

# The RainReady Approach: Non-Structural Solutions to Urban Flooding

Dawn Walker | Center for Neighborhood Technology  
7<sup>th</sup> Annual Fox River Summit | March 22, 2019





# Agenda

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- About CNT and RainReady
- Urban Flooding Challenges & Solutions
- CNT's RainReady Program
  - ✓RainReady Community
  - ✓ RainReady Home
- Q & A

# Center for Neighborhood Technology



- **About Us**
- Founded in 1978
- Sustainable Urban Solutions
- Climate
- Water
- Transportation
- Community Development

## • **Community-Based Programs**

- Outreach + Education
- Community Organizing
- Resilience Planning
- Program Administration

# “Urban Flooding”

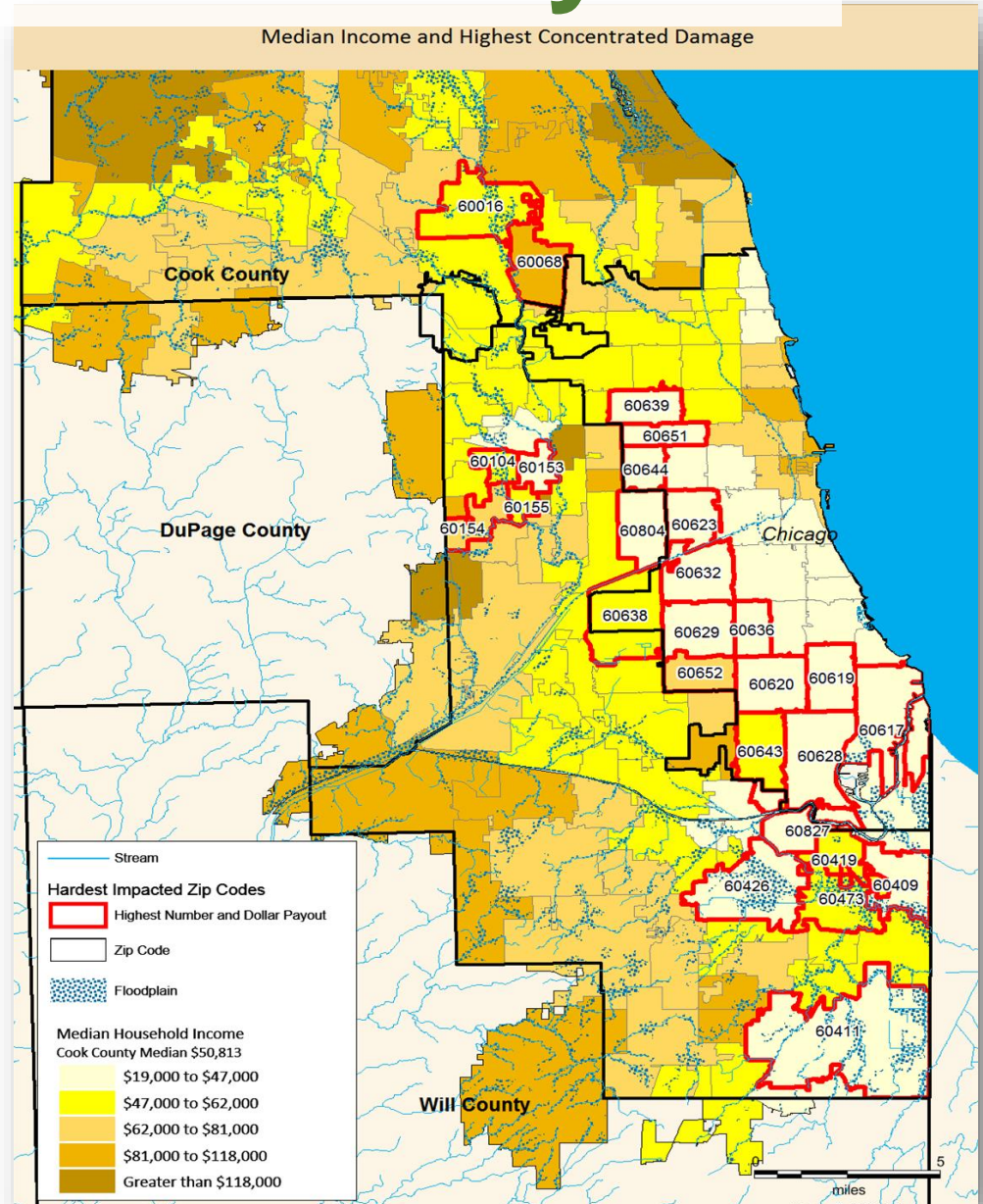
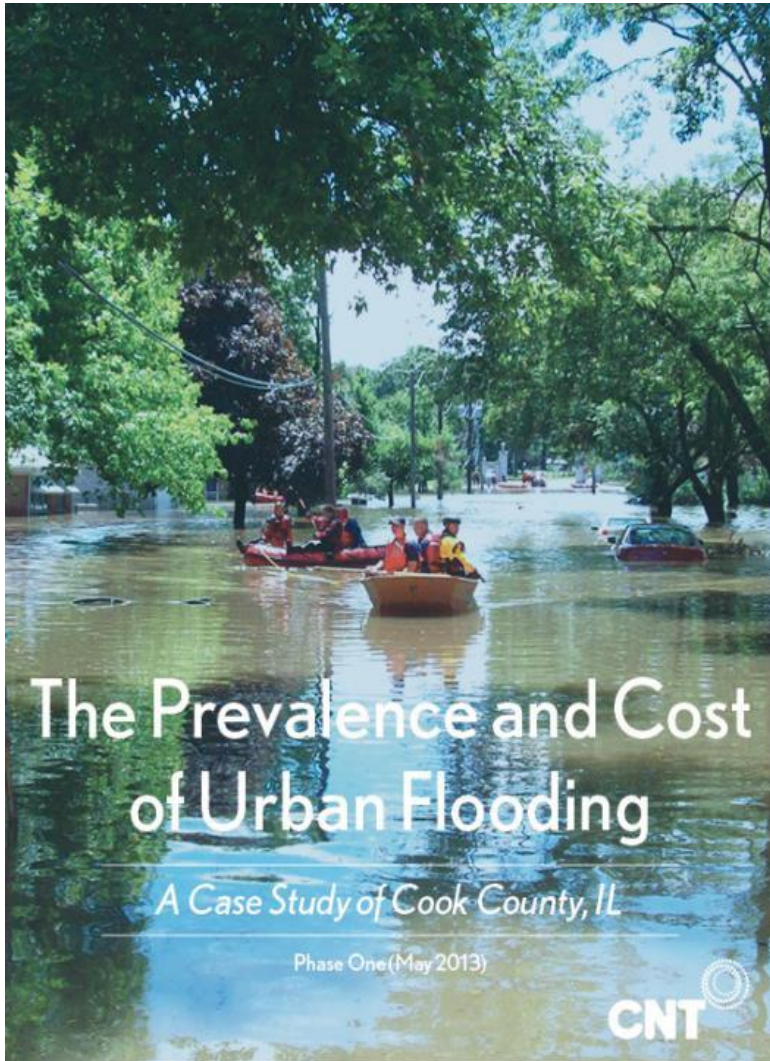


What does “flooding” mean to the average person?

What are the impacts of flooding?

What data has been collected on this issue?

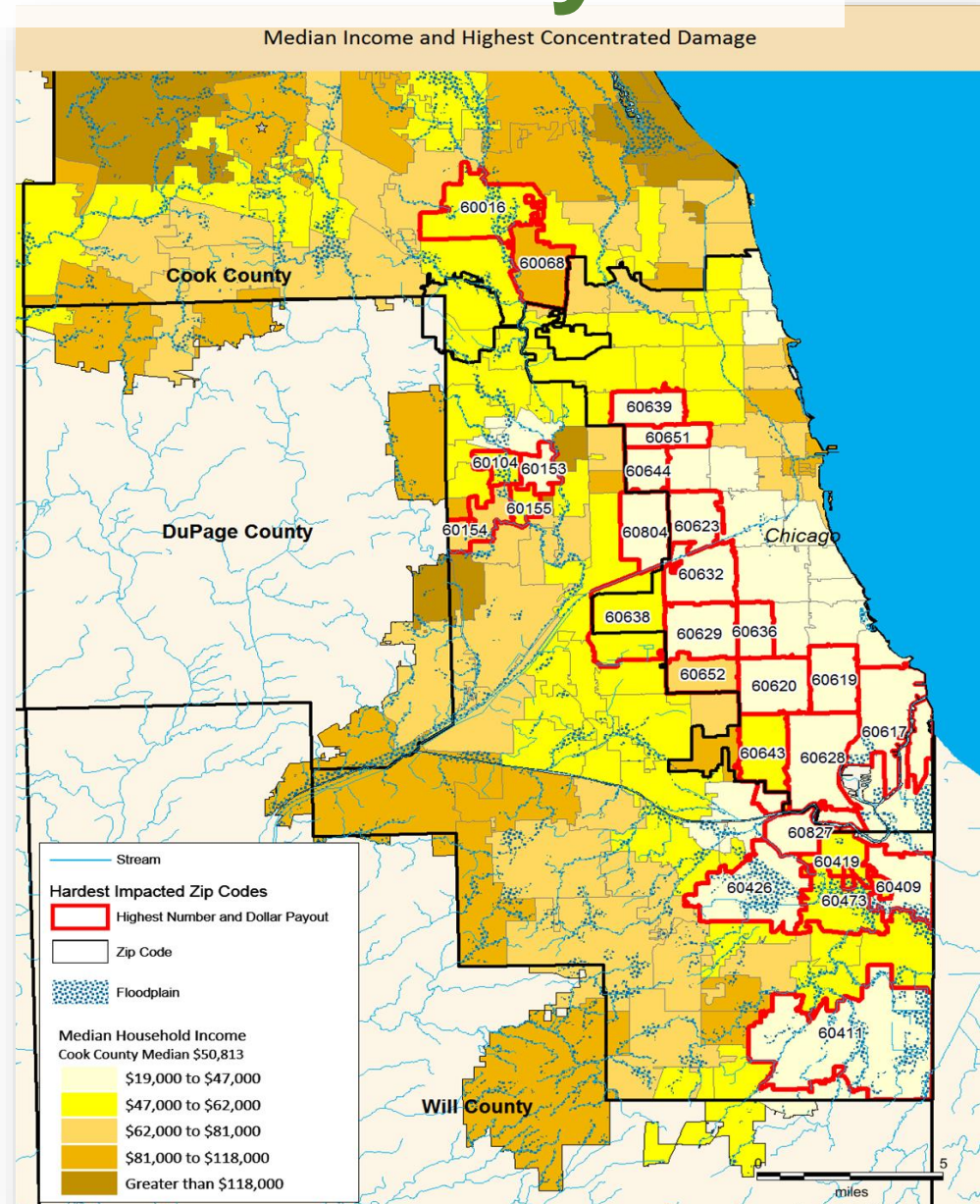
# Insurance Claim Analysis



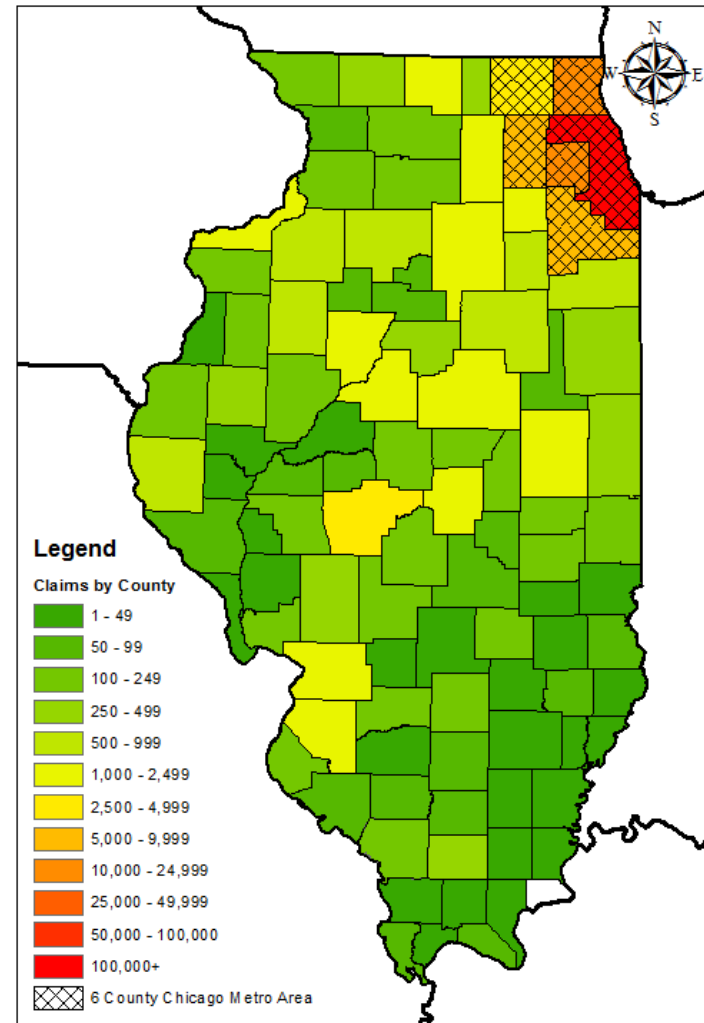
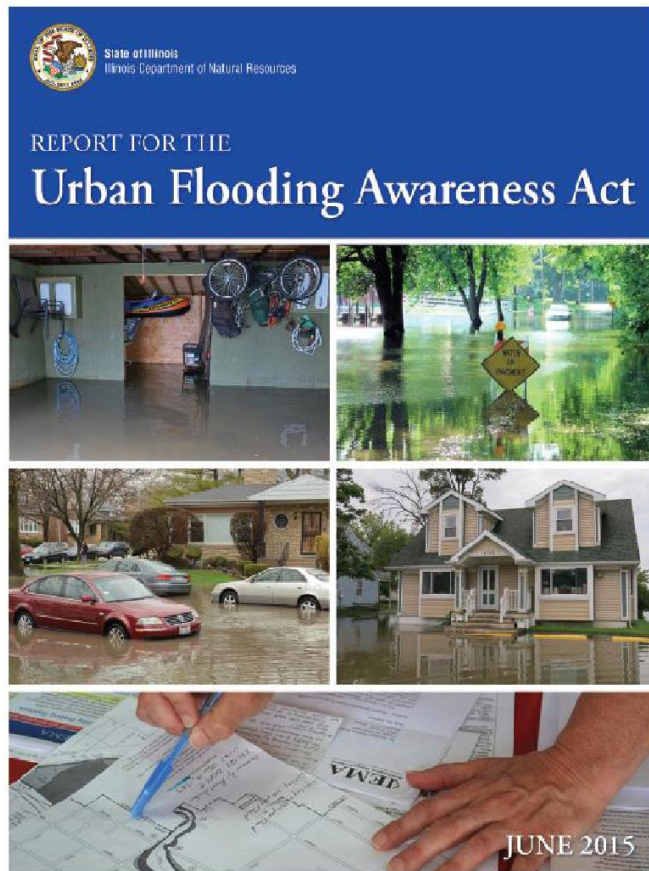
# Insurance Claim Analysis

## Major Findings

1. 92% flooding **outside** floodplain
1. Average household damage per flood: over **\$4,000**
1. **Low-income** areas affected most



# URBAN FLOODING AWARENESS ACT STUDY, IL



# Urban Flooding

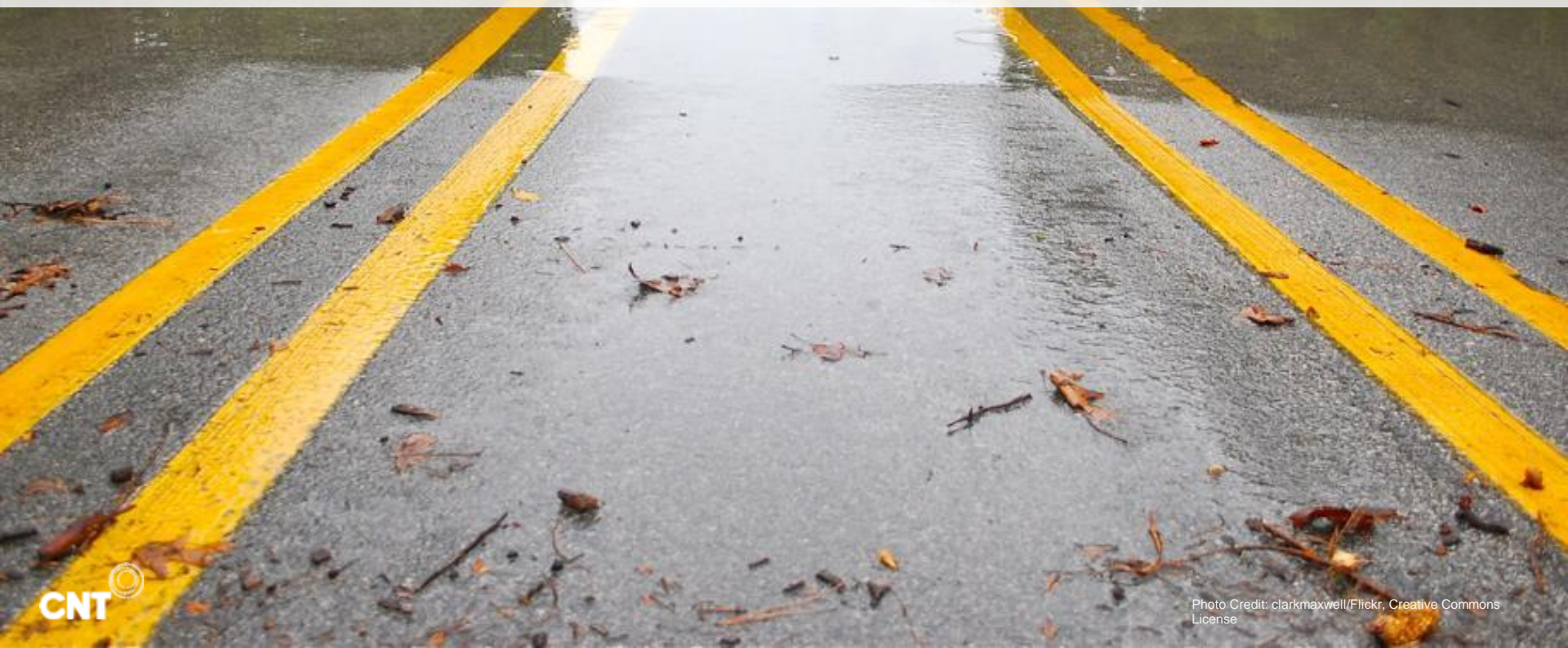
A photograph of a flooded urban street. The water is murky and reflects the sky. In the background, a bridge spans across the street. Trees line both sides of the street, and a speed limit sign is visible on the right. The overall scene is overcast and rainy.

Occurs when homes, yards or streets, are inundated with water from heavy rains or snow melt, damaging property, making travel difficult and dangerous. It also results from sewer water backing up through pipes into basements, and from water seeping through foundation walls.





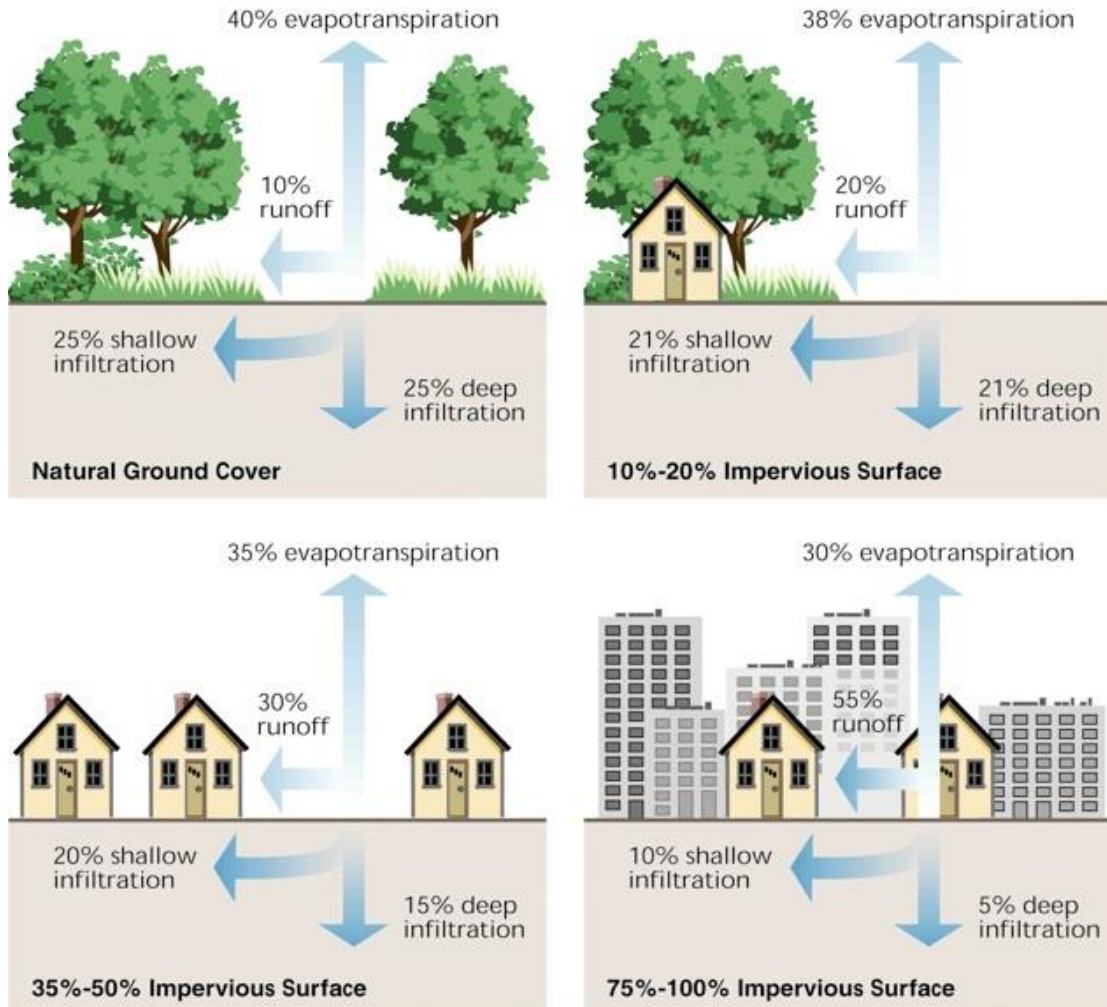
# Why is it happening?





2

# Increasing Development Intensity

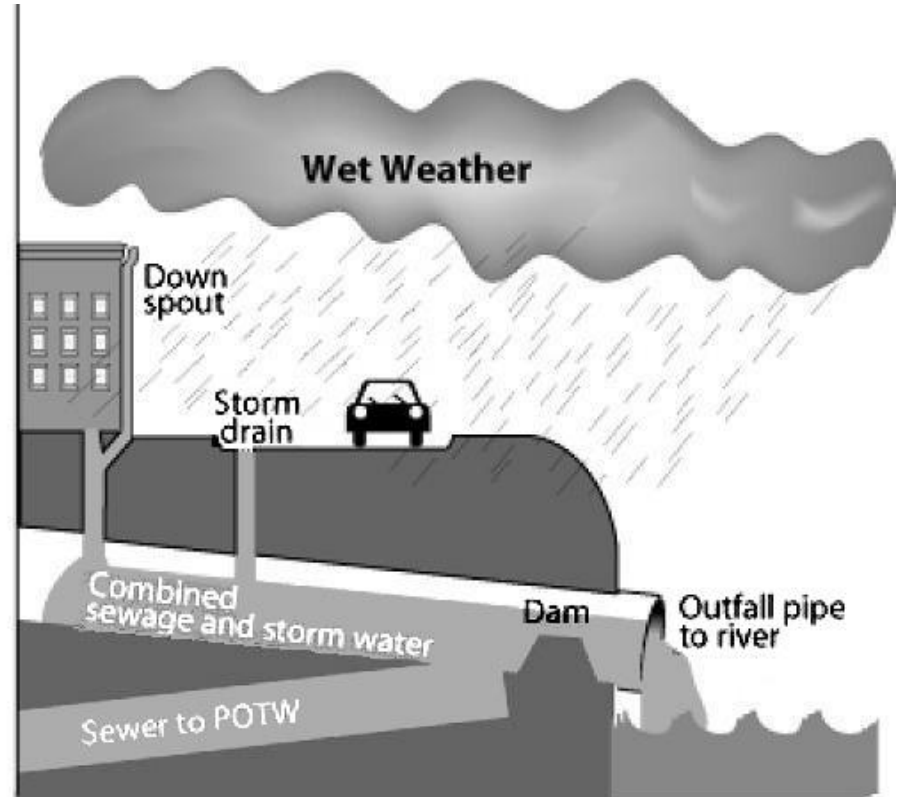
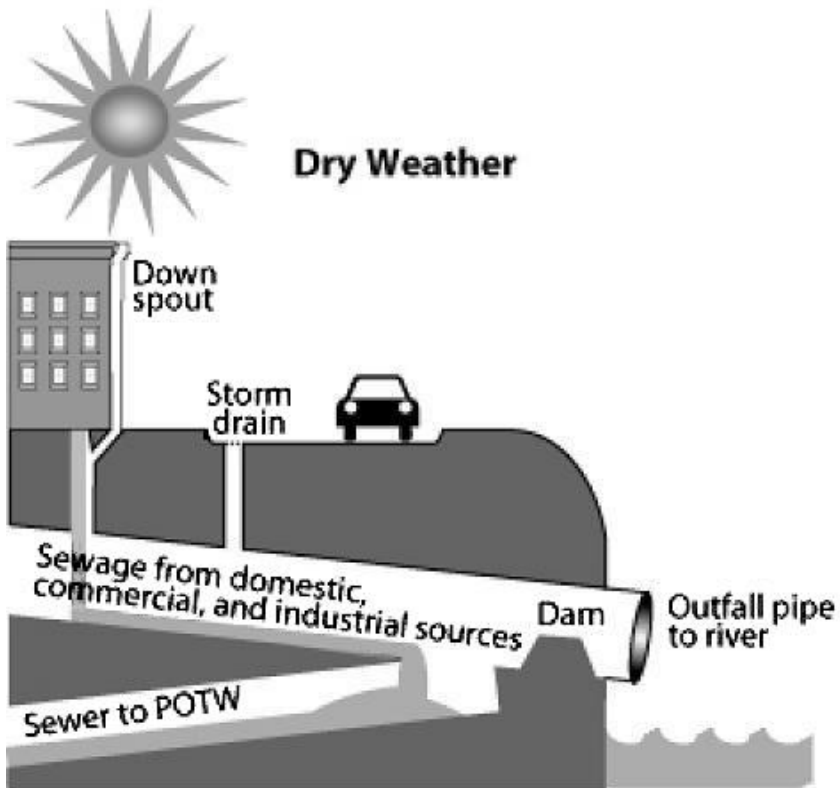


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# Aging Infrastructure



# Combined Sewer Systems



# Resulting Problems



**Basement Backups**



**Combined Sewer  
Overflow Pollution**

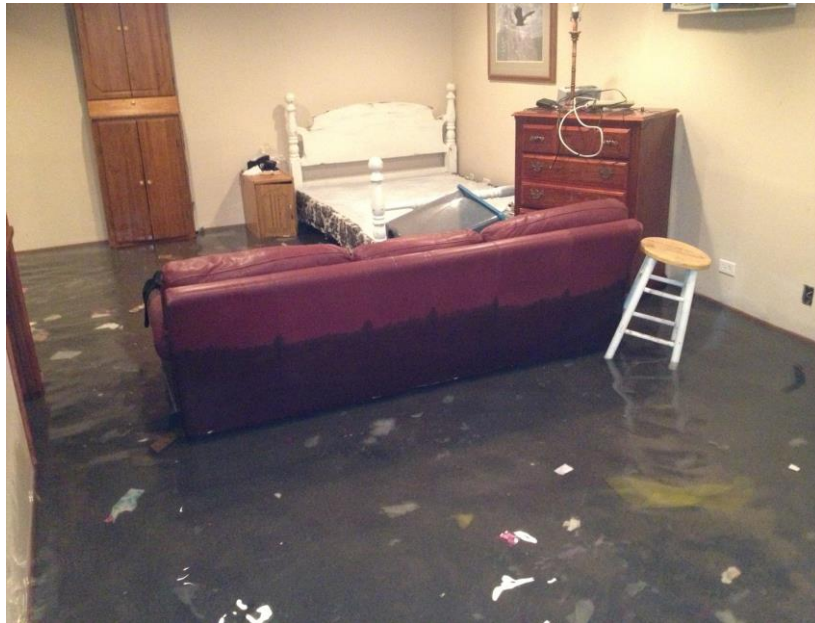


**Overland Flow: Flooded Streets**



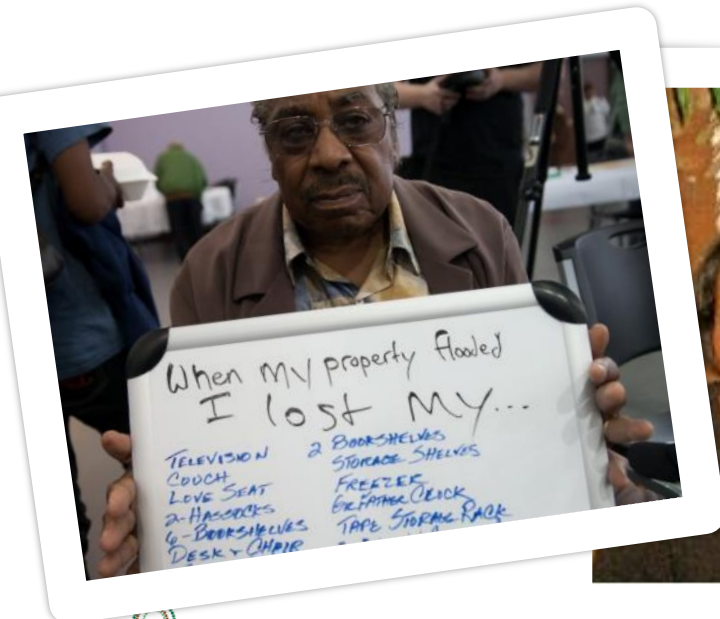
**Seepage through  
basement walls/floors**

# The Story of RainReady



# Inspired in part by: Resident Interviews + Community Meetings

- Health: Mold, Stress
- Finances: Lost wages, Home repairs
- Social: Isolation, Embarrassment





Requires a multi-tiered approach

Financial and regulatory regimes

Perception of roles and responsibility

Risk aversion

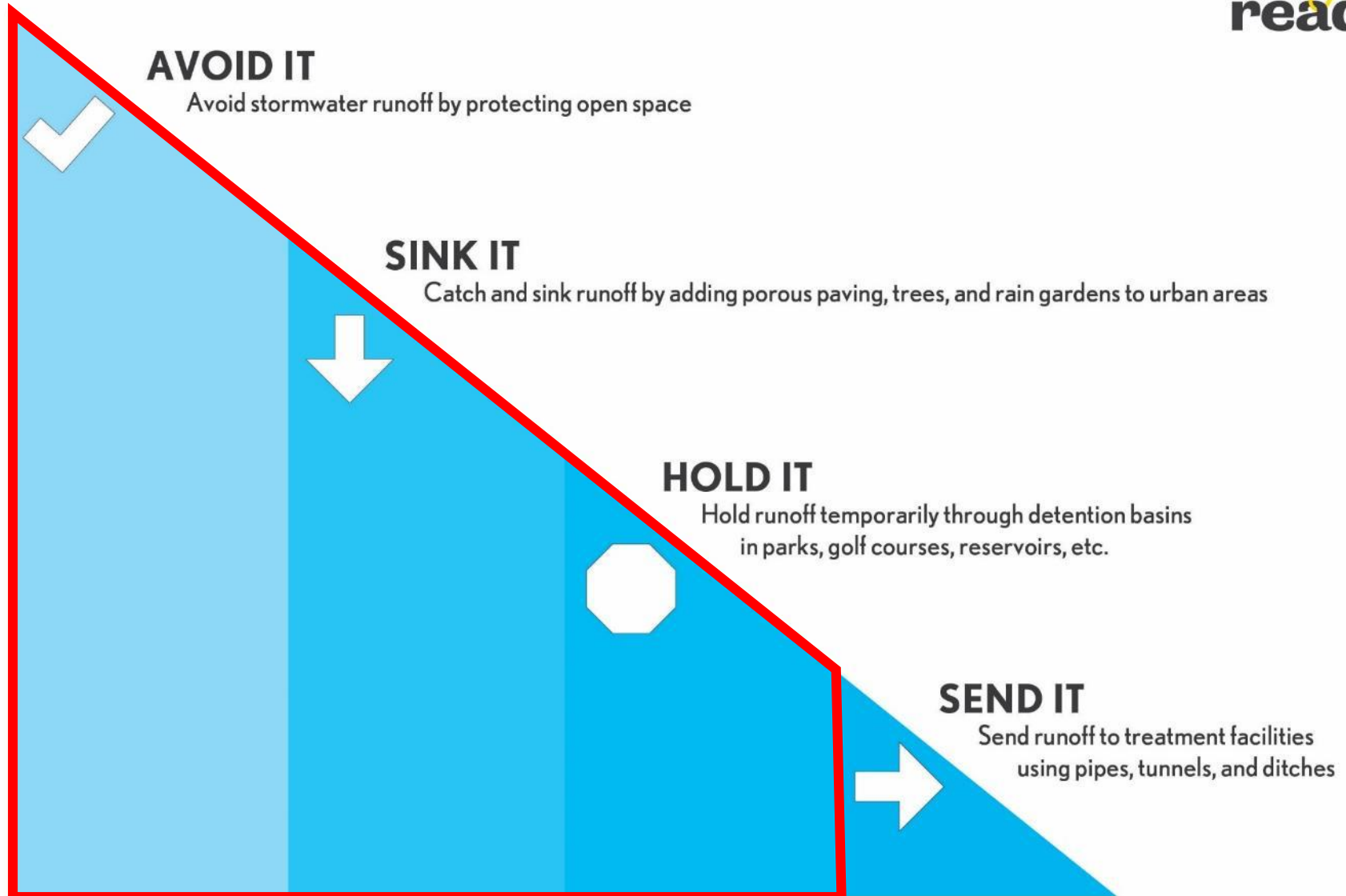
Community resistance and /or misconceptions

Success often depends on community education + engagement

Implementation is often slow and requires local champions

# Community Barriers to Effective Flood Mitigation

# Hierarchy for Stormwater Management



# Green Stormwater Infrastructure Best Practices

## Primary Benefits

- Addressing water quality and quantity (urban flooding) issues

## Common Interventions

- Bioinfiltration
  - Roadside/Parking Lot Rain gardens & Bioswales (w/ curb cuts)
  - Yard Rain gardens / Bioswales
- Disconnected Downspouts
- Trees
- Permeable Pavement – parking lots, sidewalks, bike lanes, alleys, basketball courts, turf fields, driveways, patios
- Constructed Wetlands







Welcome to  
Tanner Springs Park  
Park Rules

- 1. No dogs allowed
- 2. No alcohol
- 3. No food or drinks
- 4. No smoking



# Green Infrastructure is also a Conservation Tool



# Green Infrastructure and “Co-benefits”

Benefit	Reduces Stormwater Runoff				Increases Available Water Supply	Increases Groundwater Recharge	Reduces Salt Use	Reduces Energy Use	Improves Air Quality	Reduces Atmospheric CO <sub>2</sub>	Reduces Urban Heat Island	Improves Community Livability					Improves Habitat	Cultivates Public Education Opportunities
	Reduces Water Treatment Needs	Improves Water Quality	Reduces Grey Infrastructure Needs	Reduces Flooding								Improves Aesthetics	Increases Recreational Opportunity	Reduces Noise Pollution	Improves Community Cohesion	Urban Agriculture		
Practice																		
Green Roofs	●	●	●	●	○	○	○	●	●	●	●	●	◐	●	◐	◐	●	●
Tree Planting	●	●	●	●	○	◐	○	●	●	●	●	●	●	●	●	◐	●	●
Bioretention & Infiltration	●	●	●	●	◐	◐	○	○	●	●	●	●	●	◐	◐	○	●	●
Permeable Pavement	●	●	●	●	○	◐	●	◐	●	●	●	○	○	●	○	○	○	●
Water Harvesting	●	●	●	●	●	◐	○	◐	◐	◐	○	○	○	○	○	○	○	●



# The RainReady Program

- Launched in 2014
- Helping people manage flooding in a time of climate change
- Solutions across scales: Home to Watershed
- Suite of solutions to fight urban flooding:
  - RainReady Home
  - RainReady Community

# The RainReady Program and Approach

## Principles

- Based on community needs + goals
  - Incentivize community-wide benefits
  - Offer evidence-based solutions
  - Promote “fair share” approaches
- 
- **Suite of solutions to fight urban flooding:**
    - RainReady Home
    - RainReady Community





# RAINREADY COMMUNITY

# The RainReady Community Approach: Grassroots Action + Innovative Planning



- (1) Establish a shared understanding of flood risk
- (2) Achieve consensus on designs that are solution-oriented and that provide multiple benefits to the community, through resident education and empowerment



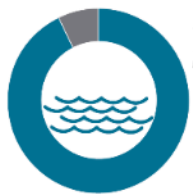
- (3) Provide municipal and community leaders with a clear roadmap for plan implementation



- (4) Pursue plan implementation concurrent to plan development by advancing priority projects

# (1) Defining Community Risk

- Mapping events
- Survey
- Stakeholder interviews



Respondents experiencing flooding problems\*

■ 93% Yes  
■ 7% No

71 survey respondents

**\$2,242** is the average amount spent on stormwater-related repairs

**\$9,314** is the average amount residents are willing to invest to reduce risk of future damage

How does water enter properties?

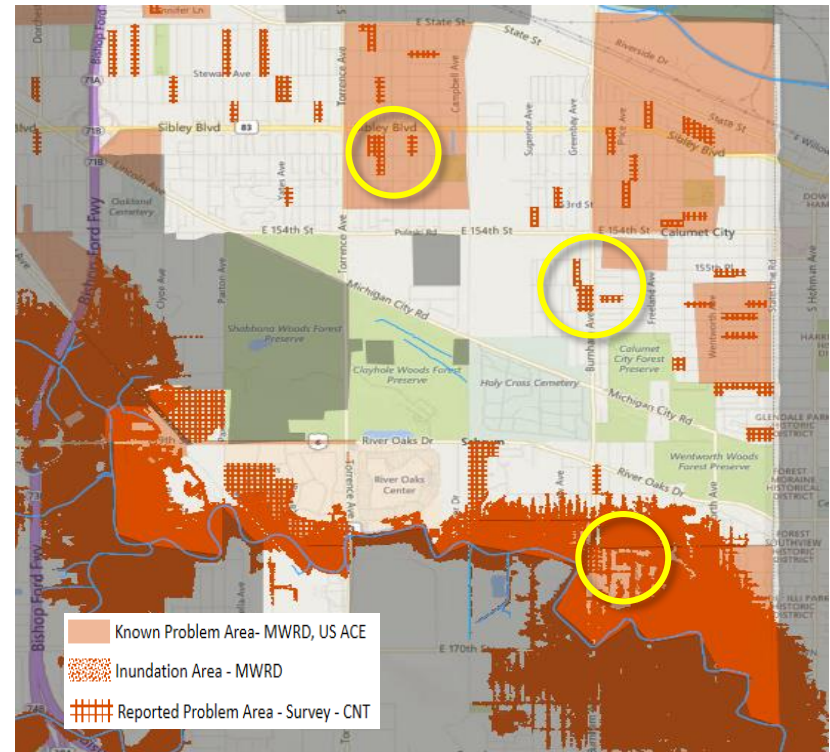


■ 24 Backing up through drains  
■ 28 Seeping through walls  
■ 10 Flowing through doors/windows  
■ 17 Pooling/ponding in yard  
■ 11 Overflow from street, creek, nearby body of water  
■ 2 Other  
■ 2 Don't know

What is the level of worry about flooding's impact on property value?



Extremely worried 30%  
Very worried 11%  
Moderately worried 22%  
Slightly worried 19%  
Not at all worried 19%



# (2) Educating and Empowering Local Champions for Planning and Implementation Resident Education

- Getting RainReady with Native Plants
- Living with water
- Proper maintenance of green infrastructure
- Resident leadership and workbook
- Green infrastructure tours
- One-to-one meetings

## Municipal Education Workshops

- Green infrastructure maintenance
- Floodplain 101
- Building effective partnerships



### RainReady Community Workbook



# (2) Solution-Oriented Design

Recommended interventions:



YOUR HOMES AND NEIGHBORHOODS



YOUR INDUSTRIAL CENTERS AND  
TRANSPORTATION CORRIDORS



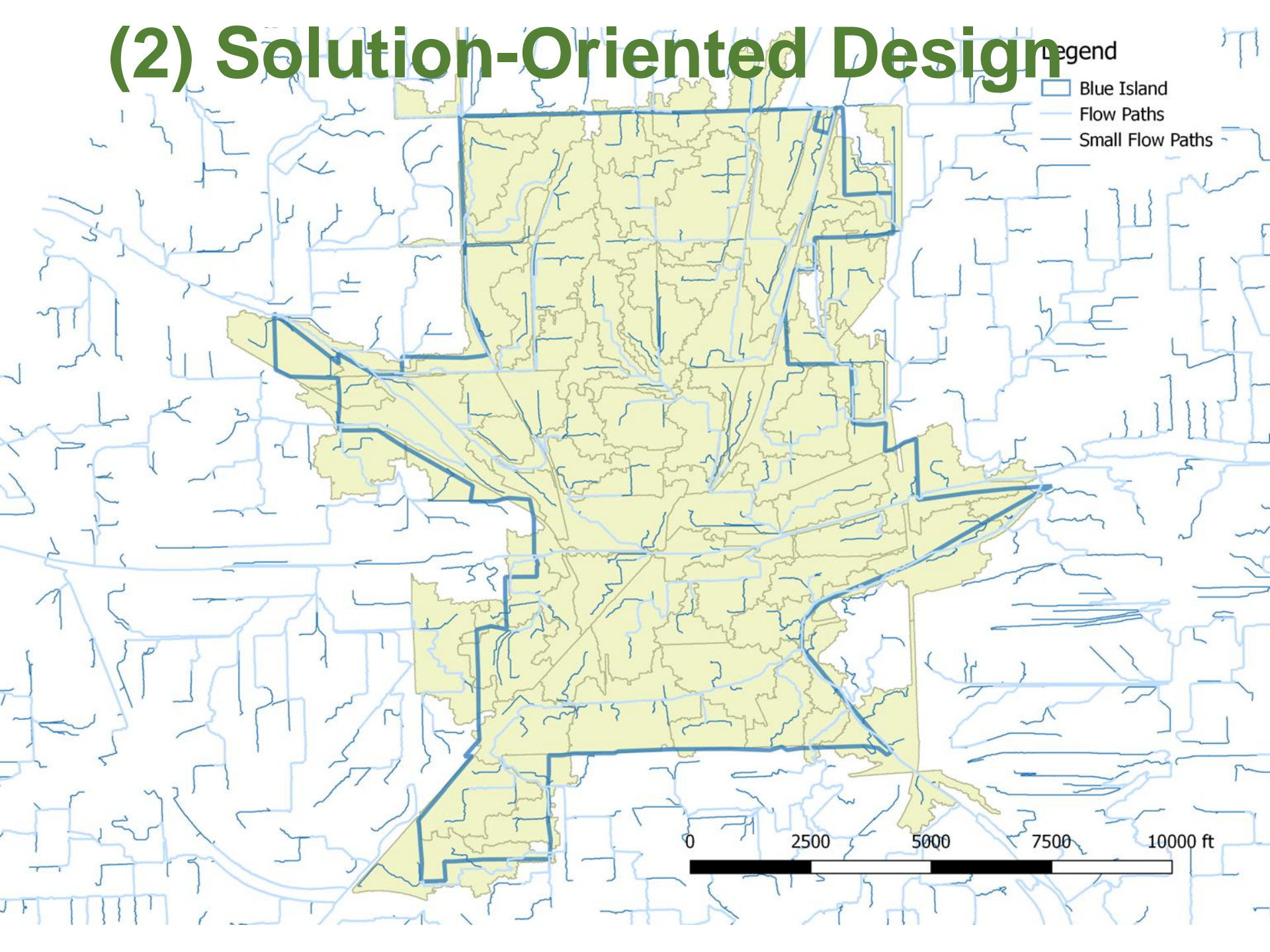
YOUR SHOPPING AREAS AND BUSINESS DISTRICTS



YOUR OPEN SPACE AND NATURAL AREA

# (2) Solution-Oriented Design

- Legend
- Blue Island
  - Flow Paths
  - Small Flow Paths





# (2) Solution-Oriented Design

## CNT/RainReady Resilience Planning Tool

**Catchment: 82** Priority Score **8**

Area: 3,363,243 sqft [view data](#)

[Print Snapshot](#)  
[Generate Permalink](#)

FLOOD RISK SCORE: 5 [expand](#)

OPPORTUNITY SCORE: 3 [expand](#)

### AVERAGE ANNUAL RAINFALL

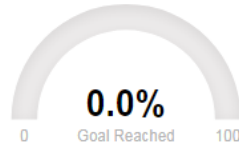
Annual Rainfall (in): 35.8 [edit](#)  
 Design Storm Rainfall (in): 5.5 [edit](#)  
 Design Storm Time (hrs): 24 [edit](#)

### REDUCTION GOAL

Precipitation Depth Capture (in): **1.0**



Volume Needed to Capture:  
280,270cuft (2,096,565 gallons)



Total Cost: **\$0**  
[show detail](#)

GREEN IMPROVEMENTS	Lifecycle Cost	% Towards Goal
<b>Roof Water Capture</b>		
<input type="checkbox"/> Green Roof	\$0	0%
<b>Roof Water Redirection</b>		
<input type="checkbox"/> Planter Boxes	\$0	0%
<input type="checkbox"/> Rain Garden	\$0	0%
<input type="checkbox"/> Rain Barrel	\$0	0%
<input type="checkbox"/> Cistern	\$0	0%
<b>Landscaping</b>		

Map Layers | Community Areas | Enter an Address or Catchment ID

Map | Streets | Transit | Bike | Expand Map | Hide Legend

Upstream → Selected Catchment → Downstream

Google | Map data ©2019 Google | 1 km | Terms of Use | Report a map error

FLOOD RISK  
low 0 1 2 3 4 5 high

### GREEN IMPROVEMENT CO-BENEFITS

**0%**  
Runoff Reduction

**\$0**  
Water Treatment Cost Reduction

**0%**  
Volume Capture Increase

[Show Details](#) | [View Methods](#)

# RainReady Community Case Study: The Village of Midlothian

## Village Snapshot

- Southern Cook County, Illinois
- 2.8 square miles
- Incorporated in 1927
- Total Population – 14,906
- Total Households – 4,319
- Median income –

*Source: 2000 and 2010 Census, 2015 American Community Survey, five year estimates*

## Flooding Problems

- Natalie Creek
- Village intersects three watersheds

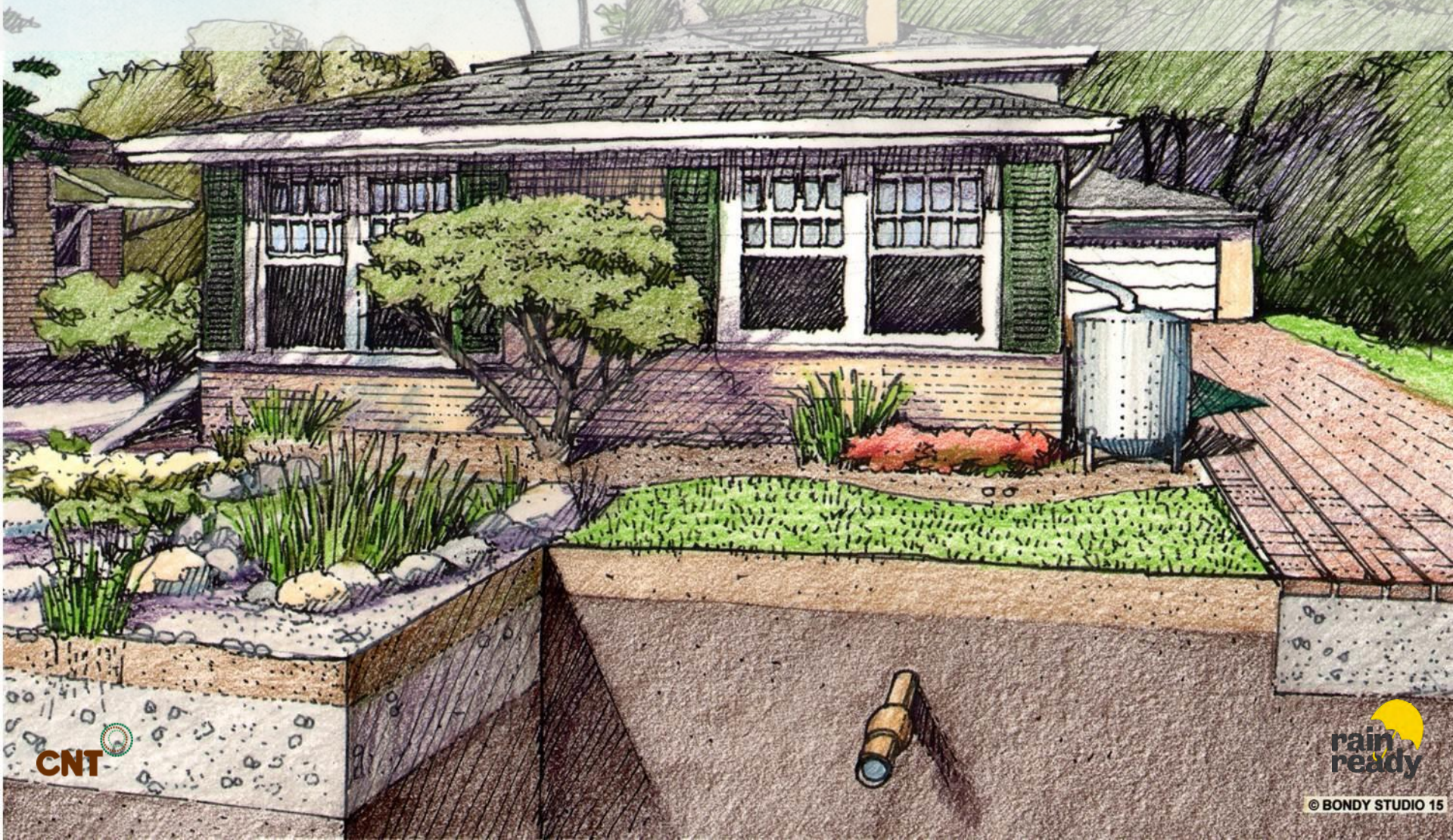
# Flooding Beyond the Floodplain

# Community Wins

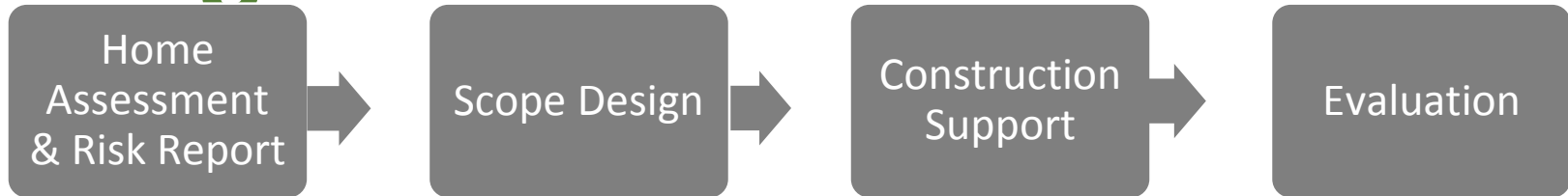
- ✓ Two rain gardens constructed
- ✓ Complete Streets Project: local technical assistance grant
- ✓ Active Trans Complete Streets Policy - \$80K
- ✓ Morton Arboretum impervious surface replacement - \$18K
- ✓ IGIG parking lot & rain garden
- ✓ Metropolitan Water Reclamation District Natalie Creek Project - \$9 M
- ✓ Local revenue funding: dedicated revenue streams “pending discussions”
- ✓ Resident Leadership
- ✓ Over \$10 million for flood mitigation projects



# RAINREADY HOME



# RainReady Home Program Design



## Key Projects

- RainReady Oak Park
- Enterprise Community Partners Resilience Cohort
- Chicago Residential Flood Assistance Program
- Cook County Residential Resilience Program



# RainReady Home Case Study: RainReady Oak Park

Outreach + Education



Assessment +  
Education



Risk Report + Scope  
Design



Construction  
Verification



Evaluation



# Outreach + Education

Your Location

Map Satellite

Linden Ave, Oak Park, IL 60302, USA ✕

Year Built: 1925  
Land Square Feet: 6250  
FEMA flood risk: Minimal Risk

Do your neighborhood streets flood when it rains?

Yes  No  I don't know

**Tip:** Take a look at your street when it next rains, and take photographs. Look to see if it is flooding in areas where there is a street sewer grate. This might help identify the cause of the street flooding. The sewer grate could be clogged with litter or leaves. If the sewer grates are clear, but street flooding still occurs, your municipality may have installed restrictor valves in the street's sewer inlet. The purpose of these devices is to slow the flow of water entering the sewer system. This reduces the risk of sewage and stormwater runoff backing up into your basement.

## Program Outreach

- Community meeting
- Direct email
- Newsletter
- Social media

## Flood Education

- My RainReady  
[my.rainready.org](https://my.rainready.org)
- Parcel-specific data
- Guided questionnaire
- Flood protection tips
- RainReady Socials



# Assessment + Education



## Key Homeowner Concerns

- Seepage / Mold
- Sustainability
- Beautification

## Homeowner Education

- Benefits of GI
- Site drainage
- Ongoing Maintenance

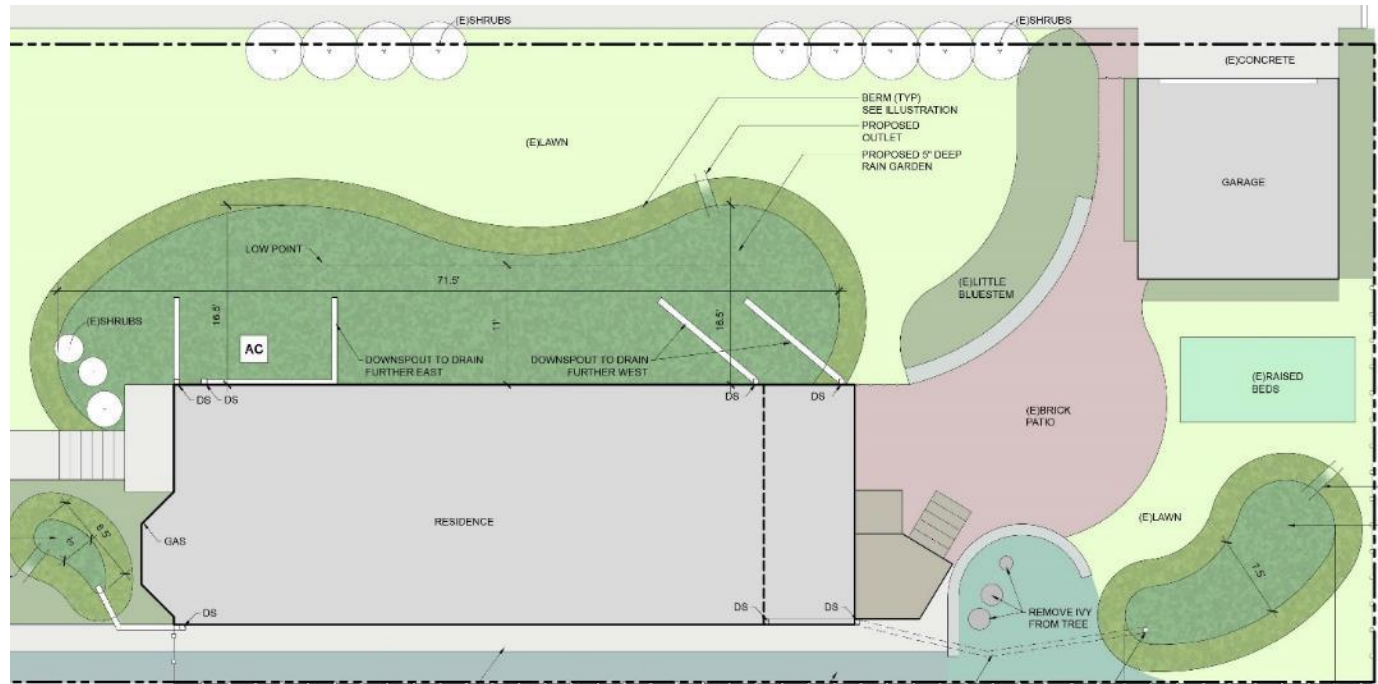
# Risk Report

+

# Scope Design

## Landscape and Building Exterior Observations

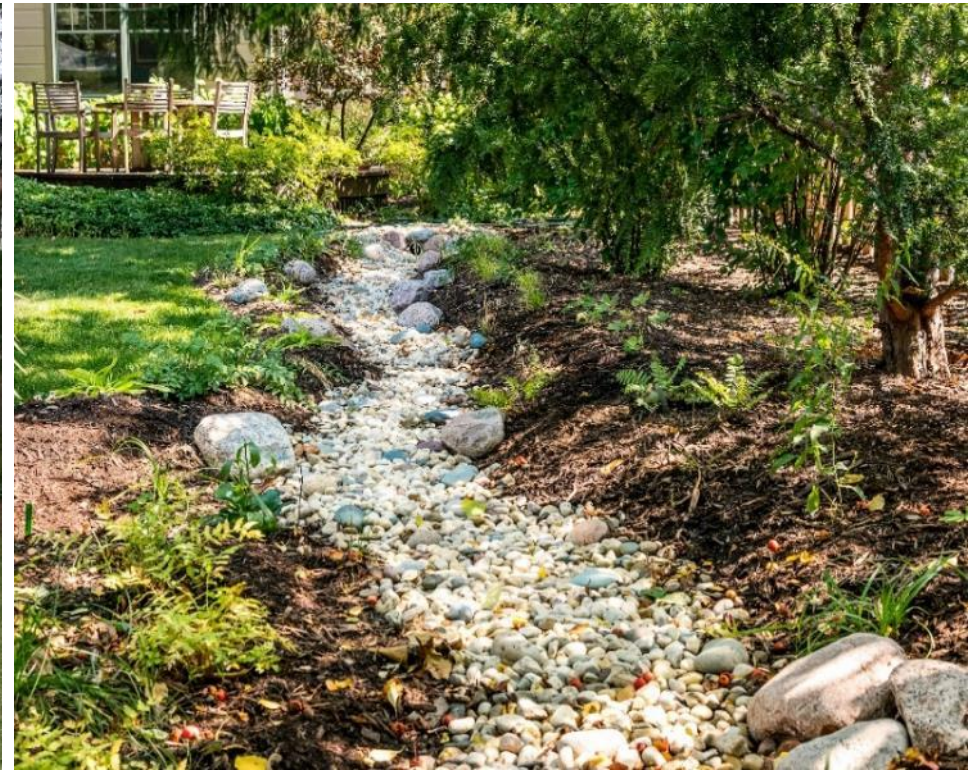
- The south yard is unevenly graded.
- The downspouts are discharging into low spots that can trap and hold water against the south foundation wall.
- The soil texture is a clay loam.



# Construction Verification



*Before*



*After*

# Private Investme nt

**LEVERAGE ACHIEVED:**  
**\$1 : \$1.8**

**Average Project Cost:**  
*\$3,845*

**Average Grant:**  
*\$1,300*

**Average Private  
Investment: \$2,345**

**Total Private Investment:**  
*\$26,914*



# Tips to Get Started + Wins

## Possible Funding Sources

- Existing sewer funding to develop a cost-share program
- Community Development Block Grant (Entitlement Communities)

## Program Administration

- Build on existing sewer cost share or grant program
- Fund Administration– Public Works
- Program management – Program staff

## Wins

- Receive buy in for larger capital projects
- Shared stormwater responsibility
- Gateway to green infrastructure
- Community education

# Our Program Partners





# QUESTIONS ?

**DAWN WALKER**

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