

City of Hoboken

Building urban resilience in the square mile city

Project at a Glance

Utility Overview

- Location: City of Hoboken, New Jersey
- Population served: ~55,000
- Service area: 1 square mile

Challenges

- Urban flooding
- Combined sewer overflows
- Aging infrastructure
- Sea level rise

Solution

- A comprehensive strategic green infrastructure plan, developed in cooperation with regional partners, that will add more place-based green space and permeable surfaces throughout the city designed to capture more stormwater where it falls before it reaches the combined sewer system.

Costs and Funding Sources

Total program cost: \$150 million

Funding sources:

- \$18 million municipal bond
- \$7.5 million municipal Open Space Trust Fund
- \$3 million Hudson County Open Space Trust Fund
- \$15 million in federal grants
- \$73 million in State Revolving Fund loans
- \$35 million in leveraged funds from project partners, such as North Hudson Sewerage Authority

Benefits



Capture over 2,500,000 gallons of stormwater



Reduced frequency and volume of combined sewer overflows



Climate change adaptation



Coastal and urban stormwater flooding resilience



Transit systems resilience



Improves access to transit systems



Doubled the amount of open space



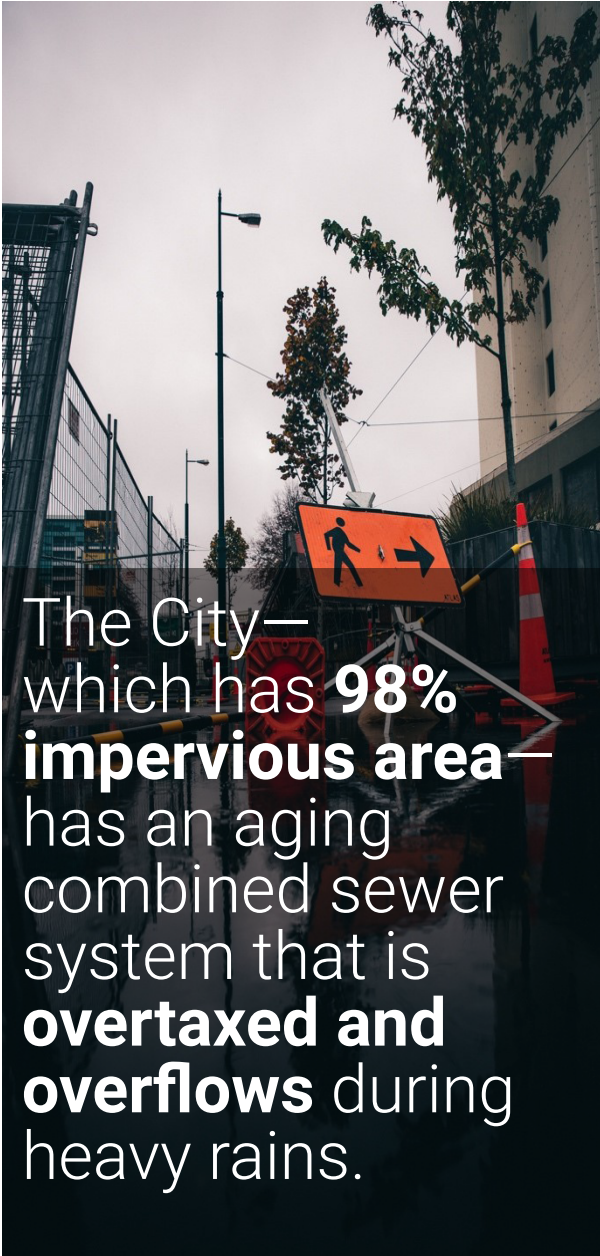
Revitalized neighborhoods and improved quality of life



Created ~80 seasonal green jobs for high school students

BACKGROUND

The City of Hoboken, once an island in the Hudson River, is now the “mile square city” that is densely populated with about 55,000 people. In the 19th and 20th centuries, Hoboken was an industrial and transportation hub. More recently, the Hoboken has become a residential outpost for New York City and other surrounding New Jersey cities.



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CHALLENGE

Due to its location on the Hudson River and its natural history as a former tidal marsh, Hoboken is prone to flooding and is vulnerable to hurricanes. Increasing intensity and frequency of extreme weather and flooding exacerbate these water management challenges. Between July 2002 and July 2012, the City experienced precipitation of more than 2 inches and tides of 4 feet or higher on 26 occasions. In addition, the City—which has 98% impervious area—has an aging combined sewer system that is overtaxed and overflows during heavy rains.

The aftermath of Hurricane Irene and Superstorm Sandy highlighted the dramatic impacts associated with this confluence of challenges. These storms resulted in unprecedented flooding that crippled Hoboken’s heavily-trafficked transportation infrastructure, stranded residents in their homes for extended periods of time, destroyed personal and public property, intensified public health hazards, and lost millions in revenues for local businesses.

SOLUTION

Hoboken’s Green Infrastructure Strategic Plan (Plan) set the foundation for the City’s comprehensive adoption of place-based green infrastructure and permeable surfaces designed to capture more stormwater where it falls before it reaches the combined sewer system. The Plan was developed in 2013 as part of the Together New Jersey regional planning effort funded by a \$5 million Sustainable Communities Regional Planning Grant from the U.S. Department of Housing and Urban Development. The City’s program has and continues to grow based on the strategies laid out in the Plan.

Implementing localized green infrastructure

To address its urban stormwater management challenges, the City installs localized green infrastructure designed to capture stormwater where it falls. As developed as part of the Rebuild by



Design competition and program, Hoboken’s approach uses a 3-part strategy: (1) delay, (2) store, and (3) discharge.

“Delaying” stormwater runoff with rainwater infiltration through pervious areas keeps the stormwater out of the combined sewer system and helps address the City’s sewer capacity challenges. The “delay” strategy is implemented through Hoboken’s Stormwater Management Ordinance, Stormwater Management Plan, the City Master Plan, and an incentive program that is part of the City’s zoning code that allows city residents to build roof decks so long as they install green roof elements as part of the design.

Through the “store” and “discharge” strategies Hoboken creates additional capacity within the North Hudson sewer system using a combination of grey infrastructure like pipes and pumping stations and green infrastructure like rainwater storage in public parks. The City works to create synergies and realize multiple benefits by marrying its grey and green infrastructure systems.

These 3 strategies are implemented on a city-wide basis, and the types of green infrastructure best management practices (BMPs) employed depend on the project’s location. In particular, through a sewershed analysis Hoboken conducted to inform the Plan, the City is organized into 3 zones:

- The **Gray Zone**, which cannot infiltrate stormwater efficiently due to a shallow depth to bedrock, where above-ground BMPs such as rainwater harvesting and green roofs are most appropriate

- The **Green Zone**, which has a greater depth to bedrock and soils that are capable of accepting and infiltrating stormwater, where vegetated BMPs like rain gardens, swales, and stormwater trees are most appropriate

- The **Blue Zone**, which contains the lowest elevations in the City, where stormwater detention may be available



The City's 3 major park projects capture at least **2,500,000 gallons** of stormwater.



Although each zone is identified by its ability to process stormwater, they are all interconnected. Thus, the City's strategic approach allows detention, infiltration and retention to work together, increasing stormwater management benefits by employing specific green infrastructure in their most suitable locations. The Plan also identifies specific sewersheds where green infrastructure would provide the most cost-effective results.

Projects installed to date

Hoboken has installed, or is currently working to install, 3 core green infrastructure projects in public parks (pictured above) that are designed to delay stormwater runoff. These are:

- Southwest Park (\$12M) – a 1-acre park that captures 200,000 gallons of stormwater
- 7th and Jackson Park (\$20M) – a 2-acre park that captures 470,000 gallons of stormwater and has helped revitalize the surrounding neighborhood
- Northwest Resiliency Park (\$85M) – a 6-acre park designed to capture up to 2,000,000 gallons of stormwater

In addition to these major projects, the City has installed 15 rain gardens along Hoboken's Washington Street and 4 green infrastructure installations were part of a revitalization project for First Street, built a green infrastructure demonstration project at City Hall, and dozens of urban stormwater tree and green roofs have been installed by property owners.

RESULTS

Since Hoboken has prioritized green infrastructure as an integral part of its stormwater and flooding management strategy over nearly the past decade, the City has already reaped multiple environmental, regulatory, economic, and social benefits.

Environmental & water management benefits

The City's 3 major park projects capture at least 2,500,000 million gallons of stormwater. The City Hall project captures the 10-year storm event and keeps 47% of monthly rainfall runoff from the City Hall roof from entering the combined sewer system. The Washington Street Project treats approximately 140,000 gallons of stormwater. This reduction in stormwater runoff of impervious areas builds flood resilience, extends the capacity of the City's aging combined sewer system, and helps reduce sewer overflows that pollute local surface waters.

Regulatory benefits

The City green infrastructure projects help it meet the requirements of the Clean Water Act that regulate combined sewer systems. These projects also aid the City's development of and compliance with its Long Term Control Plan aimed at reducing the occurrence of combined sewer overflows.

Economic & equity benefits

Hoboken strategically implements green infrastructure projects in designated Redevelopment Areas. This helps ensure the program is comprehensive and presents opportunities for public-private partnerships. Further, the City's most vulnerable communities are located in the most flood prone areas. Thus, implementation of green infrastructure in these areas has the greatest potential to address the areas frequently impacted by flooding and has the potential to significantly improve the of life for Hoboken's most vulnerable residents.

In addition, through the its Summer Green Jobs Program the City hires high school students aged 14-17 to maintain green infrastructure installations across Hoboken. Participants are trained in green infrastructure installation and maintenance and become part-time city employees in the Department of Environmental Services. In 2017 and 2018, Hoboken employed nearly 80 students through this program and provided them with valuable skills in this increasingly relevant field.

Implementation of green infrastructure best management practices also helps mitigate the significant costs involved in improving the gray infrastructure system, with some estimates as high as \$1 billion to separate the sewer and stormwater systems, to reduce the frequency of future CSO events.

Social benefits

With the installation of Hoboken's 3 new park projects the City will double its open space—an amenity that provides recreation opportunities and improves residents' quality of life. Hoboken has also integrated its green infrastructure priorities into its Sustainability Plan and Master Plan so as to further improve quality of life through integrated management.



Sources

[City of Hoboken: Green Infrastructure Strategic Plan](#)
[City of Hoboken: Stormwater Flooding Program](#)
[City of Hoboken: Stormwater Management Ordinance, Chapter 166](#)
[City of Hoboken: Southwest Park](#)
[City of Hoboken: 7th & Jackson Resiliency Park](#)
[City of Hoboken: Northwest Resiliency Park](#)
[City of Hoboken: 2018 Master Plan Reexamination Report](#)
[City of Hoboken: Summer Green Jobs](#)
[City of Hoboken: Rebuild by Design](#)
[New Jersey Future: Ripple Effects](#)

May 9, 2019, WaterNow Interview with City of Hoboken Staff