TESTIMONY OF THE MAYOR'S OFFICE OF RESILIENCY
BEFORE THE NEW YORK CITY COUNCIL
COMMITTEE ON RESILIENCY AND WATERFRONTS AND COMMITTEE ON FINANCE

Thursday, January 30, 2020

I. INTRODUCTION

Good morning. I am Jainey Bavishi, Director of the Mayor's Office of Resiliency. I would like to thank Chair Brannan of the Resiliency and Waterfronts Committee and Chair Dromm from the Finance Committee for the opportunity to testify here today.

I would also like to acknowledge my colleagues Calvin Johnson and Chris Blanco from the Office of Management and Budget and Amy Peterson, Director of the Mayor's Office of Housing Recovery Operations. They will be joining me in answering your questions. The Office of Management and Budget in particular plays a critical role in managing New York City's federal disaster recovery funds and tracking how these funds are spent by a wide variety of City agencies.

II. FEDERAL FUNDING OVERVIEW

As you know, Hurricane Sandy was the most catastrophic natural disaster in New York City's history. The storm's strong winds and immense storm surge devastated entire communities, causing $19 billion in damage and tragically taking the lives of 44 New Yorkers.

Given the immensity of the damage, it was immediately clear that federal assistance would be required to help New York City recover. Congress agreed, and through a series of appropriations allocated over $14 billion in grants for Sandy recovery and to increase the resiliency of vulnerable areas to the future impacts of climate change. These grants are managed by two federal agencies: the US Department of Housing and Urban Development, or HUD, and the Federal Emergency Management Agency, or FEMA.

Now, I will summarize the different sources of funding the City has secured from each of these Federal Agencies, starting first with HUD.

Federal Funding - HUD

In January 2013, Congress approved $4.4 billion of disaster relief funding for New York City through the HUD's Community Development Block Grant – Disaster Recovery program (CDBG-DR). Due to the requirements set by this program, the vast majority of these funds—$4.2 billion—only became available to the City in April 2015, once HUD had approved the City's Action Plan for their use. The City also received a second, smaller funding package from HUD two years later, in January 2017. This package, totaling $176 million, came from the National Disaster Resilience competition (CDBG-NDR).

Much CDBG-DR funded work is now complete, and 82% of CDBG-**DR** funds have been disbursed to the City of New York from the Federal Treasury. This is ahead of the national average for this program and New York City has the smallest remaining grant balance of the large Sandy grantees.

Federal Funding - FEMA

The City has also secured over $9.9 billion in FEMA Public Assistance, or PA, grants. We gained access to the majority of FEMA funding in 2015. Since then, we have continued to pursue and secure additional PA grants for resiliency whenever possible, including almost $700 million over the last two and a half years.

To date, we have spent just over $5 billion on projects funded by FEMA PA grants. As a result of more projects moving into the construction phase, rates of spending have increased by 30 percent over the last year.

Federal Funding – U.S. Army Corps of Engineers

In addition to the HUD and FEMA grants the City has secured, there is one other major source of federal funding I would like to highlight here. The U.S. Army Corps of Engineers receives its own dedicated funding to build its projects all across the country, including here in New York City.

The Army Corps is an important partner in building our resiliency to climate change and is advancing major projects in Staten Island and on the Rockaway Peninsula. However, the funds they are using for these projects are not administered by the City and therefore do not pass through the City budget.

III. SANDY FUNDING TRACKER

Tracking expenditures is the responsibility of the Office of Management and Budget. In 2013, Council passed Local Law 140, which focused on ensuring transparency for the Federal Sandy recovery grants. In response to this Local Law, my colleagues at OMB created the Sandy Funding Tracker website, which displays detailed information on the grant awards, spending, and reimbursement progress of the City's federal grants. All of this information is publicly accessible and is presented through an easy-to-use interface.

Since Local Law 140 of 2013 was passed, Council has continuously provided feedback and worked closely with the Administration on this reporting tool. We continually strive to present accurate and timely information to the public and look forward to continuing to partner closely with Council into the future.

IV. FUTURE SPENDING

Looking ahead, we will continue to advance critical resiliency projects in all five boroughs.

Within the next year, New Yorkers in Staten Island, the Rockaways, and on the East Side of Manhattan will be able to look out their windows and see crews beginning work on major projects. The projects happening in these areas are pieces of major infrastructure that are without precedent anywhere in the world. Taken together, they cost more than $2 billion. And they are the kind of bold, long-term solutions that will help ensure our city can withstand the coming impacts of the climate crisis and emerge even stronger.

The hard truth is that these impacts will only continue growing worse until the world breaks its addiction to fossil fuels and achieves carbon neutrality. We all know that will not be easy, and it won't happen overnight. Increasing our resiliency is a long-term process and is likely to be the work of many generations of designers, engineers, and public servants.

The investments we are making now are a down payment to secure our future. Our next challenge, however, will be to identify new sources of funds for the next generation of resiliency projects. With 520 miles of coastline, there is no shortage of work to be done. We hope to work with Council to advocate for Federal policies that invest in resiliency before disaster strikes and to identify and secure other innovative funding sources for New York City.

V. CONCLUSION

In conclusion, I would like to thank the Committee on Resiliency and Waterfronts and the Committee on Finance for allowing me to testify here today. My colleagues and I are now happy to answer any questions you may have at this time.

WATERFRONT ALLIANCE

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Oversight - Seven Years Later: Update on the Expenditure and Reimbursement of Superstorm Sandy Federal Funding

Committee on Resiliency and Waterfronts
Jointly with the Subcommittee on Capital Budget
January 30, 2019

Submitted by Karen Imas, Senior Director of Programs, Waterfront Alliance

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- Waterfront Alliance is a non-profit civic organization and coalition of more than 1,100 community and recreational groups, educational institutions, businesses, and other stakeholders. Our mission is to inspire and enable resilient, revitalized and accessible coastlines for all communities.

- Our coasts are under threat from climate change, and we're already paying for it. Seven years after the devastation of Hurricane Sandy, progress has been made, but our region is still vulnerable to the increasing risks brought by climate change and sea level rise.

- A recent report by Comptroller Stringer's office found that just over half of federal aid set aside for city repairs has gone towards those efforts. In part, this is due to federal bureaucracy, but it is also a pace of action on behalf of the City of New York that lacks the urgency needed to address the problem.

- It is critical that we use the federal funds awarded post-Sandy as expediently as possible, or we risk losing them and being unable to afford much-needed coastal protection. We have two years to spend all of the funds allocated through HUD, and while FEMAs timelines vary, FEMA spending has lagged significantly.

- There are solutions to this both at the federal and the City level, and things that we can be doing now to improve both the current use of funds and to be prepared for the future. The City should consider this issue to be the emergency that it is, and to ensure that the resources provided to the Mayor's Office of Resilience and NYCHA, as well as other City agencies, are adequate to expedite project completion.

- The Comptroller's report highlighted the discrepancy in spending among city agencies. The Police Department has used about 80 percent of its $285 million in FEMA funds, whereas the municipal health care system, Health + Hospitals, has taken advantage of just 20 percent of the $1.9 billion earmarked for it.

- We must also look toward the future. While Sandy was a rare storm in 2012, we are likely to see storms like Sandy roughly every 20 years by

the end of the century. While the focus of this hearing is on the expenditure and reimbursement of federal funding related to Sandy, it is important to also to reflect on how prepared we are for the near, mid, and long-term risks we face due to both storms and climate change.

- While progress has been made in Lower Manhattan planned projects and MTA fortification, as well as some mid-term investments in flood protection in Staten Island, we are largely not prepared.

- Red Hook, Sunset Park, Coney Island, Jamaica Bay, Hunts Point, among other vulnerable areas, demand faster and better solutions.

- And we know that the current value of properties within the floodplain is projected to rise to a staggering $101 billion in Fiscal Year 2020 — an increase of 73 percent since FY 2010. Further, nearly half a million people live in the floodplain today. 17% of NYCHA buildings are in the floodplain today, and that extent is increasing.

- But we can do better. We can dedicate resources to expediting the use of federal funds and increasing accountability through comprehensive resilience planning beyond lower Manhattan that takes into account sea level rise, storms, housing, infrastructure, and social vulnerability and proactively plans for where this City can bear more density and where it cannot.

- We can work with federal and state partners to develop long-term funding sources for adapting our City. And we can adapt our regulations so that we are not building housing - public or private and critical infrastructure in our riskiest areas, those that we will likely have to retreat from in the next 30 years. This will prepare us both for future disasters and the slow and permanent creep of sea level rise.

- Thank you for your time.

166A 22nd Street
Brooklyn, NY 11232 NYC-EJA.org

On the ground – and at the table

January 30th, 2020

Testimony: Oversight - Seven Years Later, Update on the Expenditure and Reimbursement of Superstorm Sandy Federal Funding

Thank you for the opportunity to testify. My name is Priya Mulgaonkar, and I'm the Resiliency Planner at the New York City Environmental Justice Alliance. Founded in 1991, NYC-EJA is a city-wide membership network linking 11 grassroots organizations from low-income neighborhoods and communities of color in their fight for environmental justice.

In 2012, Superstorm Sandy devastated our city, sounding the alarm that the climate crisis is here. Sandy's impacts were not equally felt, with low-income communities, communities of color, and public housing residents in coastal communities from Red Hook to the Rockaways facing the heaviest impacts and the slowest recovery.

Massive investments in coastal resiliency are essential to confronting the risks of the climate crisis. But the allocation of the Community Development Block Grant for Disaster Recovery (CDBG-DR) follows similar patterns of racial and economic inequality as Superstorm Sandy. As of December 31, 2019, of the nearly $4.2 billion in CDBG-DR Sandy Recovery funds available to the City of New York, only about 11% has been allocated to coastal resiliency.[1] Within this sliver of the pie, a whopping 70% has been allocated just for the East Side Coastal Resiliency Project, which will protect Wall Street and parts of Lower Manhattan. This $338 million in federal dollars – which is more than was allocated for the entirety of NYCHA housing recovery – has been joined by an additional $500 million from the City Budget for four capital projects to reinforce Lower Manhattan's coastal areas and provide interim flood protections for Southstreet Seaport and parts of the Financial District.

While Lower Manhattan faces a surge of investment, the handful of communities in South Brooklyn, Hunts Point, and Staten Island named in the CDBG-DR budget will split the

[1] https://www1.nyc.gov/content/sandytracker/pages/hud-cdbg-dr

remaining 30% of federal coastal resiliency funds. Communities like Far Rockaway and Red Hook, where a significant portion of NYCHA housing is situated in the floodplain, are not named in the federal coastal resiliency budget allocation. Though Red Hook was initially promised $200 million for coastal resilience through a combination of FEMA Hazard Mitigation Funding and City and State funding, that number has dropped to $100 million. And the vulnerable Hunts Point Peninsula, an EJ and industrial waterfront community that hosts one of the nation's largest food distribution centers received only $45 million for an energy resiliency project, but nothing for coastal protection.

The current allocation of coastal resiliency funding does not reflect the dire vulnerability of New York's industrial, working-class waterfront neighborhoods. A lot of national attention has been directed toward shielding lower Manhattan from the next climate emergency. Meanwhile, the most impacted communities, some of which are still recovering and waiting to return to their homes, are seeing a slower response and much more modest investments.

In 2010, NYC-EJA launched the Waterfront Justice Project, New York City's first citywide community resiliency campaign that seeks to reduce potential toxic exposures and public health risks associated with climate change and storm surge in the City's industrial waterfront. We envision a robust, working industrial waterfront in our Significant Maritime and Industrial Areas (SMIAs) that can support a regenerative, green economy while providing good, blue-color jobs. Our research has shown that the SMIAs are all in storm surge zones, and that the City of New York had not analyzed the cumulative contamination exposure risks associated with clusters of heavy industrial use. Facilities handling hazardous substances or toxic chemicals in these SMIAs represent a threat to these EJ communities in the event of a hurricane storm storm surge, and warrants significant investment in coastal resiliency. We need to ensure the retention and vitality of these industrial communities without putting residents at risk of toxic exposure.

We also need to see more concerted investment in ecologically-grounded coastal resiliency measures. Low-lying areas like the Rockaways can be protected using techniques like living shorelines, which work with the existing wetlands, beachheads and water habitats to prevent erosion and reduce wave impacts. For more industrial areas, we can elevate critical existing infrastructure and incorporate new green space, permeable surfaces, and green infrastructure to mitigate flooding.

Environmental Justice communities cannot wait for another Sandy before we act on coastal resiliency. Thank you for calling attention to the need for oversight on the disbursement of post-disaster funds.

JANUARY 2020 | ISSUE NO. 9

SURGE WATCH

A Note From the Chair

On October 24th, 2019, hundreds of Long Islanders attended a meeting hosted by the US Army Corps of Engineers (USACE) in Great Neck, Long Island to discuss a storm surge gate proposed for the upper East River. This surge gate would be located near Throgs Neck (TN) and function as part of a regional storm surge protection system. It would stop secondary storm surges that originate in Long Island Sound (LIS) from advancing through the East River into New York Harbor and adding to flooding from the primary ocean surge that enters through the Verrazano Narrows.

Attendees were naturally very concerned about the potential for additional flooding and environmental impacts that might arise east of the barrier due to closing a mile-long floodgate in the face of a LIS surge, as compared to what might happen without surge protection measures in place.

Stony Brook University's top storm-surge researchers and modelers are investigating these serious concerns using modern high-resolution numerical models of coastal ocean dynamics and storm surge physics. The issue of increased flooding outside (seaward) of the proposed Sandy Hook-Breezy Point (SH-BP) surge gate was addressed in Surge Watch #7. Only a few inches of additional surge would result over what would occur if there were no operational surge gates in place. I explained in that editorial that a storm surge is not at all like an earthquake-induced tsunami — an unstoppable wall of water — but rather more like a gradually rising extra-high storm tide.

Our ongoing research has also included computer simulations of storm surge east of the Throgs Neck gate and preliminary results are very encouraging. As expected, the largest incremental surge heights occur just east of the surge gate. However, with both regional surge gates (SH-BP and TN) deployed, the additional surge heights experienced east of Throgs Neck from a major hurricane are only 3 inches or less!! The largest of these increases are limited to the westernmost embayments of LI Sound. Incremental surge heights diminish to less than an inch at the Nassau-Suffolk border. These modest increases are in stark contrast to the USACE presentation at Great Neck that suggested additional surge height could be as much as 1½ feet. This alarming prediction triggered an understandably negative reaction.

These modest increases in surge elevation need to be addressed in regional plans, but also need to be weighed against the protection afforded virtually all of NY Harbor and the entire Hudson River, where water levels are held near normal low tide and as much as ten feet lower than they would have experienced if no barriers had been in operation!

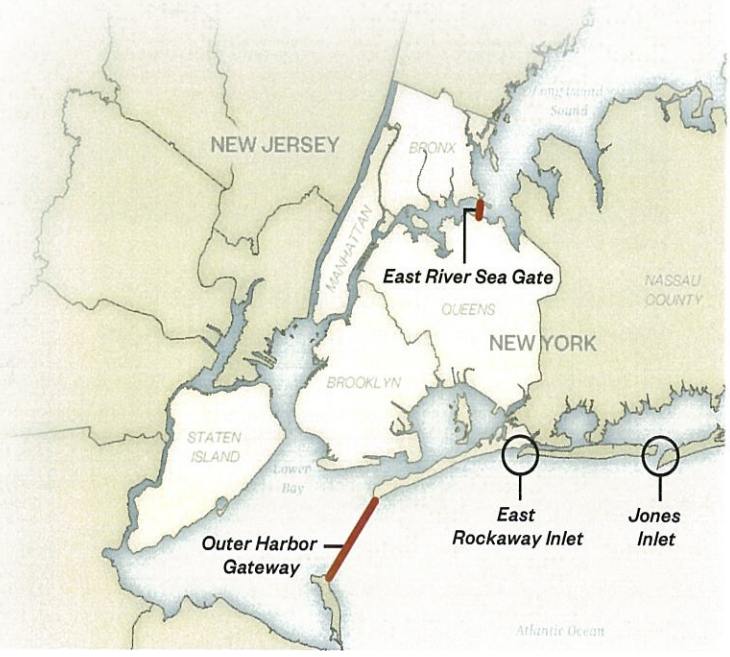
Storm surges dynamics are very complicated, but we must base our public policies on careful analyses based on world-class science and engineering. The strategies for coping with extreme weather and sea level rise will be complex and multilayered and include planning, financing, environmental and public policy considerations. We must employ the best available science in making these decisions and not stake our future on untested, unscientific scenarios.

Malcolm Bowman,
Chair, Metropolitan NY-NJ Storm Surge Working Group.

FOR THE RECORD

On February 19, 2019 the US Army Corps of Engineers New York District released an Interim Report for Coastal Storm Risk Management for the NY&NJ Harbor and Tributaries Study (HATS). State and Local partners that contributed input on the interim report include the NY State Department of Environmental Conservation, the NJ Department of Environmental Protection, and the City of NY. It is available, along with video of the October 24, 2019 public meeting held on Long Island at:
www.nan.usace.army.mil/nynjhats

The Corps is holding public meetings, check the web site for dates and location details. The public is invited to comment via email to NYNJharbor.tribstudy@usace.army.mil or by mail to:
NYNJHAT Study Team, Planning Division,
USACE NY District,
26 Federal Plaza Room 2145
NY, NY 10279-0090



Flooding caused by Hurricane Florence in Ringlewood, NC

Image Credit: *: N.C. Air National Guard/ Flickr*

Bank Regulators Present a Dire Warning of Financial Risks From Climate Change

Home values could fall significantly. Banks could stop lending to flood-prone communities. Towns could lose the tax money they need to build sea walls and other protections. These are a few of the warnings published on Thursday by the Federal Reserve Bank of San Francisco regarding the financial risks of climate change. The collection of 18 papers by outside experts amounts to one of the most specific and dire accountings of the dangers posed to businesses and communities in the United States — a threat so significant that the nation's central bank seems increasingly compelled to address it.... To learn more, *Continue Reading...*

The New York Times | Oct. 17, 2019

What Climate Risks Mean for NYC's Food Supply

To feed its 8.5 million residents, New York City relies on an interconnected food supply chain clustered around just six major distribution centers—the largest of which are located in flood hazard zones ...To learn more, *Continue Reading...*

CityLimits |Dec 30, 2019

Image Credit: *: Billy Hathorn/Wikipedia*

Climate crisis fills top five places of World Economic Forum's risks report

For first time, environment is at top of list of issues worrying world's elite ... Extreme weather events with major damage to property, infrastructure and loss of human life; Failure of climate-change mitigation and adaptation by governments and businesses....To learn more, *Continue Reading...*

The Guardian | January 15, 2020

'Ground zero' for sea level rise is New Jersey, new climate data suggests

Human-made gas emissions are speeding up sea level rise around New Jersey and, in tandem with coastal storms, will cause more frequent flooding for decades to come, according to a new report by the New Jersey Department of Environmental Protection and Rutgers University....Sea level has risen around New Jersey by about 1.5 feet between 1911 and 2019, while global sea level rose about half that, according to the report ... To learn more, *Continue Reading...*

USAToday |Dec 13, 2019

South Jersey winter storm flooding

Image Credit: *: U.S. Coast Guard District 5 PADET Atlantic City*

FEMA Renews $1.3 Billion Reinsurance for Flood Program with 27 Carriers

The Federal Emergency Management Agency (FEMA) FEMA reported its 2020 traditional reinsurance placement for the National Flood Insurance Program (NFIP) in a transaction in which 27 private reinsurers assumed $1.33 billion of NFIP's financial risk. This annual reinsurance agreement is effective from January 1, 2020 to January 1, 2021. FEMA now has transferred a total of $2.13 billion of the NFIP's flood risk for the 2020 hurricane season to the private sector.... To learn more, *Continue Reading...*

Insurance Journal | January 6, 2020

Could Climate Change Cause the Next Financial Meltdown?

A report issued this week by an umbrella organization for the world's central banks argued that the answer is yes, while warning that central bankers lack tools to deal with what it says could be one of the biggest economic dislocations of all time. The book-length report, published by the Bank for International Settlements in Basel, Switzerland, signals what could be the overriding theme for central banks in the decade to come..... *Continue Reading...*

The New York Times | Jan 23, 2020

Thank you for keeping up with the SSWG. For more information, please visit our website or www.nichiusa.org

Senior Editor: Malcolm Bowman, Distinguished Professor of Oceanography, State University of NY Stony Brook

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Investigative Reporters: Catherine McVay Hughes and Suzanne DiGeronimo FAIA, President DiGeronimo Architects

Graphics and Layout: Hazen and Sawyer

OCTOBER 2019 | ISSUE NO. 8

SURGE WATCH

An Encouraging Story about Historic but Formerly Polluted River

More than 100 seal pups born in the Thames 60 years after the river was declared 'biologically dead' *by Jessica Carpani, The Telegraph, 2 September 2019.*

The Thames River flows through central London, a 2000-yr old human settlement dating back to Roman times. It has over the centuries been heavily polluted. According to the article, *"...in 1957 the River Thames was so heavily polluted it was declared 'biologically dead' by the Natural History Museum leaving hope for marine life lost". But recent research shows the river is now "an essential nursery habitat and home to many animals: including more than 100 species of fish, including two species of shark, short-snouted seahorses and the Critically Endangered European eel. Last year the river even hosted a rare beluga whale named Benny for three months. While initially feared to be stuck, experts later found he was happily feeding on the plentiful fish....".*

Unfortunately, ingested plastics continue to be a major problem. *"Last year, the RSPCA told the Telegraph that it was the worst year for seals encountering "horrifying" plastic-related injuries. The animal charity reported that six grey seals required urgent care after becoming trapped in plastic rubbish."* It's interesting to note that the Thames River Barrier, officially opened in 1984 and located downstream of central London near Greenwich, does not appear to have any adverse effects on the river's recovering ecological health.

Fig. 1: View of the Thames River looking towards London with the Thames Barrier in the foreground. Located near Greenwich, downstream of the inner city, the barrier lies 15 miles upriver from the North Sea.

https://www.thesun.co.uk/news/9669063/london-flood-thames-barrier-strike]

The NY-NJ-LI Storm Surge Working Group encourages the USACE HATS to investigate Thames River-style rotating gates rather than the huge and clumsy Maeslant-style swing sector gates proposed for the various locations intended to protect Metropolitan New York (HATS Alternatives 2 and 3).

Why? Rotating gates allow a very high "flow through" of tides and river currents under normal weather conditions, due to the relatively small footprint of the gate piers compared to the massive blockage caused by the parking platforms for the retracted sector gates (together with the piers for the associated sluice gates both sides of the swinging sector gates, leads to an unacceptable 59% blockage of the river crossection at one proposed barrier location (north of the Verrazano Narrows). Also the Thames design has multiple channels for shipping traffic which can be easily opened or closed as needed.

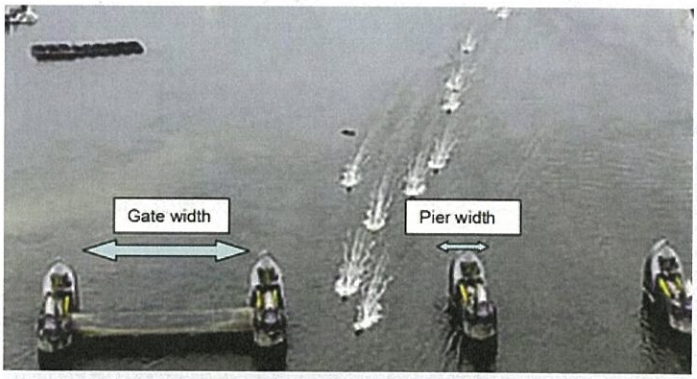

Fig. 3: Aerial view of the Thames Barrier, illustrating the favorable gate width/pier width ratio (about 3:1)

Adapted from https://www.standard.co.uk/news/flood-warnings-as-thames-barrier-closed-for-second-time-in-24-hours-6760622.html]

In summary: Any barrier design needs to be robust, easily maintained, safe for navigation, present minimal obstruction to daily tidal/river streams in normal weather, eco-friendly, reliable and cost-effective! The success story of the Thames River-style rotating gates prove that effective storm surge barrier technology already exists and could readily be applied to the relatively shallow waters lying between Sandy Hook NJ and Breezy Pt, Long Island (HATS Alternative 2).

However, the SSWG submits that HATS Alternative 3 (north of the Verrazano Narrows) is problematic from many engineering, construction, navigation and ecological aspects.

Superstorm Sandy floods West Street in Lower Manhattan

Image Credit: *ebroadsheet.com*

Come Hell and High Water

A new report from the National Oceanic and Atmospheric Administration (NOAA), the federal scientific agency responsible for study of oceans, major waterways, and the atmosphere, predicts that Lower Manhattan will, in the next 12 months, experience between double and triple the number of flooding days that it did in 2000. *Continue Reading...*

The Broadsheet | July 15, 2019

Workers dismantled oceanfront homes along Traffic Avenue in Ocean Bay Park on Fire Island in 2018

Image Credit: *Johnny Milano*

Building on Sand: The Effort to Protect Long Island's Communities & Beaches

For decades, scientists have studied the role of Long Island's barrier islands and how to preserve them. *Continue Reading...*

Newsday | September 11, 2019

Image Credit: *Yuri Smityuk/TASS via Getty Images*

UN Report Warns Climate Change Is Accelerating Ice Melt

"An existential crisis" as seas rise faster than predicted. Changes to civilization, one author says, are "permanent." That's the conclusion of a report published by the UN-backed Intergovernmental Panel on Climate Change. *Continue Reading...*

Bloomberg | September 25, 2019

A roofer working on a home in Mexico Beach, Fla., that was damaged by Hurricane Michael in 2018.

Image Credit: *Scott Olson/Getty Images*

Climate Risk in the Housing Market Has Echoes of Subprime Crisis

Banks are shielding themselves from climate change at taxpayers' expense by shifting riskier mortgages — such as those in coastal areas — off their books and over to the federal government, new research suggests. The findings echo the subprime lending crisis of 2008. One difference is that those values would be less likely to rebound, because many of the homes literally would be underwater.

Research *findings* show "a potential threat to the stability of financial institutions." They warn that the threat will grow as global warming leads to more frequent and severe disasters, forcing more loans to go into default as homeowners cannot or would not make mortgage payments. *Continue Reading...*

The New York Times | September 27, 2019

Other Flooding and Climate Change News

7 Years After Sandy - Part I: Pieces In Place That Worked, Rebuilding Efforts That Failed. *Continue Reading...*

Gotham Gazette | September 17, 2019

7 Years After Sandy - Part II: The City's Limited Resiliency Efforts Since. *Continue Reading...*

Gotham Gazette | September 18, 2019

7 Years After Sandy - Part III: Is the City's Emergency Responsiveness Ready for Whatever Comes Our Way? *Continue Reading...*

Gotham Gazette | September 19, 2019

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Graphics and Layout: Hazen and Sawyer

August 2019 | ISSUE NO. 7

SURGE WATCH

A Note From the Chairman

The Army Corps of Engineers Harbor and Tributary Study (HATS) is evaluating alternatives to reduce storm surge risk to the metropolitan area. Alternative 2 would reduce over 92% of the estimated risk and is strongly favored by the NY-NJ Storm Surge Working Group as it offers protection far superior to that provided by any other alternative under consideration. This alternative proposes the construction of movable, in-water sea gate systems at two locations. One would extend from Sandy Hook to Breezy Point; the other, from Queens to the Bronx near Throgs Neck. Together, they would effectively block storm surges that will otherwise converge with devastating effect in NY Harbor.

Alternative 2 protects most of the NYC shoreline, including Coney Island and Jamaica Bay, many miles of Hudson River shoreline, and much of northern NJ as well, including Hoboken, Jersey City, Newark Airport, the Port Elizabeth industrial complex, and communities bordering Raritan Bay including the Two Rivers region. In-water storm surge protection also minimizes very significant construction impacts and lasting operational requirements associated with land-side surge mitigation. These are becoming increasingly apparent to local stakeholders as various, land-side projects advance. In comparison, the construction and operational impacts of in-water sea gates would be minimal in most communities.

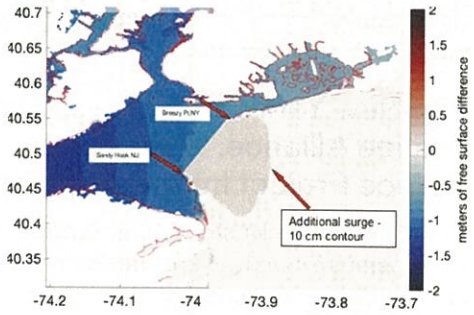
The following questions inevitably arise in conversations on Alternative 2:

"Suppose the sea gates were suddenly closed as a storm surge approached. Won't blocking flow into NY Harbor cause a massive pileup as an irresistible force meets an immovable object? Won't this damage barrier extensions and vulnerable coastline beyond? Won't the closed gates just transfer the storm's energy, significantly increasing the risk to other coastal communities?"

The answer to these questions is a surprising No! Our expert ocean modelers have demonstrated that the net increase in water levels outside the closed gates would be only a few inches. These results are best understood by appreciating the difference between storm surge and tsunami. Tsunami is triggered by sudden seafloor earthquakes that create violent vertical motion, spreading waves in all directions at enormous speeds up to 450 mph. The effect is like throwing a large rock into a pond. Though not especially dangerous in deep water, tsunami waves slow down, pile up and break on their approach to land, creating an unstoppable wall of rapidly moving water with deadly consequences. In contrast, storm surge is caused by offshore gale force winds which create large waves and ocean swell by dragging surface layers of the ocean toward the coast. These near-surface wind-driven currents may travel just a few miles per hour but still carry a huge amount of water. Storm surge manifests itself in harbors and exposed coastlines principally as extra high storm tide rather than a tsunami-like wave.

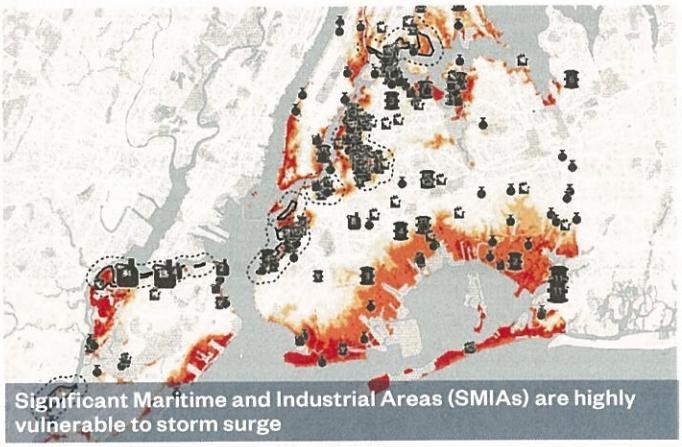
With in-water barriers, surge piles up against what becomes a continuous smooth coastline. Winds push water toward the coast and closed gates. At the same time, an opposite force (gravity) pushes back to level the ocean surface. The growing reverse pressure opposes further wind-driven surface currents, diffusing the advancing surge. The resulting balance limits the net increase in water levels outside of the sea gate system to only inches above what they would be otherwise while protecting hundreds of miles of shoreline from many feet of storm surge inundation!

Malcolm Bowman,
Chair, Metropolitan NY-NJ Storm Surge Working Group.



The regional storm surge gates of Alternative 2 raise outside surge levels by only inches while protecting hundreds of miles of shoreline from many feet of storm surge inundation.

Regional Sea Gate System



Significant Maritime and Industrial Areas (SMIAs) are highly vulnerable to storm surge

Image Credit: *Waterfront Justice Project*

The New York City Environmental Justice Alliance: Waterfront Justice Project Interactive Map

As the threats of climate change increase, destructive storms like Superstorm Sandy, Hurricane Katrina, and Hurricane Harvey will expose the vulnerabilities of coastal communities overburdened by industrial and chemical facilities in significant maritime and industrial areas. Launch the Waterfront Justice Project Interactive Map where you can explore these communities. *Continue Reading...*

http://www.nyc-eja.org/waterfront-map/

Proposed Interim Flood Protection along East River Esplanade

Image Credit: *NYC OEM*

City's First Line Of Defense Against A Hurricane? Mayor's Office To Roll Out Sandbags In Lower Manhattan

Nearly seven years after Superstorm Sandy decimated the city, Mayor Bill de Blasio's administration has finally come up with a temporary plan to protect part of lower Manhattan. To learn more, *Continue Reading...*

CBS | May 6, 2019

With More Storms and Rising Seas, Which U.S. Cities Should Be Saved First?

As disaster costs keep rising nationwide, a troubling new debate has become urgent: If there's not enough money to protect every coastal community from the effects of human-caused global warming, how should we decide which ones to save first? To learn more, *Continue Reading...*

NYT | June 19, 2019

Image Credit: *USACE*

South Shore of Staten Island Coastal Storm Risk Management Feasibility Study

The South Shore of Staten Island N.Y., Coastal Storm Risk Management project area is located along the south shore of Staten Island in New York City from Fort Wadsworth to Oakwood Beach. The project is underway in close partnership with the New York State Department of Environmental Conservation and City of New York. *Continue Reading...*

https://www.nan.usace.army.mil/Missions/Civil-Works/Projects-in-New-York/South-Shore-of-Staten-Island/

Other Flooding and Climate Change News

Safeguarding Our Shores: Protecting New York City's Coastal Communities from Climate Change;
Continue Reading...
The Office of the New York City Comptroller | May 9, 2019

These 9 NJ Communities Will 'Soon' Be Underwater: These towns are among 35 in the US that most likely will be uninhabitable and underwater, a report says.
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Patch | June 6, 2019

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