

**Issues Summary**

The following infrastructure and resiliency-related issues have been identified by Hudson County:

- Combined Sewer Overflows (CSOs)
- Stormwater management
- Future storm events
- Aging water infrastructure

**Introduction**

Formerly the Utility Plan Element, the purpose of the Infrastructure Plan is to analyze the county's water supply and distribution facilities, drainage and flood control facilities, sewerage and waste treatment, solid waste disposal, recycling, stormwater management and other related facilities, especially as it relates to resilience.

This plan will examine previous Utility Element goals and objectives, discusses issues identified by the 2002 Master Plan and the 2008 Re-examination Report, and analyze whether those issues have been reduced or increased. The Infrastructure Element also establishes new goals and objectives based on both previous and new utility and infrastructure issues. Finally, this element includes infrastructure recommendations that will enable the county to provide high quality infrastructure to meet the needs of its residents and businesses, and is resilient to future storm events.

This element works in conjunction with the 2016 5-year Capital Improvement Plan (CIP) and the 2015 Hudson County All Hazards Plan to identify and mitigate against the county's vulnerabilities to natural hazards. According to the All Hazards

Plan, the County is at high risk for frequent coastal storms, severe weather, and severe winter weather.

An inventory of water and sewer infrastructure in Hudson County is identified below.

**Table 13: Sewer Infrastructure Inventory**

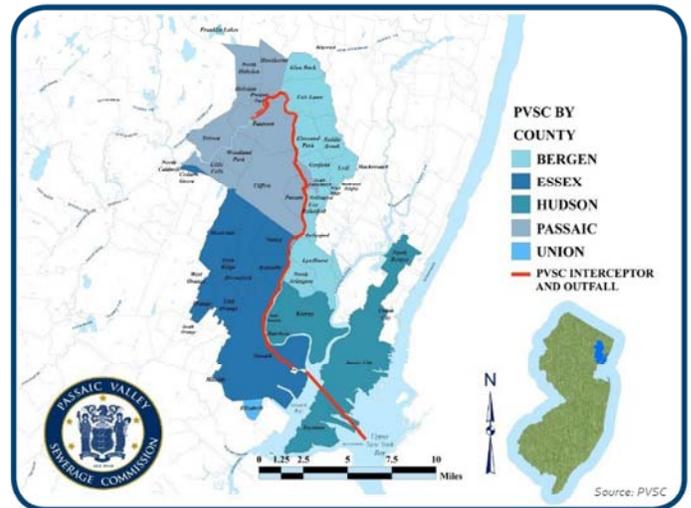
Location	Sewerage Operator	CSOs
Bayonne	Bayonne Municipal Utilities Authority (BMUA)/PVSC	30
East Newark	Passaic Valley Sewerage Commission (PVSC)	1
Guttenberg	North Bergen Municipal Utilities Authority (NBMUA)	1
Harrison	Passaic Valley Sewerage Commission (PVSC)	7
Hoboken	North Hudson Sewerage Authority (NHSA)	8
Jersey City	Jersey City Municipal Utilities Authority (JCMUA)/PVSC	21
Kearny	Kearny Municipal Utilities Authority (KMUA)/PVSC	5
North Bergen	North Bergen Municipal Utilities Authority (NBMUA)/ PVSC	10
Secaucus	Secaucus Municipal Utility Authority (SMUA)	--
Union City	North Hudson Sewerage Authority (NHSA)/PVSC	--
Weehawken	North Hudson Sewerage Authority (NHSA)	--
West New York	North Hudson Sewerage Authority (NHSA)	2
*Passaic Valley Sewerage Authority (PVSC)		85

Source: various sewerage operator websites

Table 14: Water & Sewer Infrastructure Inventory

Treatment Facility	Location	Comments
<b>Adams Street Wastewater Treatment Plant</b>	Hoboken	14-ft storm surge during Sandy into plant resulted in damage and loss of power
<b>Pump Stations (multiple)</b>	Kearny	Maintains one 17.5 million gallon per day capacity pumping station in South Kearny and three smaller pumping stations in the Kearny Meadowlands. All pump to PVSC in Newark for final treatment.
<b>Woodcliff Treatment Plant</b>	North Bergen	Maintains 4 pump stations and 9 CSO netting facilities that capture 35 tons per year of sanitary and street litter. 3 million gallons a day dumps into Hudson River and the remaining 7 million is pumped to PVSC in Newark.
<b>1100 Koelle Avenue – Wastewater Treatment Facility</b>	Secaucus	Owens and operates 7 pumping stations that vary in capacity (30,000 to 2,000,000 gallons/day). There has been no NJDEP violation since the facility was upgraded in 1991, but overflows would go into Mill Creek, a tributary of the Hackensack River.
<b>Newark Bay Treatment Plant (PVSC)</b>	Newark	--

Hudson County receives all of its water supply from sources outside the County, managed by several water service companies. Multiple innovative water partnerships have occurred in Hudson County. In 1996, Jersey City entered into a public-private partnership with SUEZ-NJ (formerly United Water) and has two reservoirs, a 23-mile aqueduct, and 275 miles of mains. Then, in 2012, United Water and Kohlberg, Kravis, Roberts (KKR) formed the Bayonne Water Joint Venture (BWJV) and entered a 40-year concession agreement with the Bayonne Municipal Utilities Authority (BMUA). The public-private partnership allows the private partners to pay off the debt from the MUA and take over operations maintenance and capital improvement of Bayonne’s water and wastewater utilities in exchange for a regulated share of revenue.





The following goals and objectives were included in the 2008 re-examination of the Utility Element.

## 2008 Goals and Objectives

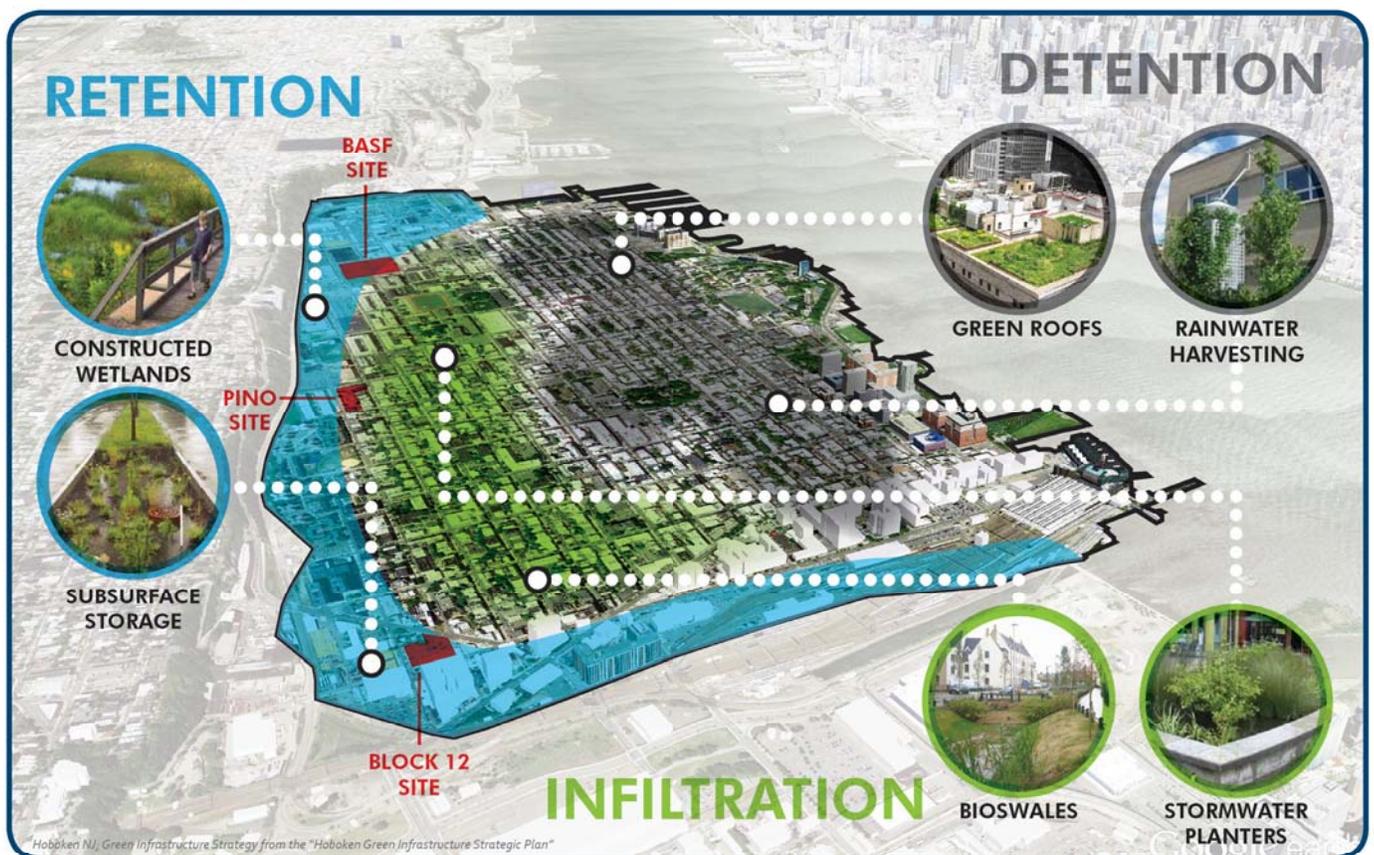
### 2008 Goals

1. To maintain existing capital facilities and replace aging capital facilities that are no longer effective.
2. To provide new infrastructure systems where necessary to encourage new development.
3. To invest in new infrastructure technology to encourage future economic growth and redevelopment.
4. To protect potable water quality.
5. To reduce stormwater run-off and nonpoint source pollution.
6. To promote the development of renewable energy.

### 2008 Objectives

1. Where feasible, separate combined stormwater and sanitary sewers as new development occurs.
2. Upgrade sanitary sewer systems to reduce the level of pollutants discharging into the rivers.
3. Investigate methods to reduce pollutant levels and reduce stormwater runoff into the Hudson River, Hackensack River, Newark Bay and Passaic River.
4. Encourage municipalities to adopt capital improvement plans to maintain and replace existing infrastructure facilities as needed.
5. Encourage the construction of new technological improvements, such as fiber optic cable, to provide incentives for future economic growth.
6. Construct drainage facilities to alleviate local flooding problems.

7. Protect out-of-county reservoir watersheds to maintain water quality and ensure an adequate water supply.
8. Encourage measures to improve public participation in recycling efforts and coordinate municipal programs within the County.
9. Reduce the amount of impervious coverage, which contributes to stormwater run-off, flooding and non-point source pollution.
10. Encourage the installation of berms, swales, culverts, retention ponds, shade trees pits and "green roofs", rain gardens or vegetative buffers to mitigate flooding, improve drainage conditions, meter stormwater run-off and reduce non-point source pollution.
11. Discourage the development and disturbance of floodplains, flood hazard areas, wetlands and natural lands, which hold and meter stormwater run-off.
12. Promote the installation of solar panels, wind turbines, and other Class 1 renewable energy sources that reduce local dependence on coal-fired power plants, foreign oil and green house gas emitting power sources.
13. Utilize new environmental technologies and Best Management Practices (BMP) to build sustainability into site design.
14. Utilize Green Infrastructure techniques that use soils and vegetation to infiltrate, evapotranspire, and/or recycle stormwater runoff.



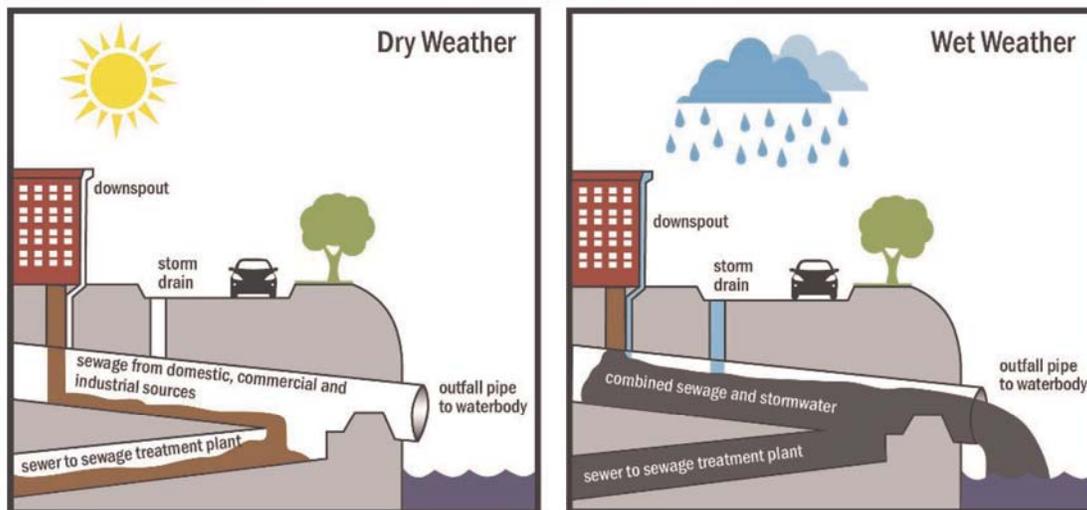
## 2002 & 2008 Issues

The following utility issues were identified in the 2002 Master Plan and 2008 Re-examination Report. This element examines what issues have increased or decreased. What the county has done to achieve the 2008 Re-examination Report of the Hudson County Master Plan is also discussed.

### Combined Sewer Overflows (CSOs)

**The Issue:** Typically, stormwater and sewer infrastructure function separately from one another. However, in 21 of New Jersey's older urban municipalities and hundreds of communities across the nation, stormwater and sewage are combined into what is called Combined Sewer Systems. These systems share underground

address the CSO issue. However, the plan also noted that grant money did not exist to aid in the implementation cost; rather, money would have to be borrowed from the New Jersey Wastewater Trust Fund. Without a Combined Sewer Overflow (CSO), the excess stormwater-sewage mix could back up into homes and businesses without ever having been treated. Although CSOs prevent in-home contamination, the mixture of wastewater is instead discharged directly into local waterways without treatment. These discharges contain high levels of pathogens, suspended solids, nutrients, oxygen-demanding organic compounds, oil, grease, and other pollutants that severely impair water quality and recreational use of urban waterways.



Source: U.S. Environmental Protection Agency, Washington, D.C. "Report to Congress: Impacts and Control of CSOs and SSOs."

pipings for both stormwater and sewage which is directed to a central plant for treatment and discharged into a waterway through a combined sewer outfall. During wet-weather events such as heavy rainfall or snowmelt, the additional high volume of rainwater overwhelms the capacity of the pipes, and the stormwater/sewage mixture gets discharged directly into local waterways without treatment. 11 of the 12 Hudson County municipalities (Secaucus has none) share 85 combined sewer outfalls out of 217 that exist statewide. As of 2002, Bayonne had 30, the highest number of CSOs for one municipality in the state. The 2002 plan identified 75 proposed projects with a total construction cost of \$35.7 million to

**What Has Changed:** The current combined sewer system infrastructure is becoming more stressed. 27% of New Jersey's population growth between 2008 and 2013 took place within the 21 NJ CSO cities, according to NJ Future. This has placed an increased demand on aging and antiquated stormwater infrastructure. In November 2014, a 54-inch diameter sewer main broke in Jersey City, which not only disrupted service on the Hudson-Bergen Light Rail Line, but also sent raw sewage into the Hudson River for many days.<sup>50</sup>

There are currently five sewage treatment plants that manage Hudson County sewage. Since the last master plan re-examination, the Central Sewage Treatment Plant in North Bergen shut down in July

2010 due to chronic equipment failures. Currently, 30% of sewage in North Bergen is treated at the Woodcliff Treatment Plant on River Road and the remainder of the sewage is piped and connected to Jersey City pipes. Jersey City pipes pump to the Passaic Valley Sewerage Commission (PVSC) located in Newark. Beginning in 2016, North Bergen will pay PVSC an annual service fee of \$7 million for 14 years for sewage treatment, financed through New Jersey Environmental Infrastructure Trust (NJEIT) with low interest rates.

In early 2015, the Christie Administration launched a new permit system that requires Long Term Control Combined Discharge Reduction Plans and enhanced public outreach for CSOs throughout New Jersey. The twenty-five permits being issued by DEP affect sewer operations in the county. Examples of long-term control strategies include gray infrastructure projects such as holding tanks or lagoons to store stormwater for later release and green infrastructure projects such as rain gardens and green roofs to capture stormwater on contact. Operators are also required to implement enhanced public notification strategies including providing real-time information on potential discharges into rivers and other waterways via a website or telephone hotline, providing leaflets, fliers and signs at areas dependent on waterways (i.e. marinas, docks, fishing piers, etc.) and posting identification signs at discharge points. These signs warn readers that there may be sewage overflows during and following wet weather, with the possibility that contact with water may cause illness.

Hudson County has additionally implemented passive solutions for the CSO problem. One common solution for reducing and eliminating CSOs are through gray and green stormwater infrastructure (GSI) practices. Some municipalities have embraced GSI solutions, especially in Hoboken through their implementation of the 2013 Hoboken Green Infrastructure Strategic Plan. In the most recent Land Development Regulations Update (2016), the County has added provisions for the use of GSI in new applications for development.

## Stormwater Management

**The Issue:** While the 2002 plan briefly examined Hudson County stormwater and identified its management as a problem, the crux of the discussion regarding stormwater management was found in the 2008 Re-examination Report. The 2008 report noted that urban stormwater runoff poses a risk of localized flooding, and climate change could make the flooding more complicated and unpredictable. Traditional solutions such as new on-site detention facilities, and repairing, rehabilitating or replacing existing infrastructure can be costly and infeasible options in a dense developed urban area. Rather, an approach to reduce the amount of runoff that enters the stormwater system using green infrastructure techniques should be considered. These techniques that were identified by the plan included – 1) more shade trees, 2) street and park designs that reduce runoff, 3) site design to harvest stormwater (i.e. rain barrels or cisterns), 4) green roofs, and 5) rain gardens and vegetative buffers. The 2008 plan also stated that while these practices can aid in reducing stormwater runoff, they also provide other benefits in the form of improved open spaces and pedestrian environments.

**What Has Changed:** The 2008 plan recommended improving stormwater run-off by using green infrastructure techniques. Since that time, the approach to stormwater management in the county has significantly improved. In an overhaul of the Stormwater Management Design Standards of the Hudson County LDR, Suggested Green Stormwater Management Practices were introduced to provide applicants a starting point for meeting the stormwater management requirements found within that section. The GSI practices include fact sheets for rain gardens, swales, flow-through planters, sub-surface infiltration trenches, permeable pavements, stormwater curb extensions, green roofs, and rain water harvesting (cisterns). Applicants are not limited to these techniques and are encouraged to use other acceptable practices as approved by the County. Depending on the amount of earth disturbance proposed by the applicant, at least one GSI practice is required by the County.

## 2008 Recommendations - Now

*"Improving Stormwater Management: The County should amend the purposes of the Site Plan and Subdivision Resolution in order to address the impact that new development has on county drainage facilities. These include but are not limited to the following:*

*"Provide the rules, regulations, and standards for the subdivision, development and redevelopment of land affecting County drainage facilities."*

The 2016 LDR included a significant update to the Stormwater Management Design Standards section and its jurisdiction. The LDR also contains the clause that, *"all subdivision and site plans that discharge directly or indirectly to County Facilities and Roads shall be subject to County approval and shall provide for the management of stormwater runoff in a manner consistent with the policies and procedures of these regulations."*

*"The county should further acknowledge the role of street trees in managing stormwater by redefining the definition of drainage facilities to include street trees and their root zones as components of county stormwater management system. The County should further craft design standards for the provision of maintenance of such facilities during site plan and subdivision review."*

The definition for Drainage System in the LDR now includes street trees and their root systems as components of the stormwater management system. The 2016 LDR makes reference to the Hudson County Community Forestry Plan, which includes detailed street tree standards.

*"The county should require the use of BMPs provided by the Environmental Protection Agency National Pollutant Discharge Elimination System (NPDES) on all development that affect county drainage facilities. This can be accomplished in part by the development of a Low Impact Development checklist for development."*

In 2008, Hudson County created a Low Impact Development Checklist that became an appendix to the Land Development Regulations (LDR). Since that time, the LDR has been updated and expanded and now includes a requirement for at least one Green Stormwater Infrastructure (GSI) technique or non-structural BMP technique in each application for development in the County.

*"Mitigate adverse drainage impacts from proposed development on drainage facilities, buildings and lands owned and/or maintained by the county."*

The 2016 LDR included a significant update to the Stormwater Management Design Standards section which successfully mitigates adverse drainage impacts on County roads and County lands by requiring, *"all subdivision and site plans that discharge directly or indirectly to County Facilities and Roads shall be subject to County approval and shall provide for the management of stormwater runoff in a manner consistent with the policies and procedures of these regulations."*

## Street Typology and Design Element Matrix

	Lane Widths	Wide Sidewalks	Benches	Bicycle Racks	Trash Receptacles	Street Trees	Vehicular Lighting	Pedestrian Lighting	Enhanced Bus Stops	Enhanced Driveway Aprons	Curb Extensions	Parklets and Flex Parking Lanes	Reduced Curb Radii	ADA Curb Ramps	High Visibility Crosswalks	Pedestrian Signals	Road Diets	Rumble Strips	Center Medians	Gateway Treatments	Neckdowns and Chokers	
Residential Boulevard	Strong	Moderate	Moderate	Low	Low	Strong	Strong	Strong	Strong	Strong	Strong	Strong	Strong	Strong	Strong	Strong	Strong	Strong	Strong	Strong	Strong	Strong
Mixed Urban Boulevard	Strong	Moderate	Strong	Strong	Strong	Strong	Strong	Strong	Strong	Strong	Strong	Strong	Strong	Strong	Strong	Strong	Strong	Strong	Strong	Strong	Strong	Strong
Main Street	Strong	Moderate	Strong	Strong	Strong	Strong	Strong	Strong	Strong	Strong	Strong	Strong	Strong	Strong	Strong	Strong	Strong	Strong	Strong	Strong	Strong	Strong
Neighborhood Street	Strong	Moderate	Strong	Strong	Strong	Strong	Strong	Strong	Strong	Strong	Strong	Strong	Strong	Strong	Strong	Strong	Strong	Strong	Strong	Strong	Strong	Strong
Downtown Avenue	Strong	Moderate	Strong	Strong	Strong	Strong	Strong	Strong	Strong	Strong	Strong	Strong	Strong	Strong	Strong	Strong	Strong	Strong	Strong	Strong	Strong	Strong
Mixed Use Avenue	Strong	Moderate	Strong	Strong	Strong	Strong	Strong	Strong	Strong	Strong	Strong	Strong	Strong	Strong	Strong	Strong	Strong	Strong	Strong	Strong	Strong	Strong
Industrial Avenue	Strong	Moderate	Strong	Strong	Strong	Strong	Strong	Strong	Strong	Strong	Strong	Strong	Strong	Strong	Strong	Strong	Strong	Strong	Strong	Strong	Strong	Strong
Scenic Boulevard	Strong	Moderate	Strong	Strong	Strong	Strong	Strong	Strong	Strong	Strong	Strong	Strong	Strong	Strong	Strong	Strong	Strong	Strong	Strong	Strong	Strong	Strong

**Legend**

- Strong Consideration
- Moderate Consideration
- Low Consideration
- Not Recommended

Furniture

Lighting

Street Design Elements

Intersections & Crossings

Speed Control & Traffic Calming

Source: Hudson County LDR

***"Create and/or maintain aesthetically pleasing landscapes along county roads."***

In 2012, Hudson County adopted a Complete Streets policy to ensure its streets are designed and developed to safely accommodate all people who use them. In an effort to implement the policy, the 2016 LDR update includes a supplement to the Functional Classification System defined by the state, classifying County roadways into eight Street Typologies. The typologies address the character, context and urban design elements necessary for a well-balanced Complete Street. Street Design Elements such as sidewalk widths, lighting, street furniture and street trees are determined for each typology and provide guidance in creating a walkable and safe pedestrian environment.

***"Ensure that development and redevelopment occurring under the county's jurisdiction minimizes any adverse impacts to the physical and living environment and is developed with the long-term goal of energy and natural resource conservation and environmental sustainability."***

One of the purposes of the 2016 LDR is to "encourage the attractive, sustainable and smart growth development of land within Hudson County" and also includes general conditions for Circulation and Roadway Design Standards. It states that "the applicant shall wherever possible use construction techniques that are designed to be environmentally sustainable and which promote the conservation of energy. Such techniques and methods include but are not limited to renewable materials, porous pavements, reductions in impervious areas (vegetated islands, etc.), green infrastructure techniques, dark sky friendly street lighting, solar power, and high-efficiency LED lighting."



## 2016 Goals and Objectives

Based on existing and new infrastructure issues and the current state of infrastructure and resiliency trends in the county, the following goals and objectives have been established to improve infrastructure in Hudson County.

### **Goal 1: Enhance the resiliency and maintenance of critical facilities and infrastructure.**

- Objective a: Identify infrastructure that is not functioning properly and needs immediate attention.
- Objective b: Ensure existing infrastructure is capable of serving current residents and businesses and promote infrastructural improvement/modernization in order to maintain the ability to meet increasing demands.
- Objective c: Evaluate the condition and current ability of existing streams and drainage systems to conduct storm flows.
- Objective d: Evaluate the condition and capacity of existing county roadway facilities.

### **Goal 2: To promote sustainable practices throughout the county.**

- Objective a: Encourage developers to design sustainable developments such as LEED Certified buildings and encourage municipalities to adopt 'green building codes' which go above and beyond baseline codes adopted by the State such as Uniform Construction Code and the International Building Code.
- Objective b: Promote and encourage the modernization of energy infrastructure in the County as well as the expansion of Class 1 renewable energy resources such as solar panel, wind turbines,

and others for both private and public facilities.

Objective c: Utilize new environmental technologies and Best Management Practices (BMP) to build sustainability into site design.

Objective d: Encourage measures to improve public participation in recycling efforts and coordinate municipal programs within the County.

### **Goal 3: To protect potable water quality.**

Objective a: Protect out-of-county reservoir watersheds to maintain water quality and ensure an adequate water supply through cooperative efforts with neighboring counties and municipalities as well as public utilities.

### **Goal 4: To reduce stormwater run-off and nonpoint source pollution.**

Objective a: Continue to implement stormwater fees and GSI practices outlined in the Land Development Regulations as well as Best Management Practices (BMPs) to infiltrate evapotranspire and/or recycle stormwater runoff.

Objective b: Support the upgrade of sanitary treatment facilities to reduce the level of pollutants discharging into the rivers.

Objective c: Investigate methods to reduce pollutant levels and reduce stormwater runoff into the Hudson River, Hackensack River, Newark Bay and Passaic River.

Objective d: Discourage the development and disturbance in floodplains, flood hazard areas, wetlands and natural lands, which hold and meter stormwater run-off.

Objective e: Develop educational programs to educate the public on the importance of keeping drainage facilities, rivers and streams and wetlands clear of debris to allow the clear flow of storm water and to minimize flooding.

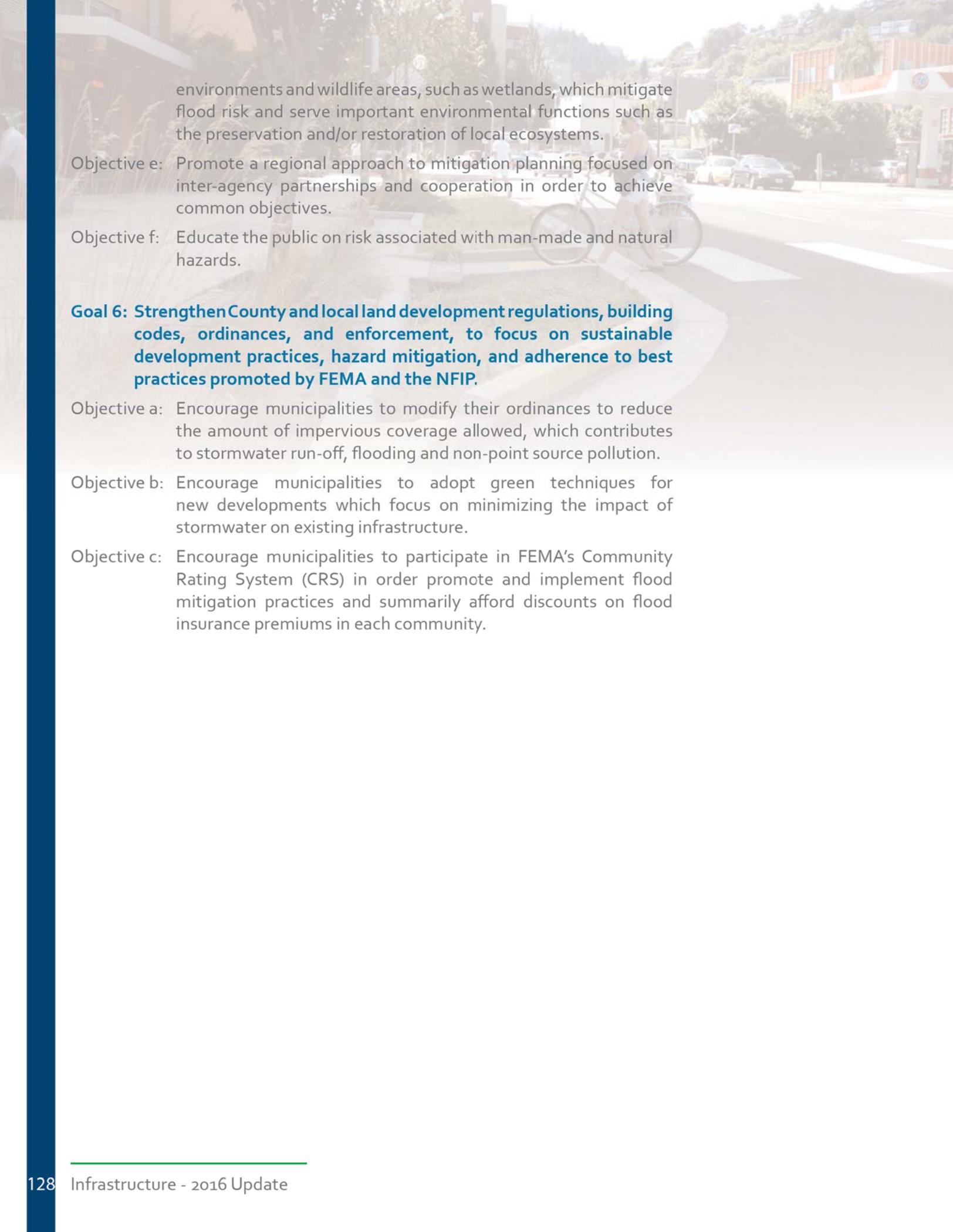
### **Goal 5: Establish flood mitigation strategies which will serve to protect life and property.**

Objective a: Establish flood mitigation strategies including flood mitigation plans, land development regulations, and structural/engineering solutions.

Objective b: Promote municipal adoption of design guidelines that exceed the minimum requirements established by the State which serve to minimize the impacts of flood events on both life and property as well as to reduce recovery time after such an event.

Objective c: Provide assistance to both public and private entities in identifying and pursuing funding opportunities to develop and implement local and county-wide mitigation projects.

Objective d: Promote the preservation and expansion of natural floodplain



environments and wildlife areas, such as wetlands, which mitigate flood risk and serve important environmental functions such as the preservation and/or restoration of local ecosystems.

Objective e: Promote a regional approach to mitigation planning focused on inter-agency partnerships and cooperation in order to achieve common objectives.

Objective f: Educate the public on risk associated with man-made and natural hazards.

**Goal 6: Strengthen County and local land development regulations, building codes, ordinances, and enforcement, to focus on sustainable development practices, hazard mitigation, and adherence to best practices promoted by FEMA and the NFIP.**

Objective a: Encourage municipalities to modify their ordinances to reduce the amount of impervious coverage allowed, which contributes to stormwater run-off, flooding and non-point source pollution.

Objective b: Encourage municipalities to adopt green techniques for new developments which focus on minimizing the impact of stormwater on existing infrastructure.

Objective c: Encourage municipalities to participate in FEMA's Community Rating System (CRS) in order promote and implement flood mitigation practices and summarily afford discounts on flood insurance premiums in each community.



## 2016 - New Issues

In addition to the issues identified by previous plans, the following issues have surfaced based on current trends and community participation feedback.

### Future Storm Events

As this section has addressed, the stormwater infrastructure in Hudson County is directly related to mitigating the impact of storm events. And as with community facilities, Hurricane Sandy overwhelmed the infrastructure systems and brought light to vulnerabilities that need to be addressed ahead of future events. In total, 528 critical facilities were exposed to storm surges as a result of Sandy. These critical facilities included 7 wastewater facilities, 63 electrical facilities, and 376 communications facilities. In addition, many more facilities outside the storm surge were rendered inoperable due to loss of power or inaccessible from flooding.

Hardening of this critical infrastructure is necessary, and where possible they should be moved outside of flood hazard areas. Electrical and communication lines can be moved underground to reduce their susceptibility to wind damage. In addition, combined sewer overflows systems should be segregated when the opportunity arises to help ensure that sewage and stormwater don't overwhelm the system and lead to untreated water entering into waterways. During Sandy, this was a particular issue as not only were the CSOs overwhelmed, but pumping stations that are located in the flood areas became inoperable, further exacerbating the problem. Utility authorities have begun to address this. For example, in the 2015 Hazard Mitigation Plan Update, the North Hudson Sewerage Authority identified wet weather pumping stations in Hoboken as potential mitigation initiatives to alleviate flooding in Hoboken.

### Aging Water Infrastructure

Aging water infrastructure is a growing concern, especially for urban areas like Hudson County where water systems were first developed. The events in Flint, Michigan have brought these challenges into

the forefront of public discussion, and stressed the importance of drinking water infrastructure for the protection of public health, particularly for young children who are more susceptible to the effects of lead in water. Unfortunately, this issue is not isolated to Flint. New Jersey Department of Health statistics showed that children in Jersey City had elevated levels of lead in their blood<sup>51</sup>, although it may not be due to lead in water. The city conducted testing of its drinking water, which revealed that there were no elevated levels of lead in the city's drinking water.<sup>52</sup>

According to a 2012 news article, "The federal Environmental Protection Agency has estimated that \$4.7 billion worth of work is needed to upgrade transmission and distribution mains in New Jersey alone over the next two decades." In May 2016, the US EPA awarded New Jersey over \$70 million to the Clean Water State Revolving Fund Program (CWSRF - \$54.6 million) and the Drinking Water State Revolving Fund Program (DWSRF - \$15.8 million). The Clean Water program offers low-interest loans to local governments for water quality protection projects to make improvements to wastewater treatment systems, control pollution from rain water runoff and protect sensitive water bodies and estuaries. The Drinking Water program offers low-interest loans to local governments for improvements to drinking water systems, with a focus on small and low-income communities. NJDEP and NJEIT both manage the DWSRF. This year the DWSRF has only awarded one project in Hudson County. Hudson County municipalities need to be aware of funding opportunities like the CWSRF and the DWSRF in order to replace their aging water infrastructure.



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Table 16: Infrastructure Recommendation Checklist

#	Recommendation	Status
I-1	Identify county utilities that need to be upgraded to meet current and future demand.	
I-2	Identify areas where current utility infrastructure is not sufficient for future development.	
I-3	<b>Identify which utility facilities are most susceptible to damage from storm events and mitigate the potential impact from future events.</b>	
I-4	Encourage municipalities to adopt capital improvement plans to maintain and upgrade existing utilities as needed.	
I-5	<b>Provide municipalities and utility operators with technical assistance and training for reducing and maintaining CSOs.</b>	
I-6	Encourage the state to provide a statewide water assessment and a certification program that rewards wastewater utilities for using best practices.	
I-7	<b>Encourage the use of new technologies and GSI techniques to improve infiltration of ground water.</b>	
I-8	<b>Provide training for municipalities for how to fund and implement green stormwater infrastructure.</b>	
I-9	<b>Ensure county utilities are in a state of good repair and are undergoing consistent maintenance.</b>	
I-10	Establish County policy where upgrades to existing infrastructure or construction of new infrastructure is consistent with the recommendations of the LDR, such as the installation of green infrastructure techniques.	
I-11	<b>Prioritize a de-silting and de-snagging program of waterways throughout the county to improve and maintain storm flows.</b>	
I-12	Promote modernization of utilities throughout Hudson County by adopting the use of smart grids, smart meters, and other energy saving infrastructure.	
I-13	<b>Establish a Hudson County FEMA Community Rating System (CRS) user group.</b>	
I-14	<b>Conduct a regional storm water management study to determine where the use of regional detention facilities would be most beneficial for reducing flooding in the county.</b>	
I-15	<b>Evaluate and improve existing stormwater infrastructure maintenance programs.</b>	
I-16	Encourage municipalities to maintain drainage facilities and waterways within their jurisdiction.	
I-17	Encourage the use of shared services within the county to maintain stormwater management facilities and waterway maintenance.	
I-18	Promote the separation of combined stormwater and sanitary sewers as new development occurs.	
I-19	Assist communities with snow removal during major snowstorms.	
I-20	Ensure pedestrian crossings and ADA ramps are properly cleared and maintained along county roadways.	

#	Recommendation	Status
I-21	Encourage recycling and composting countywide through education and recycling events.	
I-22	<b>Promote residential rainwater harvesting with rain barrel education events and sales.</b>	
I-23	<b>Explore the potential to relocate critical utility infrastructure from areas that are vulnerable to future storms and flooding.</b>	
I-24	<b>Implement the recommendations from the county's All Hazards Mitigation Plan and continue to update the plan as needed.</b>	
I-25	Implement the public utilities recommendations from the 2016 5-year Capital Improvement Plan (CIP).	
I-26	Explore the potential use of renewable energy sources at county facilities.	
I-27	<b>Ensure sanitary sewer facilities along county roads are consistently cleaned and free of debris.</b>	
I-28	Continue and expand the inspection and maintenance plan for County infrastructure in conjunction with the 2016 CIP.	
I-27	Conduct a countywide risk assessment of the potential for lead exposure in drinking water infrastructure.	
I-28	Implement recommendations of the 2016 LDR to require that developments that impact county roads and drainage facilities properly manage stormwater runoff.	
I-29	Study the potential use of the Institute of Sustainable Infrastructure's Envision <sup>53</sup> rating system to plan and develop sustainable county infrastructure projects.	
I-30	Encourage leadership and projects that support sustainability efforts throughout Hudson County with a recognition program.	
I-31	Encourage municipalities to achieve Sustainable Jersey certifications.	
I-32	<b>Continue to harden critical infrastructure to mitigate potential damage from storm events and security threats.</b>	
I-33	Mapping all County-owned and controlled infrastructure, including stormwater catch basins, and create a database for this data.	
I-34	Exploring state and federal grant opportunities to upgrade County infrastructure.	
I-35*	<b>(HC-11) Increase capacity of stormwater drainage on county roadways with particular emphasis on evacuation routes.</b>	
I-36*	<b>(HC-21) Develop a protocol for municipal reporting of hazard data to include flood high water marks and road closures.</b>	
I-37*	<b>(HC-18) As part of a public hazard awareness and education program, initiate steps to better publicize NFIP floodplain and other hazard mapping, including online mapping.</b>	

\*Recommendations from the 2015 Hudson County All Hazards Plan