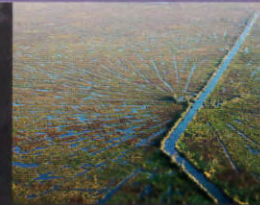




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2014

Coastal Strategies

THE NETHERLANDS NATIONAL COASTAL STRATEGY, FUTURE DIKE DESIGN • **GERMANY** THE FUTURE OF THE WADDEN SEA • **NEW YORK, STATEN ISLAND** AFTER HURRICANE SANDY: THE COMPETITION REBUILD BY DESIGN • **MISSISSIPPI RIVER** REDESIGNING THE LOWER DELTA • **NEW YORK, PUERTO RICO** RESILIENCY BY LIVING SYSTEMS • **RIO DE JANEIRO** A LAGOON FOR THE OLYMPIC PARK • **BANGKOK** WATERSCAPE URBANISM • **CALCUTTA** THE EAST KOLKATA WETLANDS • **SHANGHAI** POLDERING THE YANGTZE RIVER DELTA • **RESEARCH** A DESIGN TOPOLOGY FOR COASTS



LIFE BELT FOR NEW YORK

The concept of the BIG U, developed for the competition Rebuild by Design, is a protective system that encircles Manhattan and that rethinks infrastructure as an amenity. Three “compartments” – East River Park, Chinatown, and the Battery – illustrate the strategy.

As the Atlantic Hurricane Zone expands, the most densely populated and economically productive region in America suddenly finds itself in harm’s way. The 90-degree funnel of the New York Bight concentrates storm surge on New York City, putting half the city and its citizens at risk.

Iwan Baan’s New York Magazine cover photo of Lower Manhattan swept with darkness showed

how unprepared the city was (and gave rise to the naming of a new Manhattan neighbourhood – SoPo: South of Power, according to a resident cartoonist). When studying the historical development of Lower Manhattan, you can’t help but notice the gradual expansion of the island through landfill from the 17th century onward. The same areas that have been claimed from the sea are almost identical to the neighbourhoods

This text is based on the contribution of the BIG team to Rebuild by Design.



The BIG U not only shields the city against floods and storm water; it provides social and environmental benefits to the community, and fosters an improved public realm. The BIG U team created coordinated plans for three contiguous but separated regions of the waterfront dubbed “compartments,” one of them is depicted above Battery Park – Financial District.

flooded during Sandy. In other words, we need to take special responsibility for the areas that we have in fact created ourselves.

The Special Initiative for Rebuilding and Resiliency (SIRR) report and the PlaNYC Benchmarking Report propose eight miles of contiguous coastal protection. An urgent question presents itself: How can we protect the city from flooding without creating a wall that segregates the life of the city from the water around it?

The Highline – the former railyard in Chelsea transformed into one of the city’s liveliest parks – has taught us that a piece of decommissioned infrastructure can become a public amenity. What if we could proactively impregnate the resilience infrastructure with positive social and environmental side effects? You would never experience a flood barrier, but rather see an undulating landscape in a park, places for seating or playing, artworks, or pavilions – all providing public programs at the same time that they form an imperceptible, contiguous flood barrier: a string of pearls of resilient public programs.

The BIG U is conceived as the lovechild of Robert Moses, the “master builder” of mid-20th century New York, and the urban writer Jane Jacobs. To function as a flood barrier, it requires a holistic, coordinated effort, but to be successful as urban space, it needs to be rooted in the concerns and demands of local communities. To develop the BIG U, we have reached out to the various public and private stakeholders of the waterfront, from local authorities to grassroots. Through public meetings and design workshops, we have started a process to ensure that the BIG U won’t

be merely resilience infrastructure or flood protection, but will also serve to improve and accommodate access for all to the water, and enhance safety, social exchange, and environmental performance. As a result, the BIG U will appear as a public waterfront of diverse urban spaces, tailored to the life of the city and the citizens it is designed to protect.

The BIG U. The BIG U is a protective system that encircles Manhattan, responding to the needs and concerns of the island’s diverse communities. Stretching from West 57th Street south to the Battery and up to East 42nd Street, the BIG U protects 10 continuous miles of low-lying geography that comprise an incredibly dense, vibrant, and vulnerable urban area. The proposed system not only shields the city against floods and stormwater; it provides social and environmental benefits to the community, and fosters an improved public realm. For Phase 3 of Rebuild by Design (RBD), our team created coordinated plans for three contiguous but separate regions of the waterfront dubbed “compartments.” Each presents unique opportunities for integrated social and community planning. The compartments work in concert to protect and enhance the city, but can also stand on their own. Proposed solutions for the components were designed in close consultation with the associated communities and many local, municipal, state, and federal stakeholders; each proposal has a benefit-cost ratio greater than one; and each is flexible, easily phased, and able to integrate with existing projects in progress.

RESEARCH. We studied the history of resiliency planning in the tri-state area and elsewhere, and found that plans typically account for the existing city but fail to anticipate the natural growth and transformation of communities. In response, the team resolved to combine city-making and resiliency planning to create coordinated, intelligent designs for “growing into resiliency.” The resulting designs propose to not only solve existing problems but prevent the formation of new ones, proactively enhancing the city in many dimensions and channelling its future growth in desirable directions. Such an approach has many advantages. It creates possibilities to financially leverage incorporated projects and integrate them with existing plans. It creates opportunities to work with communities to ensure that resiliency measures double as social, economic, and environmental assets. As a dynamic process, moreover, “growing resiliency” enables planners to adapt on the fly to emergent developments such as global climate change and shifting policy priorities.

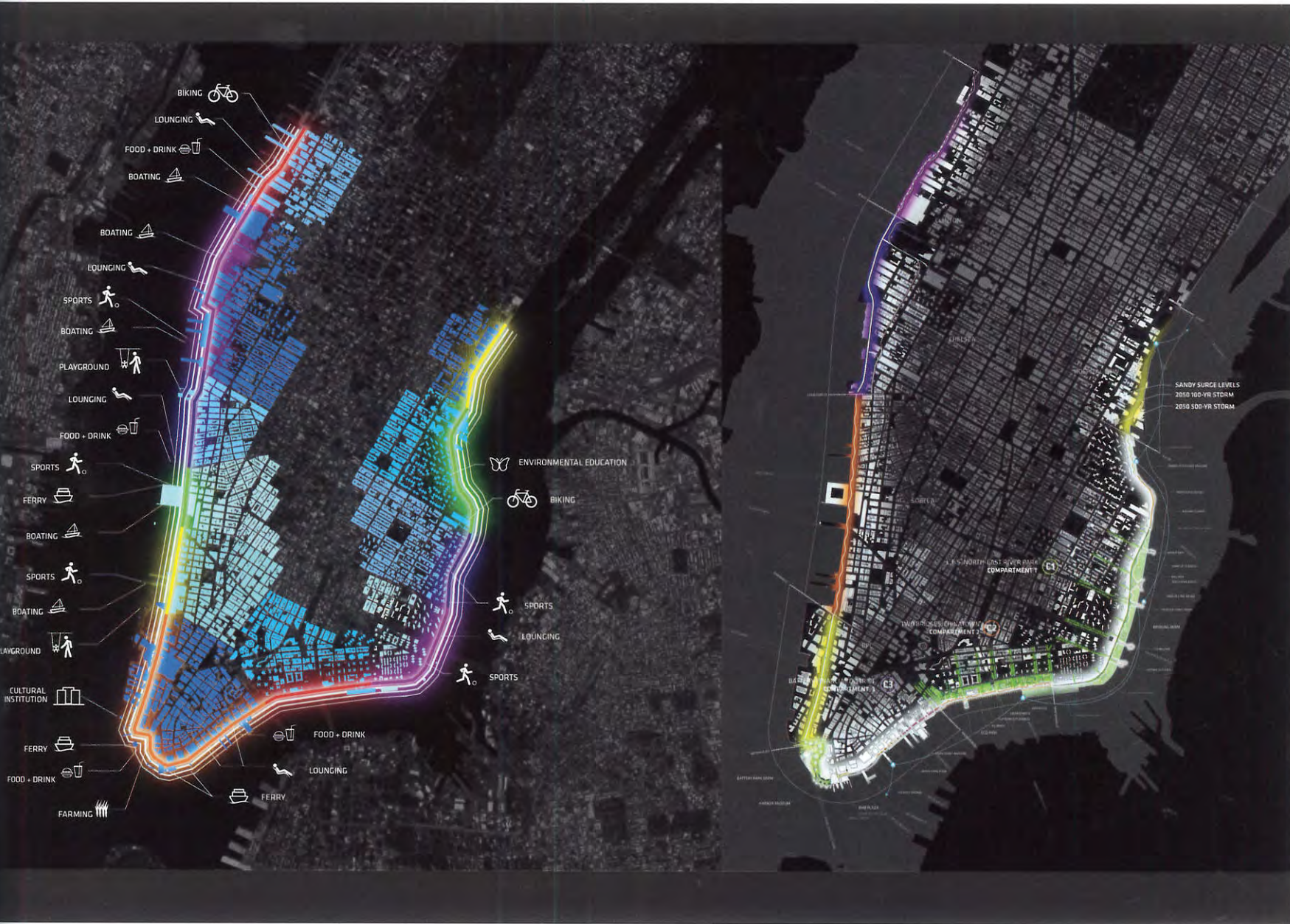
WHAT IS AT RISK? The floodplain upland of Manhattan’s 10 miles of coastline is home to approximately 200,000 people. This area contains some of the largest central business districts in the country, which cumulatively form the core of an economy with a 500 billion US dollars annual GDP and influence economic activity throughout the world. More than 52 million annual visitors come to New York City to see the 9/11 Memorial, the Battery, Wall Street, the Statue of Liberty, and Ellis Island.

BIG U, REBUILD BY DESIGN, LOWER MANHATTAN, NEW YORK

Client: U.S. Department of Housing and Urban Development

Team: BIG with ONE Architecture, Starr Whitehouse, James Lima Planning + Development, Level Infrastructure, Buro Happold, Arcadis, Green Shield Ecology, AEA Consulting, Project Projects, School of Constructed Environments at Parsons The New School for Design

The BIG U will establish water districts that will conform with already established neighborhoods like SoHo and TriBeCa and the Lower East Side to provide the localized management models to infuse tailored solutions to the varied needs along the 10-mile resilient infrastructure. Each water district will act like compartments in the hull of a ship – providing redundant protection and support.



L.E.S. NORTH – EAST RIVER PARK COMPARTMENT 1 (C1)

The northern compartment protects a deep floodplain containing a large residential community bounded to the east by the FDR Drive. Beyond the FDR, bordering the water, lies East River Park. A protective berm, easily accommodated by the relatively wide park, will shield the residential area from floods. New pedestrian bridges will connect the now-isolated park with the community.

The compartment connects to Hospital Row at 23rd Street with a deployable barrier. Under the FDR Drive at Peter Cooper Village, a series of pavilions are placed. At the land side, these can be programmed with the commercial functions and other amenities the area now lacks. On the water side, they can be programmed with recreational amenities that enhance the adjacent park. Between the pavilions, deployables maintain the relationship with the waterfront. Around the Con-Ed plant, a new flyover with an integrated levee provides a link between sections of the waterfront.

At East River Park, an undulating berm at the location of the existing service road provides flood protection. Shaped so that the existing sports fields are maintained, the berm provides topographic relief and new vistas for the back of the park. New landscape also increases the resiliency of the park through more diverse, salt-tolerant trees and plantings. Generous landscaped bridges connect East River Park to the community, enhancing existing bridges and adding additional bridges between major streets. Generous ADA-accessible ramps bring visitors gently down into the park from atop the bridges, where plazas make connections to a new, scenic bikeway and out to the water for a series of new waterfront programs. The flood protection continues to Montgomery Street by fortifying the new Pier 42 Park, where a deployable will help maintain the on-ramp to the FDR Drive.

The flood protection in L.E.S. North – East River Park protects 780,000,000 US dollars in potential damages. With a design height of 15 feet, the system has a benefit-cost ratio of 2.08.

TWO BRIDGES – CHINATOWN COMPARTMENT 2 (C2)

At Two Bridges, the relative lack of space between the residential areas and the waterfront favors a mixed flood-protection strategy. Limited-height flood protection shields the area against most recurrent floods while allowing for views to the waterfront. This is complemented by systematic measures to raise generators, et cetera, in a so-called 'wet-feet' (building-waterproofing) strategy that will allow the community to deal with the much rarer, bigger flood. The BIG Team has given special attention to ensuring that the resiliency measures add much-needed amenities for public housing.

Moving south from Montgomery Street, in front of the Pier 36 Sanitation Department facility, deployables will be attached to the underside of the FDR Drive. These deployables, in part a public art project, are designed so as to provide lighting and security in these now-dark spaces. Opposite the Smith Houses, this flood protection gives way to a system of benches, skate parks, Tai-Chi platforms and a pool, the latter enclosed in glass from 4 feet

up. The flood protection enlivens the Smith Houses' waterfront and provides recreational amenities such as laundromats, shops, and spaces for community functions. One of the ground floors is fortified and will house a Co-Gen plant serving the entire campus. A new public housing project compensates for the evacuated apartments.

As a final possibility, the team has also looked at the potential for The Elastic Berm: a gently raised landscape element winding its way through open space upland, simultaneously protecting the area while protecting views to the water and providing new amenities for the NYCHA campuses. Each of the options for Two Bridges – Chinatown have different benefits, and choices will need to be developed through continued, in-depth discussion with the community.

The flood protection in Two Bridges – Chinatown protects 237,000,000 US dollars in potential damages. With a design height of 10 feet, the system has a benefit-cost Ratio of 1.02.

BATTERY – FINANCIAL DISTRICT COMPARTMENT 3 (C3)

The unifying theme in compartment C3 is the enhancement of the touristic infrastructure in Lower Manhattan. A sequence of attractive urban spaces on the waterfront will protect the city while serving and pleasing the millions of visitors and thousands of workers in the area.

Berms in the Battery, strategically located so as to protect the ducts of the infrastructure below, create a continuous protective upland landscape. In place of the Coast Guard building, the plan envisions a new building programmed as a maritime museum or environmental-education facility. This signature building features a "Reverse Aquarium," its form derived from the flood protection at the water-facing ground floor, as well as a new Harbor Middle

School. Continuing east, a floodwall connects through the Staten Island Ferry building and aligns with the FDR Drive at the Battery Maritime Building (BMB). An elevated plaza brings the surroundings level with the monumental mezzanine floor of the BMB. This plaza connects to an elevated bikeway and footpath, which in turn connects to a series of pavilions that provide flood protection in conjunction with deployables that swing down from the underside of the FDR Drive.

The flood protection in the Financial District protects 1,900,000,000 US dollars in potential damages, including the critical infrastructure underneath. With a design height of 15 feet, the system has a benefit-cost ratio greater than 5.0.



The floodplain also contains 35,000 affordable housing units, home to over 95,000 low-income, elderly, and disabled residents, the majority of whom live in a highly vulnerable area along the East River.

Superstorm Sandy devastated much of this area. Infrastructure was disabled, homes were flooded, and people, many elderly or disabled, were trapped in their apartments. The economic heart of the Financial District stopped for a week. Many residents are still struggling with the aftermath. In public housing units affected by Sandy, mold infestation has almost doubled, illustrating that global climate change has increased the challenges of providing safe, liveable, affordable housing in Lower Manhattan. Rebuilding poses its own risks. In the worst case, uncoordinated recovery actions could result in a chaotic set of atomized changes that could prove destructive to the urban realm. A piecemeal approach would not only cost much more than a coherent plan; it would also likely worsen economic disparity in the city and leave low-income areas behind. Flood-protection measures, if not intelligently designed, might sever communities' connection to the waterfront, an unacceptable loss.

The opportunities that rebuilding brings, however, are as great as the risks. This occasion represents a priceless opportunity to rebuild better, to rebuild in such a way that as the city grows more secure physically, it gains new social, aesthetic, economic, and environmental assets that enhance its reputation as the greatest city in the world.

SOCIAL INFRASTRUCTURE. Our team proposes to rethink infrastructure as an amenity. We call its reconceived model "social infrastructure." Infrastructure in the United States, as traditionally conceived, has not been built to engage and respond to the needs of the public; rather, it has been imposed from without on cities, dividing communities and fragmenting the urban experience. The BIG U approaches the mandate to create large-scale protective infrastructure with a commitment to meaningful community engagement and fine-grained urban experiences. It fuses Robert Moses's hard infrastructure with Jane Jacobs's locally based, community-driven sensibility. The BIG U's flood-protection will not look like a wall, and it will not divide the community from itself or its waterfront. Rather, the very structures that protect us from the elements will embrace those protected, becoming attractive centers of social and recreational activity that enhance the city and lay a positive groundwork for its future.

The multivalent U consists of linked compartments, each built according to its own scale of time, size, and investment. This compartmentalization allows neighborhoods to tailor protective elements to fit their own needs, with cultural offerings, programming, and civic spaces as diverse as the city's population. Protection can be strategically phased: Small, relatively simple projects will provide immediate protection and maintain the post-Sandy momentum while laying groundwork for intelligent, long-term solutions.

Upon selection by the Rebuild by Design jury for the 3rd phase of the competition, the BIG U concept was greeted by many stakeholders on the West Side, the Battery, and on the Lower East Side (LES). In order to focus resources during the relatively short planning period, and at the suggestion of the Office of the Mayor, we decided to focus first on the Lower East Side. Here a large, vulnerable population (intended to be a major beneficiary of CDBG-DR funding) lives in the floodplain.

WORKING WITH THE COMMUNITY. On the Lower East Side, we worked intensively with LES Ready!, an umbrella organization of 26 community groups focused on coordinating emergency response and preparedness. With LES Ready! and RBD's support, our team held a series of workshops at various locations in the neighborhood. At the first workshops, the community debated the merits of various flood-protection approaches, using the models of different prototypical solutions. In the second series of workshops, the results of these discussions were incorporated in two possible integral design solutions for each compartment. These designs were also discussed at length by community members, whose feedback was used to refine the final designs. Over 150 community members attended these workshops; many returned to join the team for a celebration at the end of the process.

The component designs that emerged from this collaborative process have captured the communities' interest and contain protective elements

that can be implemented quickly. They are designed for growth: The designs are flexible enough to accommodate further community input and refinement, as well as future adjustments necessitated by changes in regulations, ongoing climate conditions, or other unforeseen needs.

THREE CUSTOMIZED COMPARTMENTS.

The resulting Phase 3 proposal envisions three compartments that function independently to provide flood protection. Each responds to the problems posed by a particular portion of the city, and to the needs and wishes of the particular community concerned.

GREEN INFRASTRUCTURE. Green infrastructure in the three compartments contributes to flood protection while providing social amenities. Climate-change models predict more frequent, heavy precipitation events, leading to increased flooding and combined sewer overflows (CSO) – problems exacerbated by impervious city streets. The urban heat-island effect will be worsened by longer heat waves. The BIG U’s native species bioswales, rain gardens, and street plantings will absorb and clean stormwater, cool the city, reduce air pollution, store carbon, buffer noise, enhance recreational activities, improve mental health, and provide green jobs. As a result, they will also reduce costs to both city and citizens.

IMPLEMENTATION. The Office of the Mayor of New York has become a close collaborator with our team. As the intended grantee of

CDBG-DR funding for the BIG U, the City of New York has the final say regarding the project’s implementation.

Implementation can begin in any of the three compartments. The BIG U’s essential flexibility allows implementation to start swiftly, and facilitates dynamic response to any emergent issues by shifting implementation focus between compartments as necessary.

In the most vulnerable areas of the U, further outreach and collaboration with public housing communities will be needed to craft a solution that fulfils the community’s needs and the BIG U’s objectives. To achieve this, we have developed a ‘toolbox’ of resilience measures that provide multiple benefits in addition to flood protection: social and cultural amenities, housing preservation, greater access to economic opportunity, jobs, ecological function, and improved public space. The team and community will work together to decide how best to deploy these tools to create a refined, fine-grained, site-specific strategy to address public housing needs.

The request for CDBG-DR funds includes not only funding for implementation of the three compartments, but also for the BIG U comprehensive planning leadership structure and continued long-term community engagement. This will preserve the effectiveness of resiliency measures and leverage the funding, social benefits, and public engagement that form the essence of the BIG U. The BIG U serves as an exemplary project: It shows how to integrate resiliency with city-making.



Proposed solutions for the components were designed in consultation with the associated communities and local, municipal, state and federal stakeholders; each proposal is flexible, easily phased, and able to integrate with existing projects in progress. From top: East River Park, Two Brigdes – Chinatown, Battery – Financial District.