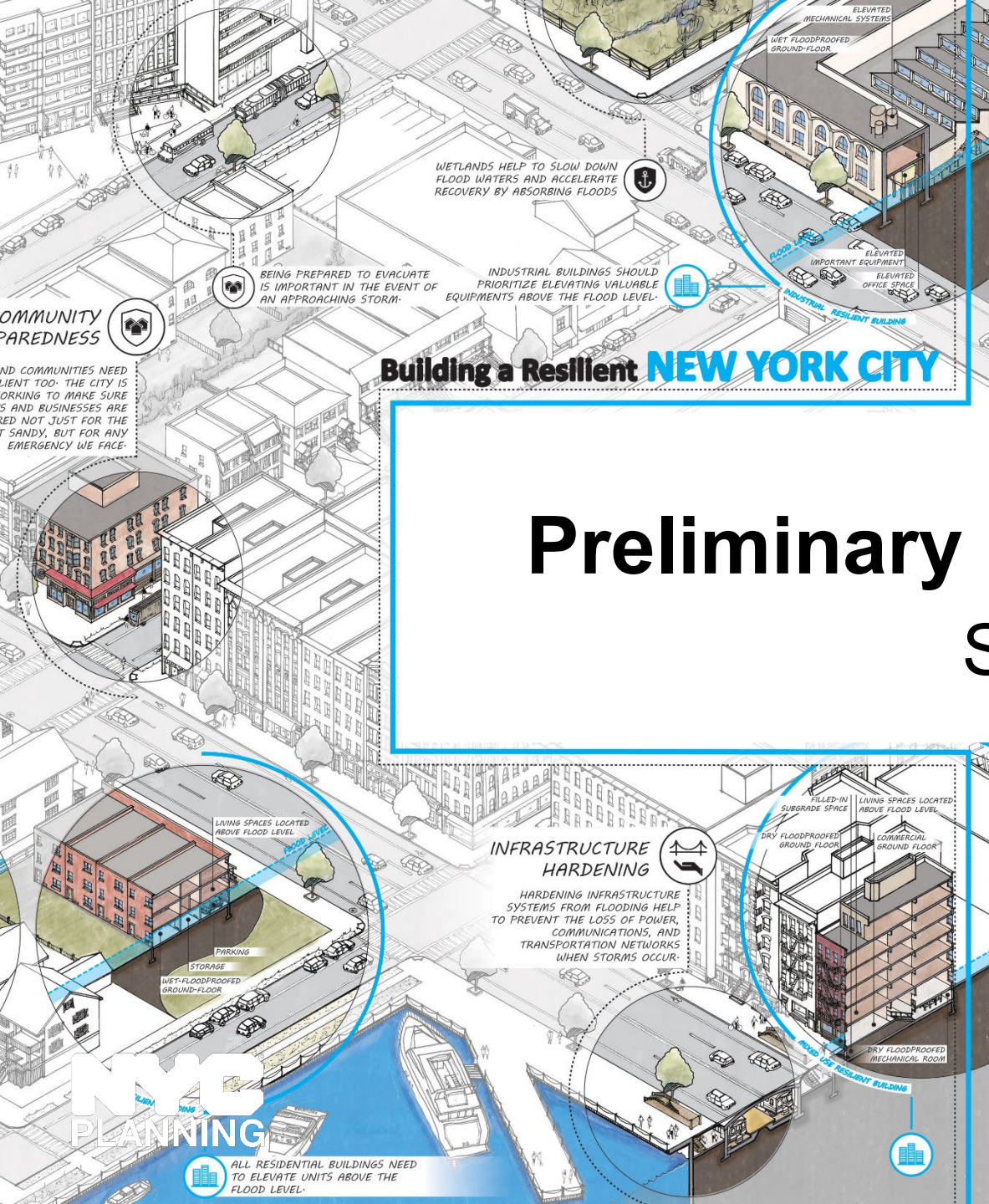


Zoning for Coastal Flood Resiliency

Preliminary Recommendations Summary

Brooklyn CB 6
September 26, 2019



Building a Resilient **NEW YORK CITY**

INFRASTRUCTURE HARDENING

HARDENING INFRASTRUCTURE SYSTEMS FROM FLOODING HELP TO PREVENT THE LOSS OF POWER, COMMUNICATIONS, AND TRANSPORTATION NETWORKS WHEN STORMS OCCUR.

LIVING SPACES LOCATED ABOVE FLOOD LEVEL

LIVING SPACES LOCATED ABOVE FLOOD LEVEL

DRY FLOODPROOFED GROUND-FLOOR

COMMERCIAL GROUND FLOOR

DRY FLOODPROOFED MECHANICAL ROOM

WET-FLOODPROOFED GROUND-FLOOR

ALL RESIDENTIAL BUILDINGS NEED TO ELEVATE UNITS ABOVE THE FLOOD LEVEL.

Today's Agenda

1. **Background** | Zoning for resiliency
2. **Preliminary Recommendations** | Summary
3. **Project Timeline & Outreach Resources**

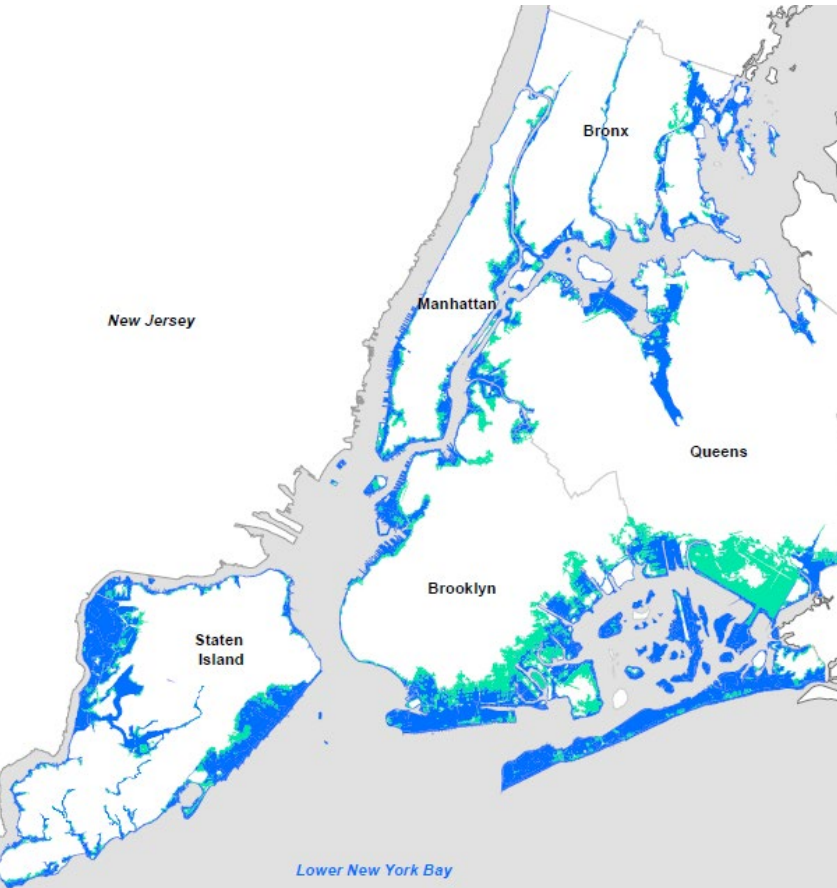
Zoning for Coastal Flood Resiliency

1. Background Zoning for Resiliency

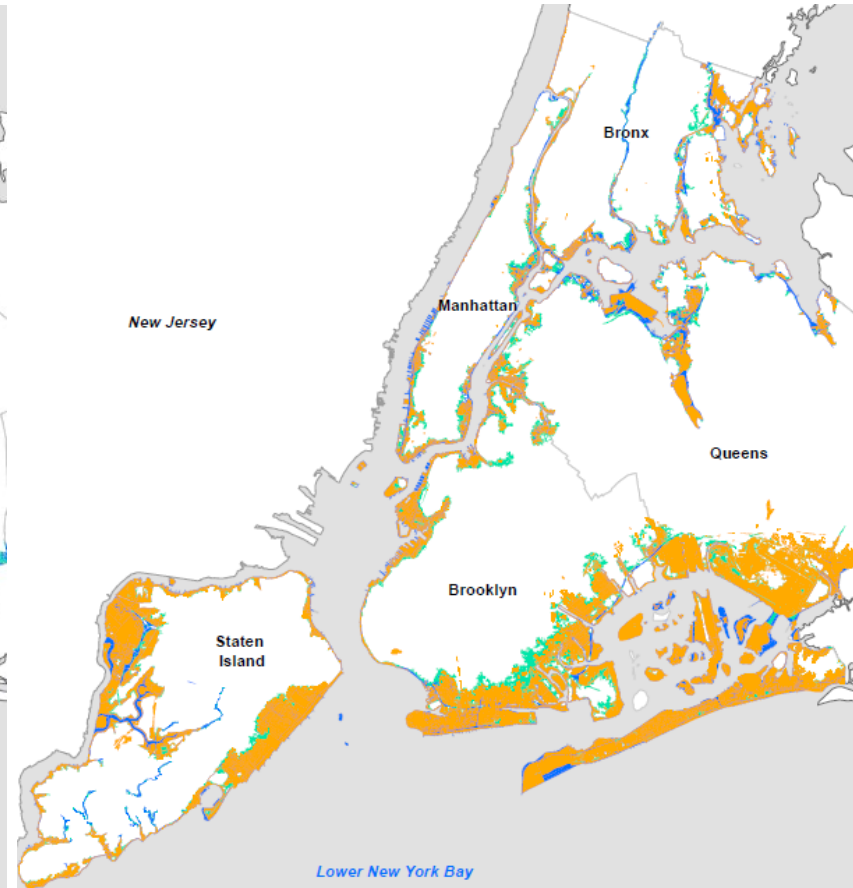
Citywide Flood Risk

NYC's flood risk is high and will increase.

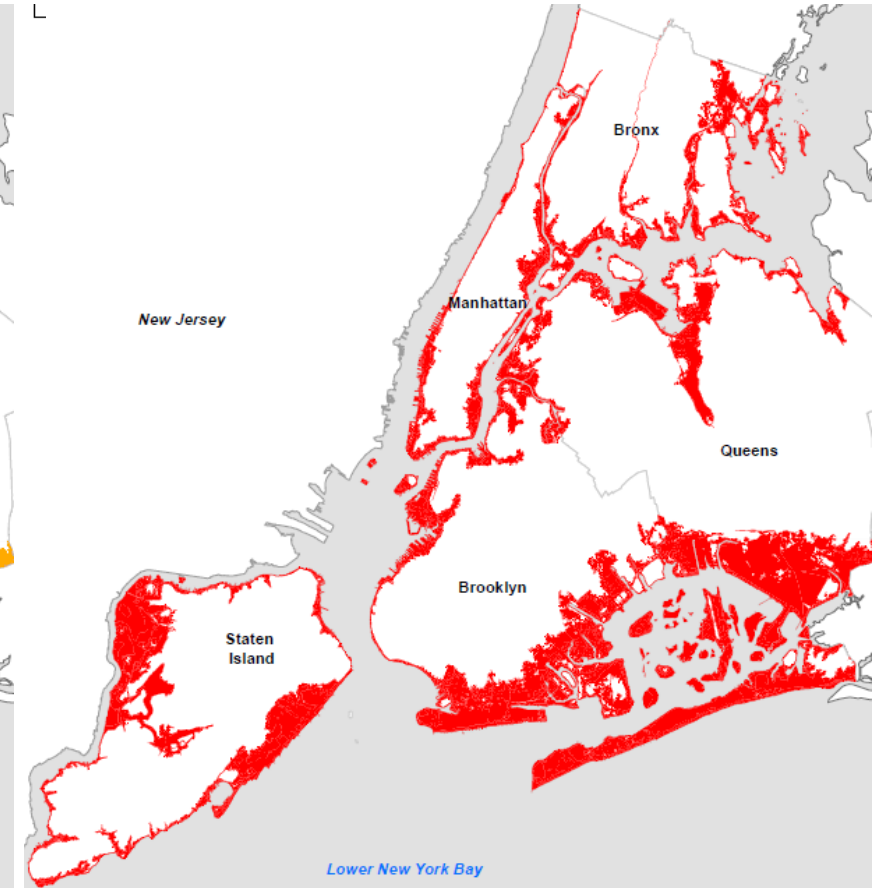
The city's current flood risk is high with ~782,800 residents in the floodplain



Sandy inundated ~half of lots currently in the 0.2% annual chance floodplain



This area will likely become the future 1% annual chance floodplain



1% annual chance floodplain (FEMA) ■
0.2% annual chance floodplain (FEMA) ■

Hurricane Sandy Storm Surge ■

2050s 1% Annual Chance Floodplain (NPCC) ■

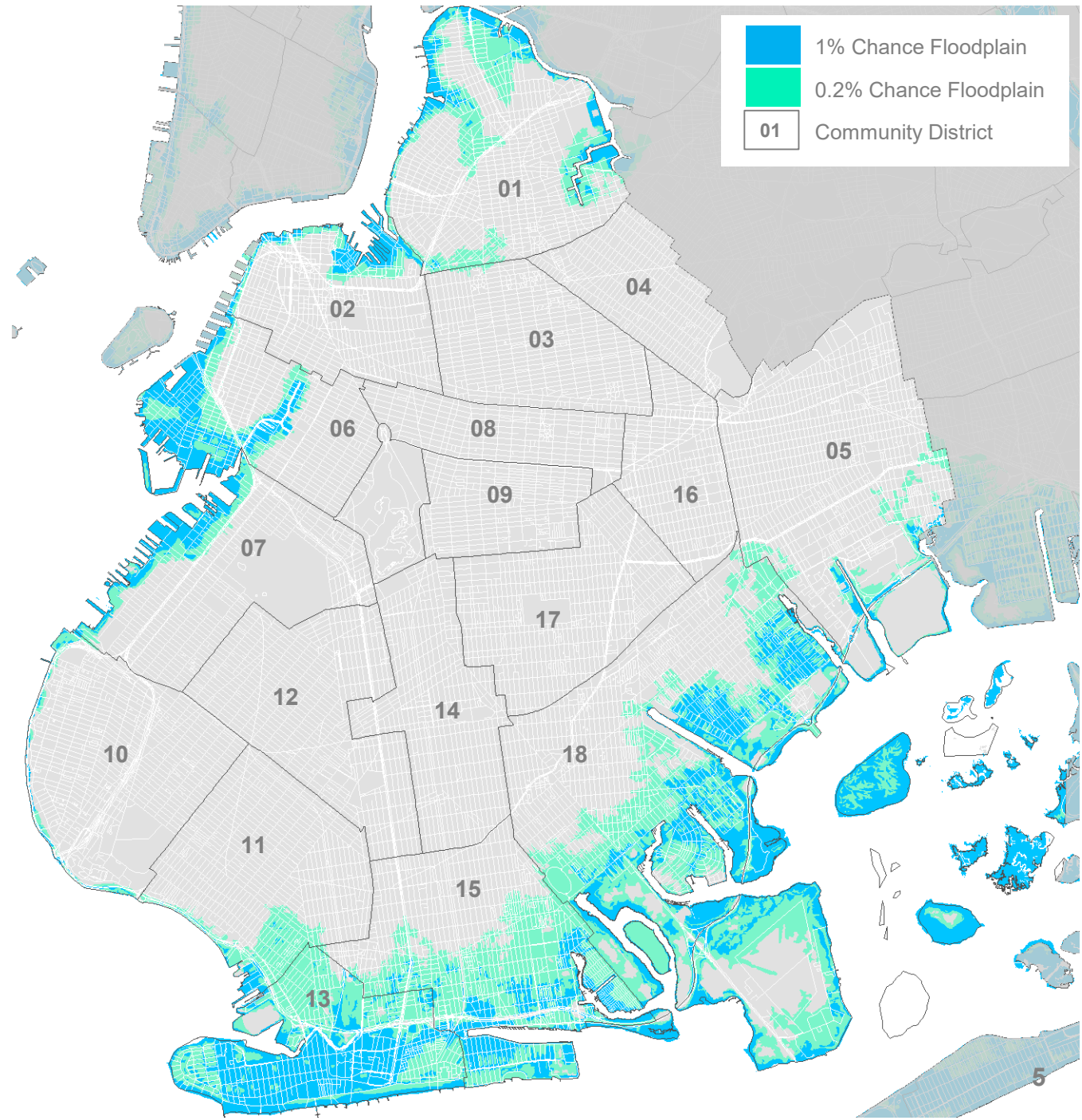
Citywide Flood Risk

1% annual chance floodplain (FIRM+ PFIRM)	0.2% annual chance floodplain (FIRM+ PFIRM)	TOTAL
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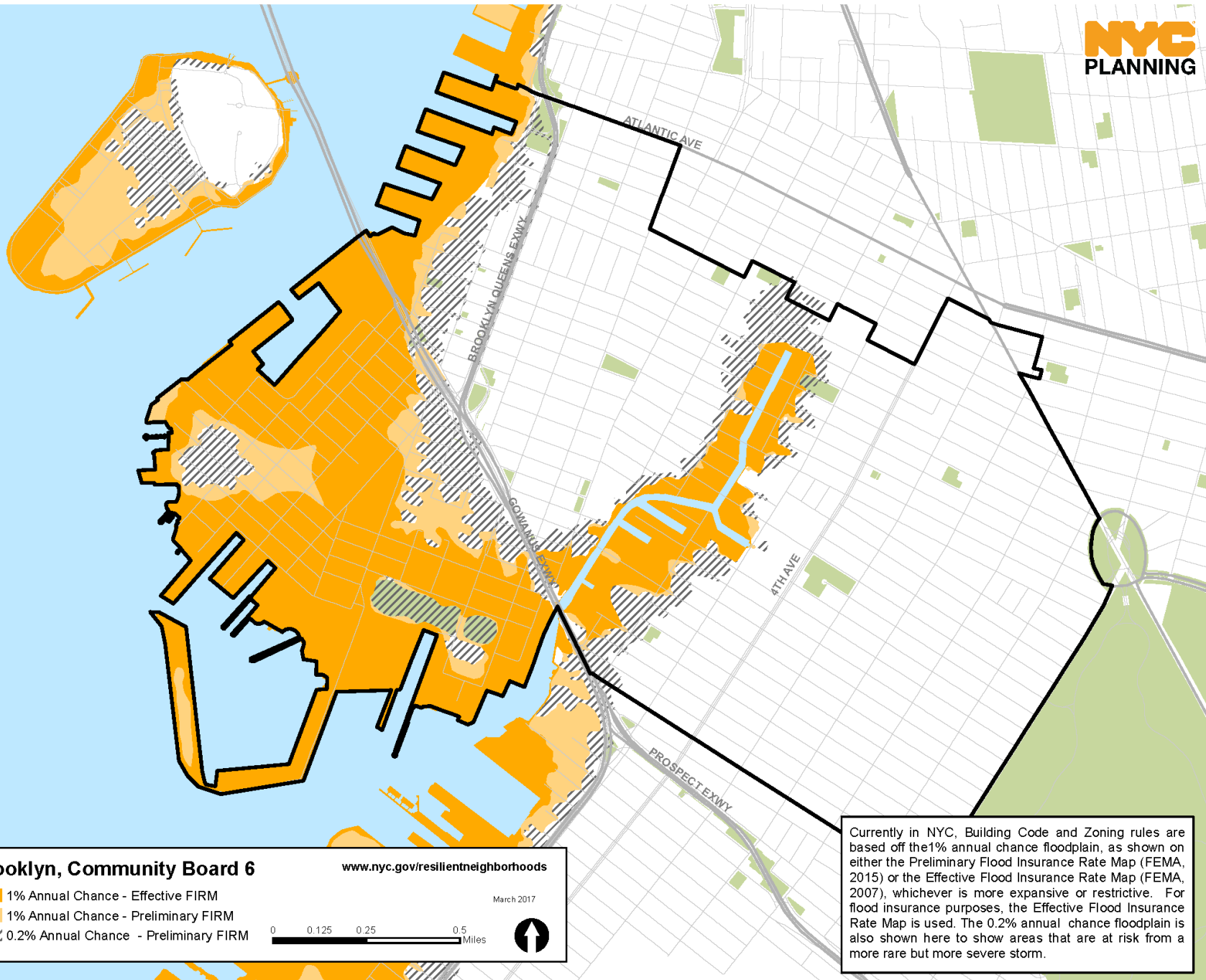
Citywide Total # of <u>Lots</u>	65,582	36,723	102,305
Brooklyn Total # of <u>Lots</u>	25,257	20,457	45,714

1% annual chance floodplain (FIRM + PFIRM)	0.2% annual chance floodplain (FIRM+PFIRM)	TOTAL
--	--	-------

Citywide Total # of <u>Buildings</u>	80,907	44,636	125,539
Brooklyn Total # of <u>Buildings</u>	29,549	25,115	54,664



■ 1% Chance Floodplain
■ 0.2% Chance Floodplain
01 Community District



Brooklyn, Community Board 6

www.nyc.gov/resilientneighborhoods

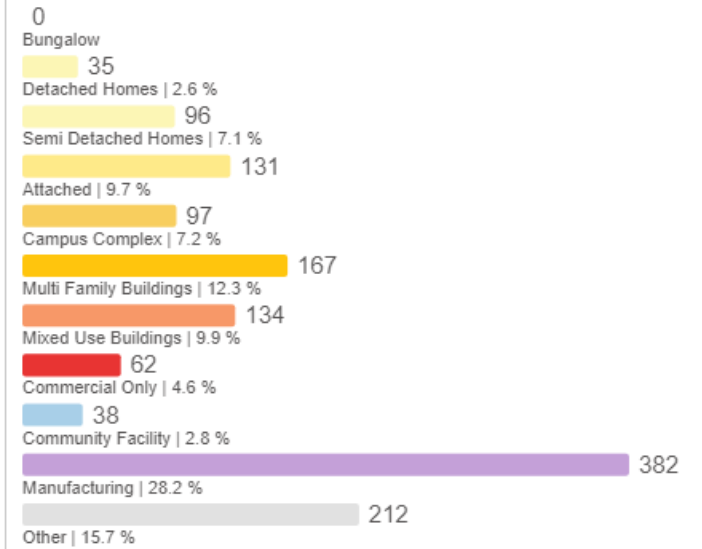
March 2017

- 1% Annual Chance - Effective FIRM
- 1% Annual Chance - Preliminary FIRM
- 0.2% Annual Chance - Preliminary FIRM



Currently in NYC, Building Code and Zoning rules are based off the 1% annual chance floodplain, as shown on either the Preliminary Flood Insurance Rate Map (FEMA, 2015) or the Effective Flood Insurance Rate Map (FEMA, 2007), whichever is more expansive or restrictive. For flood insurance purposes, the Effective Flood Insurance Rate Map is used. The 0.2% annual chance floodplain is also shown here to show areas that are at risk from a more rare but more severe storm.

1,354
buildings are in the 1% Annual Chance floodplain



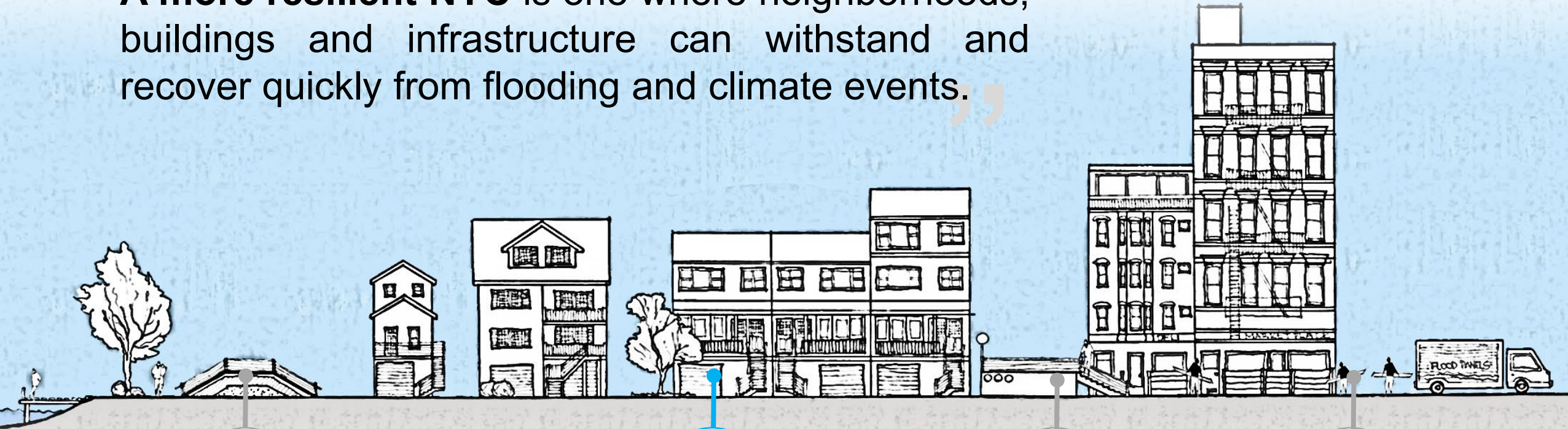
Total Buildings Within Floodplain



Brooklyn 6: 10% of buildings are in floodplain

#ONENYC

“A more resilient NYC is one where neighborhoods, buildings and infrastructure can withstand and recover quickly from flooding and climate events.”



Coastal defenses

are strengthened as first line of defense against flooding and sea level rise



Buildings

are designed to withstand and recover from flooding



Infrastructure

is protected from climate hazards



Residents and businesses

are prepared

How are buildings in the floodplain regulated?

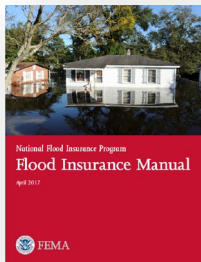


FEMA



Flood Insurance Rate Maps (FIRMs)

Determine the 1% and 0.2% annual chance floodplains **where regulations apply**



National Flood Insurance Program

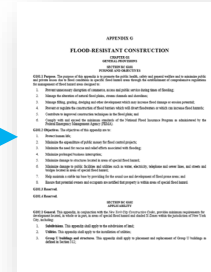
Set up Insurance Rates depending on building elevation and other requirements



Construction Standards (ASCE 24)

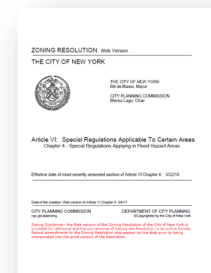
Design minimum construction requirements for flood hazard areas

NYC



Building Code (DOB)

Requires new buildings, substantial improvements and horizontal enlargements to meet FEMA standards (Appendix G)



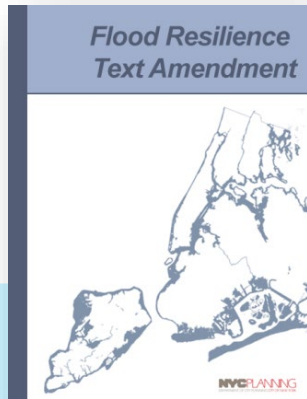
Zoning Resolution (DCP)

Zoning **accommodates** these regulations, by setting up **optional rules that assist buildings to meet Appendix G**

DCP's work since Hurricane Sandy

2012
Hurricane
Sandy

Zoning Text (emergency-basis)



2013
"Flood Text 1"
Temporary
Rules



2015
"Recovery Text"
Temporary
Rules

Research & Outreach Process

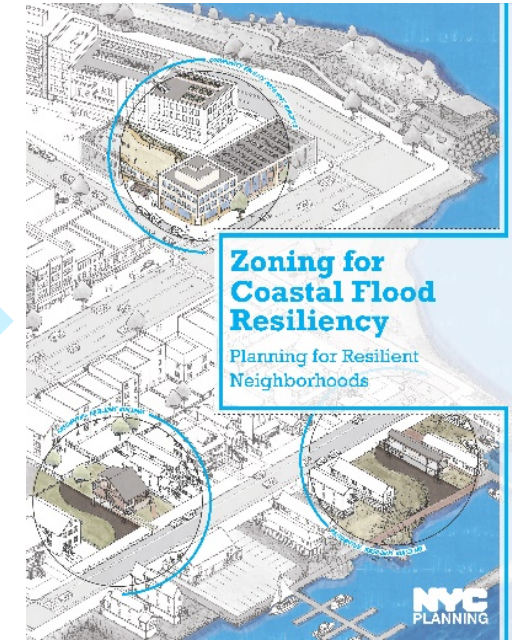


Citywide /
Neighborhood Studies
(2014-2017)



Community Outreach
Workshops
(2016-2018)

Proposal (permanent-basis)



Zoning for Coastal Flood
Resiliency
(2019)

Zoning for Coastal Flood Resiliency

From recovery to long-term resiliency

Zoning for Flood Resiliency would provide building owners flexibility to design or otherwise retrofit their buildings to reduce damage from flooding, be resilient in the long-term, potentially save on flood insurance costs, and expedite future-storm recovery.



1. Encourage resiliency throughout the current and future floodplains



2. Support long-term resilient design through flexibility in zoning



3. Allow for adaptation over time through incremental retrofits



4. Facilitate future storm recovery

Zoning for Coastal Flood Resiliency

2. Preliminary Recommendations Summary

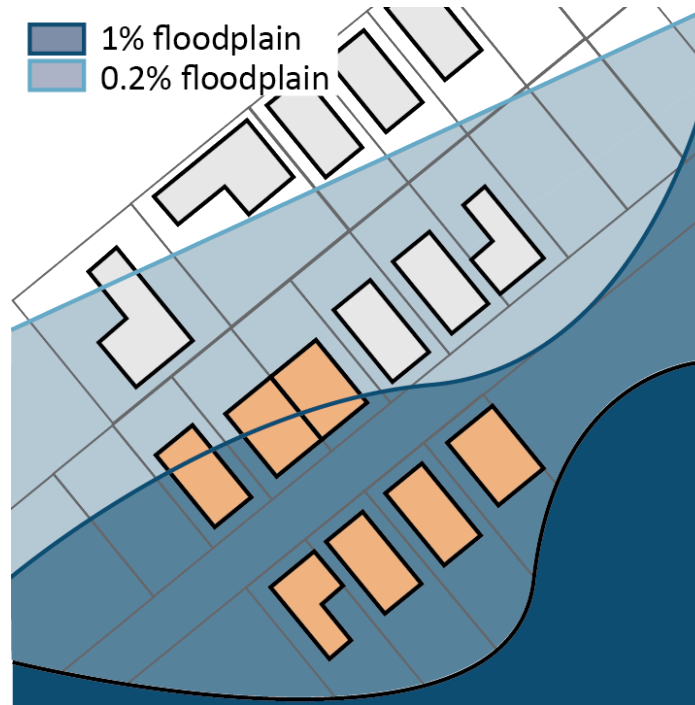
Zoning for Coastal Flood Resiliency

An expanded geography

Building owners in both the 1% and 0.2% annual chance floodplains would be able to invest in resiliency to meet or exceed flood-resistant construction standards, even when not required by FEMA or Building Code.

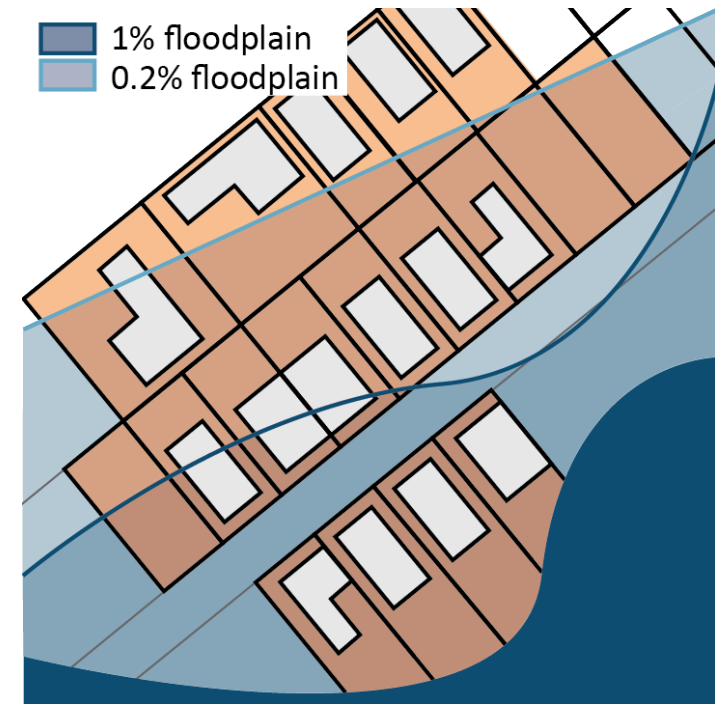


1. Encourage resiliency throughout the current and future floodplains



Existing Rules

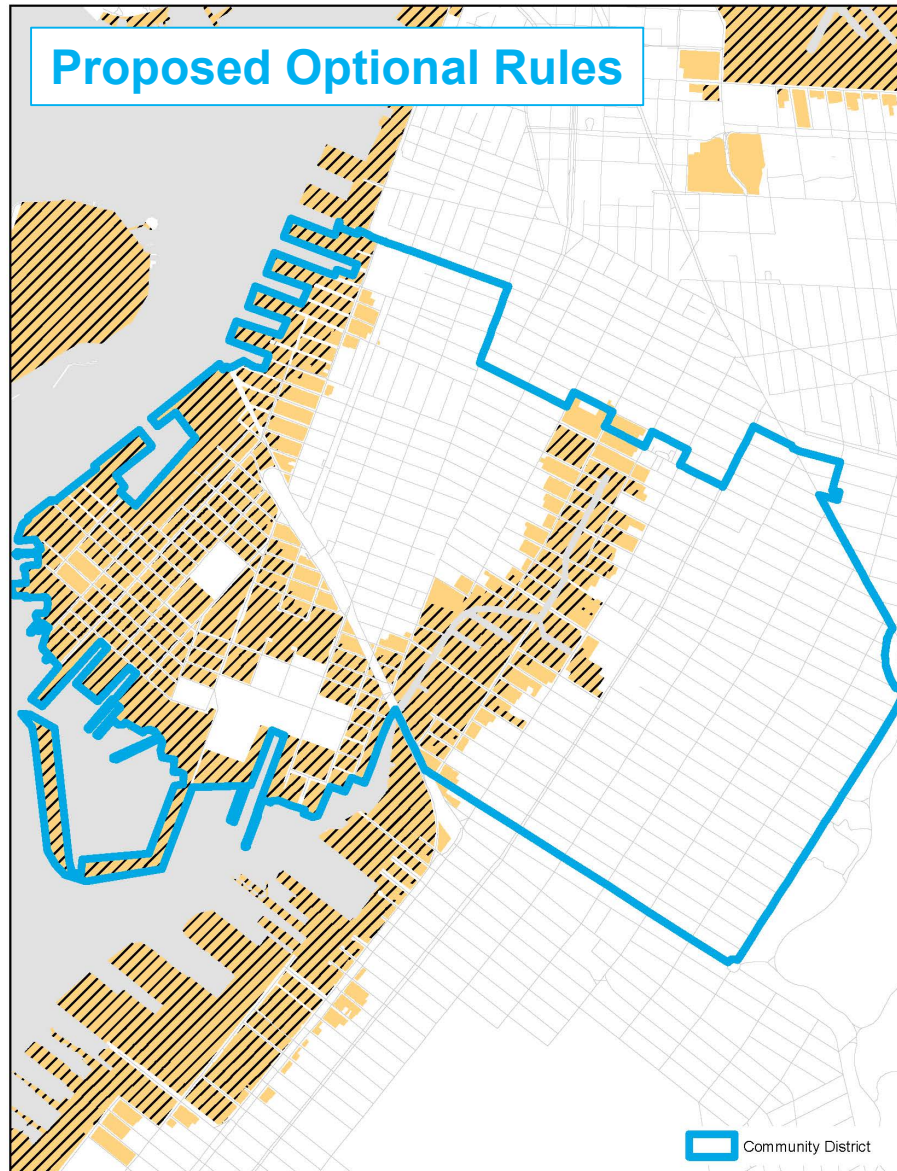
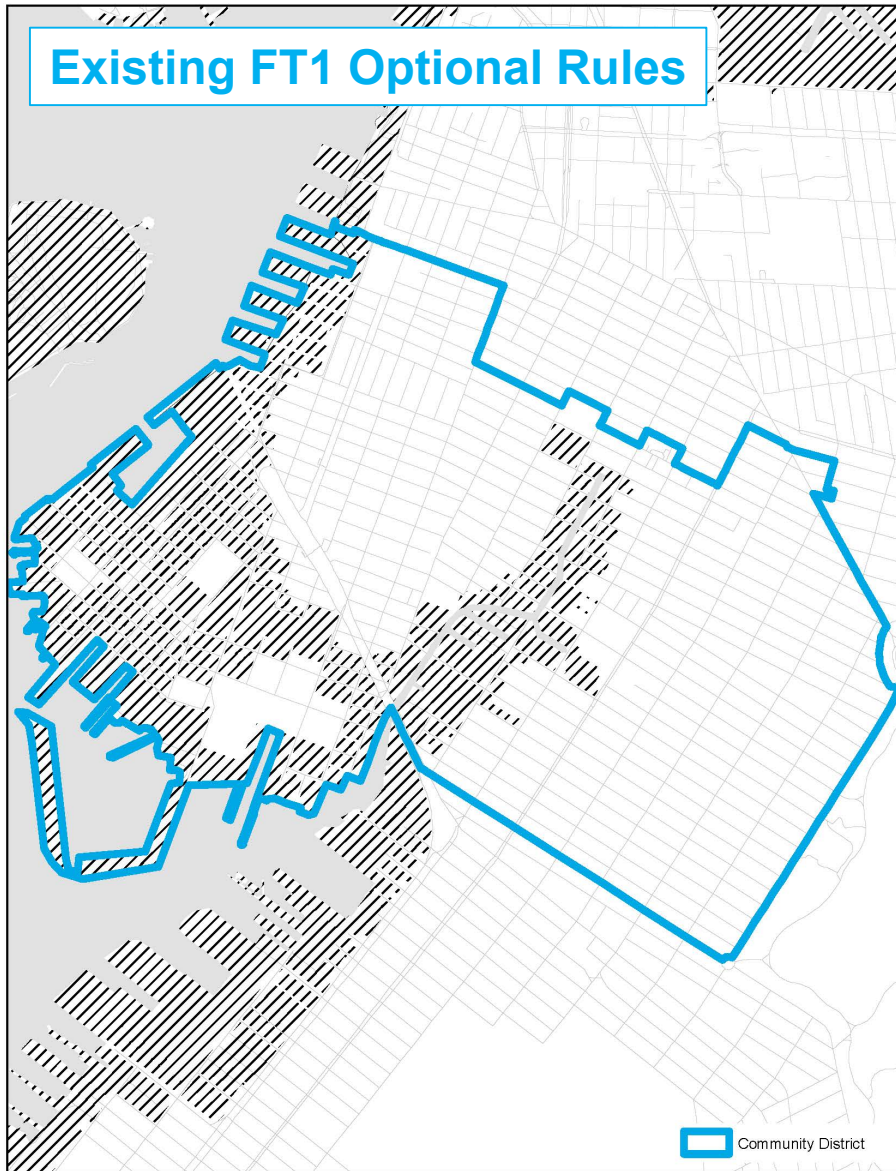
are only available to buildings within the 1% floodplain (High Risk Area)



Proposed Rules

will be available to lots within the 0.2% floodplain (Moderate Risk Area)

General Applicability in Brooklyn CD 6



 Rules available for buildings within the 1% floodplain

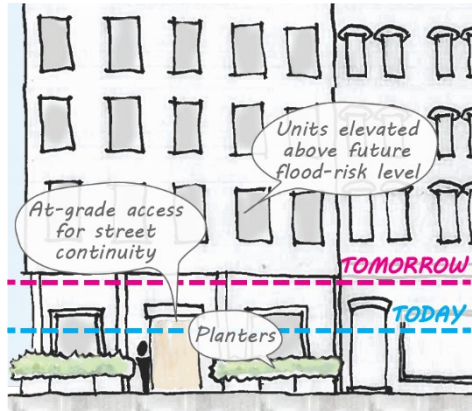
 Existing rule

 Rules available for lots within the 1% and 0.2% floodplains

Zoning for Coastal Flood Resiliency

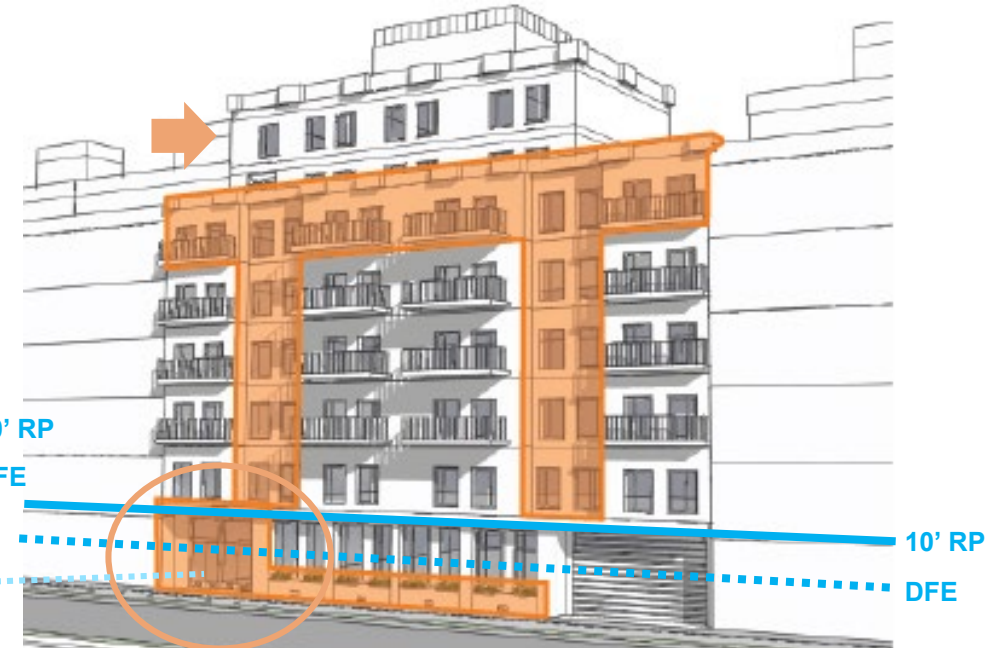
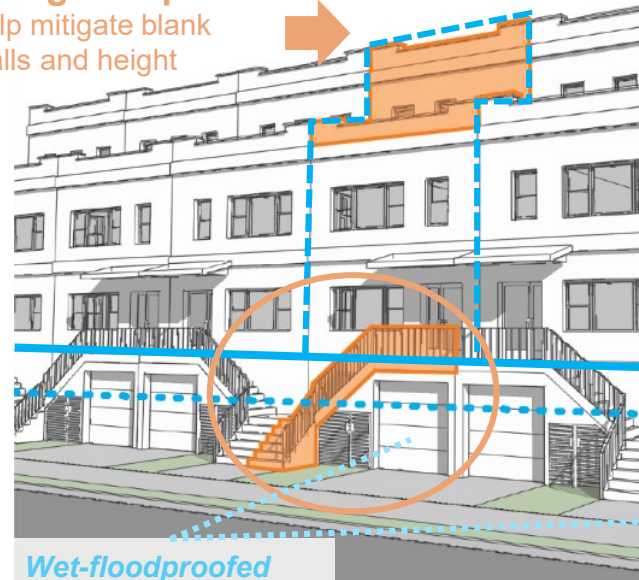
An enhanced Building Envelope

Allowances coupled with design requirements would allow building owners to accommodate sea level rise projections when designing new or retrofitting buildings, without creating negative impacts on the streetscape.



Design Requirements

help mitigate blank walls and height



Height and floor area allowances help future-proof units and place ADA access internally

2. Support long-term resilient design through flexibility in zoning

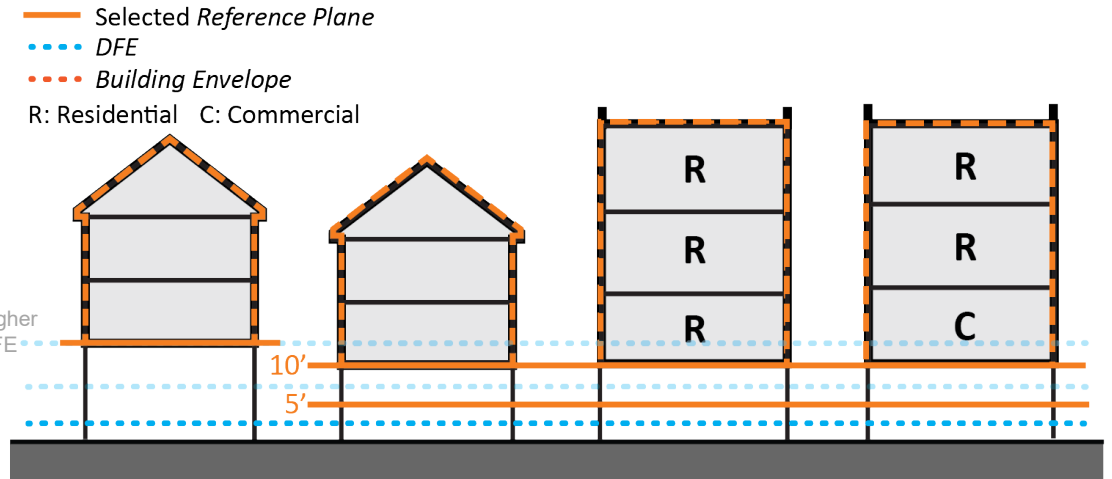
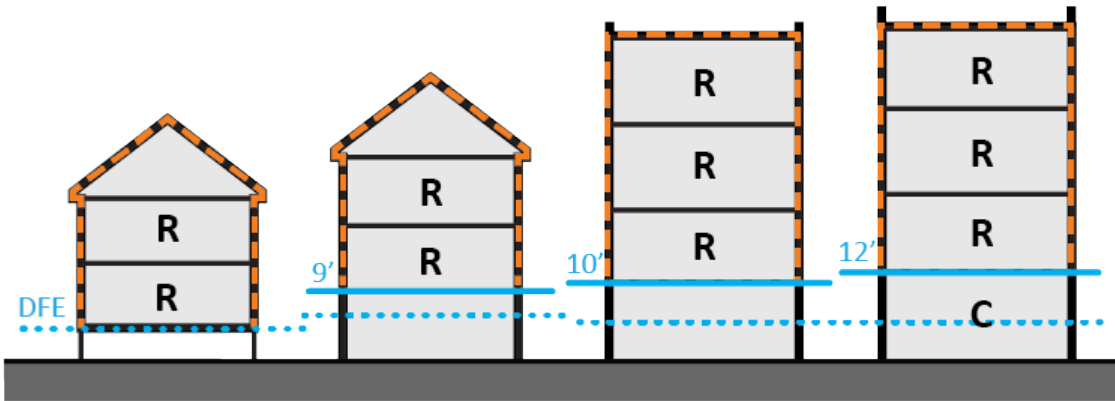
Residential Buildings

- Height allowances: envelope may be measured from the DFE or a Reference Plane of 10' (in 1% floodplain) or 5' (in 0.2% floodplain)
- Floor area exemptions for wet-floodproofed spaces (entryways, parking) will help living spaces be placed well-above flood risk levels.
- Design requirements will help mitigate streetscape issues caused from elevating.

Building Envelope

Height Allowance

Optional height regulations would facilitate buildings to **incorporate sea level rise projections** when meeting *flood-resistant construction standards*, while improving the utility of spaces below the *DFE*.



Existing Rules: DFE or a Reference Plane measured from 9', 10' or 12'* depending on the building's use and zoning district

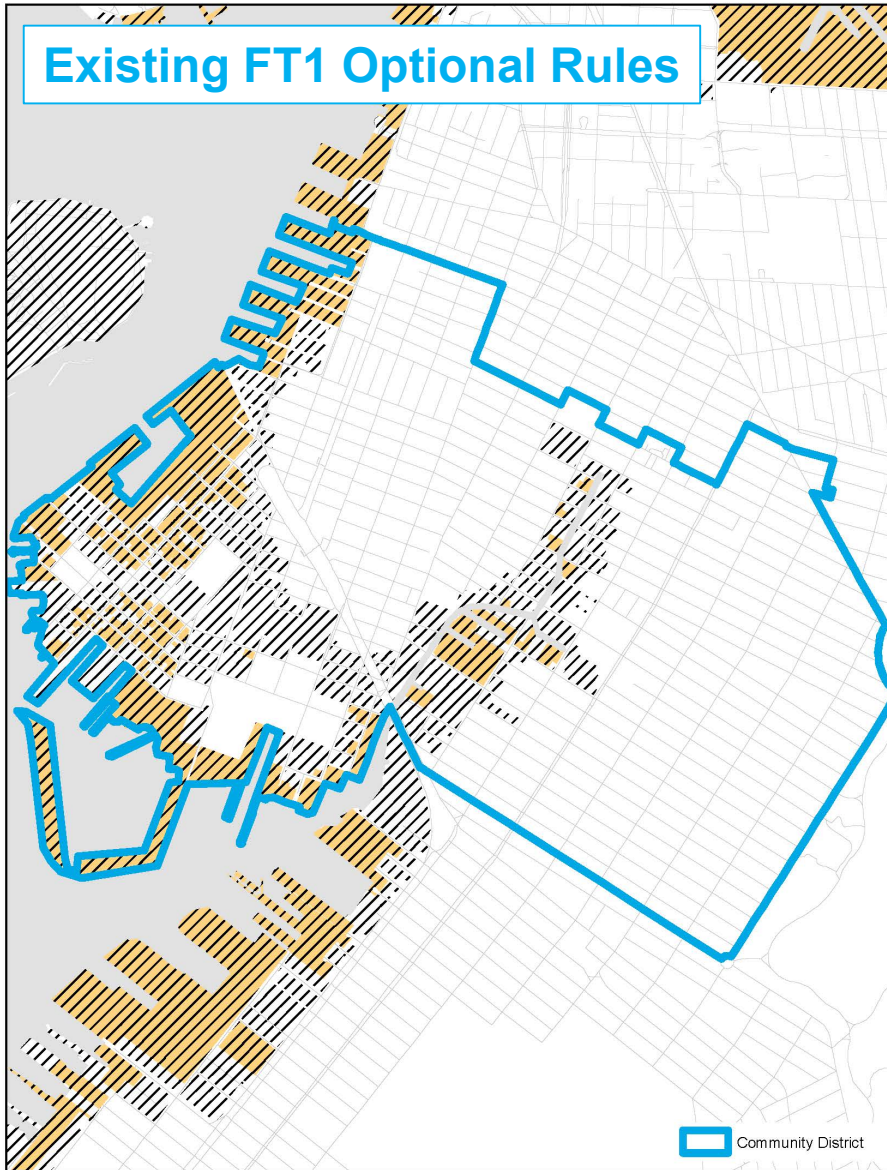
Proposed Rules: DFE or a Reference Plane of up to 10' in the 1% floodplain or 5' in the 0.2% floodplains

* 12' option available only permitted for non-residential buildings in C- or M-districts

Building Envelope

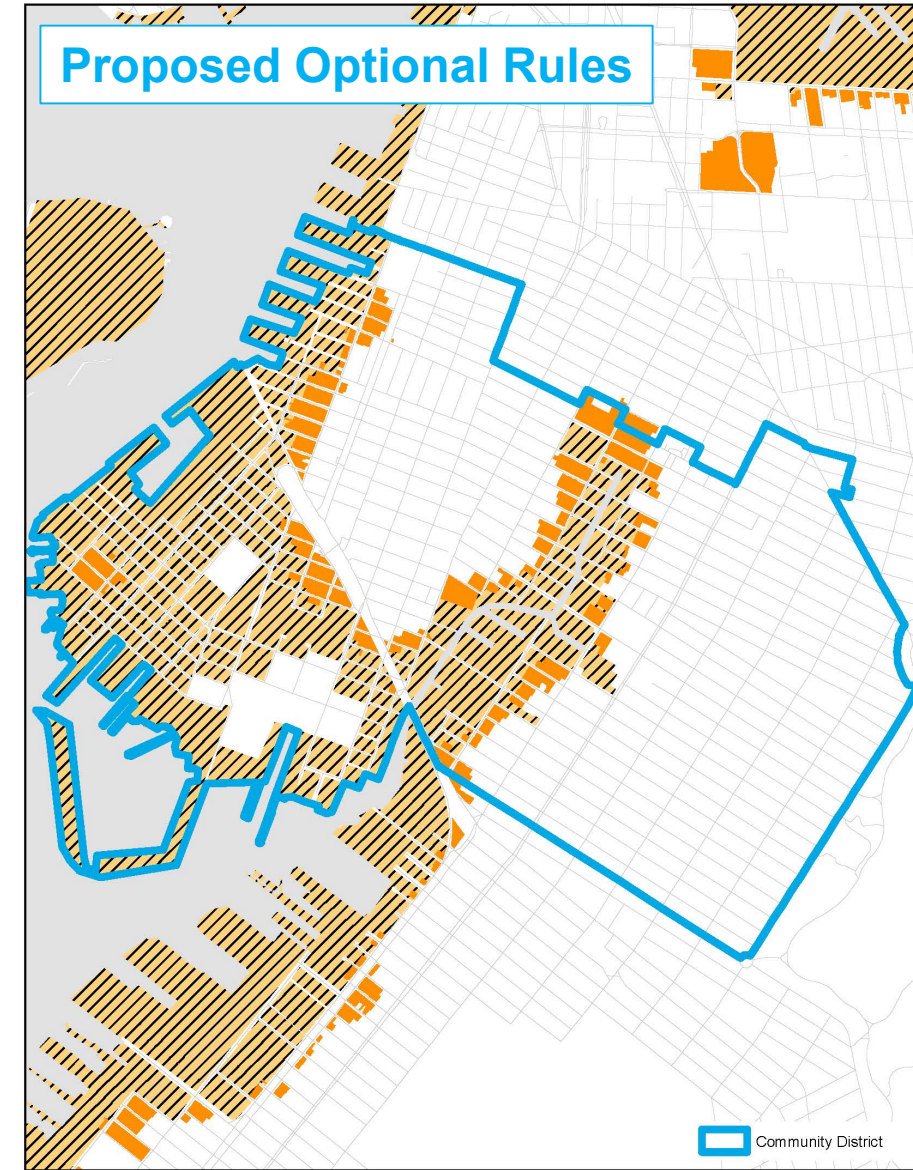
Height Allowance

Existing FT1 Optional Rules



-  Height can be measured from DFE
-  Height "bump-up" permitted

Proposed Optional Rules



-  Height can be measured from DFE or up to 10' RP whichever is higher
-  Height can be measured from up to 5' RP



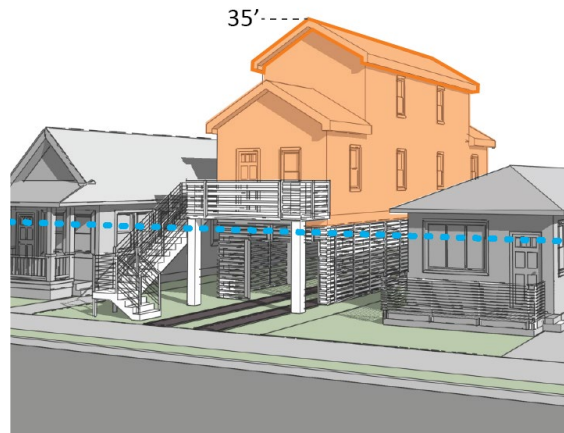
Building Envelope

“Cottage” Envelope

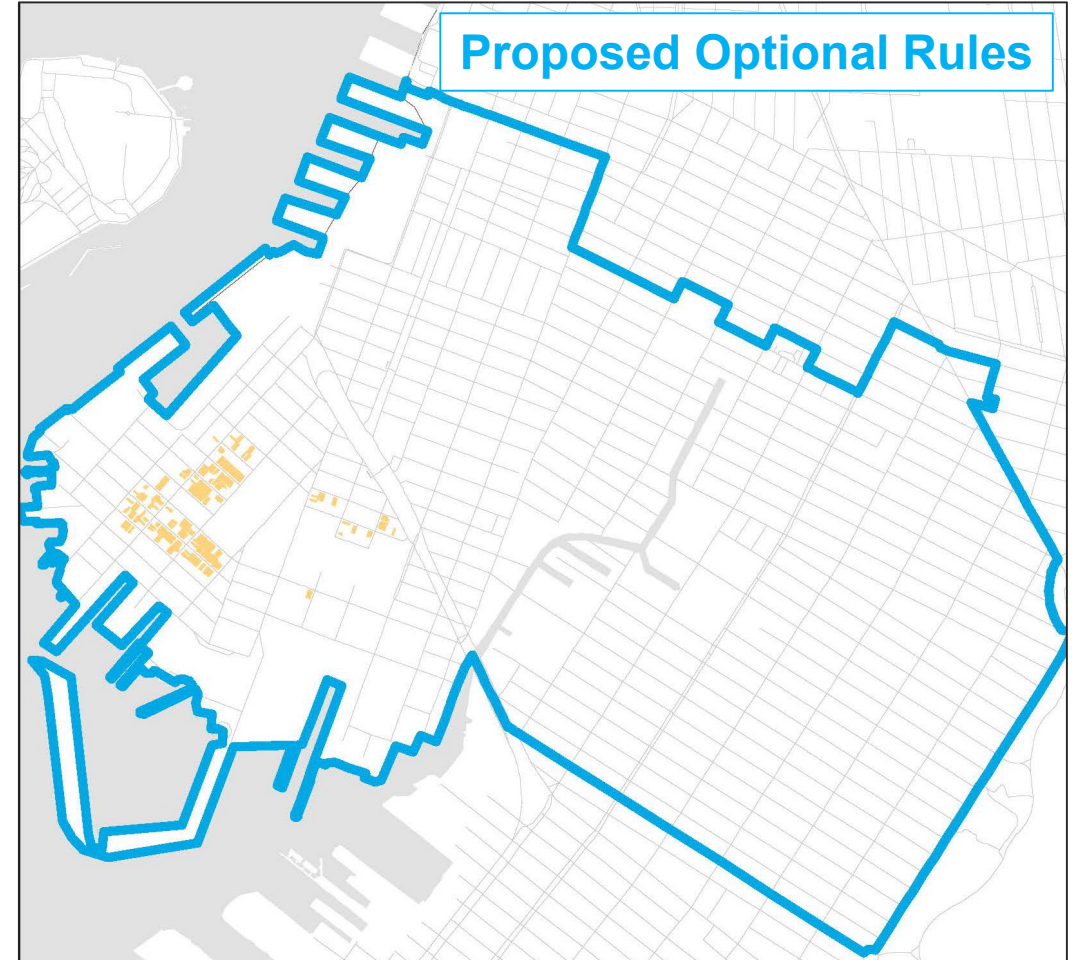
Optional *Building Envelope* would facilitate the **construction, reconstruction, and retrofit** of **detached homes** located on **small lots**, and better reflect neighborhood scale.



Existing Rules: maximum height of 35' as measured from the DFE or 9' Reference Plane



Proposed Rules: maximum height of 25' as measured from the DFE up to 10' Reference Plane

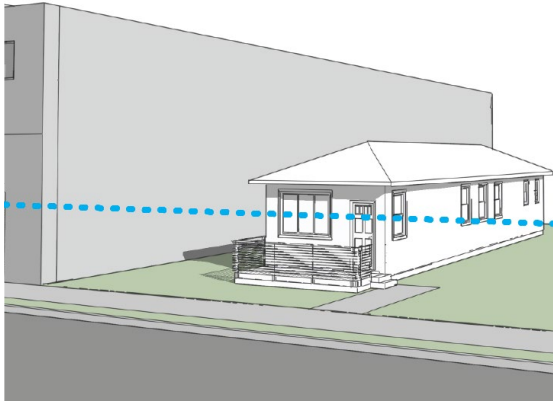


Existing rule Rule proposed within 1% and 0.2% floodplains

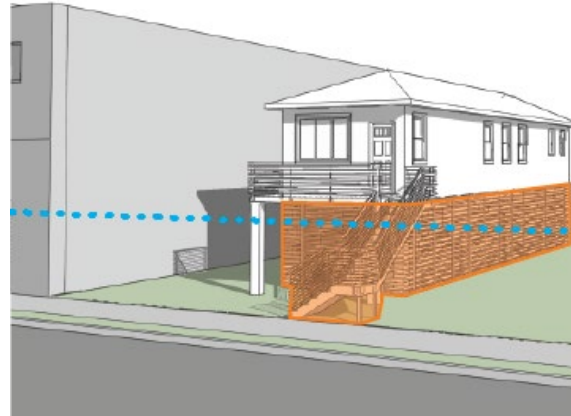
Building Envelope

Non-Conformance

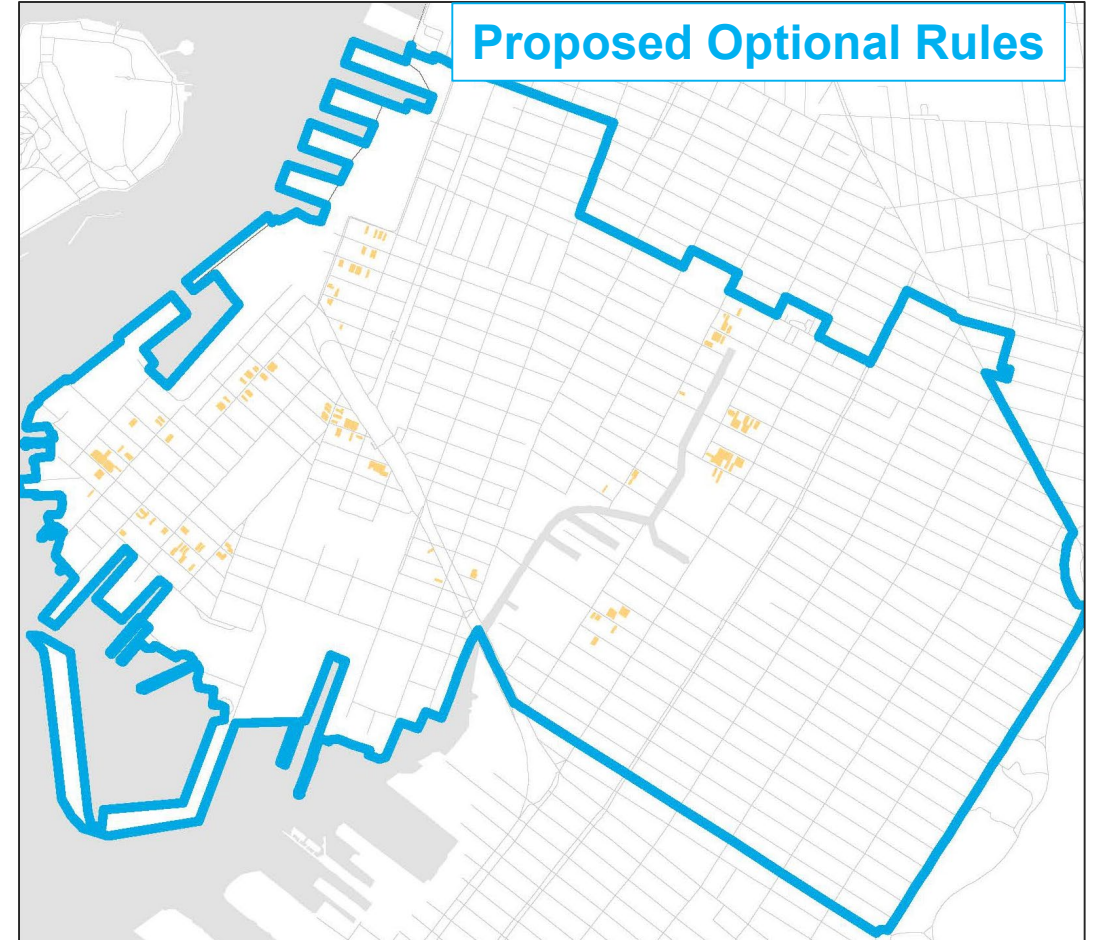
Regulations would allow the reconstruction, enlargement or alteration of a **greater range of** existing non-complying and/or non-conforming buildings to meet or exceed *flood-resistant construction standards*.



Existing Rules: homes in M/C8 districts cannot be retrofitted or rebuilt



Proposed Rules: homes in M/C8 districts can be retrofitted or rebuilt



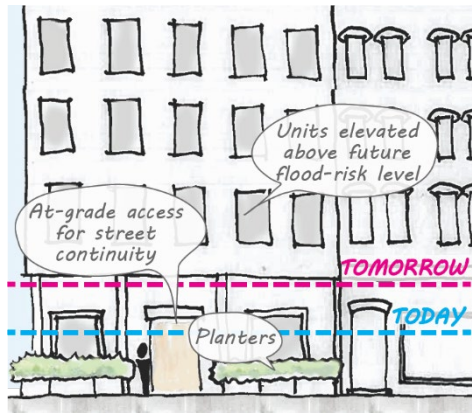
Existing rule

Rule proposed for homes in M/C8 within floodplain

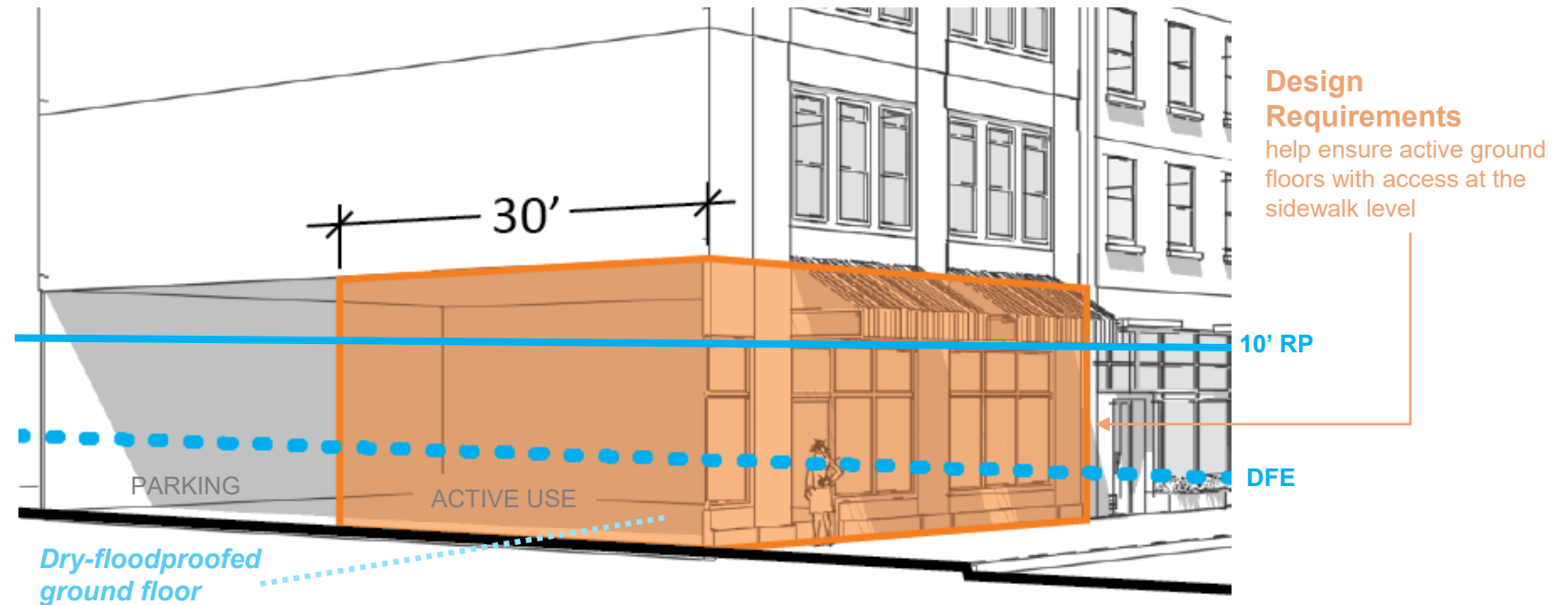
Zoning for Coastal Flood Resiliency

An enhanced Building Envelope

Allowances coupled with design requirements would allow building owners to accommodate sea level rise projections when designing new or retrofitting buildings, without creating negative impacts on the streetscape.



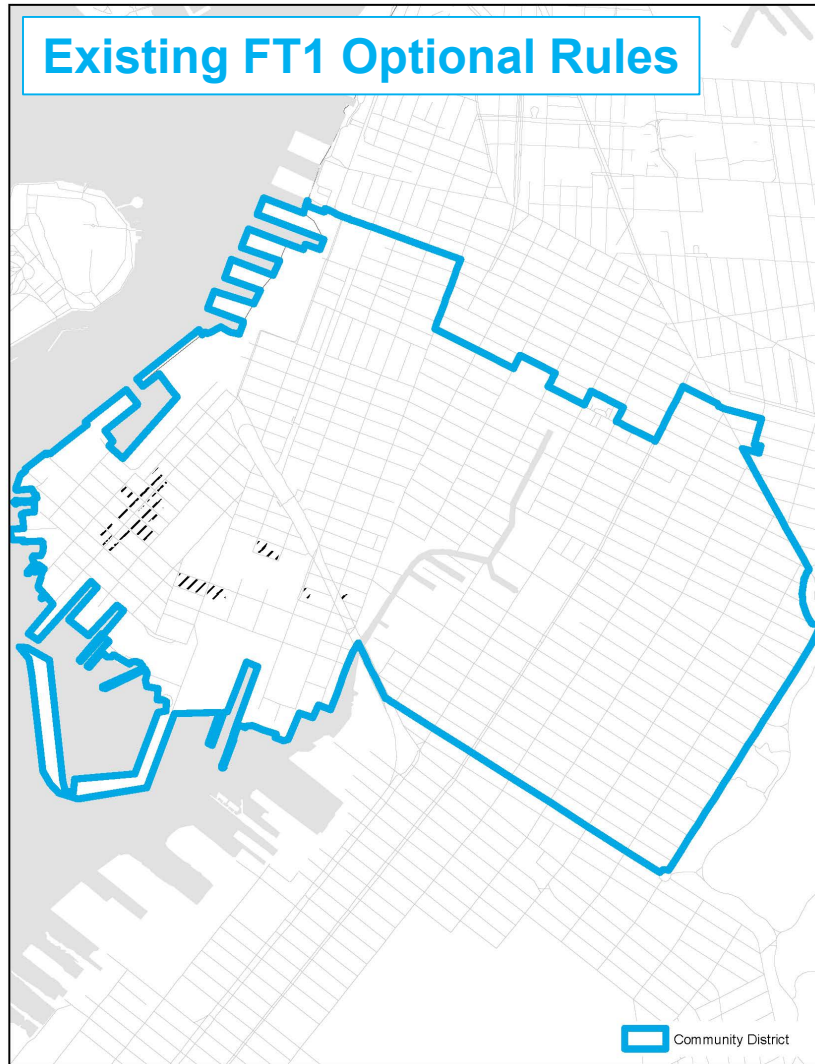
2. Support long-term resilient design through flexibility in zoning



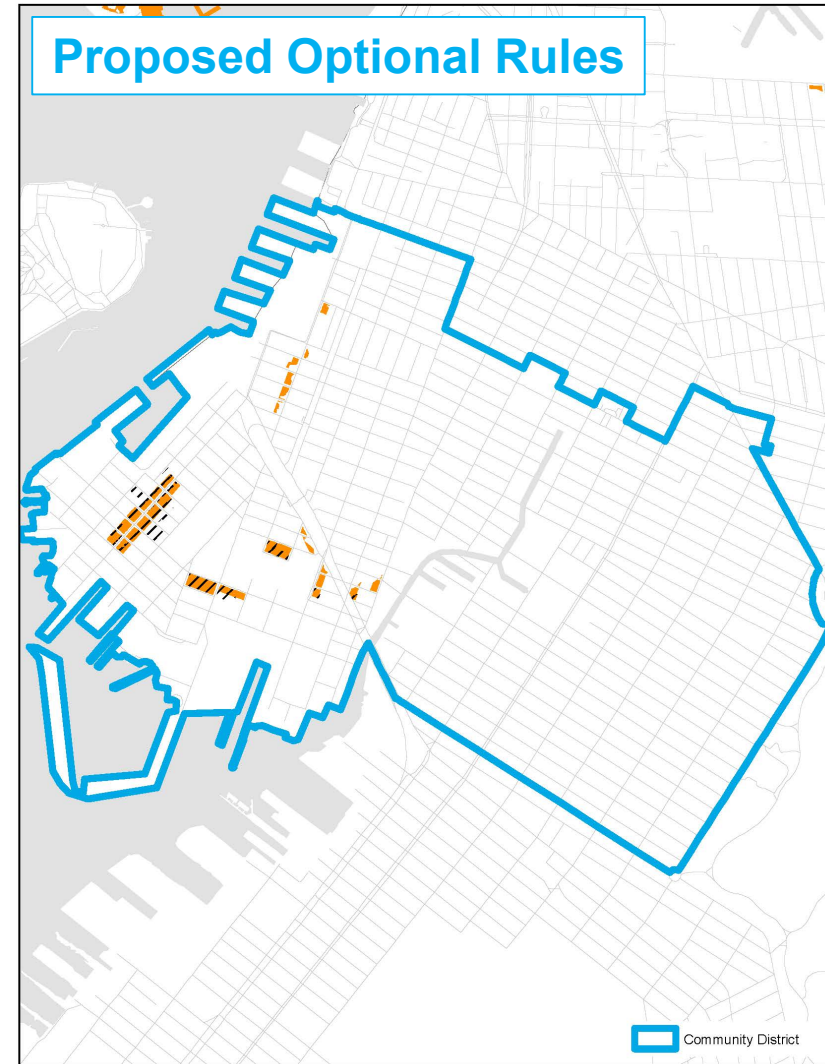
Commercial & Mixed-Use Buildings

- Floor area exemptions for dry-floodproofed spaces will incentivize active uses (commercial and community facilities) to be kept at the sidewalk level
- Design requirements will help ensure active ground floors

Floor Area regulations would exempt floor area to encourage new and existing buildings to meet **or exceed** *flood-resistant construction standards*, while ensuring quality ground-floors that are kept at street level.



▨ Rule available for full floor if commercial dry-floodproofed



▨ Existing rule ■ Rule proposed for 30' commercial dry-floodproofed

Floor Area regulations would exempt floor area to encourage new and existing buildings to meet **or exceed flood-resistant construction standards**, while ensuring quality ground-floors that are kept at street level.

Existing FT1 Optional Rules



Existing Conformance –
Elevated Commercial

Community District

Rule available for full floor if commercial dry-floodproofed

Proposed Optional Rules



Proposed Applicability –
Columbia Street

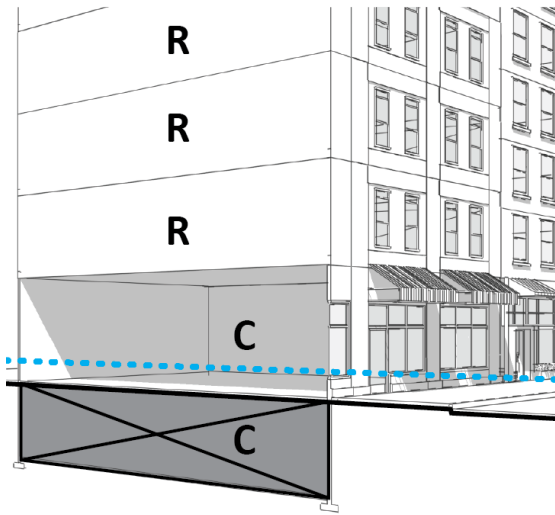
Community District

Existing rule Rule proposed for 30' commercial dry-floodproofed

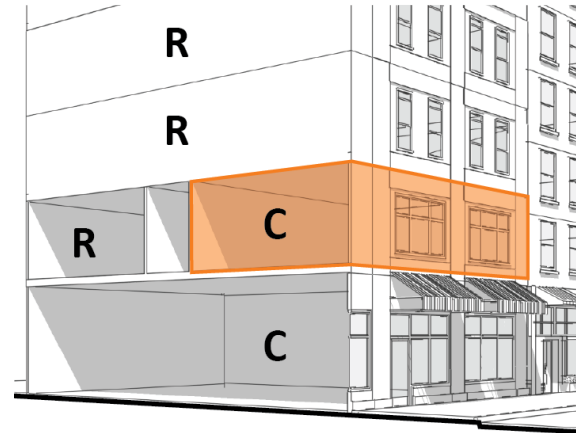
Building Design

Commercial Use

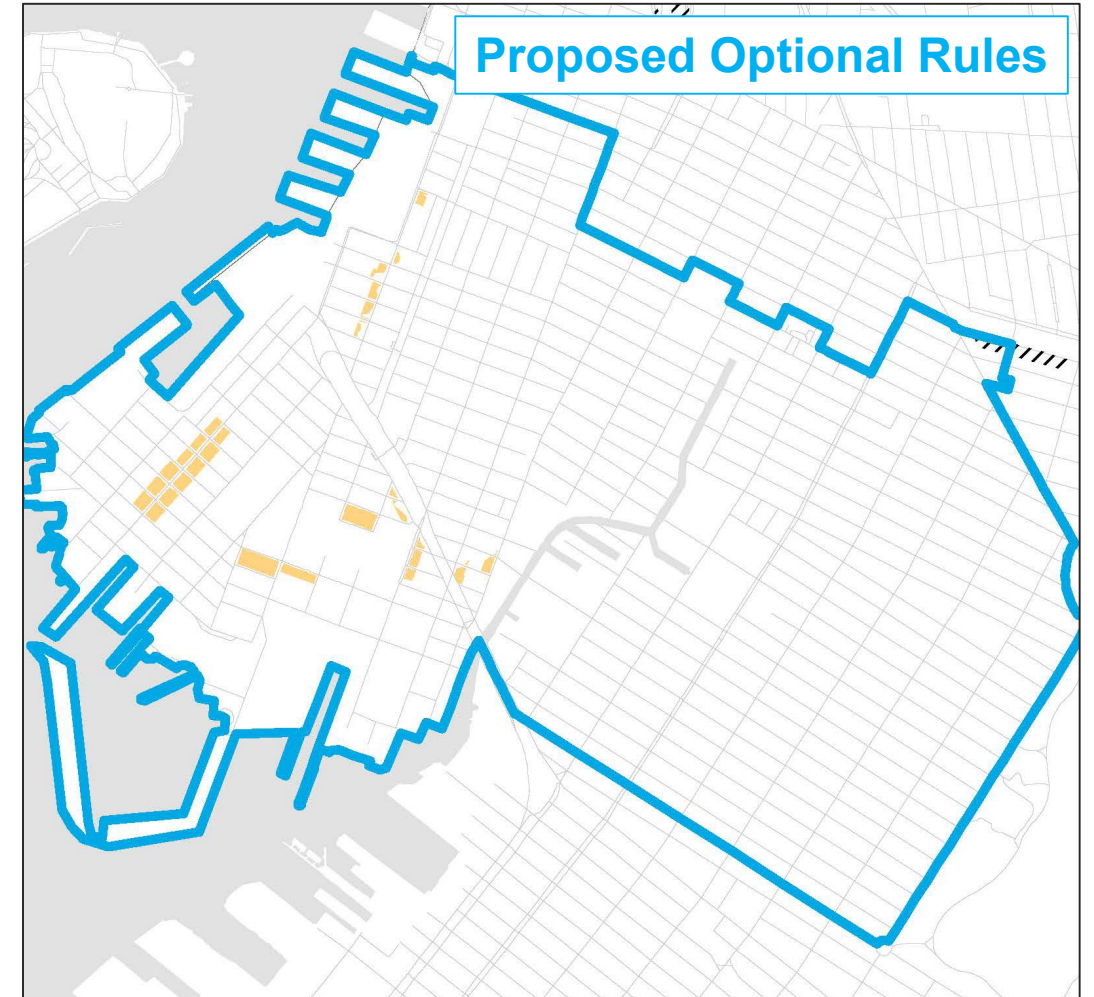
Supplemental use regulations would offer alternatives beyond dry-floodproofed cellars for businesses to locate commercial uses such as accessory spaces



Existing Rules: Commercial uses are limited to the ground-floor in mixed-use buildings in certain commercial corridors



Proposed Rules: Commercial uses can be located within the second story in mixed-use buildings above the flood level in all commercial corridors



Existing rule

2nd story commercial allowance proposed in C1 & C2 within R1-R10 in floodplain

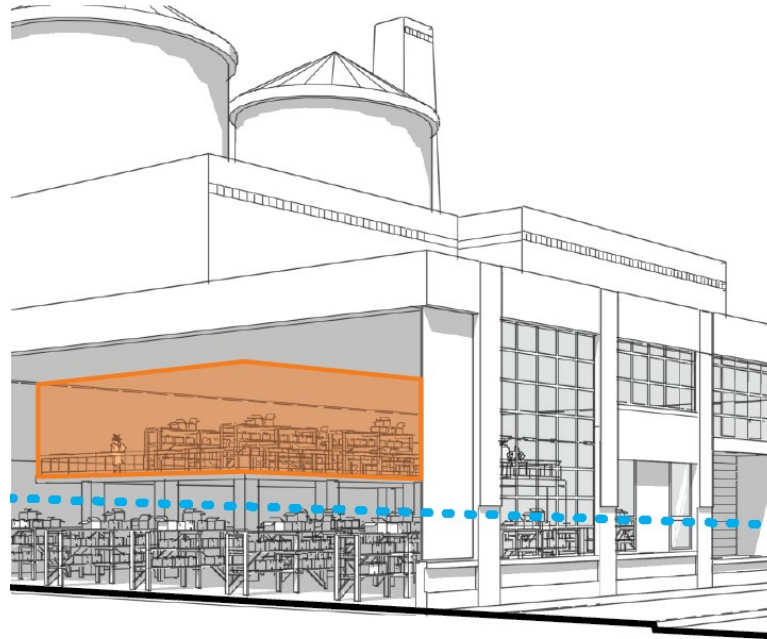
Zoning for Coastal Flood Resiliency

Alternatives for the relocation of important equipment

Building owners would have additional flexibility to relocate mechanical/electrical/plumbing equipment or generators.

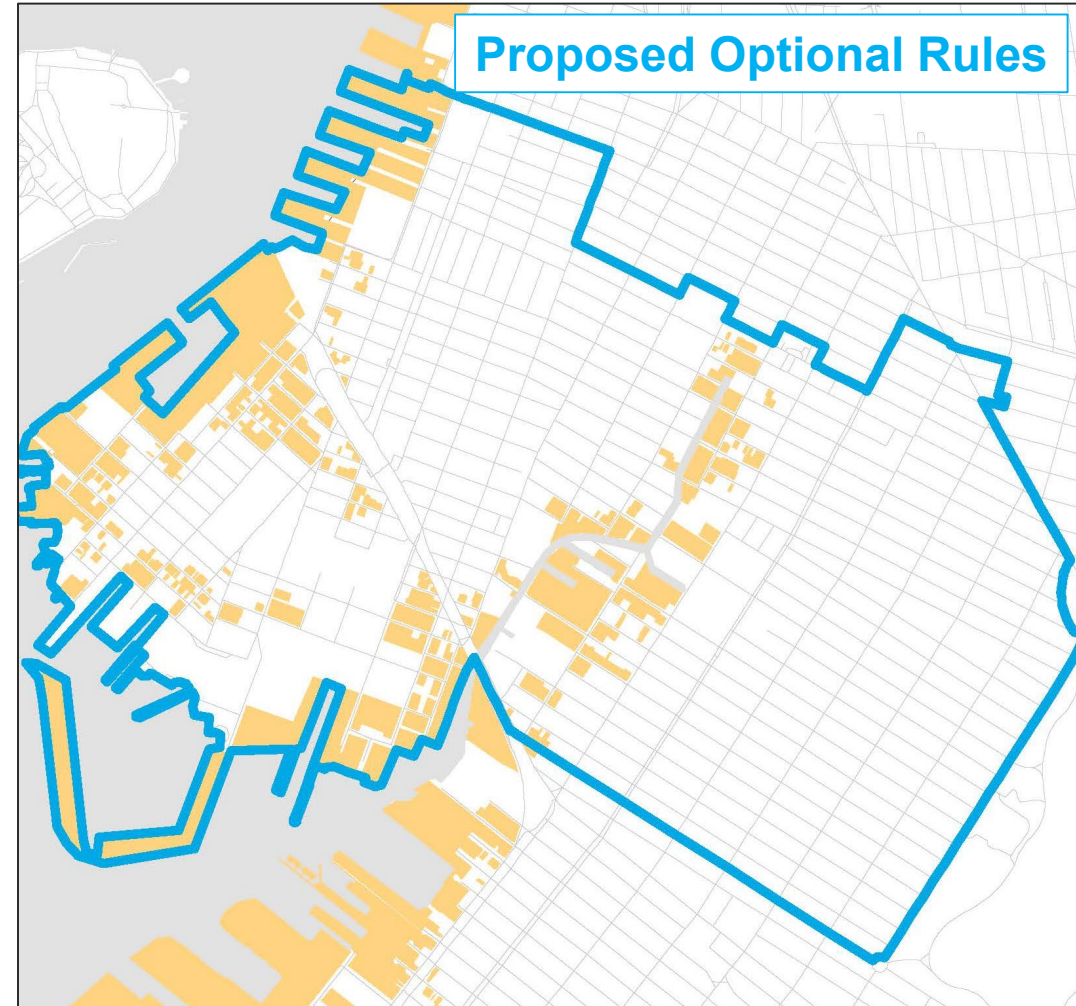


3. Allow for adaptation over time through incremental retrofits



Floor Area Exemptions

for existing industrial buildings allow the creation of small mezzanine space or a 2nd floor to store important spaces/equipment



■ Rule proposed for manufacturing buildings in M/C8

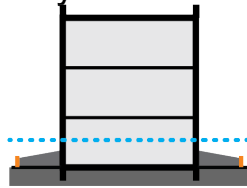
Zoning for Coastal Flood Resiliency

Alternatives for the relocation of important equipment

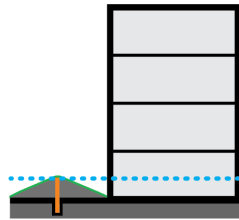
Building owners would have additional flexibility to relocate mechanical/electrical/plumbing equipment or generators.



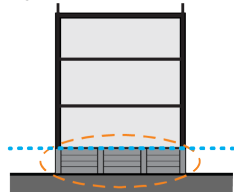
Or build retaining walls and raise yards



Or build berms

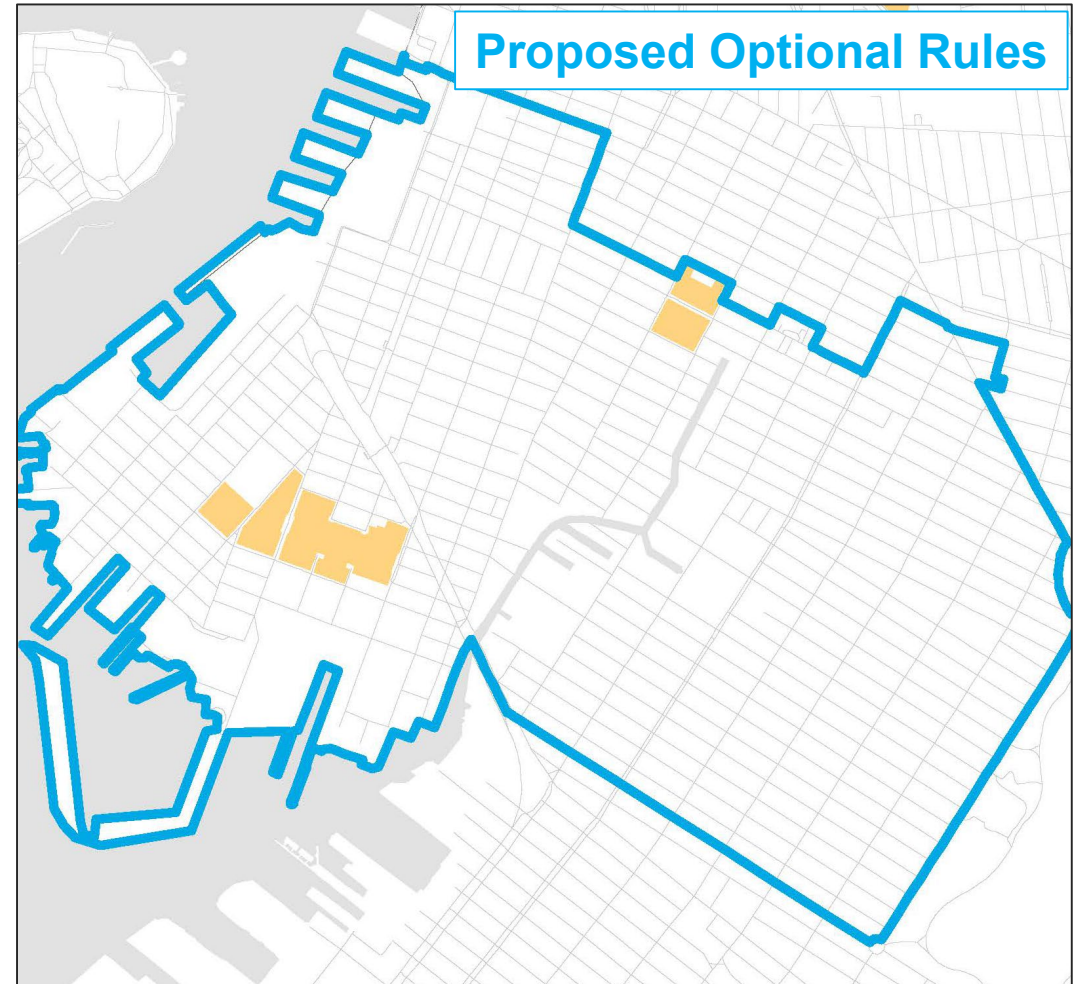


Or deploy flood panels



More flexible permitted obstructions

to provide more options for MEP to be relocated to either above the roof or within separate structures



■ MEP building allowed for campus-style housing in 1% and 0.2% floodplain

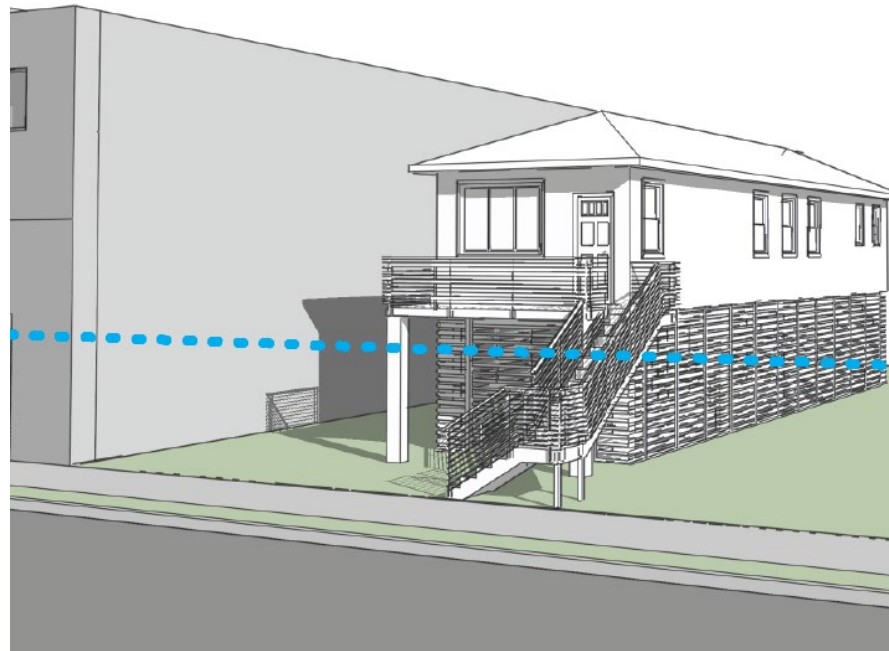
Zoning for Coastal Flood Resiliency

Future storm recovery

To be ready for future storm events, new rules would make it easier for damaged buildings to be reconstructed. This would allow residents and neighborhoods to recover faster and allow the City to offer disaster assistance.

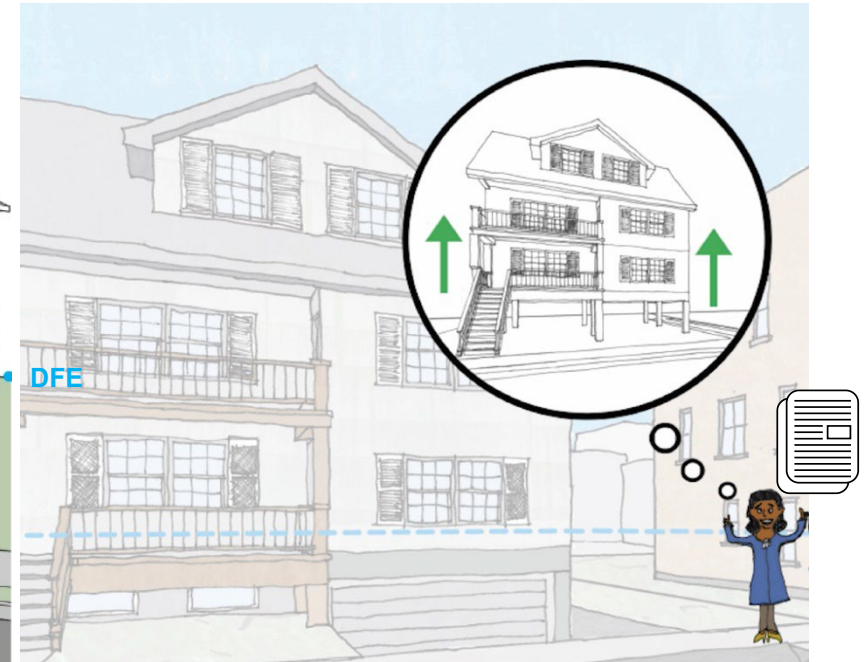


4. Facilitate future storm recovery



Reconstruction allowances

Substantially-damaged non-conforming or non-complying buildings can rebuild to at least minimum resiliency standards



Documentation process

Aerial photographs/tax bills can be used to establish the existence of a building. A survey may be used to document non-compliances

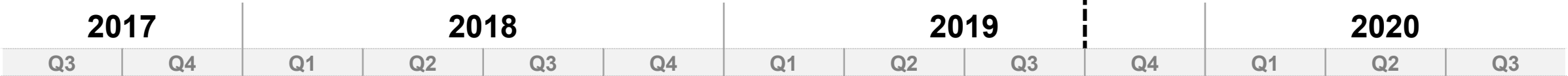
Zoning for Coastal Flood Resiliency

3. Project Timeline & Resources

Zoning for Coastal Flood Resiliency Project Timeline

* Timeline subject to change

WHERE WE ARE



Outreach

PHASE 1: BPs, BBs, CMs, public workshops

PHASE 2: BPs, BBs, CMs, CBs (high priority)

Outreach Summary
Release (August)



Draft Proposal

ZCFR WORKING GROUP (DCP) / COORDINATION WITH SISTER AGENCIES

Zoning Text

DRAFT 1 D. 2

Proposal Release (May 1)



Referral



Environmental Review

RWCDS / PROTOTYPES DSOW / EAS COMMENTS / FSOW / DEIS FEIS

Scoping (June 13)



Public Review

CBs, BPs BBs CPC CC

Broad public engagement (NEWSLETTER, EVENTS, VIDEO, LINK NYC, ETC)



Resources



NYC Flood Hazard Mapper

www.nyc.gov/floodhazardmapper

Info briefs on Flood Resilience Zoning, Flood Risk, Flood Resilient Construction, and Flood Insurance

www.nyc.gov/resilientneighborhoods

Catie Ferrara Iannitto

cferrara@planning.nyc.gov

718-780-8280

NYC PLANNING Info Brief Flood Insurance

Flood insurance covers damages to property or personal contents from flooding caused by excessive rainfall, tidal flooding, or wind-driven storm surges. Changes to flood maps and reforms to the National Flood Insurance Program will lead to increases in flood insurance rates over time. In addition to flood resilient construction, insurance is another strategy for reducing flood risk.

NYC PLANNING Info Brief Why is Flood Insurance Important?

- Floods can cause significant damage to your most valuable asset: your home or business.
- Even properties far from the coast may be at risk of flooding.
- Homeowner and property insurance do not cover damage by flooding. You must buy a separate policy.
- Federal assistance is not guaranteed in the event of a flood.
- Many property owners are required by federal law to purchase and maintain flood insurance if the property is located in a high-risk flood zone of the 2007 FIRMs (see map to right), has a federally backed mortgage, or has received federal disaster assistance.

NYC PLANNING Info Brief How Much Flood Insurance Must a Homeowner Purchase?

Properties with a federally backed mortgage in a high-risk flood zone and those that have received federal disaster assistance must maintain flood insurance up to the NFIP coverage limits, or the outstanding mortgage balance, whichever is lower. Failure to do so may lead mortgage servicers to purchase a policy for the property—possibly at a higher price—and pass on the cost through monthly mortgage bills. Homeowners without a federally-backed mortgage or outside a high flood risk zone can carry up to the maximum policy limit of \$250,000 with additional contents coverage available up to \$100,000 for owners or renters. Co-ops, larger multifamily buildings and business properties can be covered up to \$500,000. Business owners and tenants can also purchase up to \$500,000 in contents coverage.



NYC Planning | November 2016 | Flood Insurance

NYC PLANNING Info Brief Flood Risk in NYC

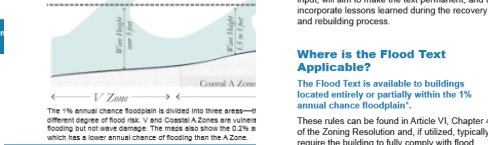
New York City is highly vulnerable to flooding from coastal storms due to its intensively used waterfront and its extensive coastal geography. Floods have the potential to destroy homes and businesses, impair infrastructure, and threaten human safety. With climate change and sea level rise, these risks are expected to increase in the future, but will most adversely affect low-lying neighborhoods.

NYC PLANNING Info Brief Flood Risks

Hurricanes, tropical storms, nor'easters, intense rain storms, and even extreme high tides are the primary causes of flooding in NYC. For building code, zoning, and planning purposes, flood risk in NYC is represented on FEMA's 2015 Preliminary Flood Insurance Rate Maps (PFIRMs).

- PFIRMs show the extent to which flood waters are expected to rise during a flood event that has a 1% annual chance of occurring. This height is denoted as the Base Flood Elevation (BFE) on the maps.
- The 1% annual chance floodplain is sometimes referred to as the 100-year floodplain. However, this term is misleading since these floods can occur multiple times within 100 years. In the 1% annual chance floodplain, there is a 26% chance of flooding over the life of a 30-year mortgage.

For flood insurance purposes, refer to FEMA's 2007 Flood Insurance Rate Maps (FIRMs). All property owners of buildings in the 1% annual chance floodplain with a federally insured mortgage are mandated by law to purchase flood insurance.



NYC Planning | November 2016 | Flood Risk in NYC

NYC PLANNING Info Brief Flood Resilience Zoning

City Planning is working with communities throughout the floodplain to identify zoning and land use strategies to reduce flood risks and support the city's vitality and resiliency through long-term adaptive planning. The Flood Resilience Zoning Text is one part of a wide range of efforts by the City to recover from Hurricane Sandy, promote rebuilding, and increase the city's resilience to climate-related events.

NYC PLANNING Info Brief Overview

The Flood Text enables and encourages flood resilient building construction throughout designated floodplains. The Flood Text modified zoning to remove regulatory barriers that hindered or prevented the reconstruction of storm-damaged properties by enabling new and existing buildings to comply with new, higher flood elevations issued by the Federal Emergency Management Agency (FEMA), and to comply with new requirements in the New York City Building Code.

It also introduced regulations to mitigate potential negative effects of flood resilient construction in the public realm. The text was adopted in 2013 on a temporary, emergency basis. Therefore a future update of this text, guided by community input, will aim to make the text permanent, and to incorporate lessons learned during the recovery and rebuilding process.

NYC PLANNING Info Brief Where is the Flood Text Applicable?

The Flood Text is available to buildings located entirely or partially within the 1% annual chance floodplain. These rules can be found in Article VI, Chapter 4 of the Zoning Resolution and, if utilized, typically require the building to fully comply with flood resilient construction standards found in Appendix G of the New York City Building Code. However, some provisions, such as elevation of mechanical spaces, are available to all buildings located in the floodplain, even if not fully compliant with Appendix G.

For more information about the Flood Text, visit: www.nyc.gov/resilientneighborhoods *for the more restrictive of the 2007 FIRMs or 2015 PFIRMs.

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NYC PLANNING Info Brief Flood Resilient Construction

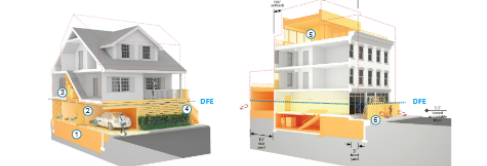
Flood resilient construction reduces potential damages from flooding and can lower flood insurance premiums. New buildings in the floodplain are required to meet flood resilient standards. Existing buildings can reduce their risk by retrofitting or rebuilding to meet these standards, or can take partial, short-term measures to address safety concerns.

NYC PLANNING Info Brief Overview

- There is a wide range of accepted flood resilient construction practices for buildings to better withstand floods and recover more quickly following a storm. These include:
 - Elevating the lowest floor.
 - Elevating mechanical equipment such as electrical, heating, and plumbing equipment.
 - Wet floodproofing by utilizing water resistant building materials and limiting uses below the Design Flood Elevation (DFE) to parking, building access, and minor storage. This allows water to move in and out of uninhabited, lower portions of the building with minimal damage.
 - Dry floodproofing sealing the building's exterior to flood waters and using removable barriers at all entrances below the expected level of flooding in mixed-use and non-residential buildings.

NYC PLANNING Info Brief Examples of Flood Resilient Construction

Visit www.nyc.gov/resilientneighborhoods to see more examples in the Retrofitting for Flood Risk report.



- Wet floodproofed residential building**
 1. Site is filled to the lowest adjacent grade
 2. Space below the DFE is for parking, building access or minor storage
 3. Mechanical systems are above the DFE
 4. Plants and stair turns improve the look of the building from the street
- Dry floodproofed mixed-use building**
 1. Rooftop addition replaces lost below grade space
 2. Commercial space is dry floodproofed with removable barriers

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