

Resilient Neighborhoods

Edgewater Park





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Edgewater Park

THE CITY OF NEW YORK
MAYOR BILL DE BLASIO

DEPARTMENT OF CITY PLANNING
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www.nyc.gov/resilientneighborhoods

FOREWORD

Edgewater Park is a charming, historic waterfront community nestled along the Long Island Sound in the Bronx. While these elements are part of what make Edgewater Park special, they also make it vulnerable to flooding today and, to an even greater degree, in the future.

Hurricane Sandy starkly demonstrated the hazards that New York City's coastal neighborhoods like Edgewater Park face. The storm also highlighted the city's and this community's resilience—their ability to bounce back from the storm and become stronger in the face of the next. Since the storm, the Department of City Planning has been working with other City agencies to increase the resiliency of coastal neighborhoods throughout the city. Our work includes a citywide flood resiliency zoning text amendment that changes zoning in the floodplain to make it easier for property owners to retrofit their buildings, and guidance documents, such as *Retrofitting Buildings for Flood Risk* and *Urban Waterfront Adaptive Strategies*, that help designers, planners, and residents plan for and adapt to the risks of flooding.

The report presented here is part of Resilient Neighborhoods, a program funded by the U.S. Department of Housing and Urban Development that complements DCP's citywide efforts by working with communities to generate neighborhood plans that advance resiliency through neighborhood-specific changes to zoning and land use and by identifying needs and opportunities for investments in infrastructure. The program includes ongoing coordination with other City agencies and illustrates the importance and effectiveness of pursuing resiliency through place-based planning.

This report is the culmination of over a year-and-a-half of working with the Edgewater Park community to envision a long-term future for the neighborhood that is consistent with OneNYC's commitment to fostering a more resilient city. Residents will find guidelines on retrofitting buildings in Edgewater Park, as well as a series of case studies for how new development can be made more resilient, while still contributing to the community's unique character.

This plan is the beginning of a conversation and a commitment to work with the community to ensure the ongoing vibrancy and resiliency of Edgewater Park.



Carl Weisbrod, Director
Department of City Planning



Homes in Edgewater Park

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EXECUTIVE SUMMARY

Hurricane Sandy's devastating impacts on New York City served as a stark reminder of the city's vulnerability to coastal storms and flooding. Though much of the Bronx was spared the damage sustained in many neighborhoods across other boroughs due to the trajectory of the storm and the timing of the tides, climate change is expected to increase the frequency and severity of future storms, 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 that has worked with communities to identify neighborhood-specific strategies to support the ongoing vitality and resiliency of ten communities located in the city's floodplain. This study focused on consensus-based community planning and capacity building for residents, and provides site-specific guidelines for retrofitting and rebuilding single-family homes and bungalows in Edgewater Park.

The City's work in Edgewater Park has three major goals that will be described in this report:

Reduce flood risk

Enable buildings to withstand flooding and other hazards while minimizing disruption to residents by updating the Edgewater Park Co-op bylaws to allow for flood resilient construction and investment.

Plan for adaptation over time

Support the ability of the Edgewater Park community to adapt and prepare for a changing climate by providing information on risk and a menu of neighborhood-appropriate resiliency measures.

Creating resilient, vibrant neighborhoods

Ensure that resilient buildings are in line with community character.

In addition, this report provides a detailed description of the outreach, research, and analysis that has driven these outcomes, as well as an overview of the planning framework and regulatory context that underpin them.

As vital as this work is, coastal resiliency cannot be achieved through one study at one point in time, but rather must be pursued through ongoing recognition of and responses to evolving risks and changing conditions. In the face of this challenge, the City will continue to work with communities such as Edgewater Park to ensure that resiliency goals can be met while maintaining the safety and well-being of residents.

OVERALL HEIGHT
OF HOME IS 33'
ABOVE GRADE.
25' ABOVE
DPE

DECORATIVE GATE +
SHED AS PRIVACY
FOR REAR YARD

NEIGHBORING CONTEXT

PERGOLA DETAIL
IS A DECORATIVE
PORCH OPTION.

PORCH BREAKS UP
HEIGHT OF HOME,
PROVIDES SPACE FOR
HOME OWNER +
IS A STREETSCAPE
MITIGATION STRATEGY.

BREAKAWAY
LATTICE WALL
HELPS BUFFER
STORAGE SPACE OF
HOME

STAIR TURN REMOVES
A VERTICAL DISCONNECT
FELT FROM HEIGHT OF HOME
+ STREETSCAPE MITIGATION
STRATEGY.

PLANTING EDGES
FIRST FLOOR ELEVATION
OF HOME + STREETSCAPE
MITIGATION STRATEGY.

260' PRIVATE WALK
TO REAR YARD + WATERFRONT

NEIGHBORING HOME
FOOTPRINT

Waterfront
walkway

INTRODUCTION

Resiliency Planning in New York City

Following Hurricane Sandy in October 2012, the City developed a detailed action plan for rebuilding, called “A Stronger, More Resilient New York,” that focused on both post-disaster recovery and long-term resiliency for the city’s coastal communities, buildings, and infrastructure. In the time since, the City has made significant progress in implementing the plan, funding a \$20 billion climate resiliency program and advancing rebuilding through initiatives such as Build it Back, as well as long-term resiliency through infrastructure investments and upgrades such as the Hunts Point Resiliency Project.

OneNYC

Drawing on this work and earlier planning efforts, in Spring 2015 the City released “OneNYC: The Plan for a Strong and Just City,” a long-term strategic plan to address the city’s most pressing challenges, including a rapidly growing population, rising inequality, aging infrastructure, and climate change. OneNYC looks to the year 2025, when the City will celebrate its 400th anniversary and begin its fifth century, to guide a conversation about how New Yorkers might meet these challenges over the next ten years and beyond. The plan is organized into strategic visions around four key themes: growth, equity, sustainability, and resiliency. A set of ambitious goals are associated with each theme. In all, the plan outlines over 200 new initiatives intended to achieve these goals over the next ten years.

The City’s resiliency goals are premised on a vision that New York City’s neighborhoods, economy, and public services will be ready to withstand and emerge stronger from the impacts of climate change and other 21st century threats. As detailed in the diagram to the right, the goals are divided into categories: neighborhoods, buildings, infrastructure, and coastal defense. Through select initiatives at each of these scales, ranging from

Resiliency refers to the ability of people, the places where they live, and the infrastructure they rely upon to withstand and recover from a natural disaster and emerge even stronger.



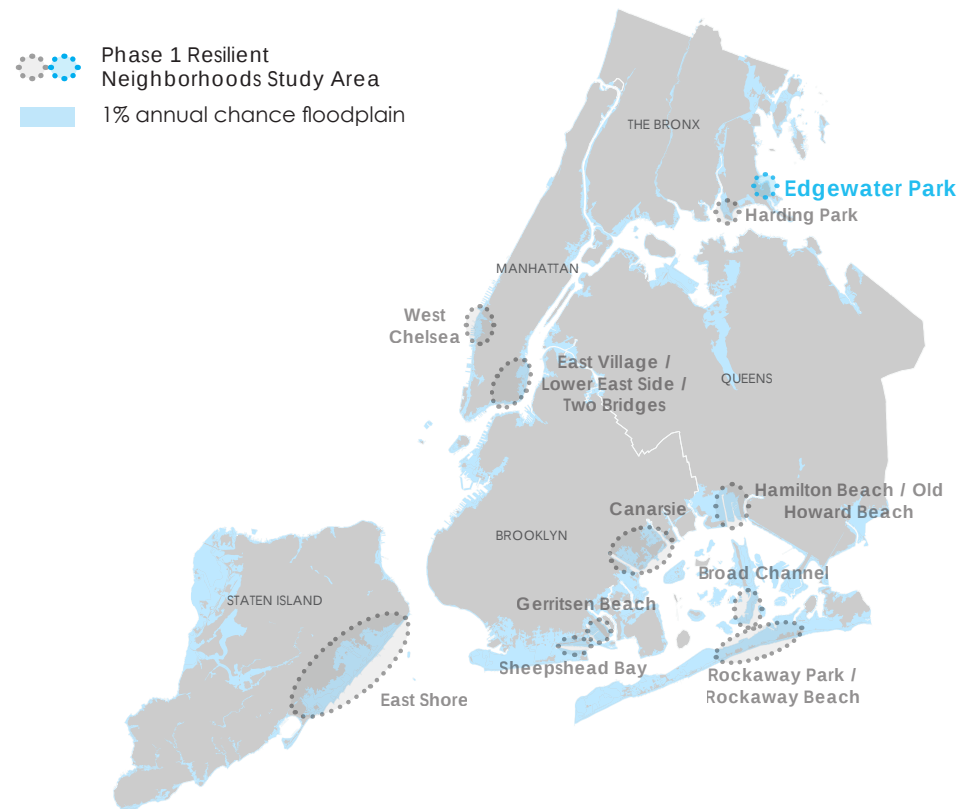
strengthening community-based organizations to pursuing policy reforms of the federal flood insurance program, the City hopes to achieve measurable impacts, including eliminating disaster-related long-term displacement of New Yorkers from homes, reducing the social vulnerability index for neighborhoods, and lowering average annual economic losses resulting from climate-related events.

Resilient Neighborhoods

One of the projects presented in OneNYC is Resilient Neighborhoods, a place-based planning initiative to identify neighborhood-specific 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 throughout all five boroughs that represent a variety of demographic and built conditions. The Department of City Planning (DCP) identified these study areas based on local resiliency challenges that warranted additional study beyond what was being undertaken as part of other citywide resiliency projects.

While the Bronx fared better during Sandy than other areas of the city due to the tides at the time of Sandy's arrival in New York City, many communities within the borough have been severely impacted by previous storms and are at risk from future storms. Edgewater Park was selected for this initiative because of the high flood risk it faces due to its unique building typology and vulnerable location on the Long Island Sound.

Established as a summer bungalow community, homes were adapted over time for year-round living. Structures are located immediately adjacent to one another on narrow streets, and while these conditions contribute to the charming and distinctive character



of the neighborhood, they also inhibit the adoption of standard resiliency measures. Today, Edgewater Park is a private cooperative community governed through bylaws administered by an active Co-op board. This ownership structure creates both operational and regulatory challenges and opportunities for creating a more resilient neighborhood.

The Edgewater Park study is a product of collaboration between DCP and other City agencies, including the Mayor's Office of Recovery and Resiliency, the Housing Recovery Office, and the Department of Buildings as well as New York State's New York Rising Initiative. Recommendations made through Resilient Neighborhoods also draw on previous work by DCP and

other City agencies. The Department's Flood Resilience Zoning Text Amendment, adopted in October 2013, changed zoning regulations to enable new and existing buildings to incorporate flood protection measures more easily. This text amendment, adopted as a temporary measure immediately after Sandy, is currently in the process of being revised and updated before its permanent adoption. In addition, "*Retrofitting Buildings for Flood Risk*," a report released by DCP in 2014, provides a comprehensive analysis of and guide to retrofit options available for buildings in the floodplain. DCP is also conducting studies on resiliency issues as they relate to retail corridors and industrial land uses throughout the city, and expects to release these findings in 2016.

Planning Approach for Resiliency

The ten Resilient Neighborhoods study areas encompass a variety of physical, environmental, social, and economic conditions, the combination of which creates a distinct set of resiliency challenges for each neighborhood. To account for this diversity of contexts and to ensure that a consistent planning approach underpins the City’s resilient land use goals, the Department of City Planning developed a tool for coordinated analysis and risk-based decision-making. The latter half of this report details the strategies and recommendations that have been developed for Edgewater Park based on this process.

The tool has three central components, outlined in the diagram to the right, beginning with a **resiliency assessment**. Through a set of analyses, the resiliency assessment evaluates coastal risks, the capacity of neighborhoods to adapt to and/or mitigate these risks, and the alignment between potential adaptation actions and other policy goals or community priorities, such as the production or preservation of affordable housing. The objective of the assessment is to determine which hazards and vulnerabilities are present within a neighborhood and evaluate the potential for adaptive investments, such as building-scale retrofits or new coastal protection infrastructure, to reduce these vulnerabilities.

The results of the resiliency assessment, in addition to input generated through community outreach, inform the selection of one or more **local resilient land use strategies**. The strategies are chosen based on a number of criteria that determine which long-term approach to development is necessary to reduce risks and achieve a more resilient built form. Across the city, there are a spectrum of potential strategies, ranging from limiting growth in areas that are at significant risk from future daily tidal flooding due to sea level rise, to maintaining existing density but altering regulations to promote retrofits, to encouraging new growth and

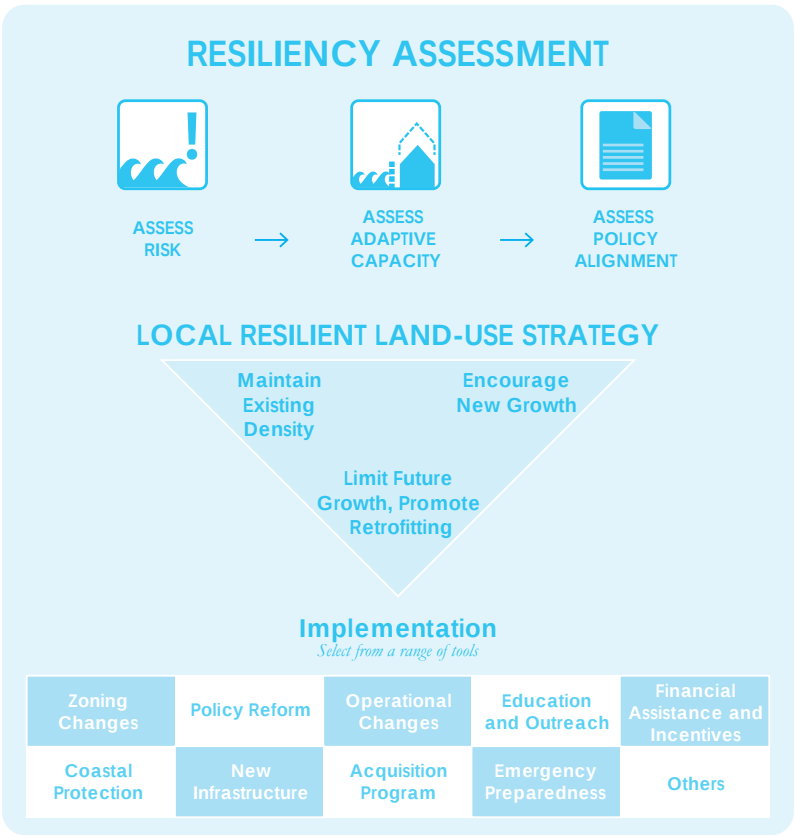
redevelopment of an existing built environment that cannot be retrofitted in place to achieve resiliency goals. Often, more than one land use strategy must be pursued throughout a neighborhood.

The final component of the process is the **implementation** of the chosen local resilient land use strategy through a variety of planning and policy tools. The range of tools include, but are not limited to, zoning changes, policy reform, operational changes, education and outreach, financial assistance, construction of new or adapted infrastructure, and emergency preparedness training. Frequently, a combination of tools enacted at different scales and amongst different stakeholders is

necessary to fully implement a land use strategy. This process of risk assessment, land use strategy selection, and implementation helps shape a planning framework for resilient development that is calibrated to challenges and opportunities within specific neighborhoods.

Regulatory Framework

One of the most important considerations in planning for neighborhood resiliency is the regulatory framework that determines how and where buildings are constructed in the floodplain. There is a wide array of programs and regulations at various levels of government that work together to manage flood risk and promote resilient



development. Since Hurricane Sandy, many federal and local laws and regulations have been modified, with significant implications for the construction and retrofiting of buildings in New York City's floodplain. At the same time, federal, state, and local authorities have been upgrading infrastructure networks and planning new coastal protection measures across the city, while also pursuing programmatic investments that will increase community preparedness and emergency response in the wake of future disasters. This mix of infrastructure investments, emergency preparedness planning, and building regulations, as illustrated in the diagram to the right, come together to create a framework for a more resilient city.

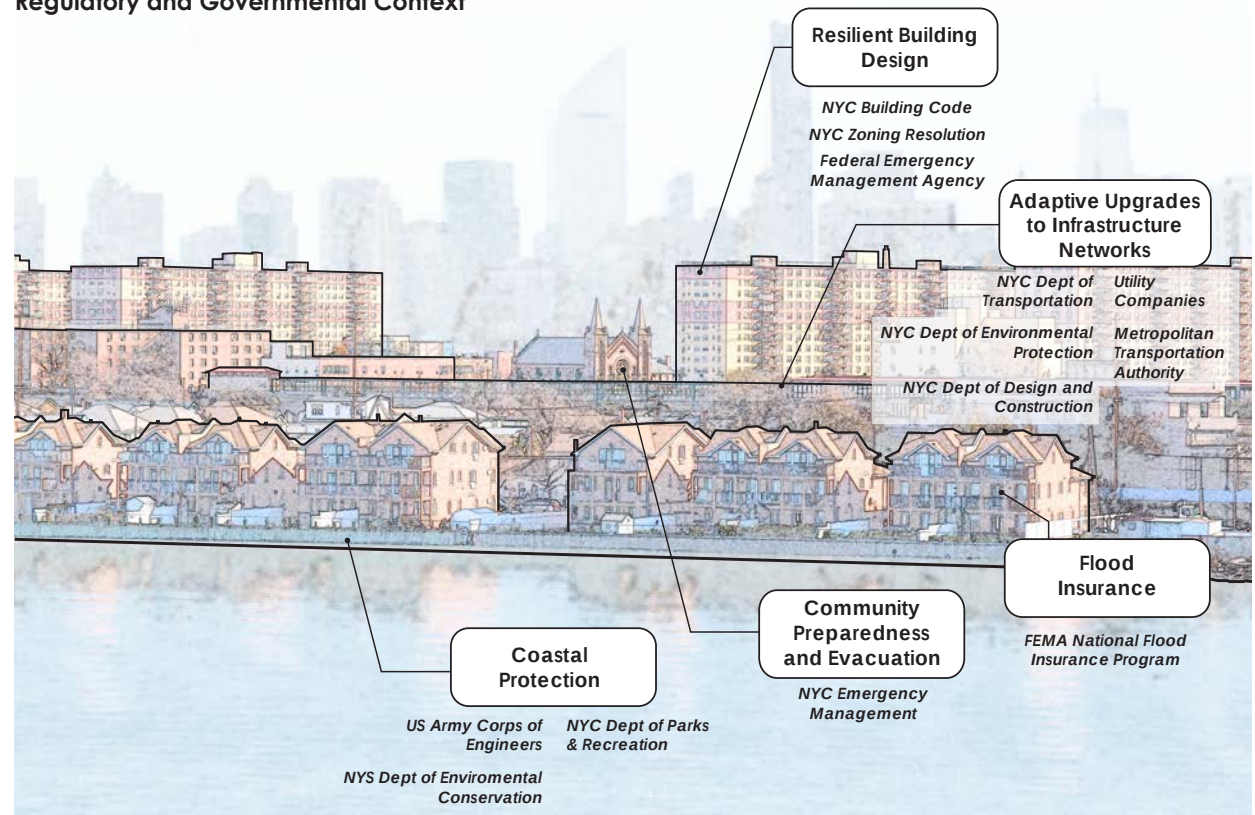
Federal Flood Maps and Flood Insurance

Most relevant to this study are a set of regulations that influence how homes and businesses are constructed in the floodplain. In the United States, floodplain regulation begins with Flood Insurance Rate Maps (FIRMs), which are created and maintained by the Federal Emergency Management Agency (FEMA). The maps show the extent and elevation that flood waters are expected to rise to during a 100-year flood event, also known as the 1% annual chance floodplain.

The 1% annual chance floodplain is divided into three zones. The V and Coastal A zones are subject to risk from wave action, while the A zone denotes areas of flood inundation without significant wave action. The V and Coastal A zones differ in degree of wave risk, the former having computed wave heights in excess of three feet and the latter having computed wave heights from one-and-a-half to three feet. FIRMs also show the 500-year or 0.2% annual chance floodplain, which is shown as the Shaded X zone on the flood maps.

The 1% annual chance floodplain is also known as the Special Flood Hazard Area, the area where National

Regulatory and Governmental Context



Flood Insurance Program (NFIP) floodplain building standards apply, and where property owners with federally-regulated or -insured mortgages are required to carry flood insurance. In order to participate in NFIP, municipalities must first incorporate FEMA flood resilience building standards into local building codes. Flood insurance premiums under NFIP are determined by the relationship between the lowest occupied floor of the structure and the Base Flood Elevation (BFE) shown on the FIRMs at the structure's location, as well as other factors. Buildings with residential occupancy or commercial uses below the BFE have a higher risk of incurring damage from flooding and are accordingly subject to higher insurance premiums, while buildings

with all occupancy and other active uses elevated above the BFE have lower damage risk and qualify for lower premiums. Elevation and flood proofing standards are described and enforced through the New York City Building Code (see next page for additional information).

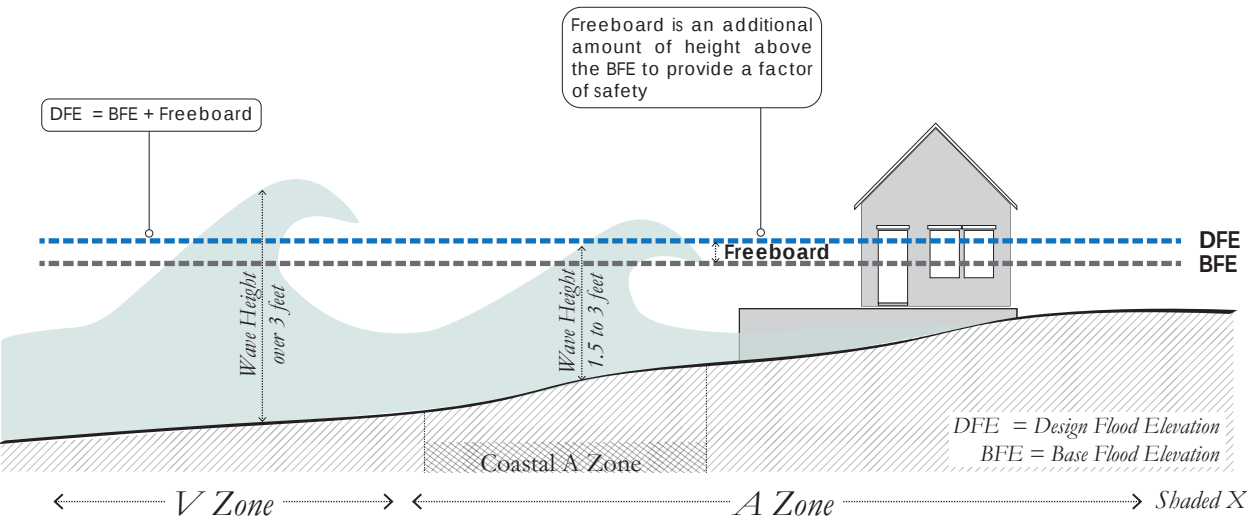
For the past several years, FEMA has been in the process of updating the FIRMs for New York City, which were implemented in 1983 and not significantly updated since. In many areas of the city, flooding from Sandy extended far beyond the floodplain shown on the 1983 FIRMs, reflecting the insufficiency of these maps as a regulatory risk mitigation tool. 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 heighten Base Flood Elevations for much of the city. The changes in inundation extent and flood elevation result from refinements to the flood modeling technique.

The implications of the expansion in the city’s floodplain are great. If the PFIRMs are officially adopted, the number of property owners in the city required to carry flood insurance will more than double. In addition, congressional changes to NFIP will make flood insurance more expensive over time for many property owners.

In summer 2015, the City submitted a formal appeal to FEMA, citing internal technical analysis that showed a smaller 1% annual chance floodplain across much of the city. As part of the public review of the PFIRMs, FEMA will review the appeal and determine if a re-mapping of the floodplain is necessary.

Flood Resilient Construction and Building Design
Flood resilient building standards are enacted through the New York City Building Code, specifically Appendix G on “Flood-Resistant Construction,” which as of 2015 applies to the Special Flood Hazard Area shown on FEMA’s PFIRMs or the 1983 adopted FIRMS, whichever of the two is more restrictive at the location of proposed development. Appendix G includes different elevation and floodproofing requirements for each flood zone, as well as separate requirements for residential and non-residential structures. The requirement to meet Appendix G is triggered by new construction or when a building is Substantially Damaged or undergoes a Substantial Improvement. As defined by Appendix G, “Substantially Damaged” buildings are those where the cost of restoring the building to its undamaged condition equals or exceeds



	ELEVATE	WET FLOODPROOF	DRY FLOODPROOF
	Open structure Eg. Open lattice	Water to run in / run out Eg. Flood vents	Watertight structure Eg. Flood shields
Ground Floor Configuration	<i>Bottom of <u>lowest structural member</u> to be at or above Design Flood Elevation</i>	<i><u>Lowest occupiable floor</u> to be at or above Design Flood Elevation</i>	<i><u>Lowest occupiable floor</u> allowed to be excavated below grade. (Not permitted for residential buildings)</i>
Permitted Uses (BELOW DFE)	☒ Parking ☒ Access ☒ Storage ☒ Non-Residential ☒ Residential	☒ Parking ☒ Access ☒ Storage ☒ Non-Residential ☒ Residential	☒ Parking ☒ Access ☒ Storage ☒ Non-Residential ☒ Residential

fifty percent of the market value of the building (not including the land). “Substantially Improved” buildings are those where any improvement, including repair, rehabilitation, or addition, would equal or exceed fifty percent of the market value of the building.

A number of new provisions within the building code were enacted after Sandy to help support resilient building in the city’s floodplain. To align with New York State standards for flood protection, the New York City Department of Buildings introduced rules requiring most residential and commercial buildings to protect one or two feet higher than the FEMA-designated Base Flood Elevation. Under these rules all new, Substantially Damaged, or Substantially Improved one- and two-family dwellings must elevate the lowest occupied floor an additional two feet of “freeboard” above the BFE shown on the flood maps. Multifamily buildings are required to provide an additional one foot of freeboard above the BFE. The elevation of the BFE plus freeboard is called the Design Flood Elevation (DFE).

To meet 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. Wet floodproofing requires the use of construction materials that are not damaged by water and providing vents to allow flood waters to pass through building walls. The wet floodproofed space can only be used for storage, parking, or building access. Basements or cellars that are below grade on all four sides are not allowed in purely residential buildings. Below-grade space is allowed if there is an adjacent grade on one side that is below the lowest level of the enclosure so that flood waters would be able to flow out by gravity. Non-residential buildings (any building that contains any amount of non-residential floor area under Appendix G) have the option of elevating and wet floodproofing, or dry floodproofing. Dry

floodproofing involves design strategies, such as flood walls, that keep water from entering a building. Dry floodproofed buildings must be designed so that walls can resist the lateral pressure of water (even walls below grade) and foundations can resist the force of buoyancy that occurs when a building is surrounded by water. 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 the lowest NFIP premiums.

Owners of buildings that are not new, Substantially Damaged, or Substantially Improved are not required to meet Appendix G requirements, but may voluntarily choose to implement partial flood mitigation strategies including elevating or floodproofing a building’s mechanical systems. These measures may not 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 in the aftermath of a flood.

Citywide Zoning for Flood Resiliency

To accommodate many of these building regulations, the Department of City Planning has instituted a series of zoning changes that remove impediments to retrofitting residential and commercial properties. The first of these changes was an emergency Executive Order, issued on January 31, 2013, that suspended height and other restrictions to the extent necessary for property owners to rebuild after Sandy. Many of these changes, as well as additional measures, were subsequently adopted by the City Council as the Flood Resilience Zoning Text Amendment on October 9, 2013. This text amendment created allowances for measuring building height from the latest FEMA flood elevations (including freeboard), providing building access from grade, locating mechanical systems above flood levels, accommodating off-street parking above grade, and restricting ground



floor uses. As shown in the images to the right, it also incorporated provisions to mitigate adverse streetscape impacts by promoting visual connectivity, façade articulation, inviting access, and neighborhood character. The text amendment rules applied to all buildings in the 1% annual chance floodplain.

The 2013 Flood Resilience Zoning Text Amendment was passed with a sunset provision and is set to expire a year after the PFIRMs are formerly adopted by FEMA. As mentioned previously, DCP is currently conducting analysis for a permanent amendment that will include many of the provisions set forth in the 2013 text amendment, along with additional regulations more attuned to certain building and lot conditions found in the city's floodplain. These changes are intended to make it easier for property owners to comply with FEMA and Building Code resilient building standards while also maintaining or maximizing permitted floor area. The Resilient Neighborhoods initiative complements these citywide efforts by studying zoning and land use changes in ten neighborhoods with unusual or particularly complex building and lot conditions that warrant additional analysis. The objective is to recommend changes to zoning that remove regulatory barriers to resilient construction and retrofiting that are relevant to these areas but need not be removed on a city-wide basis.

Streetscape Mitigation | Urban Design Principles



Visual Connectivity

Buildings should engage the sidewalk. Activity on sidewalks along building frontages supports pedestrian-friendly neighborhoods and visual interest, which in turn promotes an inviting pedestrian experience. On commercial streets, visual connectivity is important to the viability of local retail.



Inviting Access

Access elements such as ramps and stairs should be designed to appear inviting for people walking by. In residential neighborhoods, porches, stoops, and other access elements can help mitigate disconnections from the sidewalk level.



Façade Articulation

Buildings often contribute to the character of a place by offering human-scale architectural elements, particularly on the first floor. Having the windows and front door of a building face the public street can create a sense of security and comfort for pedestrians.



Neighborhood Character

Some neighborhoods have relatively uniform building types. Elevating buildings will necessarily produce variations in building height and, in some cases, placement on the lot. Designers should respect a neighborhood's character by taking cues from existing context.

Outreach Process

The Department of City Planning met with the Edgewater Park leadership in late 2013 to kick off a two year resiliency study. DCP has worked closely with stakeholders in Edgewater Park to identify and explore resiliency issues facing the community, as well as develop a framework for retrofitting existing residential structures, rebuilding in the floodplain, and ensuring the safety of future development.

In December 2013, DCP staff presented an overview of the Department's resiliency work program at the monthly Edgewater Park leadership meeting. In March 2014, staff participated in a guided tour of the community led by the Co-op. Through a participatory process, several waterfront properties were identified for further examination and selected as model sites for targeted, community-specific guidelines for retrofitting buildings for flood risk.

In July 2014, DCP returned to the monthly Edgewater Park Leadership meeting to update the community on the progress of the study, and to discuss other ongoing resiliency efforts affecting the area.

The following month, DCP and the Mayor's Office of Resiliency and Recovery facilitated a workshop with the Edgewater Park Community Leadership at the Edgewater Park firehouse. The Federal Emergency Management Agency (FEMA) presented an overview of the National Flood Insurance Program (NFIP) and the Preliminary Flood Insurance Rate Maps (PFIRMs), and DCP's Bronx Office presented the resiliency work program. The presentation concluded with a question and answer session.

As part of its outreach efforts to educate communities about the flood risk they face, DCP has continued to coordinate regularly with Edgewater Park leadership. This has included several site tours and working meetings



Co-op leadership streetscape mitigation presentation, August 12, 2015.

in which staff have worked with the community to communicate a wide range of flood related design and construction issues, such as demonstrating how residents may go about calculating and measuring required flood elevations as well as exploring site-specific reconstruction and elevation issues. Through

this process, DCP identified aspects of the Co-op's architectural guidelines that inhibited flood resilient investment or were not consistent with City resiliency policy, and has worked with the leadership to update the bylaws to allow for such retrofits and construction.

COMMUNITY RISK PROFILE

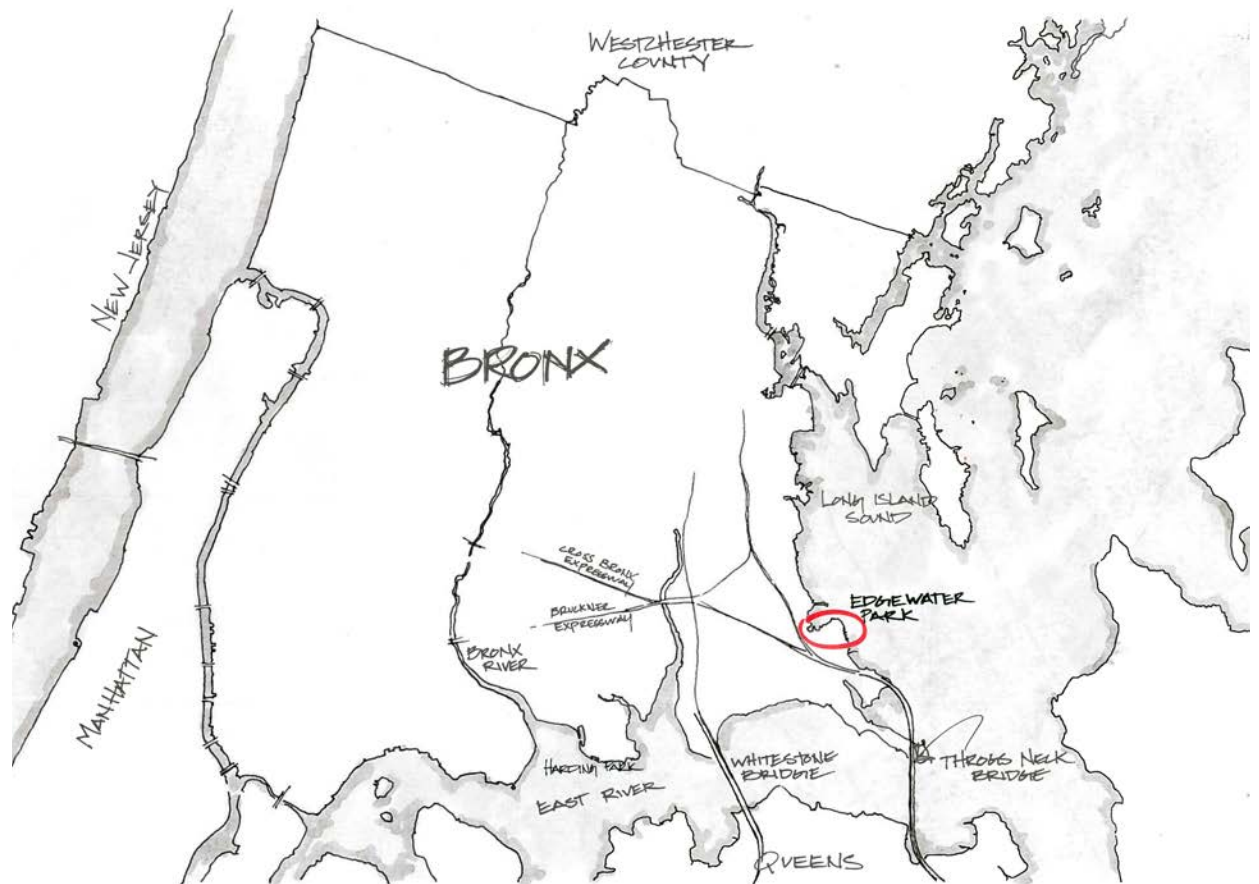
Community Character and History

Edgewater Park is a small, private waterfront community located on the Throgs Neck Peninsula in Long Island Sound. Bounded by a fieldstone bulkhead and three sandy beaches, the neighborhood fronts a half-mile of shoreline to the north and east. True to its name, Edgewater Park is built out directly to the water's edge, with a small concrete promenade separating the first row of homes from Long Island Sound. It is bounded by Miles Street to the south, the Throgs Neck Expressway and Veterans Memorial Park to the west, and Weir Creek and Eastchester Bay to the north and east, respectively.

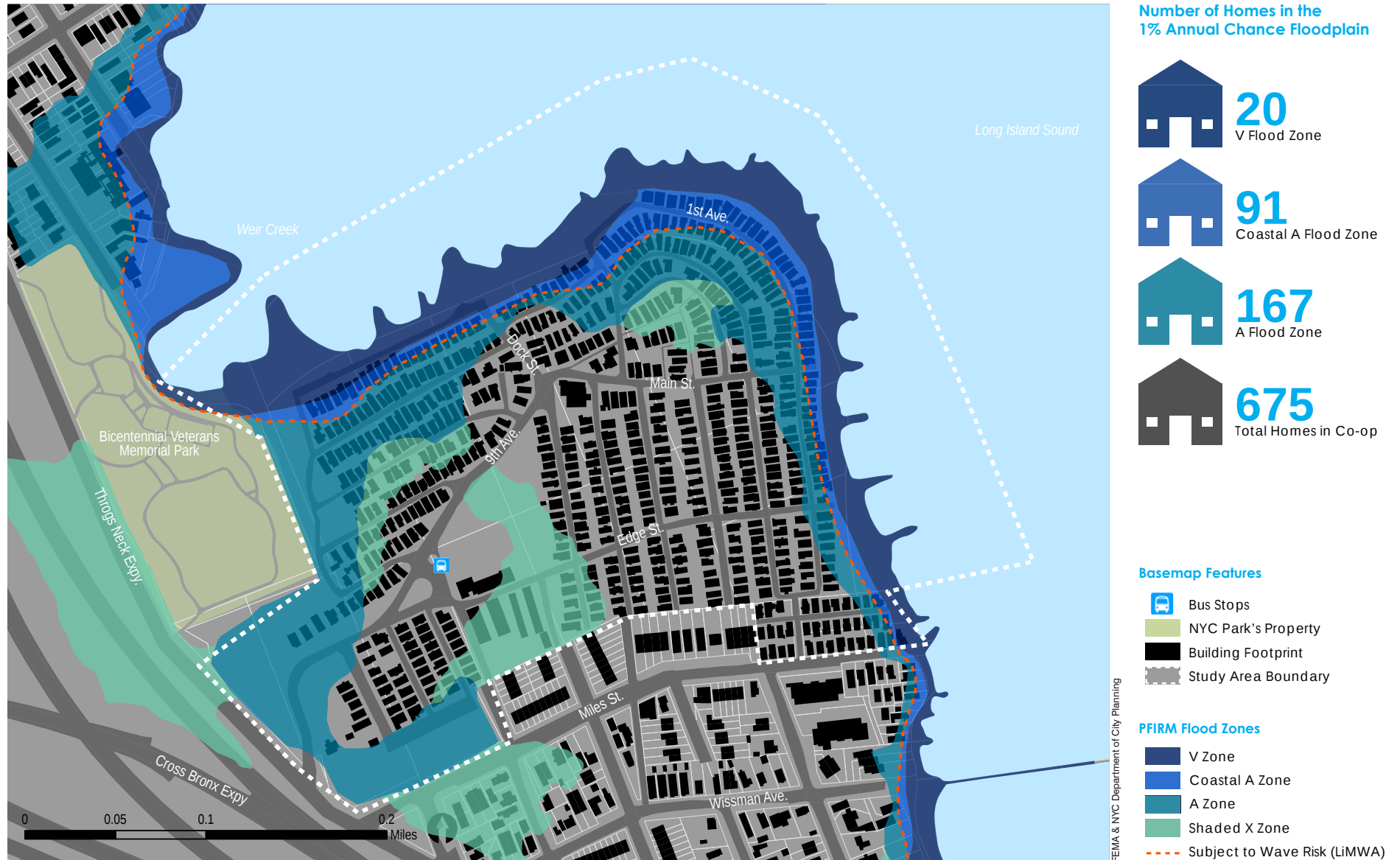
Historically the private estate of the Adey family, the area was used as a seasonal campground and rented to summer vacationers who pitched tents on the beach around the turn of the 20th century. Summer cottages and bungalows were erected during the 1920's, and were winterized to support a year-round community during the Great Depression. These quaint, converted homes still largely characterize the neighborhood today. Streets are small and narrow. Most are unmapped and without sidewalks, giving Edgewater Park the feel of a seaside town rather than an urban neighborhood.

Edgewater Park is one of a few private cooperative communities existing in New York City today. The Edgewater Park Co-op (the Co-op) was formed in 1988 when residents who formerly rented the land purchased it from the primary leaseholder. Though residents own their homes outright in these cooperative communities, they continue to lease the land, divided into shares, from owners' collectives, and pay dues to maintain communal areas and infrastructure. While Co-op properties are serviced by the City's sanitation and water systems, the community maintains a private sewage network and volunteer fire company. A board of directors, consisting of fifteen stockholders and residents, administers the community and sets forth architectural and construction guidelines, which regulate its built form.

Today, the Co-op spans fifty-five acres and includes 675 single-family residences that house approximately 3,000 residents. It is exclusively residential save for a single delicatessen that now stands where a full suburban style shopping center once existed before a fire left it damaged beyond repair in the early 1980s. The community makes use of two surface parking lots and is served by two bus lines: the Bx8, a local bus, and the BxM9, an express bus making the fifty-minute trip from the Throgs Neck area to midtown Manhattan.



Preliminary FIRMs



Flood Risk Profile

With a substantial number of homes in the floodplain, Edgewater Park faces significant risk as the community is vulnerable to multiple kinds of flood hazards including coastal storm surge with wave action and high floodwater depths. The majority of homes within the community were built prior to the enactment of floodplain management regulations and are therefore not built to today's codes for flood resistant construction. Approximately 278 homes, or just over forty percent of all homes in Edgewater Park are located in the 1% annual chance floodplain. A substantial number of these homes are located in the V Zone, where the most severe storm surge with high floodwater depths and wave activity of three feet or more could be experienced. Just fewer than 100 homes are within the Coastal A Zone, which is also characterized by considerable flood water depths and wave activity of three feet or less. The remaining 167 homes are in the A Zone, where wave activity is less a concern, but water depths could still reach damaging levels.

Base Flood Elevations (BFEs) within the study area, or the height to which water is expected to rise during a flood event, are among the highest in New York City. Approximately two thirds of homes could experience inundation between one and five feet above grade, while the remaining one third could experience floodwaters between six and eleven feet in depth.

The homes at the greatest risk of wave action and substantial inundation are located in the lowest lying areas of the community and along the water's edge. On the waterfront, homes sit as close as ten feet from Long Island Sound. The existing shoreline infrastructure, a five-foot tall concrete bulkhead, provides some protection from smaller storm events, but not the 1% annual chance storm.

With climate change and projected sea level rise, the floodplain is likely to increase over time, putting as many

as seventy-five percent of all homes in Edgewater Park in the 1% annual chance floodplain by the 2050s.

Homes within the 1% annual chance floodplain with mortgages from federally-regulated or -insured lenders are required to carry flood insurance. As of February 2013, only half of the homes located in these vulnerable areas within Edgewater Park were reported to have active NFIP policies, meaning that a significant number of homeowners living in high-risk, floodprone areas have no mechanism to protect their assets from the financial losses sustained in a storm event.

On an individual level, this can lead to severe hardship in recovering from and rebuilding after a climate event. Property owners may not be able to afford to repair the damages sustained to homes, and could even be forced to sell their houses and relocate. This can lead to disinvestment and vacancy in affected properties on the neighborhood scale.

During Sandy, dozens of homes were significantly impacted by floodwaters. Homeowners within the Edgewater Park community reported over \$1 million worth of damage to buildings alone, with average

damages claimed at over \$17,000 according to NFIP data.

Vacancy rates in the community have more than doubled in recent years, increasing from five to between ten and fifteen percent. Typical turnover without cash or outright ownership necessitates a mortgage and high financial investment in resiliency measures for many properties in the community to qualify for lower NFIP premiums.

The average current flood insurance premium paid annually within the community is \$1,050, though this figure does not represent the wide range currently paid by Edgewater Park residents (between \$200 and \$5,000 per year). Premiums vary based on how much coverage is purchased and how homes are financed. Because the vast majority of homes in Edgewater Park were constructed prior to New York City's adoption of the federal FIRMs in 1983 and are not currently elevated to the DFE, the premiums paid by many policyholders will likely rise significantly as the new flood insurance regulations take effect if homeowners do not invest in flood resilient retrofits to their structures.



Pedestrian walkway in the rear yards of homes, Edgewater Park

Building and Lot Typology Profile

Edgewater Park is made up of densely built single-family detached and multi-story bungalow-style homes that reflect the community's history as a summer campground. These kinds of older, light-frame and combustible buildings are highly susceptible to structural damage from various kinds of climate-based hazards. Because all of the homes within Edgewater Park were under the single ownership of the Co-op in 1961, the year in which zoning lots were created, the entire community is considered a single, large zoning lot. The 675 homes within the community are built on plots determined by the community's cooperative agreement and are subject to the architectural guidelines developed and enforced by the Co-op.

Individual lots within the community are very narrow, ranging from just twenty to thirty feet in width and fifty to seventy feet in depth. This creates an extremely shallow buildable footprint, and the majority of homes within the community occupy the entirety of their

plot. Structures in Edgewater Park are thus situated immediately adjacent to one another: Side yards are very narrow (often between two and five feet in depth) and in some cases, the eaves of one roof extend to abut those of an adjacent building. Front yard space is most commonly occupied by decks and other constructed spaces that extend directly to the street, creating a compact, tightly built-out community. Streets are also extremely narrow, often just twelve to fifteen feet wide.

This dense built environment poses challenges to investment in resilient retrofitting measures, as these kinds of construction projects require a certain amount of space to set up equipment, erect foundations and provide adequate access. Such construction disturbs the surrounding homes, potentially disrupting immediate and adjacent sub-surface foundations. Construction in V Zones requires deep piles that are potentially prohibitive due to cost and issues of structural engineering. Finally, a considerable number of homes have basements.

FEMA's flood resilient building standards mandate that the lowest floor of a residential building (including a basement) must be at or above the BFE. Basements are thus not permitted in new construction or substantially improved residential buildings within the floodplain, as any space below grade will retain flood waters and has the potential to damage the structural integrity of a home. Homes with basements will also face higher flood insurance premiums.



Bungalow building typology, Edgewater Park



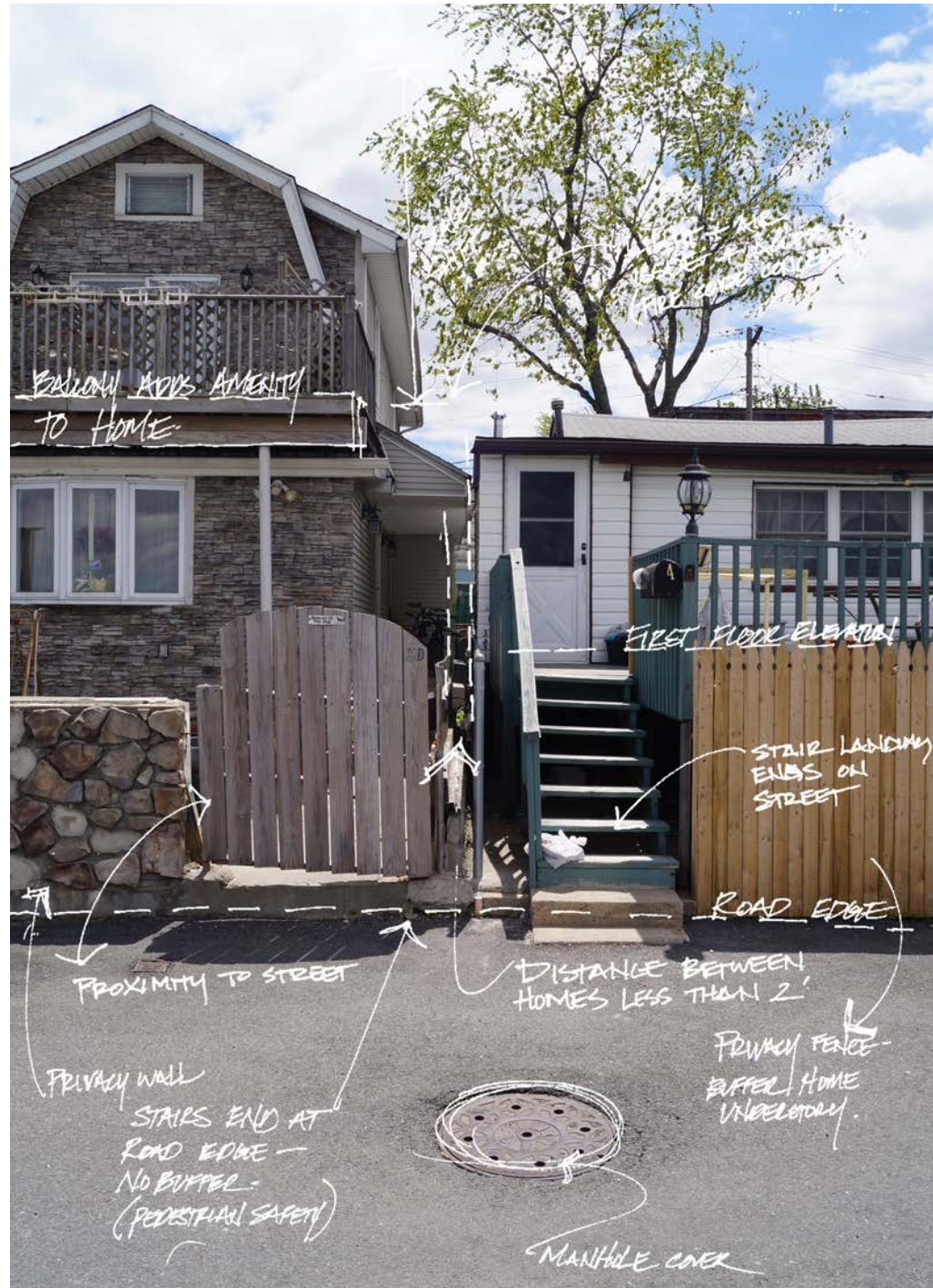
Bungalow and two story building typology, Edgewater Park

Zoning Analysis

Edgewater Park is comprised of 675 buildings, thirteen tax lots and a single zoning lot. Due to this unique condition in which the entire community exists on one zoning lot, the Department of Buildings (DOB) treats plots determined by the Co-op as zoning lots for the purposes of reviewing renovations and enlargements. The Co-op strictly enforces its own guidelines for residential renovation and construction, which largely ensure the preservation of the existing built character of the community by limiting growth and vertical expansions.

The neighborhood was rezoned to R4A in 2004 as a part of a larger contextual rezoning of the Throgs Neck Area to prevent the construction of non-contextual homes in communities like Edgewater Park. The R4A district allows for one- and two-family residences that often take the form of a two-story house with an attic beneath a pitched roof. A floor area ratio of up to 0.75 (plus a 20% attic allowance) is permitted in the district, and a minimum lot width of thirty feet is required. Modest front yards ranging from ten to twenty feet are required, as well as deep rear yards over thirty feet in addition to a distance of at least eight feet between buildings on adjacent properties.

The existing zoning does not present a barrier to redevelopment or investment in resiliency measures in Edgewater Park as the Flood Resilience Text Amendment, adopted in 2013, allows for homes in the community to elevate as-of-right, regardless of existing non-compliances. However, DCP found that the Co-op's guidelines and DOB's approach to vertical expansions needed to be updated to allow for such resilient construction and investment, as the elevation and complete reconstruction of homes and certain required streetscape mitigation strategies were prohibited.



Zoning analysis of homes, Edgewater Park

Summary of Resiliency Challenges

1 Community is vulnerable to high coastal storm surge elevations and wave action

At the building scale, these conditions make elevating properties and investing in resilient retrofits both physically and financially difficult. On the neighborhood scale, compliant structures have the potential to drastically alter the character of the community.

2 Many existing buildings are not built to resiliency standards and retrofits are challenged by lot conditions

Coupled with the narrowness of plots, the dense, tightly built-out nature of the community further exacerbates the difficulties in physically retrofitting buildings for flood risk.

3 Complex regulatory environment and permitting process

Co-op bylaws and the City's regulatory procedures do not adequately facilitate the elevation of existing buildings to the DFE, certain required streetscape mitigation strategies for resilient buildings, and the construction of new, resilient homes.

RESILIENCY FRAMEWORK

DCP worked closely with stakeholders in Edgewater Park to address the community's vulnerability to storm surge, coastal flooding and sea level rise while preserving the unique character of the neighborhood. Defined as a single zoning lot by the City, this private cooperative community containing hundreds of homes has its own mechanisms for regulating the built environment that are potentially at odds with resiliency best practices. Exacerbating this difficulty is the density to which this historic waterfront community is built, as well as the kinds of risk it faces: coastal storm surge, wave action, and high flood elevations.

These issues were addressed in a layered approach that first examined the regulatory framework of Edgewater Park's built environment, including the Co-op's architectural guidelines and the City's rules, and then providing site-specific, building-scale case studies of retrofitting strategies that both meet the latest flood resilient construction requirements and maintain the distinguishing qualities of the neighborhood.

The framework map on the following page depicts the study area and the extent of the floodplain within Edgewater Park. Building footprints outlined in yellow represent homes within the 1% annual chance floodplain where our Resilient Retrofitting and Rebuilding Guidelines apply. The solid yellow footprints designate the five case study homes, which were selected to exemplify the range of retrofitting and resiliency investments homeowners can make to both protect their properties as well as reduce the financial burden of carrying flood insurance.



Resilient Retrofitting and Rebuilding Guidelines

Homes in Edgewater Park located within the 1% annual chance floodplain that must make resilient retrofits in order to comply with FEMA standards.



Edgewater Park Case Study Homes

Homes selected by the Edgewater Park Co-op to be analysed and conceptually modified with resilient retrofit strategies.



1% Annual Chance Floodplain

Marked on FEMA's Flood Insurance Rate Maps, this is the area that has a 1% chance of flooding in any given year. It is also referred to as the "Special Flood Hazard Area."



LiMWA

The Limit of Moderate Wave Action is the inland limit of the area expected to receive waves breaking over 1.5 feet during the 1% chance flood event.



Study Area Boundary



Long Island Sound

Weir Creek

Throgs Neck Expressway

Cross Bronx Expressway

Bicentennial Veterans
Memorial Park

Parking Area

Parking Area

1st Avenue

Main Street

9th Avenue

Edge Street

Miles Street

Wissman Avenue

Case Study: 26C

Case Study: 73C

Case Study: 160C

Case Study: 49B

Case Study: 57D

0 0.05 0.1 0.2 Miles



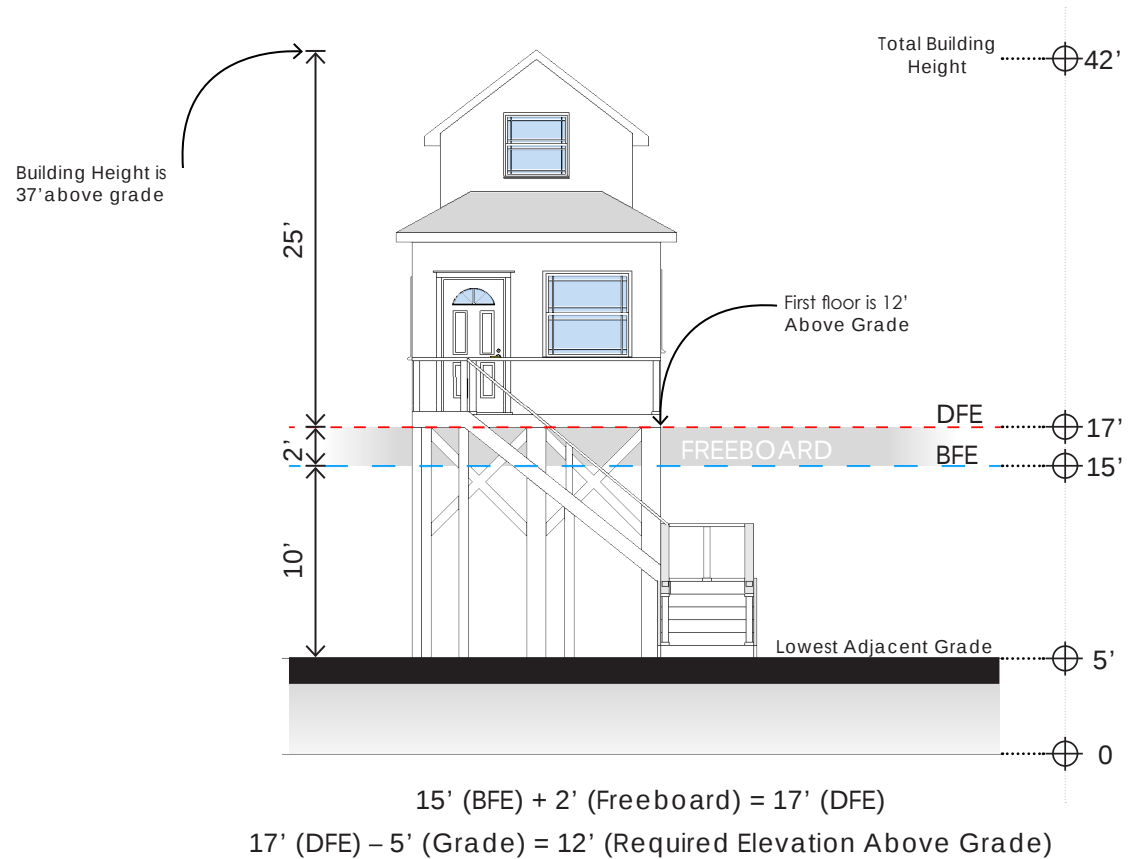
Resilient Retrofitting and Rebuilding Guidelines

As the existing regulations in Edgewater Park that control the built environment are not conducive to flood resilient construction and retrofits, DCP has worked with the community and appropriate agencies to facilitate investment in resilient homes. A primary aspect of this effort was collaborating with Edgewater Park residents in the amendment of their Co-op bylaws to allow for the elevation of homes and the incorporation of required streetscape mitigation strategies.

Previously, the Co-op mandated that the maximum height of any house could be no higher than twenty-five feet above the Bronx Datum (a base measurement for elevation) or twenty-seven feet above grade, which does not allow for the elevation of structures to FEMA-compliant levels. After presentations and workshops with FEMA, DCP, and the Mayor's Office of Resilience and Recovery about flood risk and resilient design standards, the Co-op voted to amend its bylaws to allow for building height to be measured from the design flood elevation while maintaining its twenty-five foot height limit, thus enabling homes to elevate to the new standards while maintaining the same allowable building envelope.

DCP has also worked with the Department of Buildings (DOB) to clarify and strengthen guidelines for the examination of plans to enlarge or vertically extend existing residential building walls in Edgewater Park to allow for flood resilient construction. Much like the amendment to the Co-op's bylaws, DOB now allows for building height to be measured from the Design Flood Elevation as opposed to adjoining grade. Additionally, DOB has revised its approach to the minimum allowable distance between buildings in Edgewater Park so as not to impede any from-the-ground-up construction of a new resilient homes in existing non-compliant footprints.

Design Flood Elevation (DFE) for homes in the 1% Annual Chance Floodplain





Planting

- Represents **ONE** strategy
- Must be at least 3 feet in height
- Planting beds must be at least 3 feet in width
- Plants shall screen at least 50 percent of street wall



Stair Turn

- Represents **ONE** strategy
- Must change direction at least 90 degrees
- No lower or higher than 2 feet from beginning and end of stair run



Porch

- Represents **ONE** strategy
- Finished floor must be at least 6 inches below lowest occupiable floor
- Depth must be at least 5 feet



Enclosed Porch

- Represents **TWO** strategies
- Same regulations as porch

Regulations within Edgewater Park's architectural guidelines also prohibited several of the streetscape mitigation strategies that homeowners are required to implement when elevating a structure. These strategies, pictured to the left, help promote the urban design principals discussed earlier in this report and are critical to preserving neighborhood character and a visual connection to the public realm. Ground-floor level windows and doors facing the street have been historically prevalent features of buildings in New York City and can create a sense of security and comfort for pedestrians. Elevating the first floor of a building can limit the relationship to the street and detract from the walkability and vibrancy of neighborhoods.

DCP worked with the Edgewater Park leadership to understand the importance and value of these strategies. The case study models on the following pages were developed and workshopped with the community in order to communicate the requirements for resilient retrofits and rebuilding, present an array of techniques to achieve them, as well as demonstrate the aesthetic value of the streetscape mitigation strategies. After several successful meetings, the leadership voted to remove stipulations within their bylaws that prohibited covered porches, stair turns, and plantings.

Elevation requirements for streetscape mitigation strategies:

0-5 feet: *NO streetscape mitigation strategies required*

5-9 feet: *ONE streetscape mitigation strategy required*

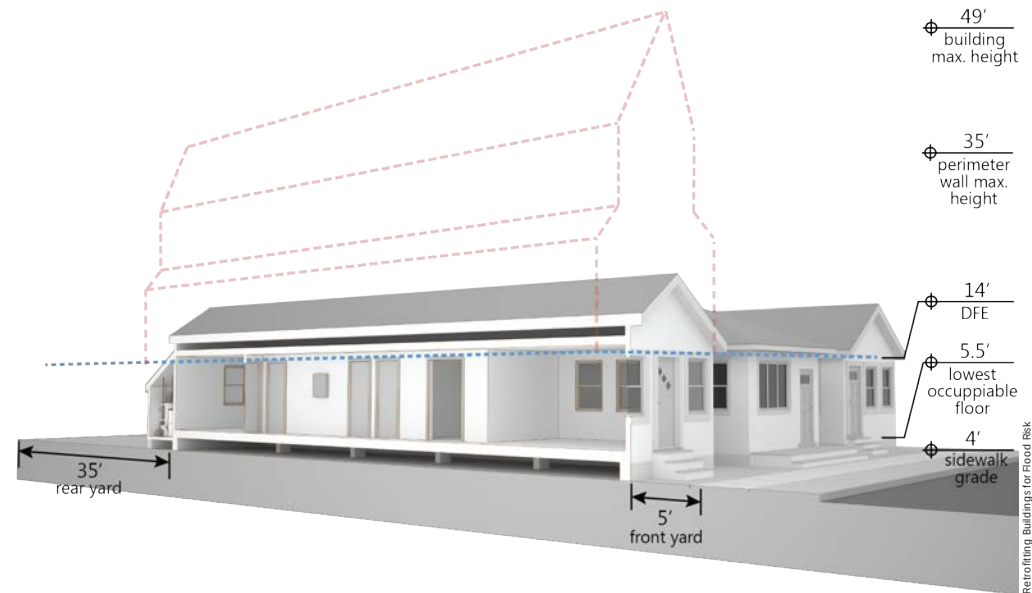
9 feet & Above: *TWO streetscape mitigation strategies required*

Case Studies

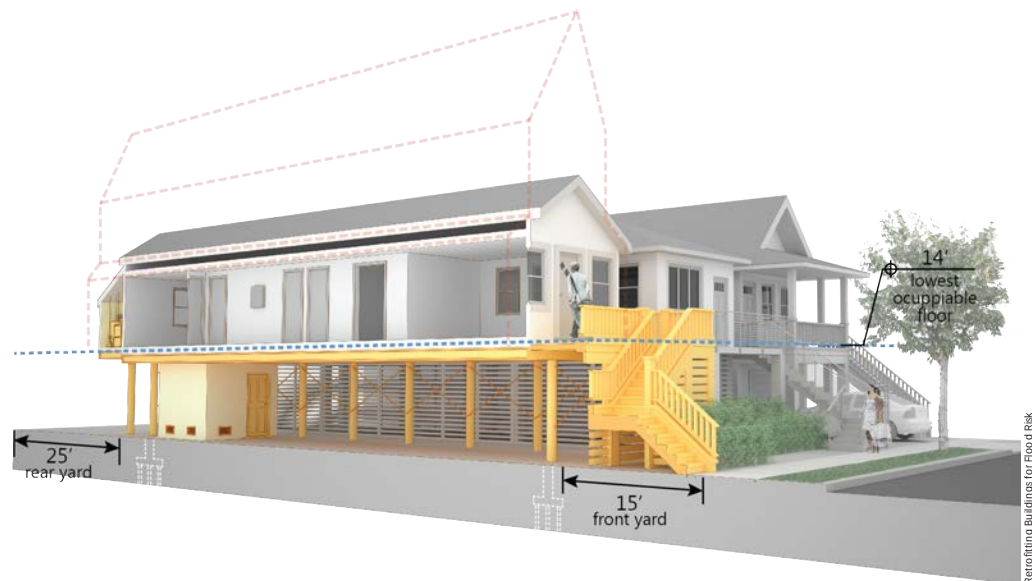
While the images to the right and on the next page are from DCP's [Retrofitting Buildings for Flood Risk](#) manual and depict the city-wide approach to making bungalow-style homes more resilient, the case study models in the following pages are site-specific and targeted illustrations of what homes elevated to FEMA's elevation requirements would look like in compliance with DCP's Zoning Flood Text Amendment and the community's updated bylaws. They are intended to provide guidance to the community for future retrofitting and rebuilding, and act as a reference tool for residents as sites in the flood zone are rebuilt. The properties were chosen to demonstrate the range of flood risk and design considerations that must be taken into account in resilient retrofits and construction within Edgewater Park, as well as provide examples as to how they may be addressed in ways that preserve the unique character of the neighborhood.

Each of the following case studies was modeled after an existing structure or the footprint of a preexisting home, and each property posed unique challenges for resilient retrofitting, including first floor elevation and access, circulation, structural and critical systems locations, parking issues, and the maintenance of a healthy and vibrant streetscape.

Though the models reflect the specifications of individual properties within the community, this exercise demonstrates the range of physical resiliency requirements that meet both the latest and most robust city-wide standards as well as community specific building requirements, and provides an inventory of best practices for flood resilient investment in Edgewater Park.



Existing Conditions



Elevation Strategy

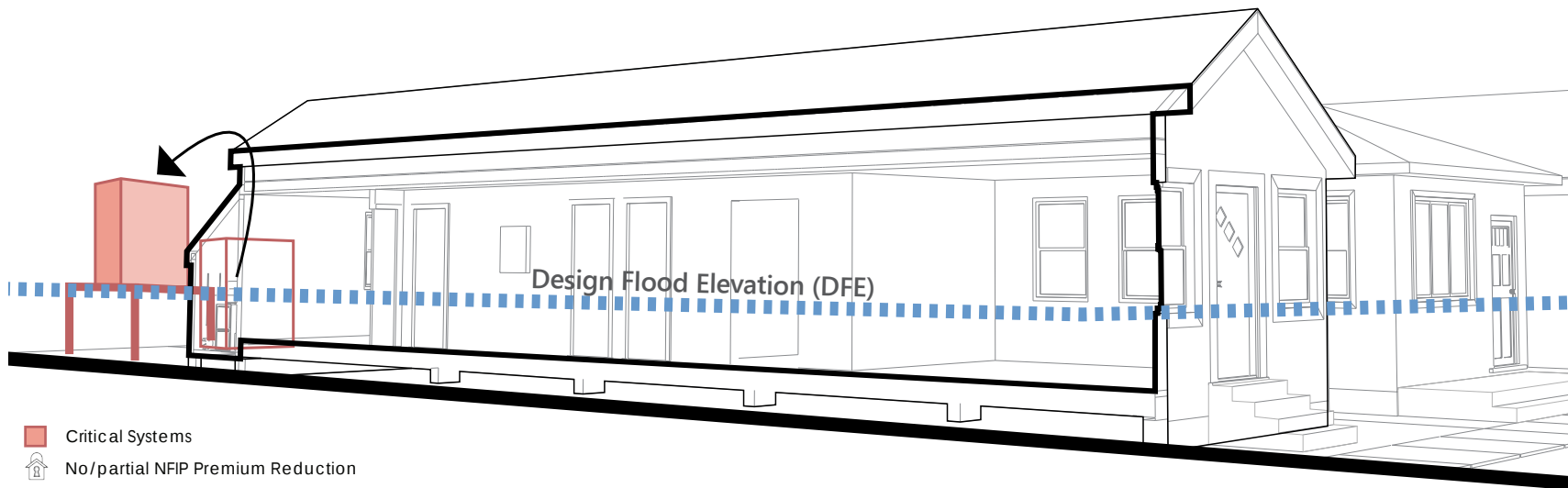
Alternative Building-Scale Strategy: Elevate Systems

Non-substantially damaged and non-substantially improved buildings within the floodplain have more flexibility in complying with Appendix G of the New York City Building Code. The alternative illustrated below reduces the amount of damage from flooding, but may not lower insurance premiums. If the lowest occupiable floor is left below the DFE, life safety must be considered. Residents should always follow evacuation procedures.

If the DFE is within a few feet of the base of the lowest occupiable floor, consider keeping the structure in place and using flood damage-resistant materials below the DFE. Residential use and lowest occupiable floor remain located below the DFE. Elevate the critical systems above the DFE. Create a continuous load path by connection of the frame to the roof and foundation.



No or partial reduction in NFIP premiums. Residential use and lowest occupiable floor remain located below the DFE.



Case Study: 57D

57D is located in A Zone, which means the area is subject to waves under one and one half feet and inundation up to the Base Flood Elevation (BFE) in the event of a storm. The BFE for this property is thirteen feet; with the addition of two feet of freeboard, the Design Flood Elevation (DFE) is fifteen feet. The grade elevation of this site is eight feet above mean sea level. In order to calculate the first floor of this home, the grade elevation must be subtracted from the DFE. Here, the first floor of habitable space must be seven feet above grade. Any space below the first floor of the home may only be used for storage and access purposes. This site has a considerable elevation requirement that poses unique design and construction considerations, given the limited lot size. The illustrative home on the following page shows two streetscape mitigation strategies, a stair turn and covered porch, though only one is required.

Key Characteristics

FLOOD RISK

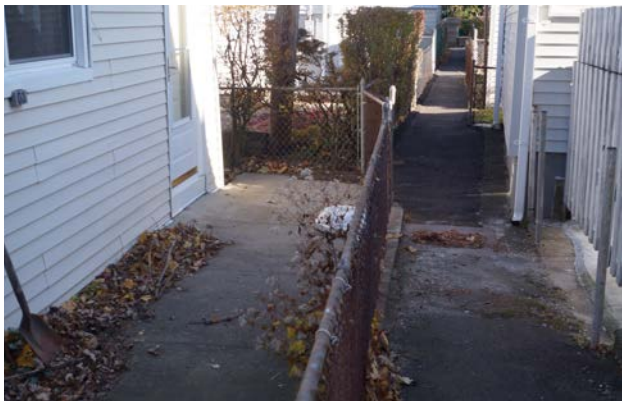
Flood Zone/BFE	A/ 13'
DFE	15'
Average Site Elevation	8'

TPOLOGY

Lot Size	30' x 60'
Building Size	26' x 46'
Yards	W. 3' / E. 8'
Construction Type	Wood Frame
Foundation Type	Slab on grade
Stories	1.5
Roof Height	17'

SITE CONDITIONS

Sidewalks	Yes, rear yard
Roadbed Width	17'
Zoning District	R4A



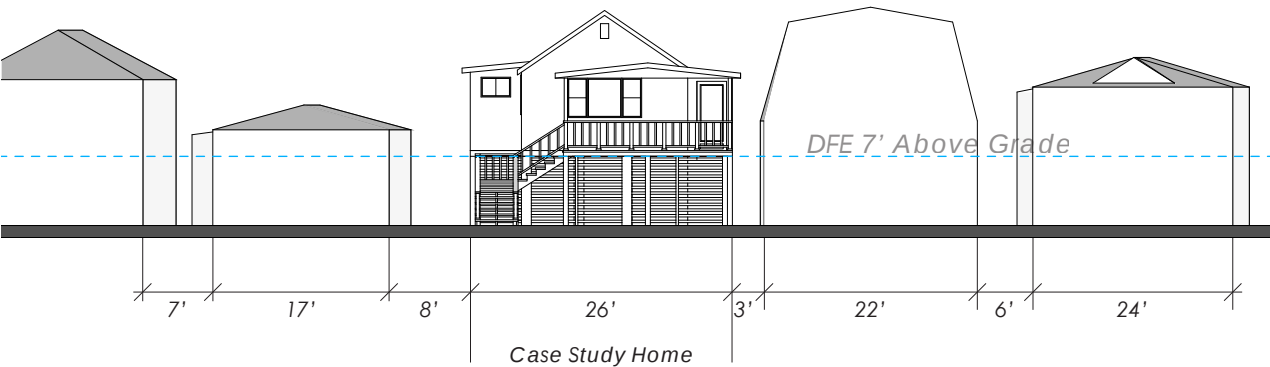
Site Plan

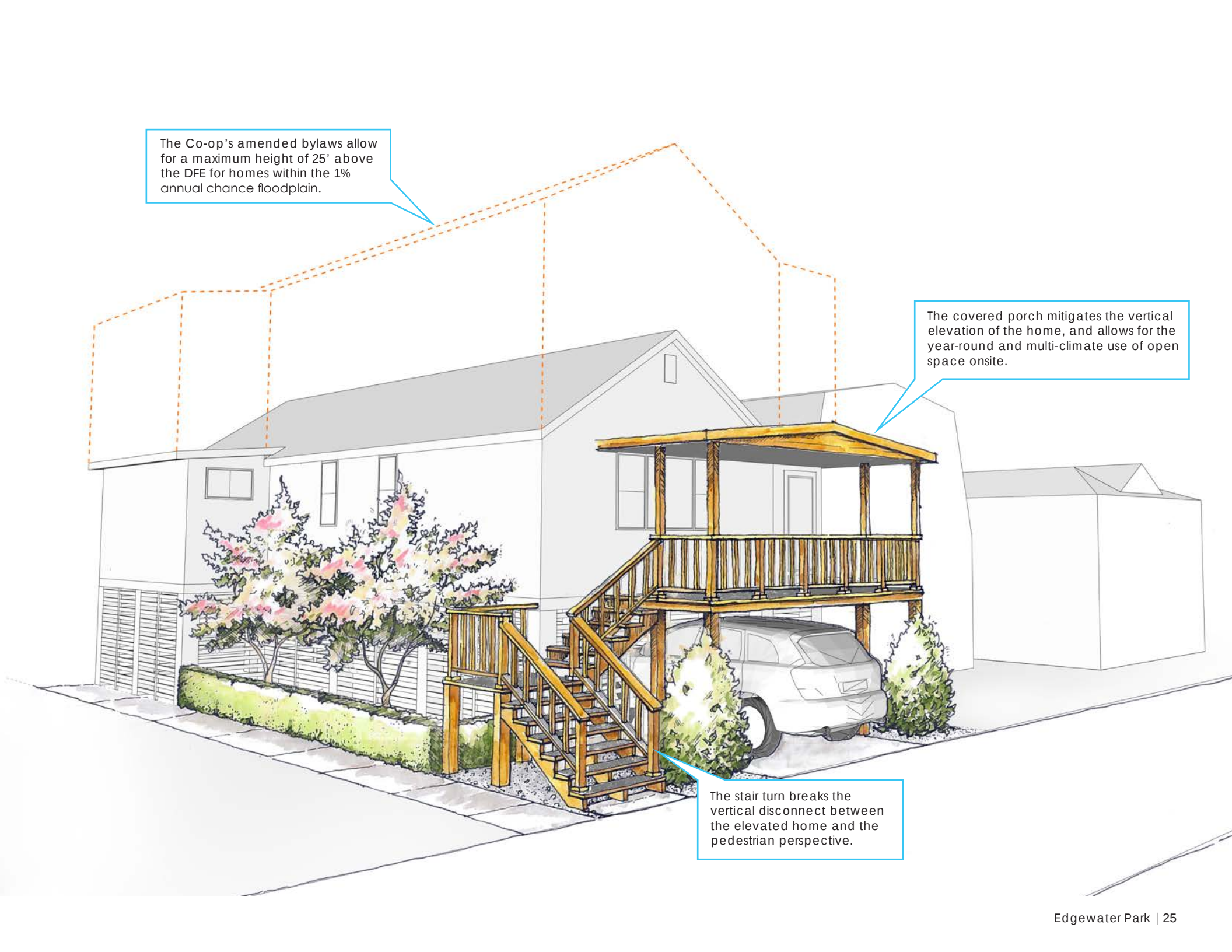


PFIRM Flood Zones

- A Zone
- Case Study Property

Site Section Elevation



An architectural rendering of a two-story house with a covered porch. The house is light gray with a dark gray roof. A wooden porch with a flat roof and railings is attached to the front. A set of wooden stairs leads up to the porch. A white car is parked under the porch. To the left of the porch is a flowering tree with pink and yellow blossoms. To the right is a small green bush. A dashed orange line outlines the house's profile, showing its height relative to the floodplain. Three callout boxes provide context: one about the Co-op's bylaws, one about the porch, and one about the stairs.

The Co-op's amended bylaws allow for a maximum height of 25' above the DFE for homes within the 1% annual chance floodplain.

The covered porch mitigates the vertical elevation of the home, and allows for the year-round and multi-climate use of open space onsite.

The stair turn breaks the vertical disconnect between the elevated home and the pedestrian perspective.

Case Study: 160C

160C is located in one of the lowest lying areas in the neighborhood. The northern edge of the home is located within the Coastal A Zone and on the LiMWA line. The Coastal A Zone is subject to moderate wave action between one and one half and three feet in height. Due to this increased risk, building codes are more restrictive here than in A Zones and can be similar to the requirements of a V Zone construction. The Base Flood Elevation (BFE) for 160C is sixteen feet. With the additional two feet of freeboard, the home has a Design Flood Elevation (DFE) of eighteen feet. The first floor of the home must be seven and a half feet above grade. The illustrative home on the following page shows three streetscape mitigation strategies, a stair turn, porch, and plantings, though only one is required.

Key Characteristics

FLOOD RISK

Flood Zone/BFE	Coastal A/ 14'
DFE	16'
Average Site Elevation	8.5'

TYOLOGY

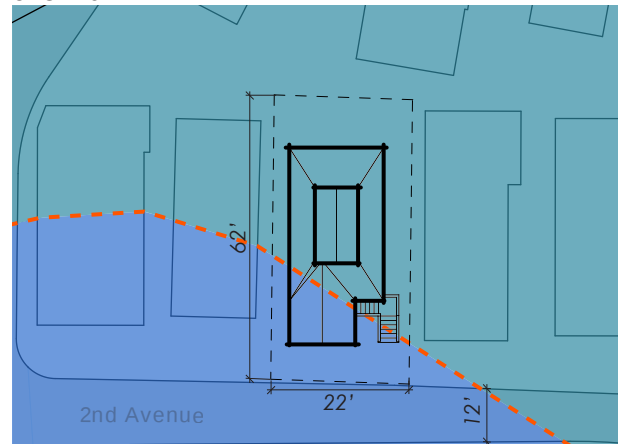
Lot Size	22' x 62'
Building Size	18' x 31'
Yards	W. 5' / E. 8'
Construction Type	Masonry/ Wood Frame
Foundation Type	Slab on grade
Stories	1.5
Roof Height	16'

SITE CONDITIONS

Sidewalks	Yes, rear yard
Roadbed Width	12'
Zoning District	R4A



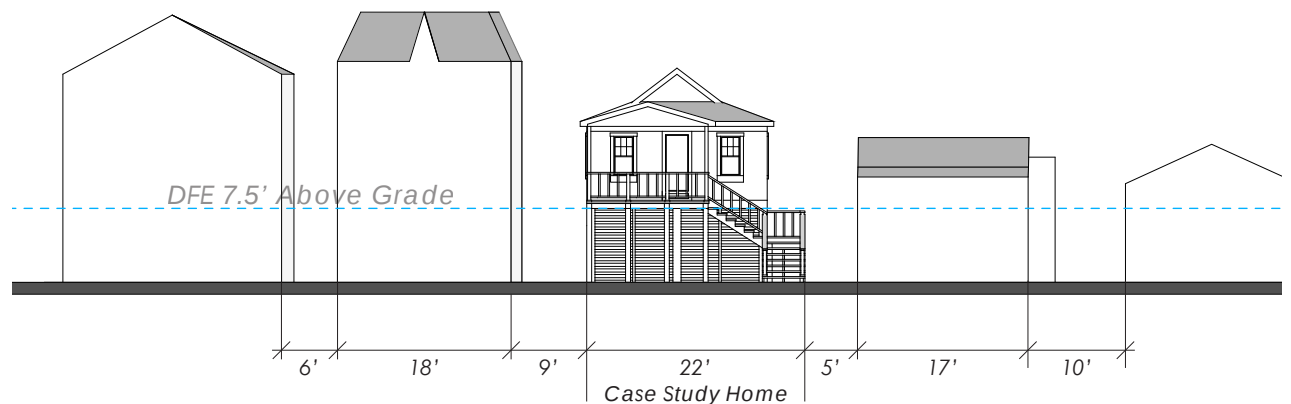
Site Plan

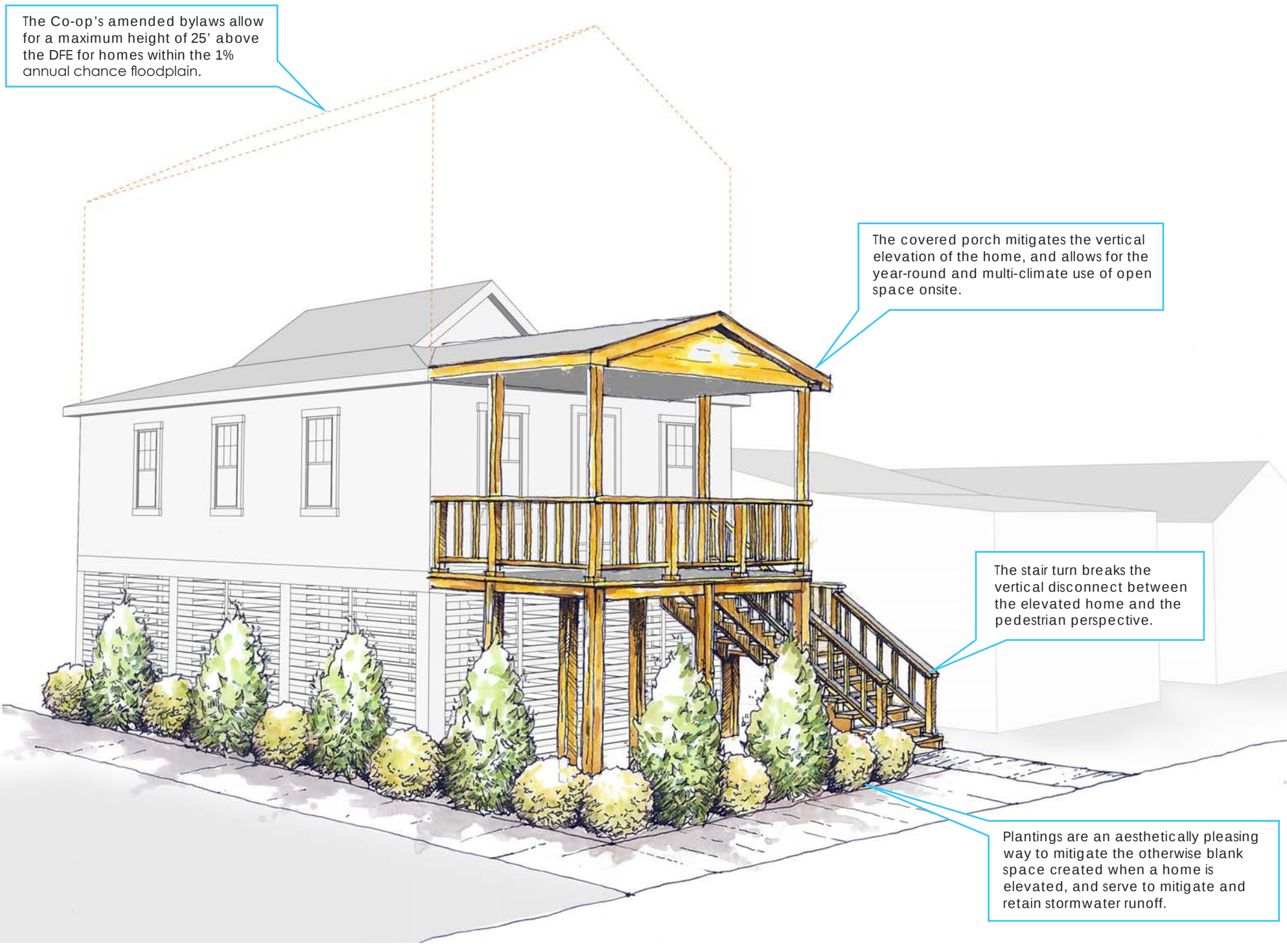


PFIRM Flood Zones

- Coastal A Zone
- A Zone
- Subject to Wave Risk (LiMWA)
- Case Study Property

Site Section Elevation





The Co-op's amended bylaws allow for a maximum height of 25' above the DFE for homes within the 1% annual chance floodplain.

The covered porch mitigates the vertical elevation of the home, and allows for the year-round and multi-climate use of open space onsite.

The stair turn breaks the vertical disconnect between the elevated home and the pedestrian perspective.

Plantings are an aesthetically pleasing way to mitigate the otherwise blank space created when a home is elevated, and serve to mitigate and retain stormwater runoff.

Case Study: 26C

26C is located in the Coastal A Zone, meaning that wave activity between one and one half and three feet in height can be expected during a storm event. Due to this increased risk, building codes are more restrictive here than in A Zone and can be similar to the requirements of a V Zone construction. 26C is a single- story bungalow that is approximately twenty feet tall. The existing first floor of the home is about three feet above grade, and there is an enclosed storage space underneath the structure. This home must be elevated five additional feet to reach the DFE of 16. The illustrative home on the following page shows three streetscape mitigation strategies: a porch, stair turn and planting. Only one is required.

Key Characteristics

FLOOD RISK

Flood Zone/BFE	Coastal A/ 14'
DFE	16'
Average Site Elevation	8'

TPOLOGY

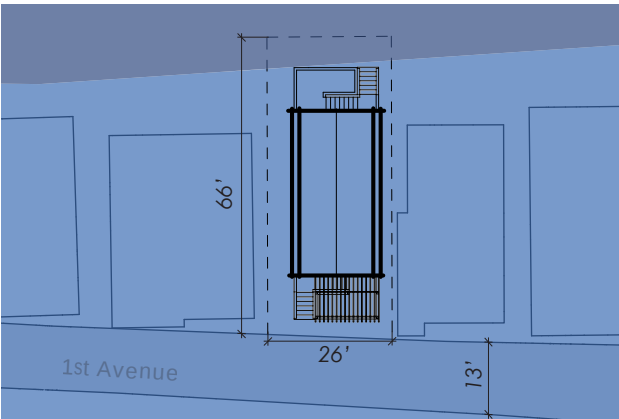
Lot Size	26' x 66'
Building Size	18' x 31'
Yards	W. 5' / E. 8'
Construction Type	Wood Frame
Foundation Type	Slab on grade
Stories	1.5
Roof Height	16'

SITE CONDITIONS

Sidewalks	Yes, rear yard
Roadbed Width	13'
Zoning District	R4A

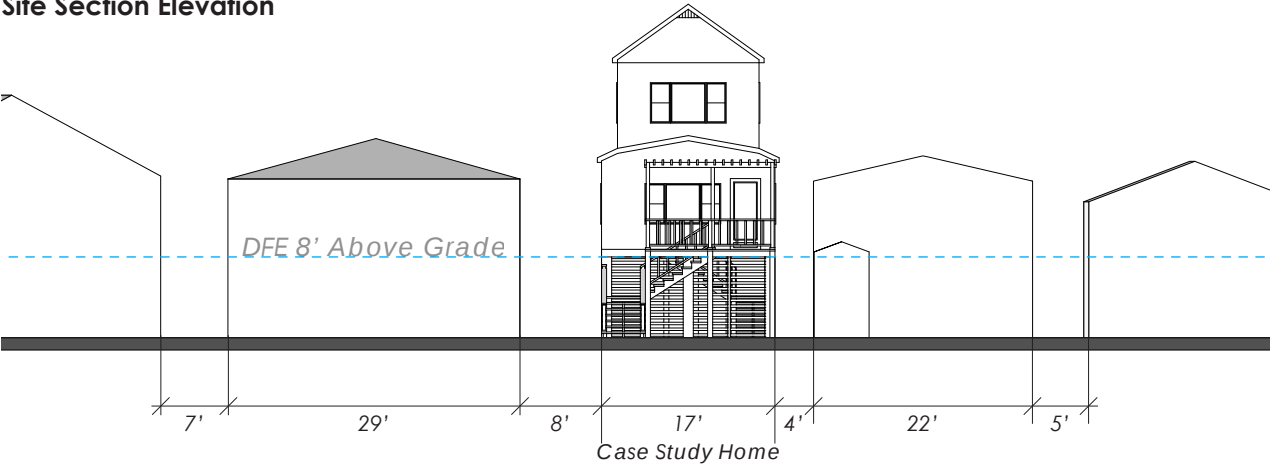


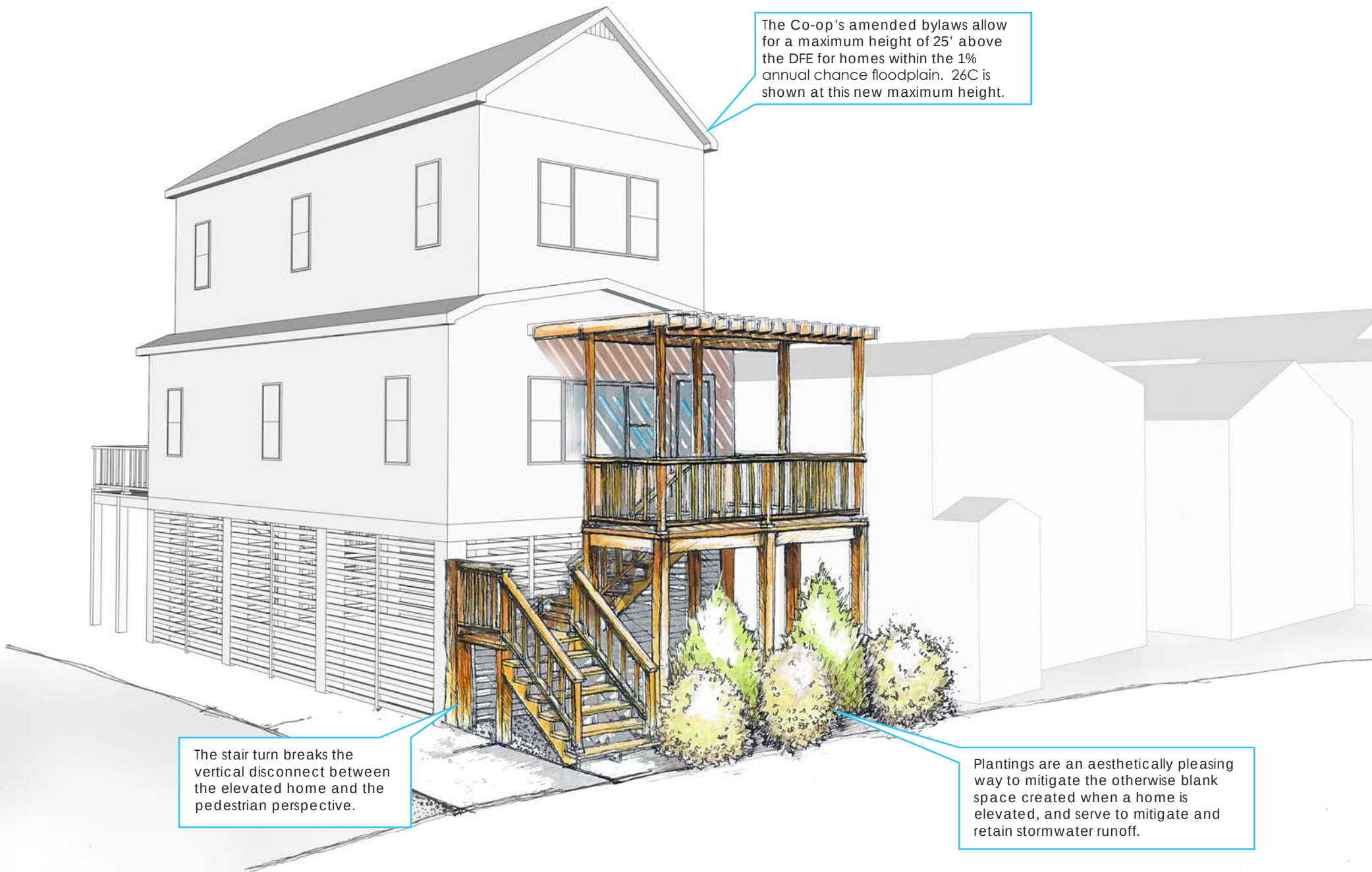
Site Plan



PFIRM Flood Zones
V Zone
Coastal A Zone
Case Study Property

Site Section Elevation





The Co-op's amended bylaws allow for a maximum height of 25' above the DFE for homes within the 1% annual chance floodplain. 26C is shown at this new maximum height.

The stair turn breaks the vertical disconnect between the elevated home and the pedestrian perspective.

Plantings are an aesthetically pleasing way to mitigate the otherwise blank space created when a home is elevated, and serve to mitigate and retain stormwater runoff.

Case Study: 73C

73C sits within the A Zone, which means that wave activity of one and one half feet in height or less can be expected. The BFE for this property is thirteen feet. Once freeboard (the addition of two feet) and grade are accounted for, the first floor elevation of 73C must be three feet above the existing ground elevation. Since open space is limited in the front and rear yard, retrofitting this site for resiliency purposes requires special design considerations in order to address access issues. Though no streetscape mitigation strategies are required because the ground floor is less than five feet above grade, the illustrative home on the following page shows two: plantings and a covered porch.

Key Characteristics

FLOOD RISK

Flood Zone/BFE	A/ 13'
DFE	15'
Average Site Elevation	12'

TPOLOGY

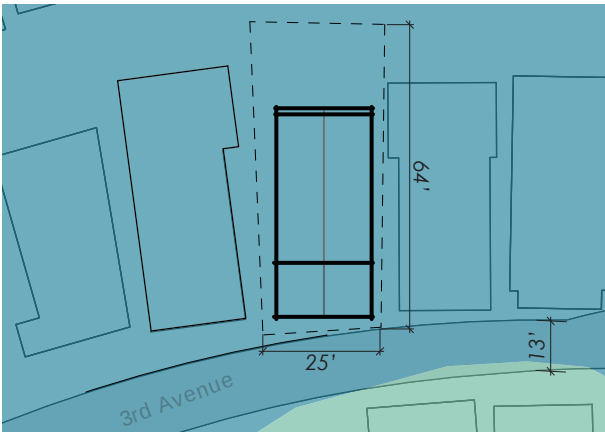
Lot Size	25' x 64'
Building Size	25' x 49' (Pre-existing)
Yards	W. 6' / E. 7'
Construction Type	NA
Foundation Type	NA
Stories	NA
Roof Height	NA

SITE CONDITIONS

Sidewalks	Yes, rear yard
Roadbed Width	13'
Zoning District	R4A



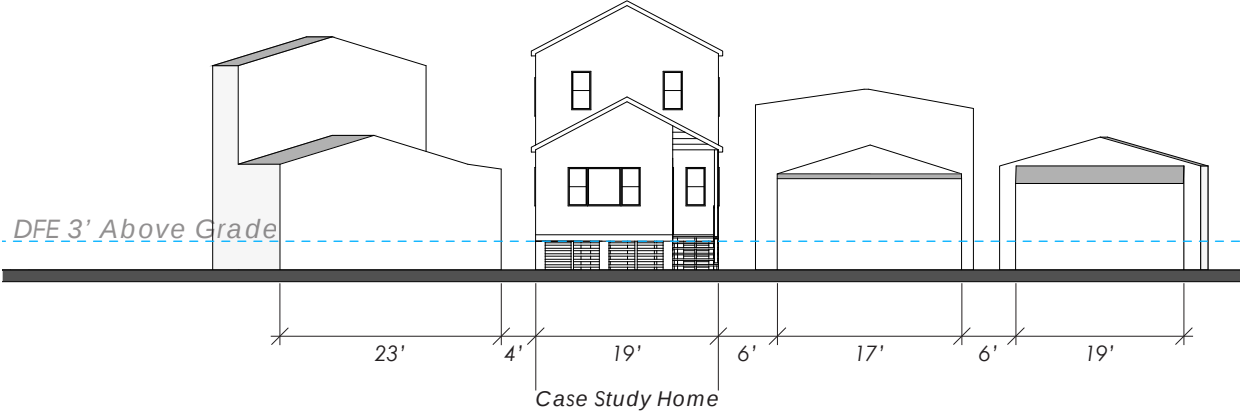
Site Plan



PFIRM Flood Zones

- A Zone
- Shaded X Zone
- Case Study Property

Site Section Elevation



An architectural rendering of a two-story house. The house has a grey upper story and a white lower story. The roof is dark grey. A callout box with a blue border and a line pointing to the roof peak contains text. Another callout box points to a wooden porch with stairs. A third callout box points to a row of green bushes along the base of the house. In the background, there are simplified grey outlines of other houses.

The Co-op's amended bylaws allow for a maximum height of 25' above the DFE for homes within the 1% annual chance floodplain.

The stair turn breaks the vertical disconnect between the elevated home and the pedestrian perspective.

Plantings are an aesthetically pleasing way to mitigate the otherwise blank space created when a home is elevated, and serve to mitigate and retain stormwater runoff.

Case Study: 49B

49B is located within the A Zone. The structure is expected to experience inundation up to the base flood elevation (13 feet), as well as wave activity of one and one half feet or less in height. Taking into account freeboard and grade, the home must be elevated three feet above the existing ground elevation. Though no streetscape mitigation strategies are required due to the low elevation requirement of five feet, the illustrative home on the following page shows two: plantings and a covered porch.



Key Characteristics

FLOOD RISK

Flood Zone/BFE	A/ 13'
DfE	15'
Average Site Elevation	12'

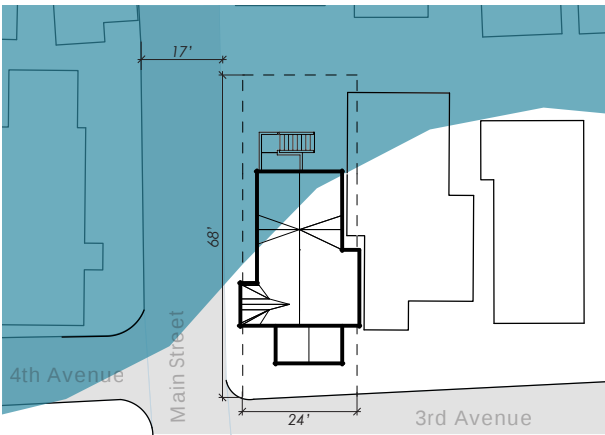
TPOLOGY

Lot Size	24' x 68'
Building Size	24' x 32'
Yards	W. 5' / E. 8'
Construction Type	Clapboard
Foundation Type	Slab on grade
Stories	1.5
Roof Height	12'

SITE CONDITIONS

Sidewalks	Yes, rear yard
Roadbed Width	W. 17' / N. 17'
Zoning District	R4A

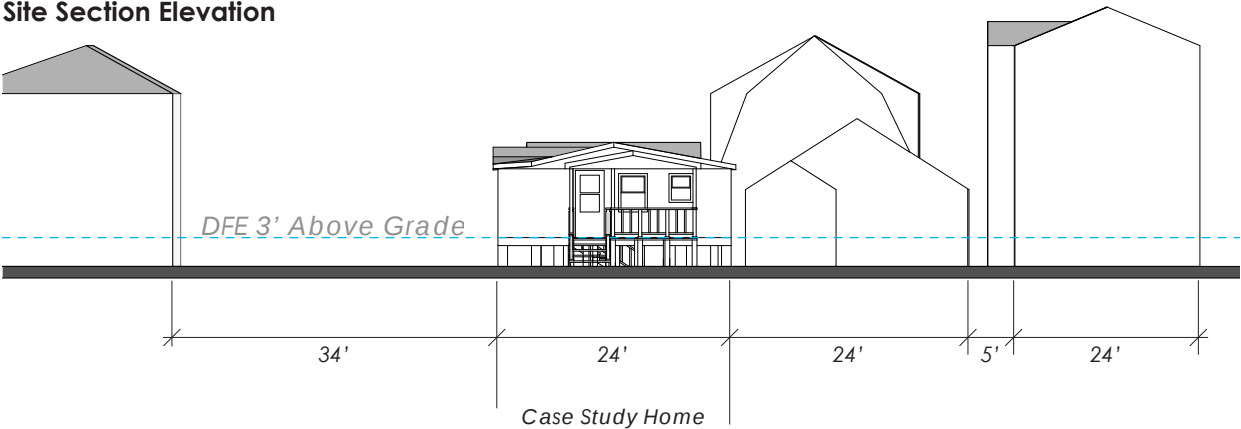
Site Plan



PFIRM Flood Zones

- A Zone
- Case Study Property

Site Section Elevation



The Co-op's amended bylaws allow for a maximum height of 25' above the DFE for homes within the 1% annual chance floodplain.

The stair turn breaks the vertical disconnect between the elevated home and the pedestrian perspective.

Plantings are an aesthetically pleasing way to mitigate the otherwise blank space created when a home is elevated, and serve to mitigate and retain stormwater runoff.

CONCLUSION

Due to factors including the timing, path and size of the storm, the Bronx was spared the brunt of Hurricane Sandy's impact. With almost 100 miles of shoreline, the borough nevertheless faces serious flood risk that is only projected to increase in the coming years with sea level rise, expanded floodplains, and more frequent and severe storms. Through its Resilient Neighborhood's place-based planning initiative, the Department of City Planning aims to empower stakeholders at all levels to identify and pursue locally-specific strategies to support the ongoing vitality and resiliency of coastal communities such as Edgewater Park. Here, three strategies aimed at different scales of intervention were identified to address the vulnerabilities of the community:

Raise awareness of and mitigate flood risks

DCP has worked with the Edgewater Park community to understand current and future climate risks and provide a menu of targeted building scale resiliency measures for residents to protect their property and life safety.

Facilitate resilient retrofits

DCP has provided guidance for the community to update the Edgewater Park Co-op bylaws to meet the most robust resiliency standards that the City can encourage and enforce, while also maintaining existing community character.

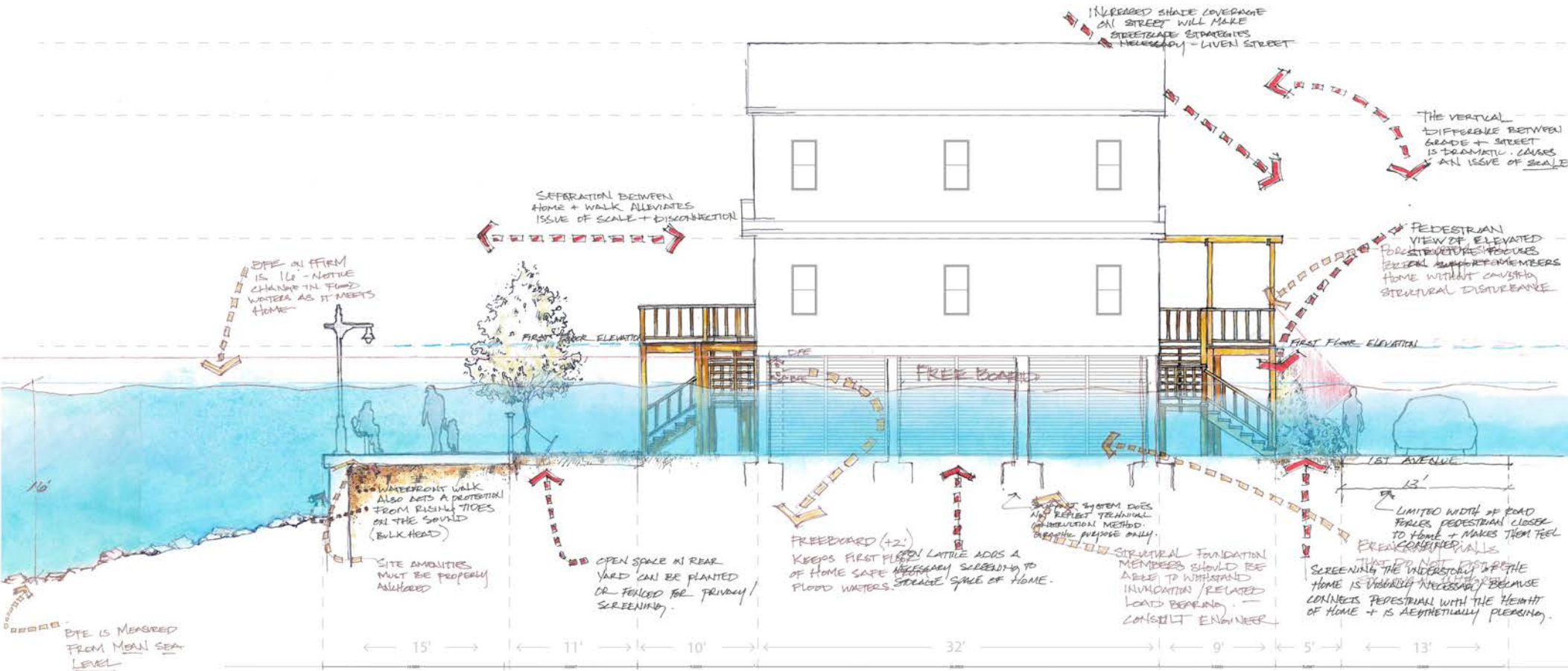
Streamline City regulations

DCP has worked with other city agencies to clarify and strengthen the the City's permitting review process for unique conditions such as those that exist in Edgewater Park and other similar communities.

The Resilient Neighborhood study of Edgewater Park was a participatory process that ultimately empowered the community to understand, proactively prepare for, and mitigate flood risk and future damage within their neighborhood. As an outcome of this process, the City was able to successfully address regulatory barriers that inhibited resilient retrofits and the construction of new, fully compliant homes within the neighborhood while ensuring the longevity of and enhancing the unique character of the community.

Resiliency Considerations

There are many considerations that must be addressed when elevating a home located in the 1% annual chance floodplain, such as existing circulation, height of expected flood waters, the relationship to surrounding context and how to access the first floor of the new home. This image illustrates some of the thinking behind the case studies that were provided on the previous pages.



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 Preliminary FIRMs 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 Preliminary FIRMs 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 Preliminary FIRMs (unless the Effective FIRMs are more restrictive) until the maps become effective following the public comment period. The Preliminary FIRMs, however, are not used to guide the requirements of the National Flood Insurance Program.

Floodproofing, Dry

For non-residential buildings, a flood retrofitting 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 retrofitting 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.

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. More restrictive New York City Building Code standards apply.

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. Building regulations are more restrictive than in A Zones and can be similar to those standards that apply for V Zones.

A Zone

The area of the SFHA that is subject to still-water inundation by the base flood with specific New York City Building Code standards.

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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