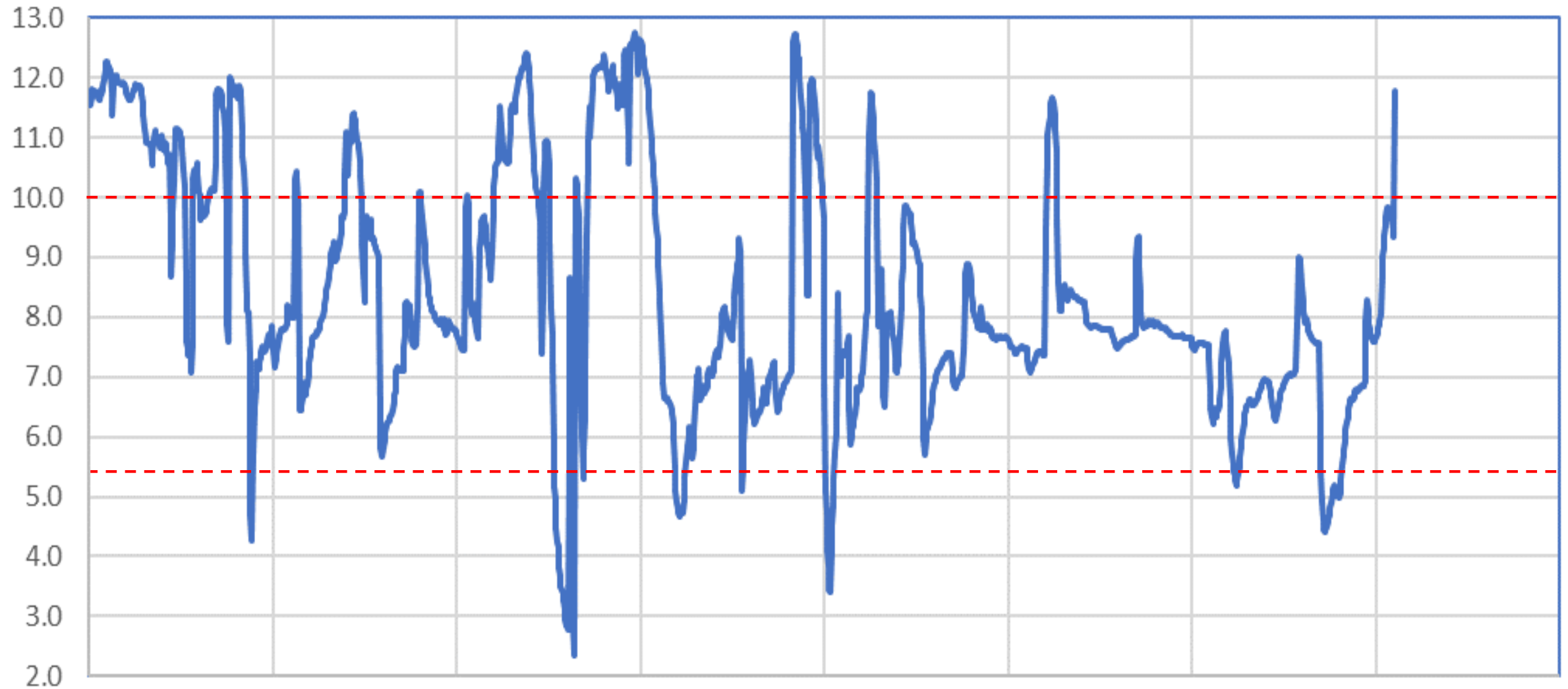
Enhanced source control is used to not only intended to reduce the pollutant concentrations to the POTW, but to ensure optimization of the WRRF and beneficial reuse of valuable byproducts

Example of Enhanced Source Control?

- The City of Memphis has a food and beverage facility
- Facility is required to monitor pH once time per day
- pH limits are 5.5 – 10 s.u.
- The facility achieves a high level of pH compliance, with some noncompliance
- The City installed continuous pH recorder



Continuous pH Monitoring at Food and Beverage Facility

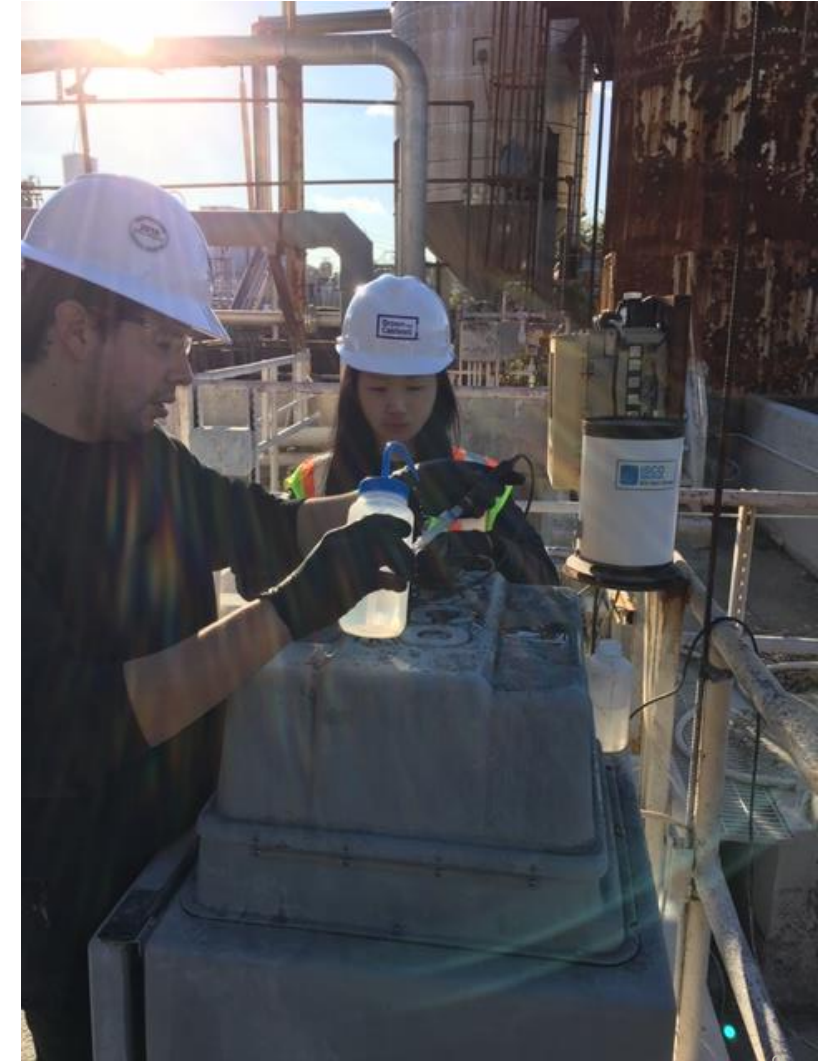


Enhanced Source Control

- What if we could monitor SIUs more frequently for the following parameters:
 - pH
 - Flow
 - BOD
 - TSS
 - COD
 - Ozone
 - Water Level
 - Salinity
 - Conductivity
 - Nitrate
 - Nitrite
 - Hydrogen Sulfide
 - Total Organic Carbon
 - Dissolved Organic Carbon
 - Assimilable Organic Carbon
 - Turbidity
 - Dissolved Oxygen
 - Chlorine
- What if we can view all of this data on our computers, phone, or tablet in real-time?

What do we mean by “smart” sensors

- Not all data collection requires “significant” human involvement
- A vast array of parameters can be collected at high frequency with new technology sensors
- Data can be collected, transmitted and analyzed in near real-time
- Literally hundreds of devices are available for dozens of WQ parameters



City of Memphis Smart Sensor Pilot Test

- Assessing collection system corrosion related to extreme pH
- Assessing COD loading related to PAA demand
- Water quality parameters
 - COD
 - BOD
 - TSS
 - pH
 - UVT (254nm)
 - UVA “fingerprint”
- Locations
 - WRRFs influent
 - Five SIUs



s::can lyser systems are being used in harsh environment

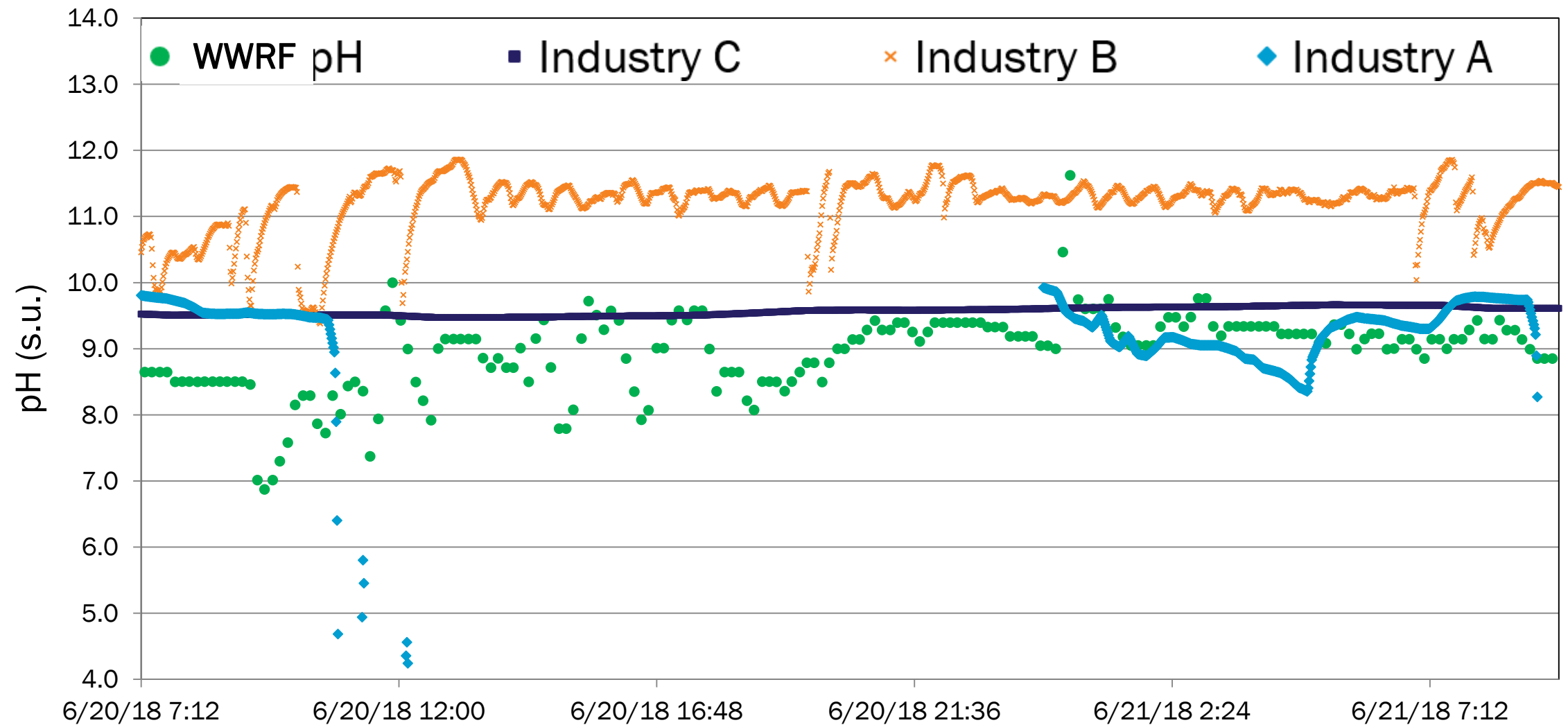


Sensor signals can be “read” in real-time from mobile devices

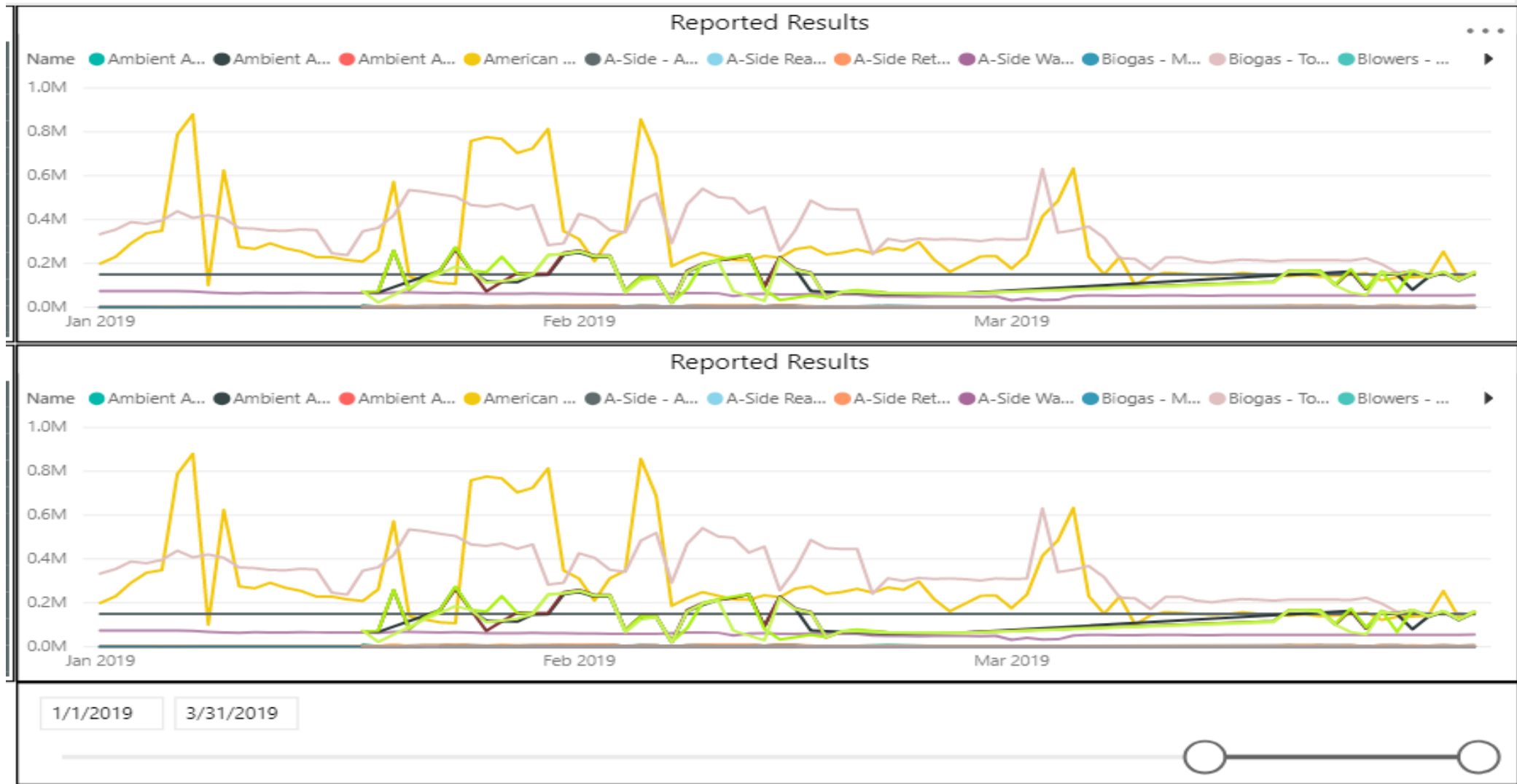


Screen-shot from iPhone shows industry exceedances during holiday weekend

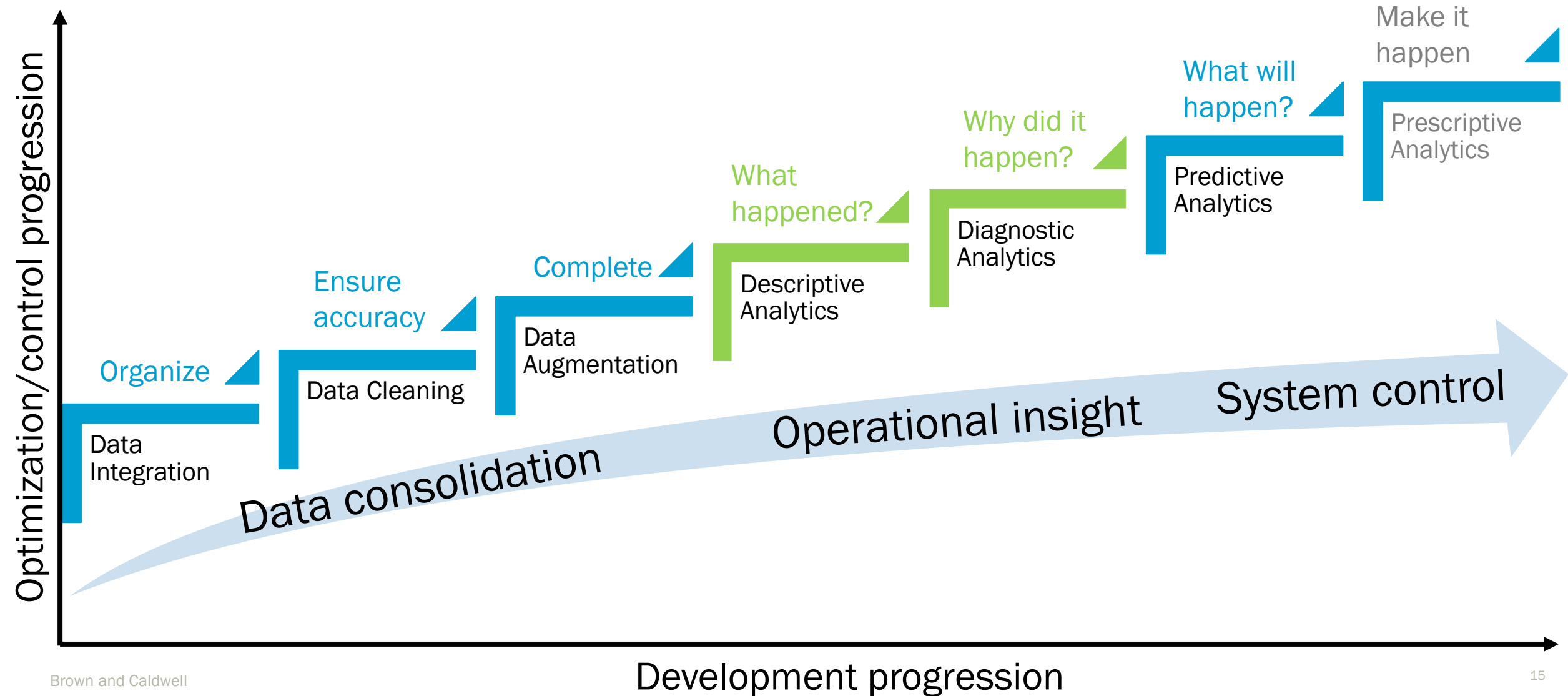
Current operations treat system data retrospectively



Stiles Waste Water Treatment Plant Process Data Visualization

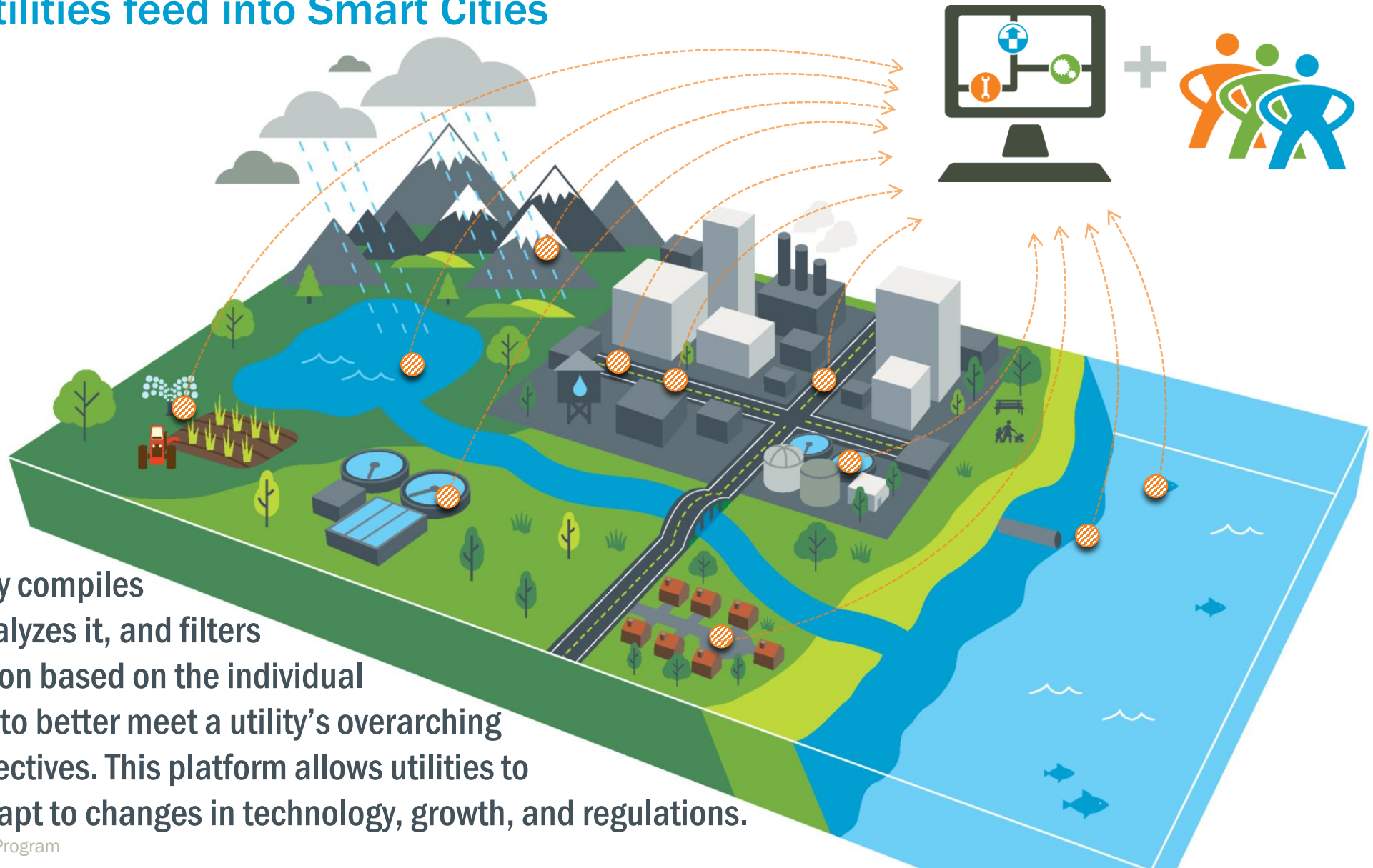


The path to “smart” operations requires a platform



Enhanced Source Control

Smart Utilities feed into Smart Cities



A smart utility compiles this data, analyzes it, and filters the information based on the individual user's needs to better meet a utility's overarching business objectives. This platform allows utilities to gracefully adapt to changes in technology, growth, and regulations.



Joshua Balentine

Senior Associate, Project Manager

Brown and Caldwell | Memphis, TN

JBalentine@brwnncald.com

T 615.238.2080 | C 901.570.1253