Resilient Neighborhoods

Sheepshead Bay

NYC PLANNING

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Sheepshead Bay Road

Resilient Neighborhoods

Sheepshead Bay

THE CITY OF NEW YORK
MAYOR BILL DE BLASIO

DEPARTMENT OF CITY PLANNING
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www.nyc.gov/resilientneighborhoods

FOREWORD

Sheepshead Bay is a waterfront community in Brooklyn with a long history of attracting New Yorkers to its shores for an array of recreational activities. From its early beginnings as a summer retreat with hotels and recreational fishing, to its identity today as a vibrant residential community, the neighborhood is deeply connected to the waterfront with numerous yacht clubs and marinas. Flooding from coastal storms is a common occurrence in much of the area. However, Hurricane Sandy in 2012 was much more severe than anything that had happened before, or in any storm since.

The Resilient Neighborhoods initiative was launched by the Department of City Planning (DCP) shortly after Hurricane Sandy. This report is the culmination of over three years of research, outreach, and hard work by DCP, working closely with floodplain residents, businesses, and local leaders to identify strategies to reduce flood risk and build a more resilient and vibrant neighborhood.

This report includes recommendations for updating specific zoning and land use regulations, as well as investments in coastal infrastructure and other programs. The conclusions of this report will guide updates to the citywide flood resiliency text amendment that DCP is currently developing.

This plan is the beginning of a conversation and a commitment to work with Sheepshead Bay to ensure the community's ongoing vibrancy and resiliency.

Marisa Lago
Department of City Planning

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EXECUTIVE SUMMARY

Hurricane Sandy's devastating impacts on New York City served as a vivid reminder of the city's vulnerability to coastal storms and flooding. With climate change, storms like Sandy are expected to increase in frequency and severity in the future, putting New Yorkers living and working on the waterfront at even greater risk. Yet, as Sandy also demonstrated, resilient building design can significantly reduce the damage caused by flooding and enable homes and businesses to be reoccupied sooner. By combining resilient building with careful land use planning and strategic investment in infrastructure, the city can adapt to challenging environmental conditions over time and create neighborhoods that are both vibrant and able to withstand and recover quickly from future floods.

Resilient Neighborhoods is a place-based planning initiative, led by the New York City Department of City Planning in collaboration with communities and other agencies, to identify strategies for the continued vitality and resiliency of ten neighborhoods in the city's floodplain. This report provides details on Sheepshead Bay in Brooklyn.

Sheepshead Bay was selected for this study because of its vulnerability to flooding from coastal storm surge and unique built form. The area includes a diverse array of lot sizes and building types ranging from small sunken bungalows to large retail spaces and multi-family apartment buildings. These typologies raise numerous challenges in meeting federal floodproofing standards under existing zoning.

Resilient Neighborhoods has been guided by three primary goals, each with a set of strategies designed to address resiliency-related issues in Sheepshead Bay:

Reducing flood risk

Modify zoning provisions to provide flexibility to homeowners seeking to retrofit and floodproof existing buildings and encourage new development to be more resilient.. Develop zoning changes to ensure that existing buildings and new developments can comply with resiliency requirements.

Planning for adaptation over time

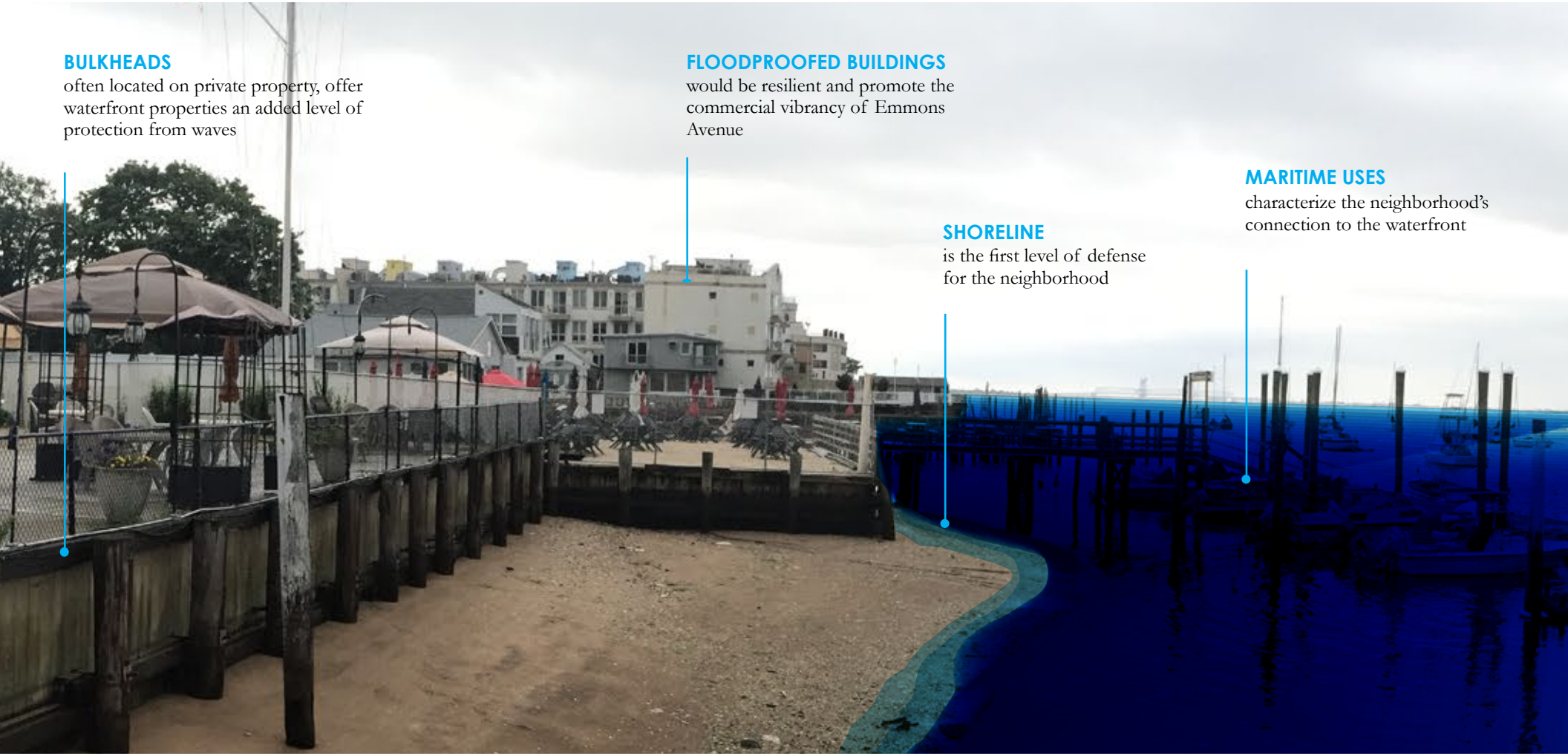
With projected climate change and associated sea level rise, flood risks are expected to increase in Sheepshead Bay over time. To improve the neighborhood's longterm resilience against these increasing risks, DCP will work to advance coastal protection strategies. DCP is coordinating with partner agencies and the U.S. Army Corps of Engineers on long-term flood protection strategies at both the neighborhood scale and within Jamaica Bay.

Creating resilient, vibrant neighborhoods

Promote residential and commercial vibrancy by supporting active streets and local businesses. DCP is developing design strategies for commercial corridors in the floodplain that mitigate flood risk while maintaining active retail uses and strengthen historic waterfront communities like Sheepshead Bay. DCP is also working with partner agencies such as Small Business Services to increase the capacity of local businesses in the floodplain.

In addition, this report provides a detailed description of the outreach, research, and analysis conducted, as well as an overview of the planning framework and regulatory context for these efforts. A glossary of key terms is provided following the conclusion.

The recommendations outlined in this report include specific actions to be undertaken in the short-term, as well as broader strategies that can guide an ongoing response to evolving risks and changing conditions, to promote equity, livability, and safety.


BULKHEADS
often located on private property, offer waterfront properties an added level of protection from waves
FLOODPROOFED BUILDINGS
would be resilient and promote the commercial vibrancy of Emmons Avenue
SHORELINE
is the first level of defense for the neighborhood
MARITIME USES
characterize the neighborhood's connection to the waterfront

Resiliency Planning in New York City

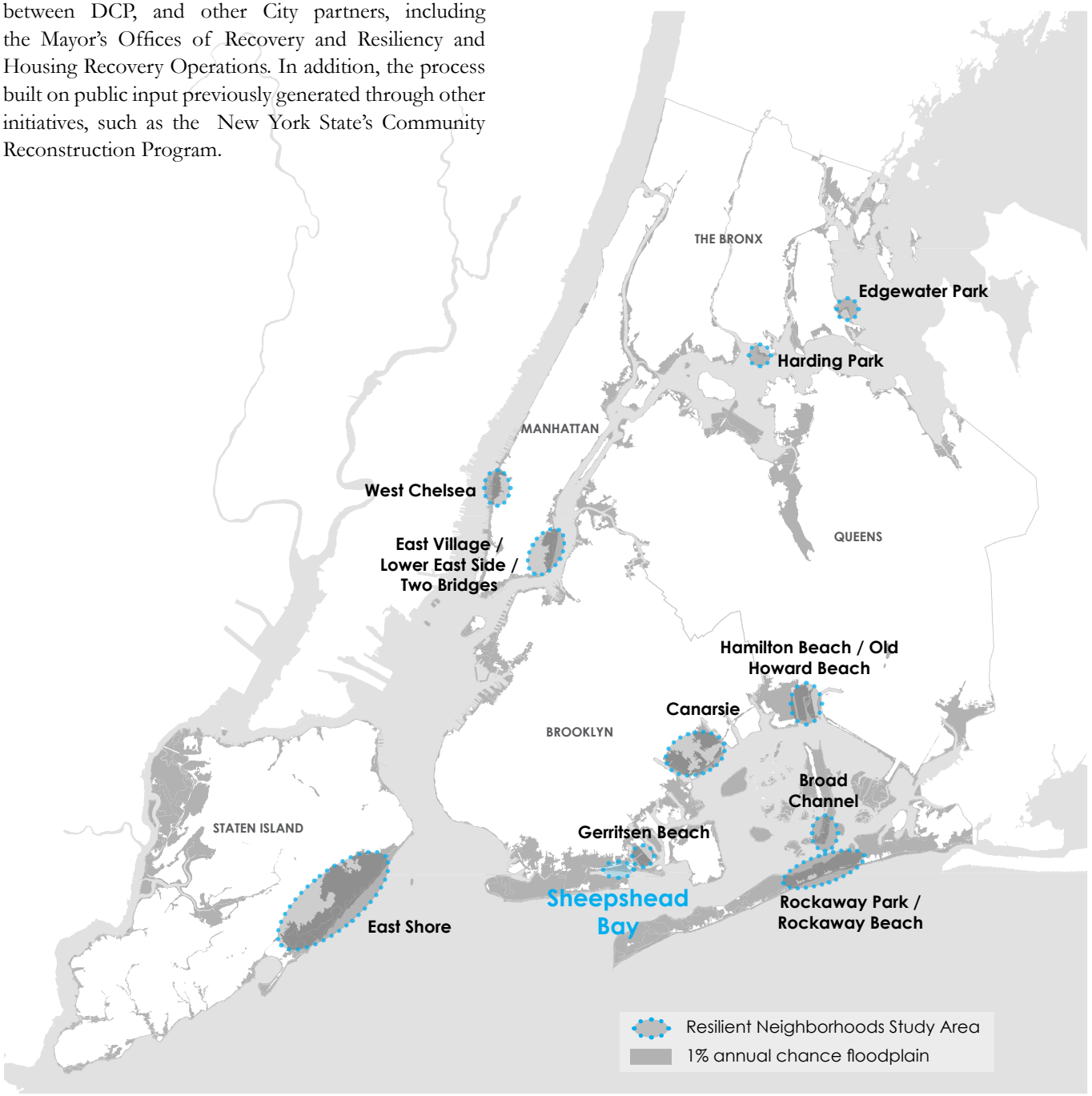
Following Hurricane Sandy in October 2012, the City developed *A Stronger, More Resilient New York*, which laid out a detailed action plan for rebuilding post-Sandy and making the city's coastal communities, buildings, and infrastructure more resilient in the long-term. The City has made significant progress implementing the plan, including funding a $20 billion climate resiliency program, advancing housing recovery through the Build it Back program, and making long-term resiliency a reality by investing in infrastructure upgrades. Drawing on this work and earlier planning efforts, the City released in Spring 2015 *OneNYC: The Plan for a Strong and Just City*, a long-term strategy to address the city's most pressing challenges, including a rapidly growing population, rising inequality, aging infrastructure, and climate change.

Resilient Neighborhoods

One of the projects described in *OneNYC* is Resilient Neighborhoods, a place-based planning initiative to identify tailored strategies, including zoning and land use changes, to support the vitality and resiliency of communities in New York City's floodplain. Based on collaboration with residents, stakeholders, elected officials, and other City agencies, the initiative focuses on ten study areas located in all five boroughs that represent a variety of demographic and built conditions. The Department of City Planning (DCP) identified these study areas because they present specific land use, zoning, and other resiliency issues that cannot be fully addressed by citywide zoning changes.

Sheepshead Bay was selected for this study because the neighborhood was severely flooded with waters reaching four to eight feet above grade. Furthermore, residential buildings in Sheepshead present unique retrofitting challenges that are not easily resolved under existing federal and local regulations.

The Sheepshead Bay study is a product of collaboration between DCP, and other City partners, including the Mayor's Offices of Recovery and Resiliency and Housing Recovery Operations. In addition, the process built on public input previously generated through other initiatives, such as the New York State's Community Reconstruction Program.




RANDAZZO'S
CLAM BAR
ONE WAY
CLAM BAR • RESTAURANT
RESTAURANT
Tartines

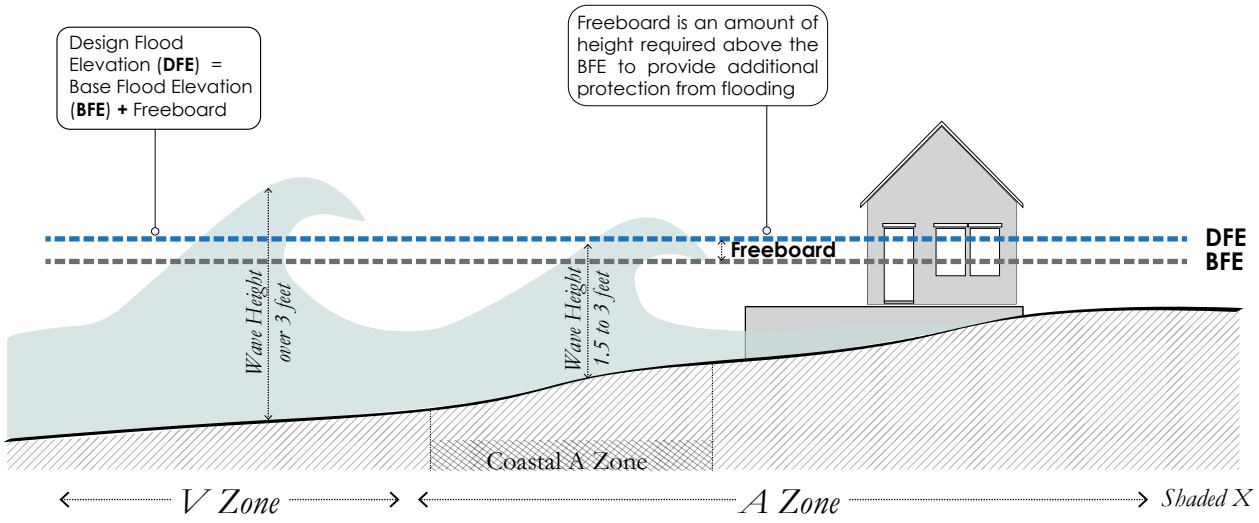
Regulatory Context

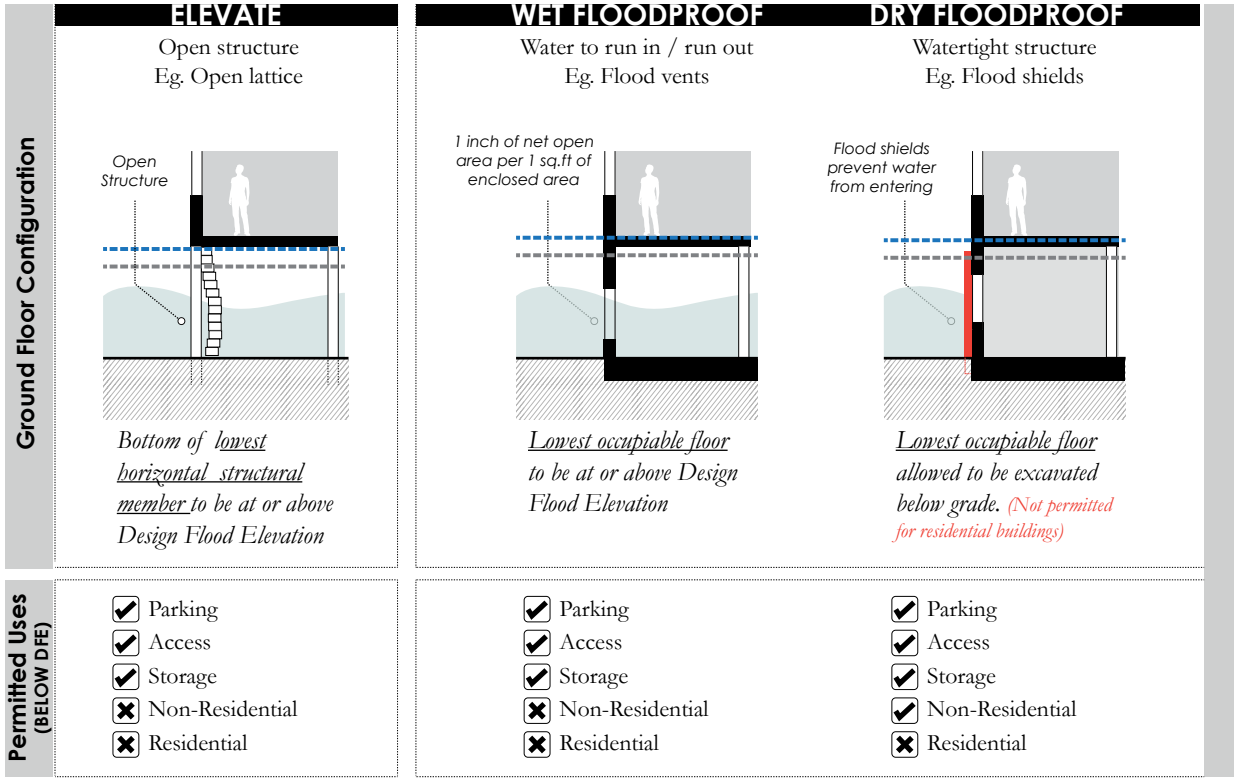
A wide array of programs and regulations at various levels of government shape the City's approach to managing flood risk and promoting resilient development. In the United States, floodplain regulation begins with Flood Insurance Rate Maps (FIRMs), which the Federal Emergency Management Agency (FEMA) creates and maintains. The maps show the extent and elevation to which flood waters are expected to rise during a 100-year flood or a flood that has a 1% chance of occurring in any given year. The elevation of the expected 1% annual chance flood is called the Base Flood Elevation or BFE. FIRMs also show the 500-year or 0.2% annual chance floodplain, which is shown as the Shaded X Zone.

The 1% annual chance floodplain is divided into three areas -- the V Zone, Coastal A Zone, and A Zone -- each associated with a different degree of flood risk. The diagram to the right illustrates these zones and the types of flood risk in each.

The 1% annual chance floodplain is also the area where property owners with federally-regulated or federally-insured mortgages are required to carry flood insurance. For residential structures, flood insurance premiums under FEMA's National Flood Insurance Program (NFIP) are determined by the relationship between the lowest occupied floor of the structure and the BFE shown on the FIRMs at the structure's location, as well as other factors. Homes built before the FIRMs were established have historically been offered subsidized insurance rates. However, due to recent federal legislative changes, those subsidized rates are gradually increasing to come in line over time with actuarial rates more closely reflecting the flood risk a home faces.

For the past several years, FEMA has been in the process of updating the FIRMs for New York City, which were implemented in 1983 and most recently





updated in 2007. As part of the mapping update, FEMA issued updated Preliminary FIRMs (PFIRMs) in December 2013 with another revision in January 2015. In most places, these PFIRMs show an expanded 1% annual chance floodplain. The maps also increase Base Flood Elevations for much of the city. The City found inaccuracies in FEMA's underlying analysis that resulted in overstating the size of the city's current 1% annual chance floodplain. (Following a successful appeal of the PFIRMs, New York City is working with FEMA to create a set of new flood maps for the city. There will be one map for insurance purposes based on current flood risk, and another for planning purposes that incorporates climate change. In the meantime, the PFIRMs remain in use for building code, planning, and zoning, as described below, while flood insurance still refers to the 2007 effective FIRMs.)

Flood Resilient Construction and Building Design

The primary purpose of the FIRMs is to establish parameters for NFIP, based on present-day flood risk. However, the same maps also establish where federal minimum standards for flood resistant construction apply. These standards are enacted through the New York City Building Code's Appendix G on "Flood-Resistant Construction," which as of 2013 applies to the 1% annual chance floodplain shown on FEMA's PFIRMs or the 2007 effective FIRMS, whichever of the two is more restrictive. Appendix G includes different elevation and floodproofing requirements for each flood zone, as well as separate requirements for residential and non-residential structures. Appendix G also includes rules requiring that most residential and commercial developments be floodproofed an additional one or two feet of "freeboard" above the FEMA-designated BFE. The elevation of the BFE plus freeboard is called the Design Flood Elevation (DFE).

To fully comply with Appendix G requirements, residential buildings must elevate all living space to be at or above the DFE, and any enclosed space below the DFE must be wet floodproofed. Non-residential buildings (any building that contains non-accessory non-residential floor area) have the option of elevating and wet floodproofing, or dry floodproofing. Where there is a mix of residential and non-residential uses, dry floodproofing is allowed, but no dwelling units may be located below the DFE. Full compliance with Appendix G results in lower NFIP premiums.

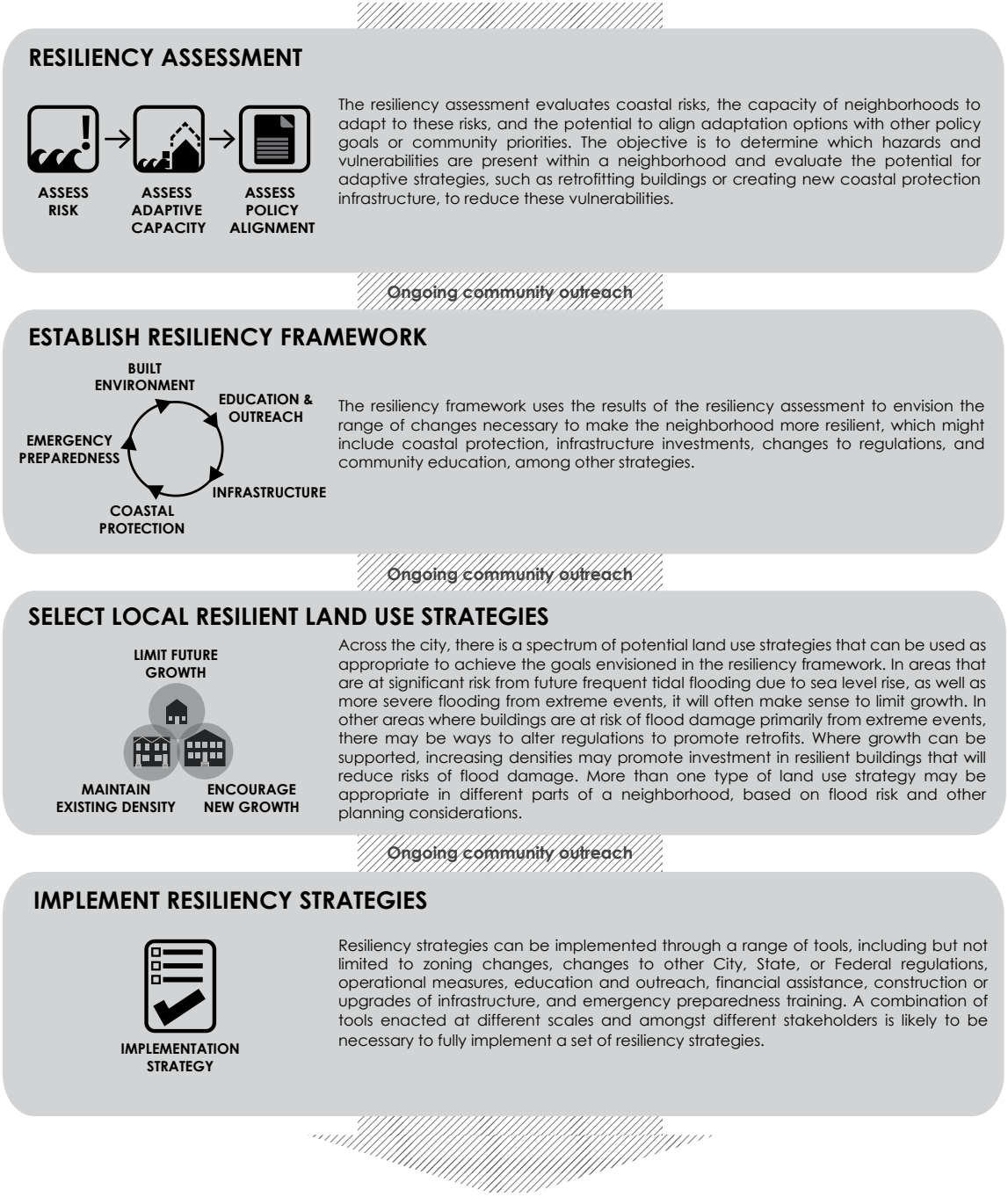
Buildings that are neither new, "Substantially Damaged," nor "Substantially Improved" (see glossary) are not required to meet Appendix G requirements as long as any changes to the building do not increase the level of noncompliance, but owners may voluntarily choose to implement partial flood mitigation strategies including elevating or floodproofing a building's mechanical systems. These measures may not currently result in lower NFIP premiums, but will reduce a building's overall vulnerability to future floods and enable the building to be reoccupied more quickly after a flood.

Citywide Zoning for Flood Resiliency

The City has instituted a series of zoning changes that remove impediments to retrofitting residential and commercial properties and accommodate many of the aforementioned building regulations. The first of these changes was an emergency Executive Order, issued in January 2013, which suspended height and other restrictions to the extent necessary for property owners to rebuild after Sandy. Many of these provisions, plus additional regulation, were included in a subsequent zoning text amendment to make the emergency order part of the City's legislation. This text amendment created allowances for measuring building height from the latest FEMA flood elevations (including freeboard required by building code), providing access from grade to elevated buildings, locating mechanical

Regulatory Context Summary

- The Federal Emergency Management Agency (FEMA) creates Flood Insurance Rate Maps (FIRMs) that show the extent and elevation of the 1% and 0.2% annual chance floodplains.
- FEMA also administers the National Flood Insurance Program (NFIP).
- The New York City Building Code's Appendix G on Flood-Resistant Construction applies within the 1% annual chance floodplain.
- The Department of City Planning works to create zoning, which controls the size and use of buildings, to accommodate flood resilient building regulations and remove impediments to flood resilient construction.



systems above flood levels, accommodating off-street parking requirements, and allowing reallocation of floor space that is abandoned and wet floodproofed. It also incorporated provisions to mitigate adverse streetscape impacts. The rules, now part of the Zoning Resolution, remain in effect and apply to all buildings in the PFIRM 1% annual chance floodplain.

The 2013 Flood Resilience Zoning Text Amendment was conducted as an emergency measure to facilitate ongoing rebuilding and retrofitting following Sandy, and included a sunset provision, so will expire a year after new flood maps are adopted by the City. DCP anticipates advancing another amendment that will make permanent the basic provisions set forth in the 2013 text, and potentially address resiliency challenges identified since then, to make it easier for property owners to make existing and new buildings resilient to current and future flood risks, while supporting the vibrancy and character of neighborhoods.

Planning Approach for Resiliency

The ten Resilient Neighborhoods study areas each exhibit a variety of physical, environmental, social, and economic conditions, the combination of which creates a distinct set of resiliency challenges, and different potential strategies for addressing them. To account for this diversity of contexts and to ensure that a consistent planning approach underpins the City's resilient land use goals, DCP developed a four-step process for coordinated analysis to guide risk-based decision-making. The diagram shown to the left explains this approach and the latter half of this report details the strategies and recommendations generated for Sheepshead Bay using this process.

Presentation to Community Board 15

HRO presenting to Plumb Beach Civic Association in conjunction with DCP

Outreach Process

The Resilient Neighborhoods initiative in Sheepshead Bay builds off of the recovery and planning work that has been done through local, state, and federal organizations, including the Citywide Flood Resilience Zoning Text Amendment, the Special Initiative for Rebuilding and Resiliency, New York Rising, and the Mayor's Office of Housing and Recovery Build-It-Back program.

During the course of the study, DCP worked closely with members of the community, local groups, and elected officials to prepare for future storms and ensure the long-term resiliency and livability of the neighborhood. In June of 2014, DCP presented the Southern Brooklyn Resilient Neighborhoods Initiative to Community Board 15. In November, DCP convened the first Community Advisory Committee to discuss resiliency challenges in Sheepshead Bay. The Committee included representatives from Community Board 15, Bay Improvement Group, Assemblyman Steven Cymbrowitz's office, and the Sheepshead Bay Plumb Beach Civic Association.

In January 2015, the Community Advisory Committee convened for a second time to discuss zoning issues in the neighborhood. The Committee met several times through the spring of 2015 to provide input on the study, identifying land use and zoning strategies that would allow for resilient re-building, determining long-term strategies for areas of high risk, and developing a comprehensive vision for local retail corridors to accommodate flood vulnerability.

The CAC was receptive to these recommendations and the Resilient Neighborhoods team also shared the recommendations with the Community Board as well as elected officials in the fall of 2015. The recommendations in this report reflect the outcome of this process.

COMMUNITY RISK PROFILE

History

Sheepshead Bay is a vibrant community with thriving commercial corridors, a working and recreational waterfront, and a diverse built environment featuring blocks of single-family bungalows and larger multi-family apartments. This study focuses on the most vulnerable areas of the neighborhood close to the bay, bounded by Avenue Z, Plumb Beach Channel, East 12th Street, and Sheepshead Bay itself (see next page).

Development began in the 1870s with the construction of hotels along the water catering to wealthy Manhattanites seeking to escape the city. The bay was originally connected to Gravesend Bay by Coney Island Creek but was filled to make way for development, shifting from farmland to predominantly water-based uses. The Sheepshead Race Track was a popular draw, as was recreational fishing, and by the 1920s the area filled with summer bungalows. Emmons Avenue was widened in the 1930s as the bay expanded to host a range of fishing and dining activities. The Belt Parkway was completed in the 1940s and blocks of attached homes were built north of the highway in the 1950s and 1960s.

The area entered a period of decline in the 1970s, seeing the shuttering of many shorefront businesses and culminating in the closure of a long-time local establishment, Lundy's Restaurant, which during its peak had held seats for 2,800 patrons. The restaurant reopened in 1997 but closed a decade later. The Special Sheepshead Bay District was created in 1973 to reinforce the community's ties to waterfront recreation and fishing by incentivizing waterfront related uses and, small businesses, and open space along Emmons Avenue. Rising real estate values starting in the 1990s drove home prices up, culminating in a rush of new condominium housing construction along with an influx of younger immigrants. Despite the significant flooding and damage caused by Sandy in 2012, Sheepshead Bay remains an active and growing community.

1926 Aerial view of Sheesphead Bay

New York Public Library

1935 View of Emmons Avenue

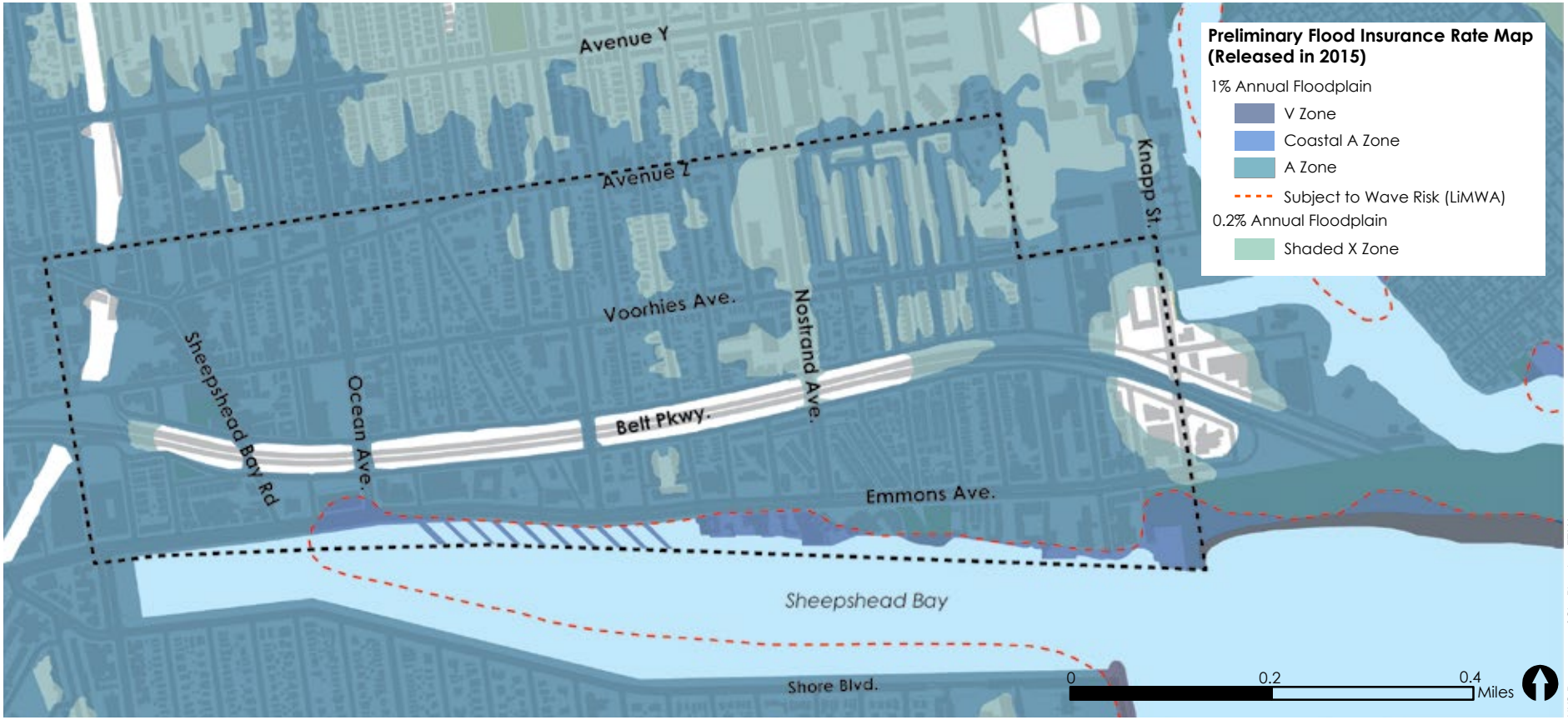
Flood Risk Profile

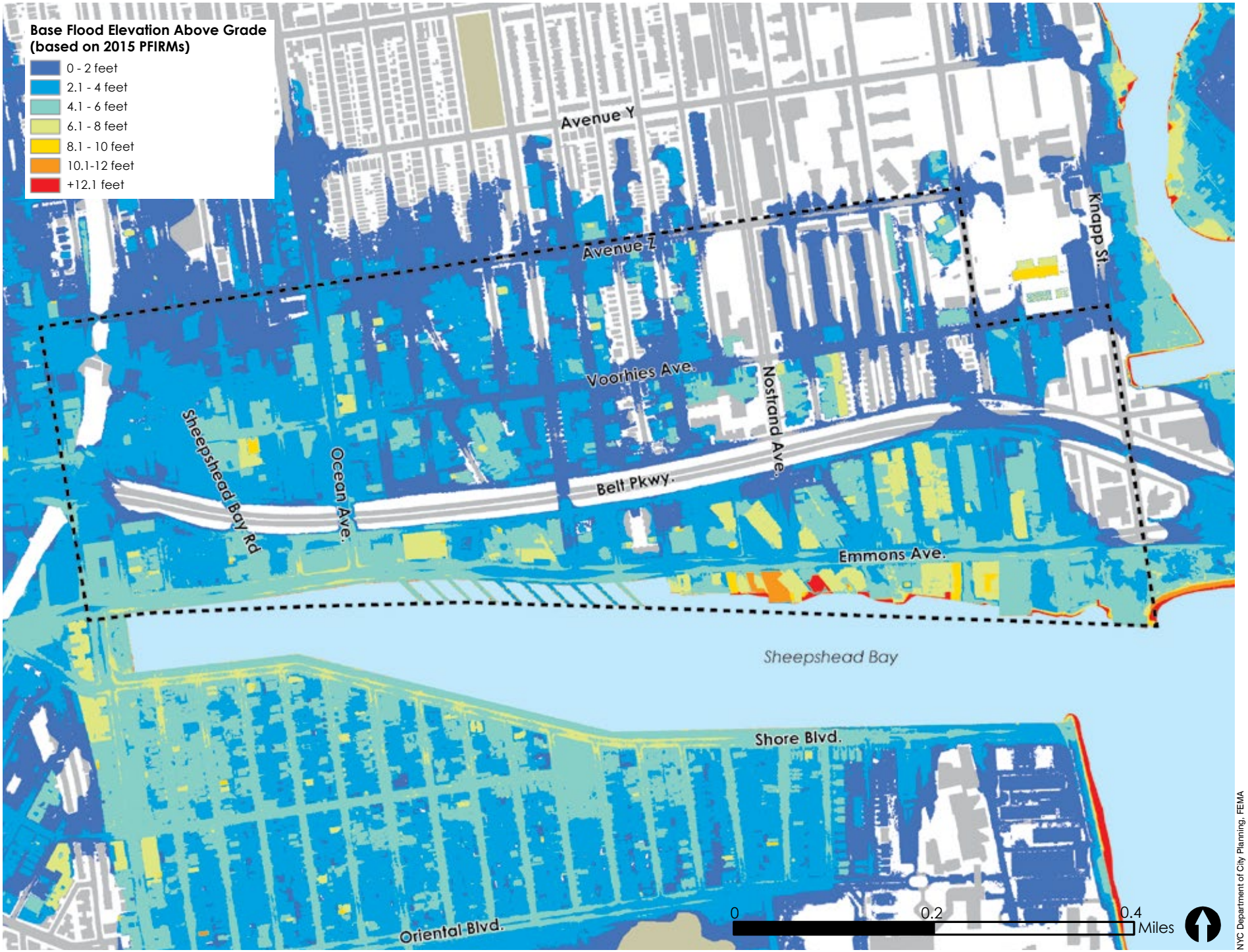
The majority of the Sheepshead Bay study area has significant vulnerability to flooding from a 1% annual chance storm event. The diversity of development types in the area and the large extent of the base floodplain impacts on over 6,500 residential units and 2,000 buildings according to the 2015 Preliminary Flood Insurance Rate Maps (PFIRMs) (see below).

Risk from waves up to three feet in height is also a concern in the areas along the bay south of Emmons Avenue, where the Coastal A flood zone extends inland. Sheepshead Bay was severely impacted during Hurricane Sandy, with the tidal surge coming up from the bay and extending north to Avenue X. Single-family homes and apartment buildings south of the Belt Parkway were especially hard-hit and faced extensive damage caused by floodwaters entering through stormwater outlets and a surge that reached up to ten feet above the ground. The sunken bungalow courts were fully submerged and continue to experience ponding and severe drainage issues today.

Small ground-floor businesses on Emmons Avenue and Sheepshead Bay Road experienced flood levels up to six feet high, resulting in the temporary and permanent closure of local businesses on both corridors. Boat houses, boat clubs, and the piers along the water were also severely damaged. The stormwater sewer infrastructure was overwhelmed during and after Sandy's duration. The Coney Island Wastewater Treatment Plant, which is located in Sheepshead Bay and serves much of Southern Brooklyn, also backed up during the storm.

The 2015 PFIRMs reflect a significant expansion from the 1% annual chance floodplain shown on the 2007 FIRMS. Over 4,000 new residential units were added to the base floodplain, as well as over 1,500 buildings. Since many of these homes were not previously within the flood zone, they were not built to current flood resilient construction standards provided by FEMA and reflected in the New York City Building Code. Additionally, the PFIRMs indicate the Base flood Elevations (BFEs) – the height to which water is expected rise during a 1% annual chance flood event. This is the elevation that new construction and to which Substantially Improved




Base Flood Elevation Above Grade
(based on 2015 PFIRMs)
0 - 2 feet
2.1 - 4 feet
4.1 - 6 feet
6.1 - 8 feet
8.1 - 10 feet
10.1-12 feet
+12.1 feet
Avenue Y
Avenue Z
Knapp St.
Voorhies Ave.
Nostrand Ave.
Sheepshead Bay Rd.
Ocean Ave.
Belt Pkwy.
Emmons Ave.
Sheepshead Bay
Shore Blvd.
Oriental Blvd.
0
0.2
0.4
Miles
NYC Department of City Planning, FEMA

buildings are required to build. Generally it ranges between two and six feet above grade throughout the district (see previous page). However, along the waterfront areas the BFEs increase, reaching up to ten to twelve feet along Sheepshead Bay and Plumb Beach Channel. In the residential area along parts of Avenue Z, the BFEs are much lower, typically less than two feet above grade.

In addition to flooding from coastal storm surge, Sheepshead Bay is projected to see moderate impacts from daily tidal inundation in the 2050s and 2080s according to projections from the New York City Panel on Climate Change (NPCC). As shown in the map below, under the high end projections for the 2050s, these impacts are mostly along the bay itself and are limited to 80 buildings and 248 residential units. The neighborhood could experience more significant impacts by the 2080s. Varied private ownership of the shoreline in the areas with the highest vulnerability makes implementing coastal protection to offset sea level rise risk difficult since the burden will fall on individual property owners to put such protection in place.

Additional vulnerability in Sheepshead Bay is caused by the neighborhood's built condition and infrastructure limitations. The low elevation of the entire neighborhood is exacerbated by low-lying lots and sunken pedestrian lanes which pose safety, access, and flooding issues. The area's stormwater infrastructure, a combined sewer system, is not designed to handle large storm events, contributing to drainage problems. The most at risk areas, the bungalow courts, are not under municipal control and suffer from routine flooding due to inadequate infrastructure. Further environmental and safety challenges are posed by bungalows that were abandoned after Sandy and remain vacant today.

Homeowner Financial Vulnerability

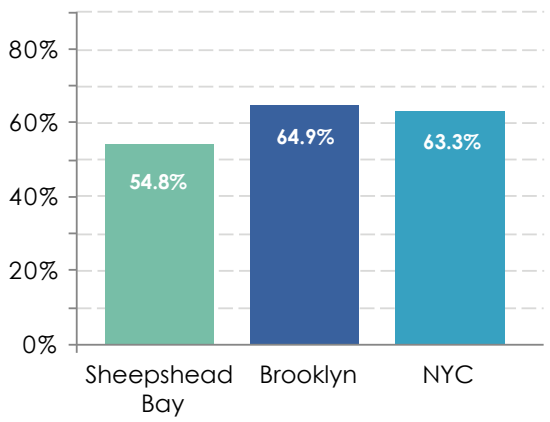
In spite of the flood risk that exists in the area, Sheepshead Bay remains a tight-knit middle class community that has shown remarkable resilience in the wake of Sandy. The property market remains strong and new development, in part spurred by new generations of immigrants from the former Soviet Union, is moving forward including several condominium projects.

Housing stock within the study area is predominantly characterized by one-and-two family homes, though there are numerous multifamily buildings scattered throughout, mainly along Emmons and Ocean Avenues. A little less than half of all residential units are owner-occupied. Many residents have been living in their home for multiple generations and are no longer paying off mortgages. Property owners within the 1% floodplain who have a government-backed mortgage are required to purchase flood insurance.

In addition, changes to the National Flood Insurance Program will bring higher premiums for buildings not built to current standards, and may make it difficult for owners to sell or for prospective home buyers to obtain mortgages. Nearly 95% of buildings in the study area were built pre-FIRM, and in 2013 only a fifth of residential buildings had NFIP coverage. This indicates a substantial gap between current building stock and flood resilience. Homeowners could reduce premiums by bringing their homes into compliance with current standards, though this would require significant financial investment.

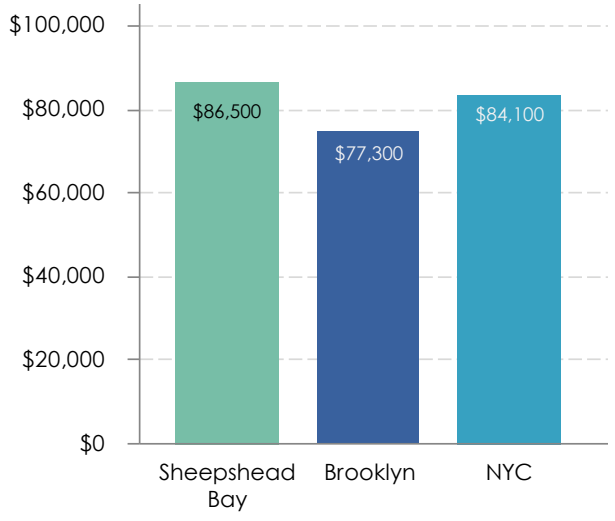
Like most coastal neighborhoods, Sheepshead Bay has seen an increase in flood insurance take-up rates since Sandy. Between 2013 and 2015, the number of active policies in the area increased by eighty-five percent, compared to less than fifty percent across Brooklyn and thirty percent citywide.

Percentage of Owner-Occupied Housing with Mortgage



Source: US Census American Community Survey, 2012 5-Year

Owner-Occupied Median Household Income



Source: US Census American Community Survey, 2012 5-Year

Percent change in number of NFIP Policies from 2013-2015

Commercial Financial Vulnerability

The expansion of the floodplain according to preliminary maps in Sheepshead Bay also highlights the flood risk commercial properties face. In Southern Brooklyn alone there are over 1,000 retail businesses in the floodplain. Twenty-six percent of these businesses are in Sheepshead Bay, primarily along Sheepshead Bay Road and Emmons Avenue.

In the study area, businesses represent over 760,000 square feet of floor area located in one-to-two story buildings that are entirely commercial, or on the ground floor of larger mixed-use buildings. Like the rest of the study area, most of these properties were built pre-FIRM and may be subject to higher insurance premiums.

Sandy-impacted businesses along Emmons Avenue and Sheepshead Bay Road that held NFIP policies on average reported between $100,000 and $500,000 in damages to NFIP. Current program guidelines for NFIP policies held by non-residential buildings, including all commercial buildings, limit compensation to $500,000 each for structural damages to the building and for loss or damage to contents. Property owners with ground floor businesses located within multifamily buildings, common throughout Sheepshead Bay, are usually assessed as residential buildings and have only $100,000 in coverage for contents, though the cap for structural damages has recently been increased to $500,000 as well.

For many small businesses the restrictions on coverage for contents located in basements or cellars also limited the ability of businesses to be compensated for all their losses. Many businesses did not have the capital reserves to fully recover following Sandy, and in some cases could not afford to reopen. Commercial properties also face structural challenges when trying to retrofit. Along Sheepshead Bay Road, businesses are typically located on the ground floor of one-to-three story attached buildings that were built in the 1920s and 1930s. Most businesses have cellars used for housing mechanical systems, inventory storage, and other functions such as food preparation that flooded during Sandy.

Neither Emmons Avenue nor Sheepshead Bay Road corridors have active local business organizations. Without an organizing entity such as a small business association or a block association, it can be even more challenging to coordinate leading up to and following a flood.

Small businesses along Sheepshead Bay Road that may be affected by higher flood insurance premiums


Commercial Uses
Mixed Commercial/Residential
Commercial/Office
Avenue Y
Avenue Z
Voorhies Ave.
Nostrand Ave.
Knapp St.
Belt Pkwy.
Sheepshead Bay Rd.
Ocean Ave.
Emmons Ave.
Sheepshead Bay
0
0.2
0.4
Miles

Existing Building and Zoning Conditions

Sheepshead Bay is composed of a wide range of land uses and buildings. Typologies examined in this study include the Emmons Avenue and Sheepshead Bay Road commercial corridors, bungalow courts along the bay, and a residential area north of the Belt Parkway.

The defining zoning of the study area is the Special Sheepshead Bay District, which runs along either side of the Emmons Avenue corridor and was established in 1973 zoned R5 and R5/C2-2 along commercial corridors with special bulk, height, and use regulations. The residential areas adjacent to the special district are zoned R4-1 and R4B. These areas underwent rezoning to contextual districts in 2005. North of the special district, across the Belt Parkway, the residential neighborhoods are zoned R3-2, R4, R4-1, and R7A. The Sheepshead Bay Road retail corridor is zoned as C4-2, a medium density commercial zoning district.

Residential development north of Belt Parkway

Former bungalow home retrofitted and elevated above the DFE

Special Sheepshead Bay District (SSBD)

In the 1960s and 1970s Sheepshead Bay experienced significant decline and many of the waterfront amenities and businesses that had come to represent the area struggled to continue operations. The Special Sheepshead Bay District (SSBD) was created in 1973 to utilize the area's prime waterfront location to strengthen and promote local retail and residential development with wider sidewalks and open public areas.

At the time of the creation of the SSBD, there were over ten acres of vacant land along Emmons Avenue (see page 20) from previously demolished buildings. There was serious concern that area would become dominated by piecemeal development that could significantly change the waterfront and residential character of the neighborhood. Therefore, special land use and design regulations were created for each sub-area of the SSBD to encourage waterfront related uses and local retail.

Ground floor and second story retail along Sheepshead Bay Road

Commercial uses along Emmons Avenue


Land Use
One & Two Family
Multi-Family Walk Up
Multi-Family Elevator
Mixed Res & Comm
Comm & Office
Industrial & Manufacturing
Transportation & Utility
Public Facility & Institutions
Open Space
Parking Facilities
Vacant Land
Avenue Z
Voorhies Ave.
Nostrand Ave.
Knapp St.
Sheepshead Bay Rd
Ocean Ave.
Belt Pkwy.
Emmons Ave.
Sheepshead Bay
0
0.2
0.4
Miles


Zoning
C1-2
C2-1
C2-2
Special Sheepshead Bay District
Avenue Z
Voorhies Ave.
Nostrand Ave.
Knapp St.
Sheepshead Bay Rd
Ocean Ave.
Belt Pkwy.
Emmons Ave.
C4-2
R7A
R4
R3-2
M2-1
M1-1
C3
C8-1
R4B
R4-1
R5
Sheepshead Bay
0
0.2
0.4
Miles

To provide amenities to the area, the SSBD also included mandatory provisions in certain sub-areas that required developments to provide a public plaza that was at least 4,000 square feet. Developments could also qualify for additional floor area by providing additional plaza space.

The provisions of the SSBD were created during a time when flood risk was not a significant concern of land use planning in the area, and before the first FIRMs for New York City were released. In reviewing the SSBD more recently through the lens of resiliency, there are provisions that have unintentionally exacerbated flooding risk along Emmons Avenue.

Commercial and residential investment have helped bring the area back after it's decline. However, because in the SSBD height is measured from curb level, in order to maximize the floor area and stay within the height regulations, many developers have created retail and residential spaces that are below grade. During Sandy these spaces flooded and created serious life and safety risks. Plazas and open space can also be built up to two feet below grade, creating spaces that could fill with water during a flood event. Furthermore, the plaza and open space regulations were written before the City formally developed design guidelines for Privately Owned Public Spaces (POPS), as a result the SSBD text does not include a formal regulatory process to ensure that plazas created for the public remain public for the life of the development or of a quality for the benefit of Sheepshead Bay residents and the public.

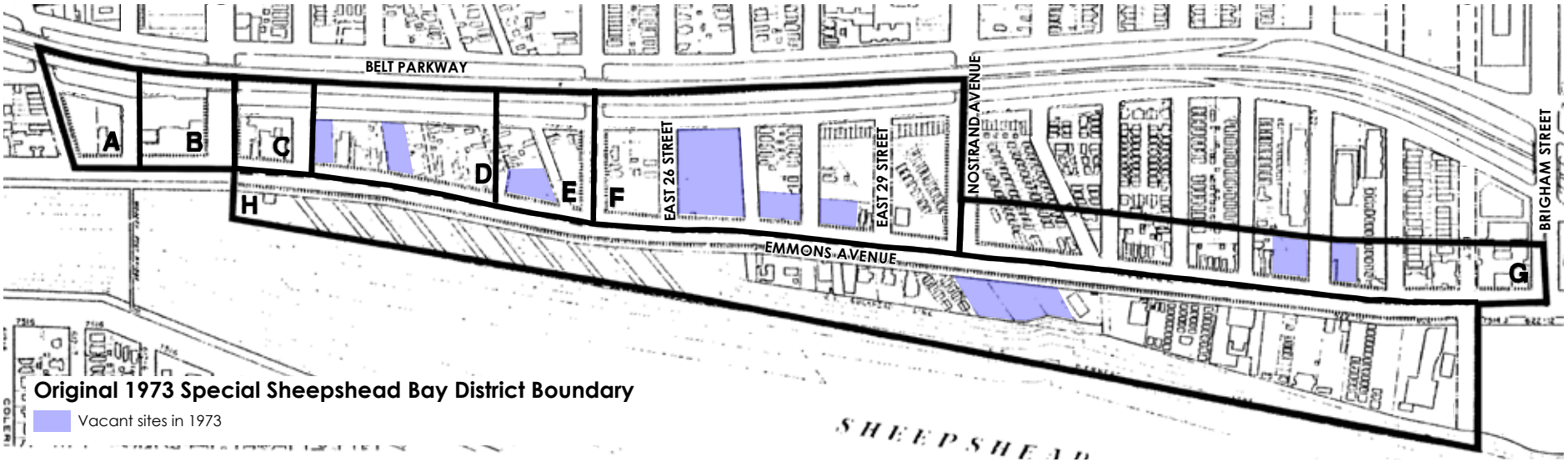
In certain sub-areas of the district, there are restrictions on what types of uses can be developed on the ground floor of a building. Uses are limited to retail but there are exceptions for one-and-two family homes and accessory lobbies. Under current NYC Building Codes and FEMA regulations, any newly constructed residential uses need to be elevated above the DFE. In mixed-use buildings or multi-family buildings, the ground floor can be occupied by a dry floodproofed retail space or a wet floodproofed lobby. For one-and-two family homes, however, the entire building would need to be elevated above the DFE, leaving only storage or parking on the ground floor. This would significantly detract from the active commercial character that is found along many parts of Emmons Avenue.

In 2006, the boundaries of the SSBD were modified (see next page) as part of a contextual rezoning requested by residents of the local community to prevent the further redevelopment of bungalows into multi-family buildings. Several bungalow courts were removed from the district and rezoned from R5 to R4-1 to better match the character of the bungalow areas. However, while bungalows were devastated during Sandy, multifamily buildings built pursuant to the 1983 FIRM were able to withstand the flooding with minimal damage to residential living spaces.

Current Buildings within the SSBD

The SSBD provisions intended to produce new maritime activities, have also limited uses and allowed a wide range of building typologies. Today Emmons Avenue features a mix of building heights, densities, and uses (see next page). Heights range from one to eight stories as buildings scale from single family detached homes to multi-family apartment buildings.

Retail services include ground level and below-grade storefronts, and large-footprint food and dining establishments. Waterfront block uses include boat clubs, cafes, and recreational fishing. The range of building types, each with their own unique vulnerabilities, conbtribute to an inconsistent retail experience.



Restaurants and cafes on western end of Emmons

Public plaza

Seven-story apartment building on eastern end

Below grade retail space in cellar

Attached buildings

Current Uses in Special Sheepshead Bay District by Subarea

- Local Retail
- Restaurants, cafe,
- Hotels
- Maritime Uses Yacht/Social Clubs
- Bungalow Courts
- 1-2 Family Homes
- Multi-family Buildings
- Health/Social Services
- Senior Housing Adult Day Care

Sheepshead Bay Road Retail Corridor

Sheepshead Bay Road is a commercial corridor developed in the 1920s and 1930s characterized by local ground floor retail with housing located above. The buildings are attached and range from one to three stories with many utilizing below grade storage accessed by sidewalk vaults. Portions of the corridor have remained vacant since Hurricane Sandy due to significant flooding during the storm. Retrofitting challenges include narrow lots and attached buildings that restrict many mitigation or repair options, and the high costs of retrofitting for small business and property owners.

Sheepshead Bay Road is within a C4-2 zoning district, which allows for larger regional retail establishments as well as higher density residential development. The DFE ranges between two and four feet above grade. To retrofit in compliance with building code, business owners would need to fill in below-grade sidewalk storage vaults, raise the lowest floor or relocate ground floor area to a new story. To account for this the 2013 Citywide Flood Resilience Text Amendment allowed for some flexibility to relocate lost retail space within the zoning envelope above the DFE.

Sheepshead Bay Road retail corridor

Mixed Residential Typologies

The residential area north of the Belt Parkway features mixed typologies and irregular lots. The block between 21st and 22nd streets features several sunken bungalows, subject to the same flood vulnerability and retrofitting challenges as the courts closer to the water. Two and three story attached homes from the 1950s and 1960s line the blocks between Nostrand Avenue and Coyle Street, and multi-family buildings up to eight stories exist along Ocean, Nostrand, and Bedford Avenues. Elevation of attached or multi-family buildings is expensive and logistically challenging, and many predate existing zoning. The remainder of the area is comprised of detached and semi-detached one-and-two family homes. The residential blocks north of the Belt Parkway are zoned R4 and R3-2, both which are low density residential districts that allow for low-rise attached

Sunken bungalows on irregular lots

buildings and detached buildings, and have a range of DFEs up to seven feet above grade. To fully comply with NFIP standards, homeowners in the flood zone must fill any below grade spaces and wet flood-proof enclosed areas below the DFE. Such areas may only be used for storage or parking, and not for residential uses.

The Citywide Flood Resilience Text Amendment allows homeowners to measure building height from the DFE, which enables property owners to relocate the lost floor area above the DFE, provided there is enough flexibility in the building envelope to do so. Buildings in both R4 and R3-2 can build to a height maximum of 35 feet with a 25 foot perimeter wall. Two and three story attached homes are present in both of these districts.

In R3-2, low DFEs and ground floors slightly elevated above grade mean in most instances there is not active living space below grade. However, to retrofit to full compliance with FEMA standards, cellars would need to be filled in and it would likely be challenging to replace that floor area elsewhere as a vertical addition on the house.

Attached homes in R4 zoning districts are generally three stories, with the ground floor sunken several feet below grade. In cases where the DFE is higher and there is residential use on the ground floor, a homeowner might face challenges trying to come into compliance with FEMA standards. In general attached homes in these districts are at the maximum height limit and overbuilt. To come into full compliance the ground floor would need to be vacated and could only be used for storage and parking. Because these homes are already overbuilt, a homeowner would not likely have enough allowable floor area to completely replace what was located on the ground floor to a new story, even if there is allowable height to do so. There are also multi-family buildings in the R4 district ranging from six to eight stories in height located principally along Ocean Avenue as well as Bedford and Nostrand Avenues. The buildings predate zoning and do not comply with the height and floor area regulations for the zoning district. BFEs for these buildings range from two to six feet above grade. A retrofit of this type of building typology would mean the loss of ground floor units without being able to compensate for the lost units.

Multi-family buildings along Ocean Avenue are in a district zoned R7A and have generally enough room in the envelope to relocate residential space. However, there are many other practical challenges to doing this.

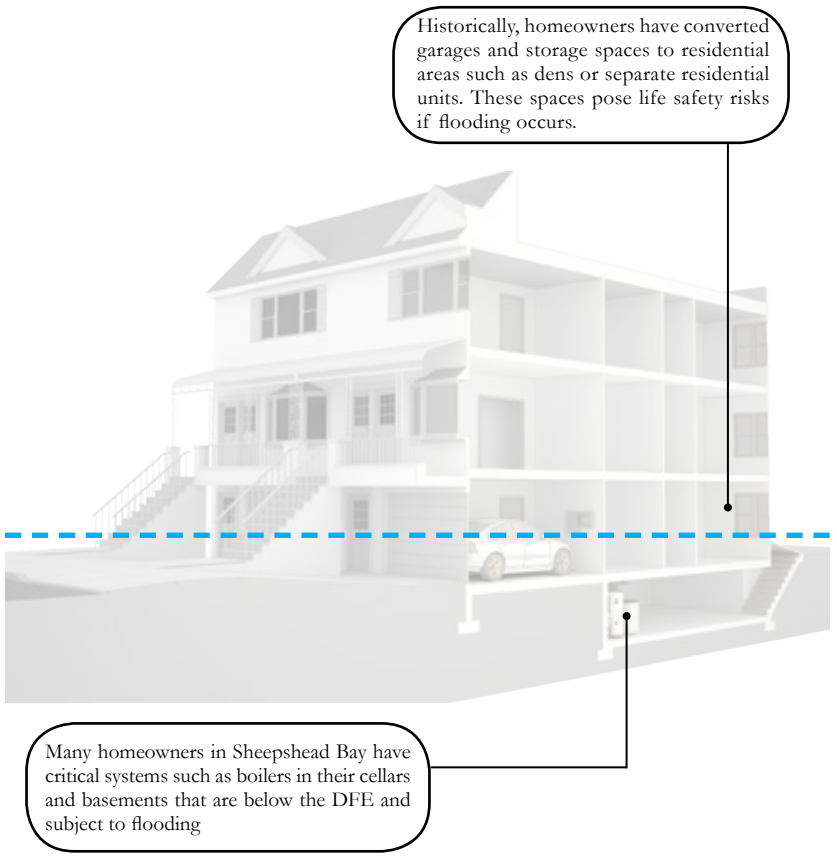
Attached homes with sunken ground floor residential space

Mid-rise elevator building with ground floor residential space

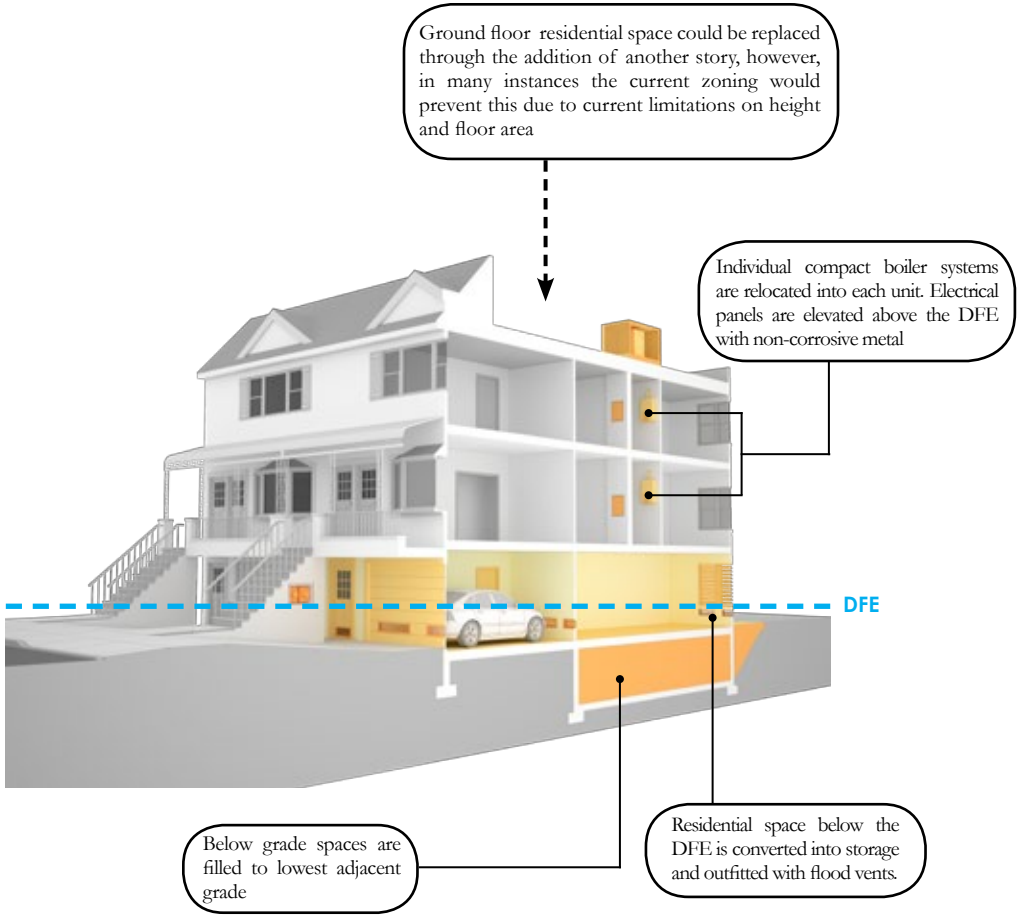
Resilient Retrofit Under Current Zoning Regulations

Attached Buildings

Based on analysis conducted for DCP's *Retrofitting Buildings for Flood Risk* guide, the diagrams below depict the challenges and recommended solutions for retrofitting a typical attached building in Sheepshead Bay. In order to come into compliance with NYC Building Code and FEMA NFIP regulations, below grades spaces would need to be filled in to the nearest adjacent grade and mechanical equipment would need to be relocated above the DFE. In some cases where there is residential space on the ground floor below the DFE, there may not be enough floor area or building envelope height to relocate this space in an addition. This could lead to a significant loss of usable residential space.



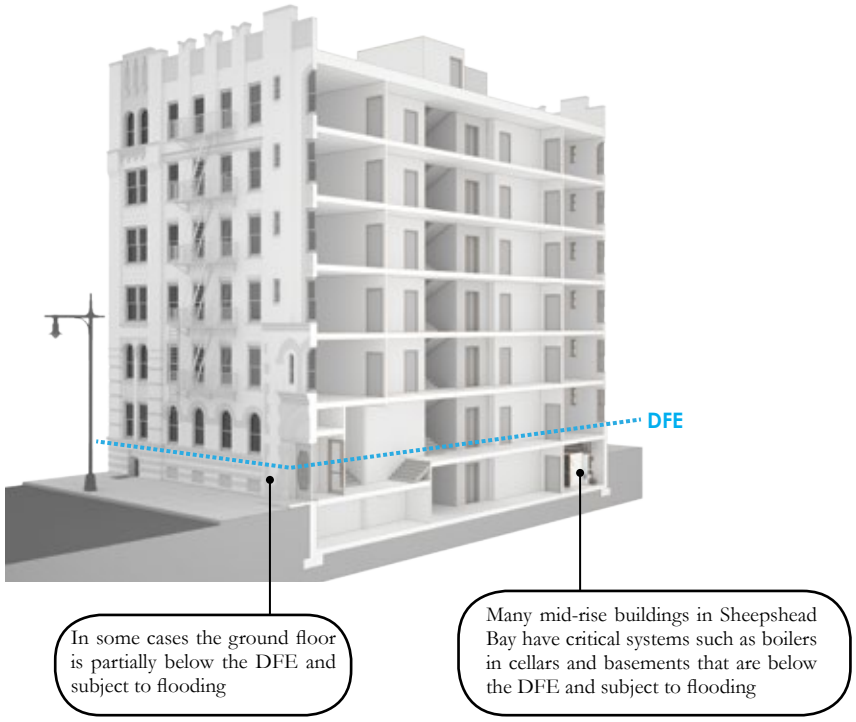
Typical Attached Building in Sheepshead Bay



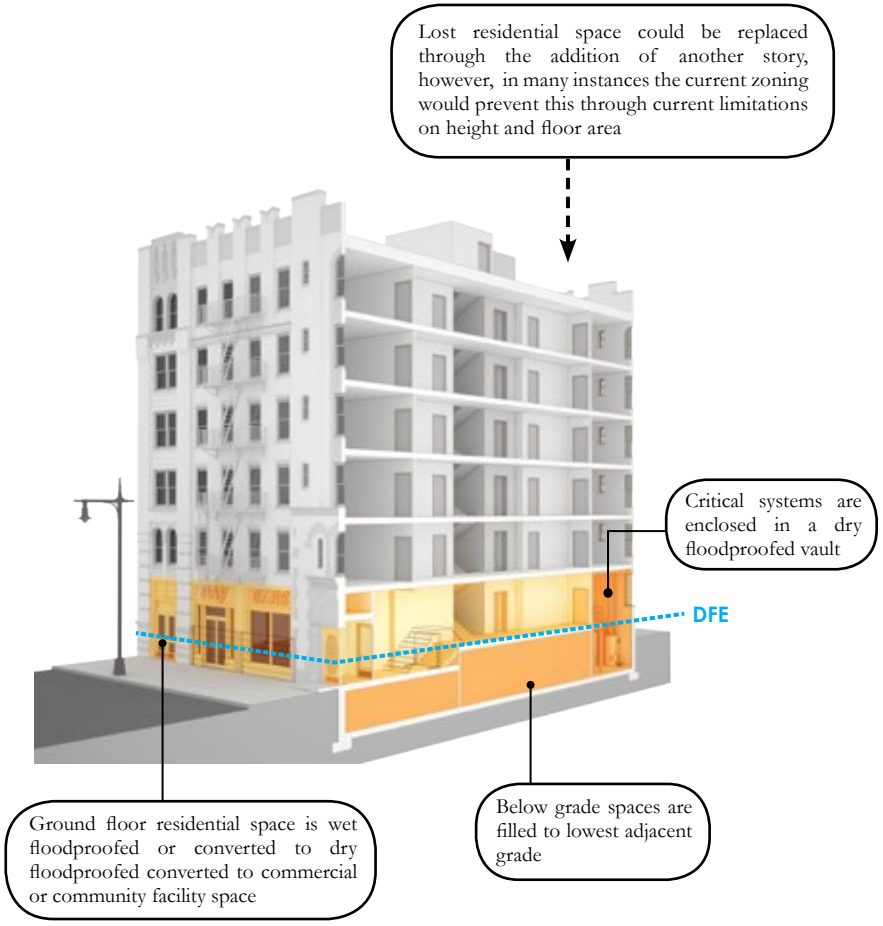
Attached Building Retrofitted to NYC Building Code and FEMA Regulations

Mid-Rise Elevator Buildings

Based on analysis conducted for DCP's *Retrofitting Buildings for Flood Risk* guide, the diagram below depicts the challenges and recommended solutions for retrofitting a typical mid-rise elevator building in Sheepshead Bay. In order to come into compliance with NYC Building Code and FEMA NFIP regulations, below grades would spaces need to be filled in to the nearest adjacent grade and mechanical equipment would need to be relocated above the DFE. In cases where these buildings pre-date zoning and are located in low-density districts, there is not enough floor area or height in the building envelope height to relocate this space in an addition.



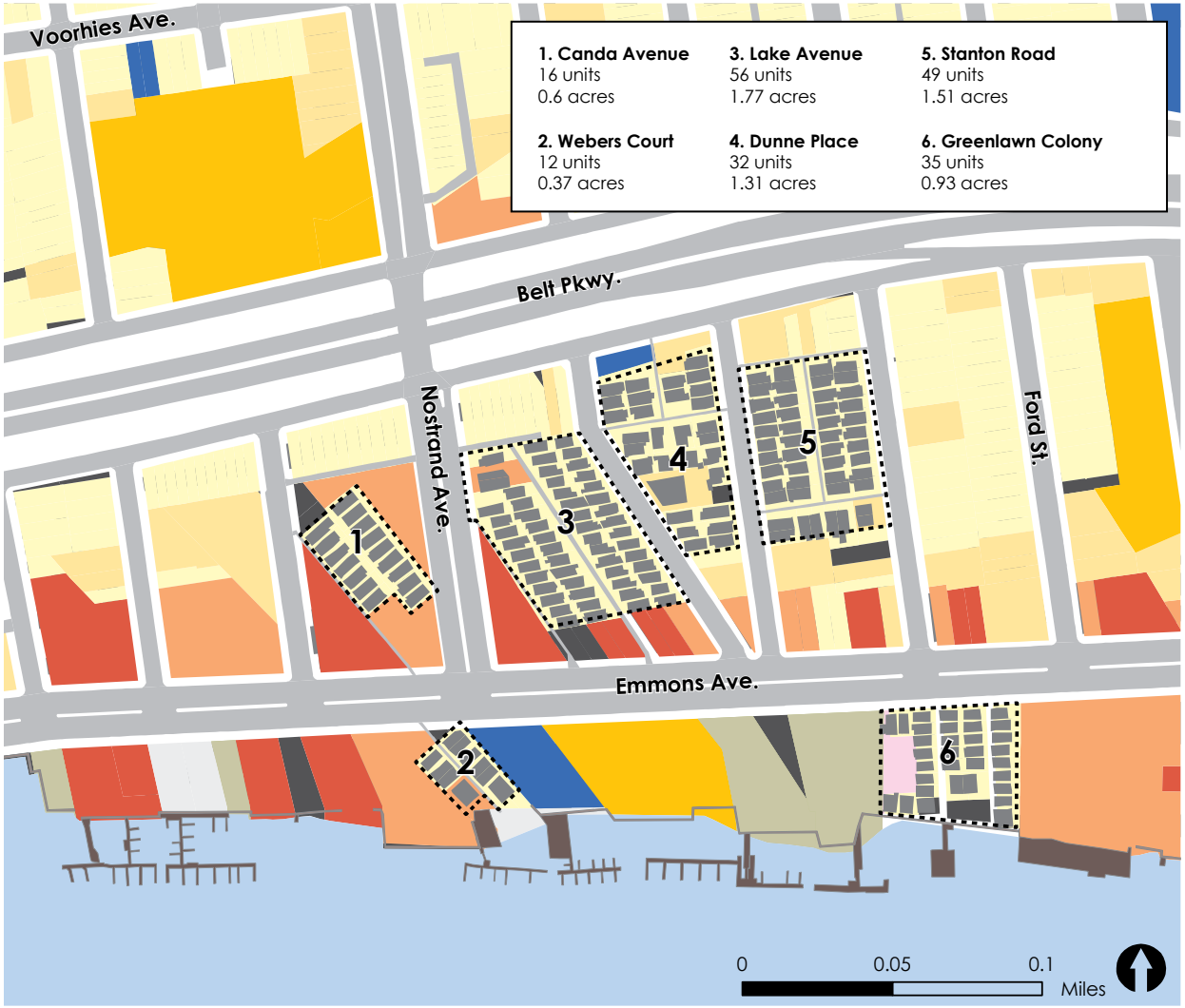
Typical mid-rise building in Sheepshead Bay



Mid-rise building retrofitted to NYC Building Code and FEMA regulations

Bungalow Courts

Like many other coastal communities in Southern Brooklyn, Sheepshead Bay contains several bungalow colonies that date back to the 1920s and 1930s when the area was primarily a seasonal beach community. As Sheepshead Bay developed into a year round community, many bungalows were redeveloped into larger homes or small apartment buildings, but approximately 200 single-family bungalows remain in the study area (see below). Most of the bungalows are located in courts that are up to five feet below grade with limited drainage infrastructure. Many of the bungalows experience routine flooding during regular rain events. The homes typically front on narrow, unmapped pedestrian alleys that are approximately five feet wide. The bungalows north of Emmons Avenue were part of a contextual rezoning in 2006 and are currently zoned R4-1, while the bungalows south of Emmons Avenue are part of the SSBD and are zoned R5. The BFEs for the bungalows range from 6 to 8 feet above grade. While detached homes are generally easier to retrofit, the combined challenges of zoning non-compliance, poor drainage infrastructure, sunken lots, and narrow walkways that cannot be easily accessed by construction vehicles, has required the courts be further studied to develop site specific retrofitting solutions. Many homeowners are enrolled in the City's Sandy recovery program, Build it Back—managed by the Mayor's Office of Housing




Webers Court


Bungalows along Brown Street

Flooding after regular rain event in Stanton Court

Hitchings Court

Recovery Operations (HRO) in partnership with the Department of Housing Preservation and Development and the Department of Design and Construction (DDC)—though some homeowners chose to finance their own repairs. Through Build it Back, owners of properties affected by the hurricane are offered one or more pathways for making improvements, depending on the level of damage and other factors: repair, repair with elevation, rebuild with elevation, reimbursement, or acquisition.

In work with HRO, DCP outlined several potential retrofitting and redevelopment scenarios for Stanton Court. The scenarios focused on two different conditions: mid-block development, where only the bungalows fronting along the pedestrian alleys are reconstructed, and full-site redevelopment, where bungalows fronting on normal city streets are also reconstructed. The analysis examined changes to current development patterns and densities, some of which would require zoning changes. The scenarios were developed for the purposes of exploring a variety of options,each of which would be evaluated for its feasibility. The Pratt Center for Community Development engaged the residents of one of the courts, Stanton Court, and developed several ideas for how newly elevated homes could be integrated with infrastructure improvements.

These scenarios and options would all require coordination among multiple property owners and the construction and maintenance of common improvements, and each has its own costs and practical challenges. The City will continue to work with stakeholders to implement practical solutions.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Summary of Resiliency Challenges

1 Flood Risk

The majority of the Sheepshead Bay study area falls within the 1% annual chance floodplain according to the preliminary flood insurance rate maps, with the bungalow courts and portions of the coastal areas subject to greater risk because they are low-lying.

2 Special Sheepshead Bay District

The configuration of existing buildings with below-grade spaces and plazas and ground floor residential uses along Emmons Avenue presents unique challenges in promoting resiliency while maintaining an active and vibrant commercial corridor.

3 Vulnerable Residential Typologies

Attached buildings, multi-family buildings, and bungalows with below grade spaces are particularly vulnerable to flooding and challenging to retrofit.

4 Retail Corridors

Retrofits necessary to bring attached buildings into compliance with NFIP standards or to replace cellar space are logistically challenging and difficult for small business or property owners to afford.

RESILIENCY FRAMEWORK

Despite economic, infrastructural, and built-form barriers to resiliency, Sheepshead Bay is a viable and vibrant community that has strong commercial and residential areas and continues to boast a strong property market. This study seeks to build on the community's existing strengths and propose new local recommendations and zoning solutions for increasing resiliency in currently at risk areas.

The framework map identifies four priority zones within the Sheepshead Bay study area where DCP has developed recommendations for promoting resiliency.

The map focuses on the Sheepshead Bay Special District, which was designated in 1973 and encompasses the Emmons Avenue commercial corridor. Ensuring the resiliency of this retail stretch is critical to the economic vibrancy of Sheepshead Bay. This study looks at current zoning provisions as well as the corridor's building typologies and proximity to the waterfront in order to identify neighborhood strategies to increase resiliency and create a long-term vision for an active destination on the waterfront.

Sheepshead Bay Road is a local retail corridor located along the B and Q subway lines that is made up of an old attached building stock. Retrofitting such properties poses both logistical and financial challenges to the small business owners who lease property along the stretch. This framework looks to highlight the barriers to resiliency and identify possible solutions in conjunction with DCP's forthcoming Resilient Retail study.

The framework also considers residential areas and seeks to alleviate zoning barriers to retrofitting. Sheepshead Bay features several typologies that pose unique challenges, including sunken bungalow courts along Emmons Avenue and attached buildings north of the Belt Parkway. Neighborhood strategies includes zoning changes to address these local conditions.

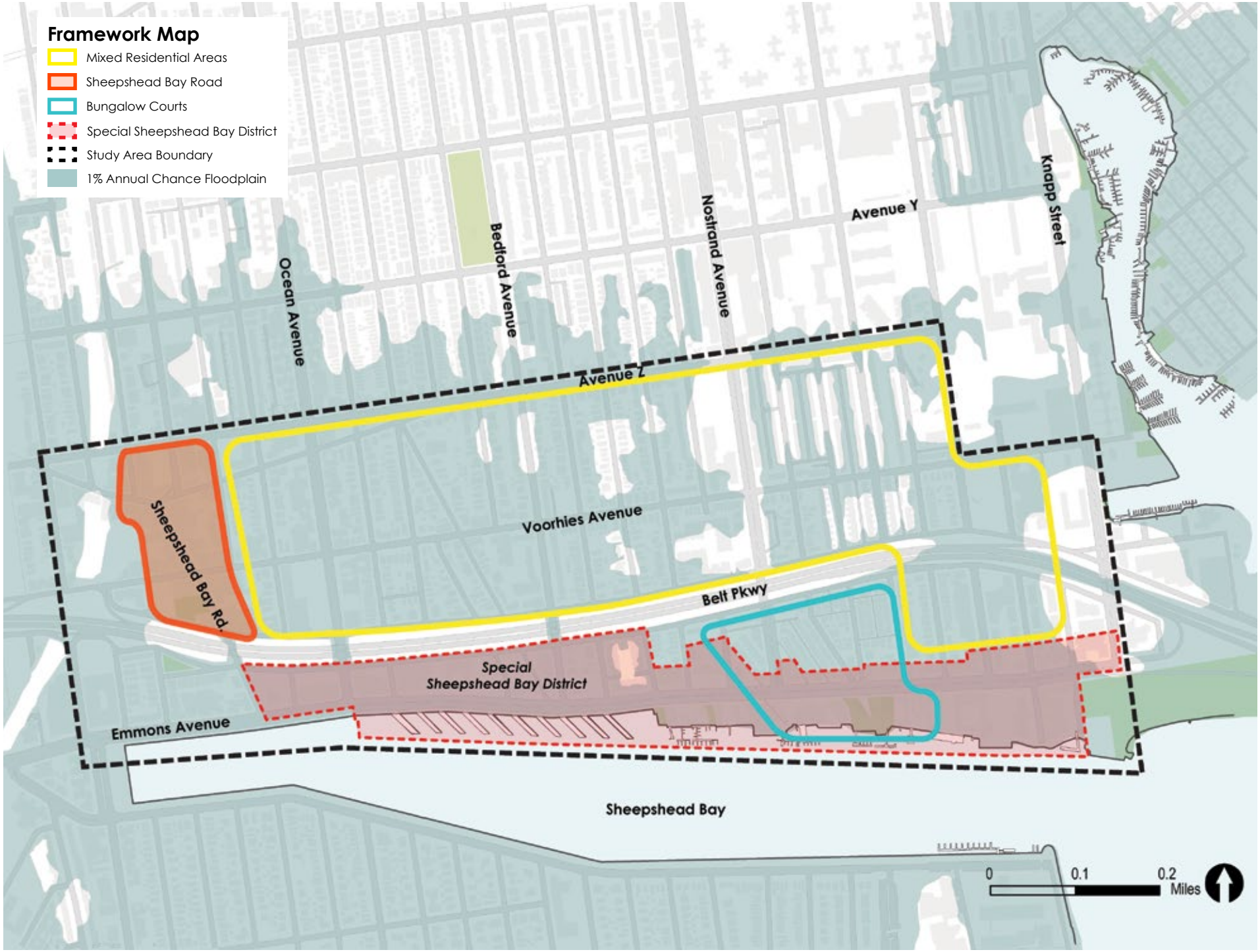
Along with the strategies outlined in this framework, the United States Army Corps of Engineers (USACE) is currently studying coastal storm risk management projects (see page 39) which can reduce the risk of coastal flooding in Sheepshead Bay and neighboring communities along Coney Island, Jamaica Bay, and the Rockaways. As the study progresses, the City will continue exploring the necessary measures to address future risks and opportunities, while working jointly with state and federal government agencies managing other infrastructure projects to advance regional coastal protection.

Mixed Residential Areas
DCP is studying additional zoning changes to ensure that existing buildings are able to be retrofitted and eliminate to impediments to developing new resilient homes in the residential areas of Sheepshead Bay.

Bungalow Courts
DCP has provided support to the Mayor's Office of Housing Recovery (HRO) Build It Back process by evaluating different retrofitting options for sunken detached homes that alleviate routine flooding and allow for emergency access while retaining community and local character.

Sheepshead Bay Road
As part of the Resilient Retail study, DCP has identified retrofitting strategies for commercial buildings along the corridor and developed urban design guidelines that promote resilience while ensuring the corridor remains active and accessible to shoppers.

Special Sheepshead Bay District
DCP has identified potential changes to the Special Sheepshead Bay District to allow resilient construction to withstand future floods and better meet the Special District goals. In the future, DCP will also identify opportunities to work with the community in developing a long term vision for Emmons Avenue as a resilient destination along the water in the floodplain.


Framework Map
Mixed Residential Areas
Sheepshead Bay Road
Bungalow Courts
Special Sheepshead Bay District
Study Area Boundary
1% Annual Chance Floodplain
Ocean Avenue
Bedford Avenue
Nostrand Avenue
Avenue Y
Knapp Street
Avenue Z
Sheepshead Bay Rd.
Voorhies Avenue
Belt Pkwy
Special
Sheepshead Bay District
Emmons Avenue
Sheepshead Bay
0
0.1
0.2
Miles

Mixed Residential Area

In the fall of 2013, the City Council adopted the DCP Flood Resilience Zoning Text Amendment. The text amendment modified zoning and land use regulations to allow buildings to rebuild and retrofit according to FEMA and NYC Building Code standards immediately following Sandy. The text provided the following zoning solutions to facilitate retrofitting and resilient redevelopment: measuring building height from latest FEMA flood elevations, accommodating building access from grade, locating mechanical systems above flood levels and accommodating off-street parking above grade.

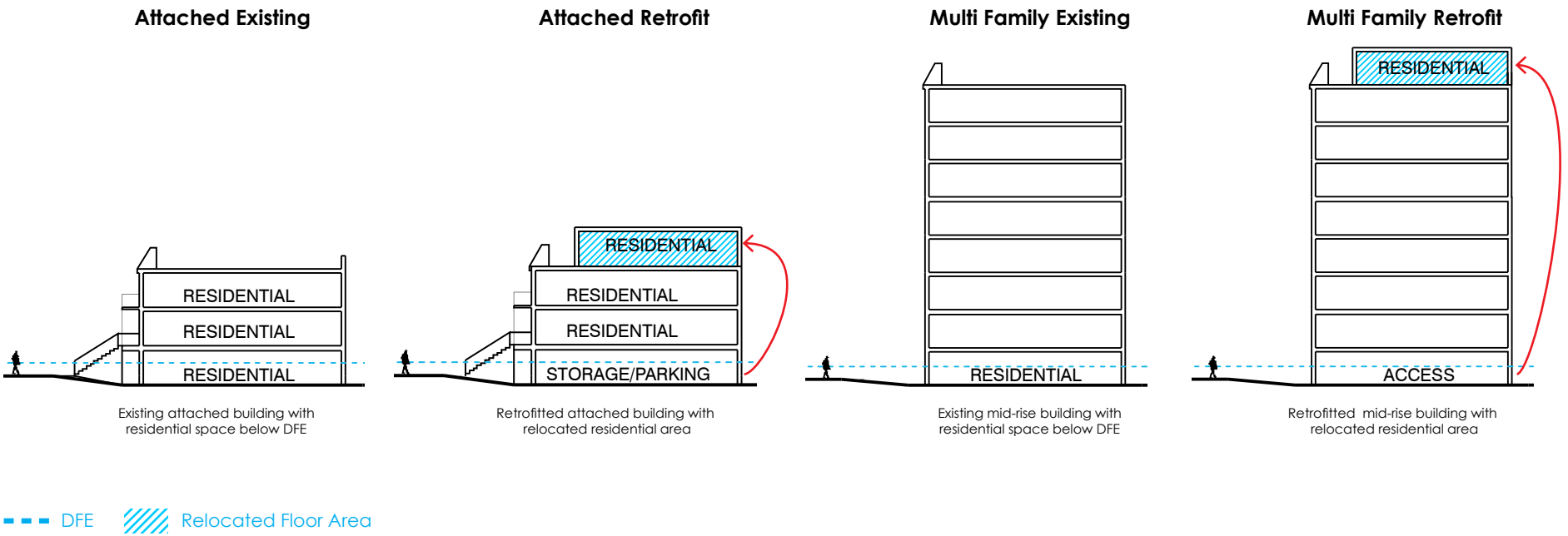
In the summer of 2015, the City Council also adopted the Special Regulations for Neighborhood Recovery text amendment developed by DCP in partnership with the Mayor's Office of Housing Recovery (HRO) and the Department of Housing Preservation and Development (HPD). The text amendment was made applicable in certain areas of the city, including Sheepshead Bay, where there was a high concentration of damaged homes within the Build it Back program whose rebuilding and retrofitting was hampered because of documentation issues and irregular lot conditions.

With the amendment, the process was simplified for documenting the existence of older structures damaged during Hurricane Sandy, and a new zoning envelope was created for narrow and shallow lots to expedite the rebuilding effort.

Other potential zoning modifications being studies for broader applicability could help alleviate impediments to retrofitting in Sheepshead Bay:

For attached and semi-detached buildings that are losing floor space on the ground floor by coming into full compliance with NYC Building Code Appendix G, zoning could allow this floor space to be replaced above the DFE through the construction of a vertical addition.

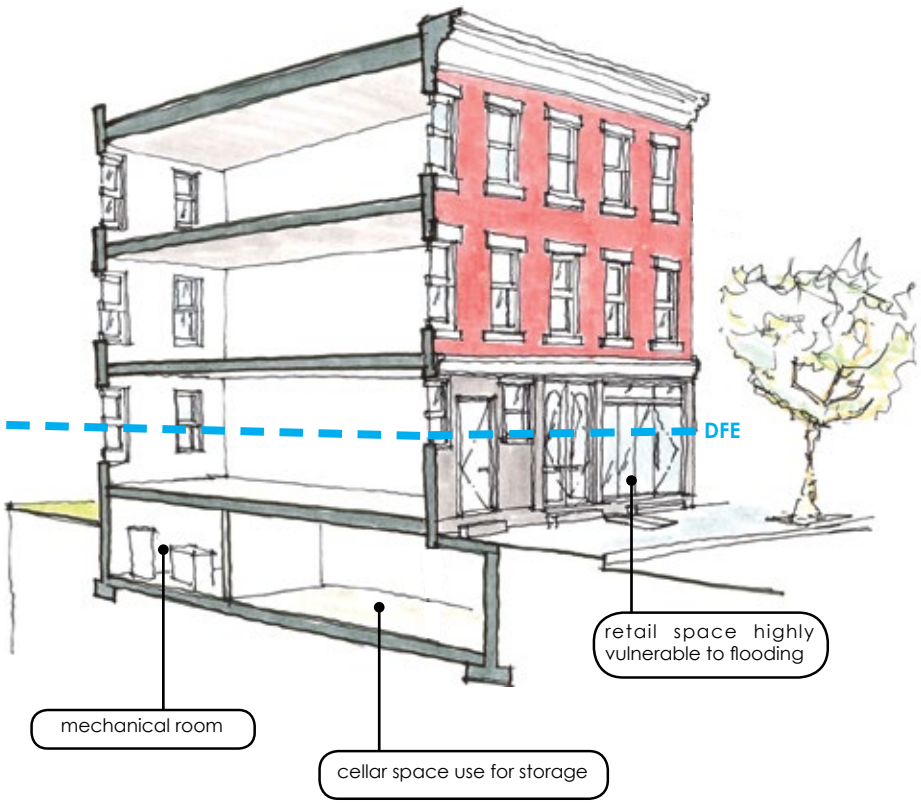
For detached buildings that have low DFEs and are losing usable floor space that was once at or below grade, zoning could allow relief that allows buildings to elevate to a height that allows for parking and storage at grade as well as a higher standard of flood protection.



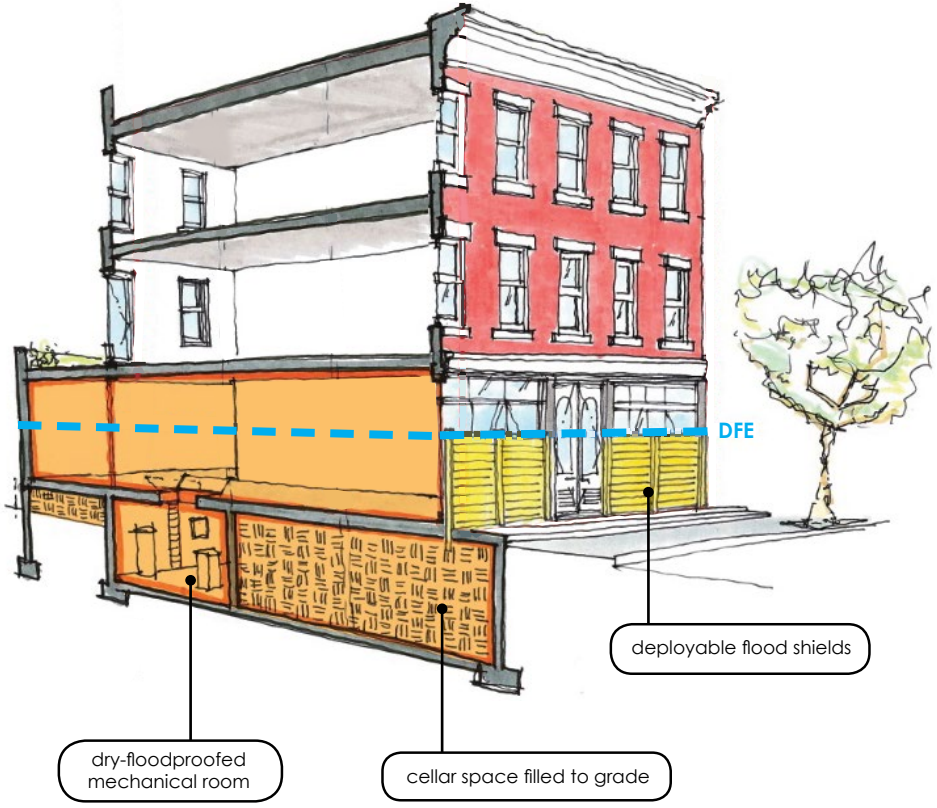
Sheepshead Bay Road

The resiliency challenges along the Sheepshead Bay Road are analogous to many of the challenges that commercial corridors throughout the floodplain face. The corridor is a study area within the Department of City Planning's *Resilient Retail* study. The study provides retrofit and design strategies for mitigating flood risk to commercial buildings while maintaining active ground floor retail that is accessible to community residents. The Department of City Planning and partner agencies such as Small Business Services have also been working with local business and property owners to develop strategies that strengthen the role of the corridors as community centers and ensure that critical retail services are available following natural disasters.

Existing low rise mixed use building with below grade space



Retrofitted low rise mixed use building

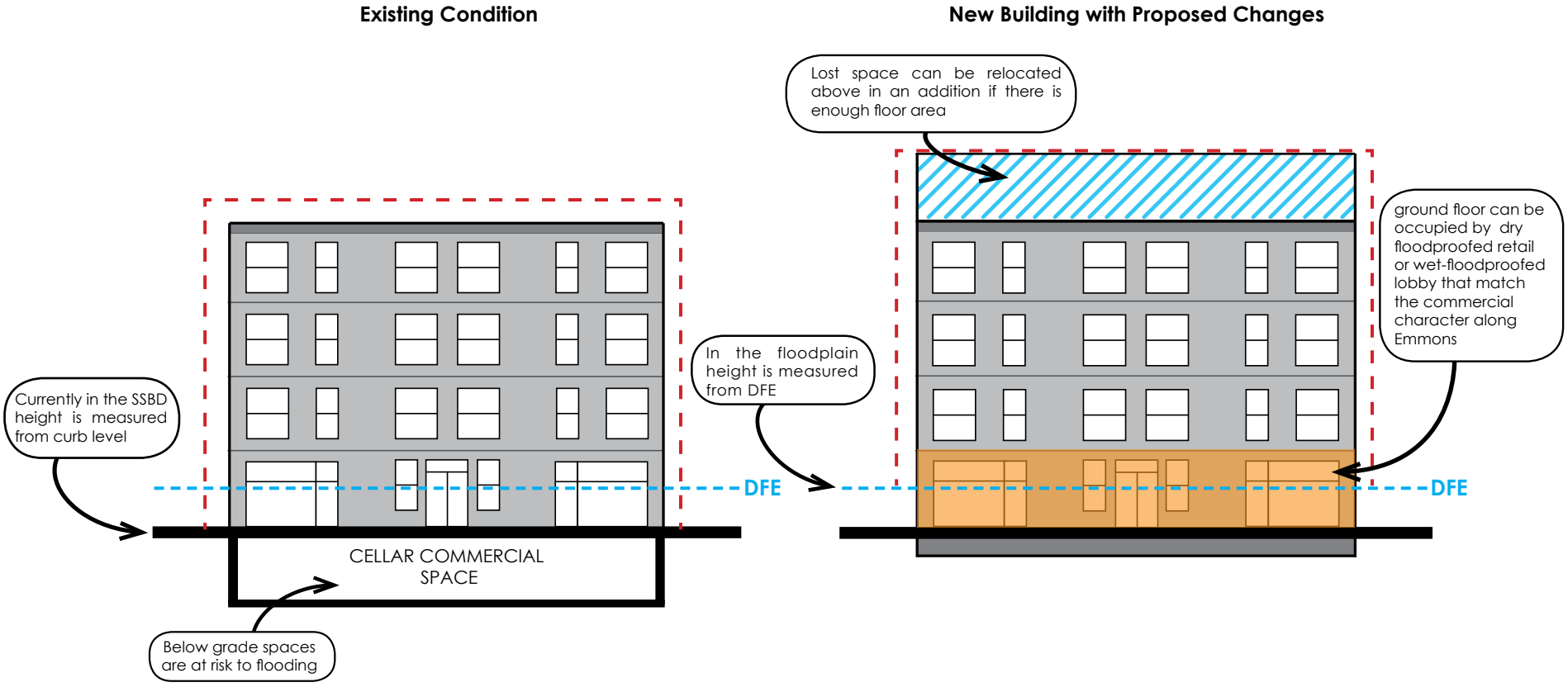


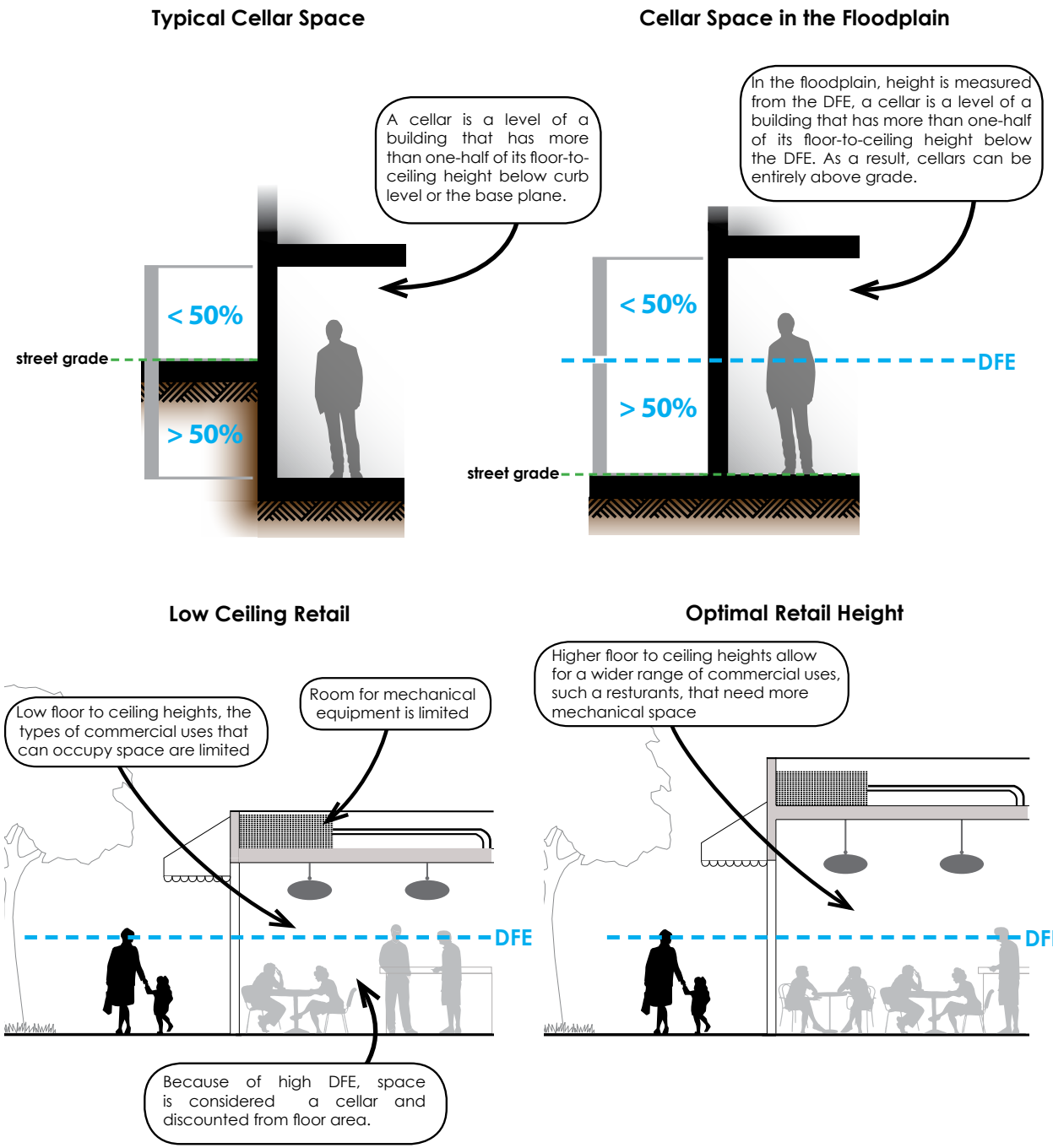
Special Sheepshead Bay District

Emmons Avenue is the heart of the Sheepshead Bay waterfront, with commercial and recreational boats, restaurants and shops lining the commercial strip. The corridor represents a destination not only for local residents, but also for the nearby communities. Hurricane Sandy was a stark remark of how fragile commercial corridors can be in the event of a flood, making it particularly hard for businesses to reopen in the aftermath of a storm. Several businesses along Emmons Avenue have not been able to return after the storm, and commercial spaces remained vacant for several months after flooding.

Consistent with Federal requirements and City policy, all new developments within the Special District must comply with current resiliency standards and practices. Maintaining active commercial uses at the ground floor will support Emmons Avenue as a vibrant destination along the Southern Brooklyn waterfront.

Historically several developments within the SSBD have provided below grade retail spaces in order to maximize floor area and comply with the district's height regulations. This not only can adversely impact the livelihood of a commercial strip by creating an awkward pedestrian retail environment, but also represents a serious risk during a flood event. Today's Federal, State and local code requirements for building in the flood zone pose strict limitations on commercial uses located below the flood elevation, requiring commercial spaces below the DFE to be dry floodproofed, which can be costly. Furthermore, dry floodproofing of spaces entirely below grade, such as cellars, presents often severe structural challenges and can be even more costly, in some cases, prohibitively so.





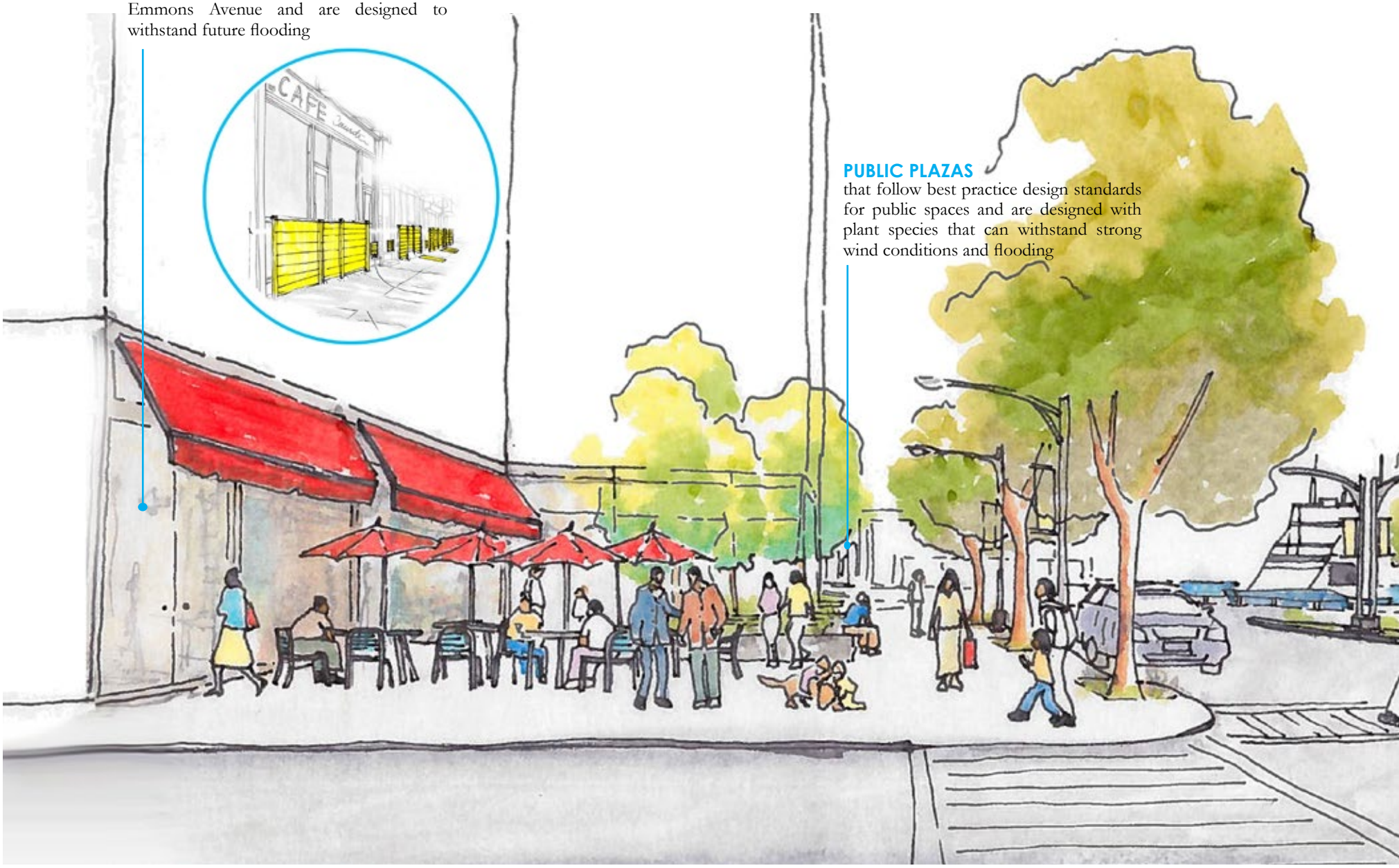
The Department recommends updating the Special District regulations to reflect current FEMA and NYC Building Code requirements. By doing so, any new development would be clearly required to comply with the underlying regulations of the SSBD and also meet the resiliency standards of the Special Regulations Applying in Flood Hazard Areas within the citywide Zoning Code.

Furthermore, to support the vibrancy of a commercial corridor in a flood-prone area it is desirable for mixed-use development not only be floodproofed, but also to ensure that active uses, such as restaurants, cafes, and retail stores, can be located at or close to street level. A floor to ceiling height of at least twelve to thirteen feet is desirable most commercial businesses.

Because in the flood zone building height is measured from the DFE, rather than the street level, ground floor spaces can be considered "cellars" under zoning. A defined "cellar" is a space exempted from floor area calculations, partially (at least 50%) or entirely below the "base plane", the level from which height is measured. This exemption reflects that the usability and function of this space is frequently limited. When the DFE is several feet above grade, ground floor spaces can be designed to qualify as cellars and not be included towards the overall floor area of the development (see top images).

At least some developments in the floodplain with DFEs between four and a half and six feet above street level,are being built with low floor to ceiling heights (between nine and eleven feet) at the ground floor, in order to qualify as cellars, as defined in the zoning code. This condition tends to create commercial spaces that have a higher risk of remaining vacant. This study has identified improvements to both the Special Regulations Applying in Flood Hazard Areas and the SSBD of the Zoning Resolution, which would removed this

ACTIVE COMMERCIAL GROUND FLOORS
promote the commercial vibrancy of Emmons Avenue and are designed to withstand future flooding



PUBLIC PLAZAS
that follow best practice design standards for public spaces and are designed with plant species that can withstand strong wind conditions and flooding

undesirable and unintended consequence by allowing the provision of commercial ground floors within dry floodproofed mixed-use buildings without penalty, promoting higher-quality commercial spaces and more vibrant streetscapes.

Beyond the single-building scale, the current Special District regulations incentivize the provision of public plazas and open space through a generous floor area bonus. However, the quality of open space produced through this provision has not been strong and the standards in the zoning do not reflect current best practices for public plaza design or resiliency.

To ensure that new plazas in the Special District are accessible, active, and flood resilient, this plan recommends to introduce design and resiliency requirements for all new public plazas in all sub-areas where such bonus is available. The enhanced provisions would require plazas to comply with up-to-date design standards for public plazas throughout the city and would require resiliency measures, including plant species able to withstand common issues in the floodplain, such as flooding and strong winds.

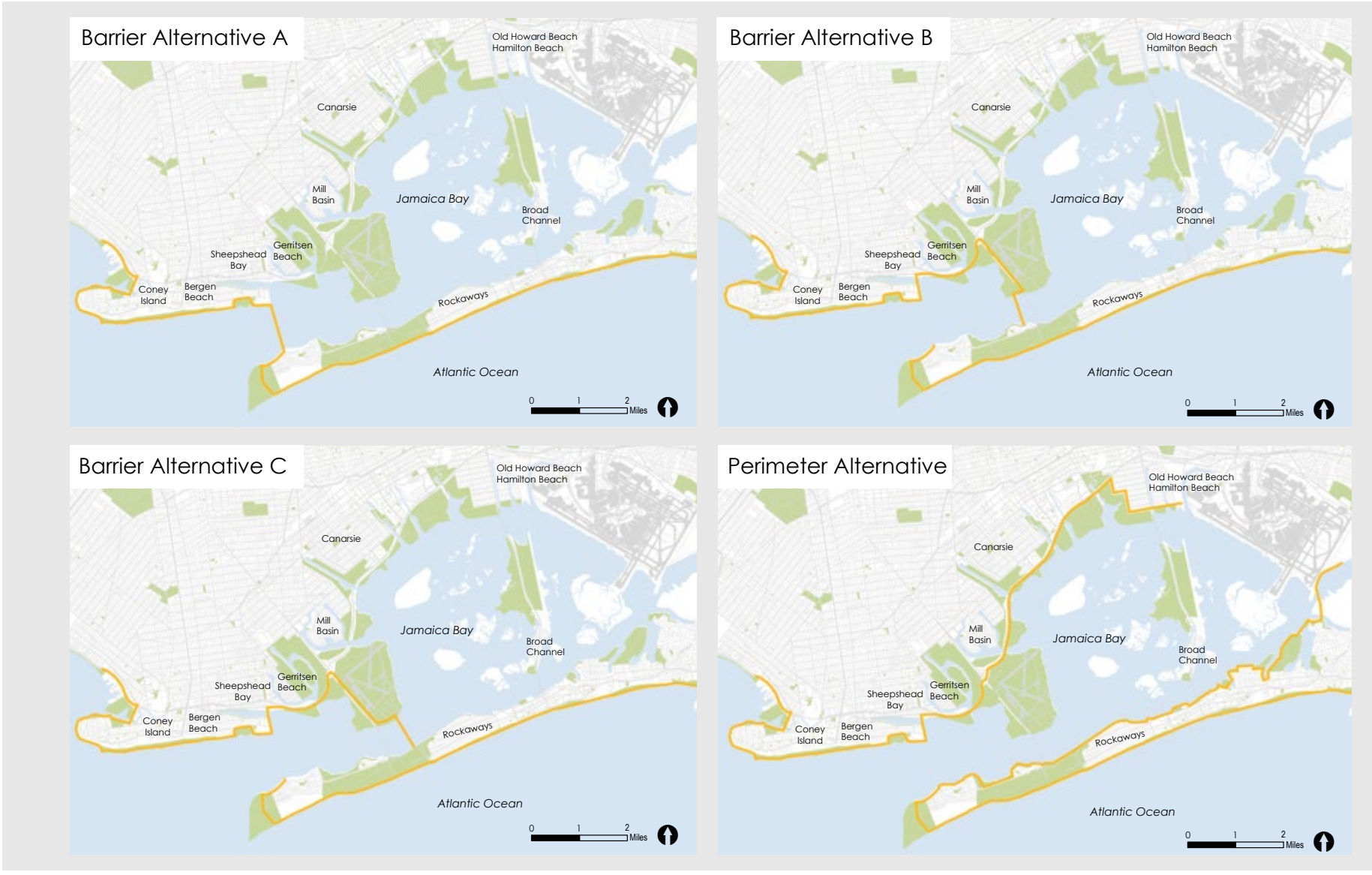
Bungalow Courts

While many homeowners in the courts are enrolled in the City's Sandy recovery program, Build it Back, many bungalows have been abandoned or are in foreclosure. Additionally, homeowners who have completed all repairs are less likely to participate in Build it Back. As a result the courts do not have the full enrollment in the Build it Back program, which would be necessary to execute full-site redevelopment strategies. Build It Back's recovery approach to this area has included intensive outreach, partnership with elected officials including Council Member Deutsch, and coordination among homeowners. While evaluating the feasibility of elevating and reconstructing homes, Build It Back is also studying infrastructure repairs for this area, which would improve the resiliency outcomes of its projects in this area. Currently Build It Back is working to complete design on those homes in the program and is working with the homeowners to facilitate the formation of a Homeowner's Association that will allow the installation of new internal sewer and water systems that will make these communities safer and more resilient to future flood events.

Bungalow elevation through the Build it Back Program photo credit: Mayor's Office of Housing and Recovery

Coastal Protection

The United States Army Corps of Engineers (USACE) is currently studying coastal storm risk management projects for Jamaica Bay and surrounding communities, including the Rockaways and Coney Island. The Corps is assessing strategies for controlling erosion and reducing risks from coastal storms along the Atlantic shorefront, including groins, dunes, berms, and reinforced dunes. To reduce risks from flooding in the Bay, they have identified several potential alternatives (see below), including a series of shoreline protections along the edge of Jamaica Bay and the bayside of Rockaway Peninsula, as well as a hurricane barrier at the inlet of Jamaica Bay in one of several different locations. Under both scenarios, risk from coastal flooding along Sheepshead Bay would be reduced. The Corps has determined that the hurricane barrier option is more cost-effective and would have fewer environmental impacts. The alignment is still being analyzed to ensure, among other things, that water quality and coastal habitats in the Jamaica Bay would not be compromised. Implementation of the project is not assured, and would require several more years of permitting and design, as well as additional funding and approval from Congress.




BAY
FEST
SUNDAY
MAY 18

CONCLUSION

Hurricane Sandy significantly impacted the Sheepshead Bay community and highlighted the neighborhood's risk to coastal flooding, particularly the bungalow courts and Emmons Avenue. It also highlighted how difficult it has been for local businesses and homeowners to recover from the storm and prepare for the next one. Despite this vulnerability, however, Sheepshead Bay remains a viable coastal community and there are many opportunities to build on the strengths of the neighborhood and geography to ensure long-term resiliency.

The resiliency framework for Sheepshead Bay will guide the Department of City Planning's ongoing work and inform inter-agency efforts. In summary, the recommendations include:

Zoning Changes to Enable Resilient Development

DCP will promote building retrofits in mixed-use areas by proposing changes to the zoning that allow sufficient flexibility for height and floor area measurement. For instance, for attached and semi-detached buildings that would lose floor space on the ground floor by coming into compliance with NYC Building Code Appendix G, changes could allow for the lost floor space to be replaced above the DFE. For detached buildings that are losing floor space, such as a cellar or storage below grade,changes could provide zoning relief that allows buildings to elevate to height necessary to allow for better use of the ground floor for parking and storage.

Sheepshead Bay Road

Using recommendations developed through DCP's *Resilient Retail* study, City agencies including SBS will continue to support resilient business retrofits, streetscape improvements, and disaster preparedness education for property owners and small businesses to ensure that critical retail services are available following natural disasters.

Special Sheepshead Bay District

DCP will identify recommendations to SSBD zoning text that would ensure regulations align with the most current flood resilient construction guidelines to more easily accommodate retrofitting, as well as to promote resilient development. Public space regulations in the SSBD can also be updated to include requirements for resiliency and to promote the creation of well-designed, inviting spaces that support the commercial vibrancy of Emmons Avenue.

Coastal Protection

The City, led by ORR, will continue coordinating with the U.S. Army Corps of Engineerings as it analyzes the opportunities for coastal protection in Southern Brooklyn.

The Resilient Neighborhood recommendations for Sheepshead Bay were shaped by input from the community and work with other City, State, and Federal agencies. The Department of City Planning will continue to work on advancing the resiliency goals listed in this report and remains committed to working with the community to address resiliency needs through zoning, exploring retrofit financing opportunities, promoting business development, and exploring future study of infrastructure and coastal protection strategies.

GLOSSARY OF KEY TERMS

Base Flood Elevation (BFE)
The computed elevation in feet to which floodwater is anticipated to rise during the 1% annual chance storm shown on the Flood Insurance Rate Maps (FIRMs) issued by the Federal Emergency Management Agency (FEMA). A building's flood insurance premium is determined by the relationship between the BFE and the level of the lowest floor of a structure.

1% Annual Chance Floodplain (100 Year Floodplain)
The area that has a 1% chance of flooding in any given year. It is indicated on FEMA's Flood Insurance Rate Maps (FIRMs). See "Special Flood Hazard Areas," below.

Design Flood Elevation (DFE)
As defined by the New York City Building Code, the Design Flood Elevation (DFE) is the minimum elevation to which a structure must be elevated or floodproofed. It is the sum of the BFE and a specified amount of freeboard (see definition below) based on the building's structural category.

Flood Insurance Rate Maps (FIRMs)
The official flood map, on which FEMA has delineated the Special Flood Hazard Area (SFHA), 0.2% annual floodplain (Shaded X Zone), Base Flood Elevations (BFEs), and floodways.

Preliminary Flood Insurance Rate Maps (PFIRMs)*
The PFIRMs are the best available flood hazard data. FEMA is in the process of updating the Flood Insurance Rate Maps (FIRMs) for New York City and issued PFIRMs in December 2013 and again in 2015 as part of this process. The New York City Building Code requires new and substantially improved buildings to use the PFIRMs (unless the effective FIRMs are more restrictive) until the maps become effective. The PFIRMs, however, are not used to guide the requirements of the National Flood Insurance Program.

Floodproofing, Dry
For non-residential buildings, a flood mitigation technique that results in the building resisting penetration of flood water up to the DFE, with walls substantially impermeable to the passage of water and structural components having the capacity to resist specified loads.

Floodproofing, Wet
A flood mitigation technique designed to permit parts of the structure below the DFE to intentionally flood, by equalizing hydrostatic pressures and by relying on the use of flood damage-resistant materials. With this technique, parts of the building below the DFE are only to be used for parking, storage, building access, or crawl space.

Freeboard
An additional amount of height above the BFE to provide a factor of safety to address the modeling and mapping uncertainties associated with FIRMs, as well as a degree of anticipated future sea level rise. It is a risk reduction requirement found in Appendix G of the Building Code and recognized by NFIP as an insurance premium reduction factor. In New York City, one foot of freeboard is required for commercial and multi-family buildings, and two feet for single- and two-family buildings.

* In October 2016 FEMA announced that the City of New York won its appeal of FEMA's 2015 Preliminary Flood Insurance Rate Maps and has agreed to revise New York City's flood maps. This will result in revised flood maps which will provide New York City residents with more precise flood risk data for current conditions, in addition to providing a new map product for future conditions that account for climate change. Until any new flood maps are issued, the city's building code will continue to reflect the 2015 Preliminary FIRMs to ensure that new buildings are better able to withstand flood risk.

National Flood Insurance Program (NFIP)
Federal program that makes flood insurance available to municipalities that enact and enforce floodplain management regulations that meet or exceed the criteria established by FEMA. Under this program, properties within the SFHA with a federally-backed or -regulated mortgage are required to buy flood insurance. Communities participating in the NFIP must incorporate flood-resistant construction standards into building codes.

Special Flood Hazard Areas (SFHA)
Area of the floodplain that has a 1% chance, or greater, of flooding in any given year. Also referred to as the 100-year floodplain or the 1% annual chance floodplain. The SFHA is separated into zones depending on the level of hazard:

V Zone
The area of the SFHA subject to high-velocity wave action that can exceed three feet in height.

Coastal A Zone
A sub-area of the A Zone that is subject to moderate wave action between one-and-a-half and three feet in height.

A Zone
The area of the SFHA that is subject to still-water inundation by the base flood.

Substantial Damage
Damage sustained by a building whereby the cost of restoring the structure to its pre-damaged condition would equal or exceed fifty percent of the market value before the damage occurred. When a building is substantially damaged or substantially improved (see below), it is required to comply with Appendix G of the Building Code as if it was a post-FIRM structure.

Substantial Improvement
Any repair, reconstruction, rehabilitation, addition or improvement of a building with cost equaling or exceeding fifty-percent of the current market value of the building. When a building is substantially improved, it is required to comply with the flood-resistant construction requirements of Appendix G of the Building Code.

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Data Sources

Federal Emergency Management Agency
NYC Panel on Climate Change
U. S. Department of Housing and Urban Development

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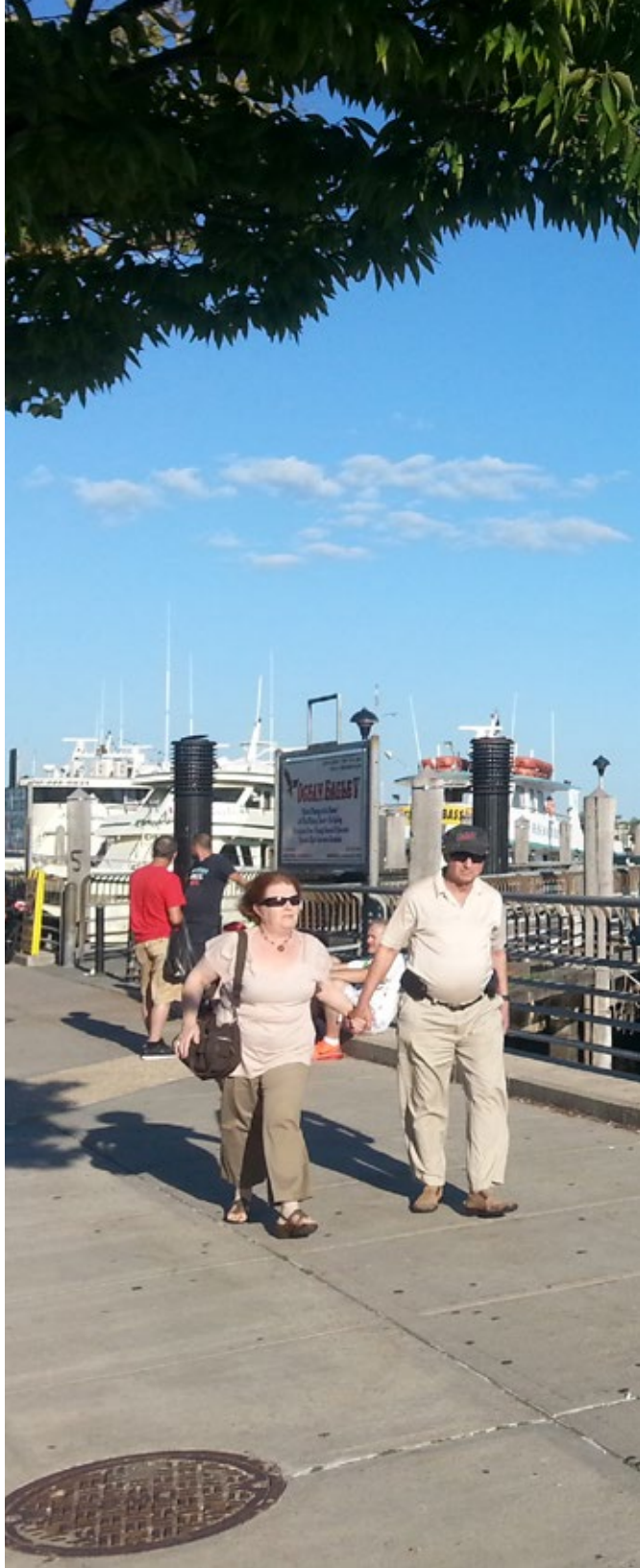

RESOURCES

TECHNICAL GUIDANCE

New York City Department of City Planning

Retrofitting Buildings for Flood Risk
nyc.gov/retrofittingforfloodrisk

Designing for Flood Risk
nyc.gov/designingforfloodrisk

Urban Waterfront Adaptive Strategies
nyc.gov/uwas

Flood Resilience Zoning Text Amendment
nyc.gov/assets/planning/download/pdf/plans/flood-resiliency/flood_resiliency.pdf

Special Regulations for Neighborhood Recovery
nyc.gov/site/planning/plans/special-regulations-neighborhood/special-regulations-neighborhood.page

Resilient Retail
www.nyc.gov/resilientretail

New York City Department of Buildings

Building Code Appendix G Flood-Resistant Construction
www1.nyc.gov/site/buildings/codes/2014-construction-codes.page

Federal Emergency Management Agency

Flood Insurance Rate Maps
region2coastal.com

National Flood Insurance Program
floodsmart.gov

INFORMATIONAL RESOURCES

OneNYC
nyc.gov/onenyc

Mayor's Office of Recovery and Resiliency
www.nyc.gov/html/planyc/html/resiliency/resiliency.shtml

New York City Panel on Climate Change
onlinelibrary.wiley.com/doi/10.1111/nyas.2015.1336.issue-1/issuetoc

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