



# The (Digital Business Model) #Shift in Stormwater Source Control #Stormwater Smartgrids

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Latornell - Helpful or Hype

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## In A Changing Utility World

Stormwater Infrastructure & Business Models Need to Change Too





# A Variable Climate with Shifting Fiscal, Regulatory & Social Trends Challenges Legacy Management Tools and Business Models

There is a Storm Brewing in Stormwater

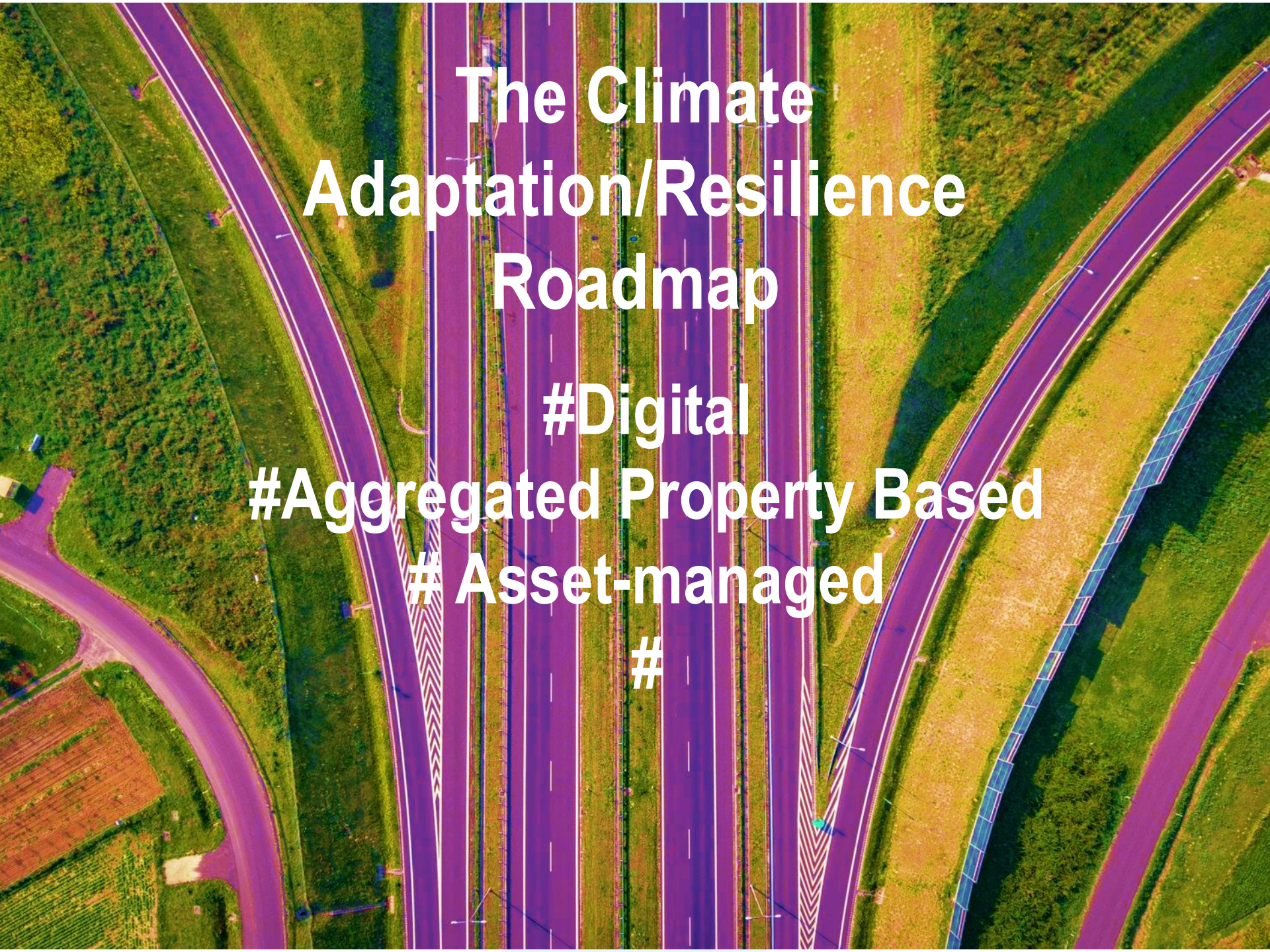
**We Cannot Manage Stormwater  
With Cost or Operational Effectiveness  
When an average**

**47%**

**of gross impermeable urban area has**

**0%**

**of utility asset-managed source control.**



# The Climate Adaptation/Resilience Roadmap

#Digital

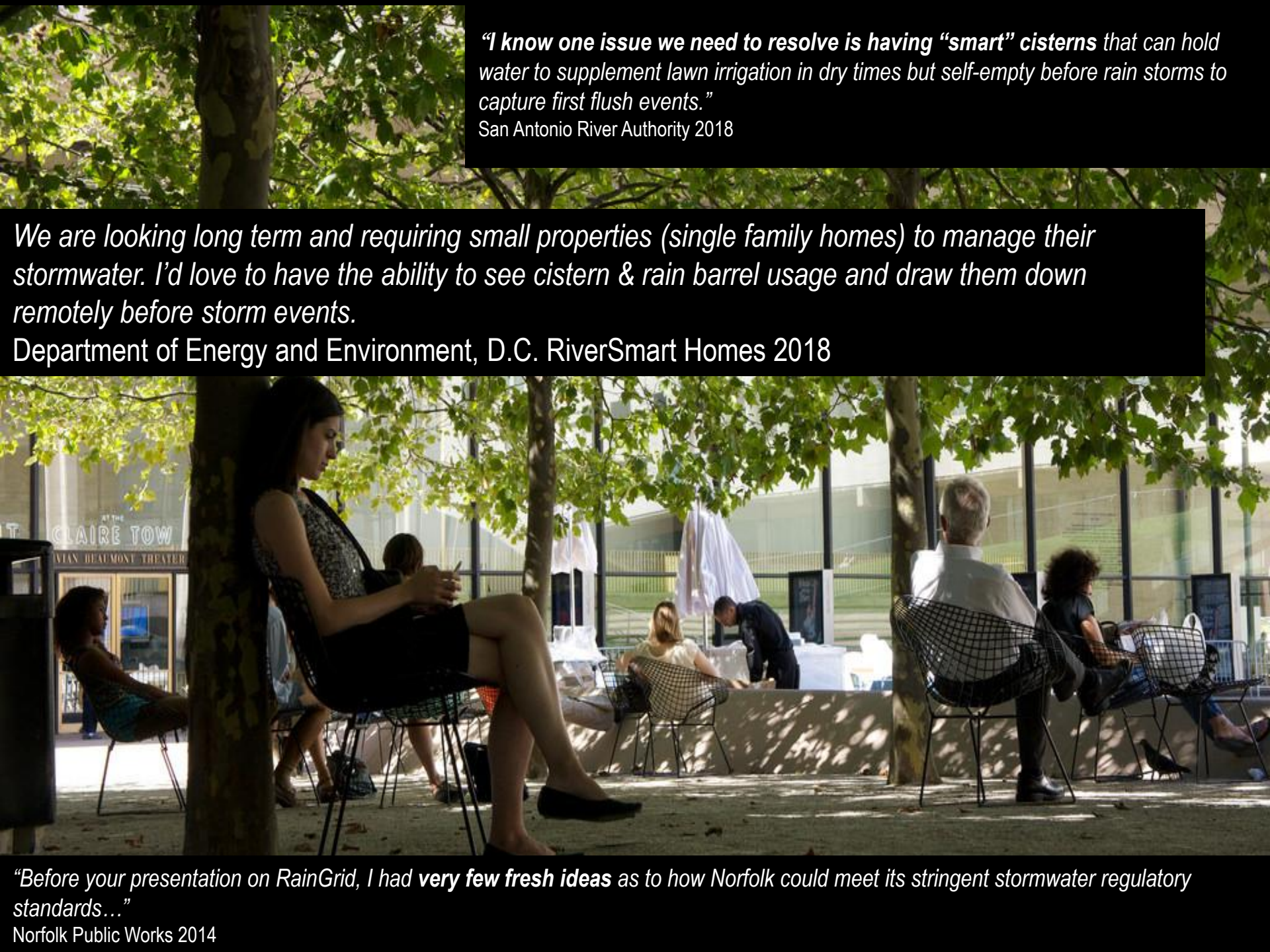
#Aggregated Property Based

# Asset-managed

#

# This is ground zero for Digital Community-based Stormwater





*"I know one issue we need to resolve is having "smart" cisterns that can hold water to supplement lawn irrigation in dry times but self-empty before rain storms to capture first flush events."*

San Antonio River Authority 2018

*We are looking long term and requiring small properties (single family homes) to manage their stormwater. I'd love to have the ability to see cistern & rain barrel usage and draw them down remotely before storm events.*

Department of Energy and Environment, D.C. RiverSmart Homes 2018

*"Before your presentation on RainGrid, I had **very few fresh ideas** as to how Norfolk could meet its stringent stormwater regulatory standards..."*

Norfolk Public Works 2014

# Pre-digital Residential Source Control Programs Have Marginal Success Rates of 14-24%

Example  
City of Toronto  
Downspout Disconnection Program  
Est. 1991, Abandoned 2008



**“The initial storage capacity of the rain barrels was not maintained because**

**...residents either did not use the water from the barrels or did not empty their barrels.**

**...methods must be found to ensure that the rain barrels are emptied following a rainfall.”**

**Insurance Bureau of Canada, The Wingham Rain Barrel Study, 2011**

A man in a dark suit and white shirt stands outdoors next to a water meter. He is smiling and has his hand on the meter. The meter has a white pipe and a label that says 'COLLECT' and 'BYPASS'. In the background, there are houses and a car under a blue sky.

**PROPERTY OWNERS DO WANT TO  
BE PART OF THE SOLUTION.**

**THEY JUST DON'T WANT TO PAY  
FOR THEM OR MAINTAIN THEM.**

**The answer is NOT to transform property owners  
into operators.**

**It is to transform customers into utility partners.**

# RAIN MEETS DATA

## The RainGrid™ Stormwater Smartgrid™

Reliable -  
Operation

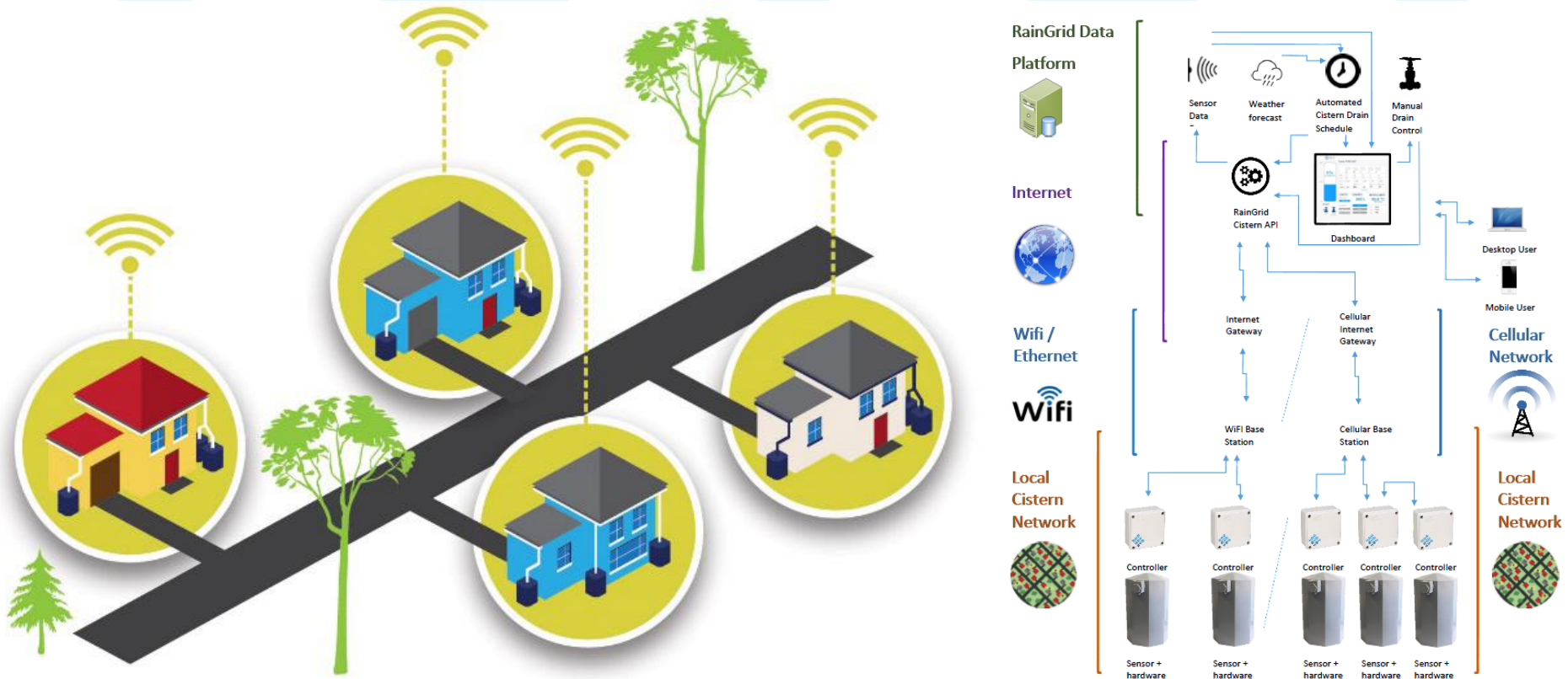
Measurable - Data

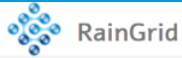
Cost - Effective

- 5 Day Quantitative Precipitation Forecast – correlating raw weather data to property location
- IoT controllers for ultrasonic cistern level sensors, electrically actuated drain valves and other peripherals
- Re-use, groundwater recharge, resewering
- Real-time UI/CX operational & micro-climate data visualization and analytics:
- property and network-wide admin views & analysis
- >50% CAPEX/OPEX cost advantage vs. conventional storage or passive green infrastructure ~ \$0.33/USG

# “Stormwater Smartgrids™”

- ▶ “Out of the box” IoT manages residential cisterns rooftop runoff for enhanced water security (retention, reuse and recharge) infrastructure at the lowest CAPEX/OPEX price point.
- ▶ Scalable AI data visualization & analytics dashboards for residential and utility administrative users





169 Browning Ave V3

## 88%

Capacity Left

### FORECAST

	Monday June 24	Tuesday June 25	Wednesday June 26	Thursday June 27	Friday June 28
High	23 °C	22 °C	25 °C	26 °C	25 °C
Low	18 °C	16 °C	15 °C	17 °C	18 °C
Pressure	100.5 kPa	100.9 kPa	101.4 kPa	102.1 kPa	102.1 kPa
Rain	10.9 mm	-	2.5 mm	-	3.5 mm
Drain		Planned		Planned	

### CONTROL

Status: Automated

Manual Drain

- Empty 10%
- Empty 100%
- Stop

### DIVERTED

381 L

Week

Month

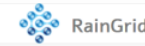
Year

### MICRO CLIMATE

29.3 °C

99.227 kPa

Lat: 43.68  
Lon: -79.35  
Alt: 122 m



169 Browning Ave V3

### Tank Level

### Microclimate

### Diversion Rate

- Real-time (6 sec) data capture when active, 6 min when resting.
- Installed power/communications options: AC-DC-PoE / wireless (Zigbee), CAT5, WiFi, Cellular
- Leased/purchased hardware, annual cloud-data subscription service



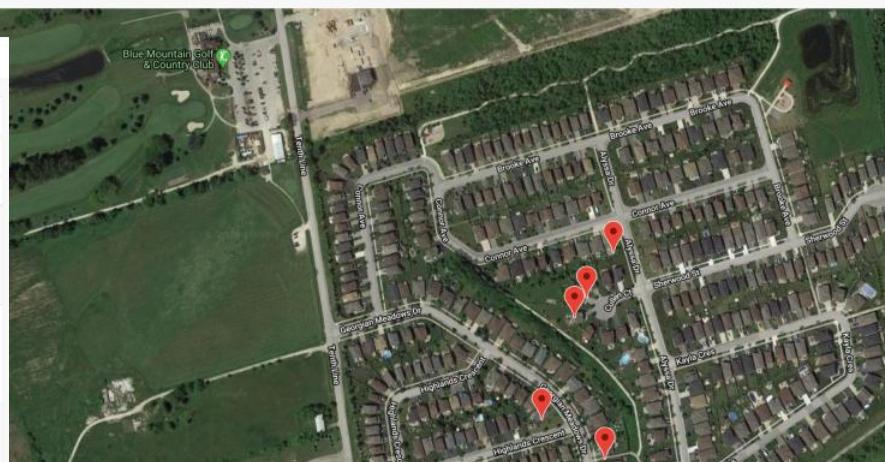
# Administrative Utility Manager Dashboards <manage.raingrid.com>

❖ Ten dashboards provide detailed individual property, and network operational & peripheral (sensors, valves, power & communications) diagnostic capability

- 1. System
- 2. Mapping
- 3. Data Reports
- 4. Data Filtering
- 5. Test Protocol
- 6. System Set-Up
- 7. Users
- 8. Regions
- 9. Administrators
- 10. User Options

SN	Name	Master	Master ZB	Update	Controller	RSSI	Voltage	Current	Press	Temp	Level	Valve	Target	Set Target
301-0	V3-01 6 Barnside Court	Jan 24, 2019 5:52:17 PM	Ex04	2019-01-05	Jan 24, 2019 6:14:55 PM	-1.0	1.252	0	98.86	38.09	0.5254	closed	Free	<input type="button" value="0"/> <input type="button" value="3"/> <input type="button" value="A"/> <input type="button" value="S"/> <input type="button" value="Free"/>
302-0	V3-02 8 Highlands Crescent	Jan 24, 2019 6:11:24 PM	BDP8	2019-01-05	Jan 24, 2019 6:14:41 PM	-1.0	1.202	0	98.643	39.76	0.2627	closed	Free	<input type="button" value="0"/> <input type="button" value="3"/> <input type="button" value="A"/> <input type="button" value="S"/> <input type="button" value="Free"/>
303-0	V3-03 25 Georgian Meadows Drive	Jan 24, 2019 6:12:02 PM	EX0F	2019-01-05	Jan 24, 2019 6:14:38 PM	-1.0	1.206	0	98.764	38.05	0.27645	closed	Free	<input type="button" value="0"/> <input type="button" value="3"/> <input type="button" value="A"/> <input type="button" value="S"/> <input type="button" value="Free"/>
304-0	V3-04 28 Bark Street	Jan 24, 2019 6:09:16 PM	g05A	2019-01-05	Jan 24, 2019 6:14:52 PM	-1.0	1.248	0	98.202	41.54	0.38456	closed	Free	<input type="button" value="0"/> <input type="button" value="3"/> <input type="button" value="A"/> <input type="button" value="S"/> <input type="button" value="Free"/>
305-0	V3-05 48 Cullen Court	Jan 24, 2019 6:01:55 PM	Ex0B	2019-01-05	Jan 24, 2019 6:14:53 PM	-1.0	1.215	0	98.184	38.25	0.44504	closed	Free	<input type="button" value="0"/> <input type="button" value="3"/> <input type="button" value="A"/> <input type="button" value="S"/> <input type="button" value="Free"/>
306-0	V3-06 12 Cullen Court	Jan 24, 2019 5:59:00 PM	BE0E	2019-01-05	Jan 24, 2019 6:14:41 PM	-1.0	1.215	0	98.185	37.25	0.30277	open	0.00007	<input type="button" value="0"/> <input type="button" value="3"/> <input type="button" value="A"/> <input type="button" value="S"/> <input type="button" value="Free"/>
307-0	V3-07 48 Paterson Street	Jan 24, 2019 6:14:53 PM	Ex0A	2019-01-05	Jan 24, 2019 6:14:38 PM	-1.0	1.215	0	98.222	41.88	1.08608	open	0.2954	<input type="button" value="0"/> <input type="button" value="3"/> <input type="button" value="A"/> <input type="button" value="S"/> <input type="button" value="Free"/>
308-0	V3-08 5 Barnside Court	Jan 24, 2019 6:02:20 PM	Ex0h	2019-01-05	Jan 24, 2019 6:15:02 PM	-1.0	1.215	0	98.215	37.28	0.05739	closed	Free	<input type="button" value="0"/> <input type="button" value="3"/> <input type="button" value="A"/> <input type="button" value="S"/> <input type="button" value="Free"/>
309-0	V3-09 10 Cullen Court	Jan 24, 2019 5:52:05 PM	Ex0h	2019-01-05	Jan 24, 2019 6:14:38 PM	-1.0	1.202	0	98.251	39.45	0.02748	closed	Free	<input type="button" value="0"/> <input type="button" value="3"/> <input type="button" value="A"/> <input type="button" value="S"/> <input type="button" value="Free"/>
310-0	V3-10 142 Hunter St.	Jan 24, 2019 6:00:38 PM	EM 3	2019-01-05	Jan 24, 2019 6:14:38 PM	-1.0	1.255	0	98.220	37.50	0.15730	closed	Free	<input type="button" value="0"/> <input type="button" value="3"/> <input type="button" value="A"/> <input type="button" value="S"/> <input type="button" value="Free"/>

SN	Name	Location	Roof Area (sq ft)	Roof	Controller Config	Roof Config	Sensor Configuration	Enabled	Activated
301-0	V3-01 6 Barnside Court	107-11-1425	1632	BlueSides	v3-default (g)	ultraflow 1.1 (m (g))	RT: <input type="text" value="0-4.2025"/> Temp: <input type="text" value="38.09"/> Pressure: <input type="text" value="0.5254"/> <input type="button" value="Save"/>	<input checked="" type="checkbox"/>	Activated <input type="button" value="Configure New Data"/>
302-0	V3-02 8 Highlands Crescent	107-11-1425	1745	BlueSides	v3-default (g)	ultraflow 1.1 (m (g))	RT: <input type="text" value="0-4.2025"/> Temp: <input type="text" value="39.76"/> Pressure: <input type="text" value="0.2627"/> <input type="button" value="Save"/>	<input checked="" type="checkbox"/>	Activated <input type="button" value="Configure New Data"/>
303-0	V3-03 25 Georgian Meadows	107-11-1425	1632	BlueSides	v3-default (g)	ultraflow 1.1 (m (g))	RT: <input type="text" value="0-4.2025"/> Temp: <input type="text" value="38.05"/> Pressure: <input type="text" value="0.27645"/> <input type="button" value="Save"/>	<input checked="" type="checkbox"/>	Activated <input type="button" value="Configure New Data"/>
304-0	V3-04 28 Bark Street	107-11-1425	1632	BlueSides	v3-default (g)	ultraflow 1.1 (m (g))	RT: <input type="text" value="0-4.2025"/> Temp: <input type="text" value="41.54"/> Pressure: <input type="text" value="0.38456"/> <input type="button" value="Save"/>	<input checked="" type="checkbox"/>	Activated <input type="button" value="Configure New Data"/>



# Case Study: Collingwood Smart Stormwater Pilot Project - Stormwater Smartgrid™ 3.0

## Project Objectives and Installation Detail –

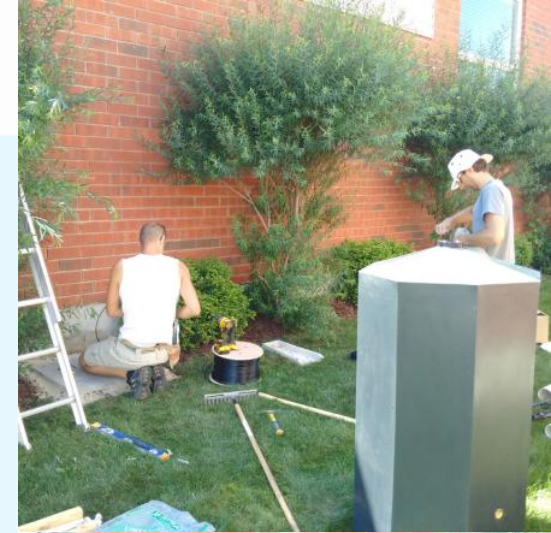
- **Eliminating stormwater runoff draining to the Town's aging sewer system and drainage infrastructure;**
- Reducing extraneous stormwater (inflows) to the Town's Waste Water Treatment Plant and **preventing CSOs into Georgian Bay during extreme weather events.** Excessive inflows to the WWTP linked to non-compliant connected residential sump pumps discharging high water table flows to the sanitary system; and
- **Monitoring Low Impact Development (LID) installations and SDRT (Smart De-Risking Technology) installations used at residential and ICI properties.** Effort will be made to disperse the installations throughout the community so that data results can be extrapolated to other areas.

Ten residential Stormwater Smartgrid™ installations on 1R 500L cisterns reduce lot level stormwater runoff by 50-75% during 24 hour rainfall events. Each SDRT will maintained and monitored in real-time during non-winter periods.

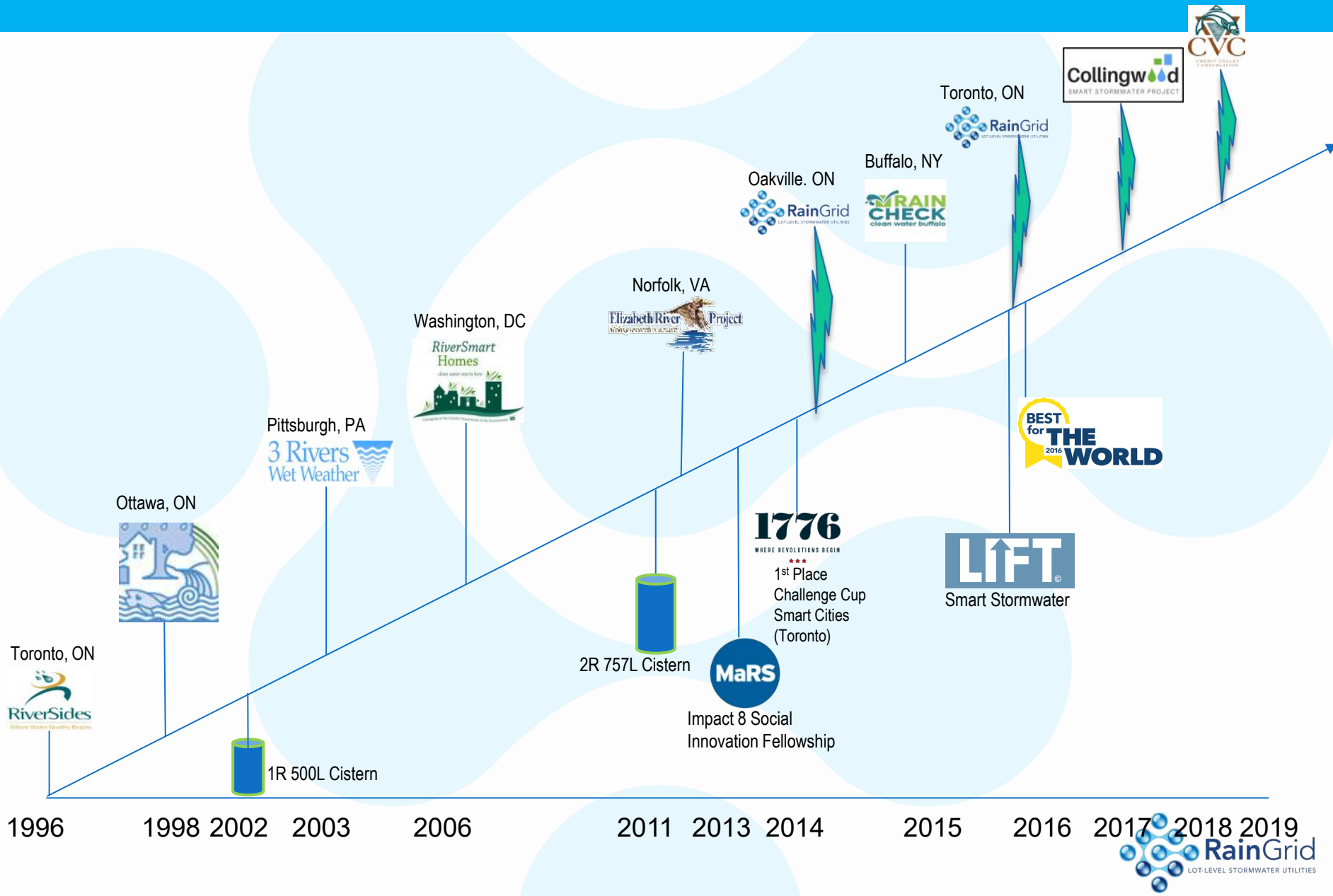
Stormwater Smartgrid™ 3.0 controllers w/ ultrasonic level, temperature and barometric pressure sensors, and a three-phase ¾" electrically actuated drain valve.

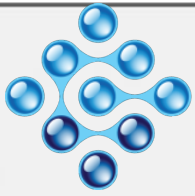
CAT5 cabled Power over Ethernet (PoE) and two-way data transmission via the household internet connection.

No dedicated reuse or groundwater recharge wells were built for this pilot due to restricted installation time.



## #Shifting RainBarrel Programs into Digital Community Utilities





# RainGrid **Global Demonstrations, Pilots and Deployments**

## Pending

Malmo, SE: VA-Syd, WSP, SWR

Lewes, UK: Southern Water

Los Angeles: GLASWC

San Francisco: SFPUC

Collingwood ON

Toronto ON

Waterloo ON

Silver Spring MD

Washington DC

New Orleans, LA



## **Stormwater Smartgrids™**

**Reliable, Measurable and Effective**

What else could you ask for....

**Data Driven**

**Resilient**

**Scalable**

**Aggregated**

**Property-based  
Community-scale**

**Cost – effective**

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