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## Making Connections: Planning for Green Infrastructure in Two Bridges

 by [Kerri Culhane](#)  
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In 2010, New York City's Department of Environmental Protection, responsible for the city's water supply, released an ambitious and comprehensive [Green Infrastructure Plan](#). The plan recognizes that the greatest ongoing challenge to water quality is combined sewer overflows (CSOs), which refers to the flowing of untreated wastewater directly into our waterways during heavy rains. The range of strategies and technologies to capture, reuse or simply delay stormwater runoff — like swales, green roofs or permeable paving — is collectively termed “green infrastructure,” and it's a hot topic these days. UO readers have learned about green infrastructure implementation and experimentation in [the wetlands of Staten Island](#) and [the rooftop farms of Queens](#), among other [examples](#). And this week, **Kerri Culhane**, an urban historian, planner and designer, explains how geographical, historical and architectural factors converge to make the community where she works, **the Lower East Side's Two Bridges neighborhood**, uniquely suited to put green infrastructure into action. Her compelling argument makes use of the vivid realities of rising water levels and ever stronger storms, the untapped capacity of open spaces in the [towers-in-the-park housing](#) that predominates in the area, the significant capital investments and design projects along the East River waterfront currently underway, and the ability of green infrastructure projects to provide social and economic benefits in addition to responding to urgent environmental imperatives.

 -[C.S.](#)


### Two Bridges Neighborhood

One year ago this month, Hurricane Irene brought heavy flooding to South Street and the East River Waterfront Esplanade in the Two Bridges neighborhood of Manhattan's Lower East Side. The storm's upcoming anniversary is a fitting occasion to discuss the urgent need to manage and mitigate stormwater. And Two Bridges — a low-lying and flood prone neighborhood with a mix of public housing and historic buildings, extensive frontage on the newly activated East River Waterfront Esplanade, and a location just out of the orbit of New York City's financial and civic center — presents a unique opportunity for the City and private property owners to make a significant commitment to economic, social, cultural and environmental sustainability by incorporating green infrastructure into the landscape.



Photo Courtesy of [kiddigit](#)

### **A History of Two Bridges, Abridged**

The Two Bridges neighborhood is one of Manhattan's oldest — and newest — neighborhoods. Located on the Lower East Side, the neighborhood's name refers to the location of its historic core between the Brooklyn and Manhattan Bridges. The establishment of the Two Bridges Urban Renewal Area in 1970-71 pushed the neighborhood's eastern boundary up to Corlear's Hook. The majority of land in the area is publicly owned and zoned for residential use. And much of it is made land, formed of centuries of landfilling and bulkheading that have transformed a natural shoreline of tidal marshes and stream mouths into an industrial waterfront of denticulated slips and piers in the shadow of the elevated FDR Drive.



Detail of Egbert Viele's 1865 topography and waterways map of Manhattan



Left: East River waterfront from the Williamsburg Bridge before the FDR (1906).  
 Right: East River Waterfront from the Manhattan Bridge after the FDR (1991) |  
 photos courtesy of the Library of Congress

In the late 1930s, the city began to refashion this early-eighteenth century, mixed-use portside neighborhood into a largely residential community of subsidized housing on the towers-in-the-park model. These developments stand alongside densely-built city blocks of mid-eighteenth century artisans' houses, nineteenth century rowhouses and tenements, as well as nineteenth and twentieth century civic buildings and light industrial lofts. Starting in 1939, when the Vladeck Houses broke ground, Two Bridges buildings were launched skyward from the centers of landscaped green spaces; small blocks were assembled into superblocks, and streets and streetwalls erased. In 1954, the East River Drive / FDR Viaduct was elevated above South Street, turning a formerly vibrant corridor servicing the waterfront into a derelict commercial strip. In 1997, when the last residential lot of the Two Bridges Urban Renewal Area was built out, the Two Bridges neighborhood was completely transformed by publicly built or subsidized large-scale affordable housing complexes and transportation infrastructure. Today, superblocks line the East River from the Brooklyn Bridge to 14th Street.



Left: Blocks cleared to construct the Vladeck Houses, ca. 1939, (c) NYCHA / La Guardia and Wagner Archives, City College | Right: Vladeck Houses today, courtesy of [Joel Raskin](#)

As a remedy to the congested and unhealthy tenement district they replaced, the superblocks' swaths of green space provided ample 'light and air.' The Alfred E. Smith Houses (1953), La Guardia Houses (1957) and Rutgers Houses (1965) are architecturally undistinguished buildings — functional rather than beautiful; however all were set within formally conceived park-like green spaces. Linear paths intersect with curvilinear paths; “allées” and “bosques” of predominantly [London Plane](#) trees now form a mature canopy shading seating areas, play grounds and acres of grass. These planned, green features contend with the more recent, unplanned addition of infill parking lots and dumpster corrals. Open spaces are dominated by hardscape, and more lot area is dedicated to parking lots than to green space.



Hardscaped open spaces along Rutgers Street and Madison Street | photos by Kerri Culhane

Parking lots and dumpster platforms define the South Street streetscape, considered, in every sense, to be the backside of the neighborhood. (With one exception, none of the urban renewal-era buildings on South Street have front doors facing the waterfront). Beyond the parking and dumpsters, several factors contribute to South Street's inhuman scale: the elevated FDR Drive; the busy and fast South Street truck route; the active Department of Sanitation facility at Pier 35; and the lack of safe street crossings to the waterfront. The lack of commercial or residential street life further disconnects the neighborhood from the waterfront.

When the public housing was built, proximity to the river was not conceived as a value-adding amenity. The city's rivers were its commercial and industrial center, points of entry for the majority of immigrants, and the fastest and easiest means of traveling throughout what would become the greater New York region. They also served as the most convenient dumps, and received millions of tons of raw sewage, chemical and slaughterhouse waste, solid waste, and the more-than-occasional dead body. While today the East River's toxicity is less than the peak it reached in the 1970s, it still receives regular "contributions" from the many combined sewer overflow outfalls (CSOs) and contaminated upstream watersheds that continue to empty to the East River.



Looking northeast along South Street. | Photo Courtesy of WXY Architecture + Urban Design

### Planning the Recreational Waterfront

The days of the productive industrial waterfront on the Lower East Side have passed, and recreation and tourism drive our current economy. In recent years, the City has undertaken a wholesale re-evaluation and redesign of the East River Waterfront. In the past decade alone, no fewer than three public plans address the East River Waterfront in Two Bridges, including “Transforming the East River Waterfront” (City of New York, 2004). This plan, produced under the auspices of the New York City Economic Development Corporation and designed largely by SHoP Architects with community input, called for the development of the [East River Waterfront Esplanade](#) (ERWE). The linear ERWE extends two miles from Montgomery Street down to the Battery Maritime Building, featuring pavilions and piers-turned-parks along its route, some operated as commercial ventures. For the first time in its history, the Two Bridges neighborhood will have access to significant recreational space.

Yet, the ERWE is seen by many in the community as a harbinger of gentrification. In a neighborhood where 85% of residents rely on rent controls or subsidies, and whose location is much more desirable today than at any earlier point in its history, the general feeling is that the improvements were not intended to benefit the current residents. In response to the City’s plan, a coalition of community-based organizations sought extensive resident input to balance the City’s perspective on waterfront development, and in 2007 produced *A People’s Plan* (O.U.R. Waterfront Coalition, 2007), calling for the recreational space on the piers to be more public and less commercial.

Most recently, the East River Blueway Plan, an effort launched by the Manhattan Borough President’s Office and led by WXY Architecture + Urban Design [*and discussed on Urban Omnibus [here](#) - Ed.*], seeks to address some of the access and upland connection issues that were not realized in the 2004 and 2007 plans.



Projected Inundation During Hurricane Categories 1-4 (NOAA)

The plans laid out by the City in 2004 and now nearing completion represent a significant investment in public open space on a waterfront threatened by the certainty of sea level rise. Just a year ago, South Street was inundated by the relatively minor surge during Hurricane Irene. Runoff from the associated downpour overwhelmed the combined sewer system and pushed contaminated water and raw sewage into open waters around the city.



Photo via [Bowery Boogie](#)

Residents may fear displacement by gentrification, but an equally inexorable threat is that of displacement by climate change. Every resident — in affordable or market rate housing — should be concerned with managing stormwater runoff to the CSOs that pollute their waterfront and storm surges that threaten the future of the neighborhood.

Student projects — such as Susannah Drake and Stephen Cassell’s Two Bridges studio at Harvard, or Kaja Kuhl and Skye Duncan’s Five Borough Studio at Columbia — have looked at issues ranging from ecological design to equity. In particular, Drake and Cassell’s studio investigated how design can meaningfully address storm surges, sea level rise and the future of Manhattan’s shoreline. And indeed, these challenges and opportunities require major and comprehensive design interventions, and potentially a refashioning of the urban fabric entirely. In the short term, the deployment of green infrastructure within the existing landscape can not only manage stormwater runoff, but help to connect the past, present and future built environment through functional, physical and ecological connections.

### **Green Infrastructure Potential in Two Bridges**

Two Bridges, poised at the lowest point in the Lower East Side’s extensive, hardscaped East River watershed, is the last point on land to slow, capture and infiltrate the overland flow of stormwater before it reaches the river. Among the existing “green” assets of the neighborhood is the New York City Housing Authority’s (NYCHA) now-mature tree canopy that provides the dual benefit of localized cooling and mitigation of some stormwater runoff. Acres of mown turf grass, concrete sidewalk and asphalt streets surrounding this urban bosque, however, still speed runoff to storm drains and to the river.

The extensive acreage controlled by NYCHA provides the greatest opportunity for stormwater infiltration with the greatest number of potential side benefits. Superblocks provide the advantage of open space for the deployment of green infrastructure.



“Towers-in-the-parking-lot” | Photo by Kerri Culhane

Some towers-in-the-park in recent years have been diminished into towers-in-the-parking-lot. Creating performance park landscapes will return towers-in-the-park to the original concept of providing light, air and “restorative” green spaces. Porously-paved paths and parking lots can be softened with bioswales and rain gardens; the uniformly mown turf grass green space, currently fenced off from resident use, could be returned to functionality as rain gardens and meadow, providing environmental benefits while preserving the integrity of the mature, forested landscape that is among its most pleasing and character-defining assets.

Embedding these types of green infrastructure features into walkways, streets and open space can create physical, visible and conceptual connections between upland areas (and their residents) and the East River Waterfront Esplanade and the future parks at Piers 35 and 42. But the benefits aren’t limited to mitigating stormwater runoff; green infrastructure can improve water and air quality. And the installation and stewardship of green infrastructure could create local job opportunities in public housing, where the current unemployment rate is approximately 30%. Engaging NYCHA residents in the installation and stewardship of green infrastructure as part of its existing workforce training or [Garden and Greening Programs](#) dovetails with NYCHA’s stated commitment to its own Green Agenda, which calls for a reduction in the 2,000 acres of mown grass across all of its campuses and an increase in resident stewardship of the landscape.

Beyond NYCHA, green infrastructure could be incorporated into other city owned properties in the neighborhood. For example, a Department of Transportation and Department of Parks and Recreation collaboration to pilot bioswales to capture street flow could be designed in a way to lead the visitor, arriving by the F train at Madison and Rutgers Streets, down the slip to the ERWE. And schools in the neighborhood could use roof gardens, rain gardens and raised beds to reduce runoff from largely hardscaped school grounds.

Private property owners, especially those along the South Street “frontline” between Catherine Slip and Clinton Street, also have to show a commitment to green infrastructure. The existing parking lots and dumpster platforms along this stretch of South Street are likely to be redeveloped as the waterfront park and piers become more of an attraction. The redevelopment of these sites will impact the user experience of the ERWE; well-designed rain gardens, bioswales and pervious pathways would complement the design philosophy underlying the ERWE.

Private improvements to the streetscape of the area are being led by Two Bridges Urban Renewal Area co-sponsors Two Bridges Neighborhood Council, where I work, and Settlement Housing Fund. To demonstrate the principles of green infrastructure, and to improve a social gathering space, we asked Susannah Drake’s dland studio to design a rain garden for the South Street side of Two Bridges Tower, 82 Rutgers Slip.



Above: Runoff Collection Potential of 82 Rutgers Slip. Below: Proposed Street Swales and Rain Terrace | Images courtesy of dland studio

Facing both South Street and Rutgers Slip, the hardscaped social gathering place and playground stands at the upland gateway to the future Pier 35 Eco-Park, and eventually the Rutgers Slip Pavilion, on the ERWE. dland studio devised a plant palette to include both “infiltrators” — plants that can take a soaking during a rain event — as well as plants for mitigating hydrocarbons and accumulating heavy metal, significant issues along the South Street truck route and the elevated FDR, and in the shadow of the Manhattan Bridge. Swales would capture street flow and infiltrate it in sidewalk planters, and provide a visual cue that ecological design is at work.

Special zoning and increases in local, state or federal funding opportunities could motivate owners not otherwise inclined toward implementing green infrastructure. NYCEDC, as the operator of much of the waterfront, should have a particular



interest in and commitment to protecting and enhancing the user experience of its ERWE by providing financing or devising partnership and business models to fund this important work.

Through green infrastructure, this neighborhood — long disengaged from its waterfront — can meaningfully connect to the public park developments along the East River, while enhancing the towers-in-the-park concept for the benefit neighborhood stakeholders the city, property owners and, most importantly, the residents.

*Over the past 15 years, Kerri Culhane has consulted on projects ranging from detailed documentation of historic architecture to landscape-scale conservation efforts; urban design integrates her interests in natural resources conservation, cultural resources preservation, and the cultural landscape. She also holds an M.A in Architectural History and Historic Preservation from Virginia Commonwealth University and an M.A. in Sustainable Landscape Planning and Design from the Conway School. As Associate Director of [Two Bridges Neighborhood Council](#), she leads Two Bridges' engagement in community planning and neighborhood preservation.*

*The views expressed here are those of the author only and do not reflect the position of Urban Omnibus editorial staff or the Architectural League of New York.*

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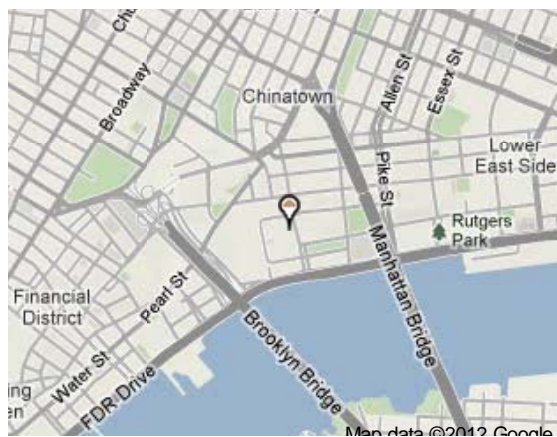
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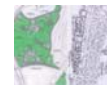


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