



# **RainReady – Carrboro, NC**

**Town Council Presentation – 5/5/2020**





# CNT

## resilient, sustainable and livable cities for everyone

CNT's mission is to make cities work for everyone. CNT works at the intersection of environmental sustainability, social equity, and technology—with particular attention on creating efficient and affordable solutions for low-income communities and communities of color.



# Process

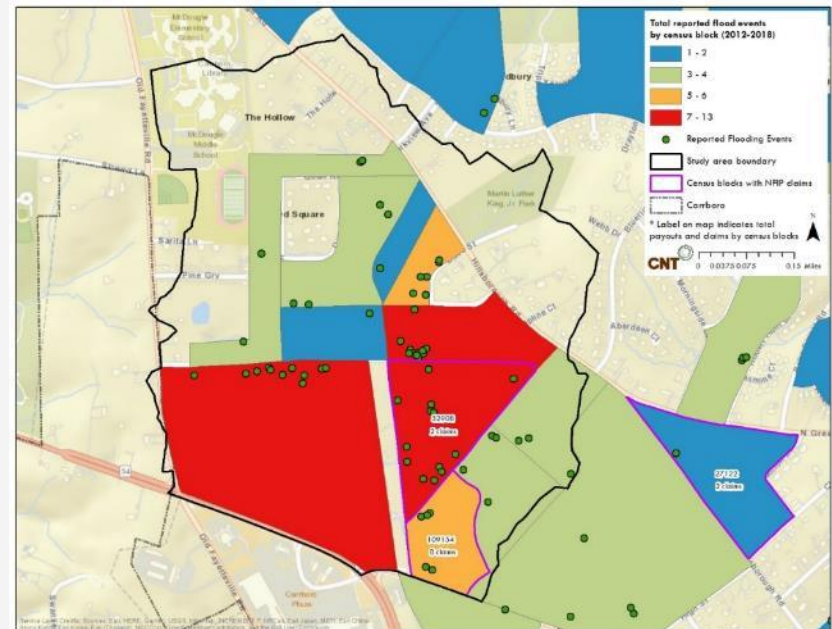
- Gather Existing Conditions
  - Review public data
  - Survey Residents
  - Interview Town Staff
- Recommend Program Design
  - Develop retrofit templates
  - Estimate costs and benefits
  - Identify engagement needs
  - Define priority targets
  - Identify evaluation measures
  - Conduct case study



# Existing Conditions

In Carrboro, flooding can generally be attributed to the following primary factors:

- Climate
- Geology
- Land Use and Development
- Stormwater Infrastructure





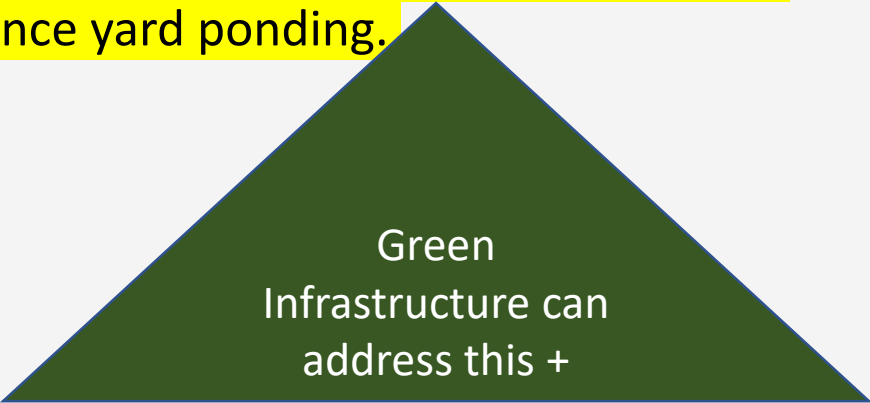


# Survey Results

- Note that these are suggestive and not scientific

## Lived Experience

- More than 1/2 of respondents were at least moderately worried about the impact of flooding on their property.
- Over 60% of respondents have had flooding problems for at least one year.
- Most respondents overall and about half of those who experience flooding, still acknowledge a gap in understanding or the need for help.
- Flooding from creeks overtopping their banks accounts for about 40% of respondents' flooding issues as they see them, but 65% of respondents indicate that they currently experience yard ponding.



Green  
Infrastructure can  
address this +

Respondents will  
contribute and are  
interested in green  
infrastructure

# Survey Results

## Resident Responses to Flooding

- More than half of respondents have invested in some kind of flood mitigation strategy. Reported costs are in line with what we've seen (median \$3,000, adjusted average \$6,308).
- More than 2/3 of respondents have repaired gutters and downspouts, which are the basic first steps.
- Two thirds of respondents are willing to invest some amount of money to reduce their risk of flood damage (median \$2,000, average \$2,000).
- While survey responses would suggest that rain barrels, cisterns, and french drains have been the most popular solutions thus far, almost 50% indicated they would pursue a rain garden with some assistance.



# Program Recommendations

## Outreach and Education

- 3 Audiences
- Clear, non-technical summary of past efforts
- Solution involves homeowner participation
- Identify local champions
- Consider offering assessments

## Community Partnerships

- Public Schools
- Higher Ed Institutions
- Resident-led conservation groups
- Environmental Non-profits
- Local Businesses - landscapers, nurseries, etc.
- Conflict Resolution Center





# Audience A

- Homes in floodplain with extreme Flooding
- Solutions: elevating homes or relocation
- Could (some already do) benefit from federal disaster funding

# Audience B

- Homes adjacent to floodplain
- Concerns about severity of future flooding
- Solutions: green and gray infrastructure

# Audience C

- Homes not near floodplain
- Experience yard ponding or non-structural flooding
- Solutions: green infrastructure can offer meaningful benefits





## Program Recommendations

### Policy and Regulations

- Public Purpose Doctrine
- Limitations to support structural improvements
- Town cannot support maintenance on private property

### Financing and Funding

- Stormwater utility could contribute but may not be enough
- State Revolving Loan Fund
- CDBG
- Municipal Bonds (GASB 62 rules)
- Affordability





# Program Recommendations

## Program Eligibility

- Building Types
  - Owner occupied
  - SFD or 2-4-unit buildings
- Eligible Green Infrastructure Measures
  - Depaving
  - Rain gardens
  - Bioswales
  - Rain Barrels/cisterns
  - Dry wells
  - Others
- Eligible Applicants
  - Town residents
  - Disconnect downspouts
  - Others
- Eligible Costs
  - Labor and Materials
  - Permit fees
  - Some exceptions





### Short Term (1 Year)

- Town Staff and SWAC designs, pilots, coordinates small-scale residential green infrastructure program
- Establish interdepartmental coordination
- Identify key partners
- Develop Communications Materials
- Amend LUO to exclude native vegetation from nuisance
- Budget for pilot
- Continue to support owners in floodplains seeking federal support

### Mid Term (2-4 Year)

- Continue community education and engagement.
- Investigate financing and funding options.
- Use lessons learned from pilot to launch Town-wide residential green infrastructure assistance program.
- Continue larger stormwater program development.
- Coordinate stormwater management projects that address federal and state water quality regulatory requirements.
- Continue to support owners in floodplains seeking federal support

### Long Term (5+ Year)

- Evaluate program success, including financing and funding and program sustainability.



# What informs these recommendations? (background)



# Hierarchy for Stormwater Management



## **AVOID IT**

Avoid stormwater runoff by protecting open space



## **SINK IT**

Catch and sink runoff by adding porous paving, trees, and rain gardens to urban areas



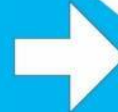
## **HOLD IT**

Hold runoff temporarily through detention basins in parks, golf courses, reservoirs, etc.



## **SEND IT**

Send runoff to treatment facilities using pipes, tunnels, and ditches



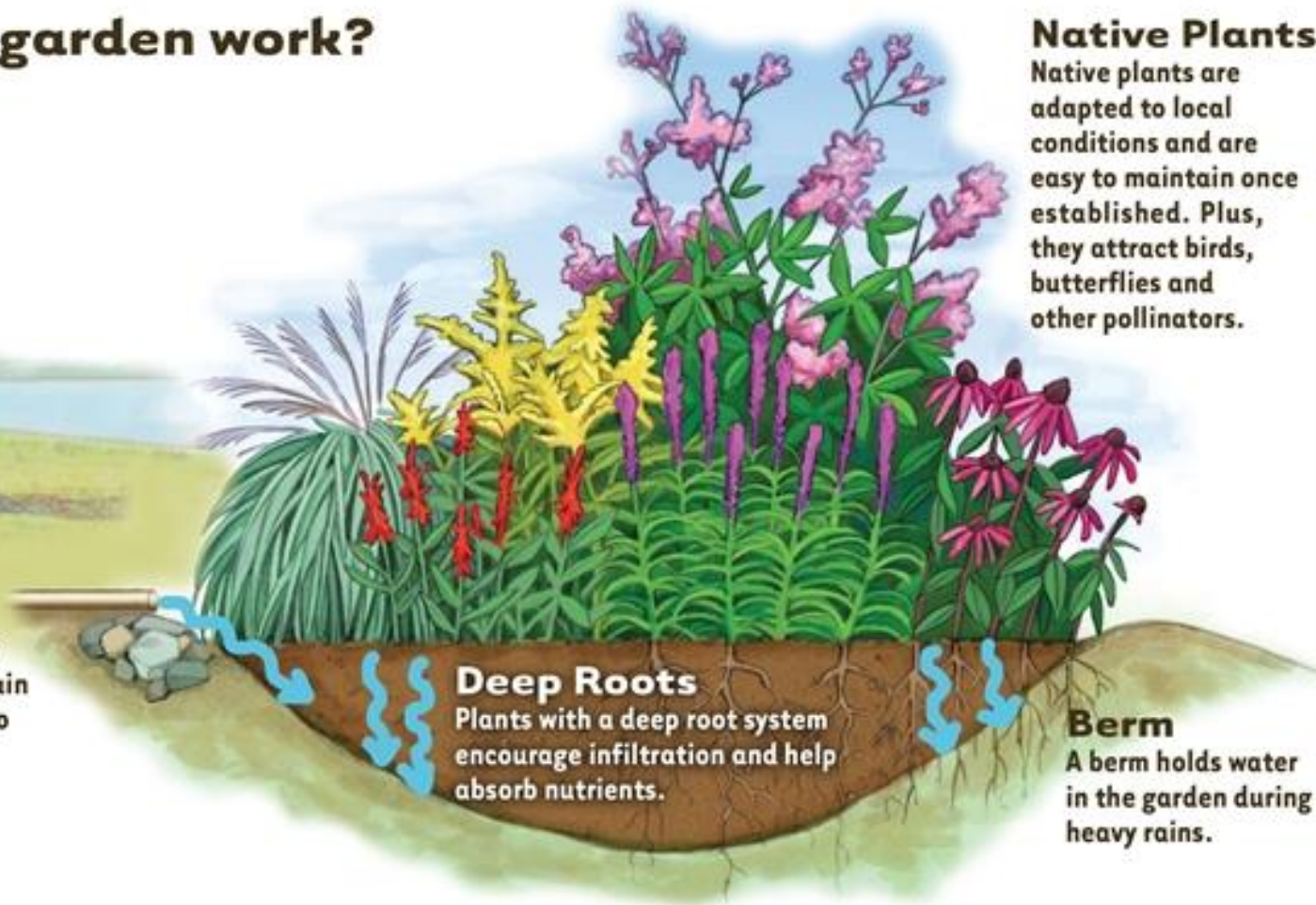


# How does a rain garden work?



## Gutters & Down Spouts

Assist with directing rain water from your roof to your rain garden.



## Deep Roots

Plants with a deep root system encourage infiltration and help absorb nutrients.

## Native Plants

Native plants are adapted to local conditions and are easy to maintain once established. Plus, they attract birds, butterflies and other pollinators.

## Berm



















A berm holds water in the garden during heavy rains.







# Green Infrastructure and “Co-benefits”

Benefit	Reduces Stormwater Runoff												Improves Community Livability						
	Reduces Water Treatment Needs	Improves Water Quality	Reduces Grey Infrastructure Needs	Reduces Flooding									Increases Available Water Supply	Increases Groundwater Recharge	Reduces Salt Use	Reduces Energy Use	Improves Air Quality		
Practice																			
Green Roofs	●	●	●	●	○	○	○	●	●	●	●	●	◐	●	◐	◐	●	●	
Tree Planting	●	●	●	●	○	◐	○	●	●	●	●	●	●	●	●	◐	●	●	
Bioretention & Infiltration	●	●	●	●	◐	◐	○	○	●	●	●	●	●	◐	◐	○	●	●	
Permeable Pavement	●	●	●	●	○	◐	●	◐	●	●	●	○	○	●	○	○	○	●	
Water Harvesting	●	●	●	●	●	◐	○	◐	◐	◐	○	○	○	○	○	○	○	●	



Yes

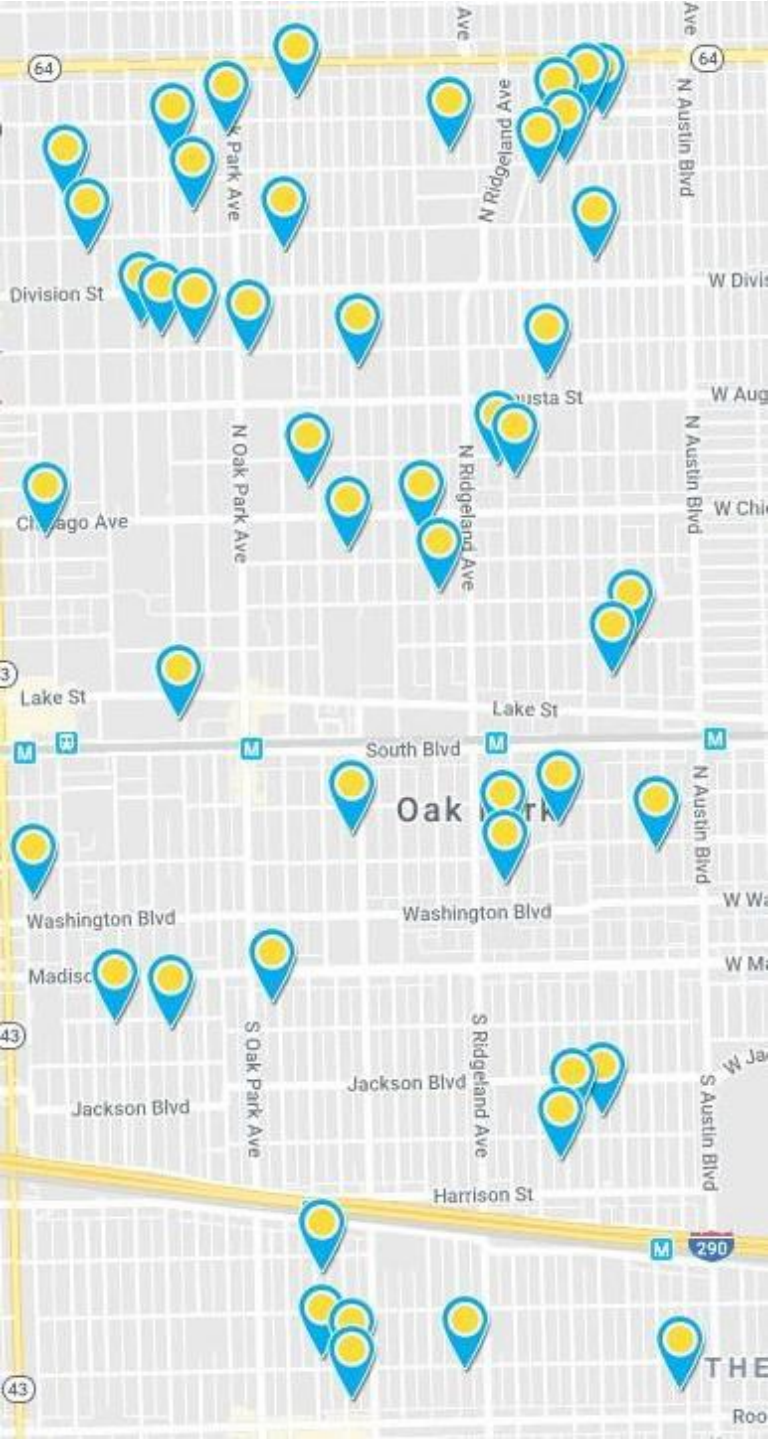


Maybe



No





# RainReady Oak Park (IL)

## Completed Installations

- 36 Rain Gardens or Bioswales
- 4 Dry Wells
- 6 Depavings

## Stormwater Management

Estimated **724,000** gallons of rain  
diverted from Oak Park's sewer system



# Questions?

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