



# Throwing Shade on Indy: *Planting Trees for Stormwater and Community Health*

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# Overview

- Purpose and Goals
- Evaluation
  - Prioritizing Planting Areas
  - Capture and Storage
  - Benefit
- Case Study
- Benchmarking
- Schedule and Metrics
- Questions





# Purpose and Goals

Purpose: Evaluate feasibility and benefit of planting trees within CSO area by the end of Citizens' Consent Decree

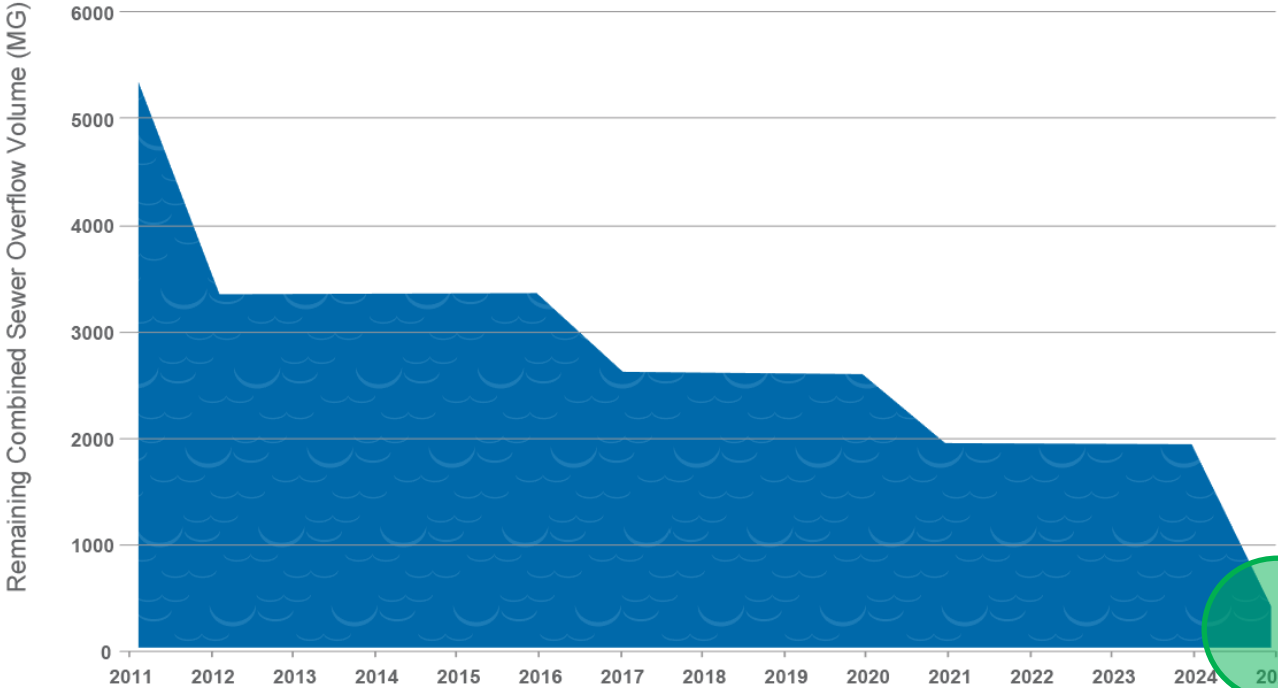
## ➤ Goals:

- Reduction of stormwater
- CSO Peak Shaving
- Community Health



# Background – CSO Consent Decree

## CSO Reduction to Waterways



- 2011**  
Early action projects and updated hydraulic model
- 2012**  
Belmont AWTP and LS-507 improvements online
- 2017**  
DRTC and Southport AWTP improvements online
- 2018**  
Eagle Creek CSO abatement project online
- 2021**  
White River and Lower Pogues Run Tunnels online
- 2025**  
Fall Creek and Pleasant Run Tunnels online

AWTP: Advanced Wastewater Treatment Plant  
BG: Billion Gallons

CSO: Combined Sewer Overflow  
DRTC: Deep Rock Tunnel Connector

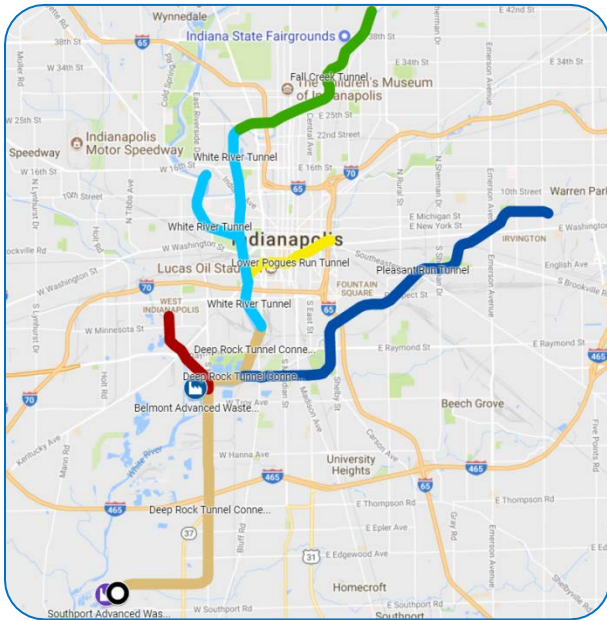
LS: Lift Station  
MG: Million Gallons

Note: All dates indicate December 31 of year shown

# Grey and Green

## Grey

- Advanced Wastewater Treatment Plants
- DigIndy Tunnel System
- Offline Storage



## Green

- CSO 033
- 10,000 Trees Program



# Program Enhancements



Environment

Business



Community



- Green / Sustainable Solutions
  - Additional reduction of CSO
  - Environmental Benefit
- Coordination with business
- Limiting community impacts
- Community ownership and engagement

➤ What incorporates all three??



A stylized graphic of a tree with a green trunk and two green leaves, one at the top and one at the bottom right. The trunk is a vertical line that also serves as the letter 'T' in the word 'Ten'.

# 10 thousand TREES

To help keep Indy's Waterways Clean!

Citizens Energy Group, in partnership with Keep Indianapolis Beautiful and the City of Indianapolis

# Program Partners



*keep*  
**Indianapolis**  
*beautiful* INC.

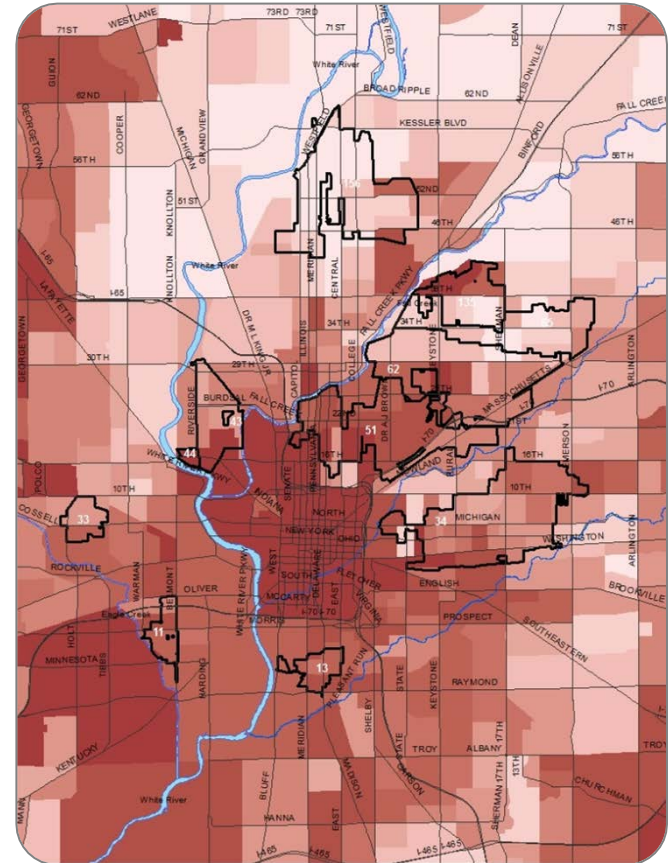


- Community Partner
- Promoting neighborhood and natural greenspace
- Community Forestry and Youth Tree Teams
- City adoption of trees after initial maintenance



# Program Evaluation

- Partner with Keep Indianapolis Beautiful
- GIS model and experiential knowledge
- Identify plantable spaces
  - CSO area
  - High impervious surface area
  - High plantable space
  - Low existing canopy
  - Right-of-way

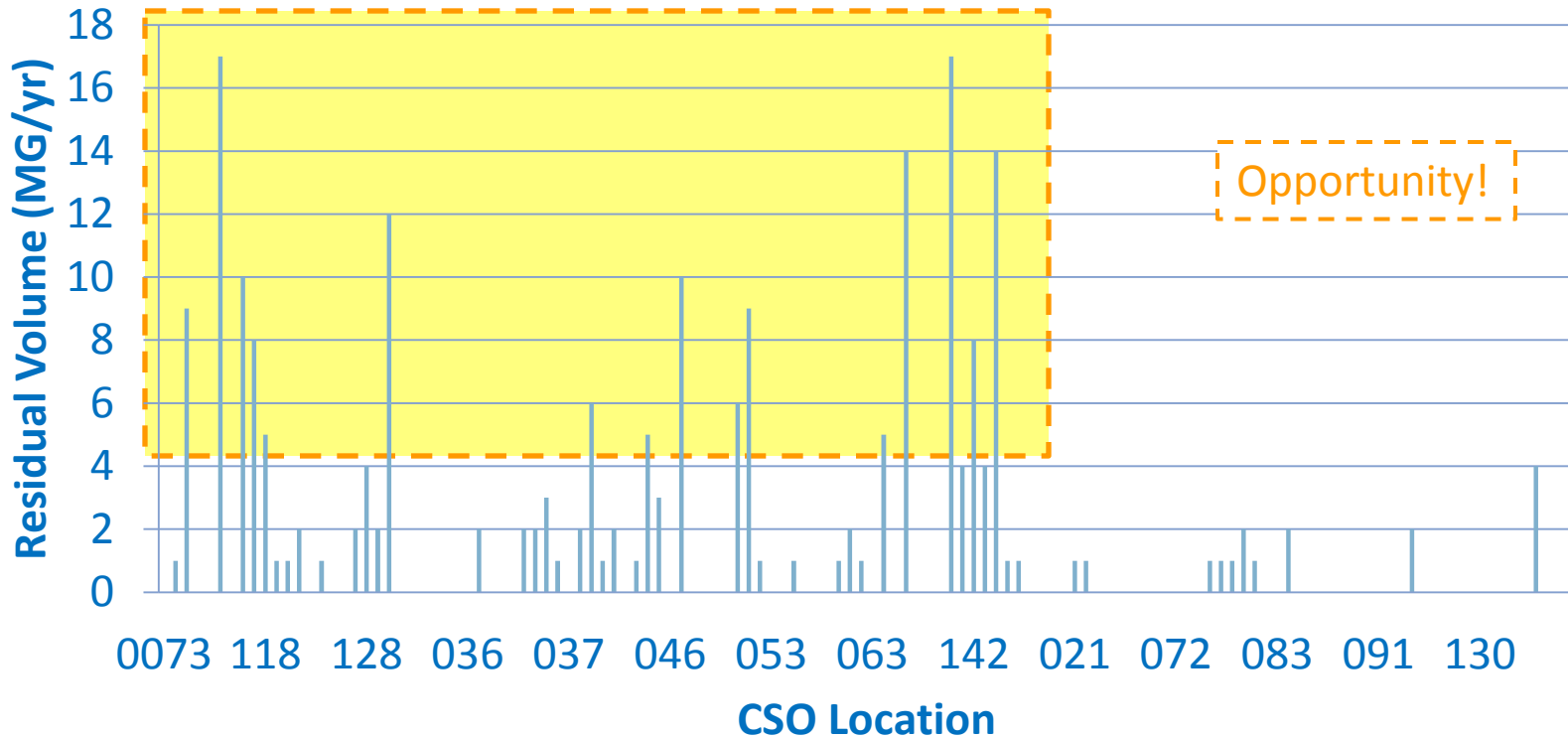


*Prioritized CSO Basins – KIB Hot Spot Tool*

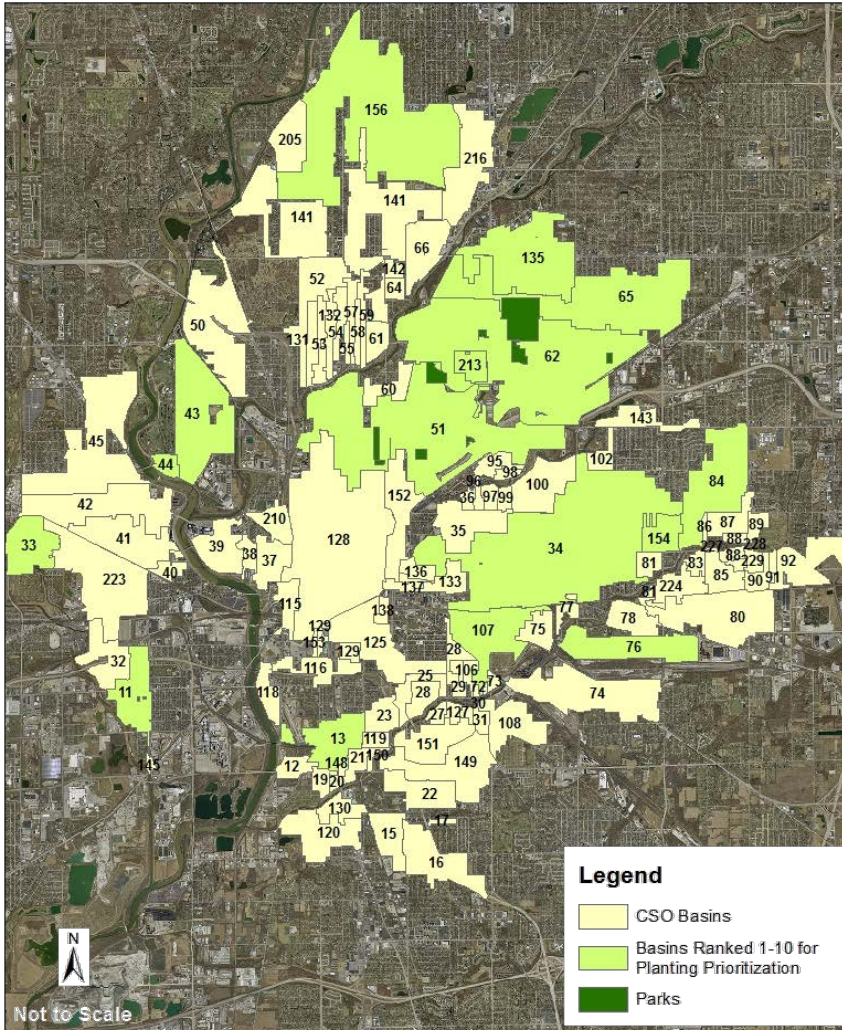
# CSO Basin Prioritization

## *Targeted Peak Shaving*

Residual CSO Volume by Basin



# CSO Basin Prioritization



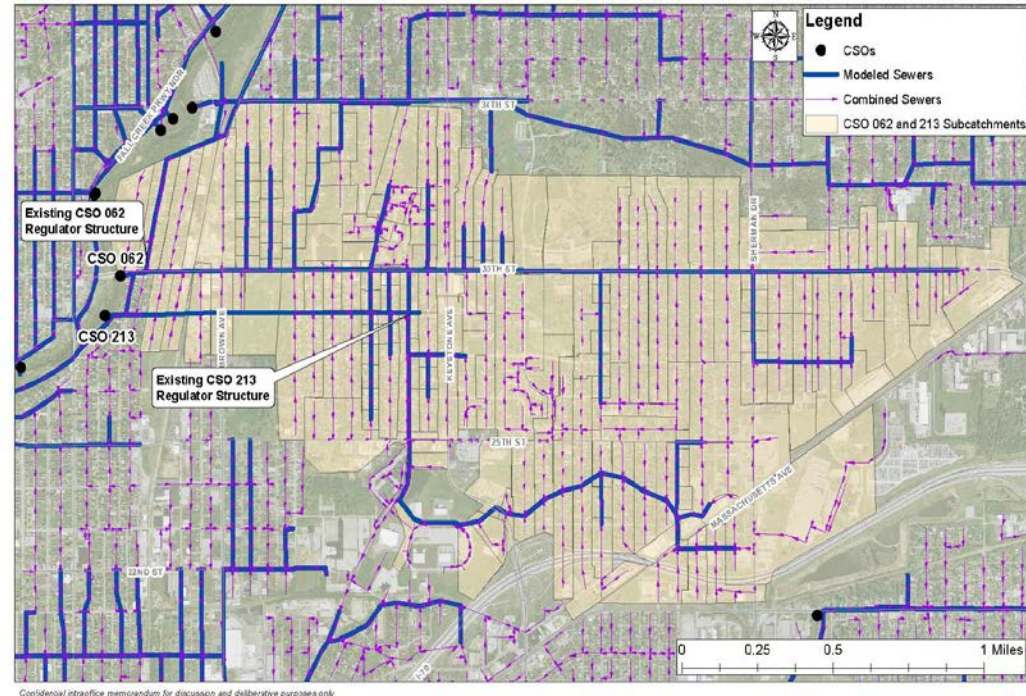
- Aligning goals with the Consent Decree program
  - Residual CSO
  - KIB Ranking
  - Tree Count
  - AFO Date / Schedule
- Identify top 10 basins
  - Refine each year





# Case Study

- CSO 062
  - Large area
  - High residual CSO volume (120 MG/yr)
  - High plantable space (>3,200 trees)
- Stormwater Storage
  - 100 gal/tree (at maturity)
  - Over 13 MG annually
- CSO Reduction
  - Modeled as depression storage
  - 1:7 ratio of CSO removed to stormwater removed
  - 2 MG annual CSO reduction



# Benefits - Capture and Storage

- 10,000 Trees
  - 1,000,000 gal/event
  - 41,000,000 gal/year
- 100 gal/tree/event
- 41 wet weather events in recreational season
- 1:7 CSO:Stormwater Reduction
  - **5.8 MG CSO Reduction Annually!**



# Cost / Benefit Analysis

- \$500 /tree
  - Evaluation
  - Planning
  - Planting
  - Three years maintenance and survivability

- \$5M for 10,000 Trees
  - \$5.00/gallon stored
  - Potential \$1.23/gallon savings

Table 3: Cost Comparison

Project	Volume Stored (gal)	Total Cost	Cost/Gal
CSO 062 Basin <sup>1</sup>	320,000	\$1.60 M	\$5.00
DigIndy Consent Decree	290.75 M	\$1.81 B	\$6.23

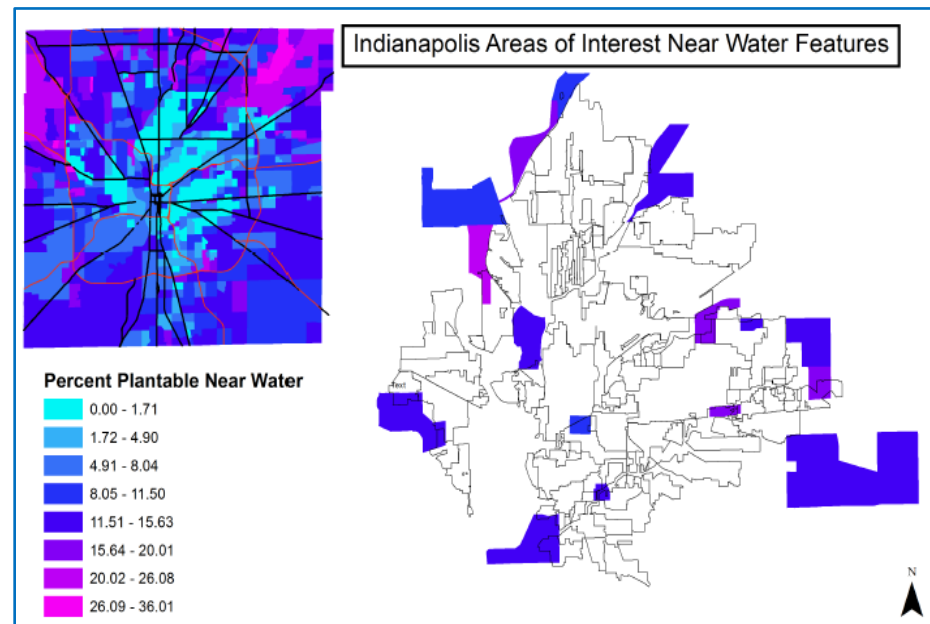
<sup>1</sup>Assumes 3,200 trees with 100 gal of storage per tree





# Ancillary Benefits

- Trees and urban forests provide<sup>1</sup>:
  - Increased physical and mental health
  - Traffic calming and accident reductions
  - Improved air, soil, and water quality
  - Increased property values
  - Reduced effects of urban heat island

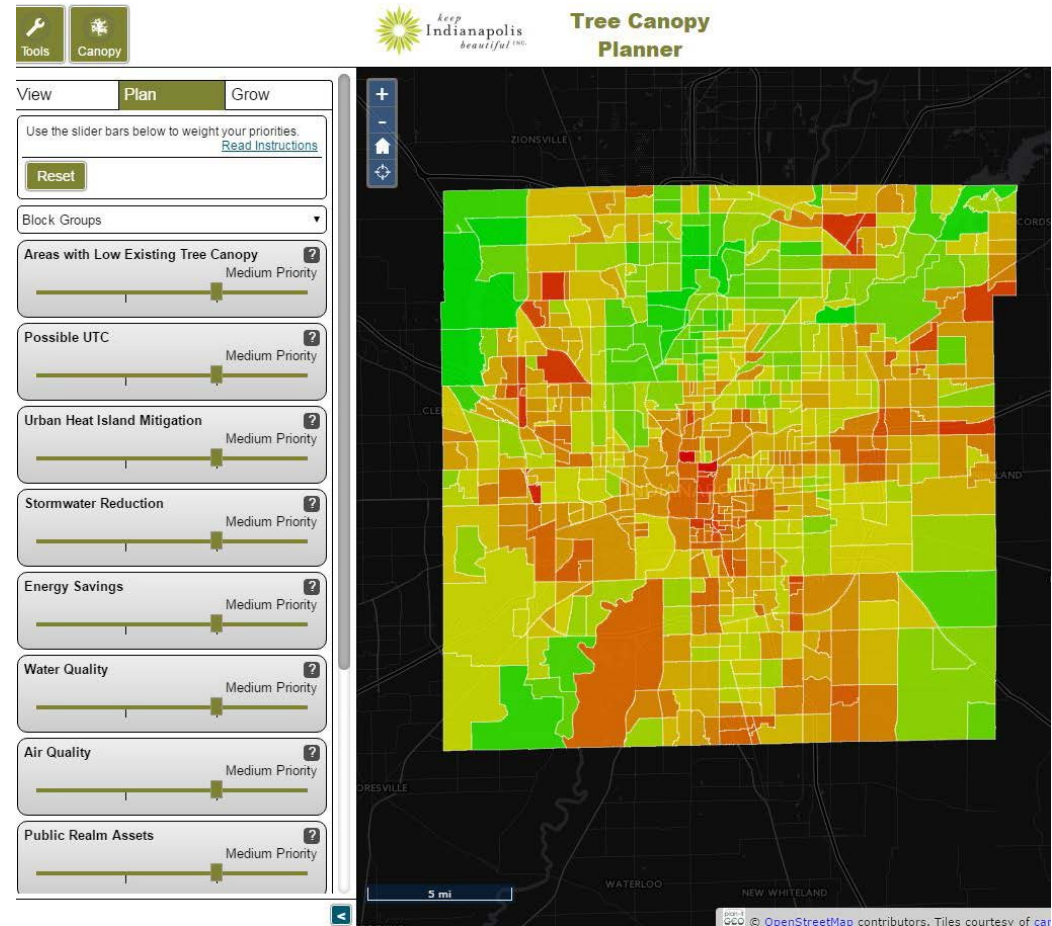


*Census Blocks with Potential Impact to Water Quality*

<sup>1</sup> Alliance for Community Trees

# Ancillary Benefits

- Secondary factors point to high-risk areas
  - Water quality
  - Air pollution
  - Urban heat island
  - Median home values
  - Vulnerable populations
- Refine planting areas



# Benchmarking

City	Stormwater Benefits	Ancillary Benefits
Los Angeles, CA [7]	Over 35 years, one million new trees will capture 14 to 21 billion gallons of stormwater	Reduces carbon dioxide and air pollution by up to 10,000 tons, saves about 1 million MWh of electricity
City of Cambridge, MA [1]	Existing trees intercept 28.7 million gallons of stormwater annually. Annual environmental services is valued at approximately \$7.5 million	Urban forest removes about 171,500 pounds of air pollutants annually
Portland, OR [5]	236,000 existing trees save over \$11 million in stormwater processing by intercepting nearly 0.5 billion gallons of stormwater annually	\$980,000 annual benefits for air quality and \$750,000 saved in energy costs from reduced stormwater processing
New York, NY [7]	Existing trees intercept 890 million gallons of stormwater annually, valuing over \$35 million each year	Existing trees remove approximately 2,000 tons of air pollution annually, valued at \$9.24 million
Philadelphia, PA [7]	Trees, bioswales, and permeable pavement reduces 15 billion gallons of stormwater overflow annually	Existing trees and shrubs remove 971 tons of air pollution annually
Washington DC [7]	Green infrastructure prevents over 1.2 billion gallons of stormwater from entering the sewer system, resulting in \$4.7 billion savings in unnecessary gray infrastructure	Existing trees were estimated to store 526,000 tons of carbon in 2006

- Precedent to intercept stormwater
- Reduced operational costs
- iTree/cost saving estimates





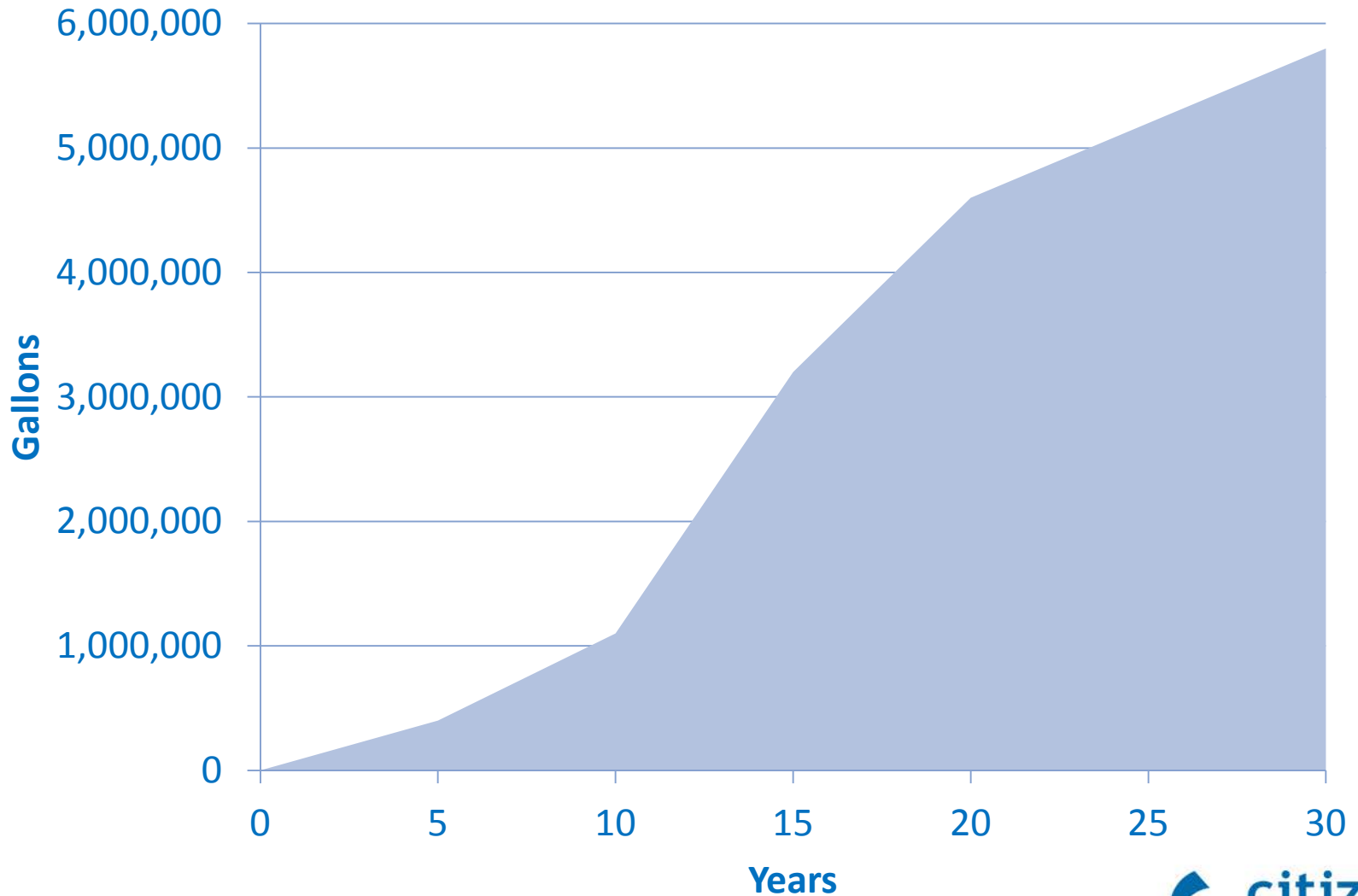
# Schedule and Metrics

Year	Milestone
2015	Begin Evaluation
2016	Project Planting Kickoff
2017	Plant 700 Trees
2018 - 2023	Plant 1400 Trees Maintain Existing Trees
2024	Plant 700 Trees Maintain Existing Trees
2027	Complete Maintenance and Final Survivability Assessment

## Metrics

- Project identification and procurement
- Volunteer plantings
- Three-year maintenance
  - Weekly watering
  - Youth Tree Teams
- Survivability Assessment
  - 80% Survivability
- GIS tracking of all trees

# 10,000 Tree Program – Timeline of CSO Reduction Benefits



# Program Kick Off





# Program Kickoff – Douglass Park





# Arbor Day Orchard Planting





# Arbor Day – Eleanor Skillen Elementary





# Arbor Day – Eleanor Skillen Elementary





# Summary

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Questions?

