



Rising Above: Retain, Detain — Then Drain!

Stormwater Management for Louisiana's Communities
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As Louisiana recovers from the devastating floods of 2016, the **Rising Above** series is designed to provide guidance to local leaders and decision makers on building and rebuilding sustainable infrastructure that reduces flood risks.

This brief, produced by the Center for Planning Excellence with support from the Walton Family Foundation, McKnight Foundation, and the Greater New Orleans Foundation, focuses on stormwater management best practices and policies from across the United States.

The Challenge: Water, Water Everywhere

Though Louisiana has been contending with the challenges of managing water throughout its history, the combination of outdated infrastructure, alterations to natural landscapes, and increases in precipitation associated with climate change is resulting in more flooding and increased flood risks for residents and businesses.

Many municipalities are currently relying solely on gravity drainage and pumps to manage stormwater, which have proven over time to increase subsidence. Many, if not most, of these systems were designed and built decades ago and are now easily overwhelmed by the heavy downpours that are becoming increasingly common in Louisiana.

Changes in the natural landscape are further exacerbating the challenge of handling stormwater.

In metro areas, urban and suburban development has significantly changed the nature of the land cover. What was once pervious – grass, wetlands, and forest that absorb, retain, and slowly drain water – is now largely impervious, covered with asphalt, concrete, and other hard surfaces through which water cannot pass. Draining wetlands, removing vegetation, removing or moving soil, grading land surfaces, and constructing roads and drainage networks to accommodate new development all alter the way in which precipitation is absorbed and force much greater quantities of runoff into surrounding water bodies.

As development continues to replace vegetated land, marshlands, and tree cover with paved surfaces, the amount of water these outdated drainage systems are expected to manage is increasing. Pavement not only does not absorb water as the natural landscape once did, but it also accelerates the pace of runoff, increasing the rate at which it needs to be collected in order to prevent flooding.



Infiltration trenches are one example of green infrastructure that helps reduce demand on drain pipes by retaining runoff.

The impacts of climate change are also contributing to increased demand on drainage systems, as rainfall is becoming demonstrably heavier and more frequent in many regions of the country.

In the context of changing precipitation patterns and tight budgets, nature-based stormwater management systems (described below) that include multiple retention and detention features are recognized as a best practice. Implementing green infrastructure improves water quality and expands drainage capacity without the prohibitive expense of a major stormwater pipe system overhaul.

Nature-Based Solutions

With multiple factors contributing to increased amounts of stormwater runoff, the future of water management cannot rely solely on storm sewers and pumps, or focus exclusively on drainage. Resilient, “future-proof” stormwater management systems will be comprised of a diverse set of complementary measures – including green infrastructure and low-impact development practices -- that work together at multiple scales to reduce flood risk, maintain water quality, and enhance streets and neighborhoods. Plans at the local, regional and state level must provide the framework for systemic solutions in order to align priorities, understand extra-jurisdictional impacts, and leverage resources for implementation. People are an essential part of the equation, as well. Residents, business owners, elected officials, and developers all need to understand that everyone has a role to play in improving stormwater management and reducing flood risk for our communities.

“What is considered a 100-year rainfall seems to happen here all the time. Weather patterns are more extreme than they used to be. Just this summer, we had hellacious rain falls in a short period of time. It used to be where we had nice afternoon showers and now we have torrential rains with lightning and thunder coming down for three hours. And with that, we experience some severe street flooding.”

*– Mayor Mark Piazza,
Abbeville, La.*



Bioswales are landscaped depressions that filter and drain runoff water. Bioswales can be used anywhere to manage stormwater and improve water quality.

Green Infrastructure

Green infrastructure is an important element of several strategies for better managing stormwater and reducing flood risk. According to the Environmental Protection Agency, **green infrastructure – sometimes referred to as low-impact development – reduces runoff and treats stormwater at its source – reducing flood risk, while also providing environmental, social and economic benefits.**

Unlike the conventional use of pipes to convey stormwater to a water treatment facility, green infrastructure uses vegetation, soils, and gravity to manage water close to where it falls. Rain gardens, bioswales, use of native vegetation for landscaping, permeable surfaces, rainwater harvesting systems, and networked green spaces are some of the most common examples of green infrastructure. Green infrastructure can help manage water at all scales from the site level to regional watersheds. Beyond absorbing water

and slowing runoff, green infrastructure reduces pollution, improves air and water quality, reduces heat island effects and provides aesthetic enhancements to streets and neighborhoods.

If Louisiana’s communities are to remain viable for the future, we must retrofit flood-prone areas with green infrastructure and incorporate it into development practices for future growth. Developing the necessary technical expertise, policy framework, and public understanding is essential to implementation of the green infrastructure needed to reduce the impacts and losses associated with flooding. To that end, we make the following recommendations.

Recommendations

Identify Priority Action Areas. Mitigating for local flood hazards should not be contingent upon disaster recovery funds. Along with accurate hydrologic models, data identifying repetitive flood losses and past disaster impacts can identify the areas most vulnerable to flooding. These should be prioritized for investments in green infrastructure to reduce flood risk. Further, areas upstream

of flood-vulnerable areas should be also be targeted for additional measures to improve stormwater management and reduce demand on conventional drainage systems. Accurate hydrologic models can also help identify upstream contributors and help determine the most effective measures for reducing flood risk in a given area.

Develop stormwater management plans. To address riverine and flash flood risks within watersheds throughout the state, stormwater management plans need to be developed at the municipal, parish, and regional scale to serve as guiding documents for the corresponding watershed authorities. Such plans should address floodplain management within a watershed, provide short- and long-term goals for managing water quantity and quality, and provide guidance on how to protect the watershed and its inhabitants. Further, a stormwater management plan can facilitate coordination of local jurisdictions within a defined watershed to address shared flood risk.



Gutters and Rain barrels channel and store roof runoff for later use. Spouts can also channel roof runoff to pervious areas such as lawns or to underground water storage such as cisterns.

Use stormwater fees to implement stormwater management plans. The impacts of population growth – more development, fewer pervious surfaces, and more polluted runoff – are causing stormwater management programs to become increasingly expensive. To offset these costs and leverage infrastructure projects, local jurisdictions can develop a stormwater fee that supports stormwater management projects and practices that reduce flood risk. As capital improvements are made, the stormwater fee can also provide funding for incorporating green infrastructure features into other projects.

Adopt an open space preservation plan. The purpose of an open space preservation plan is to balance land use and development with preservation and conservation of the natural environment. The conservation of the natural environment allows for it to perform valuable ecosystem services, such as absorbing and filtering stormwater and improve quality of life. Such a plan will help guide development and redevelopment with standards that establish a minimum amount of acreage to be preserved. An open space preservation plan should be coordinated at the regional watershed level to maximize its benefit.

Incentivize handling stormwater on site. Handling stormwater on site will reduce the amount of runoff entering the drainage system. Property owners can implement a number of site-level features such as a rain barrels, rain gardens, bioswales, and replace impervious surfaces like concrete with pervious materials such as gravel or permeable pavers. Incentives in the form of tax credits, stormwater fee discounts, and rebates can be used to offset the costs of implementation and reward measures taken to increase the amount of stormwater that can be handled on site.

Case Study: Kansas City Overflow Control Program

Green Solutions Pilot Project

Located in a mostly residential neighborhood, this pilot project implemented green infrastructure solutions and streetscape improvements for controlling sewer overflow.

By working with the public, Kansas City installed more than 150 green infrastructure elements, including rain gardens, porous pavement, bioretentive and cascading rain gardens, and used native vegetation to reduce sewer overflows by up to 3.5 million gallons per rainfall.

The 744 acre area was designed to integrate green solutions in the public right-of-way and improve streets, curbs, and sidewalks.



<http://kcmo.gov/marlborough/#.WdRS6non7o0>



Incentivize reduction of impervious surfaces. Reducing the cover of impervious surfaces on residential, commercial and public properties is an important strategy for increasing the retention and detention of stormwater. Existing impervious surfaces can be replaced with pervious surfaces through which water can penetrate, thus reducing the amount of water entering the drainage system at a given time. Incentives in the form of tax credits, stormwater fee discounts, and rebates can be used to increase participation of residents and commercial property owners.

Conduct a comprehensive code audit. Parishes and municipalities should review their entire code to ensure that all aspects are consistent with stormwater management best practices – especially regulations for planning, subdivisions, roads, drainage, parks and recreation, and zoning. A stormwater management code will not be effective unless it is woven through the entire code and supported by incentives.

Doing so will maximize opportunities for improved stormwater management from all development and redevelopment projects.

Adopt ordinances that include stormwater management best practices. Guidance for new development and redevelopment in urban and suburban areas should call for stormwater management best practices such as landscape standards, tree preservation standards, and green streets standards that can significantly increase on-site water stormwater management and reduce drainage damage to reduce flood risk. CPEX's Louisiana Land Use Toolkit (2009) and Louisiana Coastal Land Use Toolkit (2012) contain model ordinances that can be adapted for use by parishes and municipalities, available for download at www.cpex.org/publications-toolkits.

Engage and educate the public. Communicating with the public about stormwater management best practices can empower residents and business owners to reduce their own risks by taking action at the site level and help build support for policy measures such as higher regulatory standards and fees and incentives to improve stormwater management systems.



Buffer strips are naturally occurring or landscaped vegetated areas that slow down drainage while also filtering silt and pollutants from runoff. They are one of the most cost-effective green infrastructure elements.

The Front Yard Initiative

The Urban Conservancy has developed this initiative to address excessive yard paving in New Orleans and increase safety, improve stormwater management, and beautify neighborhoods throughout the city.

The Front Yard program incentivizes reduction of impermeable surfaces that increase runoff into stormwater drains by reimbursing eligible homeowners \$2.50 per square foot of pavement that is removed, up to 500 square feet (\$1,250).



www.urbanconservancy.org/project/fyi/#project-details