Optimizing Detention System Releases to Mitigate Localized Flooding Impact

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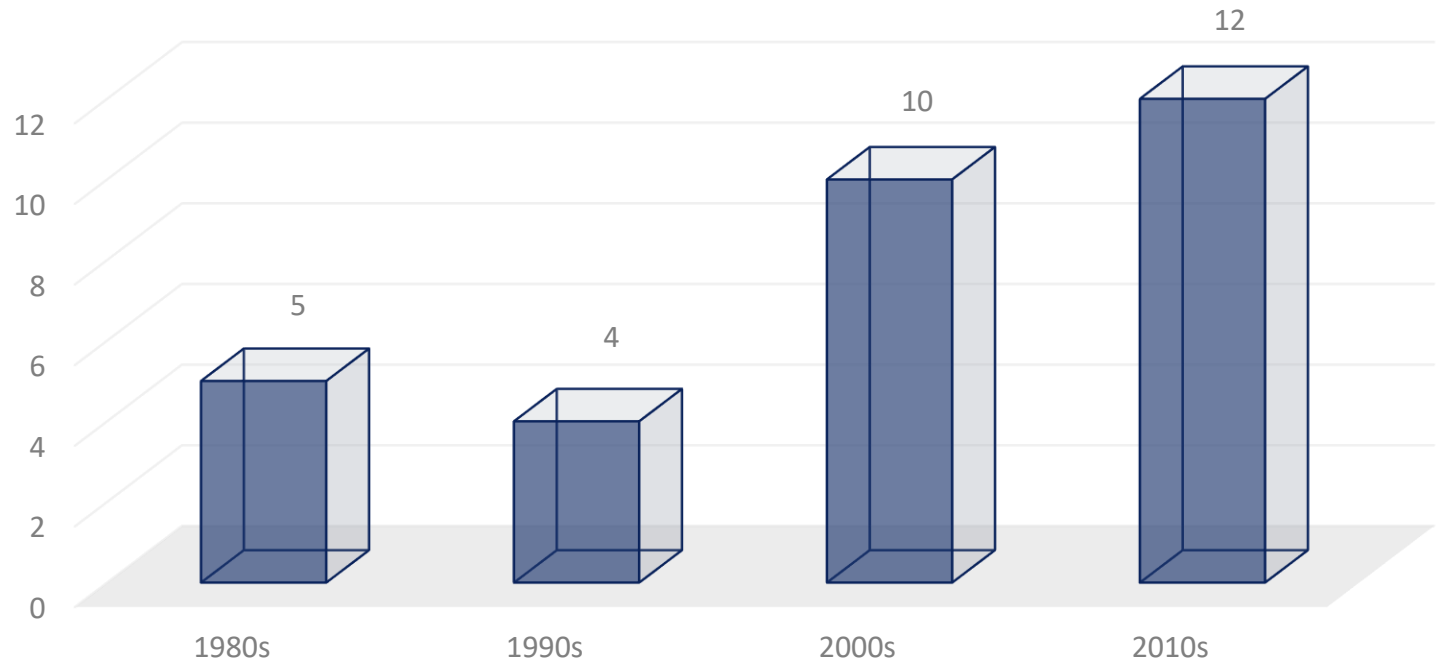
Background

Common Culprits

- Changes in Climate
- Urbanization
- Outdated Infrastructure

Number of Annual Flood Events Resulting in $1 Billion of Damage

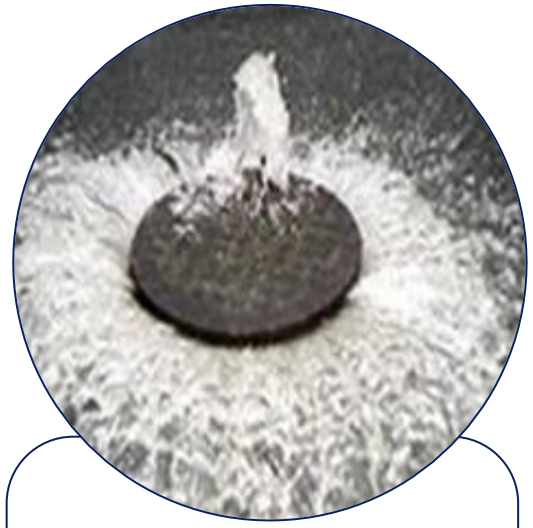
-National Centers for Environmental Information-



We cannot change these effects… but can lessen their impact

Wet Weather Impacts on Our Communities

Flooding
Averaging Billions of damage annually and more than 150 deaths in the United States



Sewer Overflows
Over 850 billion gallons of untreated sewage overflows occur every year.

Water Quality
80% of water pollution is caused by stormwater runoff.

Stream Erosion
Displacement and destruction caused by heavy flow rates.

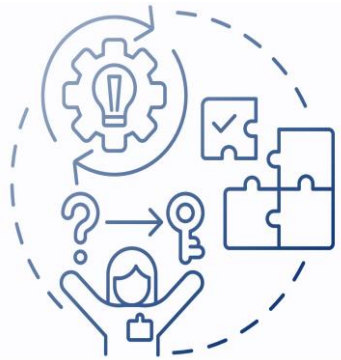
Critical Business Issues

Challenges with Traditional Approach

- → Site Constraints
- → Cost
- → Disruption
- → Performance Verification
- → ***Passive and Non-Adaptive***

Limited Resources & Aging Infrastructure

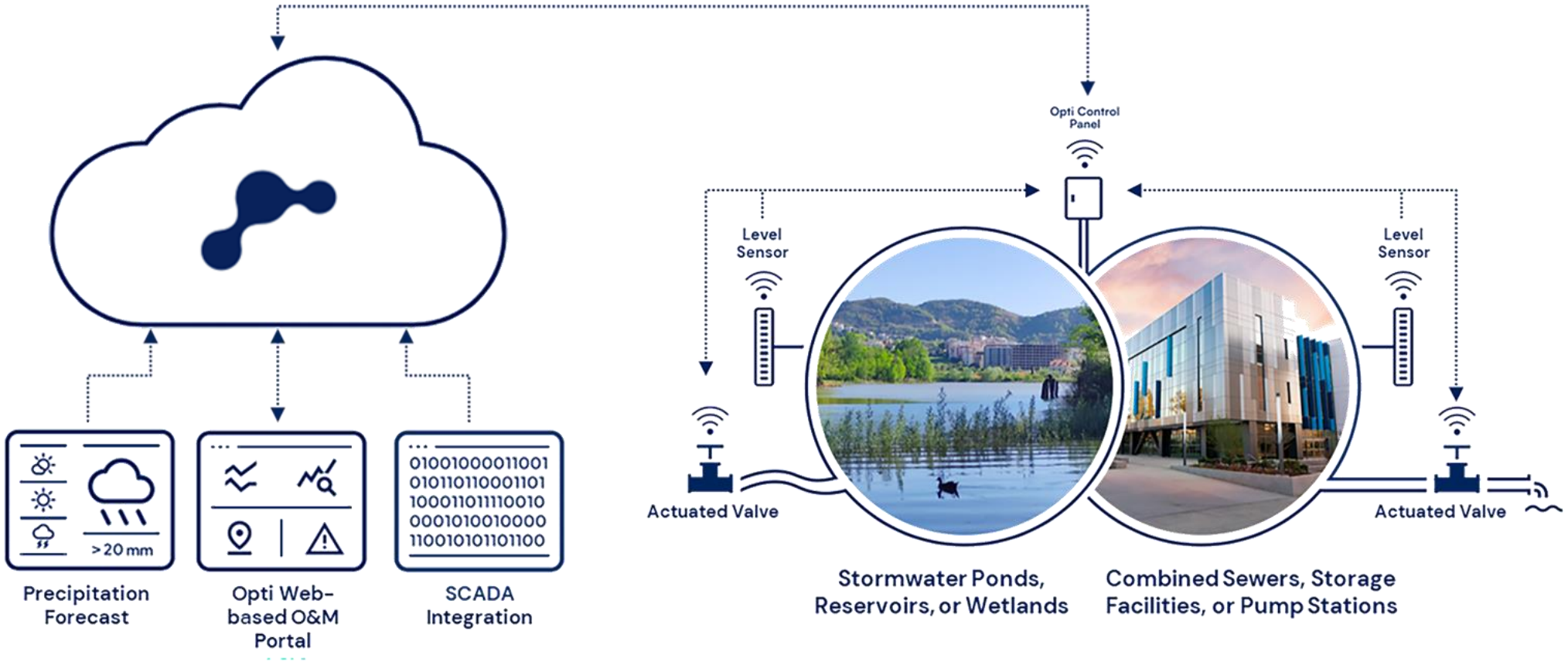
Adapting to a Changing Environment



Operations & Maintenance

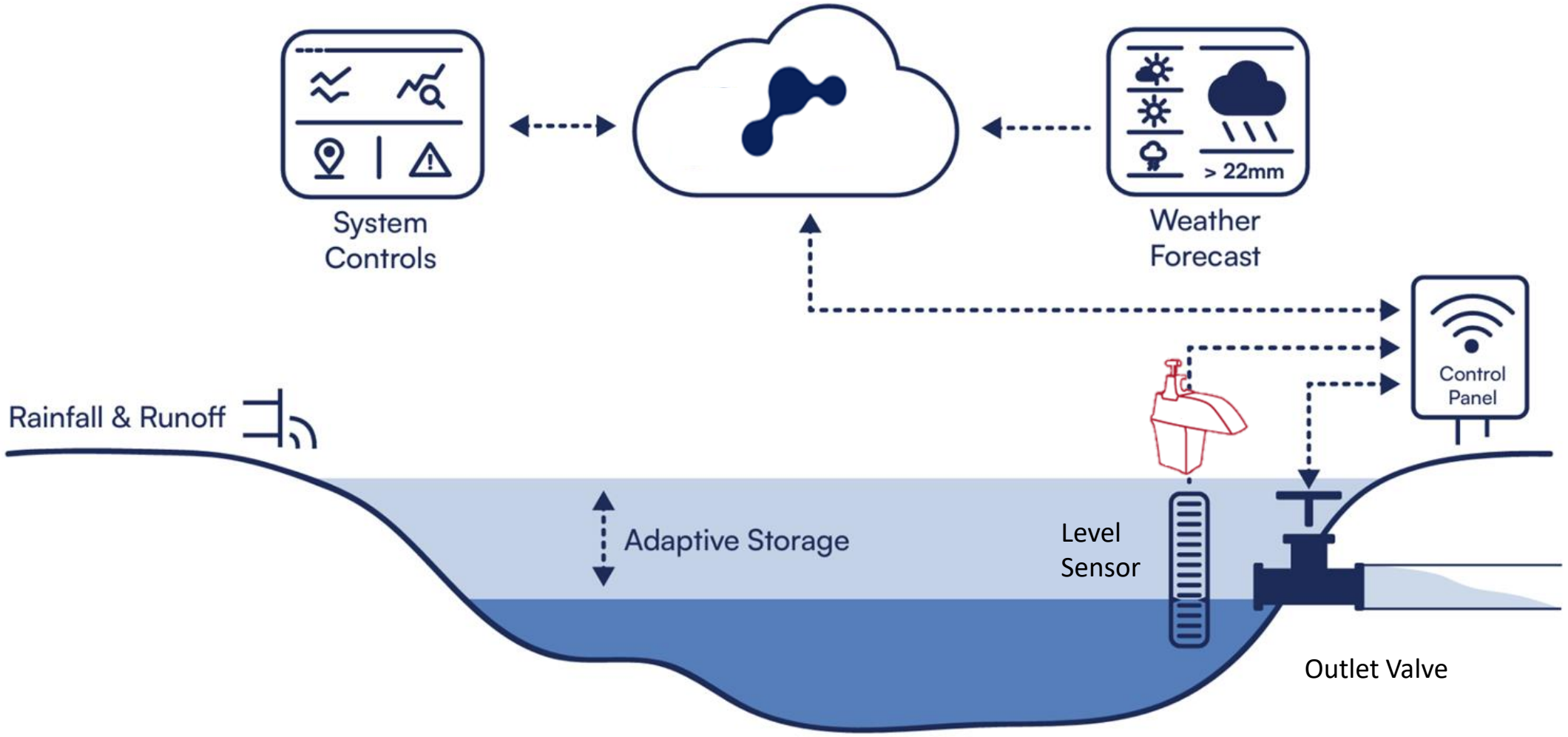
How do we take control!

Continuous Monitoring and Adaptive Control (CMAC)

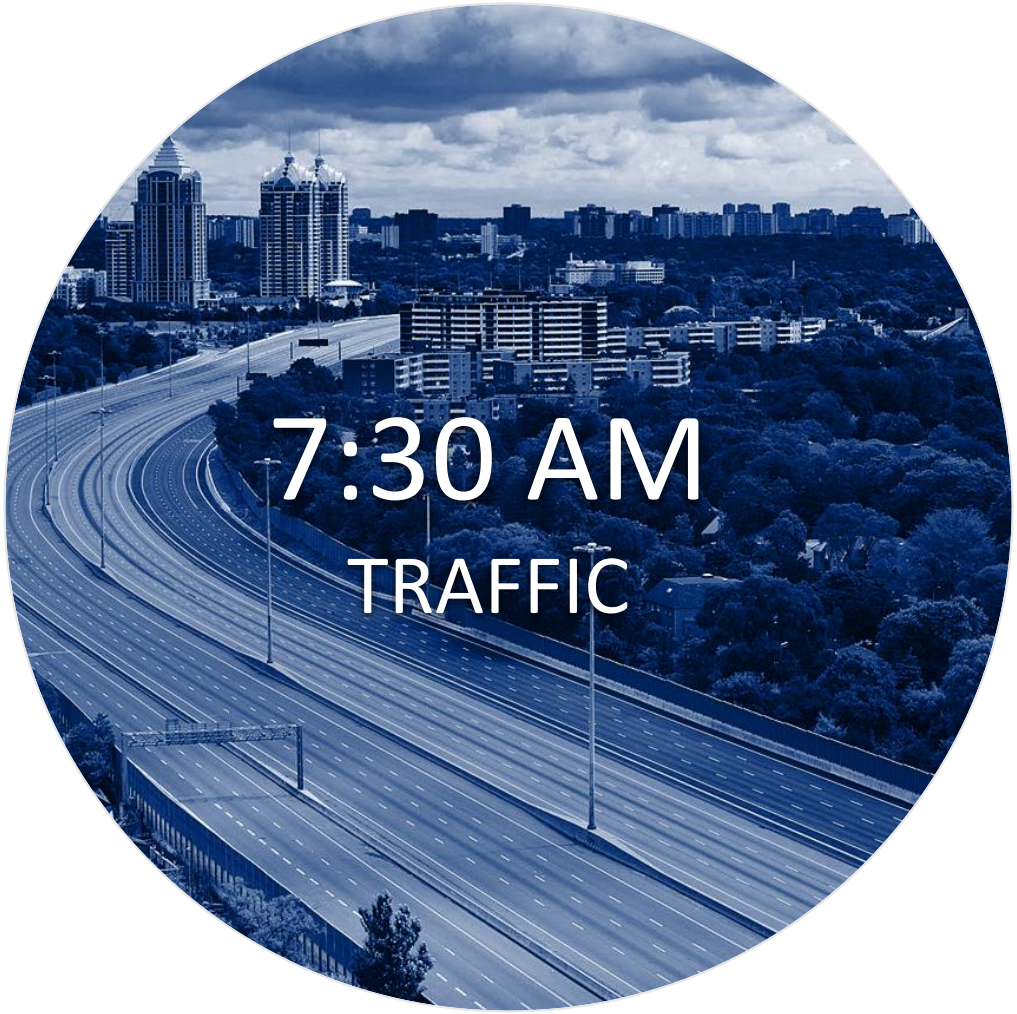


Data + Action = A trusted and comprehensive stormwater control platform.

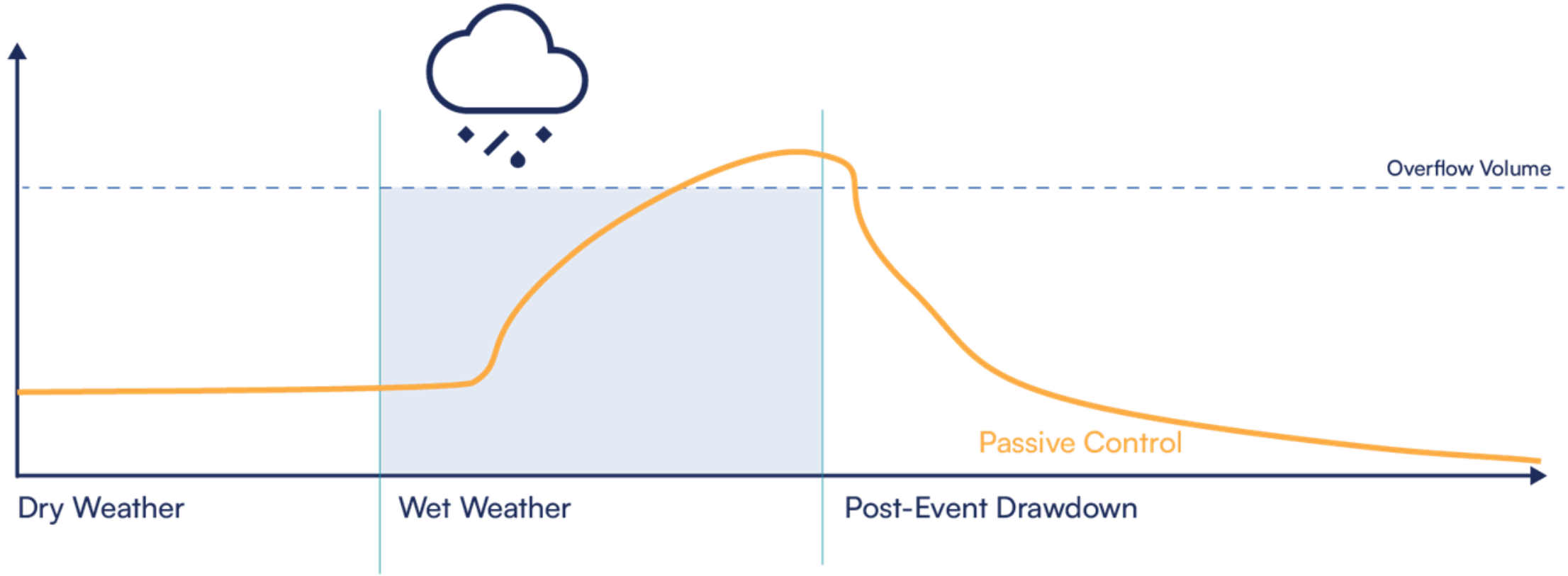
Continuous Monitoring and Adaptive Control (CMAC)



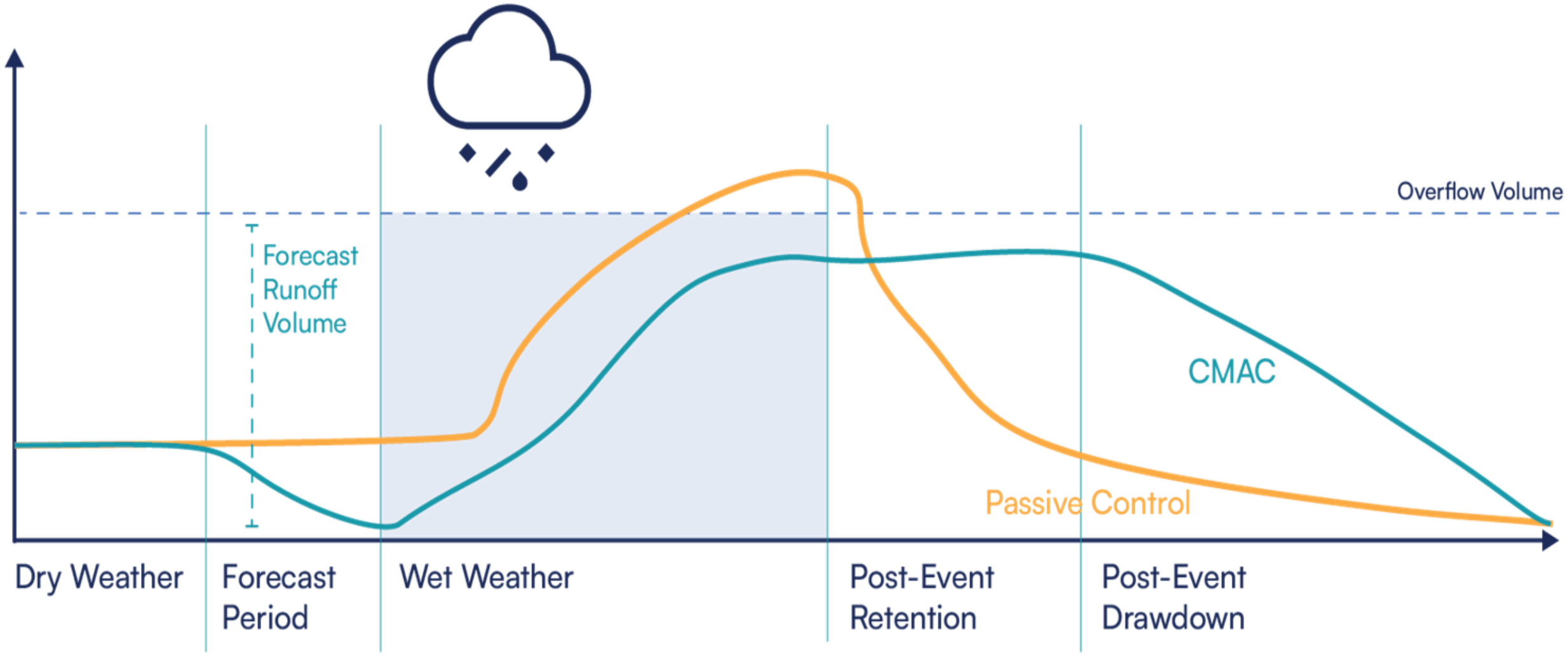
Timing and Predictability is Key



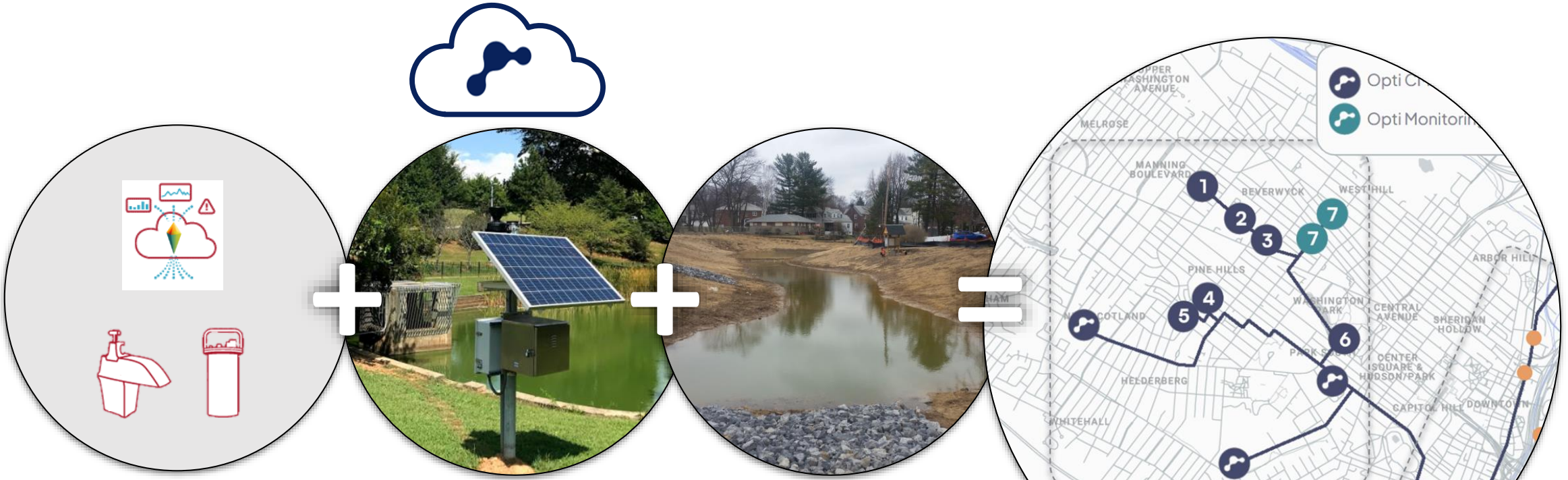
Passive Stormwater Management



Adaptive Stormwater Management



Journey to a Smart Sewer



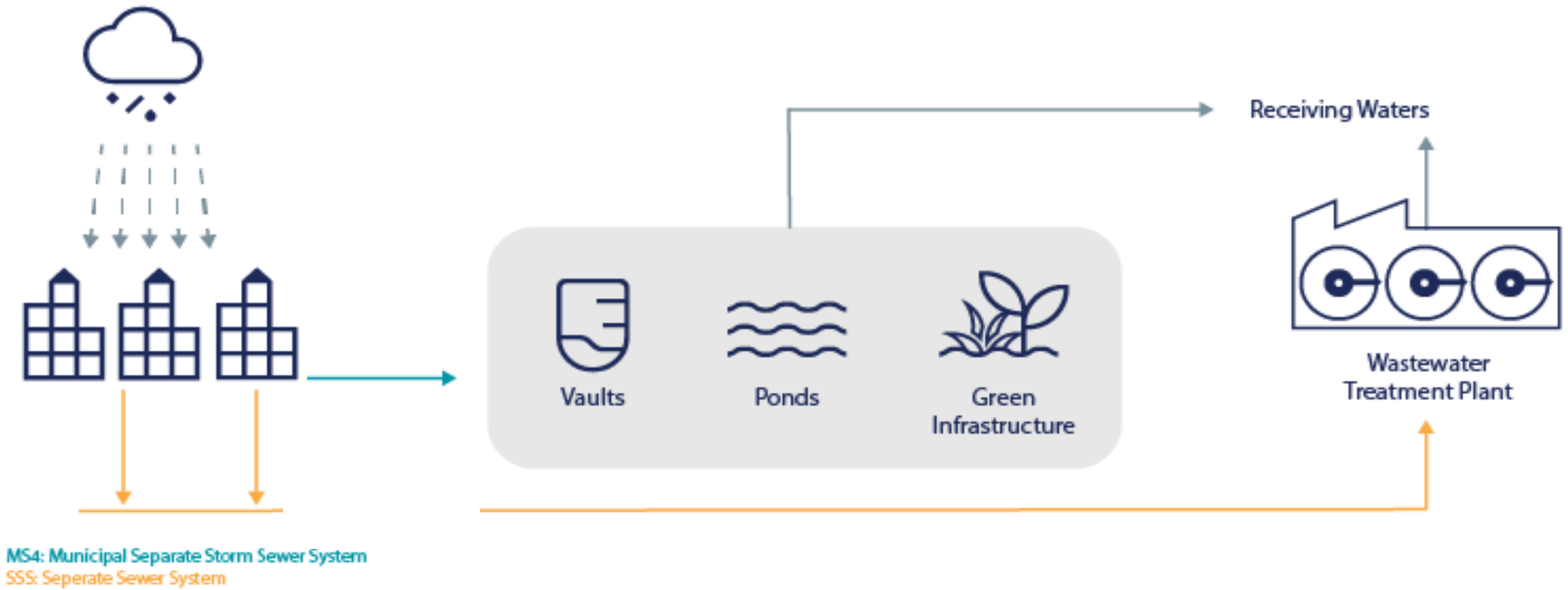
Monitoring & Analytics

Enhance Existing Infrastructure

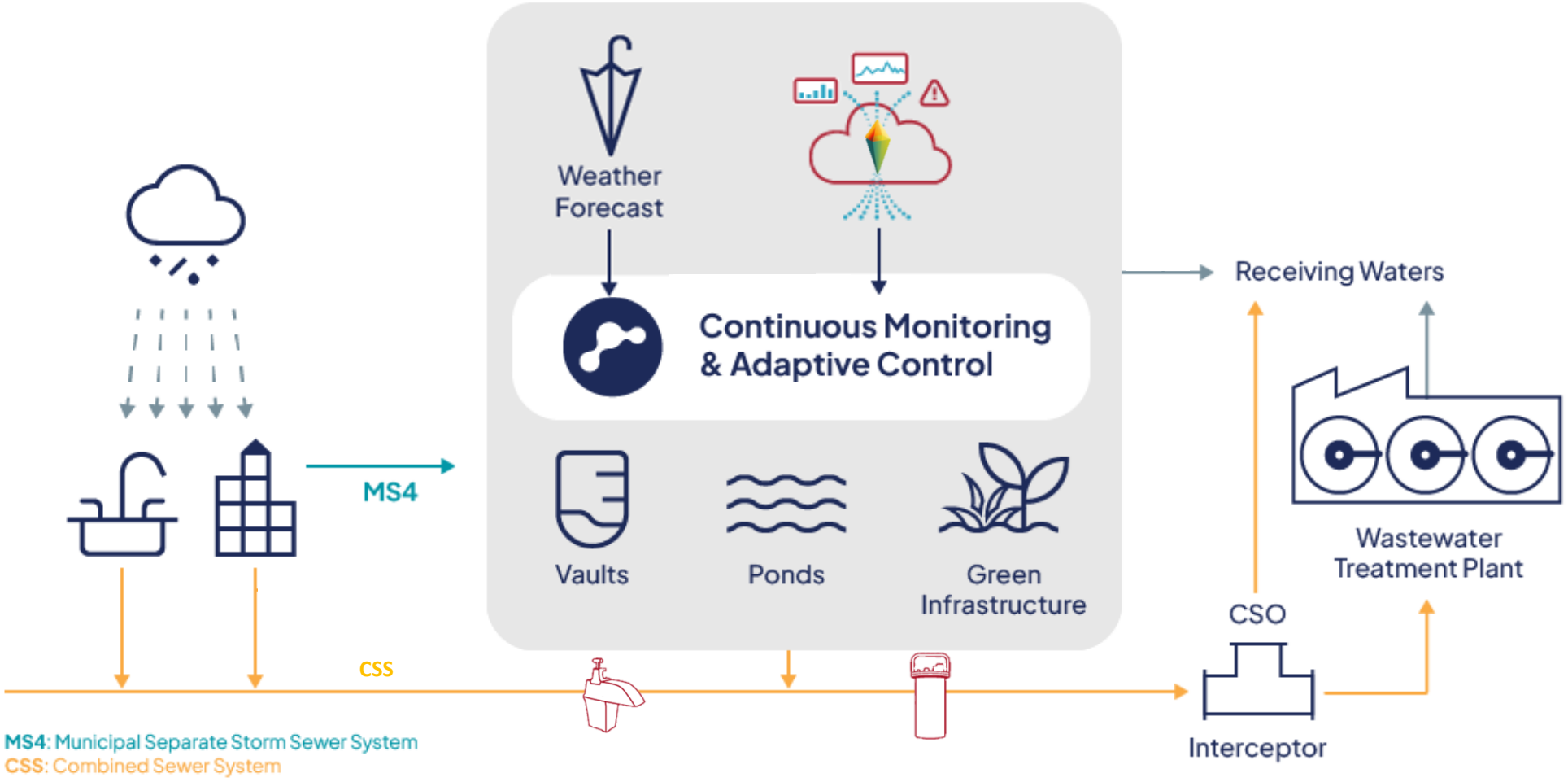
Optimize New Infrastructure

Smart Watershed Network

Passive: Typical Urban Stormwater Collection System



ADAPTIVE: Optimized Upstream Storage & Downstream Release



CMAC: Multiple Benefits

- **Flood Mitigation**
  Just in time storage
- **Combined Sewer Overflow Mitigation**
  Optimize upstream storage and downstream release
- **Water Quality Improvement**
  Increase residence time
- **Maximize Asset Performance**
  Improve compliance and O&M
- **Water Conservation**
  Maximize capture and reuse
- **Hydromodification Reduction**
  Minimize erosive flows

Case Study

Pilot Community

Pilot Community- Early adopter of the “modern day” sewer system

~9,600

Miles of Sewer

4500 Miles Wastewater Sewer

3000 Miles Stormwater Sewer

1700 Miles Combined Sewer

500+ Miles of Sewer > 80 Years Old

300+ Miles of Sewer > 120 Years Old

1 – 150

Years Old

350+

MGD

Divided amongst multiple treatment plants

Monitoring and Analytics

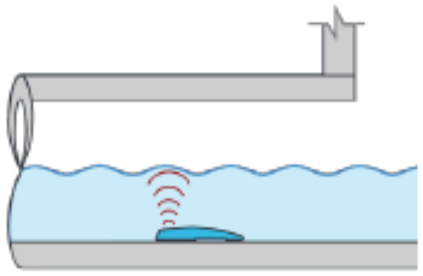
Smart System

Project Details

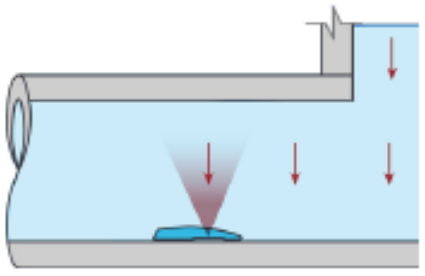
- ~400 Monitoring Devices
  - 225+ Flow & Level
  - ~100 Rain Guage

The equipment used for data acquisition on this pilot had the following features

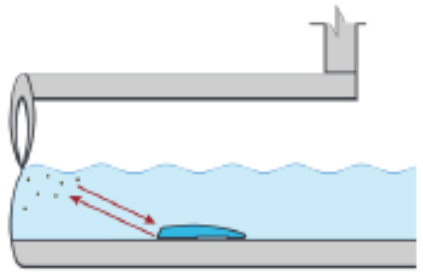
- 24/7 Monitoring
- Battery Operated
- Remote Telemetry



Up-looking Ultrasonic Depth

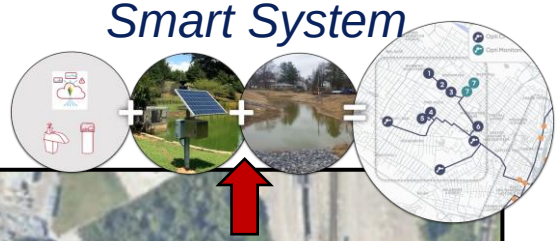


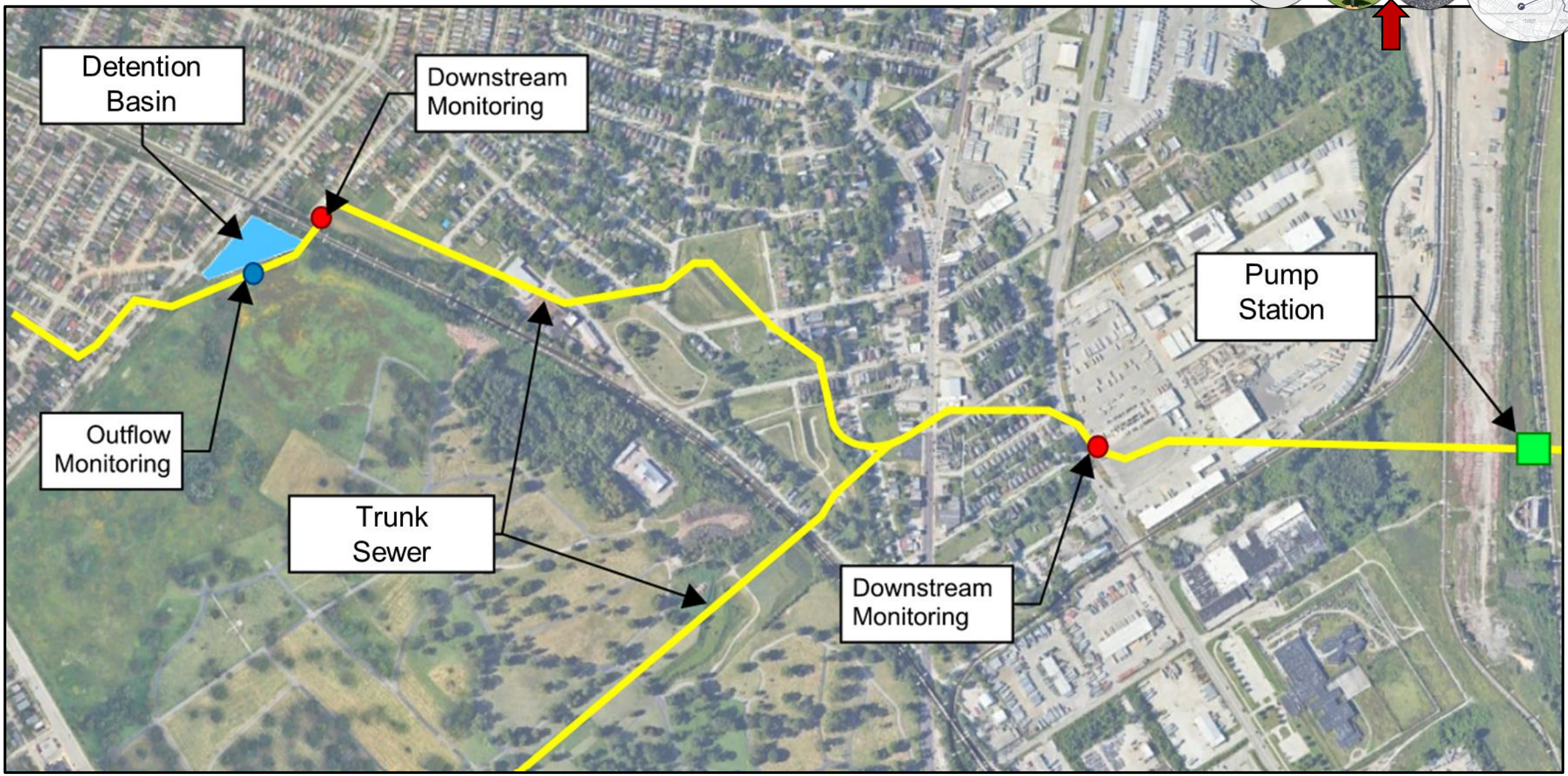
Surcharge Pressure Depth



Continuous Wave Doppler Velocity

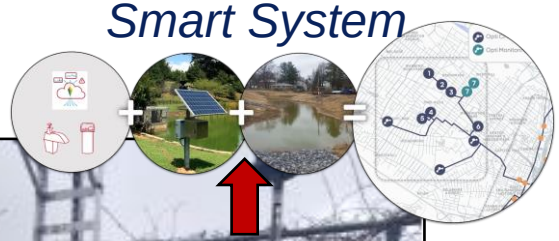
Project Basin



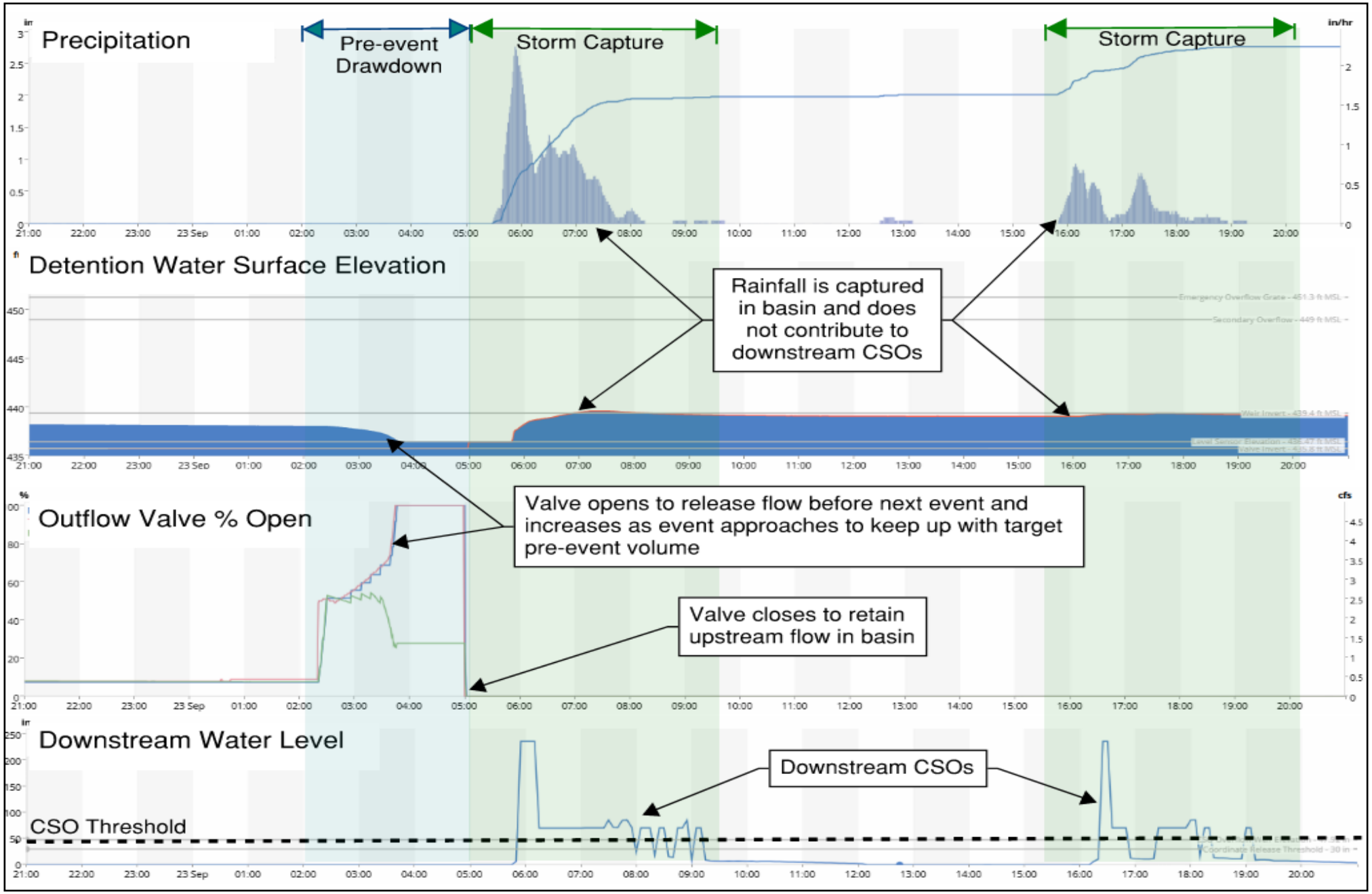


Basin Photo

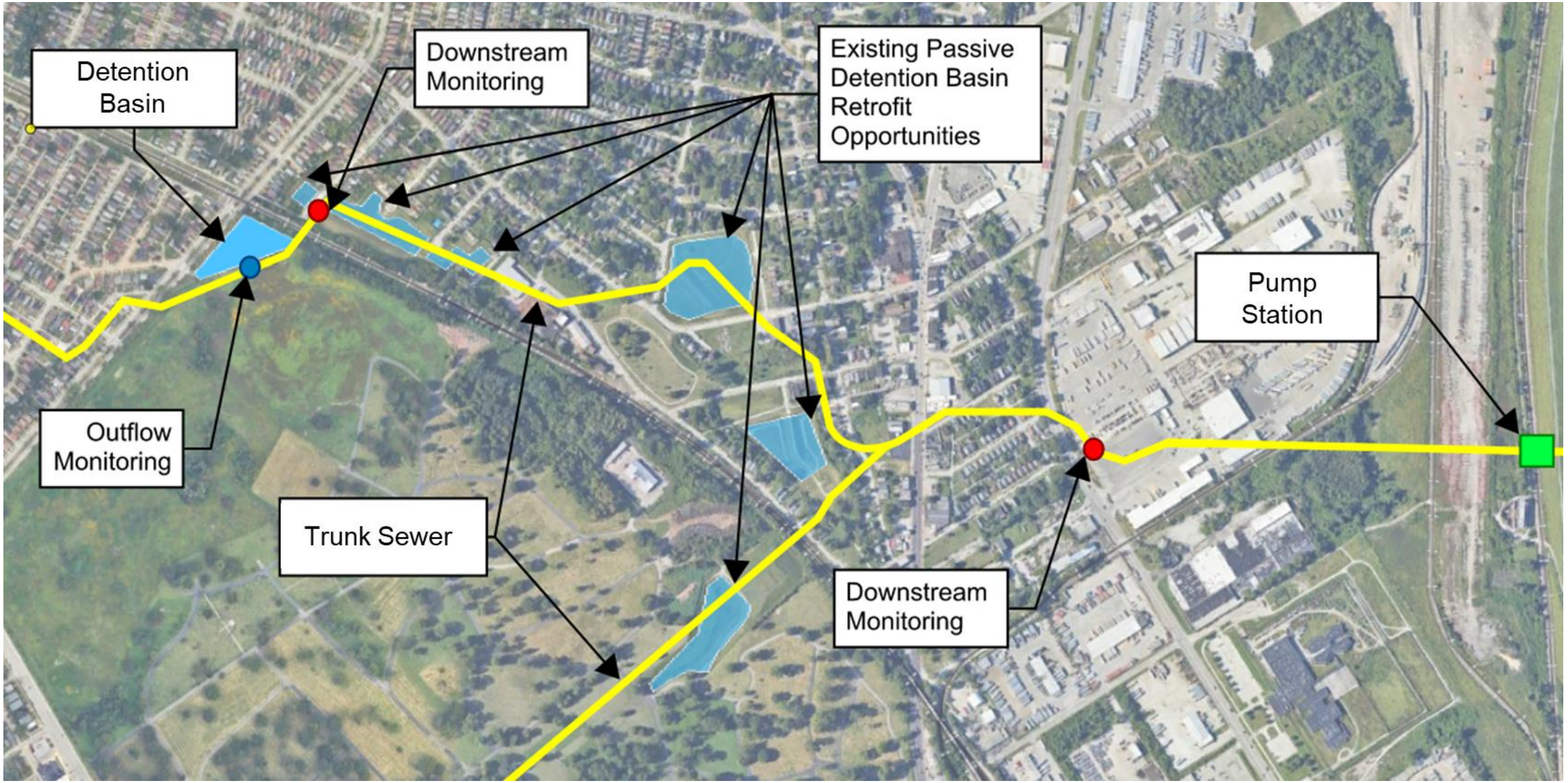
Smart System



System Performance



Future Work - Smart Watershed Management



Thank You!

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