

RESOURCE

# ResilienCity Park Case Story (Hoboken, NJ)

## Overview of BRIC

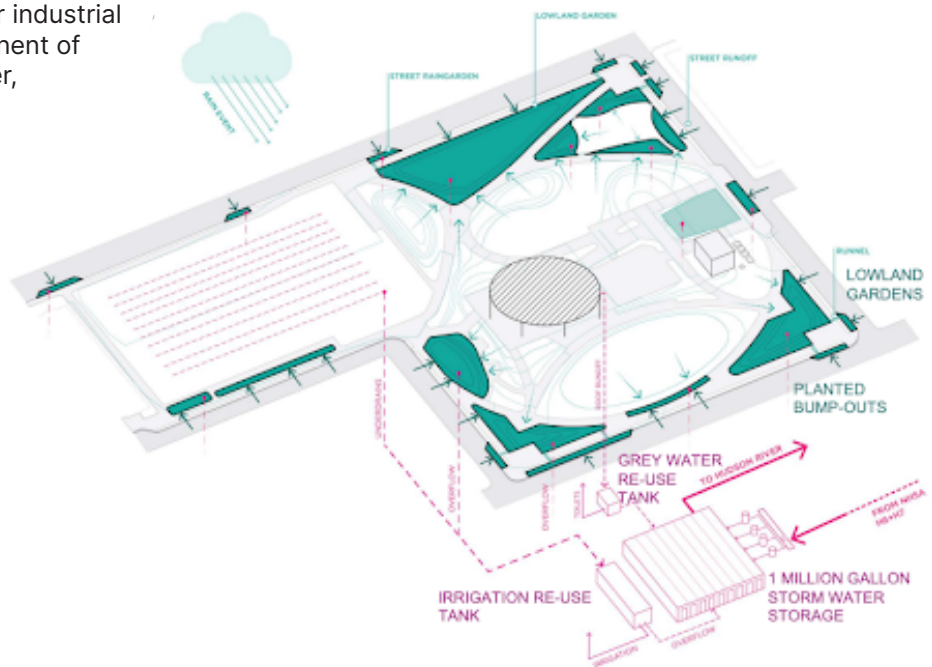
The Building Resilient Infrastructure and Communities (BRIC) grant program, administered by the Federal Emergency Management Agency (FEMA), provides funding directly to states for preventive investments in natural disaster resilience, including hazard mitigation planning and projects that will reduce the risk of damage in the event of a natural disaster. Non-state entities apply for BRIC funding as subapplicants by submitting applications to their state hazard mitigation officers.

The Local Infrastructure Hub is highlighting Hoboken, New Jersey's ResilienCity Park project, formerly Northwest Resiliency Park, as it shows how BRIC grants can be used to invest in multipurpose infrastructure, incorporating resilience for extreme weather events and public amenities for daily functional use.

Due to their topography, Hoboken sees flood risks related to storm surge and rainfall, which can cause damage throughout the city. This has occurred due to both hurricane events and more frequent, heavy rainfalls. Additionally, Hoboken's [combined sewer overflow system](#) creates an additional risk; in heavy rainfall events, stormwater joins sanitary flows and can overwhelm wastewater treatment facilities, polluting the Hudson River and leading to more flooding in the city.

Hoboken's resiliency parks are part of the broader strategy in New Jersey's [Rebuild by Design - Hudson River project](#), funded by the Department of Housing and Urban Development. The Rebuild by Design project is focused on improving physical, ecological, economic, and social resilience to flooding events. The resiliency parks are an innovative combination of above-ground recreational amenities and green infrastructure and below-ground gray infrastructure, a key component of the overarching strategy. ResilienCity Park is the newest of three such parks in Hoboken, with a fourth in planning.

ResilienCity Park has transformed a former industrial site into a new public park and is a component of the city's resiliency infrastructure. Together, Hoboken's resiliency park network aims to minimize the risk of flooding facing the greater Hoboken community, by storing and providing for delayed discharge of millions of gallons of stormwater that would otherwise flood streets, homes, and businesses.



## Considerations for Municipalities

Disaster events have varying impacts for cities, depending on a city's existing infrastructure and the nature of the event, including wildfires, droughts, landslides, tornadoes, earthquakes, winter storms, inland and coastal flooding, tsunamis, and hurricanes. As climate change continues, extreme weather events have become more frequent and increasingly more severe, necessitating that cities reevaluate their infrastructure and ability to respond to such events. This case story raises several considerations for municipal leaders and stakeholders as strategies for mitigation and adaptation are considered, including:

- What are the hazards and risks to your city ?
- Within your city, how are specific communities overburdened and underserved by city amenities and resilient infrastructure?
- At the state level, who is responsible for the statewide BRIC grant application and sub-applicant review?
- What entity will be the eligible sub-applicant and how will you engage with them?
- How will funded activities support risk mitigation and adaptation efforts?
- How do funded activities fit and connect with the city or region's broader adaptation and mitigation strategies?
- What is the impact of weather and climate disasters on delivery of public services, including emergency services?

## Hoboken, NJ

### Fast Facts

Population (city)	<b>58,690</b>
Land area	<b>1.25 mi<sup>2</sup></b>
2022 Aggregate assessed property <a href="#">valuation</a>	<b>\$11.876B</b>
NFIP coverage	<b>\$2.3B</b> <i>(in assets in Hoboken)</i>
Total NFIP policies	<b>9,832</b>
Underinsured or uninsured property value	<b>\$9.5B</b>



## ResilienCity Park

### Project at a Glance:

**Project Leadership** Mayor Ravi Bhalla  
Caleb Stratton, Assistant Business Administrator & Chief Resiliency Officer

**Location:** City of Hoboken

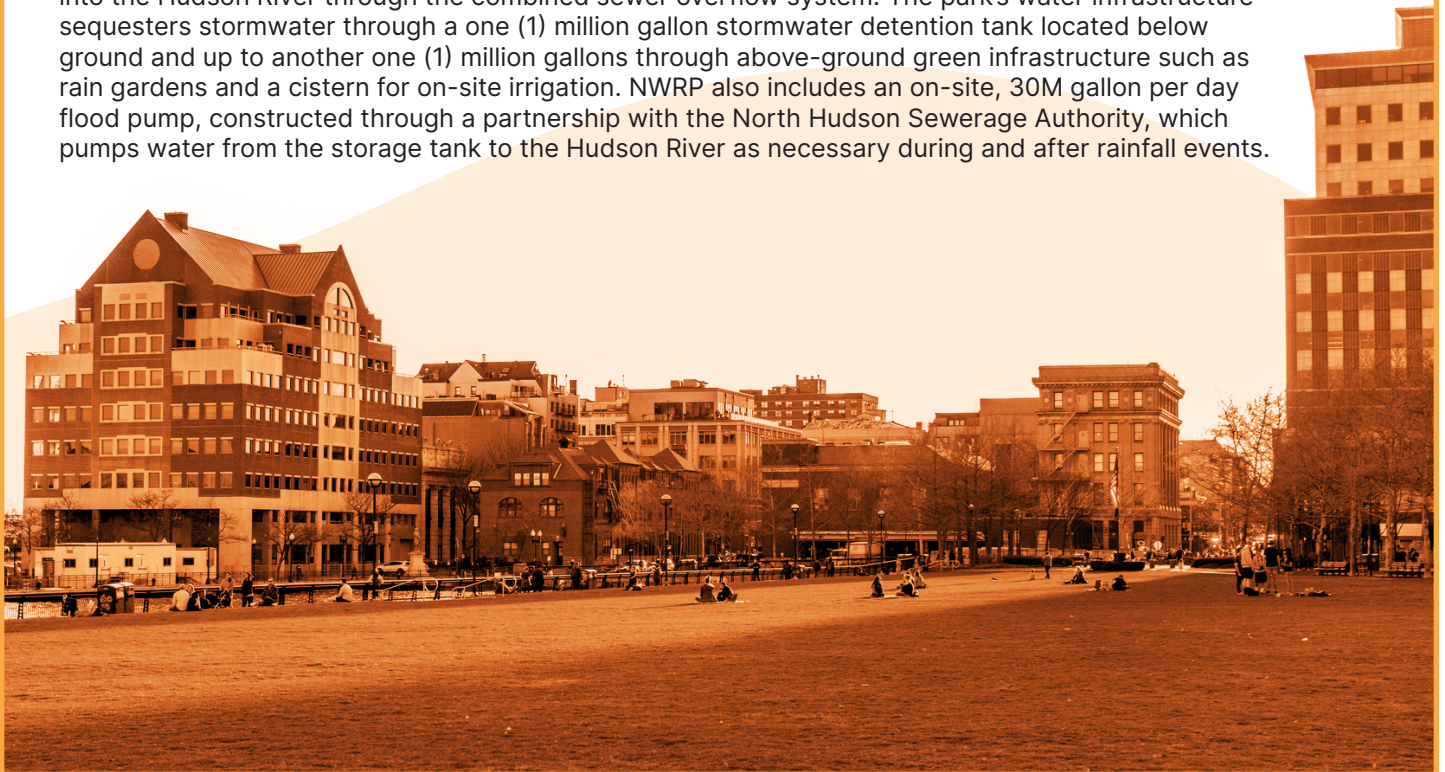
**Timeline:** September 2019 – Fall 2023

**Focus:** Climate resiliency, stormwater management

### Project Description in Brief

The ResilienCity Park project, formerly known as Northwest Resiliency Park (NWRP), is transforming [a former industrial site](#) into a public park that provides the public with both recreational and resiliency benefits. The park includes a new multi-purpose athletic field, a basketball court that doubles as a stormwater detention basin, playground, open lawn space, a recreational water feature, and below-ground stormwater infrastructure. The park will also have a terrace pavilion with a café and community room that will open when its construction is complete in Fall 2023..

NWRP can detain up to two (2) million gallons of stormwater, through above and below-ground infrastructure, that would have otherwise flooded city streets and residential basements, and forced untreated wastewater into the Hudson River through the combined sewer overflow system. The park's water infrastructure sequesters stormwater through a one (1) million gallon stormwater detention tank located below ground and up to another one (1) million gallons through above-ground green infrastructure such as rain gardens and a cistern for on-site irrigation. NWRP also includes an on-site, 30M gallon per day flood pump, constructed through a partnership with the North Hudson Sewerage Authority, which pumps water from the storage tank to the Hudson River as necessary during and after rainfall events.



## Key Players/Entities

<b>Mayor Ravi Bhalla</b>	Current Mayor of Hoboken
<b>Mayor Dawn Zimmer</b>	Former Mayor of Hoboken (2009-2017)
<b>Caleb Stratton</b>	Assistant Business Administrator & Chief Resiliency Officer
<b>North Hudson Sewerage Authority</b>	Key project partner for planning, construction, and obtaining funds
<b>New Jersey Department of Environmental Protection</b>	Key project partner at the state-level providing administrative support for the project in working with federal entities
<b>New Jersey State Police</b>	Key project partner as a collaborator for considering and developing resiliency strategies given the effects of heavy rainfall events on emergency response capacity

## Funding Sources

- \$10M grant from BRIC [subrecipient]
- \$44M in low-interest financing, including \$2M in principal forgiveness, from the NJ Infrastructure Bank through the Environmental Protection Agency's (EPA) Clean Water State Revolving Loan Fund
- \$24M in bonding through Hoboken's Open Space Trust Fund

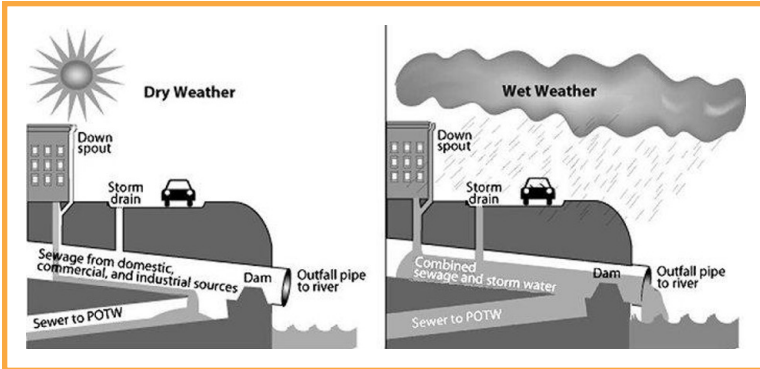
## Project Dates / Timeline

The City first envisioned using the site that would become NWRP for a city park in their 2004 Master Plan. Following Hurricane Sandy in 2012, the City's [2014 Green Infrastructure Strategic Plan](#) and [2015 RE.Invest Feasibility Study](#) identified the site's potential as a green infrastructure and flood management park. In 2016, Hoboken acquired the six-acre site to transform the former industrial site into their largest public park. Construction for NWRP began in September 2019. A grand opening for the park was held in June 2023, with all components completed except for the terrace pavilion, which is expected to be complete in Fall 2023. This is the City's third resiliency park opened since 2017; together the other two (Southwest Resiliency Park and the 7th & Jackson Resiliency Park) can detain a combined total of 670,000 gallons of stormwater during heavy weather events.



## Problem to Solve

Following Hurricane Sandy in 2012, 75% of the city was inundated and significant portions of the city were inaccessible for almost a week. This was not the first time a large coastal storm caused costly flooding in the city - approximately 80% of the city is in a coastal floodplain. Furthermore, low-lying areas of western Hoboken can experience flooding if the city receives more than 0.8 inches of rain per hour.



Most of Hoboken is covered in impermeable surfaces, and the City's combined sewer overflow system heightens the effects of flooding. While working seamlessly in dry weather, in heavy rainfall events stormwater joins with sanitary flows, which can quickly overwhelm wastewater treatment facilities. As a result, stormwater floods streets, residences, and businesses, while untreated wastewater and stormwater flows into the Hudson River, polluting a regional water source, recreational amenity, and critical estuarine habitat for plants and animals. Furthermore, at high tide the combined sewer overflow system's outfalls can be blocked by high tides, further hindering the infrastructure's capacity.

Because of the flood risk, the city of Hoboken has just over 9,800 flood insurance policies through the National Flood Insurance Program (NFIP) covering a total asset value of \$2.3B. According to property tax assessments, the aggregate assessed property value in Hoboken is over \$11.8B. Additionally, the NFIP's coverage for residential properties maxes out at \$350K per policy, and \$1M for commercial properties, and the average cost of a 1,000 sq foot condominium in Hoboken is about \$1M, and so if there is a total loss of contents, NFIP will not cover the full value of losses. As a result, there are \$9.5B in uninsured or underinsured liabilities, for which the federal government and/or residents are responsible for repairing or replacing in case of major damage.

In total, [Flood impact assessments](#) estimate that rainfall-caused flooding leads to an estimated \$660-\$810M in expected loss in property values, with 530-560 buildings impacted out of a total of 850, and 68% of residents of Hoboken residing in impacted homes.

After Hurricane Sandy, city and community leaders recognized that they needed to pivot to new strategies to become more resilient, rather than rebuilding in the same way. Traditional approaches taken by FEMA, such as raising the community above grade, would not work, as doing so would eliminate the city's ability to have ground-level housing and retail. Thus, Hoboken needed an alternative that would mitigate the flood risks without losing the character of the community.

## Hoboken's Geography

The north, west, and southern sections of Hoboken are built on what was previously a tidal marsh with a hydraulic connection to the Hudson River. As a result, the city of Hoboken was effectively an island. Then, the tidal marsh area was infilled for industrial development in the late 19th century to support the waterfront community in Hoboken. Today, fill material covers 62% of the land area in Hoboken [[Resilient NJ: Northeastern New Jersey, Flood Impact Assessment](#)]. Many of these filled areas are less than three (3) feet above sea level. The Northwest Resiliency Park sits within this historically infilled and industrial area, in what is now a more residential neighborhood.



## “We all agreed we did not want to flood again... and we went from that consensus”

— Caleb Stratton, Hoboken's Assistant Business Administrator & Chief Resiliency Officer

### Rebuild by Design

In May 2021, Governor Phil Murphy, HUD Secretary Marcia Fudge, Senator Cory Booker, Congressman Albio Sires, Mayor Ravinder Bhalla, and Former Mayor Dawn Zimmer [celebrated the groundbreaking](#) for the [Rebuild by Design - Hudson River](#) project, which was made possible by over \$230M in Superstorm Sandy recovery funding from HUD and has been in planning for several years. The Rebuild by Design project is a national model for resilient infrastructure; the project's comprehensive approach to resilience consists of four integrated components – resist, delay, store, and discharge – to manage storm surge and rainfall events. The resist structure consists of hard infrastructure, such as bulkheads, floodwalls, and seawalls, as well as soft landscaping features, such as berms and levees. The remaining components are embedded in a combination of hard infrastructure and soft landscaping to defend against flooding events and interconnected infrastructure to manage stormwater runoff and drainage. The resiliency parks, all included in the Rebuild by Design Hudson River project, are an example of the delay, store, and discharge components in practice.

### Pre-Development

In the years since Hurricane Sandy, Hoboken has invested in developing partnerships and staff capacity by:

- Building the city's engineering department, that now has three (3) full-time professional engineers,
- Designating a floodplain manager in Hoboken's zoning office,
- Encouraging additional staff across city offices to obtain Certified Flood Manager designation and investing in staff training to support this,
- Bringing in environmental consultants to support with more complex plantings and systems, and
- Strengthening relationships with the North Hudson Sewerage Authority (NHSA), NJ Department of Environmental Protection (NJDEP), and NJ State Police.

Through relationships with NHSA and NJDEP, Hoboken saw where common goals could be pursued to leverage additional funding sources through collaborative efforts.

The city identified the eventual site of NWRP for acquisition and redevelopment in 2004. A former industrial site turned vacant asphalt lot, the site was remediated for development by the Fordham Park based chemical company, [BASF](#), before the city was finally able to acquire the location in 2016 under the leadership of Former Mayor Dawn Zimmer. Prior to the start of the “Parks as Defense” strategy, there was community demand for a multifunctional parking garage that would serve as a “store” component within the [stormwater and flood risk mitigation framework](#). As Caleb Stratton, Chief Resiliency Officer, said “if you build a parking garage in Hoboken, people will name their children after you.” However, given the cost of such a project the city could not produce a favorable cost-benefit analysis outcome despite using numerous modeling approaches. While the parking garage concept was not feasible, these initial engagements generated support for the broader concept of mixed-use public investments, combining infrastructure with public amenities.

## Community Engagement

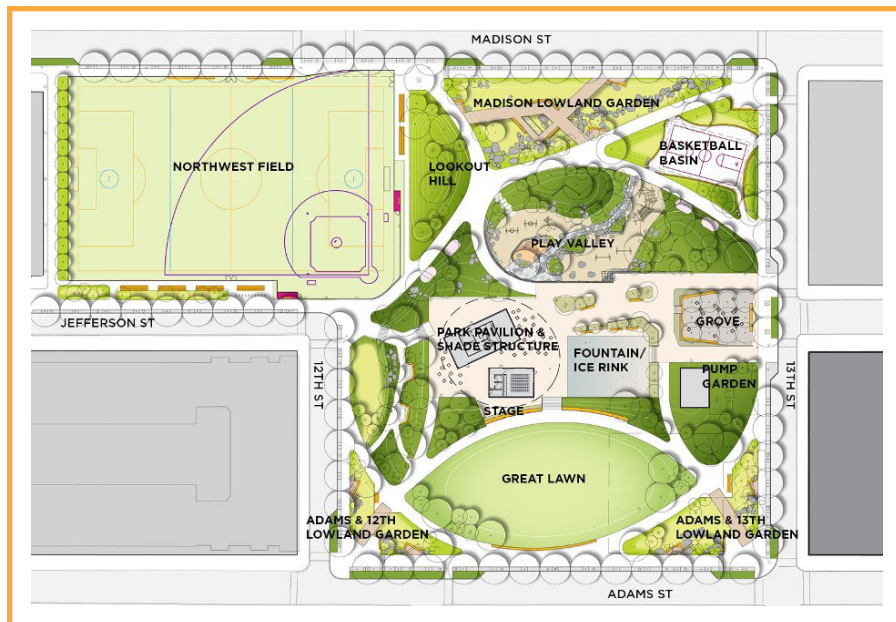
Caleb Stratton discussed the challenges that were faced early on in the community engagement process, from the start of discussions around building resilient infrastructure through the beginning of construction for NWRP. The first challenge came in ensuring that the city engaged the core constituencies that were most impacted by flooding events in their neighborhood. These community members wanted something done to build in resiliency, but there were four thematic constraints with that feedback:

- 1 Don't build in front of me,
- 2 Don't build behind me,
- 3 Don't build in my neighborhood, but
- 4 Don't leave me out.

An initial proposal was to build a flood wall in the city to redirect stormwater, however that would physically separate underserved and disadvantaged communities; the city's core constituencies were strongly opposed to this. Incorporating the community feedback in the planning forced the city to consider more innovative approaches to building resiliency. This thinking would result in the idea of multipurpose infrastructure that blends above-ground recreational facilities and green infrastructure with below-ground resiliency infrastructure within the parks. With this approach, an unpopular neighborhood necessity was turned into a neighborhood amenity.

This high level of community engagement would continue throughout the planning process and beyond. After site acquisition in 2016, Hoboken built a "pop-up park" on the site that would temporarily provide an additional public space to the community. In 2017 Hoboken commissioned a Pre-Design Analysis and Public Engagement Report that included extensive community input from an online survey and other city-wide engagement activities to identify what residents wanted to see in the new above-ground park. The report was based on engagement with over 1,400 community members, including youth, who provided feedback that would drive the design of the park, incorporating multi-generational interests and accessibility needs, multipurpose fields, flexible space designs, and community demand for various amenities (e.g., bathrooms and drinking fountains). As part of this process, Hoboken hosted a Public Design Charrette.

Upon the release of the report, the project team began to develop design alternatives, before hosting a series of three public meetings to review proposed designs and the preferred concept design. The final design, as approved by the Hoboken City Council in March 2019, includes a multi-purpose athletic field, gardens, basketball courts, and a pavilion and stage. Several green and gray infrastructure components for stormwater management are built into this design above and below ground, including rain gardens, drainage to an irrigation reuse tank, and a one (1) million gallon stormwater storage tank with a pump system to control its discharge to the Hudson River.



Construction began after closure of the pop-up park in September 2019, and continued through 2022, construction advanced through three phases:

- 1 **Installation of 1M gallon storage tank,**
- 2 **NHSA's construction and related work, and then**
- 3 **Construction of the above-ground park.**

A grand opening was hosted at NWRP in June 2023 with Mayor Bhalla and Governor Murphy in attendance, alongside other key stakeholders. In the Fall of 2023, upon its completion, the terrace pavilion, with restrooms, a community room, and a cafe, will be open.



## Partner Engagement

There were several key partners that were engaged throughout the project, including the NJ State Police (NJSP), NHSA, NJDEP, FEMA, and outside advisors who provided varying support and resources. A guiding principle in partner engagement for this project was to identify and create opportunities for goal alignment across organizations that would facilitate collaboration and create access points for additional resources.

NJDEP has a strong engagement role as the sponsor for the Rebuild by Design - Hudson River project. . The city's collaboration with them enabled Hoboken to be a subrecipient of BRIC funds, and NJDEP were able to provide additional access to other federal resources. The city also recognized the impact that the ability to split responsibilities had in enabling the city to use their staff capacity most efficiently; as Caleb Stratton recognized, NJDEP and other state entities handled the administrative burdens related to federal funding and related compliance, including for permitting, enabling the city to focus more of their capacity on partner and community engagement and easement acquisition that were necessary to allow the project to move forward.

The NHSA engaged with this and other city-led resiliency projects given their mandates and requirements for environmental regulations, such as mandates from EPA based in the Clean Water Act. One component of related EPA mandates and policies are those for a [CSO program](#) and a related permitting program that the sewerage authority is subject to. The [EPA's CSO Control Policy](#) consists of two phases to help communities reduce and control overflow events. With these policies in mind, Hoboken saw a clear opportunity to align goals and collaborate with NHSA, as improving stormwater infrastructure would support both entities' missions. The partnership with NHSA is formalized through memoranda of understanding, shared service agreements, joint projects, and crossover between internal engineering teams and external project consultants. The collaboration between the two entities enabled Hoboken to access additional resources for NWRP, and broader resilient infrastructure work in the city. NHSA is responsible for construction, ownership, and operations of the pump associated with the park's underground storage tank.

Given the impact of heavy rainfall events on emergency response capacity, the City of Hoboken has engaged with NJSP to ensure that resiliency projects support continuity of emergency response services and capacity. City representatives meet with NJSP semi-annually to advise them on current and upcoming projects and collaborate on their efforts.

As the federal agency responsible for mitigation, disaster preparedness, response, and recovery activities, FEMA is the primary federal partner/collaborator for the resiliency park projects and broader mitigation work in Hoboken. In addition to being responsible for administering BRIC, FEMA manages the NFIP. As noted by Stratton, FEMA has a significant and vested interest in this type of project that will reduce, if not eliminate, flood risks in the community given the agency's exposure to risk for insured and uninsured or underinsured properties. Therefore, FEMA was willing to support the project beyond the BRIC program.

Outside advisors provided additional support to the project at various points, such as a team from the Netherlands that was addressing similar challenges related to coastal flooding in communities in their country, and the Hurricane Sandy Rebuilding Task Force, as established under the Obama Administration and led by Shaun Donovan with representation from cabinet-level agencies and White House domestic policy staff. Hoboken engages with external consultants and the Army Corps of Engineers to ensure that the city's shoreline and inland water projects are done within the right permitting framework. They also point to the execution of inland projects to communicate their broader objectives regarding investments in resiliency infrastructure and to drive collaboration. For example, NWRP will serve as an interior drainage feature for a coastal flood protection levee when the levee is completed.

## Project Funding

NWRP costs approximately \$78M, including the site acquisition costs of \$26M and site development costs totaling \$52M. The project is funded by a \$10M BRIC grant, \$24M in bonding from the city’s Open Space Trust Fund, and at least \$44M in low interest financing, with \$2M in principal forgiveness through NJ’s Infrastructure Bank, who administers the Clean Water State Revolving Loan Fund.

### Capital Stack

BRIC	<b>\$10M</b>
State Revolving Loan Fund (NJ I-Bank)	<b>\$44M</b> (financing)
Hoboken, Open Space Trust Fund	<b>\$24M</b>
<b>Total</b>	<b>\$78M</b>

In September 2023, Hoboken received an additional \$6.2M BRIC grant for expansion of their Southwest Resiliency Park. Several of the other components of Hoboken’s flood mitigation and resiliency infrastructure are funded in part by BRIC grants as well, including Harbor Side Park, which incorporates elevated flood protection features. The City of Hoboken has received five (5) BRIC grants over the past six (6) years to support its resilience efforts.

In discussing their successes with BRIC awards, Caleb Stratton, said “the language that local government speaks doesn’t necessarily translate to the federal lexicon in putting projects into programs. There is a translation of the project intent into the format in how the federal government can digest that project,” in other words: cities need to translate and design projects to ensure they fit the funding sources at the federal level. Additionally, city leaders need to identify what relationships are necessary to go from a local level in designing and developing a project, to the federal level for funding; in many cases, such as for BRIC, cities need to work with states or other eligible entities to ensure that they can access federal funding opportunities.

## Community Impact

NWRP will have a dual impact on the local community. First, the new park transforms the former industrial development and vacant lot into a permanent, modern park asset with green space and infrastructure, a multipurpose field, and community gathering spaces. Secondly, the project is removing risk from the floodplain due to the capacity of Hoboken’s new green and gray infrastructure. Rather than offloading risk via insurance vehicles, the City of Hoboken is making needed improvements to mitigate flood-related risks.

Before developing the park, the city modeled both flood depth and extent; this park will modify both of these within the floodplain. Hoboken has since submitted a Conditional Letter of Map revision to FEMA that would remove 80% of the community from the coastal floodplain when the greater Rebuild by Design - Hudson River project is completed. While the city will still experience shallow urban ponding in certain low-lying areas, upon its completion, the Rebuild by Design project will have reduced, or eliminated, the majority of risk affecting billions of dollars of assets.

Altogether, NWRP and Rebuild by Design – Hudson River project will result in lower flood insurance costs for most property owners in Hoboken and will narrow the gap between insured and uninsured risk community-wide, while also providing for \$8M in annual savings to the city, per the park project’s benefit-cost analysis.

**“The costs for this project are in the millions, but the savings are in the billions”**

— Caleb Stratton

## Conclusion

Today, NWRP, alongside other resiliency parks in Hoboken, is a critical component for interior drainage in Hoboken in rainfall and coastal events. Through an innovative combination of above-ground green infrastructure, and below-ground gray infrastructure, NWRP alone can store 2M gallons of stormwater that would otherwise flood the streets and basements in Hoboken, costing residents and responding agencies thousands of dollars for response, repairs, and replacement. The 30M gallon per day pump, operated by NHSA, enables a delayed and controlled discharge of the detained stormwater to reduce the risk of overflow of the combined sewage overflow system, helping to keep the Hudson River clean.

In [September 2023](#), the park's effectiveness was visible when Tropical Storm Ophelia brought 2.15 inches of rain to Hoboken. The NHSA's pumps connected to resiliency parks pumped a total of 17M gallons of stormwater out of the city during the storm. NWRP's green and below-ground infrastructure withheld stormwater from the city's streets, alongside other resiliency parks in the city; after pooling water on Monday night, and the park was dry by Tuesday morning.

The City will begin construction on the expansion of the Southwest Resiliency Park before the end of the year, doubling the existing park's size from one acre to two acres (1-2), and increasing stormwater detention capacity at the Southwest Park from 200,000 gallons to 510,000 gallons. Hoboken is also conducting a public planning process to design a fourth resiliency park at 800 Monroe Street in the west end of the city.

Once all parks are completed, the City will have expanded resiliency parks by approximately ten (10) acres since 2016, and together the four (4) parks will detain over three million gallons of stormwater that would otherwise cause damage costing residents, businesses, and FEMA for repair and replacement.