

THE BIG U

THE BIG U PRINCIPLES

The principles behind the design of the Big U are:

- Flood protection and preparation are not a mere line of defense; they must take entire neighborhoods and districts into account.
- The design should be community-driven.
- The system should be compartmentalized and should be able to be built incrementally.
- Physical resiliency should be combined with social resiliency.
- The requirements of different sectors (housing/transit/energy/urban development) should be addressed by one solution.
- Flood protection should be tied to community benefits (better open space, better access to housing, jobs and education, lower insurance rates, possibilities for growth), allowing government investment to be leveraged with local and sectoral funding in a Resilient Community District.

The Big U is a protective system around Manhattan, driven by the needs and concerns of its communities. Stretching from West 57th street south to The Battery and up to East 42th 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, an improved public realm. For Phase 3 of Rebuild by Design, the Big U Team created separate but coordinated plans for three contiguous regions of the waterfront and associated communities, regions dubbed compartments. Each compartment comprises a physically separate flood-protection zone, isolated from flooding in the other zones, but each is equally a field for integrated social and community planning. The compartments work in concert to protect and enhance the city, but each compartment's proposal is designed to stand on its own. Each was designed in close consultation with the associated communities and the many local, municipal, state and federal stakeholders; each has a benefit-cost ratio greater than one; and each is flexible, easily phasable, and integrable with existing projects in progress.

RESEARCH

The Big U concept was the product of a research phase in which the BIG Team studied the history of resiliency planning in the Tri-State Area and elsewhere. The team's research demonstrated that resiliency plans typically have taken the existing city into account but failed to provide for the natural growth and transformation of communities. In response, the BIG Team resolved to combine city-making and resiliency planning to create coordinated, intelligent designs for "growing resiliency." The resulting designs would not only solve existing problems, but prevent the formation of new ones, proactively enhance the city in many dimensions, and channel its future growth in desirable directions. Such an approach has many advantages. It creates possibilities for leveraging the incorporated projects financially and integrating them with existing plans. It makes it possible to work with communities to ensure that the resiliency measures become social 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 new legislation.

WHAT IS AT RISK?

The floodplain behind the 10 miles of coastline is home to approximately 220,000 people. This area contains some of the largest central business districts in the country, which cumulatively are at the core of an economy with a \$500 billion annual GDP, and influences economic activity throughout the world. More than 52 million visitors annually come to New York City to see such sites as the 9/11 memorial, The Battery, and Wall Street, or to take the ferries to the Statue of Liberty and Ellis Island. The area also contains 35,000 affordable housing units, many of which have been hit hard by Sandy. Over 95,000 low-income, elderly, and disabled residents live there, predominantly along the East River.

Superstorm Sandy devastated much of the area. Much of the infrastructure was disabled, the economic heart of the Financial District stopped for a week, homes

were flooded, and people were trapped in their apartments. Many residents are still struggling with the aftermath. Mold, for example, has almost doubled in public housing affected by Sandy. It is clear that global climate change has made the challenges of providing affordable housing to Lower Manhattan even greater. Rebuilding after Sandy poses its own risks. In the worst case, each party (building owners, NYCHA, DOT, MTA) might rebuild just for itself, resulting in a chaotic set of atomized changes that could prove destructive to the urban realm as a whole. Such a piecemeal approach would not only cost much more than a coherent plan; it would also worsen economic disparity in the city as low-income areas, financially stretched as they are, inevitably are left behind. The poor would be left with nothing or worse. Another danger is that flood-protection measures, if not intelligently designed, might sever the communities' connection to the waterfront, so important for this area.

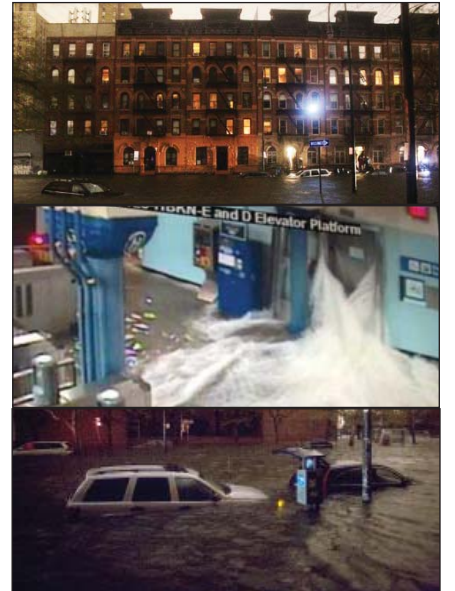
The opportunities that rebuilding brings, however, are as great as the risks. This occasion represents a priceless opportunity to rebuild better, to rebuild in such a way that even as the city grows more secure physically it is endowed with new social, aesthetic, economic and environmental assets, becoming more secure in many other senses.

SOCIAL INFRASTRUCTURE

The BIG Team proposes to rethink infrastructure as an amenity. The team calls it social infrastructure. Infrastructure in the United States, as traditionally conceived, has not been civic, accessible, designed with interaction with the public in mind; rather, it has been imposed from without on our cities on a large scale, sometimes with terrible consequences for the urban experience. The Big U combines the mandate to create large-scale protective infrastructure with a commitment to meaningful community engagement. It fuses 'Robert Moses' hard infrastructure with 'Jane Jacobs' locally-based, community-driven sensitivity. The Big U's flood-protection will not look like a wall, and it will not separate the community from the waterfront. Rather, the very structures that protect us from the elements will become 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 on its own scale of time, size and investment. This in turn allows neighborhoods to tailor the protective changes to fit their own programs, needs, assets, and opportunities. Small, relatively simple projects will maintain the resiliency investment momentum post-Sandy, and at the same time set in motion intelligent long-term solutions.

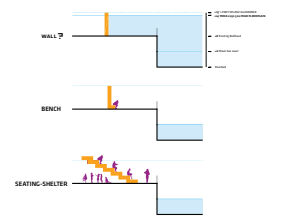
After the Big U was selected by the Rebuild by Design Jury for the 3rd phase of the competition, the BIG Team was greeted enthusiastically by many stakeholders on the West Side, at the Battery, and on the Lower East Side (LES). In order to focus resources in the relatively short planning window, the BIG Team, at the suggestion of the Mayor's Office, decided to focus first on the Lower East Side. Here a large, vulnerable population (a major target of CDBG-DR funding) lives in the floodplain.



THE LOWER EAST SIDE



ROBERT MOSES JANE JACOBS



FOCUS SCOPE

WORKING WITH THE COMMUNITY



To better understand the needs of the communities in Lower Manhattan, the BIG Team analyzed earlier, non-flood-related projects in the area, projects such as the East River Esplanade, The People's Plan (a reaction to the Esplanade), and the East River Blueway Plan. Since the community was actively involved in the design of these projects, the projects tell the story of what the community finds important. In addition, many elements of these plans are already under way.

On the Lower East Side (LES), the BIG Team worked intensively with LES Ready, an umbrella organization of twenty-six community groups. A joint planning committee prepared a series of workshops at various locations in the neighborhood. At the first workshops, the community debated the merits of various approaches, using the BIG Team's 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. Once again these designs were discussed at length by community groups. Many people from the community attended these workshops as well as the party at the end of the process.

Our major stakeholder, the City, saw the BIG Team's approach on the LES as suitable for other sections of the Big U. After discussions with the Battery Conservancy and the Downtown Alliance, the BIG Team expanded its design efforts to include the Financial District and The Battery.

In addition to working with the community, the BIG Team spoke to a vast array of city, state and Federal agencies, elected officials, and planning boards. These made many suggestions and tweaks that were incorporated into the proposals, enabling the plans to handle deftly many issues of concern to these entities. The BIG Team would like to express its profound gratitude for the kind attention and constructive criticism the proposals received.

A proposal for each of the compartments between East 23rd St. and the Battery emerged from the design process described above. Elements of each compartment can be implemented quickly. The Big U proposal has the support of the community, the design sought to minimize execution risk related to permitting and regulatory review, and has a positive benefit-cost ratio. At the same time, each compartment is designed for growth: each is able to incorporate decisions that could not be made by the stakeholders within the timeframe, opportunities that are unrealizable under current regulations, possible higher design heights in response to climate change, and more drastic transformations of the city. The designs anticipate continued future growth.

THREE CUSTOMIZED COMPARTMENTS

The resulting Phase 3 proposal is for three compartments that, while linked together, function independently in terms of flood protection. Each is a particular solution to the problems posed by a particular portion of the city, and each responds to the needs and wishes of the particular communities concerned.



PUBLIC WORKSHOPS

C1: L.E.S. North - East River Park

from E. 23rd St. to Montgomery St.

The northern compartment protects a deep floodplain next to the FDR Drive, which separates it from East River Park. The park, now poorly connected to the community, has room for a protective berm.

The compartment connects to the flood protection of Hospital Row at 23rd Street with a deployable. 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. 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. In East River Park, an undulating berm at the location of the service road to the FDR Drive provides flood protection. The berm is shaped so that the existing sports fields can be maintained. Generous landscaped bridges will connect the East River Park to the community. 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 East River Park protects \$780,000,000 in potential damages (NPV). With a design height of 15ft, the system has a benefit-cost ratio of 2.08.

C2: Two Bridges

from Montgomery St. to the Brooklyn Bridge

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, etc., in a so-called 'wet feet' (or waterproofed buildings) 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.

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 Smith Houses, this flood protection system gives way to a system of benches, skateparks, tai-chi platforms and a pool, the latter in a glass pavilion from 4 feet up. The flood protection enlivens the Smith Houses waterfront and provides recreational amenities. Buildings in the area are flood-proofed: utilities are moved, basements strengthened and the apartments on the ground floor are evacuated. This in turn makes space for 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.

The flood protection in Two Bridges protects \$237,000,000 in potential damages (NPV). With a design height of 10 ft, the system has a Benefit Cost Ratio of 1.02.



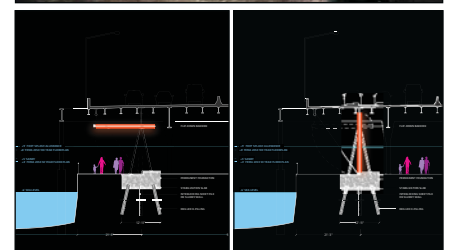
NEAR AND LONG TERM POTENTIALS



NEW TOPOGRAPHIES IN EAST RIVER PARK



NEW RECREATIONAL SPACE UNDER THE FDR



INTEGRATED "FLIP-DOWN" DEPLOYABLES



THE BATTERY BERMS

C3: BATTERY-FINANCIAL DISTRICT

from the Brooklyn Bridge to the Battery

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 is derived from the flood protection at the water-facing ground floor. 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/footpath, which in turn connects to a series of pavilions which provide flood protection in conjunction with deployables that swing down from the underside of the FDR Drive.

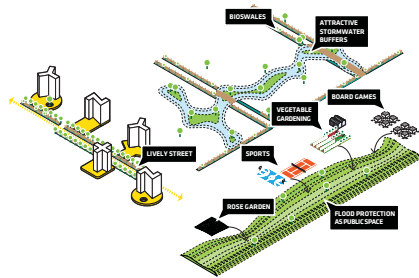
The flood protection in the Financial District protects \$1,900,000,000 in potential damages (NPV), including the critical infrastructure underneath. With a design height of 15ft, the system has a benefit-cost ratio greater than 5.0.



THE HARBOR SCHOOL + MUSEUM

GREEN INFRASTRUCTURE

Green infrastructure in all three compartments contributes to both flood protection and social amenities in the Big U. Climate-change models predict more frequent heavy-precipitation events, leading to even more street flooding and combined sewer overflows (CSO) than we have already experienced in our largely water-impervious city. The urban heat island effect will be exacerbated by longer heat waves. The Big U's native species bio-swales, 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 by-product of these benefits, they will also save the City and its residents money, for example in healthcare.



IMPLEMENTATION

The Mayor's Office has become a close collaborator of the BIG Team during the development of this third phase of Rebuild by Design. As the intended grantee of CDBG-DR funding for the Big U, the City of New York is expected to implement the project however a new mayoral administration has yet to make such a decision.

Implementation of the proposal can start in any of the three compartments. This flexibility, part of the essence of the Big U, allows implementation to start swiftly. While risks have been minimized as much as possible in this phase, the compartmental design makes it possible to respond to any unresolved issues



COORDINATION WITH MAYOR'S OFFICE

that might come to light in design development simply by changing the order of implementation while the issues are addressed.

Raising the integration between some of the stakeholders such as at some of the area housing communities and the Big U objectives to a high level will take a bit more time. To achieve this, the BIG Team has developed a 'toolbox' that demonstrates how resilience measures can achieve multiple objectives: more amenities, housing preservation, greater access to economic opportunity, jobs, and better public space. Using this toolbox, an even more integrated and comprehensive strategy for the 'towers-in-the-park' can, over time, be developed with the community.

The BIG Team's proposal is quickly implementable and highly integrated, yet it is organized so as to be responsive to new, longer-term opportunities and necessities, and to allow for even higher levels of integration. Evolving regulations might eventually make it possible to build resiliency measures in water and soft edges. The City's affordable housing strategy can generate new opportunities and imperatives for housing preservation. The rise in sea level can accelerate. Construction elsewhere on the shore or in the water can impact the necessary design heights. Mobility changes. The Big U incorporates a framework for adapting to the inherent dynamism of urban reality.

Growing resiliency will provide ever-increasing benefits for the city, but it will also require a continuous, active planning process. Part of this proposal, therefore, is to develop a Big U Lower Manhattan Waterfront planning leadership, which will streamline the adaptation of all planning initiatives to preserve resiliency, and which will address the long-term needs and possibilities of Lower Manhattan as these inevitably evolve. A high-capacity public agency with both authority and resources must be identified to serve as a coordinating planning and implementation agency lead for the Big U, supported by an interagency Technical Working Group and a broadly representative Community Advisory Committee.

The request for CDBG-DR funds, therefore, contains not only the funding for implementation of the three compartments, but also the funding for the Big U comprehensive planning leadership structure and community engagement process over a prolonged period. This is the only way to preserve the effectiveness of resiliency measures such as those contemplated here, and it is the only way to maximize the funding leverage, benefits, and public engagement which form the essence of the Big U. The Big U thus serves as an exemplary project: it shows how to integrate resiliency with city making.



THE BRIDGING BERM



THE STORM SURGE



BETTER PUBLIC ACCESS AT EAST RIVER PARK