CITY TECH COLLABORATIVE

WE REINVENT CITIES

**Leveraging Technology for High Performance Infrastructure:
City Tech's Smart Green Infrastructure Monitoring Solution**

January 2020
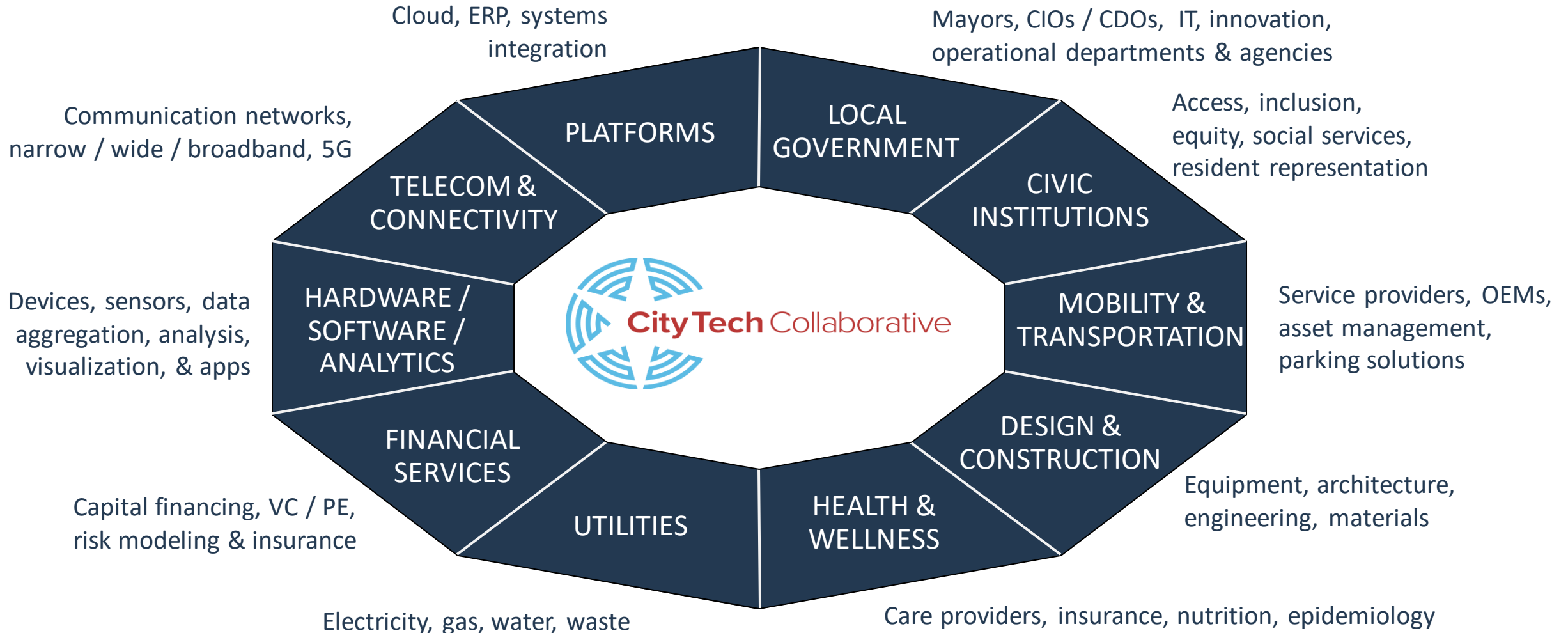
ABOUT
CITY TECH

City Tech accelerates technology-enabled solutions to make cities happier, healthier, and more productive

① We tackle **public problems** and **business opportunities** that are **too big for any single sector or organization to solve alone.**

② We create cross-sector teams that develop **scalable**, **market-ready** urban solutions; our **proven approach** and **methodology** help City Tech solutions succeed where other collaborations fall short.

③ We focus on industries that shape urban life – current City Tech initiatives include **Advanced Mobility**, **Healthy Cities**, and **Connected Construction**.

④ City Tech was born and raised in Chicago, and **every city is a potential partner.**

CITY TECH ENGAGES CROSS-SECTOR INDUSTRY & CAPABILITY PARTNERS

Consortium Members are Evolving Across Previous Industry and Capability Boundaries, Opening New Business Opportunity

Cloud, ERP, systems integration

Mayors, CIOs / CDOs, IT, innovation, operational departments & agencies

Communication networks, narrow / wide / broadband, 5G

Access, inclusion, equity, social services, resident representation

PLATFORMS

LOCAL GOVERNMENT

TELECOM & CONNECTIVITY

CIVIC INSTITUTIONS

City Tech Collaborative

Devices, sensors, data aggregation, analysis, visualization, & apps

HARDWARE / SOFTWARE / ANALYTICS

MOBILITY & TRANSPORTATION

Service providers, OEMs, asset management, parking solutions

FINANCIAL SERVICES

DESIGN & CONSTRUCTION

UTILITIES

HEALTH & WELLNESS

Capital financing, VC / PE, risk modeling & insurance

Equipment, architecture, engineering, materials

Electricity, gas, water, waste

Care providers, insurance, nutrition, epidemiology

CORPORATE MEMBERS, PARTNERS, & COLLABORATORS

City Tech's Ecosystem Combines Broad Capabilities and Deep Expertise To Implement Groundbreaking Urban Solutions

City Tech Consortium Members & Key Partners

Select Solution Participants & Collaborators

CITY TECH PROGRAMS & OFFERINGS

Reinventing Cities Through Technology-Enabled Solutions and Resident Engagement to Make Cities Happier, Healthier, & More Productive

1. City Solutions

End-to-end opportunity identification, solution development / testing, and go-to-market support to address pressing urban challenges

2. Resident Engagement

Direct resident design input and feedback on public-facing technology, including City Tech projects, local government initiatives, websites, apps, and other products and services.

3. Thought Leadership

Conferences, workshops, training, and ideation with public, private, and civic leaders to drive innovative, inclusive, and impactful technology solutions

A PROVEN APPROACH TO RESULTS-FOCUSED, HIGH-IMPACT COLLABORATION

Our Solutions Methodology Delivers Innovative, Market-Focused Results

1 OPPORTUNITY DISCOVERY

2 SOLUTION DEFINITION

3 SOLUTION IMPLEMENTATION

4 SOLUTION SCALING

- ADVANCED MOBILITY
- HEALTHY CITIES
- CONNECTED CONSTRUCTION
- AND MORE
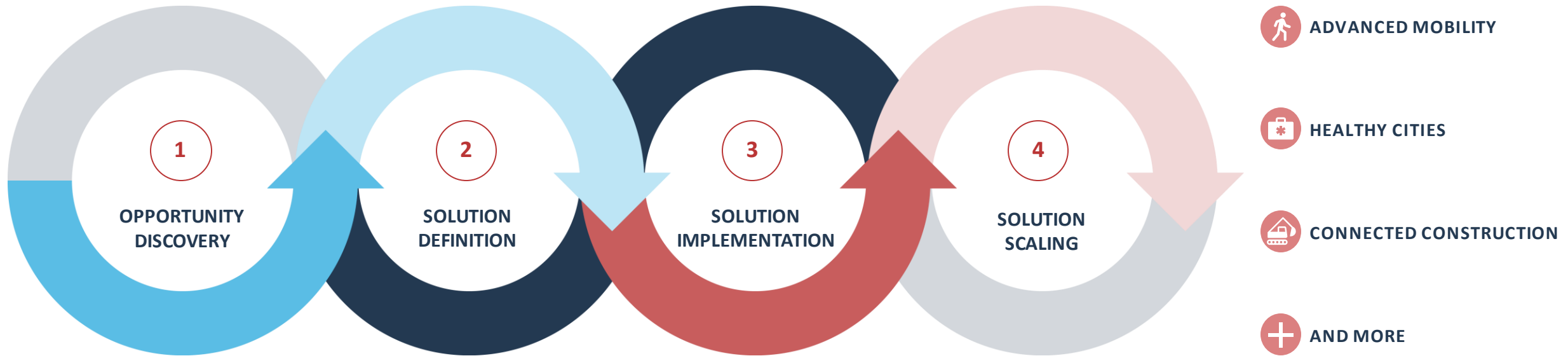
ACCELERATED RESULTS & BUSINESS IMPACT:

Technology Integration	Market Validation	Strategic Partner Development	Policy & Landscape Assessment	Public Recognition & Civic Engagement

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SMART GREEN INFRASTRUCTURE MONITORING

CITY TECH PERSPECTIVE ON WATER INNOVATION

The Disruption of Water & Sanitation Systems

From source to reclamation, water management is shifting towards a watershed approach, integrating natural systems with the built environment through the convergence of physical and digital.

HOLISTIC UNDERSTANDING OF WATERSHEDS AND SUBSYSTEMS
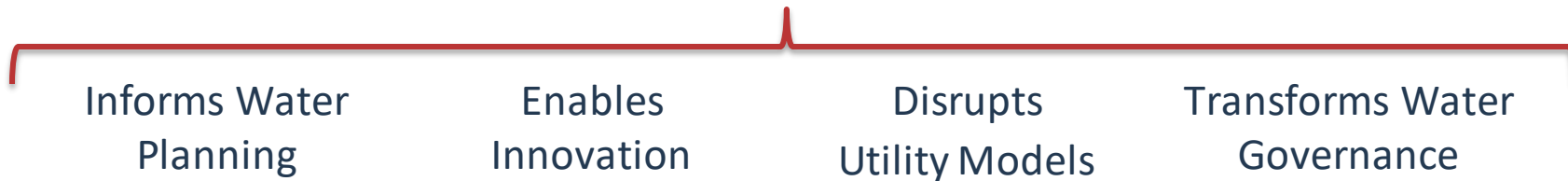
| Informs Water Planning | Enables Innovation | Disrupts Utility Models | Transforms Water Governance |

SMART GREEN INFRASTRUCTURE MONITORING

Preventing Urban Flooding Through Technology-Enabled Solutions

✏️ CHALLENGE

Cities are making major investments in green infrastructure (GI) yet have limited ability to:

» Consistently monitor the performance of the investment
» Optimize investments in GI to maximize benefits
» Compare GI investments against traditional grey infrastructure solutions
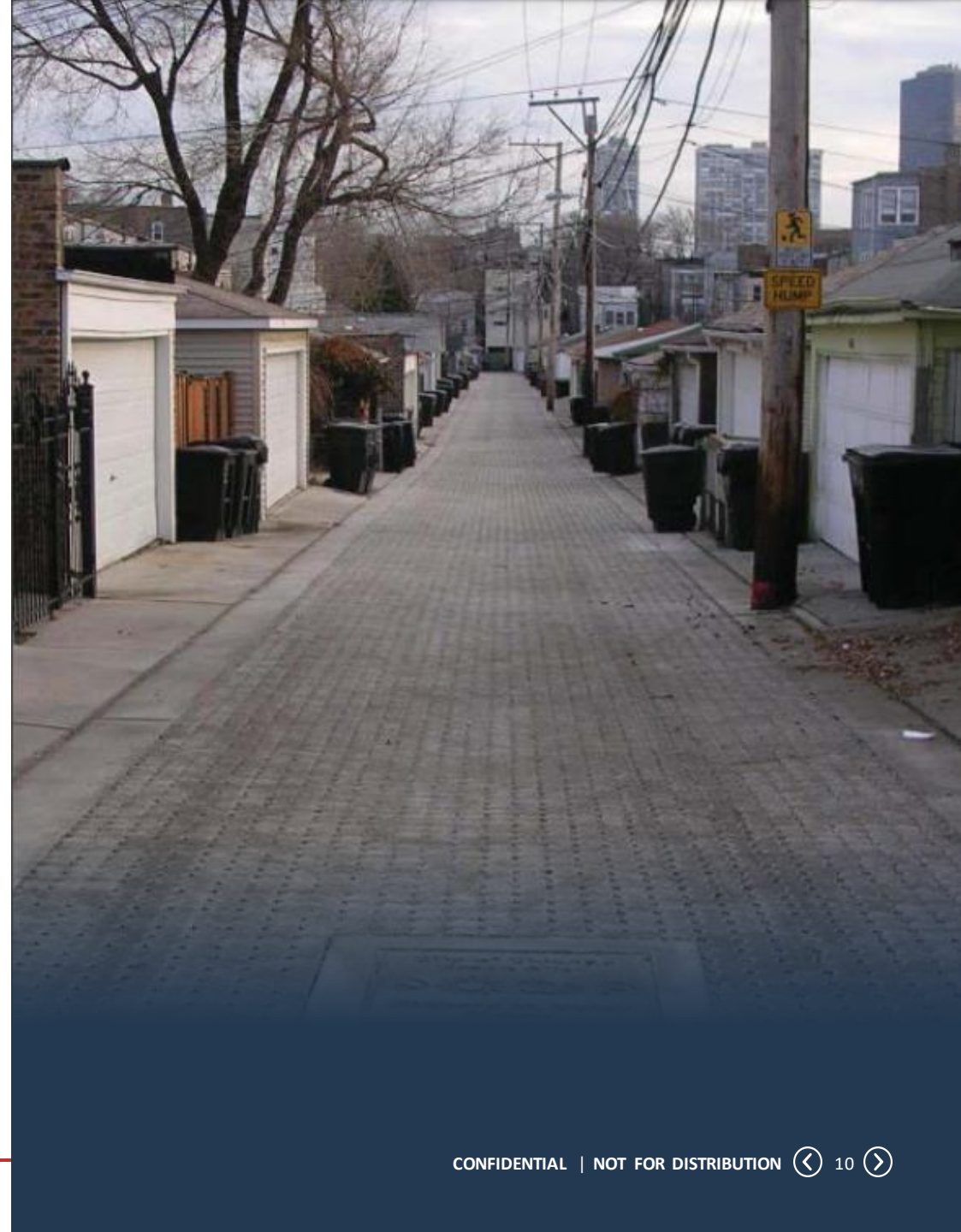
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SMART GREEN INFRASTRUCTURE MONITORING SOLUTION

Preventing Urban Flooding Through Technology-Enabled Solutions

✓ SOLUTION

A low cost IoT-based sensing package, allowing GI performance data from multiple sites to be aggregated for individual and collective performance management.
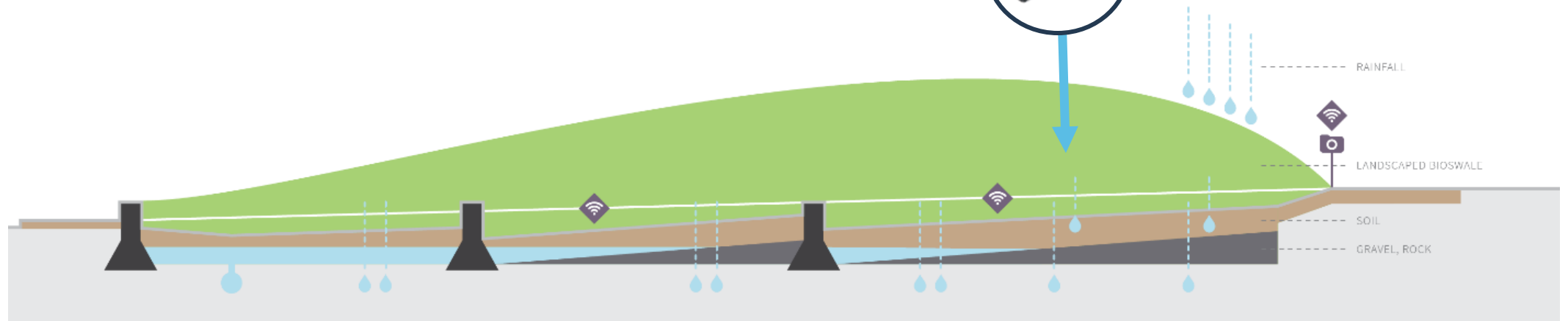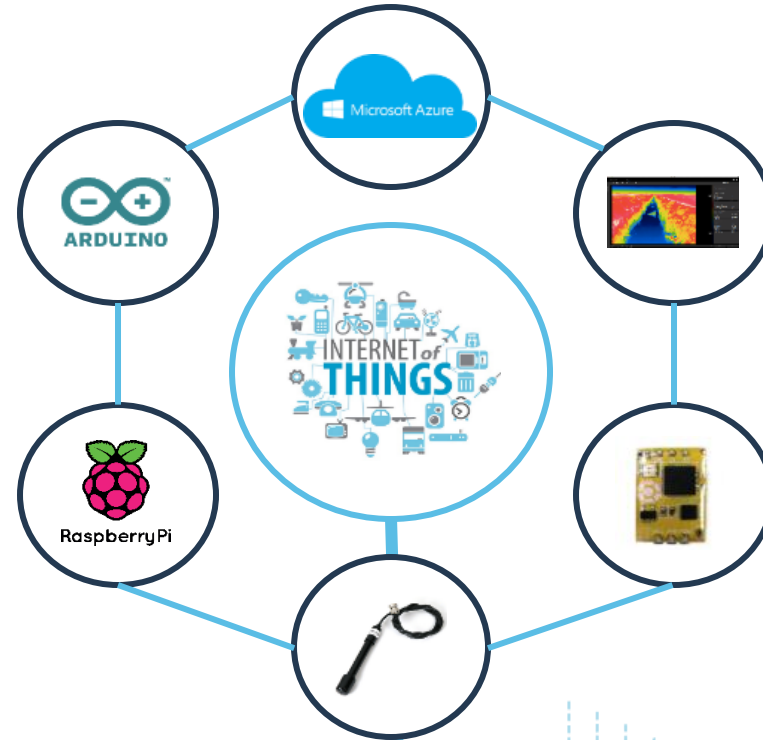
RAINFALL

LANDSCAPED BIOSWALE

SOIL

GRAVEL, ROCK

SMART GREEN INFRASTRUCTURE MONITORING SOLUTION

Preventing Urban Flooding Through Technology-Enabled Solutions

Microsoft — **House the data**

City of Chicago — **Provide the testbed and share data**

westMONROE PARTNERS — **Provide subject matter expertise**

SENFORMATICS Sensing · Informatics · Innovation — **Deploy sensor technology**

Opti — **Deploy telecom and dashboards**

AECOM — **Review data for commercial application**
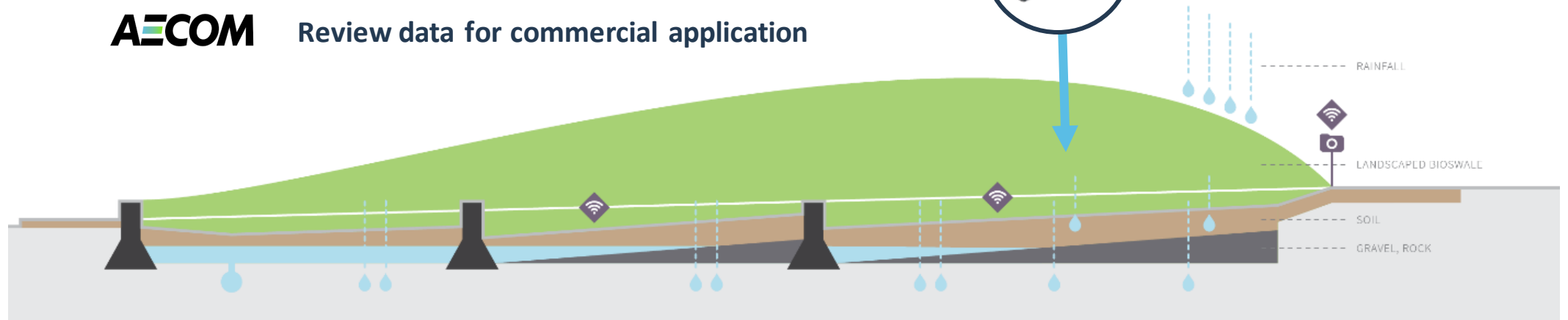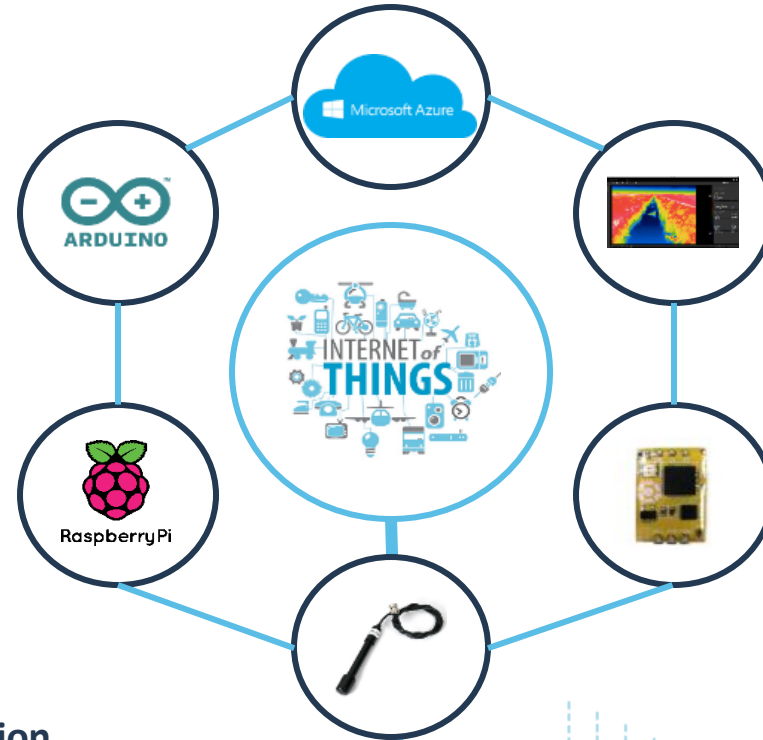
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SMART GREEN INFRASTRUCTURE MONITORING

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✈ PILOT

Create and deploy sensors, communications, and cloud analytics supporting GI performance data collection at four urban GI sites in both public and private locations.

» **Start:** June 2015

» **Current Status:** Technology installation completed March 2017 and data collection completed in November 2017. Opti successfully transitioned to market.

SENSOR DEPLOYMENTS

Piloting Across Multiple Green Infrastructure Types

Installations across 4 green infrastructure types:

1. Permeable Pavement (Langley Avenue)
2. Bioswale (UI LABS – Goose Island)
3. Infiltration Planter (Argyle Street)
4. Tree grate filters (Cottage Grove Avenue)
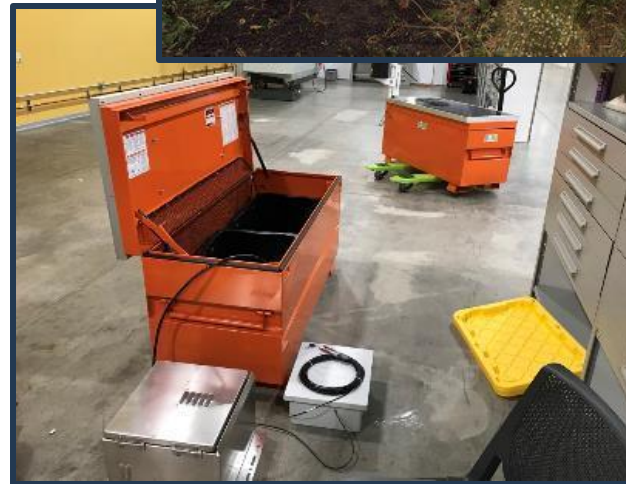
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EXAMPLE SENSOR INSTALLATION LOCATION: PERMEABLE PAVEMENT

Argyle Street Between Broadway and Sheridan
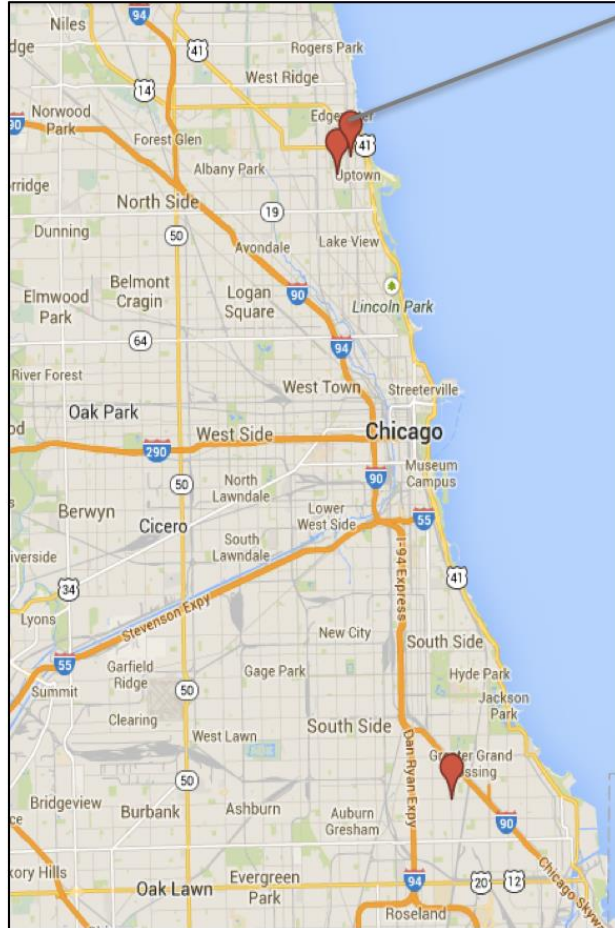
Commercial
- **permeable pavers**
- **infiltration planters**

Argyle St

EXAMPLE SENSOR INSTALLATION LOCATION: PERMEABLE PAVEMENT

Argyle Street Between Broadway and Sheridan
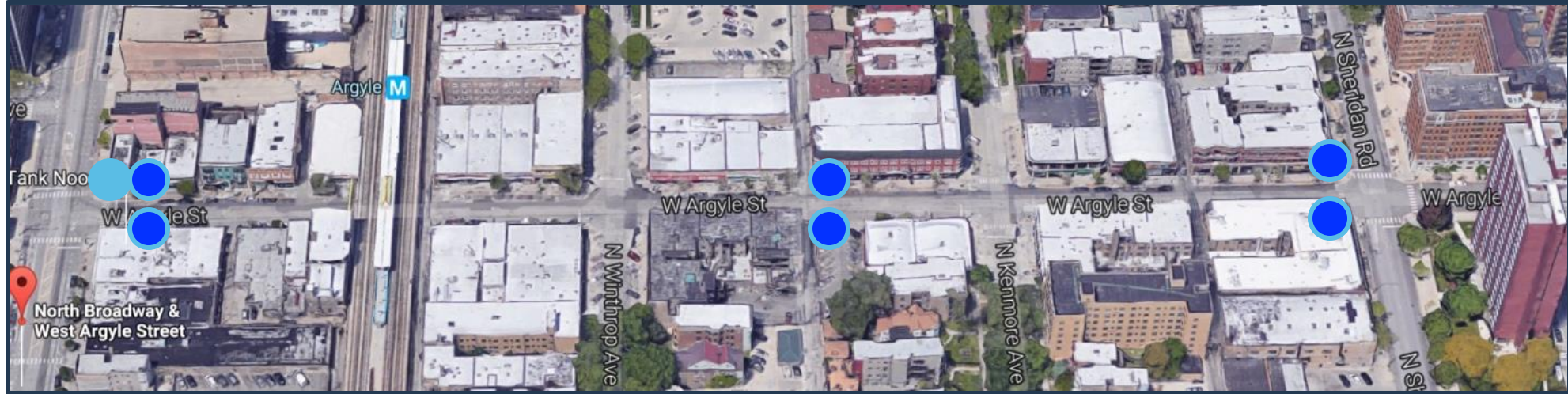
🔵 Transmission Node (includes Opti solar wireless gateway; tipping bucket rain gauge, temperature, humidity, wind speed, wind direction)

🔵 Decagon GS3 (Water Content, Temperature, Conductivity) at sub-grade at 18-inches; Decagon 10HS (Water Content) at 10-cm

RESULTS

SCALABLE TOOLS TO EVALUATE GI PERFORMANCE
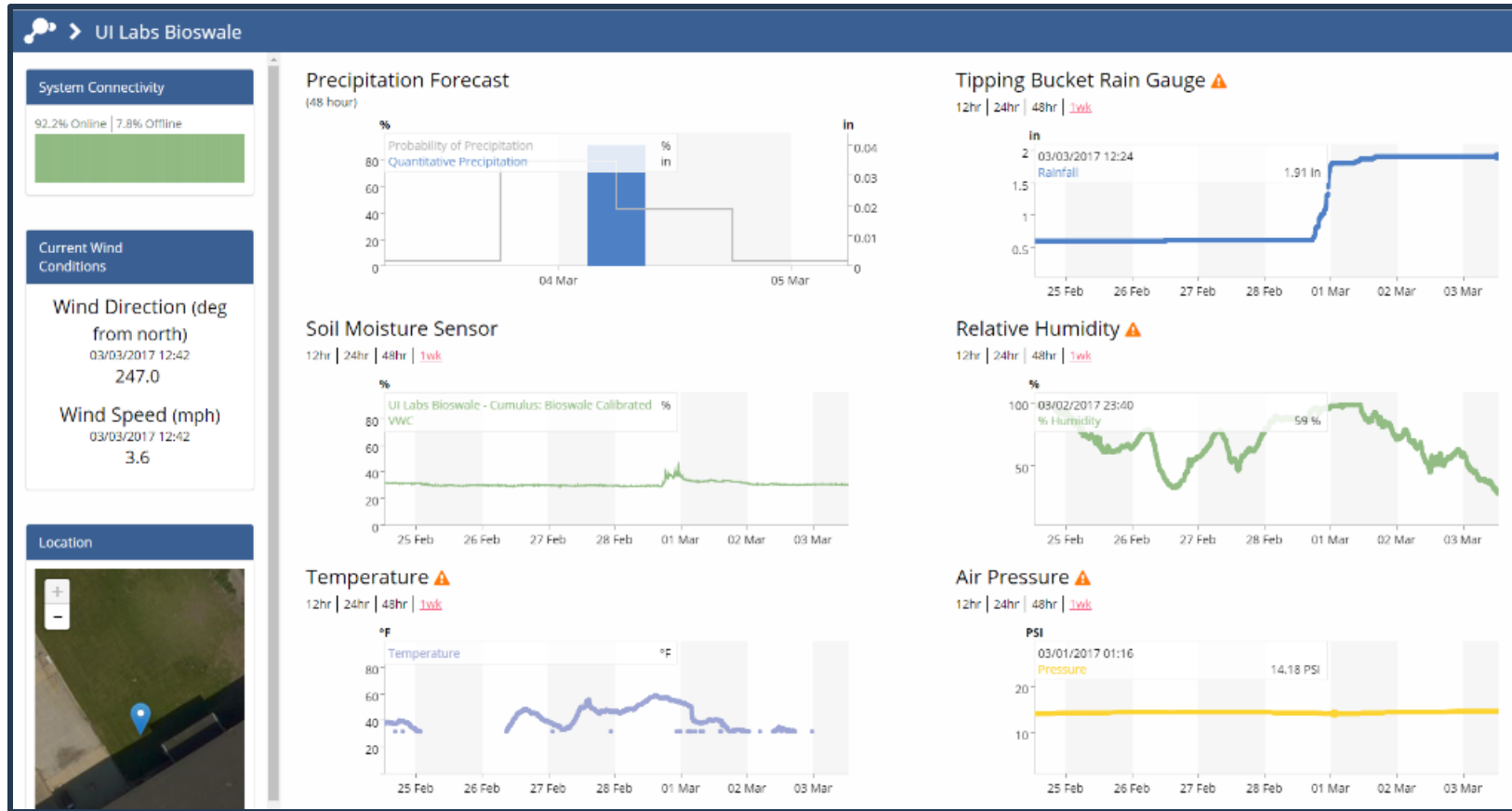
» Improves future engineering of green infrastructure through sensing data from functioning systems

» Platform connects to over 20,000 data streams to blend external data sets with live local data

» Allows for multiple sites to be monitored from one central location and can be shared with stakeholders and public

DATA SHARING AND GOVERNANCE // DATA.CITYOFCHICAGO.ORG

Building an Ecosystem of Performance Data Users

SMART GREEN INFRASTRUCTURE MONITORING

Preventing Urban Flooding Through Technology-Enabled Solutions

OUTCOMES

☑ A novel, sensing technology to meet the challenges of data collection from decentralized stormwater infrastructure across a city.

☑ New data sources and frequency to enable existing GI maintenance as well as performance feedback to inform future designs.

☑ The ability to collect GI performance data from multiple sites and enable systemwide GI and traditional stormwater infrastructure planning.

☑ New, real-time stormwater storage capacity data to enable future real-time or performance- based management systems and contracts.

☑ Demonstrated pathways to active / dynamically controlled infrastructure at the edge of cloud

KEY QUESTIONS FOR DISCUSSION

- Where is your community on the progression from watershed performance baselining to performance-based management and control?

- How can data and tools for GI performance either change the role of existing stormwater management stakeholders or empower new participants to remove barriers?

- How can we best support collaborations between unlikely partners to remove barriers to green infrastructure adoption, operational management, and long-term performance?

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THANK YOU

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