

# **COMMUNITY STRATEGIES FOR HAZARD MITIGATION**

**IN GOWANUS, BROOKLYN**

URBAN PLANNING STUDIO | SPRING 2018

GSAPP Columbia University

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## A focus on soft solutions for community hazard mitigation at all scales

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New York City is currently creating its 2019 edition Hazard Mitigation Plan (HMP), a process and document the Federal Emergency Management Agency (FEMA) requires in order for cities to be eligible for federal funding in the aftermath of a disaster. In the 2019 HMP, New York City Emergency Management (NYCEM) has included the Emergency Planning Toolkit for Community Leaders, a new program which aims to equip communities with information and strategies in the face of emergencies.

Our studio, with its focus on community-based strategies and in partnership with NYCEM, seeks to enhance and reify the Emergency Planning Toolkit in the context of the Gowanus neighborhood in Brooklyn, New York City. Gowanus, with unique physical, environmental, and social vulnerabilities shaped by its industrial past, proximity to the coast, and economically vulnerable residents, offers a compelling and instructive case study to provide realistic strategies for replicability through New York City. Further, with the neighborhood undergoing a dramatic rezoning effort that will compound the effects of disasters with high increases in density and expected neighborhood change, our studio is interested in practical means of engaging the community to build resilience.

We analyzed the Gowanus neighborhood and its built environment in order to understand its physical and environmental vulnerabilities and identified potential hazards that are most likely to affect Gowanus in the future. Through our research we found that flooding, coastal storms, extreme heat, hazmat, utility outage, and winter weather are the central hazards facing the neighborhood.

Recognizing that social vulnerability has a compounding effect in the context of disaster, our studio focused on better understanding the most pressing social aspects of vulnerability through the implementation of a Social Vulnerability Index (SVI). Our SVI included socioeconomic

status, household composition, disability, race, language and housing characteristics. The SVI analysis highlights the northernmost area of Gowanus as most socially vulnerable, and it is important to note that this area also corresponds with the locations of all three of the New York City Housing Authority (NYCHA) public housing properties in Gowanus. The actual geographical segregation between NYCHA residents and the remaining neighborhood residents is an overarching vulnerability that impacts community cohesion and barriers to a neighborhood-scale emergency response network.

Taken together and following these initial efforts to identify social and physical vulnerabilities, our studio turned to a comprehensive community engagement process which included in-depth interviews, virtual interviews and a facilitated workshop event in the neighborhood. The engagement process was designed toward better understanding coordination among community organizations and city agencies already working in Gowanus. These existing community and social networks, whose work ranges in focus from official city roles and quasi-official organizations focusing on community development to arts, culture, youth, elderly and environmental organizations, intersect with the goals of the Emergency Planning Toolkit and are a necessary resource in its mission to engage communities with emergency preparedness, response, long-term recovery and mitigation planning strategies.

Our engagement process and efforts to understand the connections between city agencies and community organizations provided the impetus for our work and has informed our final recommendations. The value in recognizing existing social networks and the capacity of community organizations to respond to and prepare for disaster through city sanctioned efforts makes clear that the Community Emergency Planning Toolkit, when embedded in the functions of these community organizations, can exist as a powerful tool for communities contending with the complexity of emergency preparedness and response. Our studio developed methodologies and recommendations in the context of the central question, “How can we better engage communities in the hazard mitigation process?” a question initially raised by NYCEM at the beginning of the studio.

These lessons inspired our studio to make recommendations that are structured to allow for replicability in other neighborhoods in New York City. Our recommendations include mitigation actions that address conditions in Gowanus’ built environment; ideas on how to communicate disaster preparedness through effectively designed guides and resources; ways to strengthen connections between the community and city agencies in an attempt to bring official responses and expertise to the existing social networks already in place in communities; and finally, a common space we call Gowanus Commons, which builds off these recommendations and brings them together into a unified platform.

# Introduction

New York City Emergency Management (NYCEM) is the primary coordinating agency responsible for managing how New York City prepares and responds to emergencies. From flooding, to extreme temperatures, infrastructure failures, and disease outbreaks, NYCEM's work focuses on the city as a whole, and works to educate and equip the public with information and tools around emergency preparedness through programs like Ready New York, Community Emergency Response Teams (CERT), and Citizen Corps. Currently, NYCEM is in the process of developing the next version of its Hazard Mitigation Plan (HMP) to be released in 2019.

HMPs are required of cities in order to be eligible for post-disaster mitigation funding from the Federal Emergency Management Agency (FEMA), and must be updated every five years. NYCEM's plan outlines goals, objectives, and specific actions New York City can take to reduce risks.

Within this plan, NYCEM aims to include an approach to disaster planning that focuses on community-based efforts to emergency response and recovery. With this goal in mind, NYCEM has developed the "Community Emergency Planning in NYC Toolkit for Community Leaders", which is comprised of two parts: a workbook, and a fillable emergency plan template. The workbook aims to provide community leaders with information on how to organize, define, and map their community to build an emergency network.

Whereas the plan template includes scenarios and walks leaders through articulating their key stakeholders and resources for their own community emergency plan. The toolkit draws from the successes of community-driven planning efforts and reflects this through its aims at facilitating group collaboration.

NYCEM has just begun to pilot this toolkit in some New York City neighborhoods. As they work to understand its potential as a tool for community preparedness and resiliency, they have asked our studio team for help in developing an enhancement for the toolkit. It was instructed that this augmentation take the form of a neighborhood-specific Hazard

Mitigation Plan for Gowanus, Brooklyn. Our work was to be conducted at the local level, with a focus on developing recommendations to guide communities in evaluating their potential hazards.

Ultimately, we framed much of our studio query around the following question posed to us by NYCEM:

## How do we better engage the Gowanus community in the hazard mitigation process?

Though the Toolkit begins to touch on many important topics, our studio recognized the limitations of this formulaic approach that only targeted official or self-selecting community "leaders". Therefore, in order to create a thoughtful plan that catered to all community groups and individuals within Gowanus, including those with specific vulnerabilities and unique capacities, we grounded our work within the lens of access and equity.

**PLAN MAINTENANCE- MISSION AND LEADERSHIP STRUCTURE**

**EMERGENCY NETWORK MISSION**  
[Insert name, description of goals, and/or history of Community Emergency Network]

**LEAD TEAM MEMBERS**  
The lead team will:

1. Convene its members in order to continually improve upon this plan: communicate any necessary changes or updates; complete disaster exercises; discuss lessons learned from exercises or actual disasters.
2. Ensure that resources, information, plans of actions are up-to-date.
3. Educate and include all members of the community in preparedness efforts.
4. Register the network with NYC Emergency Management at [nyc.gov/citizencorps](http://nyc.gov/citizencorps).

**LEAD TEAM MEMBERS**

Lead Team Member	Affiliated Organization (if applicable)	Contact Information

COMMUNITY EMERGENCY PLAN  
**PLAN MAINTENANCE**

NYCEM Toolkit Template Section

## PROCESS

The process implemented within this project reflects three approaches to answering the question of how to best engage communities for hazard mitigation. The first approach is that of **"as planned"**. This approach speaks to the work already implemented on a daily basis by NYCEM and their associated agencies; where simulation drills that combine their technical expertise on response with speculated scenarios are often implemented. The "as planned" approach fits within the work of the "Community Emergency Planning in NYC Toolkit for Community Leaders", which relies on a top-down structure to help communities self-organize and create a "community emergency network".

The second approach of **"as lived"** is community driven. "As lived" focuses on the immediate time after a disaster, in the case of our project NYCEM had asked us to concentrate on the first 72 hours, or three days, following an event. Just as disasters are unpredictable, so are the results of even the most thoughtful and informed plans. As it is impossible to predict every issue that may come up, the "as lived" approach recognizes the importance of improvisation and quick thinking in providing a tactical bottom-up response.

This presents an interesting dichotomy requiring a bridge between these approaches to create a comprehensive disaster preparedness, recovery, and mitigation strategy for communities. Therefore, we have introduced into our process a third approach of **"as imagined"**. Imagination encourages individuals to be tactful in their actions and understanding of their own capacities, by combining elements of both speculation and improvisation. This approach includes building community capacity, stronger community coalitions, as well as empowering individual characters through the speculation and improvisation of emergency planning. Through these three approaches we believe that we can begin to better engage the communities in the hazard mitigation process and build strong coalitions in the community.



"AS PLANNED": NYCEM Speculation Drill

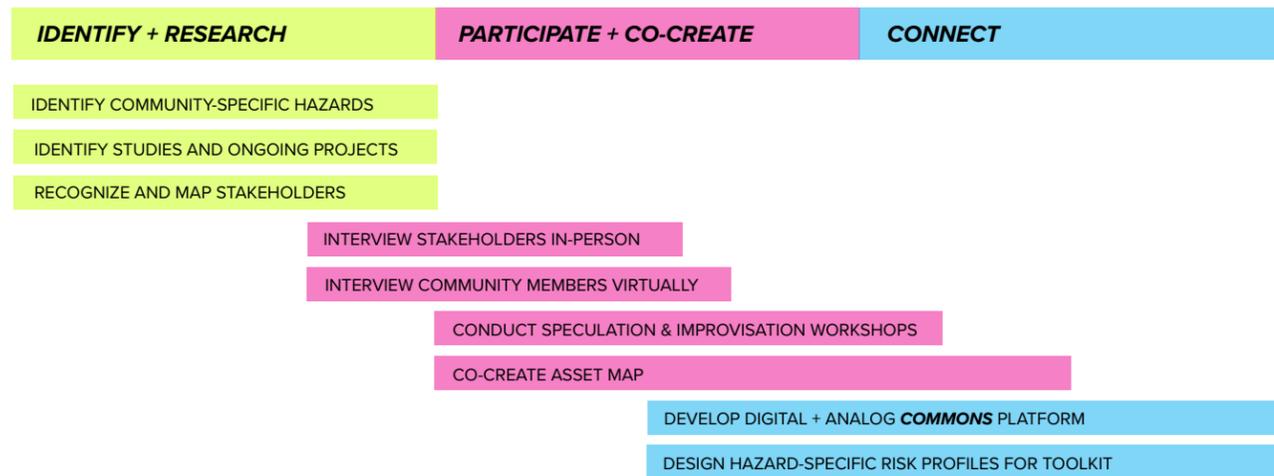


"AS LIVED": Bike Ready community organization



"AS IMAGINED": Imagined Community Action

Project Time Line



**IDENTIFY + RESEARCH**

The first phase of our process, as seen in the image above, focused on developing a familiarity with the neighborhood of Gowanus and identifying what hazards have the greatest potential to significantly affect its community and built environment. The research conducted within this section aided our team in developing an understanding of how the specific aspects of the neighborhood will be affected by the various hazards identified. Additionally, by thoughtfully addressing the socioeconomic and physical conditions of Gowanus, we have also developed an inclusive and comprehensive understanding of the potential extent of disaster impacts, and more importantly, the planning and mitigation processes that work to reduce the associated risks.

Through public data analyses, spatial analyses, and academic research, this phase provided the lens in which we were able to begin our community engagement and define our mitigation opportunities. Our Gowanus specific Hazard Mitigation Plan utilizes this research to create a community and agency understanding of the neighborhood and its complexities, where we are able to understand the type of disaster, severity, probability, consequence, and location in an effort to increase knowledge.

**PARTICIPATE + CO-CREATE**

In the second phase, we aimed to ground our previous research in various community groups and coalitions that already exist within the Gowanus neighborhood through the implementation of the ideas of “as planned”, “as lived”, and “as imagined”. The data analyses and academic investigations provided abstractions of risks associated with Gowanus, but we needed to develop our processes and recommendations based off an understanding of the needs and desires of community stakeholders allowing for the recommendations to be crafted by those who will be impacted.

This phase was a crucial step in developing the community specific elements of the hazard mitigation plan. Through three diverse methods of engagement (in-person interviews, virtual interviews, and a facilitated workshop) we were able to bridge the lived-experience gap in our research through community participation. The recommendations and processes we developed were crafted contemporaneously with the community and risk reduction activities and tools were co-created with important members of Gowanus.

**CONNECT**

The final phase of this project aims to aggregate our collective work into recommendations through the format of soft solutions that leverage existing capacities and build new connections. We focused on dynamics we saw at play in Gowanus but believe these ideas are replicable in other New York City neighborhoods. Some of our recommendations focus on the built environment, some are about communication, and some are about how agencies and communities collaborate and work together. Above all they arise from the powerful work that is already underway in within the Gowanus neighborhood.

These solutions have been developed for the differing stages of emergency management. They also address the numerous scales of community in Gowanus focusing on solutions that are specific and implementable for individual households, apartment buildings or city blocks, or even entire neighborhoods. The general philosophy behind the Connect phase is to not only reconcile the divide between community-centered risk reduction activities with New York City agencies, but to also bolster these current efforts into the formal processes instilled by NYCCEM.

# History

Gowanus is neighborhood in South Brooklyn. It is located within Brooklyn Community District 6 which includes Carroll Gardens and Red Hook to the west, and Park Slope to the east.



Gowanus originally was home to the Canarsee tribe who lived along a series freshwater streams. In the 17th century, Dutch settlers had colonized the area and began to use the streams for farming purposes. The streams were eventually dammed in order to form the Gowanus Canal in the 19th century. The canal was the center of New York City commercial and maritime industries, however, these industries and others, such as gas plants and coal yards, contributed to decades of unchecked pollution in the canal and adjacent sites.

As industrial uses continued operate, the Gowanus Canal soon became an open sewer and continued use extended throughout the 20th century. However, as the industry evolved with new transportation technologies and the construction of the Gowanus Expressway in the 1960s, the heavy use of the canal soon declined. Today, the Canal still serves as a

means to transport goods in and out of Brooklyn although the water in the canal remains heavily polluted.

There have been a number of attempts to remediate the canal over the past 70 years. The US Government passed a series of laws, such as the Federal Water Pollution Control act in 1948 and the Clean Water Act in 1972 that were intended to address water pollution nationwide. The establishment of the Environmental Protection Agency (EPA) in 1970 sparked a series of studies that investigated polluted waterways like the Gowanus Canal.

However, it was not until 2002 when the US Army Corps of Engineers and the New York City Department of Environmental Protection had determined what it would take to remediate the canal. By 2005, the study was completed with dredging and habitat restoration among the core recommendations. In March 2010, the EPA designated the Gowanus canal as the first Superfund site in New York City. The superfund cleanup process aims to address contamination and layers of sediment in the waterway from its history of industrial use.

In October 2012, Superstorm Sandy had devastating impacts on New York City, bringing thirteen feet of storm surge into the New York harbor. Basements and ground-level apartments in Gowanus were reported by the New York Times to have been flooded with contaminated canal water and the Gowanus Pumping Station was reported to be offline for 33 hours due to the flooding. The damage caused by Superstorm Sandy slowed the canal cleanup process and by 2014 the project scoping phase was completed.

The EPA-led dredging process started in 2017 and is projected to be completed by February 2019.

Our study boundary was defined using a series of institutional boundaries and previous planning studies.

## Brooklyn Community District 6

We started with Community District boundaries, as these boundaries define how the budget and resources get allocated throughout the city. This boundary also includes the neighborhoods of Red Hook, Park Slope, Carroll Gardens, and Cobble Hill.

## Google Maps

Google has identified a boundary for each neighborhood in New York. Although they are not a governmental agency, our study recognizes how prominently their Maps service is used when navigating neighborhoods.

## Canal Corridor Zoning

In 2008, The NYC Department of City Planning developed a rezoning study for an area they called the “Gowanus Canal Corridor.” This was the first effort by a city agency to recognize Gowanus as an area for potential redevelopment.

## Bridging Gowanus Planning Process

From 2013 to 2015, District 39 City Council member Brad Lander and Gowanus Neighborhood coalitions took part in a community planning process called Bridging Gowanus. This boundary was defined by this process

## Plan Gowanus DCP Neighborhood Study

Following the work of Bridging Gowanus, DCP launched their Plan Gowanus study in 2016. This study identified Gowanus as one of eight neighborhoods in their PLACES initiative.

Drawing from these 5 boundaries, we constructed our study boundary which runs along Smith and Clinton Streets to the west, the Gowanus Expressway and Prospect Avenue to the South, 4th Avenue to the East, and Warren and Wyckoff Streets to the North.

We soon discovered that our working neighborhood boundary is nearly entirely encompassed in City Council District 39, however, the three NYCHA properties in Gowanus are located just to the north of our initial study boundary. In order to study the neighborhood as a whole, we included a small portion of City Council District 33 that serves all three of the NYCHA properties into our final study area boundary.

# Study Area



+



+



+



=



IDENTIFY +

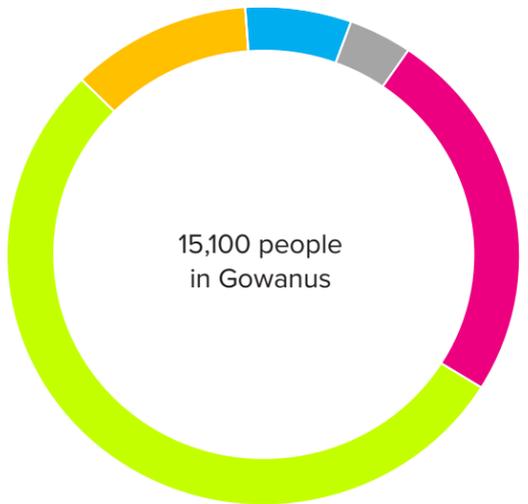
RESEARCH

# Demographics

### CHARACTERISTICS

The estimated population of our defined study boundary is 15,100 people which was identified through dasymetric mapping.

Additionally, while Community District 6 enjoys being the least rent burdened community district in all of New York City, this privilege does not extend to Gowanus renters and 35 percent of residents within our study boundary are rent burdened. Our data shows that the median household income for all of Gowanus is a healthy \$81,000. However, there is a considerable portion of the residential population, about 3,800 people, living under the NYC Poverty Threshold which for a family of four (two adults with two children) is \$32,402.



### SELECTED SOCIAL VULNERABILITIES

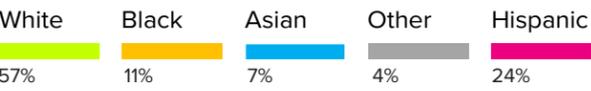
Gowanus is home to a number of socially vulnerable populations which will be discussed later in the report. Below are a snapshot of populations selected for the created social vulnerability index.



5th Avenue Committee at Gowanus



Running Club at Gowanus community center



- 3,800** below poverty
- 2,100** no HS diploma
- 4,765** under 18 years old
- 2,931** over 65 years old
- 3,000** are foreign-born
- 1 in 3** are NYCHA resident
- 5,300** are rent burdened

# Built Environment

As previously mentioned, Gowanus is home to a mix of industrial, commercial, and residential uses.

The north end of the study area is bounded by rapidly-changing Downtown Brooklyn. Adjacent to this northern boundary are the Gowanus NYCHA properties, Wyckoff Gardens and Warren Houses, pictured right. The other NYCHA property, Gowanus Houses, is located on the northwest edge of the study boundary.



New York City Housing Authority (NYCHA) properties

The residential core consists of low-rise single-family homes built in the early 20th century, now inter-mixed with infill development built after 2000. The Department of City Planning has identified Gowanus for potential rezoning, and developers have begun to build new high-rise residential buildings along the canal.



Low-rise brownstones

The residential core of the neighborhood is not well connected by public transit. There are three MTA rail lines, the F, G and R, and four stations located in Gowanus. The MTA also operates four bus routes, The B37, B57, B61, and B103 LTD. Because of this, car ownership rates have remained high in Gowanus. The Gowanus Expressway connects the Brooklyn Battery Tunnel to the Brooklyn-Queens Expressway.



Smith-9th Street station

The Gowanus Expressway runs above the MTA Third Avenue Line. In 1996, New York State Department of Transportation had slated to replace the Gowanus Expressway with a tunnel, but the project was canceled in 2011.

To the right is a comparison of manufacturing and residential concentrations in the years 2009 and 2015. While manufacturing has had a slight decline, between the years, relative concentration did not change.

In 2009, residential concentration was largely focused at the NYCHA properties to the north of the study area. We see that there has been a boom of residential development after the neighborhood planning study *Bridging Gowanus* in 2013 and Superstorm Sandy in 2014.



365 Bond Street

## Manufacturing Concentration



2009



2015

## Residential Concentration



2009



2015

# Physical Hazards

New York City Emergency Management has identified 10 hazards both natural hazards and non-natural hazards that are particular to the city in their Emergency Planning Toolkit.

Among the above hazards, we conducted a hazard assessment and identified that the following are more likely to have an effect on Gowanus: flooding, coastal storms, hazmat, extreme heat, winter weather, and utility outage.

These hazards have different applicability tied to the physical location of the neighborhood and the social identities of these communities, the former will be addressed in this section and the latter will be further discussed under social vulnerability.

- Biological Events
- Coastal Storm
- Earthquake
- Extreme Heat
- Fire
- Flooding
- Hazmat
- Tornado
- Utility Outage
- Winter Weather



Extreme heat



Winter weather



Flooding



Utility outage

# GOWANUS HAZARD MITIGATION

# Extreme Heat

NYCEM defines an extreme heat event as periods when the heat index is over 100° F (37.8° C) for one or more days, or over 95° F (35.0° C) for two or more days. According to the US National Weather Service, extreme heat events cause more deaths than any other weather-related event, and in the wake of climate change, these events are more likely to occur.

At the neighborhood scale, the thermal environment is closely related to land use. Areas with more vegetative cover, such as street trees, have more shading and evapotranspiration than areas with built surfaces (C. Rosenzweig 2015), and high settlement densities are significantly correlated with higher temperatures (Harlan, et al. 2006).

In addition, people aged under 17 years old and those over 65 years old (V. Berisha, et al. 2016), or those with pre-existing health conditions are more vulnerable during heat waves. Cooling centers, air conditioned places such as community centers or libraries, may provide valuable services to these vulnerable populations (V. Berisha, et al. 2016).

Previous literature show the three indicators that are most telling for determining vulnerability for heat are age, whether or not someone lives alone, and the presence of green space (Knowlton et al, 2007). These indicators were analyzed using the 2016 American Community Survey 5-Year estimates at the census tract level. We found that Gowanus has a lower percentage of residents below 18 and above 65, and a lower percentage of single-person households as compared to Brooklyn and New York City as a whole.

However, as per the built environment and the presence of green or open space, Gowanus is much more susceptible to extreme heat hazards due to its industrial history and nature and impact of the heat island effect (ULI et al. 2018). The green spaces, which consists of only 0.16% of total land area in Gowanus, are completely overshadowed by the amount of man-made, heat absorbing materials such as concrete and asphalt that only worsen the problem.

## LANDSAT MAP



0.5 mi

	Age under 18 + over 65 (%)	Living Alone (%)	Greenspace by area (%)
GOWANUS STUDY AREA	26.7	27.1	<b>0.16</b>
BROOKLYN	35.3	28.7	16.20
NEW YORK CITY	34.0	27.1	14.00

ACS 2016 5-yr Estimates  
NYC Dept. of City Planning

The City of New York operates cooling centers at times of projected extreme heat. To supplement potential cooling center locations and to increase the neighborhood's cooling capacity, we have identified facilities and objects such as schools, parks, and fire hydrants, that have the capacity to help cool people in danger of overheating.

## FACILITIES MAP



0.5 mi



Gowanus Houses Community Center



Thomas Greene Park



Fire hydrants throughout community



PS 572 The Children's School

# Winter Weather

When the temperature is at or below freezing for an extended period of time, it could be defined as an extreme cold event. The criterion of the time range and the temperature is obscure (Conlon et al. 2011; Gómez-Acebo et al. 2010; Barnett 2005) and there is not an exact definition for extreme cold in New York City.

Extreme cold always occurs simultaneously with heavy snow, ice, sleet, and freezing rain, which can pose serious hazards. Snowstorms could cause blocked roads, closed highways, or loss of utilities. Additionally, unusual cold causes an increased risk regarding health outcomes, which severely impacts the elderly and people with pre-existing health conditions.

There have been several events of extreme cold that have happened in NYC. According to weather reports last year, the cold snap around New Year's Eve led to two casualties in Bronx and Queens (Lowry 2018). During the most recent cold snap, there was no direct community engagement for winter hazards, and the official NYCEM warning was "Stay indoors as much as possible" (NYCEM 2017).

However, building conditions in public housing during this extreme cold period were reprehensible. Building conditions and reliable access to heat and hot water are important proxys that should be considered when assessing physical vulnerabilities in the context of extreme cold. In addition to this, populations with disabilities are considered to be highly vulnerable populations in winter weather, and in Gowanus, nearly 10% of the population has an Ambulatory Disability (Conlon et al, 2011).

According to 311 NYC data, by 2016 the complaints on heat outage and hot water in Gowanus seemed to be far less than the average level of complaints in Brooklyn, or in New York City, a different result that what our group expected. While this data did not show the severe impact of the heating malfunction, our virtual interview process revealed that 6 out of 17 respondents did not have reliable or adequate heat within their units.

## State Of Emergency Declared For NYC As Blizzard Hits Hard

The storm is expected to hamstring the evening commute.  
By Noah Manskar, Patch Staff | Jan 4, 2018 11:05 am ET | Updated Jan 4, 2018 1:00 pm ET

## Storm Slams East Coast, Leaving a Trail of Havoc

By JAMES BARRON JAN. 3, 2014

Capital Weather Gang

## Forecast updates: Blizzard warning from N.J. to Conn.; over a foot of snow in NYC

**For Immediate Release  
#55-17**

## NYC EMERGENCY MANAGEMENT URGES NEW YORKERS TO PREPARE FOR EXTREME COLD

## Deadly winter storm hits Northeast: the latest

By Joel Pavetski

February 13, 2014 | 7:44am

## Even Sharks Are Freezing to Death: Winter Rages and the Nation Reels

## Monster blizzard slams NYC: MTA subways, commuter trains to shut down as city prepares for the worst

## 2016 Blizzard Was NYC's Biggest Snowstorm on Record, NOAA Report Finds

The record smashes the previous all-time mark of 26.9 inches, set in 2006  
Published at 11:10 AM EDT on Apr 28, 2016 | Updated at 7:56 PM EDT on Apr 28, 2016

## Arctic blast after 'bomb cyclone' leaves 2 dead in NYC

By Mackenzie Lowry and Stephanie Pogones

January 6, 2018 | 4:23pm | Updated

News headlines about NYC winter extremes



View to Union Street Snow in Gowanus

# Flooding

## HURRICANES

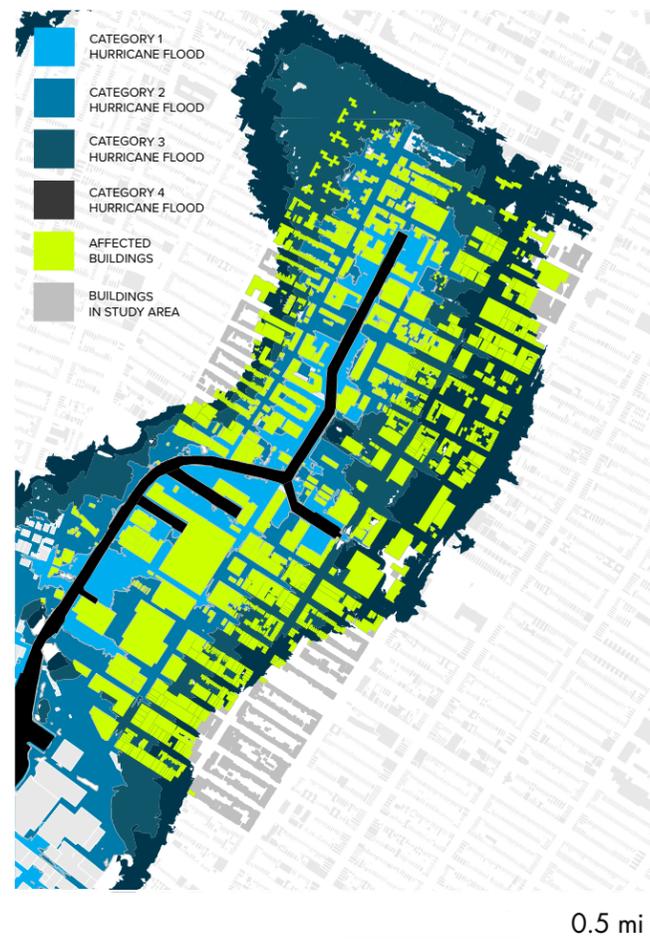
It is important to add the physical aspects of Gowanus alongside the socioeconomic indicators to understand in greater detail the flooding vulnerability of the neighborhood (Cutter, et al, 2003).

Gowanus' geographic location as a coastal community creates a specific flooding vulnerability that needs to be addressed by Emergency Management. Compounding this issue is a contaminated canal that bisects the community. As you can see in FEMA's 2013 Flood Insurance Rate Map, all of the flood risk disseminates from the canal.

Flooding events can be spurred by many natural events that are often exacerbated by the built environment. Some of these natural events specific to Gowanus include storm surge, tidal flooding, and inland flooding.

Aspects of Gowanus' built environment that compound the effects of a flooding event is the presence of a superfund site in the Gowanus Canal, the Combined Sewer Outflow that lines the canal, and poor drainage issues throughout the neighborhood. Contaminated water from the canal will likely escape its boundary and inundate the dry areas of the neighborhood, posing a public health challenge.

## HURRICANE FLOOD MAP



## 311 COMPLAINTS

Gowanus has a higher risk of flooding hazards due to the community's proximity to the coast, as well as the Gowanus canal, a water feature that protrudes into the community. What was once marsh lands, the canal was fashioned to accommodate industry as an avenue of distribution. Nuisance flooding events are quite common in Gowanus. After parsing through 311 data, standing water and sewage backups are constant complaints in the area. The map on the top right pinpoints where those events have taken place over the past year.



Street-level sewage backup



Flooding near Gowanus Canal

	Buildings Affected (%)	Residential Units Affected (%)
Category 1	6.1	0.5
Category 2	30.1	43.6
Category 3	50.0	70.0
Category 4	66.5	83.4

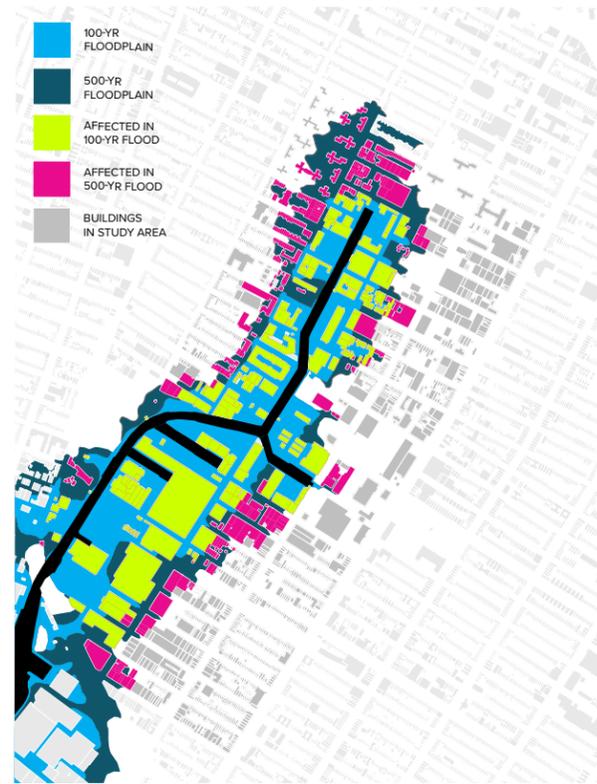


Standing water post-Sandy

# Flooding

## FEMA FLOODPLAIN

Observing the community's vulnerability to the various causes of flooding allow for us to spatially observe how the community will be affected by certain events, helping us plan strategies around those uncertainties. The count of buildings affected helps us gauge the severity of flooding issues, and what community networks need to be activated in light of those events; a 500-year flooding event will affect 30% of Gowanus' buildings, while a 100-year flood only affects a little more than 10%. There also needs to be a focus on how these maps will change due to sea-level rise induced by climate change. While many municipalities continue to use the 2007 & 2013 FEMA Flood Insurance Rate Map to conduct risk assessments, these maps often underestimate the levels of inundation, thus giving a false sense of risk certainty. It is important to interpret Gowanus' flood risk using various floodplain maps, especially thinking long-term with rising sea-levels as an impending challenge. To the bottom right, you can see the effects of a flood event based on changing sea-levels.



0.5 mi

## SUPERSTORM SANDY

The primary effects of flooding is the direct damage and economic loss the inundation will have on the community.

These effects transcend damaged buildings, and will have adverse impacts on the operation of the manufacturing, industrial, and commercial services in the community, creating large economic losses.

The secondary effects felt by the Gowanus community are quite severe. The presence of the superfund site poses many public health concerns during flooding events. The CSO in the neighborhood produces an overflow of combined raw sewage during any rain event that exceeds 1 inch.

Sandy offers a great case study to understand how flooding events can drastically impact the Gowanus community. While the devastating effects of Sandy extended into Gowanus, the inundation was similar to that of the 100-year flood.



Post-Sandy flooding and debris

## STORM SURGE

The storm's flooding effects disrupted the operation of the Gowanus pumping station for 33 hours and sent 13 million gallons of combined raw sewage into the canal, causing a major public health concern. From meeting notes observed in the Plan Gowanus community outreach that focused on resiliency, a main concern of community members were specific to evacuation routes. 70% of residential units are in Evacuation Zone 2. Understanding how these storms will inundate the community helps us better define evacuation routes and the existing assets along these avenues that can provide valuable resources. The devastation a hurricane can bring to Gowanus is highlighted in the storm surge map.

## UTILITY OUTAGE

Our academic research regarding flooding vulnerability of physical features highlighted the presence of a basement (Special Initiative for Rebuilding & Resiliency). A severe impact of Sandy came from the destruction of critical systems, many located in basements. 98% of our study area's building stock is pre-1980, meaning there is a higher chance that the utilities of these buildings are located in the basement (McEntire, et al, 2002.) If these utilities are affected, tenants' access to heat and electricity may be compromised. Regardless of the flooding type—be it coastal, tidal, or inland—it is imperative to understand how the neighborhood's built environment will respond. The spatial and physical layout of Gowanus exacerbates much of the vulnerability to flooding. Identifying these vulnerabilities and understanding how they will react during a flooding hazard provides formal agencies and the community the knowledge in order to prepare for a flooding hazard.

## HAZMAT

The Gowanus Canal is a designated superfund site. The contamination of the canal includes PAHs, VOCs, PCBs, pesticides, & metals. Water inundation in Gowanus from the canal is a extreme public health concern, including dysentery, e.coli, giardia, cancer, & arsenic poisoning. The CSO compounds this issue as rain events can release raw sewage into the canal. A NYC Department of Health Report concluded that exposure to biological and chemical contaminants from the Gowanus Canal can cause public health hazards through skin contact, ingestion, or fish consumption (DOH, 2017).



0.5 mi



Basement flooding

## OVERVIEW

While physical vulnerability identifies the relationship between certain features of the built environment and the potential severity of a disaster in a neighborhood, social vulnerability speaks to the degree of how the social conditions of a neighborhood allows communities to prepare, respond, recover, and mitigate for disasters.

Identifying social vulnerabilities that exists within a neighborhood allows for a nuanced approach to disaster planning that addresses the role that structural inequities have on certain populations. By recognizing the potential impact of disasters on vulnerable populations, emergency planning practitioners can better design processes that involve individuals, stakeholders, and communities that would have the most to lose should a disaster strike.

## DEFINING SOCIAL VULNERABILITY

Social vulnerability has been framed by disaster scholar as “characteristics of a population that influence the capacity for a community to prepare for, respond to, and recover from disasters” (Cannon 2004). These conditions and circumstances can include health, disability, age, literacy, or immigration status (Wisner 2006). More importantly, it is critical to understand that this vulnerability stems from social inequalities and historic patterns of social relations that have manifested as social structural barriers.

Additionally, the concept of “vulnerability bundling” (Thomas 2013) runs parallel to conceptualizations of black feminist literature and definitions of “intersectionality” (Collins 1990). In the simplest of terms, intersectionality looks at how inextricable components of marginalized identities (ie race, gender, class, sexual orientation, age, etc) compound upon another, effectively reducing one’s power in society, and thus increasing their vulnerability. This framing applied to disaster planning posits that certain marginalized communities will experience disasters in a more heightened way because of their position in society.

***“All people are inescapably defined at once by their sex, sexuality, gender, age, race, or ethnicity, and their physical bodies at any point in time. The concept of vulnerability bundling highlights intersecting social patterns that, taken together, increase or reduce people’s relative vulnerability and capacity in the face of hazards and disasters.” (Enarson 2010)***

The assessment of social vulnerabilities allows for the proper identification of needed resources that vary from neighborhood to neighborhood. Understanding the role of compounding vulnerabilities and intersectionality provides emergency planning practitioners the necessary information to help specific communities prepare, respond, recover, and mitigate future disasters.

Finally, an approach to emergency planning that addresses social vulnerability helps to inform inclusive outreach strategies. This is particularly important in helping design outreach approaches that combine comprehensive strategies and specialized efforts. Additionally, the process of identifying social vulnerabilities within neighborhoods is a potential pathway to creating necessary collaborations and connections within existing organizations and efforts. Bridging the work of specialized organizations that focus on the needs of vulnerable populations to the efforts of emergency planning creates a robust emergency community network with added capacity.

There are multiple demographic components that contribute one’s social vulnerability in the context of disaster planning. Table A list out some relevant factors to measure and understand social vulnerability.

# Measuring Social Vulnerability

SOCIAL VULNERABILITY CATEGORY	SUBCATEGORIES	CONCERN
<b>Class</b>	<ul style="list-style-type: none"> <li>Low income</li> <li>Poverty</li> <li>Education Attainment</li> </ul>	<ul style="list-style-type: none"> <li>- Role of social capital and how they change depending on one's class</li> <li>- Access to different resources depending on one's social sphere</li> <li>- Disaster's impact and ability to worsen inequity</li> </ul>
<b>Race &amp; Ethnicity</b>	<ul style="list-style-type: none"> <li>Race + Hispanic</li> <li>Composition</li> <li>Race + Income</li> <li>Language Spoken at Home</li> <li>Nativity/Immigration Status</li> </ul>	<ul style="list-style-type: none"> <li>- Important to look at intersection of identities amongst all demographic categories</li> <li>- Role of language as a barrier or potential asset</li> <li>- Special barriers and fears of undocumented communities and families</li> </ul>
<b>Gender</b>	<ul style="list-style-type: none"> <li>Gender</li> <li>Gender + Age</li> <li>Gender + Race</li> <li>Single-Women Headed Households</li> </ul>	<ul style="list-style-type: none"> <li>- Women's role in organizing family matters, and role as a key communicator</li> <li>- Role of safety for women in post-emergency settings (eg safety for women in emergency shelters)</li> <li>- Older lifespan for women, needs of elderly women</li> </ul>
<b>Age</b>	<ul style="list-style-type: none"> <li>Children (very young, young, adolescent)</li> <li>Elderly (65-74, 75-84, 85 and older)</li> </ul>	<ul style="list-style-type: none"> <li>- Psychological effect of disasters on children</li> <li>- Existence of family networks</li> <li>- Special attention to communication and messaging for both children and the elderly population</li> <li>- Issues of accessibility</li> </ul>
<b>Disability</b>	<ul style="list-style-type: none"> <li>Physical Disability</li> <li>Mental Disability</li> <li>Age + Disability</li> <li>Veterans</li> </ul>	<ul style="list-style-type: none"> <li>-Consideration for special facilities and organizations that focus on special needs</li> <li>-Accessibility considerations for elderly populations with limited mobility</li> </ul>

Table A - Social Vulnerability Factors

## SOCIAL VULNERABILITY INDEX (SVI)

To operationalize the concept of social vulnerability, we incorporated the Social Vulnerability Index (SVI) (Flanagan et al. 2011) as used by the Agency of Toxic Substances and Disease Registry (ATSDR) under Center for Disease Control. This tool helps to rank and the spatially identify where vulnerable communities are, and thus employ targeted efforts that address specific community needs in the context of emergency planning.

The ATSDR applies this model on a national scale, but for the purposes and scope of this research, we altered the methodology slightly to better fit the context of New York City. The original model ranks 15 social factors, while ours ranks only 13 with each factor fitting into one of four themes: (1) socioeconomic status, (2) household composition and disability, (3) minority status and language, and (4) housing characteristics.

Additionally, the existing ATSDR SVI map uses 2014 American Community Survey 5-year Estimates, which we have replaced with the most current 2016 American Community Survey 5-year dataset to reflect the most currently available data. Finally, we maintained the geographic scope to be contained within NYC so that vulnerability would be relative to census tracts within the jurisdictional boundaries of New York City Emergency Management.

Each SVI factor is ranked by percentiles according to the census tracts within the study area, in this case New York City, and the percentiles are then given a value of "0" or "1", with the value of 1 representing a percentile rank of 90% or higher. This flags this census tract as having high vulnerability for a specific SVI factor.

The different values from each factor are then grouped together into the aforementioned themes. All values are then added, which results in tracts having a value that ranged from 0-11. To contextualize this information so that it is more neighborhood specific, we display the SVI map in quintiles based on aggregated social factors.

<b>Socioeconomic Status</b>	Below poverty
	Unemployed
	Income
<b>Household Composition + Disability</b>	No HS Diploma
	Age 65 +
	Age 18 -
	Civilian with Disability
<b>Minority Status + Language</b>	Single parent
	Minority
<b>Housing Characteristics</b>	Speaks English Less than well
	Multi-unit Structure
	Crowding
	Group Quarters

Social Vulnerability Index Factors



Relocated family, one year post-Superstorm Sandy

# Social Vulnerability - Gowanus

## SOCIAL VULNERABILITY INDEX

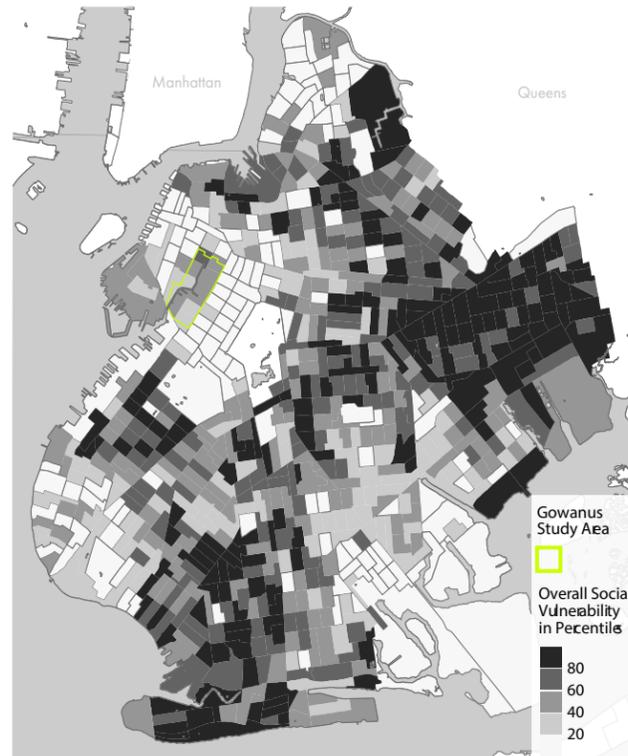
The neighborhoods of Park Slope, Carroll Gardens, and Boerum Hill all have SVI rankings within the bottom quintile, that is the data reads these neighborhoods as having no major indicators of being socially vulnerable.

However, for Gowanus this is not the case. In Gowanus, the SVI themes that trigger a reading for higher social vulnerability are socioeconomic status and minority status. This is predicated on the relative higher poverty rate that is found in this community, and in particular the northern section of our study site where three NYCHA properties are located.

This cursory analysis begins to identify where vulnerable populations reside. Additionally, understanding the spatial relationship of both physical and social vulnerabilities allow us to shape a nuanced action plan for the next step of our research: coordinating outreach strategies with communities that are at most risk in times of disaster. In our specific study, Gowanus' relatively heightened social vulnerability is parallel to our findings in the hazard analysis chapter, reflecting the need to integrate the many stakeholders of Gowanus—with special attention to NYCHA residents and manufacturing business owners—in the process of emergency planning, and in particular long-term mitigation strategies. This method, since it is applied to New York City as a whole, can be replicated throughout New York's various neighborhoods to determine place-based vulnerabilities as defined by these social factors.

## PUBLIC HOUSING BUILDINGS (NYCHA)

As mentioned, the northern section of the study site where the census tracts show for highest social vulnerability are where three NYCHA properties, Wyckoff Gardens, Gowanus Houses, and Warren Street Houses, are located. This flags this portion of the neighborhood as the most socially vulnerable and thus an area of concern for emergency planning. This finding is also backed through our findings from in-person and virtual interviews discussed further in the following chapter. NYCHA residents and advocates have informed the studio group of specific issues that act as barriers to comprehensive emergency planning.



Brooklyn's Social Vulnerability Index Map



Community Board 6 Social Vulnerability Index Map

In particular, building maintenance is of high concern for residents. Poor weatherization of buildings exacerbate the risks that disasters potentially bring, with these risks heightened for elderly and/or disabled NYCHA residents. Reports of windows that do not open or close, insufficient access to basic utilities such as heat or hot water, and sewer backups into building units, are just a few reports that account for the inefficiencies of these buildings and highlight how the physical risk embedded in the built environment interacts with the social vulnerability of the NYCHA community.

Additionally, the logistical challenge in coordinating efforts for emergency planning at a building scale are another barrier to effective emergency planning. Administrative and management miscoordination and miscommunication between NYCHA residents, property/building managers, and NYCHA administration make even simple and straightforward efforts at comprehensive emergency planning a rather difficult task. Public housing advocacy group, Fifth Avenue Committee had discussed the difficulty in employing a voluntary emergency roster response form because of the miscoordination between NYCHA building managers and administrators.

Finally, Wyckoff Gardens is at the pre-development stages under the NYCHA NextGen initiative. This program aims to generate much needed revenue for the agency and establishes partnerships between NYCHA and private developers to create infill developments on existing NYCHA land that are a mix of market-rate and affordable units plus community facilities and active floor retail. As of our last discussion regarding the Wyckoff project with Fifth Avenue Committee, there are two expected infill developments and 500 prospected units that are a mix of market-rate and affordable units, plus added community facilities and ground-floor retail that will be constructed on Wyckoff Gardens' parking lots. This pending change is important in the context of emergency planning especially considering the ways in which new development might be leveraged to provide needed building upgrades, ie weatherization, for the Wyckoff property, as well as considering the challenge that an influx in population will bring.



Wyckoff Gardens, NYCHA Housing



Warren Street Houses, NYCHA Housing

# Neighborhood Change

An additional element of concern in relation to the physical and social vulnerability of the Gowanus community is that of the potential man-made hazard—neighborhood change. In our social vulnerability assessment, we have seen that the surrounding neighborhoods in the Community Board 6 have a much lower vulnerability based on the CDC indicators. As these surrounding neighborhoods experience socio-economic demographic shifts towards a less vulnerable population, Gowanus is experiencing the pressures of neighborhood change.

Gowanus’ built environment displays a prime opportunity for development to occur. This is also compounded by Mayor De Blasio’s affordable housing program, Mandatory Inclusionary Housing (MIH). As MIH mandates the inclusion of affordable housing, the municipal support of private development as a means of producing affordable units extends into neighborhoods who are primed for development. The land potential of Gowanus, where large industrial lots have the potential to be converted to large scale residential developments, likely that of a R-6, is perfect to support affordable housing creation.

Based on our calculations, the number of new residential units according to redevelopment in Gowanus could reach 6,400 units (representing 17,700 incoming residents). The methodology to create this estimate used a liberal projection of development in Gowanus. We took manufacturing zoned lots in Gowanus, selected by ones that abut the canal and Third Avenue corridor, then selected by lot sizes greater than 40,000 SqF. We used the R-6 FAR and Brooklyn’s average unit SqF and household size to get a count of units and population count. This rough estimate allows us to imagine a future Gowanus where more people are impacted by the hazards, and thus a need to accommodate this potential in our strategies.

We can see this support in the Department of City Planning’s (DCP) participatory neighborhood planning study in Gowanus. DCP is currently in the process of outreach as they use the Bridging Gowanus planning study to inform the rezoning. Their effort is in line with the city’s PLACES planning

process which lies within the Mayor’s Housing Plan to develop more affordable housing. DCP mentioned that a significant aspect of the rezoning will be focused on the transition of manufacturing uses to residential uses; spatially, these areas will likely be located along the canal and the Third Avenue corridor. In our interventions, we need to address how the neighborhood changes, for better or worse. New development can have a positive impact on resilient and sustainable initiatives, seen in stormwater retention and green infrastructure.

However, it can spur demographic changes that support the exclusion of certain populations, potentially harming existing networks. Understanding the changing landscape will aid us in developing relevant interventions at different time scales.

In particular, Fifth Avenue Committee’s efforts in harnessing the upcoming rezoning process as an avenue to develop an EcoDistrict\* reflect how this change can bring in positive changes in the built and social environment of the neighborhood.

An EcoDistrict approaches sustainability and resilience at various scales within a neighborhood to integrate mitigation both as a set of social practices and physical infrastructure interventions. Though an oversimplified analogy, an EcoDistrict serves a neighborhood the way LEED certification serves a building. This approach seeks to integrate residents, property and business owners, community organizations, developers, and city agencies in developing a resilient and sustainable neighborhood with the lens of environmental justice and equity in mind.



365 Bond Street



The Royal Palms Shuffleboard Club - Union Street



Potential lots transformed to residential areas by Rezoning



View of the Gowanus Canal toward market-rate housing complex at 365 Bond Street

During the **Identify + Research** phase we were able to build an understanding of the physical and social conditions that make Gowanus what it is today. From this process and its results we have highlighted three key takeaways.

These takeaways have helped guide our process and shape the next phases which we call **Participate + Co-Create** and **Connect**, as well as our final recommendations.

## 1. Data and statistics alone do not paint a complete picture

Our studio learned in several instances that our data could be just as limiting as it was enlightening for the hazards and topics we discussed. There were points during our research where data did not reflect what we were hearing from the community as this was the case in drawing conclusions from 311 call data. Another example of misleading data was evident when we saw that Gowanus' healthy median household income did not reflect the reality that a quarter of Gowanus' residents live under New York City's poverty threshold.

This data-based research helped us identify Gowanus' potential vulnerabilities and groups who were at higher risk, but we recognized that a deeper investigation was needed in order to ground truth our findings. This acknowledgment of the limitations of data helped shape the next phase of our project, where we focused on understanding the lived experiences of community members in order to find a way to better engage the community in the hazard mitigation process. Outlined in the following chapter, our qualitative research began to fill the gaps where the data was insufficient and helped answer the questions raised in our initial research phase.

## 2. There is no one-size fits all approach in disaster preparedness and hazard mitigation

Next, we learned that the impact and severity of disasters exists on a spectrum. Often in disaster and emergency preparedness literature focuses on extreme cases both in the language that's used and the stories that it highlights.

The social vulnerability index reveals that disasters have varied effects that are dependent on the varying socioeconomic factors at work both at

the community and individual level. Solutions for disaster preparedness and hazard mitigation must be designed specifically to meet the unique needs of the neighborhoods and communities where they will be deployed.

By identifying who may be more at risk during a disaster event and why, we can begin to create more thoughtful and effective hazard mitigation interventions and recommendations. This was most apparent with our research identifying NYCHA residents as being most at risk. This finding requires extra thought in shaping outreach processes that include NYCHA residents and stakeholders in efforts of emergency planning.

## 3. Neighborhood change can be a man-made disaster

With large-scale rezoning and the NYCHA NextGen project underway, change is on the horizon for the Gowanus neighborhood. With our emphasis on developing policy recommendations and interventions that account for a neighborhood's physical and social vulnerabilities, it is important to consider what these changes will entail when addressing emergency planning in the area.

Through forward thinking and innovation, we began to see that there are ways to leverage these new projects to integrate resiliency into their scope, seeing them as opportunities to further the hazard mitigation agenda.

*PARTICIPATE* +

*CO-CREATE*

# Methodology



In these efforts to understand the needs of the community in the context of hazard mitigation & emergency planning, we identified the key community leaders, community groups, and city agencies working in Gowanus. Our neighborhood outreach strategy included the use of three unique processes that were designed to inform and facilitate engagement across Gowanus' diverse network of stakeholders in a way that would aid the implementation and impact of ^Toolkit in the community. These stakeholders and their coordination with each other ultimately represents the landscape in which the toolkit will thrive. The basis of this work is founded on the idea that connected communities are more resilient, and equipped to recover, when faced with a disaster (Wodder, 2016; Solnit, 2010).

Illustrated in the Gowanus specific network diagram (as seen on the next page), our studio has created a blueprint for understanding this community coordination and connectivity. This makes clear that Gowanus is a complex site with a wide range of organizations and agencies whose work intersects with hazard and resiliency planning at a neighborhood scale. The diagram aims to visualize social network capacities in order to weave together a community-based emergency response network. The diagramming process was essential in identifying existing and overlapping efforts in order to begin to understand what strengthening this

emergency response network would look like.

This diagram showcases the cohort of city agencies, community organizations, and local businesses with different perspectives. Some of these agencies take on quasi-official roles focused on community development, as well as other arts and culture organizations that focus on environmental and social justice causes. For the purposes of our work, these groups have been organized into categories which range in focus from arts and cultural projects, youth, elderly and disabled focused organizations, to environmental organizations, and local business coalitions.

We have emphasized what our research has revealed as some of the most critical organizations with wide-ranging efforts invested in resiliency planning—their level of influence and community connectivity are depicted in the diagram as nodes with various scales of magnitude.

As a whole, the studio engagement process consisted of in-person interviews, virtual interviews, and a workshop designed and facilitated by our team. This tripartite process allowed us to take away extremely nuanced and informative insights—guiding our strategies for engagement and the overarching trajectory of our work throughout the course of the semester.

# Social Network

## arts + culture + youth + elderly + disabled

- The Old American Can Factory
- The Gowanus Studio Space
- Rooftop Films
- Groundswell: Art, Community, Change
- New York Philharmonic
- Dance Theater Etcetera
- Brooklyn Community Foundation
- Brooklyn Arts Council
- Hospital Audiences, Inc.
- Arts Gowanus
- Park Slope Armory

## social, economic, and environmental justice

- Fifth Avenue Committee
- Gowanus Neighborhood Coalition for Justice
- Families United for Racial & Economic Justice
- Gowanus Canvassing Committee at Gowanus Houses
- Hester Street
- CHIPS
- Rebuilding Together
- Arts and Democracy
- Red Hook Initiative
- Neighbors Helping Neighbors

## city agencies

- NYC Emergency Management
- Department of City Planning
- NYC Department of Housing Preservation & Development
- Brad Lander NYC Council
- Stephen Levin NYC Council
- NYCHA
- NYC Economic Development Corporation
- Community Board 6
- Department of Youth and Community Development
- Department of Environmental Protection

## recovery + resiliency

- National Performance Network
- Urban Land Institute
- Red Hook Volunteers
- Red Hook Coalition
- Turning the Tide
- Center for Resilient Cities And Landscapes at Columbia GSAPP

## environment

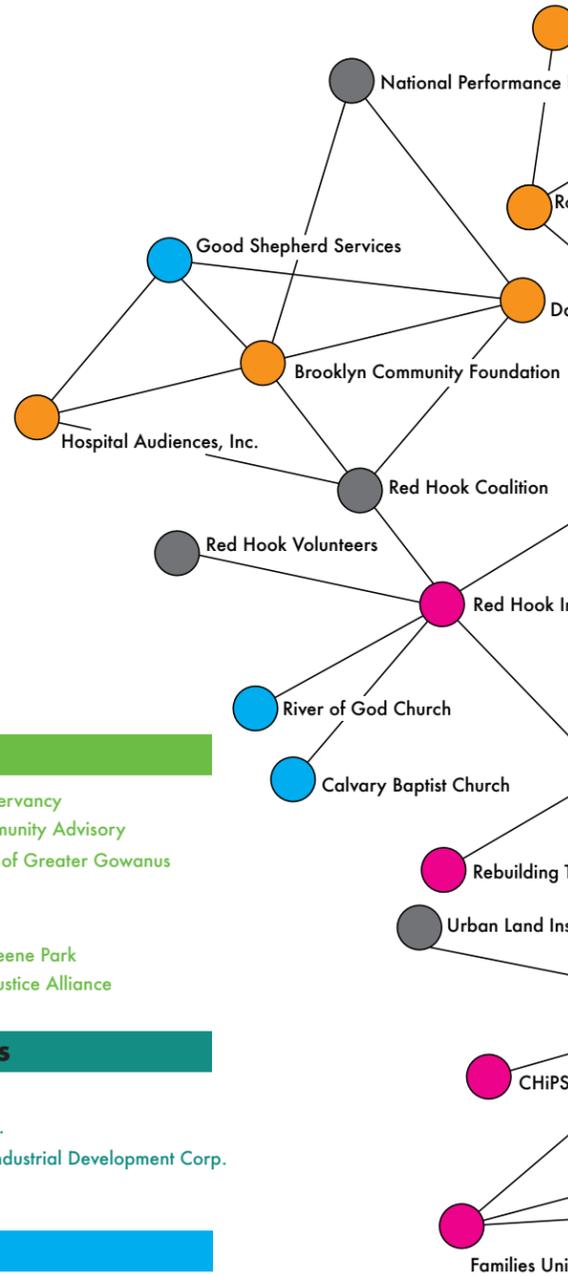
- Gowanus Canal Conservancy
- Gowanus Canal Community Advisory
- Friends and Residents of Greater Gowanus
- Gowanus by Design
- Grain Collective
- Friends of Thomas Greene Park
- NYC Environmental Justice Alliance

## local businesses

- Gowanus Alliance
- Salvatore Basile II Inc.
- Southwest Brooklyn Industrial Development Corp.
- Brooklyn Boulders

## faith oriented

- Calvary Baptist Church
- River of God Church
- Good Shepherd Services
- UJA Federation



# Community Stakeholder Interviews



Sabine Aronowsky  
Fifth Avenue Committee



Karen Blondel  
Turning the Tide (T3)



Jill Cornell  
NYC Emergency Management



Caron Atlas  
Arts and Democracy



Natasia Sidarta  
Gowanus Canal Conservancy



Mohamad Amin  
NYC Emergency Management



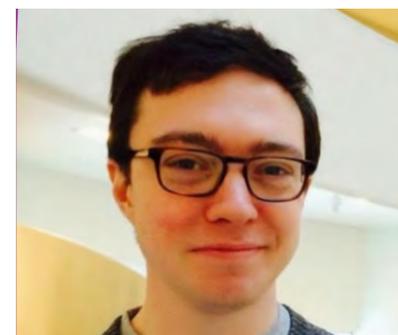
Catherine Ferrara  
NYC DCP



Michelle Saenz  
SBIDC



Catherine Zinnel  
Office of New York City  
Councilmember Brad Lander



Jonah Rogoff  
NYC DCP

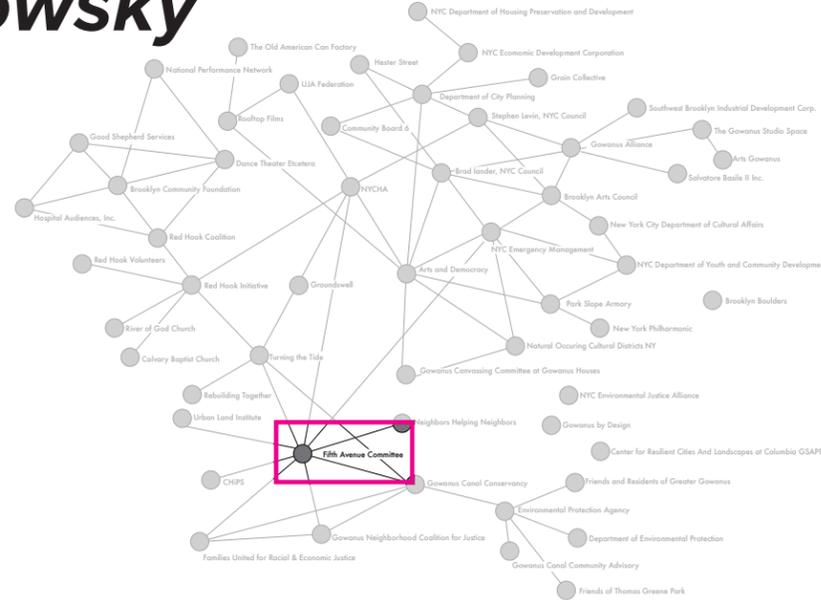


Ellis Calvin  
Gowanus Studio Space

# Sabine Aronowsky



**Fifth Avenue Committee**  
Community Development  
Consultant



**“Community hubs are essential for emergency response”**

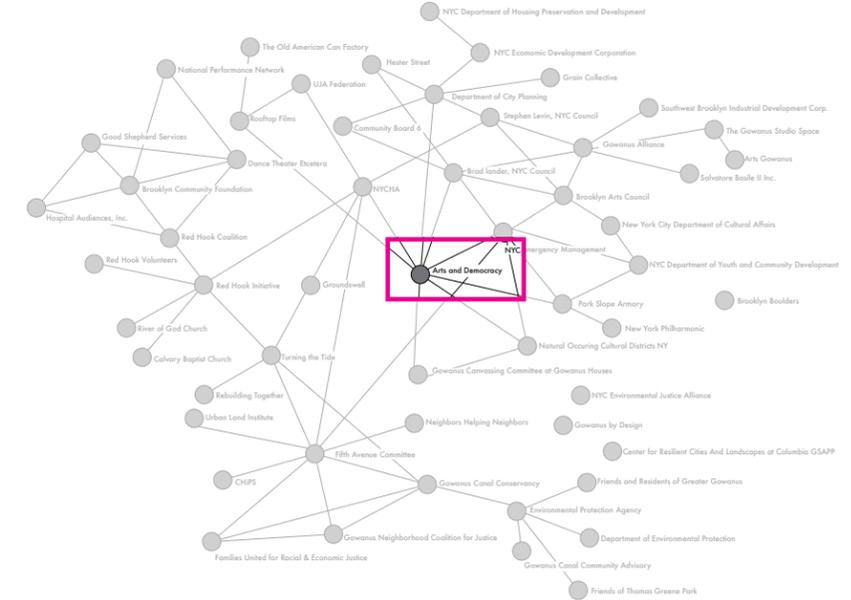
Sabine Aronowsky is a lifelong resident of Gowanus and Park Slope, and a Campaign Manager at Fifth Avenue Committee. One of the takeaways from our interview with Sabine centered on the topic of agency coordination and social cohesion among public housing residents and the neighborhood at large. Described as “a tale of two governments,” Sabine outlined a number of strategies for better integrating NYCHA into the big picture of planning in Gowanus.

Sabine also shared insights about the compounded effect of climate related emergencies on seniors, and the need to plan for the large population of seniors living in public housing. Lastly, she discussed the importance of community hubs for emergency response, and described how Fifth Avenue Committee was able to open their Gowanus office as a hub after Superstorm Sandy—as their office was located outside of the flood zone and they were able to coordinate and provide supplies and resources to local residents.

# Caron Atlas



**Arts and Democracy**  
Director



**“Cultural work rooted in community networks can advance a just and creative recovery”**

Caron Atlas leads Arts and Democracy, which puts arts and culture on agendas to further environmental justice, equitable development and participatory democracy. After Superstorm Sandy, Councilman Brad Lander asked Caron to bring wellness programming to the Park Slope Armory Shelter which was home for a month to over 500 displaced elderly and disabled residents from the Rockaways. Caron described this as a great illustration for how city-community partnerships can provide an environment for creative recovery efforts, although she lamented the short lifespan of the collaboration.

The Arts + Democracy project created a wellness center within the shelter that provided programming including: arts and culture, exercise, massage, religious services, a Veterans Day commemoration, film screenings, therapy dogs, AA meetings and stress relief.

As a small organization with the capacity to take responsibility for programming, the wellness project was able to be nimble and resourceful in bringing not only resources, but joy to people who were in shock. Shelter leadership took note of the impact realizing that the artists were the ones who knew the residents best and came to rely on them to communicate with residents. One of the doctors credited their work with avoiding a riot in the shelter.

# Catherine Ferrara



NYC Department of City Planning  
Brooklyn Office  
Flood Resilience Planner



***“The Gowanus Neighborhood Planning Study seeks to foster a thriving neighborhood by reinforcing and encouraging a robust local economy anchored by a mix of uses and businesses, while creating opportunities for new housing with affordable housing in appropriate locations... This collaborative planning process seeks to coordinate ongoing work by government agencies and leverage recent and planned public and private investments to promote a thriving and inclusive neighborhood.”***

- NYC Department of City Planning

# Jonah Rogoff



NYC Department of City Planning  
Brooklyn Office  
Urban Planner

Catherine Ferrara, a Flood Resilience Planner, and Jonah Rogoff, a City Planner, work in the Brooklyn office of New York City Department of City Planning and were able to give us critical information regarding the rezoning process in Gowanus as well as the Gowanus Neighborhood Planning study led by DCP, Plan Gowanus. It is important to note that Plan Gowanus builds from community engagement methodologies and recommendations which were specified within Bridging Gowanus (Lander et al. 2016; NYC DCP. 2016, 2017). Bridging Gowanus was a community engagement platform led by New York City Council Member Brad Lander of District 39 which emerged as a response to neighborhood anxieties surrounding the new rezoning in the interest of developing a comprehensive plan that allows for residents to have a voice in shaping the futures of their community. Brad Lander is one of the first council members who introduced participatory budgeting in the Bridging Gowanus plan, and it is this spirit of community participation in infrastructure development and land-use changes that DCP has centered its rezoning efforts in participatory planning methods.

The Gowanus rezoning will impact the current residents with increased population and density, and industrial sectors due to manufacturing to residential rezoning. Within this context,

DCP takes on a critical role in leveraging new development to include affordable housing and resilient infrastructure development in the final comprehensive plan. Catherine shared with us that the 4th Avenue corridor and the lots adjacent to the canal will most likely be rezoned. As DCP sees it, the residential rezoning represents an opportunity to bring in more affordable housing into the neighborhood and leverage green infrastructure and resilient developments with little effect on neighborhood change. The percentage of affordable units that will be included is under review in an effort to determine the feasibility of providing 50% - 70% affordability in new residential development as proposed in the Bridging Gowanus study. DCP supports the development of residential development in the floodplain but is focused on resilient building standards.

DCP was unaware of the development of NYCEM's Community Emergency Planning Toolkit. Although this lack of connection between agencies represents a disconnect, our findings from the interview begin to illustrate an opportunity for these agencies to partner in an effort to leverage mitigation projects and sustainable design standards, the inclusion of street trees and participatory budgeting processes in the rezoning.

DCP is facilitating engagement processes with the community in the rezoning process and is committed to integrating sustainable infrastructures and leveraging development for resilient building standards. While they support the development of more residential buildings in the neighborhood, even in the floodplain, they are also pushing for the implementation of sustainable and resilient design standards in this process.

# Karen Blondel



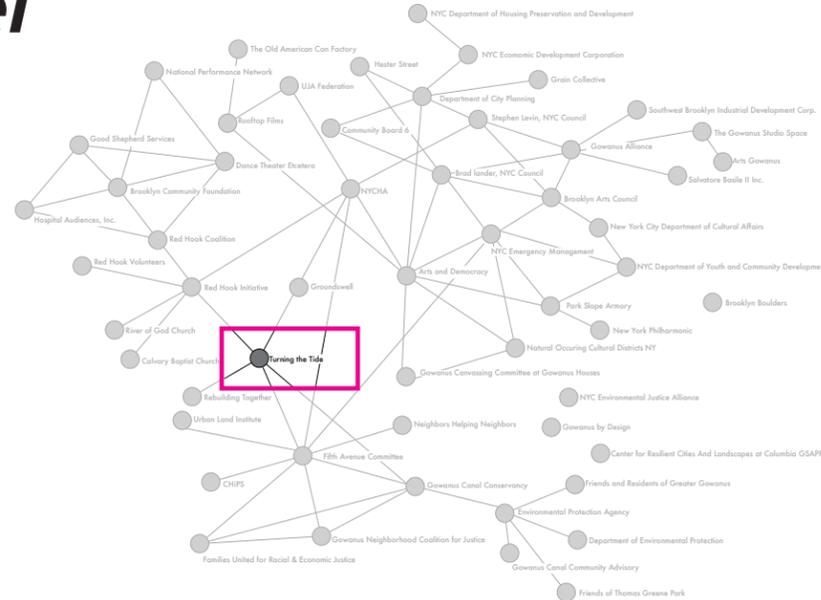
**Turning the Tide (T3)**  
Environmental Justice Community Organizer

**“Rezoning brings about issues to the people who are native to this community... A lot of the smaller stores that we all rely on are being priced out and that’s a problem”**

*(T3, 2016)*

Karen Blondel leads the initiative, Turning the Tide (T3), an organization that evolved in the aftermath of Superstorm Sandy and was led by the Fifth Avenue Committee in collaboration with the Red Hook Initiative, Families United for Racial and Economic Equality, the Southwest Brooklyn Industrial Development Corporation and in partnership with the New York City Housing Authority. T3’s work focuses on environmental equity and aims to advocate for low income and NYCHA residents. This is especially important in Gowanus where large scale funding streams provided by the rezoning are ushering in neighborhood change (T3, 2016).

In addition to her role at T3, Karen Blondel is a resident of Red Hook Houses West and works in Gowanus as an Environmental Justice Organizer at the Fifth Avenue Committee. Blondel described the need for efficient maintenance standards in NYCHA buildings that address both residential use and the responsibilities of resident association managers. We learned about ways in which the lack of management and oversight in NYCHA buildings has a direct impact on the residents’ capacity to communicate with each other and with their resident association managers. For instance, the protocol for approving flyers is tedious and time consuming. Karen illustrated the barriers for elderly residents in seeking help in an evacuation situation. In response, she suggested that NYCEM train CERT teams for the NYCHA community and elect a resident organizer as a cornerstone manager for emergency response efforts.



# Natasia Sidarta

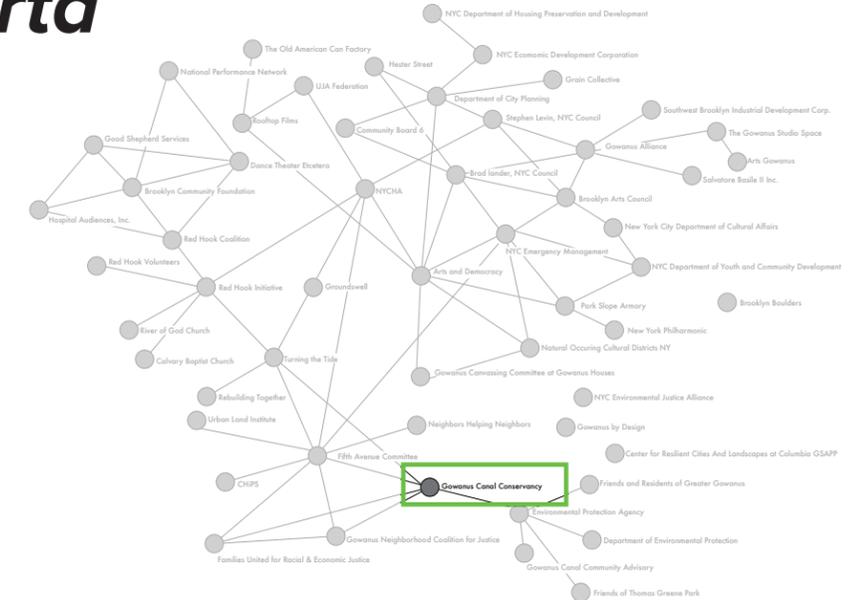


**Gowanus Canal Conservancy**  
Program Manager

**“The Gowanus Canal is a very polluted, almost abandoned site, but there’s been a lot of community support (for) the Superfund Project itself and also cleaning the canal (to improve) water quality and... greenspaces”**

*(Bklynr, 2018)*

Gowanus Canal Conservancy served as a community resource for many residents impacted by Superstorm Sandy, although ultimately, their old facility was flooded during the storm. In our interview, Natasia Sidarta, the Program Manager at Gowanus Canal Conservancy, shared some of the organization’s experience and noted that due to the lack of an emergency plan, the organization was severely limited in their ability to connect with other community organizations facing similar barriers in the recovery process. The GCC hub has since been relocated to a shared facility with a NYC Department of Sanitation (DSNY) salt shed, which offers stewardship and education programs and is home to a rainwater harvesting system, a plant



nursery and a compost project facility. The GCC has further plans to elevate equipment as a hazard mitigation effort.

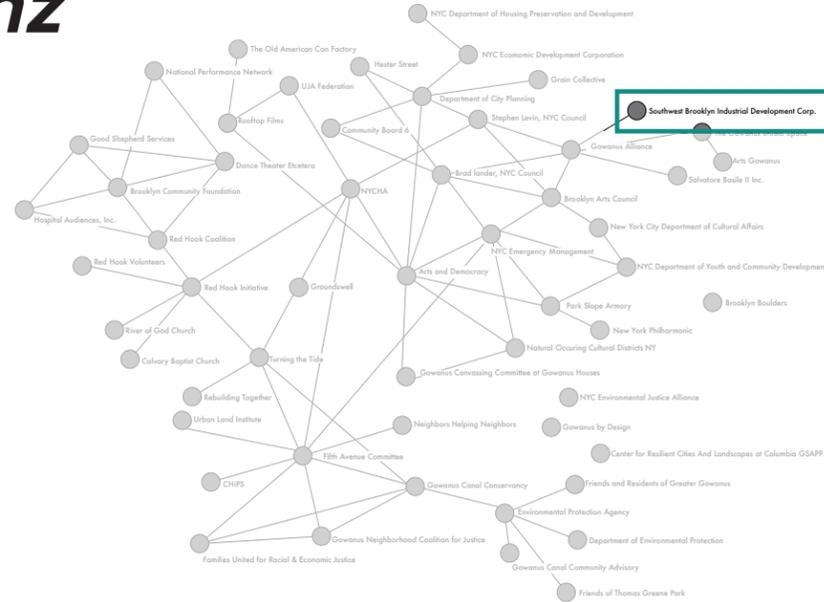
GCC’s project, Lowlands, which advocates and provides support for development of parks and green space along the canal, is a series of mitigation proposals that have been presented to the Department of City Planning as mitigation strategies for consideration and integration into the Gowanus rezoning plan. Some proposals include infrastructural interventions for storm water retention, street tree campaigns, and designs to develop wayfinding systems for the neighborhood. These design proposals recognize disaster preparedness as a complex issue and have designed proposals which focus on both mitigation and response efforts.

Currently GCC is partnered with DSNY, NYC Compost Project and NYC Council Member Brad Lander, and relies entirely on its community volunteer network to carry out hazard mitigation projects and recovery initiatives. This illustrates the organization’s unique ability to mobilize communities and neighborhood organizations around hazard mitigation, response and recovery efforts and effectively manage the programing and development of these types of meaningful initiatives. Although this network of stakeholders does not include NYC Emergency Management, GCC is interested in learning more about the toolkit and would be prepared to distribute in their network as a prospective partner.

# Michelle Saenz



**Southwest Brooklyn Industrial Development Corporation**  
Business Services Manager



# Ellis Calvin



**Gowanus Studio Space**  
Director of Membership and Outreach



## “Resiliency is a slow motion disaster”

We spoke with Michelle Saenz, the Business Services Manager at SBIDC, who serves as the primary contact for businesses seeking resources or incentives or who are navigating compliance issues. SBIDC also serves as a link between local manufacturing and industrial businesses and city agencies.

SBIDC has also been incredibly active in relation to disaster recovery and preparedness and are well positioned to help us understand the impacts of disaster on small businesses and the manufacturing sector—two key and unique constituent groups in Gowanus. In the aftermath of Superstorm Sandy, SBIDC worked with the Port Authority of New York and New Jersey to launch a Small Business Storm Resiliency Program. This research and partnerships with three businesses in Red Hook led to SBIDC’s development of model emergency preparedness

plans and other resources specifically targeted at resilience for small businesses.

Our interview focused on the current work SBIDC is doing around resilience and disaster preparedness with local businesses, the more general work they are doing in the context of rezoning, as well as their perspective on how businesses in Gowanus and surrounding neighborhoods form or might form coalitions to support each other in disaster preparedness.

SBIDC helps businesses with issues around resiliency by helping businesses to participate in the SBS PREP program which provides an assessment of flood-related resilience to the business and a \$3,000 grant to implement recommended flood protection measures. SBIDC also helps businesses navigate flood insurance requirements.

SBIDC struggles to get businesses to come together to become a constituency that the city needs to listen to due to the reality that business owners are already stretched far too thin to be able to think about long-term resilience issues. There are too many demands on business owners’ time. However, with rezoning as a direct threat to manufacturing zones with commercial land use changes, senior leadership of SBIDC are actively involved in rezoning conversations in Gowanus.

## “How might past emergencies have been better mitigated with more community involvement?”

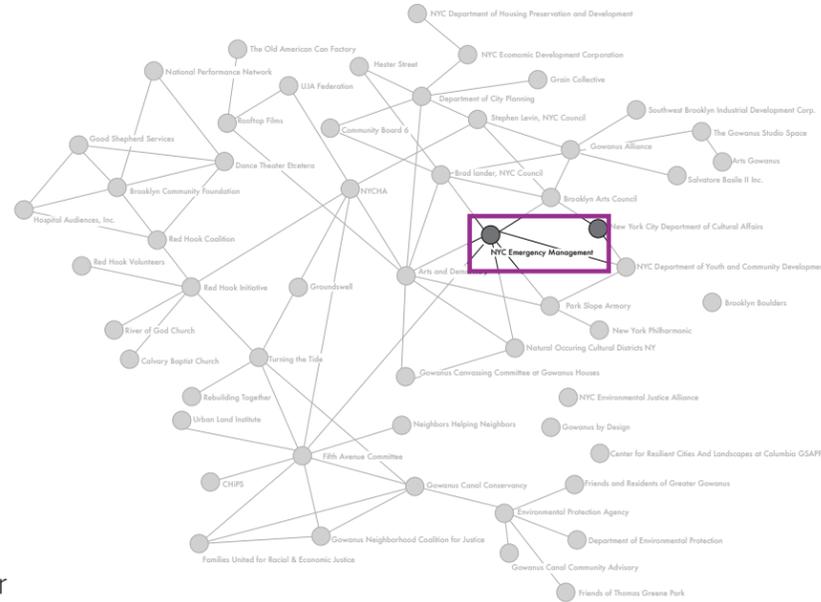
Ellis is the director of Membership and Outreach at the Gowanus Studio Space, which is a cooperatively run and not for profit shared studio. The economic model of the studio has allowed it to be a springboard for economic development in the neighborhood and membership levels begin at \$160 per month. Former and current members have gone on to found several anchor institutions in the neighborhood, some of which include Four and Twenty Blackbirds and the robot store. The studio space is currently expanding its space and encouraging new members to join.

As a planning studio, we were able to attend one of the Gowanus Studio’s monthly meetings where we presented our work and organized a workshop event. This was a helpful exercise it testing the efficacy of our facilitation guides in engaging with community members who typically do not think about disaster response and preparedness on a regular basis.

# Jill Cornell



NYC Emergency Management  
Community Engagement Coordinator



# Catherine Zinnel



Office of New York City  
Councilmember Brad Lander  
Deputy Chief of Staff



# Mohamed Amin



NYC Emergency Management  
Fellow

Jill Cornell and Mohamed Amin invited our studio to a guided tour of Gowanus and a conversation early on in our research phase. This afternoon focused on identifying key stakeholders within Gowanus as well as those in adjacent neighborhoods who have played a key role in disaster response and recovery in the past.

The conversations highlighted the need to include the multiple council members invested in Gowanus: Brad Lander of District 39, Steven Levin of District 33, and Carlos Menchaca of District 38; the important role of social and community cohesion in disaster planning, as well as the initiative to support innovative projects that address the built environment and mitigation efforts such as the work led by AKRF, an environmental, planning and engineering firm, and Fifth Avenue Committee's green space pilot program for open space and flood remediation.

***“There’s a need for stronger interagency coalitions addressing disaster mitigation.”***

Catherine Zinnel is the Deputy Chief of Staff for Council Member Brad Lander, representing the majority of Gowanus. She led the community neighborhood plan, Bridging Gowanus, a study that emerged in response to community concerns and anxieties around the neighborhood’s upcoming rezoning, exploring the ways in which this future rezoning will impact community networks and existing resources.

From our interview at the Brooklyn office, we left with three core takeaways from our conversation with Catherine. The first being a discussion about coordination among agencies and the need for stronger interagency coalitions addressing disaster mitigation and preparedness. Secondly, we discussed the topic of inter-boundaries within Gowanus, which there are multiple, and leaving communities to be politically divided. This fragmentation is likely to impact and distort voting for participatory budgeting and other democratic planning initiatives. We also discussed what Catherine phrased as “Sites on Radar” which represent public spaces where communities could congregate in the event of a disaster and potentially serve as community hubs. These spaces include The Old Stone House in Park Slope, Ennis playground, and the Gowanus Canal Conservancy Salt Lot facility.

## Methodology

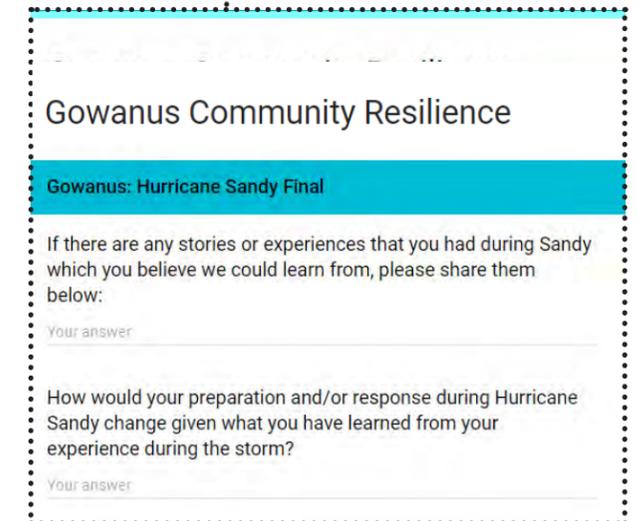
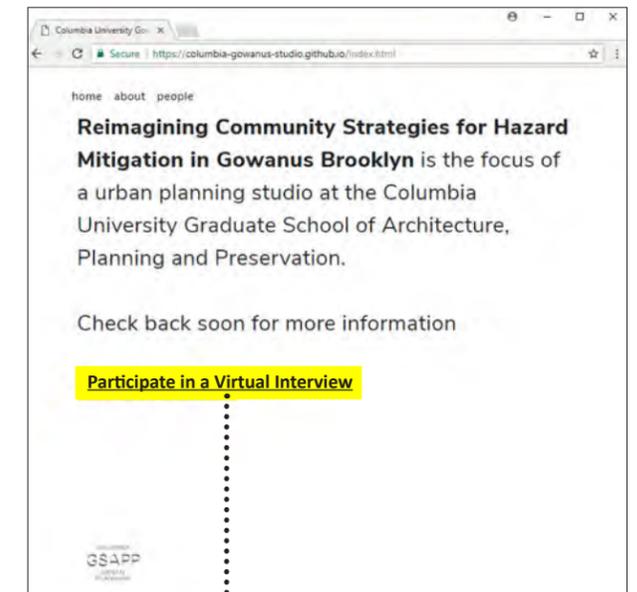
The series of personal in-person or telephone interviews allowed us to gather input from many significant people. However, in order to reduce the barriers to participation, we devised an online virtual interview platform with the use of Google Forms as a method of participation which was less time consuming. The virtual interview platform included a series of both multiple choice and open-ended questions that allowed members of the Gowanus community to tell stories about their experiences during Superstorm Sandy, as well as provide other information about disaster planning and preparedness.

Virtual interview participants were also asked about the community organizations on which they rely, their access to adequate heat and/or air conditioning, and their previous efforts to prepare themselves and their families for a disaster. A full copy of the virtual interview questions, as well as the complete set of anonymous multiple choice answers, can be found in the appendix.

With the idea of “co-creation” in mind, the first draft of the virtual interview survey questions was vetted by Sabine Aronowsky of the Fifth Avenue Committee, and Karen Blondel of Turning the Tide, during our in-person interview with them. Their feedback was incredibly helpful and all changes were incorporated in the final version of the virtual interview questions.

Invitations to participate in virtual interviews were sent out on Tuesday, March 27th by members of our studio team to organizations and people with whom we had previously reached out to. Many of these stakeholders then forwarded this request on to colleagues, friends, and members. All invitations directed participants to our studio project website, as can be seen to the right. Once on our website, participants could read more about our team, studio goals and process, before proceeding to participate in a virtual interview.

The virtual interview platform was closed to responses on Sunday, April 22nd at which point a total of eighteen virtual interviews had been collected. All answers and stories collected were anonymous for logistical purposes.



# Results

It is important to recognize before reading this summary that a self-selecting group of eighteen people participated in our virtual interview process, and so any findings or conclusions which we may be able to draw from these results are subjective and not statistically significant. However, we do believe that the qualitative information which was gathered through this method is of great value as it has helped us develop a better understanding of the Gowanus community in terms of disaster preparedness, recovery and mitigation.

Our virtual interview began with questions concerning the impact of Superstorm Sandy on the Gowanus neighborhood and community. Many of the people who participated in the virtual interviews identified themselves as having been residents, employees, business owners, or property owners in Gowanus during Superstorm Sandy.

Very few of the Gowanus residents chose to evacuate for the storm, and those who did stated that they utilized their personal vehicle and went to the home of family or friends in a different neighborhood of New York City. The majority of virtual interview participants who were residents of Gowanus during Superstorm Sandy choose to shelter in place. Few of these people claimed that they had the resources that they needed. When asked to identify any missing resources which would have been helpful to them, methods of communication, sources of light and electricity were all identified.

Virtual interview participants were asked to elaborate more about how they accessed information and communicated during Superstorm Sandy. A wide variety of methods and tools were identified, including: Devices (computer, tablet, smartphone or other) with Internet Access, Cell Phone Networks (calls and texting with no internet access), Radios, Word of Mouth, Social Media, Landline Telephones, and VHF / UHF Free Television Stations.

Next, the respondents were asked to specify which disasters they believed to be most relevant to Gowanus. By far the most common concerns were “Sewage Backup in homes / neighborhoods” and flooding. Virtual interview participants also identified themselves as being commonly concerned about “Coastal Storms”, “Utility Outage”, “Winter Weather”, “Extreme Cold” and “Extreme Heat”. However,

**Q:** **What methods / tools did you have access to for communication and information during the storm?**

**A:** “596 Acres created a closed text network between distribution hubs on the ground in Rockaway/ Coney and served as a dispatch for donations/resources like [Gowanus Studio Space].”

participants were less often worried about “Hazmat - Chemical Spills and Radiation”, “Biological Events - Communicable Diseases such as Influenza”, “Fire”, “Earthquake” and “Tornadoes”.

When asked in tandem about whether their family, household and/or business had an emergency plan, and how prepared they would feel if an emergency situation were forecast for the future, it became clear that most of Gowanus’ community members who participated in a virtual interviews were aware of their vulnerabilities, and would like to be more prepared in the future. Presently, only around one third of the people who participated in the virtual interview process have an emergency plan, with very few of them believing it is good in its current state. The rest of the participants do not have an emergency plan currently, although the majority of them would like to create one.

After asking “How prepared would you feel if an emergency situation were forecast for Gowanus in the near future?”, participants feelings of preparedness did appear to be somewhat connected to whether or not they have already created an emergency plan for themselves, their household and/or their business. Out of the people who had already created an emergency plan, the

**Q:** **If an emergency were forecast for Gowanus in the near future, what tools / resources / information would you need from official community or city agencies to increase your level of preparedness?**

**A:** “Help with building resiliency preparation”  
“Real time updates on weather conditions, travel conditions [and] mass transit updates”  
“Ways and places to let able-bodied folks know where they can help out.”  
“Clear evacuation protocol”

majority felt “Prepared”. However, out of the those who did not create an emergency plan, the majority felt unprepared.

There are many tools, resources and information sources which the people who participated in the virtual interview feel that they would need from official community and city agencies to increase their preparedness. These items can fall into the broad categories of transportation and evacuation protocol, programs to build preparedness and resiliency, general communication, funding and systems for coordinating help efforts.

Although participants are in need of new tools and protocols in emergency situations, when asked who they would currently turn to in the Gowanus Community it was obvious that there already exists a strong network of community connections and organizations whom residents rely on and feel supported by. By far the most common responses to this question were simply one’s “Neighbors” and “Family / Friends”. Following these two options, the next most common community resources selected were local assets like “Community Organizations” and “Community Leaders”, followed by “City Agencies”, NYC Emergency Preparedness Protocols, “Faith Based Organizations, and “Disability and

Functions Needs Coordinators”.

When asked to specify which community leaders, community organizations, city agencies, faith-based organizations, and NYC Emergency Management Preparedness Programs to which they would turn in an emergency situation, many different organizations and people were listed. Some of the most commonly stated answers included the Fifth Avenue Committee, the Red Hook Initiative, the Red Hook West Residents Council, the Red Hook Justice Center, 311, WNYC, Notify NYC text alerts, council members, and several specific community leaders. It is important to recognize that these groups and leaders cross the borders of the Gowanus and into neighboring communities.

In addition to community leaders and organizations, participants were also asked to state which neighborhood places they utilized the most aside from their home and work. Answered varied from restaurants and bars to artist spaces and community grassroots meetings, showing the variety and clear importance that these “third spaces” play in the lives of Gowanus residents.

**Q:** **What neighborhood spaces do you spend the most time in aside from your home and work?**

**A:** “Coffee shops, bars [and] markets”  
“Local art studio - Gowanus Studio Space”  
“Community grassroots meetings”  
“Painting studio”  
“Several local restaurants and bakeries, [and] Thomas Greene Park”  
“Parks”  
“[The] Community Center”  
“Red Hook Initiative, Red Hook Library [and the] Fifth Ave Committee Community Room”

# Superstorm Sandy Stories

**Q:** If there are any stories or experiences that you had during Superstorm Sandy which you believe we could learn from, please share them below:

**A<sub>1</sub>:** “We live in an old industrial loft building one block from the canal. **Our basement remained flooded** for weeks, landlord didn’t have the wherewithal to pump it out. **We had no heat or electricity** until the day after Thanksgiving. **Electric and gas meters were replaced in the basement**, rather than raised up above flood level.”

**A<sub>2</sub>:** “Gowanus Studio Space... was spared flood damage and instead **became a donation drop-off location** for the weeks that followed and organized a fundraiser almost immediately after the storm. [Gowanus Studio Space] also **hosted meetings for other groups** of local artists to plan actions/responses. The drop-off center worked because we were able to pre-sort the donations and make sure they were useful before shipping them out to Rockaway. We could also target our requests to our audience. **The fundraiser generated over \$1000** in cash that went to specific individuals and groups in Rockaway that were able to use it right away (vs. the bigger organizations/operations).

(I am not sure I would change my preparation and/or response during Hurricane Sandy). [Gowanus Studio Space] was **an existing community of people who had local resources** that we could use to assist others. **We tapped into our networks** (596 Acres, Occupy, GSS members, & friends) to do what we can. It felt much more direct with more accountability than the Red Cross or even Occupy Sandy.”

**A<sub>3</sub>:** “I [was working with] the Gowanus Canal Conservancy during Hurricane Sandy. Since I lived nearby in Brooklyn, **I helped clean our stewardship site that was flooded with over a foot of water**. However many of my peers could not travel to their [work sites], so they used the opportunity to volunteer and help those affected by the hurricane - it was a **large and enthusiastic disaster response workforce** that became a positive outcome of not being able to attend (to) their [normal work]. [If I could change my preparation and/or response during Hurricane Sandy], I would have made sure to **fully charge my cellphone and stored more drinking water**.”

**A<sub>4</sub>:** “The experiences are from the perspective of a nonprofit organization that owns and manages affordable housing for low and moderate income tenants in Gowanus and in South Brooklyn and whose main office is in Gowanus. **Many of our tenants refused to evacuate** despite our doing door to door outreach and urging folks to go to a shelter. Their reluctance is understandable given that several are **formerly homeless and had bad experiences with ‘shelters’**.”

**Our staff were the first responders** in the buildings we manage. Two buildings in Gowanus and two in Red Hook lost power for several days/weeks (depending on buildings). Other buildings lost heat. **We had to temporarily relocate tenants** from Gowanus to other properties since the electrical outage lasted more than two weeks.

Our property management staff is accustomed to handling weather related emergencies but **Sandy had a more profound and longer-lasting impact** that required our entire organization and external partners to support. **Our relationships with our local vendors were key** to getting our properties up and running weeks faster than other local buildings that were impacted and we were able to then become spaces that other local community residents were able to go to.

Also, our staff and local leaders delivered food, water and medicine to public housing residents in Gowanus Houses who lost electricity and therefore the ability to use the elevators. **Many senior and wheelchair bound individuals were trapped** and needed help getting basic needs met. **The community rallied to help each other**. Having **strong connections** with our neighbors, local groups and businesses was **key to addressing and mitigating the immediate impact of the storm**.

[Because of our experiences during Hurricane Sandy], **we now have more formal plans in place to handle disasters** and do regularly disaster preparedness workshops and reminders for the community and our tenants. **Gowanus - as a community though - is still in need of a formal disaster plan.**”

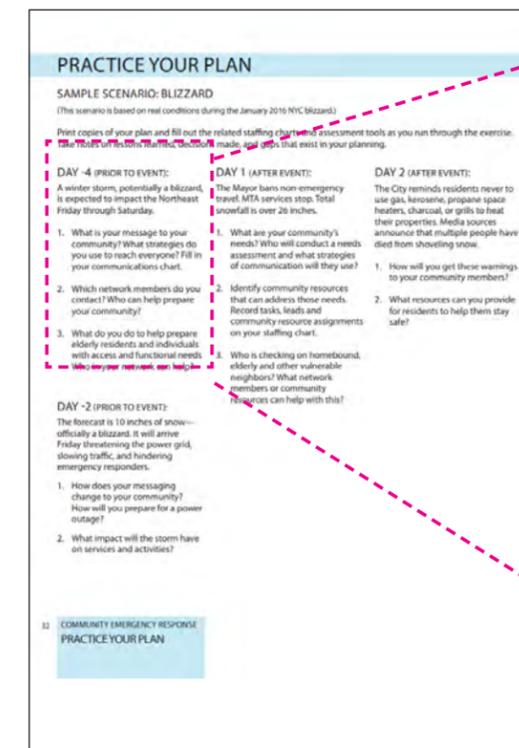
# Methodology

While part of Participate + Co-Create, this last activity we did moved away from conversations that informed our study to testing a prototype of a customized Facilitation Guide and Workshop. This communication tool was crafted to help shape conversations specific to disaster preparedness and recovery while spurring imaginative thinking and improvisation with groups of people who do not think about this topic on a daily basis. It was designed to help people imagine themselves in situations and be able to calmly and rationally think about what tools, skills, or community networks they have that would aid them in their recovery, as well as allow them to help others. Facilitation guides can be accessed and utilized by anyone within their community to start a conversation on disaster preparedness and recovery, and begin to build a foundation of resilience. This is part of our final deliverable, and more information can be found in the Recommendations chapter of this report.

The prototype facilitation which we developed built off of the “Practice your plan” scenarios in the very back of NYCEM’s toolkit, as seen in the image below. These scenarios were crafted by the NYCEM team to help citizens work through potential disasters and formulate plans for preparedness. As they are placed in the very back of the toolkit, they require that the user has some understanding of what information and instruction specific to community planning for disasters has preceded them. In our Facilitation Guides, the basis of these scenarios was left the same, but the presentation was tweaked to initiate a more imaginative response from people who are unfamiliar with the ideas surrounding disaster preparedness.

Our team was able to test this idea with members of the Gowanus Studio Space on Thursday, April 5th, 2018 during one of their regularly scheduled committee meetings. The idea of implementing the

NYCEM TOOLKIT



FACILITATION GUIDE



## Workshop + Facilitation Guides



Workshop with Gowanus Studio Space

facilitation guide and workshop model within an existing meeting reduced barriers to participation and fit our vision for the tool. The workshop began with a brief introduction of our studio project. We handed out a flyer with some key information surrounding our project and process, explaining some of the work which we had already completed, and facilitated an open discussion about the experiences of Gowanus Studio Space during Superstorm Sandy.

Through this conversation, we learned that the topic of disaster preparedness and recovery is not new to the members of Gowanus Studio Space. During Superstorm Sandy, Gowanus Studio Space was not flooded, and they were able to capitalize on their large industrial facility during Superstorm Sandy to help others by holding a fundraiser and acting as a distribution center for donated goods. However, during this conversation we also learned

that although they are experienced in implementing innovative solutions through improvisation and quick thinking when it is necessary during a disaster situation, this topic is not one which they often think about before an event was forecasted. Following this conversation, we moved into the facilitated activity.

With plenty of room for participants to record answers, the facilitation guides served as a way for attendees to talk openly about disaster planning, recovery and mitigation. The Gowanus Studio Space members were split up into small groups and each given a different scenario (extreme heat, a power outage and series of fires, and a blizzard) as well as guiding questions addressing the workshop's three topics: speculate, improvise and adapt. Each topic was allotted three minutes for discussion and group members were invited to talk and collaborate while writing down whatever came to mind.

### PHASE 1: Speculate

During the speculate phase, they were asked to imagine themselves in the scenario, and share their perceived vulnerabilities. Here, the participants were asked to "Imagine, as fully as you can, where you would be and what is around you when your scenario happens" and asked leading questions about how they would feel and what challenges they would face. In essence, to think only about themselves but to share this with their group members. Although asked to think only of themselves, it was interesting that they were already thinking about their family, friends, neighbors, and broader community. One member would be worried about his mom and wondering if she had tried to go to work, another would be reaching out to their extended family to ensure everyone was okay, a third noted that their neighbors would probably have already shoveled the walk.



**"[I'm] worried about hurting myself shoveling and getting to work."**

*Henry and Daniel*

**One**  
Imagine, as fully as you can, where you would be and what is around you when your scenario happens.

What worries you the most?

What are the first ways your everyday life would be changed by this scenario?

What would emerge as your most pressing need or vulnerability?

*Hi: ~~Elton~~ Bronx. Superstorm center is nearby, and a reservoir (Jerome Park) Between 4 and D train*

*D: In Gowanus, home from work (DOE) my neighbors would be shoveling the walk*

*H: My mom, where is she? (Leaves for work early)*

*D: Injured about hurting myself shoveling, getting to work on Tuesday*

*H: No wade. Not able to meet obligations (no mobility)*

*D: No wade: Possible delay in getting groceries*

*H: Heat, possibly*

*D: Danger of attempting to travel in blizzard conditions*

**Discuss with your group in 3 minutes. Designate a notetaker to document your conversation (bullet points are fine, spelln dsnt matter)**

**PHASE 2: Improve**

Next, they were asked to think about how they may utilize improvisation to respond to needs and vulnerabilities of their group-mates in a nimble and flexible way. Answers to the initial question, “what knowledge/resources/skills/tools/people or past experience could you draw on to help meet their most pressing needs?” ranged from simply commiserating with each other, to utilizing bicycle powered fans during a heatwave. Most notably, both groups mentioned the Gowanus Studio Spaces existing online social communications network, Slack, as being the first place they would turn to both offer and ask for help.



**“I can offer help informally through [our communications tool] Slack”**

**PHASE 3: Adapt**

The third series of questions asked the participants to imagine how they would utilize what they learned to adapt their everyday life in a way which would help lessen the barriers that currently exist to understanding and planning for disasters in their community. Participants were prompted with the question “imagine that their scenario was resolved, and everyday life had resumed.” One participant lamented on making sure she had the contact information for all her loved ones somewhere besides her cell phone in case something happened to it, while another noted that the sidewalk access to the Gowanus Studio Space entry is hard to navigate in the snow, but since he knows the owner of the building it is within his capacity to reach out and ask about how this could be changed for increased safety and access during emergencies.



**“I realized that I should probably keep important contacts somewhere other than my phone.”**

**Two**  
After hearing how this scenario would impact your partner the most, what (knowledge/resources/skills/tools/people/past experiences) could you draw on to help meet their most pressing need?

In what ways might you be able to offer assistance to your partner?

Discuss with your group in 3 minutes. Designate a notetaker to document your conversation (bullet points are fine, spelln dsnt matter)

*Henry and David*

H: Communication w/in GSS  
Slack notable  
Offering, asking for help informally

D: Same

+ alerting one another to community issues

+ general exercise of community contacts, resources

**Three**  
Imagine that your scenario is now resolved, and everyday life has resumed.

What would some of the lasting impacts be from the kinds of assistance you and your group members were able to offer one another?

What are ways, even without a disaster, that these forms of powerful community support and reliance could be put in play?

Discuss with your group in 3 minutes. Designate a notetaker to document your conversation (bullet points are fine, spelln dsnt matter)

*Henry + David*

H: Becoming aware of the location and needs of other members, reinforcing contacts

D: Planning, reflection on issues on street + sidewalk access to GSS doorway, entry. Residual ice and plowed snow is often an issue on this block. No Block-wide shoveling, snow mitigation plan. No salt, sand on premises. Slippage, safety issues expected.

Foresight...

Common-sense reinforcement of communication and liaison w/ landlord (Mitch)

As we learned during our in-depth interviews, virtual interviews, and workshop processes, the topics of disaster preparedness, resilience, hazard mitigation and the like can be overwhelming. This process has allowed us to develop a unique perspective of the Gowanus community and the social networks which exist within it. Additionally, this experimentation with multiple methods of communication has aided us in developing a better understanding of how to talk about disaster preparedness, recovery and mitigation with different types of stakeholders depending on their level of expertise and experience with these topics. With this in mind, we are able to capture several key takeaways based on these conversations which have helped guide our final recommendations.

## 1. There is no defined path to understanding disaster

First, we learned that the path to understanding how to be prepared for disaster situations, and the resources that exist, can be confusing for residents and community groups. Through our virtual interviews we learned that many people did not have emergency plans but wanted them, stressing the point that individuals often want to be prepared but may not know where to begin. Additionally, when looking at the larger scale, we learned that although there is a lot of significant and meaningful work being done by community groups and city agencies, there often exists repetition and overlap in their missions due to inadequate communication across peer organizations. Higher levels of coordination and communication could significantly increase the impact of their work.

## 2. Social networks are critical assets

Second, we heard repeatedly about how existing social networks served as assets during disaster situations, greatly increasing the possibility and effectiveness of response. During an emergency situation, people turn to their family, friends, and community groups first. These are the people they know, trust, and are often in close proximity. These communication networks and connections that already exist are strong and familiar, and have the potential to ease any anxieties people may have during these difficult times. By both thoughtfully investing in and supporting the functions of more

formal community groups, as well as recognizing the significance of less formalized social connections, practices of resiliency and preparedness could be embedded within existing social networks in order to enhance and increase the community's overall resiliency.

## 3. People congregate in meaningful and frequented spaces

Next, we found that during disasters people naturally congregated in the meaningful and frequented spaces within their community. In the aftermath of Superstorm Sandy the residents of Gowanus gravitated to physical spaces that already served as a "third space" within their daily life. These facilities included coffee shops, art studios, community centers, homes of family members, parks and libraries, all of which double as hubs for the person's specific social and community network. Strong examples of the role in which these spaces can have in disaster preparedness and recovery can be seen in the post-Superstorm Sandy examples of the Gowanus Studio Space collecting recovery supplies and hosting a fundraiser, and the 5th Avenue Committee opening their offices for residents escaping their flooded homes.

## 4. Disaster response must be nimble

Lastly, we learned that disaster response needs to be flexible and nimble. Just as the emergency itself is often unexpected and unpredictable, even the most well thought out plans are often interrupted by unforeseen circumstances. However, we learned from our community engagement efforts and conversations that these issues did not stop many community groups from improvising in order to help themselves and their community. Through their flexible self-governing structures, community groups like the Gowanus Studio Space were not limited by liability issues that can hinder others. By being creative and flexible, unlikely partnerships were able to form that brought groups like the local synagogue and local arts organization Rooftop Films together to collaborate and provide support to residents after Superstorm Sandy.

CONNECT

# COMMUNITY HAZARD MITIGATION RECOMMENDATIONS

## Approach

Turning to our recommendations for hazard mitigation: we have synthesized our research and outreach efforts focusing on soft solutions which leverage existing capacities and build new connections. We have focused on dynamics we saw at play in Gowanus but feel that these are ideas which are replicable in other neighborhoods in New York City. We have crafted recommendations that address all phases of emergency management: the continuous feedback loop of Prepare, Respond, Recover, and Mitigate. However, as we worked to craft recommendations, we realized that there was a need to work not only across these phases, but also across multiple scales focusing on solutions which are specific and implementable at a neighborhoods scale.

We have organized our recommendations into four focus areas:

1. Mitigation actions, addressing concrete issues in the built environment which are central for hazard mitigation
2. Ideas for how disaster preparedness is communicated and how to foster collaboration
3. On how we might strengthen connections between community-level hazard mitigation actions and city-wide mitigation planning
4. A proposal for an intervention we are calling Gowanus Commons, which builds off these recommendations and brings them together through a unified platform.



Cycle of emergency management

		CATEGORY				
		PREPARE	RESPOND	RECOVER	MITIGATE	LONG-TERM CHANGE
SCALE	HOUSEHOLD					
	BLOCK					
	NEIGHBORHOOD					

Categories and Scales Matrix



Rendering of Sponge Park along Gowanus Canal

**1.1 Use the new neighborhood development and rezoning efforts as an opportunity to create and encourage small and large scale infrastructure that facilitates neighborhood-wide hazard mitigation**

We urge residents, business owners, and community leaders together with City Planning and Emergency Management to advocate that any new development include hazard mitigation benefits. This is particularly relevant in Gowanus, given the major rezoning effort that is ongoing in the neighborhood. New development has the potential to exacerbate many of the key risks we have identified as impacting Gowanus. However, if this new development incorporates hazard mitigation actions, these adverse impacts could be avoided or in the best-case bring neighborhood-wide mitigation benefits. There are many measures new developments might be required or incentivized to include or to provide funding for: such as community rooms, which can act as temporary shelters, cooling and heating centers; street trees; cool pavement; onsite stormwater management; lockers for resources; and much needed additional parks and open spaces.



Gowanus by Design competition entry for Thomas Greene Park

# 1.0 MITIGATION ACTIONS

**1.2 Emergency Management should create formal partnerships with local organizations for disaster response + recovery.**

Many organizations often have space and other resources that they lend during disasters for evacuation resource distribution and other uses—from sleeping accommodations at hotels, to community spaces at religious institutions and vehicle fleets available from distribution facilities. Partnerships would allow more resources to be reached and would support response and recovery inside spaces that are already meaningful in residents' everyday lives. Responses to Superstorm Sandy offer key precedents: the Park Slope Armory functioned as a major shelter for residents from the Rockaways; and Gowanus Studio Space served as resource distribution center allowing supplies to be brought to nearby Red Hook.



Interior of Park Slope Armory YMCA



Post-Sandy resource distribution at the Gowanus Studio Space

**1.3 Launch an awareness campaign about maintenance issues among building owners. Many of the hazards caused by impacts from extreme weather as well as educating owners**

Through our community engagement process, we received direct concerns regarding populations' vulnerability as pertaining to the building scale. In their advocacy work and community outreach, the Fifth Avenue Committee noted resident concerns surrounding lack of A/C units for elderly populations, fixing nonoperational windows (as overheating occurs due to steam leaks), and keeping traps clean. Individuals in multi-family residential buildings currently do not have the agency to perform building-level maintenance procedures that aid in mitigating the effects of a hazard.

We suggest that through a NYCEM and Fifth Avenue Committee (in their Housing Ambassador capacity) partnership, develop a building maintenance checklist that creates a measure of mitigation during hazards. Incentivizing or requiring owners to perform a monthly evaluation of the building maintenance checklist would aid in the overall preparation and hazard risk reduction of the entire building. Disseminating and educating the tenants on the items of the checklist will allow them to hold the owner/landlord accountable for meeting the building level hazard mitigation criteria.

A potential outcome may be that tenants are empowered to perform some of these building maintenance chores, for example, Jill Cornell of NYCEM mentioned how she routinely empties the drainage catchment to mitigate drainage issues. FEMA implements a building checklist within their Hazard Mitigation Grant Program in order to determine the award for funding (FEMA).

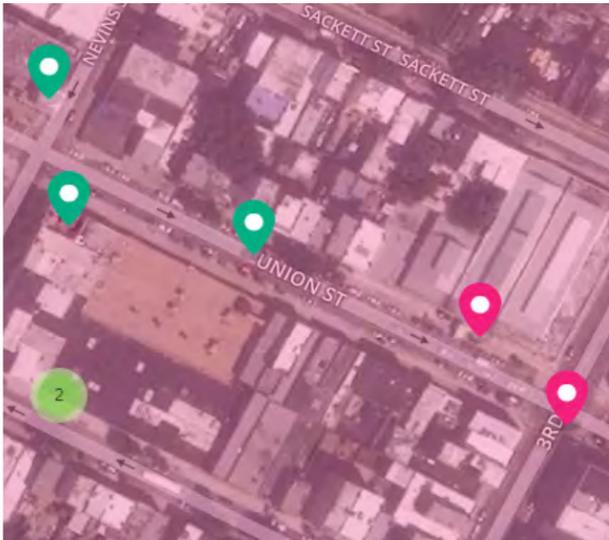
Our suggestion focuses on a building checklist that can be administered at a local scale and action items are held accountable by the tenants.



Scene from participatory documentary *Sandy Storyline*

### 2.1 Emergency Management should continue design and implement resources that foster imagination and improvisation in communities.

We encourage Emergency Management to make disaster preparedness a part of residents everyday life by developing and sharing resources that will spur conversations and imagination surrounding these topics. Emergency management should further prioritize the graphic design of these materials. NYCEM's recent resources for children are a good example of this, however designed resources could target more and different groups and could be an opportunity to connect with groups and artists located within communities. The work of the Gowanus-based Center for Urban Pedagogy (CUP) is a key example here. In their Making Policy Public series CUP facilitates partnerships between advocacy organizations and graphic artists to create materials dealing with pressing urban policy issues (Center for Urban Pedagogy 2017). Emergency Management might also consider designing workshops and other processes that communities could use to foster preparedness like the one our studio implemented with Gowanus Studio Space.



DCP "Map Your Community" platform

### 2.2 Foster community hubs in order to connect existing efforts from diverse contributors.

This recommendation aims to connect social networks, which have proven to be essential assets in times of emergency with city agencies building mutual trust. We encourage Emergency Management to create a space for residents, community organizations, and city agencies to share information, stories, educational resources, and other vital items affiliated with reducing the barrier to understanding for disaster preparedness and resiliency.

The work of the Red Hook Hub, as a community-based messaging and information distribution network is a key example here. This project combines digital and physical bulletin boards that are used to announce everyday neighborhood events as well as to connect residents in times of emergency (Red Hook Initiative 2017). City agencies are also increasingly using a variety of tools to connect with communities, such as Emergency Management's Notify NYC app, as well as the interactive map-based Plan Gowanus outreach platform developed by DCP. Emergency management should find ways to foster community building through disaster preparation, such as through storytelling, tools for participation, as well as educational materials. Our proposal for Gowanus Commons is one possible implementation strategy.

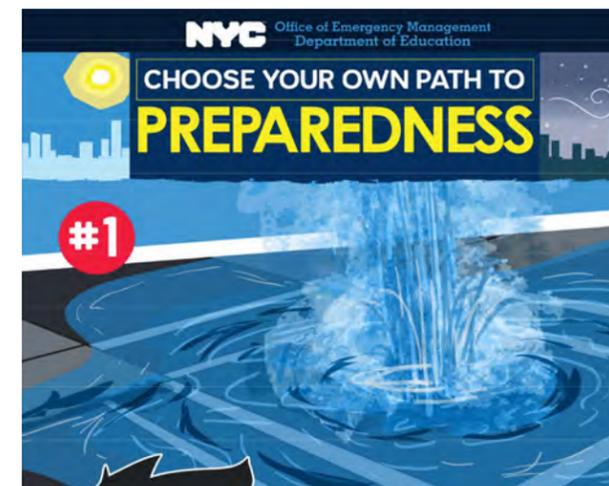
### 2.3 Call chain cohesion in the building

As we have identified, social cohesion and strong community networks offer support in all phases in disaster planning. Academic literature surrounding heat waves note that short-term social contact can reduce risk (Smeenza .et al, 1999). The potential for vulnerable populations to not consider heat as a hazard, and their reluctance to reach out for help, can be mended through establishing networks of communication and increasing social contact (Wolf et al. 2009).

Establishing social contact to identify specific resident needs during a hazard can be extended to other disasters. We propose implementing a chain call system at the building level to establish social contact in a measure against neighborhood hazards. This system would allow for vulnerable populations to have someone "check-in" on them during a hazard to better identify issues and needs. After identification, resources can be administered by a community member, but if the need is extreme, residents can reach out to a more appropriate service.

A precedent of this system can be found in Chile called "Programa Plan Cuadrante de Seguridad Preventiva (PCSP)" which was established by Chilean Police office in the late nineties. The benefit of community calling systems allows for direct and timely response to a vulnerable person. In a heat wave, a calling system has the potential to quickly identify an affected person and their need, and deliver a resource in a timely matter. If further formal assistance is required, the community member can call emergency services and hold the owner/landlord accountable for meeting the building level hazard mitigation criteria.

A potential outcome may be that tenants are empowered to perform some of these building maintenance chores. FEMA implements a building checklist within their Hazard Mitigation Grant Program in order to determine the award for funding (FEMA). Our suggestion focuses on a building checklist that can be administered at a local scale and action items are held accountable by the tenants.



NYCEM Preparedness guide for students

# 2.0 COMMUNICATION & COALITIONS

### 3.1 Advocate for and support locally organized wellness centers in all recovery shelters.

We recommend that NYCEM recognize and support the capacity of community and arts organizations to organize creative recovery processes, and direct resources and funding to the functions of these community organizations so foundational to equitable recovery efforts.

One highly successful model of this is The Arts + Democracy Project. This organization was invited by Councilman Brad Landert to organize the infrastructure and programming for the wellness center in the Park Slope Armory shelter post Superstorm Sandy. This allowed local organizations and volunteers to create a temporary community hub for displaced residents. The wellness center drew on community networks, strong relationships with city agencies, and artists and volunteers from across the city to provide wellness and religious services. The programming included musical and theatrical performances and film screenings, exercise and massage to address pain from sleeping on cots, a Veterans Day commemoration, therapy dogs, and AA meetings, among others. In the paper, "Creative Recovery and Cultural Resiliency," Caron Atlas describes her experience as the director of the project. This recommendation is informed by our interview with Caron Atlas, director of Arts and Democracy Project.

### 3.2 Partner with organizations that foster socially restorative processes.

Emergency events often magnify existing inequalities and for those impacted the most, the recovery process is a long and burdensome one. Social resources too often overlooked in hazard mitigation planning are essential in advancing a more equitable recovery and more resilient communities. We recommend that NYCEM partner with organizations that aim to foster socially resilient communities.

Rebuilding Together, a national nonprofit organization that works in communities with volunteers and private partners to repair and rebuild homes in times of need and in post-disaster events, provides one such opportunity. The new headquarters building recently expanded into a 4,400 square foot space in Gowanus, which also provides job training programs and certification programs for construction and custodial employment. Partnerships with organizations like Rebuilding Together would allow Emergency Management to help foster equitable rebuilding efforts in the aftermath of hazard events. This recommendation is informed by our experience at a Red Hook Initiative event where we were able to meet a representative of Brooklyn Rebuilding Together.

### 3.3 We recommend that Emergency Management embed the functions of their Toolkit within existing community-level structures.

Many non-profit, art, and community groups successfully take the lead in disaster recovery and response efforts. The impacts of this work has been incredibly significant. However, there is a disconnect between these efforts and the community-oriented work of Emergency Management. If the toolkit became a part of existing community efforts and events, the toolkit's reach and therefore impact could be significantly increased, bringing hazard mitigation and expertise to the community level. There are many possible paths Emergency Management could take to implementing this. From more fully embedding Community Emergency Response Teams (CERT) within community groups. To including NYCEM Planning and Hazard Mitigation Planning Staff in community outreach meetings and events. As we have seen in Gowanus, many different community groups are already actively involved in disaster response and hazard mitigation planning, such as Arts & Democracy with the Park Slope Armory Shelter, Gowanus Studio Space, Fifth Ave Committee, and the Red Hook Initiative. However they would greatly benefit from the expertise of NYCEM, as well as guidance on how to access additional resources to support their work. The toolkit could allow this.



NYCEM-led Community Emergency Response Teams



Resource distribution at Red Hook Initiative

# 3.0 CONNECTING COMMUNITIES & CITY AGENCIES

### *3.4 Support CERT teams for NYCHA residents.*

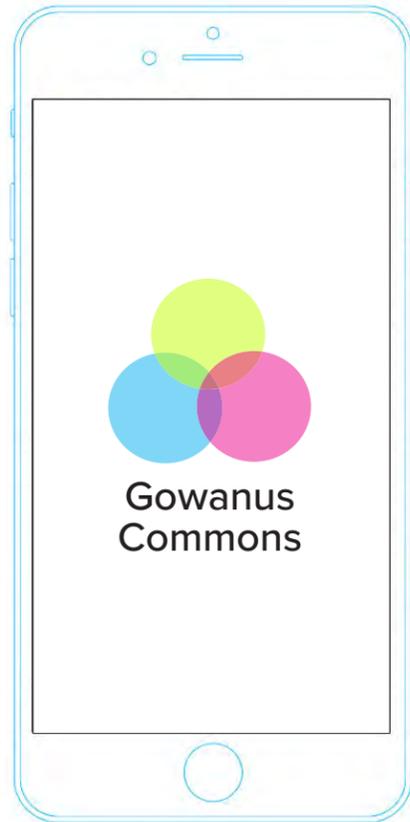
In an effort to integrate NYCHA into the community response network, we recommend that NYCCEM design a policy and implementation campaign to support CERT teams for NYCHA residents.

This would help provide emergency support to a population who has not been adequately planned for. Currently, emergency responders are limited in being able to help NYCHA residents with disability, access and functional needs. In order to be able to receive assistance in evacuation or other emergency related response before federal agencies arrive, NYCHA residents must submit a 'voluntary emergency response form' to management which is said to be registered on a resident portal. However, this process has not been fully developed and implemented due to a lack of coordination among building managers and NYCHA administration which leaves Gowanus' most vulnerable NYCHA residents unnecessarily burdened in the next emergency event. This recommendation is informed by our interview with Karen Blondel, director of Turning the Tide (T3).

### *3.5 We recommend that a Community Hazard Mitigation Task Force be formed comprised of members of community based organizations housed within the local Community Board.*

Hazard mitigation addresses many issues that fall under the Community Board's areas of responsibility—land use and zoning, service delivery; city budget planning; as well as community advocacy—and yet it is not a part of most Community Board efforts. This task force, situated within Brooklyn Community Board 6, would formally recognize the extensive networks and capacities that already exist within the partner organizations, bringing a level of leadership and accountability to this work that would bridge many different organizations. Among other things, the task force would organize the advocacy for hazard mitigation infrastructure and programs for response, recovery, and long-term resilience.

This task force would recognize, and work within, the extensive networks and capacities already embedded within the Gowanus community and form a direct connection with the efforts of Emergency Management.



Visit Gowanus Commons Prototype @ [bit.ly/2KnvvAG](https://bit.ly/2KnvvAG)

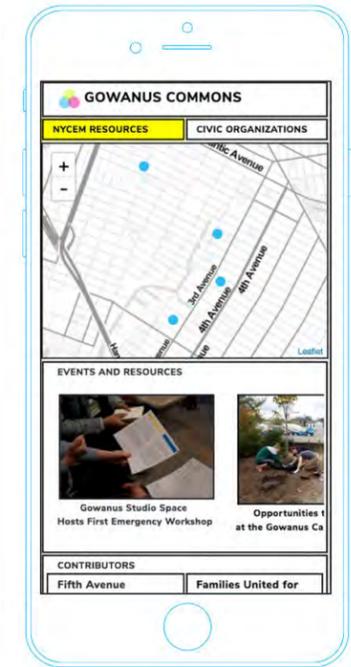
Finally, we have developed a proposal which seeks to leverage technology to be able to inform policies through democratic processes. The proposal, Gowanus Commons, expands on the technological aspects of Notify NYC Alerts, and the Ready NYC app that Emergency Management has developed. However it transforms these from unidirectional conduits of information to an exchange between city agencies and communities. Gowanus Commons aims to facilitate the implementation of resources and activities that foster imagination and improvisation in communities, to be “a living toolkit” for hazard mitigation. It aims to encourage redundancy, synergy, and collaborative work between existing community networks and coalitions to “plan, live, and imagine” together for better outcomes from disaster.

Gowanus Commons is a web-based application that connects Emergency Management with communities. The platform has two sides, one for civic organizations, and one for Emergency Management. We propose that the Commons would be hosted by Emergency Management, who would be responsible for maintaining resources both neighborhood-specific and city-wide. The Commons would form a direct link between Emergency Management and civic organizations through the Hazard Mitigation Task Force. The Task Force and its members and member organizations would be responsible for populating information on the Civic Organizations side.

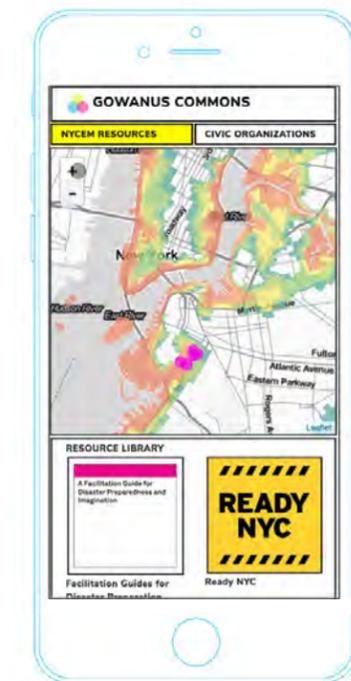
The Commons, which could be piloted in Gowanus but expand to include individual sites or pages for many neighborhoods in New York City, is designed to be able to host a number of different types of resources. An interactive map forms the central component of both sides of the app. On the community side, the map displays key events and initiatives that have been launched by neighborhood groups. This would include planned and implemented hazard mitigation projects, information about workshops and other community events, as well as the locations of all organizations currently engaged with hazard mitigation in the neighborhood. Each of the items listed in the map would be collected in a scrollable library and archive. Below the community resource library is a listing and catalog of contributors which serves to connect groups working in the community, as well as to visualize for NYCEM and other outsiders the social networks for disaster response and hazard mitigation at work in the neighborhood.

On NYCEM’s side the map displays important information related to risk, such as evacuation zones, as well as community input gathered from preparedness workshops. Below the map is a centrally located library of community hazard mitigation resources: facilitation guides developed for specific groups, the community toolkit, educational materials targeted at children, as well as individual and household-level preparation tools.

Gowanus Commons is a space and a rallying call for community participation in the hazard mitigation process. It would be the motivation for the work of the community board task force and it would be a way for Emergency Management to continue to know about community-level hazard mitigation work.



CIVIC ORGANIZATIONS



INSTITUTIONAL RESOURCES

# 4.0 GOWANUS COMMONS

## ***Appendix***

01. Bibliography

02. Facilitation Guides

03. Virtual Interviews Results

04. Flooding Impact Calculation

05. Gowanus Flooding Hazard Profile

# 01. Bibliography

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# 02. Workshop + Facilitation Guides

Appendix 03 showcases the Facilitation Guides which were designed and implemented in a Workshop on with members of the Gowanus Studio Space on Thursday, April 5th, 2018 during one of their regularly scheduled committee meetings.

The facilitation guides were designed to be utilized in a group settings in order to foster communication and improvisational thinking within conversations surrounding disaster preparedness and hazard mitigation. Additionally, these guides were designed

to be utilized by people who may not be familiar with these topics already.

Users of the guides would first choose their scenario (A, B or C, all of which are based of the "Practice your Plan" scenarios found in the back of NYCCEM's Toolkit). Next, the participants move through the phases (Speculate, Improvise and Adapt), working collaboratively to answer questions and recording their answers within the blank pages adjacent to the questions.

## 1. Speculate

Imagine, as fully as you can, where you would be and what is around you when your scenario happens.

What worries you the most?

What are the first ways your everyday life would be changed by this scenario?

What would emerge as your most pressing need or vulnerability?

Discuss with your group in 3 minutes. Designate a notetaker to document your conversation (bullet points are fine, spelling doesn't matter)

## Choose Your Scenario...

Scenario A	Scenario B	Scenario C
<p>It is Thursday in the late afternoon, in July.</p> <p>Last Saturday the heat index had exceeded 100 degrees for the third day in a row. Meteorologists predicted these conditions to continue for the next four days. The City, in partnership with public facilities, opened cooling centers across the city.</p> <p>Then, on Monday the temperature hit 106 degrees, and the heat index soared to 126 degrees. You learned that there have been 144 fatalities directly related to the heat wave, the power in your neighborhood went out.</p> <p>Now, on Thursday as it approaches evening, power outages grip the entire city. The death toll has climbed above 700. The MTA announces the closure of all subway terminals due to dozens of heat-related deaths in the tunnels. Due to the increased demand for services and gridlocked traffic, ambulance responses are delayed up to two hours.</p>	<p>It is Saturday evening, in August.</p> <p>On Thursday just after 4pm, a power surge caused tens of millions of people to lose electricity. All train service in New York City was suspended, including commuter rail and subways. Thousands of commuters are stranded.</p> <p>By Friday in the middle of the day, the power was still out. The city is gridlocked, cell service is disrupted, but landlines are working. In one day there have been 60 major fires, caused mostly by candles. The FDNY answered over 7,500 calls which pertained to 4,000 individual events that they responded to. Because all buildings over 5 stories tall require electric pumps to access water, most high-rise buildings do not have access to water.</p> <p>It is still unclear when the power will come back on and there are reported deaths due to carbon monoxide poisoning from generators.</p>	<p>It is Monday morning in January.</p> <p>Last week weather forecasters announced that a winter storm, potentially a blizzard, was expected to impact the Northeast Friday through Saturday. By Thursday the forecast confirms that there will be at least 10 inches of snow, officially a blizzard.</p> <p>On Friday night, the Mayor banned non-emergency travel. All MTA services stop. The Port Authority closes bridges and tunnels in the region. By Sunday the total snowfall is over 26 inches.</p> <p>There are widespread power outages in Long Island and other areas surrounding New York City. The City reminds residents never to use gas, kerosene, propane space heaters, charcoal, or grills to heat their properties. Media sources announce that multiple people have died from shoveling snow.</p>

## 2. Improvise

After hearing how this scenario would impact your partner the most, what (knowledge/resources/skills/tools/people/past experiences) could you draw on to help meet their most pressing need?

In what ways might you be able to offer assistance to your partner?

Discuss with your group in 3 minutes. Designate a notetaker to document your conversation (bullet points are fine, spelling doesn't matter)

### 3. Adapt

Imagine that your scenario is now resolved, and everyday life has resumed.

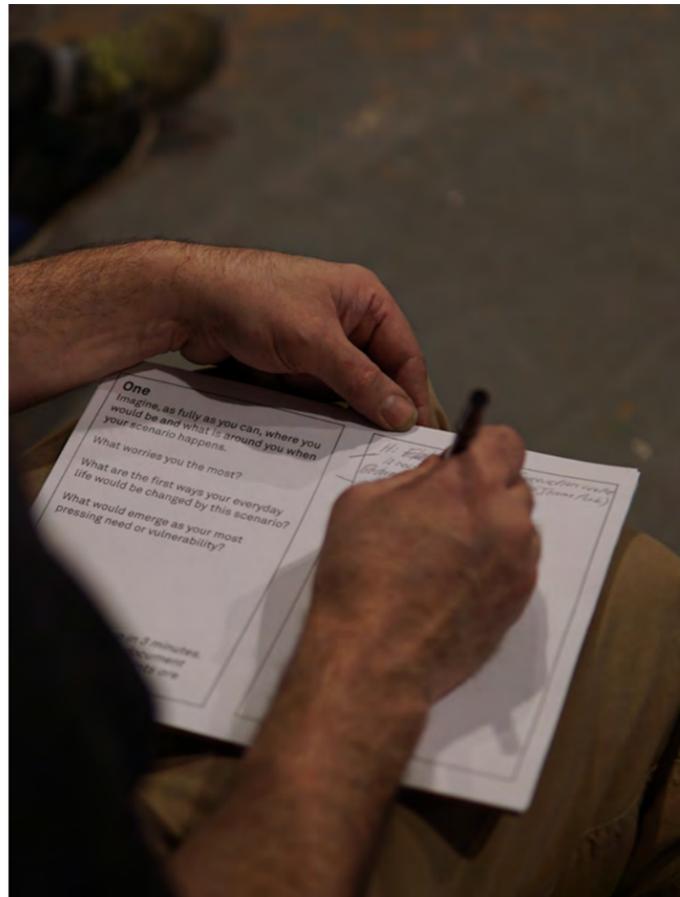
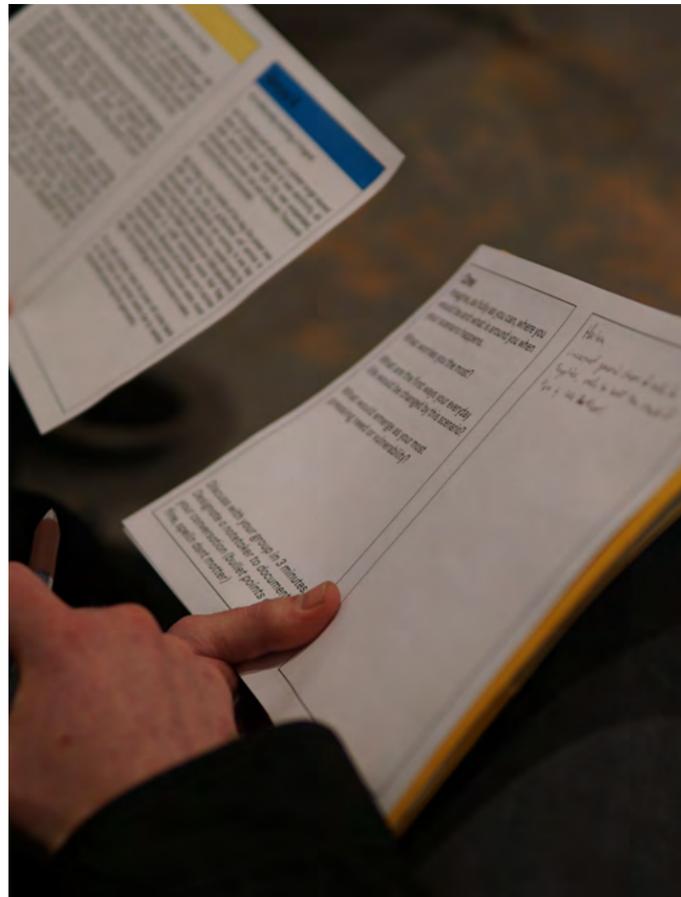
What would some of the lasting impacts be from the kinds of assistance you and your group members were able to offer one another?

What are ways, even without a disaster, that these forms of powerful community support and reliance could be put in play?

Discuss with your group in 3 minutes. Designate a notetaker to document your conversation (bullet points are fine, spelling doesn't matter)

Blank space for notes.

Blank space for notes.

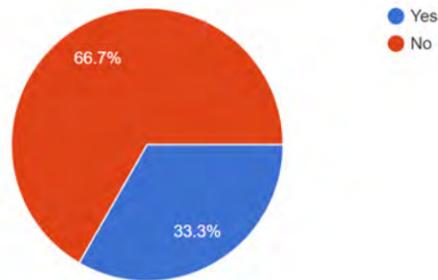


# 03. Virtual Interviews

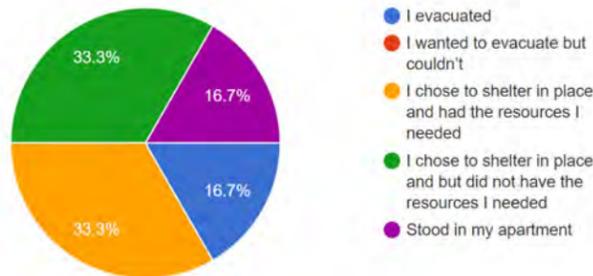
Appendix 2 contains the results of our virtual interviews. It is important to note that these results have been edited to remove personal identifying information (this information was not asked for, but occasionally volunteered by participants within the long answer responses). Invitations to participate in

virtual interviews were sent out on Tuesday, March 27th, 2018 and the platform closed to responses on Sunday, April 22nd, 2018. In total eighteen virtual interviews were collected all of which were kept anonymous for logistical reasons.

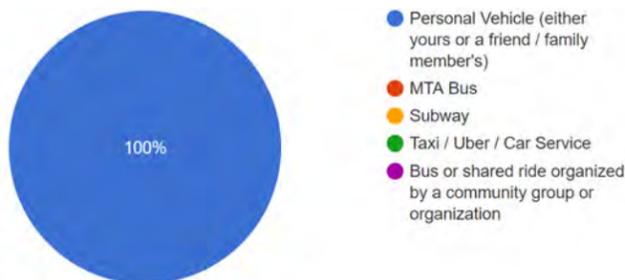
## 1. Were you a resident of Gowanus during Superstorm Sandy? (18 Responses)



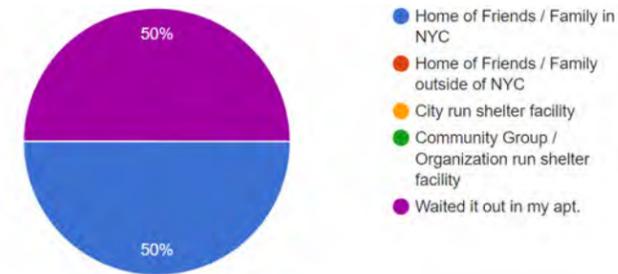
## 2. What did you do to prepare for the storm? (6 Responses)



## 3. What transportation mode did you use to evacuate? (2 Responses)

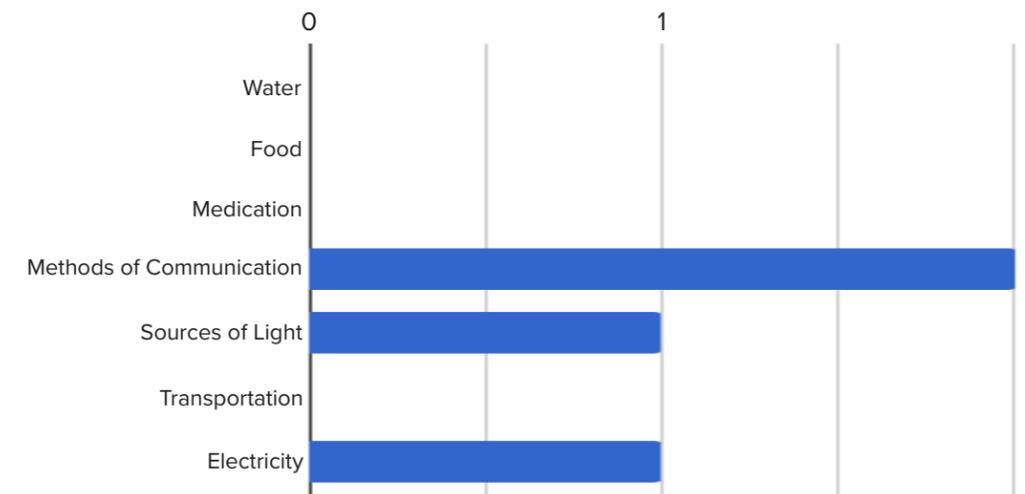


## 4. Where did you evacuate to? (2 Responses)

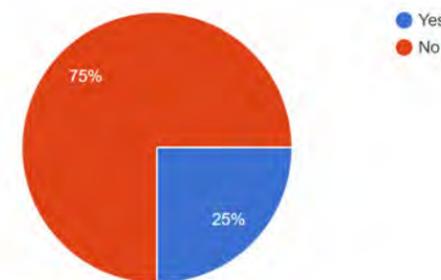


2

## 5. What resources did you lack while sheltering in place during Sandy? (please check ALL that apply) (2 Responses)



## 6. Were you an EMPLOYEE and / or BUSINESS / PROPERTY OWNER in Gowanus during Superstorm Sandy? (6 Responses)



**7.** If there are any stories or experiences that you had during Superstorm Sandy which you believe we could learn from, please share them below: (4 Responses)

“I [was working with] the Gowanus Canal Conservancy during Hurricane Sandy. Since I lived nearby in Brooklyn, I helped clean our stewardship site that was flooded with over a foot of water. However many of my peers could not travel to their [work sites], so they used the opportunity to volunteer and help those affected by the hurricane - it was a large and enthusiastic disaster response workforce that became a positive outcome of not being able to attend (to) their [normal work].”

“We live in an old industrial loft building one block from the canal. Our basement remained flooded for weeks, landlord didn’t have the wherewithal to pump it out. We had no heat or electricity until the day after Thanksgiving. Electric and gas meters were replaced in the basement, rather than raised up above flood level.”

“Gowanus Studio Space... was spared flood damage and instead became a donation drop-off location for the weeks that followed and organized a fundraiser almost immediately after the storm. [Gowanus Studio Space] also hosted meetings for other groups of local artists to plan actions/responses. The drop-off center worked because we were able to pre-sort the donations and make sure they were useful before shipping them out to Rockaway. We could also target our requests to our audience. The fundraiser generated over \$1000 in cash that went to specific individuals and groups in Rockaway that were able to use it right away (vs. the bigger organizations/operations).”

“The experiences are from the perspective of a nonprofit organization that owns and manages affordable housing for low and moderate income tenants in Gowanus and in South Brooklyn and whose main office is in Gowanus. Many of our tenants refused to evacuate despite our doing door to door outreach and urging folks to go to a shelter. Their reluctance is understandable given that several are formerly homeless and had bad experiences with ‘shelters’.

Our staff were the first responders in the buildings we manage. Two buildings in Gowanus and two in Red Hook lost power for several days/weeks (depending on buildings). Other buildings lost heat. We had to temporarily relocate tenants from Gowanus to other properties since the electrical outage lasted more than two weeks.

Our property management staff is accustomed to handling weather related emergencies but Sandy had a more profound and longer-lasting impact that required our entire organization and external partners to support. Our relationships with our local vendors were key to getting our properties up and running weeks faster than other local buildings that were impacted and we were able to then become spaces that other local community residents were able to go to.

Also, our staff and local leaders delivered food, water and medicine to public housing residents in Gowanus Houses who lost electricity and therefore the ability to use the elevators. Many senior and wheelchair bound individuals were trapped and needed help getting basic needs met. The community rallied to help each other. Having strong connections with our neighbors, local groups and businesses was key to addressing and mitigating the immediate impact of the storm.”

**8.** How would your preparation and/or response during Hurricane Sandy change given what you have learned from your experience during the storm? (4 Responses)

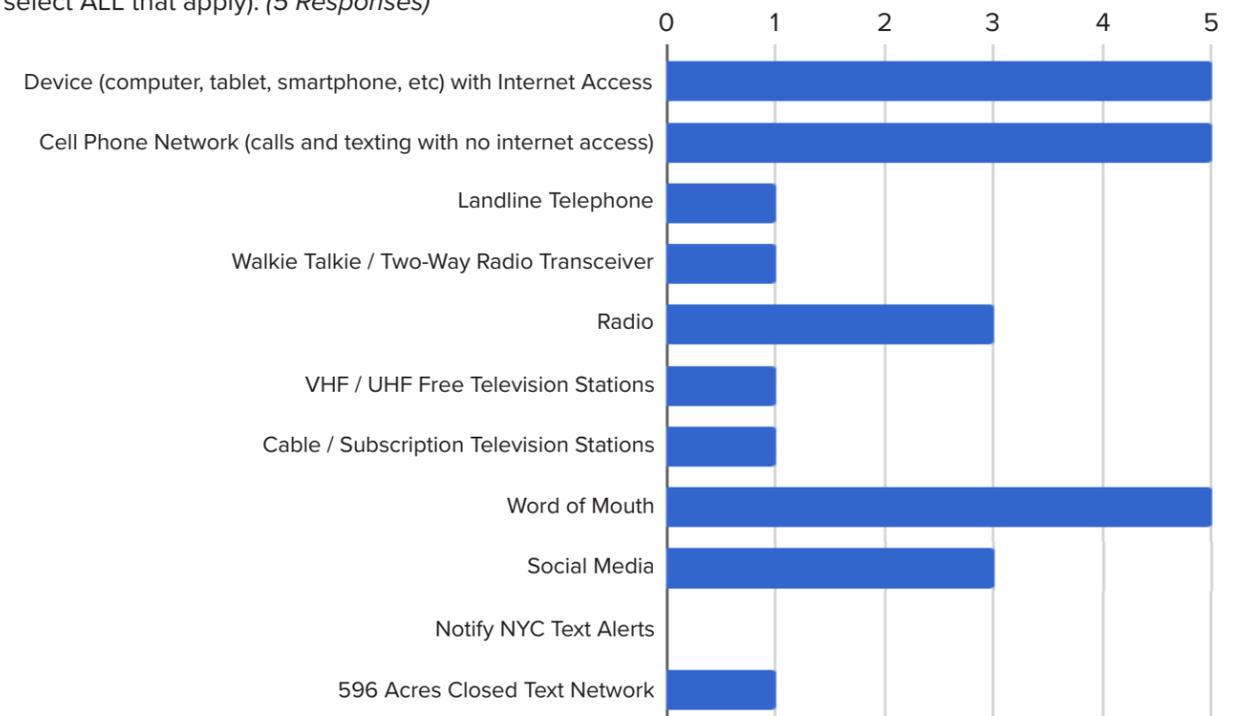
“I would have made sure to fully charge my cellphone and stored more drinking water.”

“We’d still have to do the same: evacuate and wait for repairs”

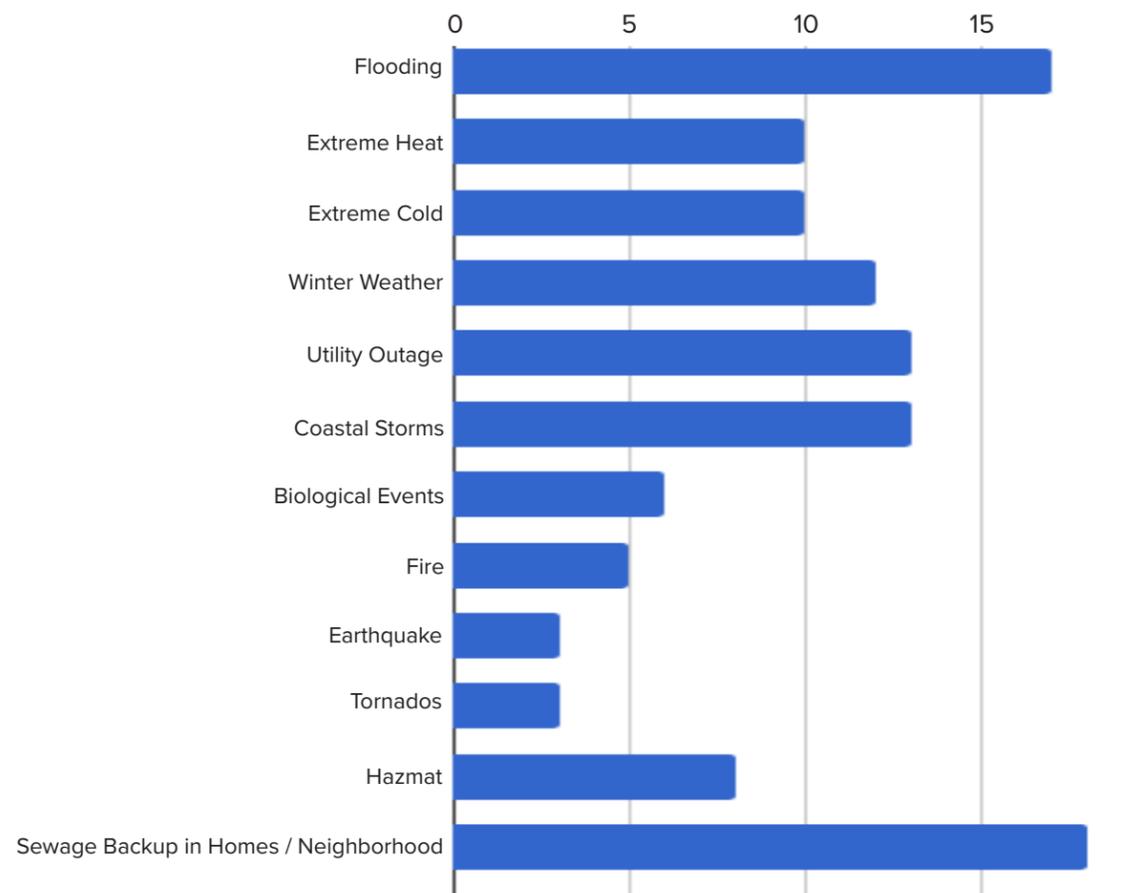
“I am not sure it would. We were an existing community of people who had local resources that we could use to assist others. We tapped into our networks (596 Acres, Occupy, GSS members, & friends) to do what we can. It felt much more direct with more accountability than the Red Cross or even Occupy Sandy.”

“We now have more formal plans in place to handle disasters and do regularly disaster preparedness workshops and reminders for the community and our tenants. Gowanus - as a community though- is still in need of a formal disaster plan.”

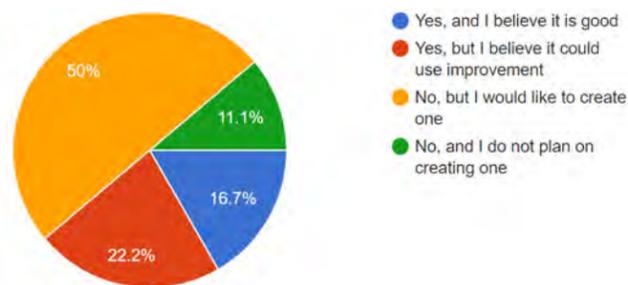
**9.** What methods / tools did you have access to for communication and information during the storm? (please select ALL that apply): (5 Responses)



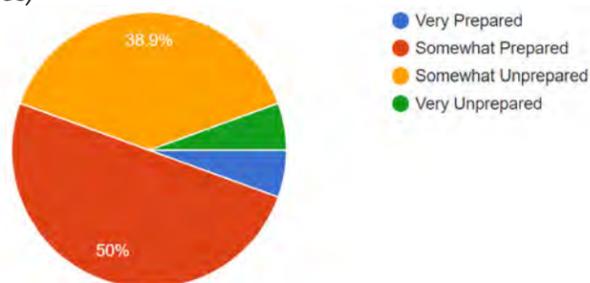
**10.** The following disasters have been defined by NYC Emergency Management and our organization as being relevant to New York City. Please select the ones which you feel are relevant to Gowanus (please select ALL that apply): (18 Responses)



**11.** Does your family / household / business have an emergency plan? (18 Responses)



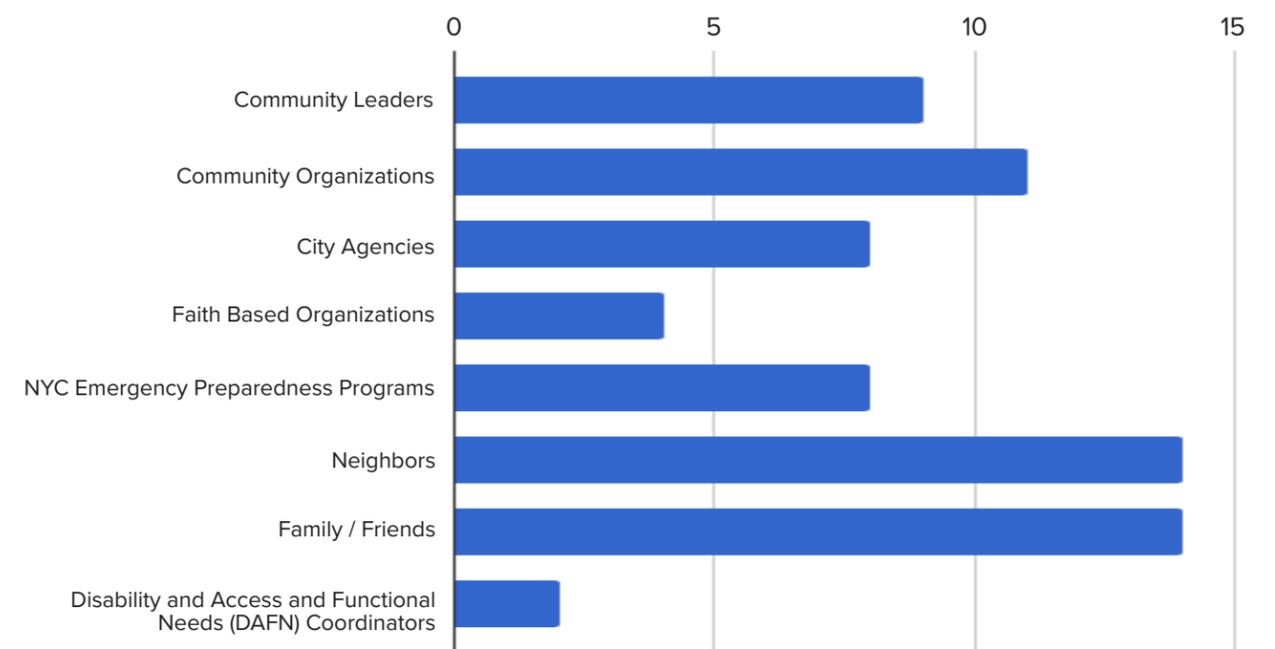
**12.** How prepared would you feel if an emergency situation were forecast for Gowanus in the near future? (18 Responses)



**13.** If an emergency situation were forecast for Gowanus in the near future, what tools / resources / information would you need from official community or city agencies to increase your level of preparedness? (13 Responses)

- “transportation, funds, food, shelter”
- “Where to go in case there was a hurricane with flooding”
- “More reminders about being prepared even when an emergency is forecast.”
- “Free emergency go bags or kits”
- “clear evacuation protocol and a way to drive my car without insane traffic”
- “The Notify NYC text alerts are super helpful.”
- “Don’t know”
- “Help with building resiliency preparation, more help pumping out, restoring electric and gas.”
- “Shelter locations, public transit status, ways/places to help out for able-bodied folks”
- “Not sure.”
- “Real time updates on weather conditions, travel conditions, mass transit updates”
- “Emails and texts”
- “The Gowanus Wi-Fi Mesh network that we will be installing by fall 2018 and that should be further expanded in Gowanus. Cooperation from NYCHA, community center locations within NYCHA, food/water/medicine, independent source of electricity and much more. Gowanus should have a formal disaster plan.”

**14.** Who would you turn to in your community in an emergency situation? (select ALL that apply) (18 Responses)



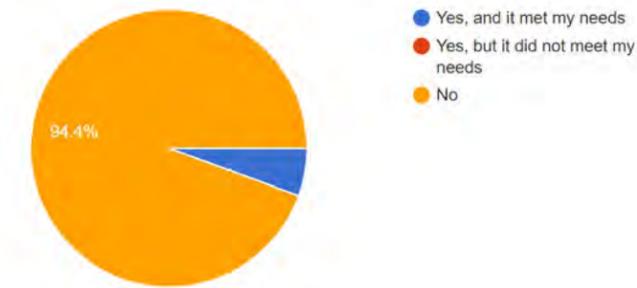
**15.** If you selected one of the first five options above (Community Leaders, Community Organizations, City Agencies, Faith Based Organizations, and/or NYC Emergency Management Preparedness Programs) please specify which person/organization/program: *(10 Responses)*

- “Fifth Avenue Committee, Red Hook Initiative, Red Hook West Resident Council”
- “RHI, RH Justice Center”
- “Notify NYC text alerts”
- “Again dont know”
- “311, WNYC”
- “Stephen Levin’s office”
- “Brad Lander’s Office, Fifth Avenue Committee”
- “Councilmember, DEP, CB6”
- “NYC OER, local elected officials, FAC”

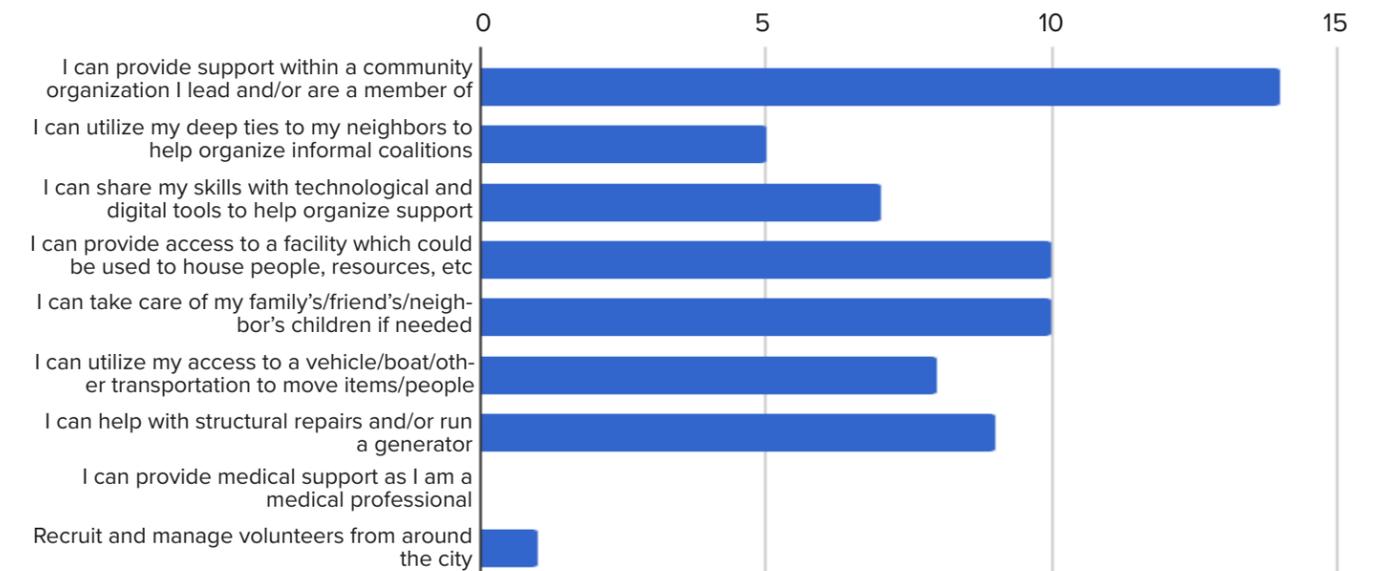
**16.** What neighborhood spaces do you spend the most time in aside from your home and work? (this can include anything from your local library or community center to your favorite coffee shop or other local business): *(16 Responses)*

- “Parks (2)”
- “Red Hook Initiative, Red Hook Library, Fifth Ave Committee Community Room”
- “Community center”
- “Mostly another borough ex: Manhattan”
- “All organizations in red hook”
- “coffee shops, bars, market”
- “None, other”
- “local yoga studio”
- “Local art studio- gowanus studio space”
- “GSS”
- “Gowanus Studio Space”
- “Artist studio”
- “Community grassroots meetings”
- “Painting studio”
- “Several local restaurants and bakeries, Thomas Greene Park”

**17.** Have you ever utilized a heating or cooling center in your community? *(18 Responses)*



**18.** In the immediate aftermath of disasters residents and community members can play an active role in the recovery effort -- often in very creative ways. With that in mind, please identify which of the following YOU could do in an emergency situation (please select ALL that apply) *(17 Responses)*



**19.** Do you have adequate air conditioning (A/C) and/or adequate heat in your home? (please select ALL that apply) *(17 Responses)*



# 04. Flooding Impact Calculations

## Flooding Event Impacts on the Built Environment

The table below shows various features of the built environment and their respective impacts during a specific flooding hazard. Looking at the how residential units, buildings, and mobility aspects of Gowanus are affected during the different flooding events, we can create policy and physical interventions that limit the impact of this. Here we see the percentages of the different items are affected, and that there is substantial impacts on Gowanus' physical fabric in regards to mobility and housing.

Different Flooding Events' Impacts on the Built Environment

Flooding Event	% Bldgs	% Resi Units	Basements	Bus Stops	Subway Entrances
100yr	11.45%	1.93%	11.44%	18.75%	16.67%
500yr	31.57%	43.83%	30.66%	34.38%	16.67%
Sandy Inundation	9.62%	2.34%	14.50%	12.50%	0.00%
Cat 1 Storm Surge	6.11%	0.51%	4.83%	3.13%	0.00%
Cat 2 Storm Surge	30.13%	43.63%	29.25%	21.88%	16.67%
Cat 3 Storm Surge	49.97%	69.82%	49.88%	46.88%	16.67%
Cat 4 Storm Surge	66.54%	83.44%	65.33%	87.50%	50.00%
Evac Zone 1	12.28%	1.57%			
Evac Zone 2	38.85%	70.53%			
Evac Zone 3	6.11%	1.16%			
Evac Zone 4	11.01%	10.21%			
Evac Zone 5	21.12%	11.64%			
Evac Zone 6	10.67%	4.93%			
<b>Total Bldgs</b>		<b>Total Residential Units</b>	<b>Total Bus Stops</b>	<b>Total Subway Entrances</b>	
1799		11078	32	6	

# 05. Gowanus Flooding Hazard Profile

This mock-up could potentially act as a community specific hazard profile. The template would aim to deliver nuanced and specific information regarding a specific hazard, and on the back, outline specific recommendation to reduce risk.

## Flooding Hazard

### Gowanus

#### Coastal Flooding

The cause of Coastal Flooding is mostly due to storm surge. Gowanus is a coastal community in a low-lying area that makes it vulnerable to flooding by seawater.

#### Tidal Flooding

Tidal Flooding is caused by the natural variations in changing tides based on the lunar cycle. This type of flooding hazard will become more severe as sea levels are projected to rise.

#### Inland Flooding

Inland Flooding is due to heavy rainfall and large scale storms. The lack of street trees, open space, and heavy industrial use provide a built environment that limits the ground's capacity to absorb water.

### Consequence

#### Built Environment

##### Presence of Basement

Utilities are often located in basements, where water inundation can limit access to heat and electricity. 47% of Gowanus Buildings have basements, 98% of which pre-date 1980, meaning there is a higher chance that utilities are located in them.

#### Superfund Site

The Gowanus Canal is a designated superfund site. The contamination of the canal includes PAHs, VOCs, PCBs, pesticides, & metals. Water inundation in Gowanus from the canal is a extreme public health concern, including dysentery, e.coli, giardia, cancer, & arsenic poisoning.

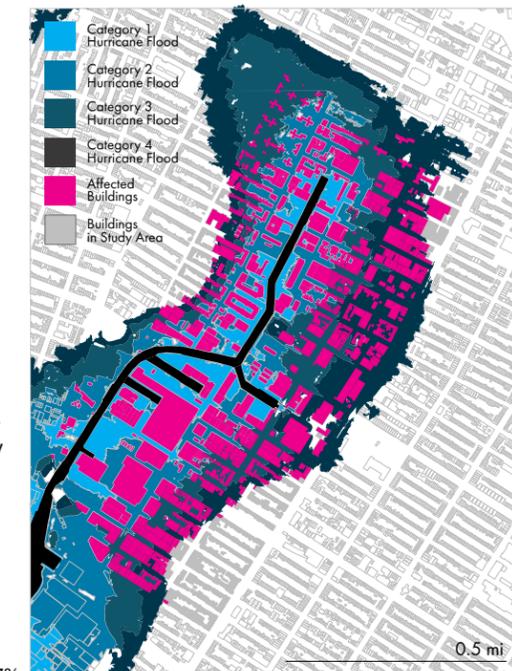
#### Combined Sewer Outfall

The overflow of raw sewage into the canal, and potentially the neighborhood, can be spurred by a rain event producing only 1" of precipitation. Public health concerns associated with raw waste are apparent.

#### Residential Development

Resilient development standards for new residential development in the neighborhood can create green infrastructure limiting the impacts of flooding.

### Location



### Risk Probability

	% Bldgs	% Resi Units	Basements
100 Year Flood	11.45%	1.93%	11.44%
500 Year Flood	31.57%	43.83%	30.66%
Sandy Inundation	9.62%	2.34%	14.50%
2020 Sea Level Rise			
Cat 1	6.11%	0.51%	4.83%
Cat 2	30.13%	43.63%	29.25%
Cat 3	49.97%	69.82%	49.88%
Cat 4	66.54%	83.44%	65.33%

### 2050 Sea Level Rise

### Social



See Flooding Recommendations →

The Community Strategies for Hazard Mitigation in Gowanus, Brooklyn report was completed by a project team of eleven M.S. in Urban Planning students from the Columbia University Graduate School of Architecture, Planning, and Preservation as a part of the Spring 2018 Studio curriculum.

The report was designed using Adobe Creative Cloud and is set using the Proxima Nova family.

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