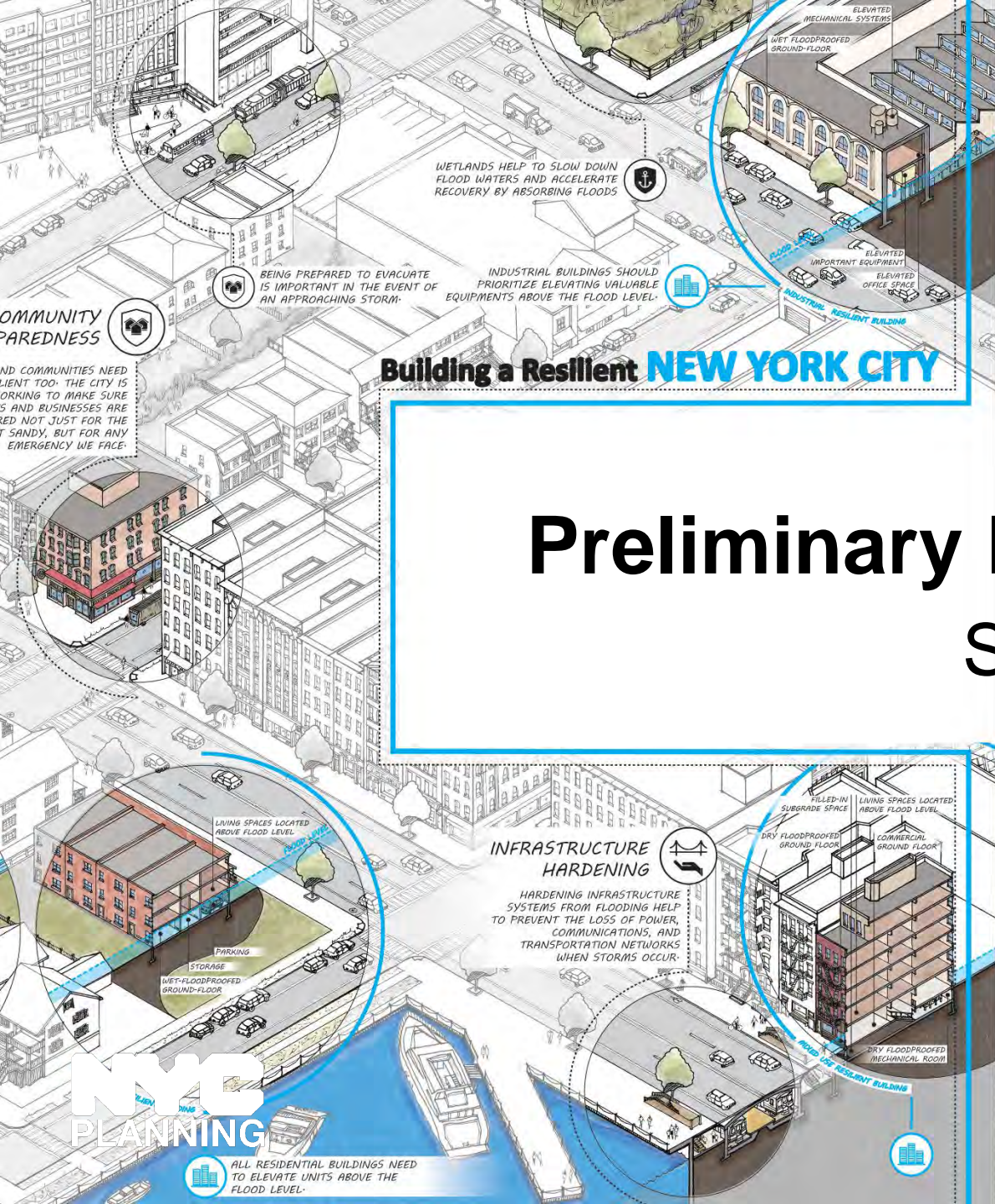


# Zoning for Coastal Flood Resiliency



Building a Resilient **NEW YORK CITY**

## Preliminary Recommendations Summary

Brooklyn CB 10  
September 10, 2019

**NYC**  
PLANNING

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

# Today's Agenda

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

# Zoning for Coastal Flood Resiliency

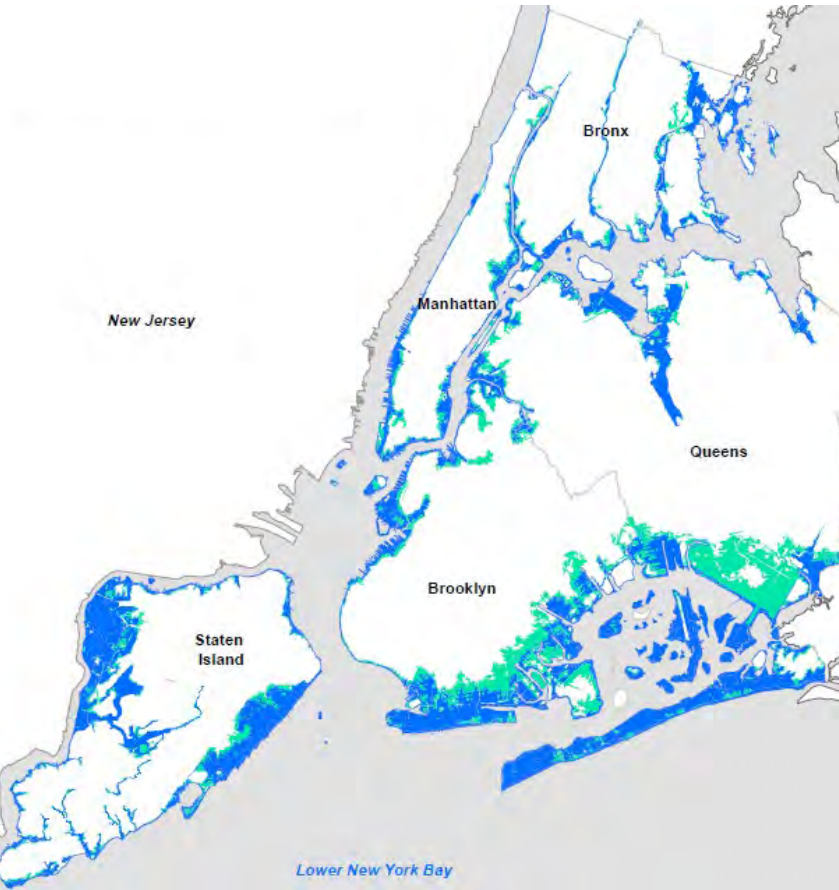
## 1. Background

### 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) ■

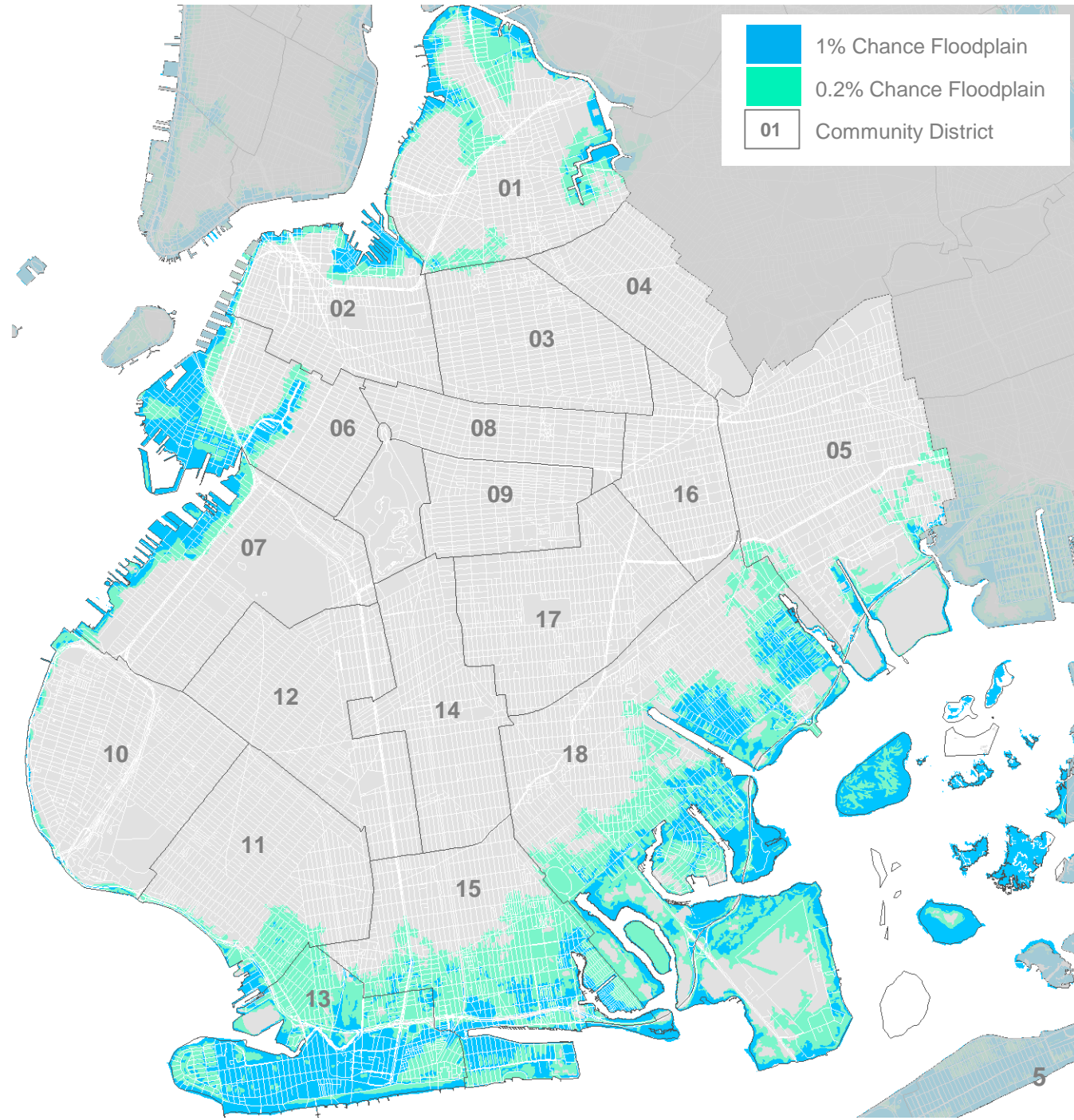
# Citywide Flood Risk

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

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
--	--	-------

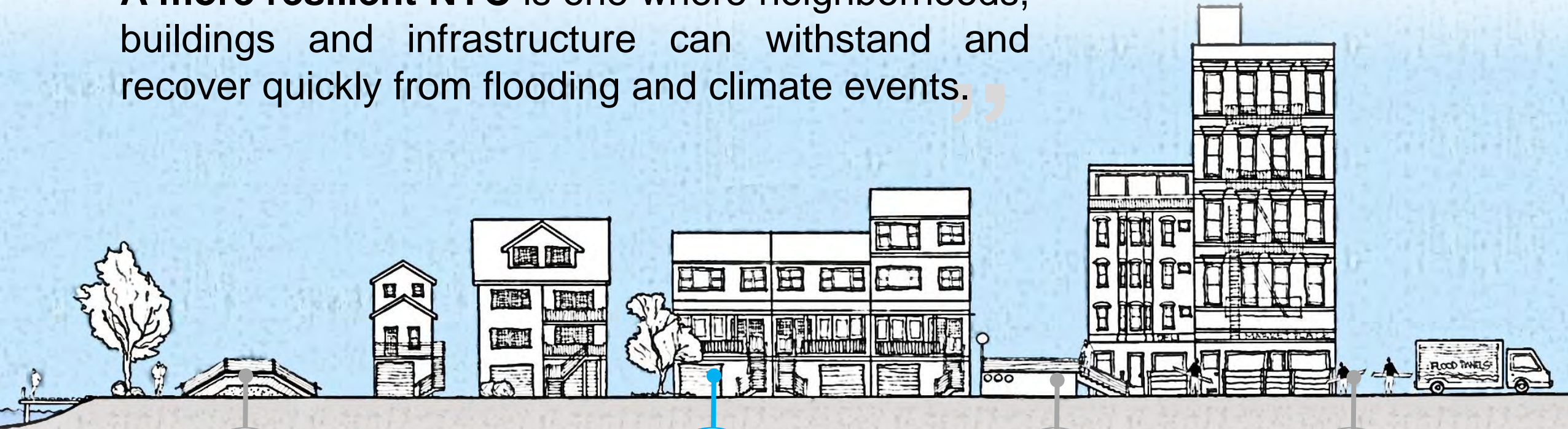
Citywide Total # of <u>Buildings</u>	80,907	44,636	125,539
Brooklyn Total # of <u>Buildings</u>	29,549	25,115	54,664



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

# #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

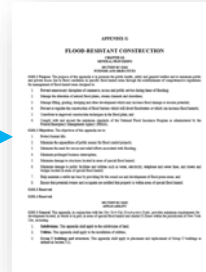
**Set up Insurance Rates** depending on building elevation and other requirements



### Construction Standards (ASCE 24)

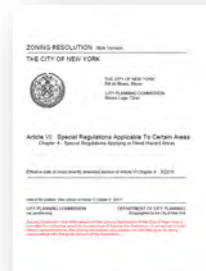
**Design minimum construction requirements** for flood hazard areas

## NYC



### Building Code (DOB)

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



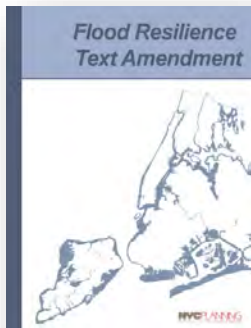
### Zoning Resolution (DCP)

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

# DCP's work since Hurricane Sandy

## From recovery to long-term resiliency

### Zoning Text Amendments (emergency-basis)



**2013- FT1**  
Temporary Provisions



**2015- SNRN**  
Removed additional zoning barriers

### Outreach Process

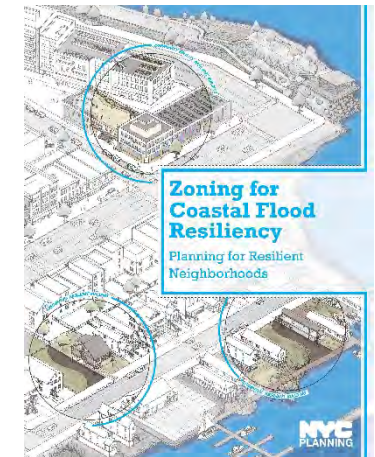


**Citywide / Neighborhood Studies**  
(2014-2017)



**Community Outreach Workshops**  
(2016-2018)

### Proposal (permanent-basis)



**Zoning for Coastal Flood Resiliency**  
(2018-2019)



# 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

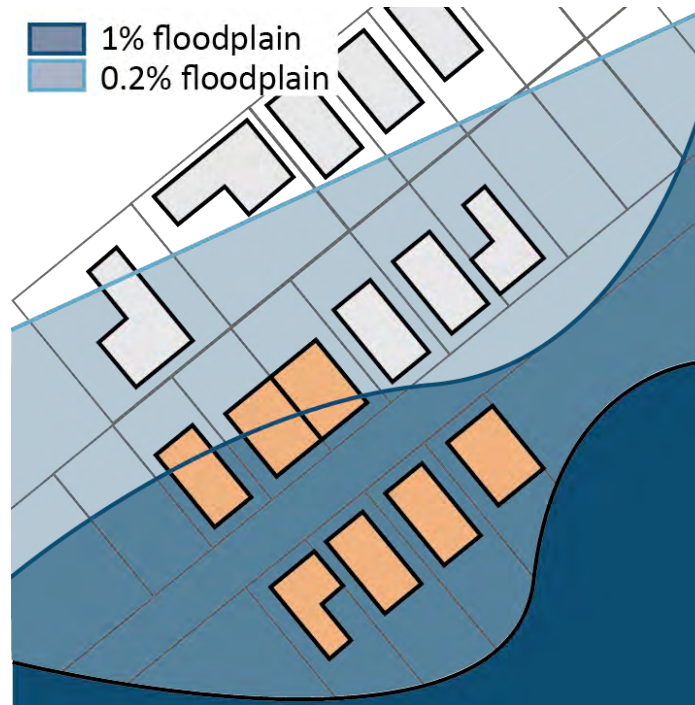
# Zoning for Coastal Flood Resiliency

## 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.*

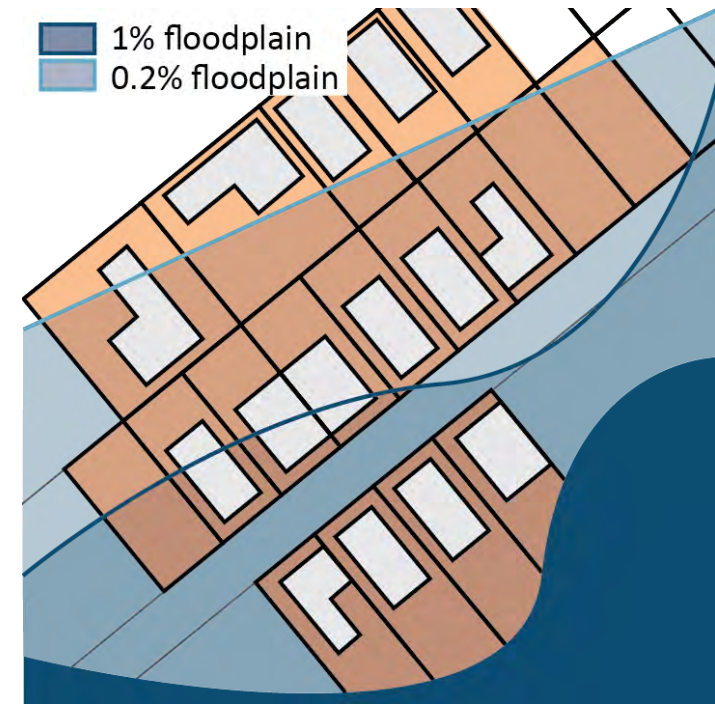


**1. Encourage resiliency throughout the current and future floodplains**



### Existing Rules

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



### Proposed Rules

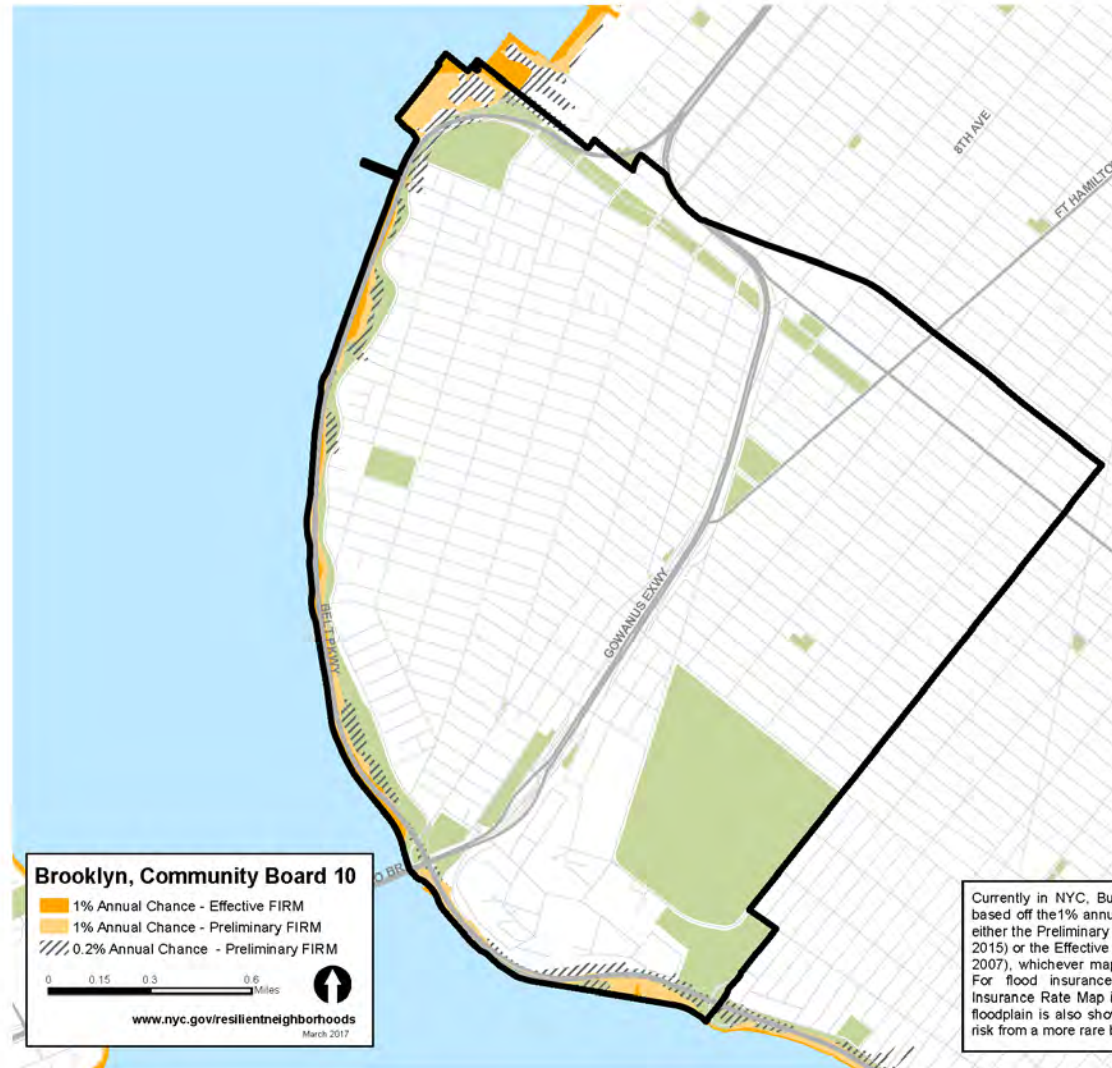
will be available to lots within the 0.2% floodplain (Moderate Risk Area)

# Zoning for Coastal Flood Resiliency

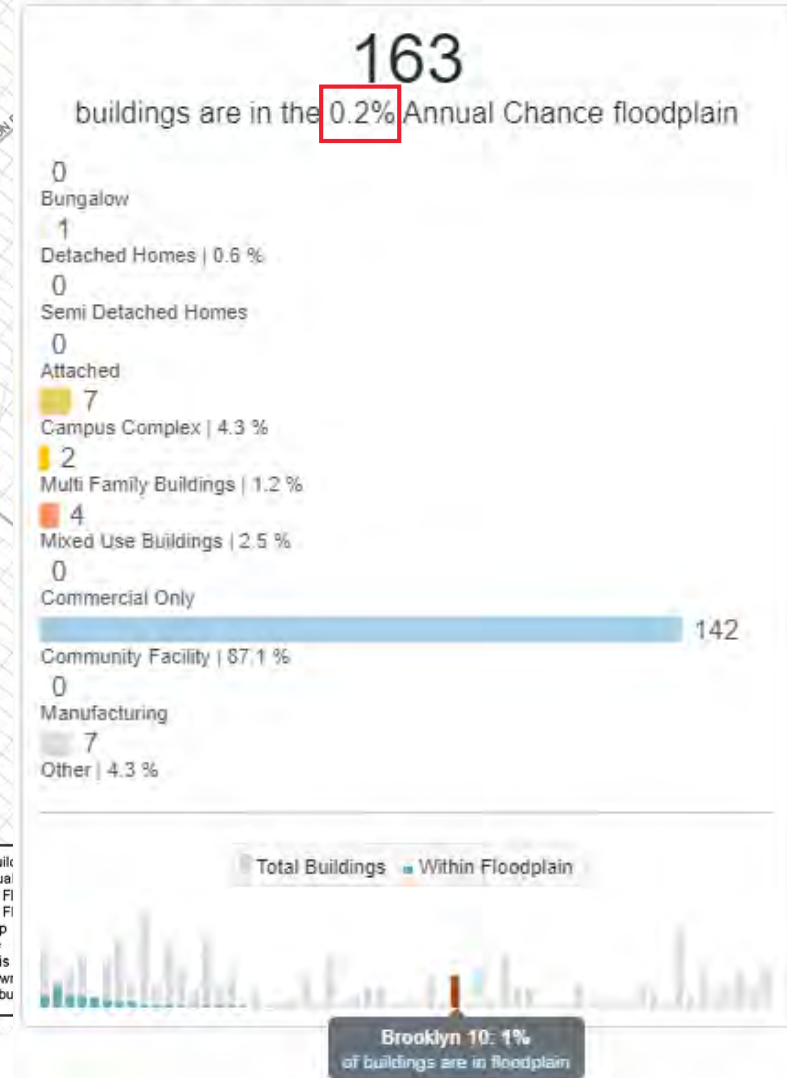
## An expanded geography



1. Encourage resiliency throughout the current and future floodplains

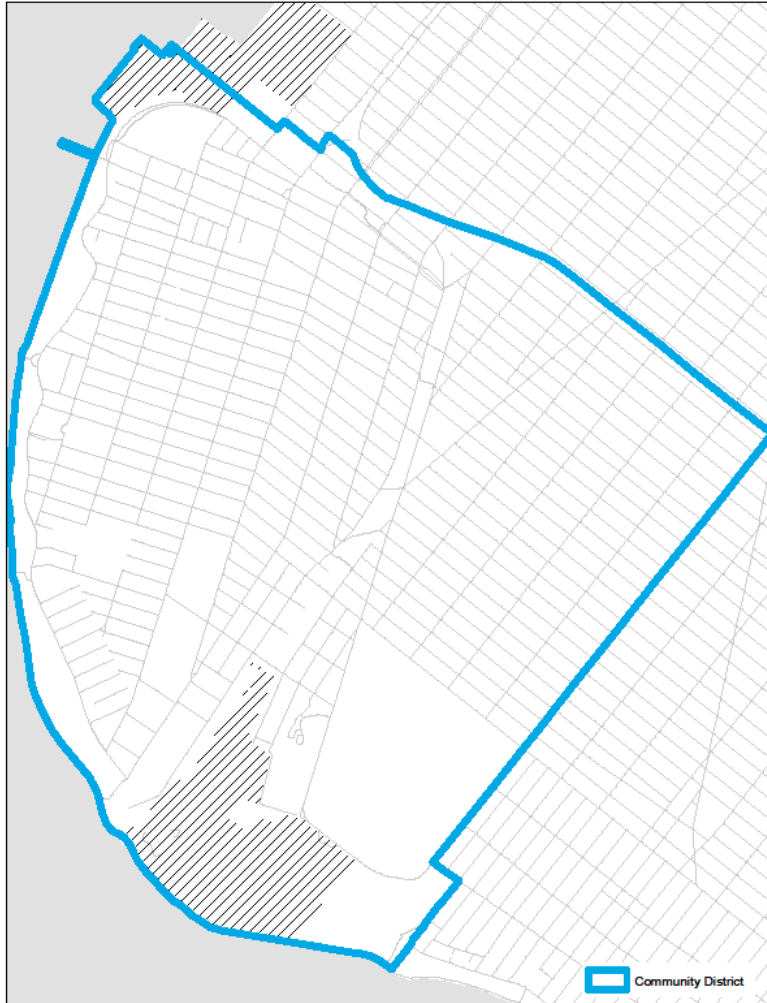


### Buildings in Floodplain <sup>1</sup>



# Applicability in Brooklyn Community District 10

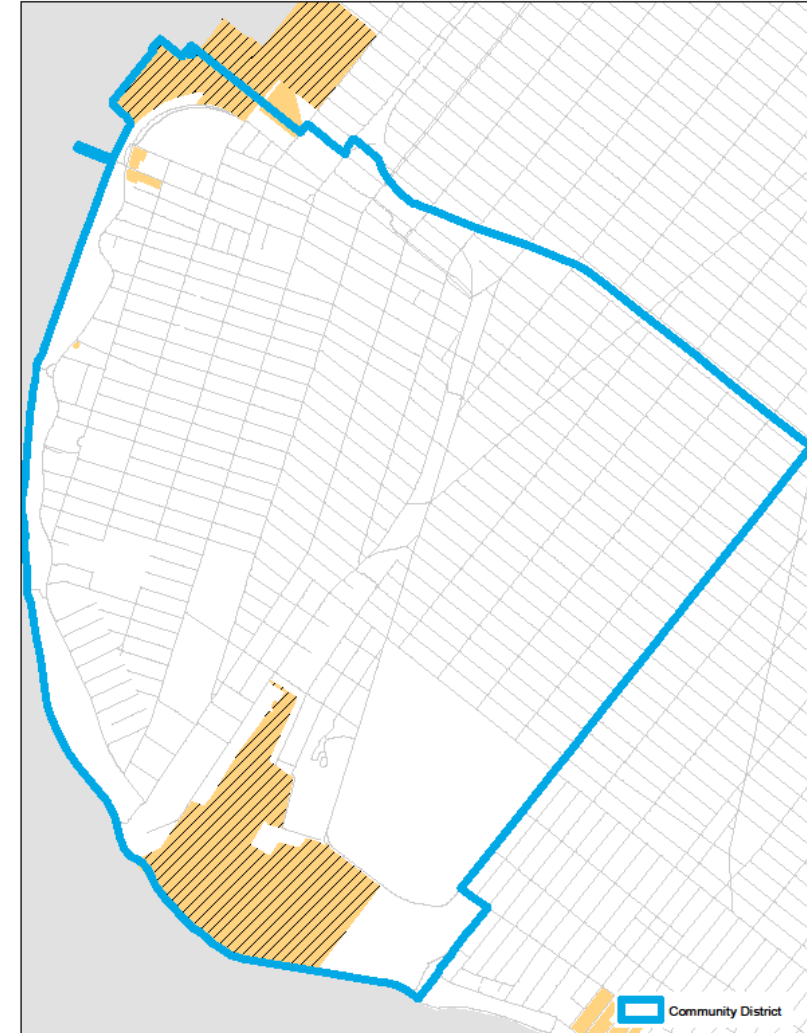
Existing FT1 Optional Rules



 Rules available for buildings within the 1% floodplain



Proposed Optional Rules

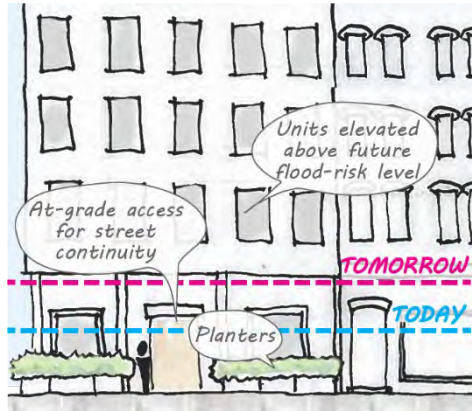


 Existing rule  Rules available for lots within the 1% and 0.2% floodplains

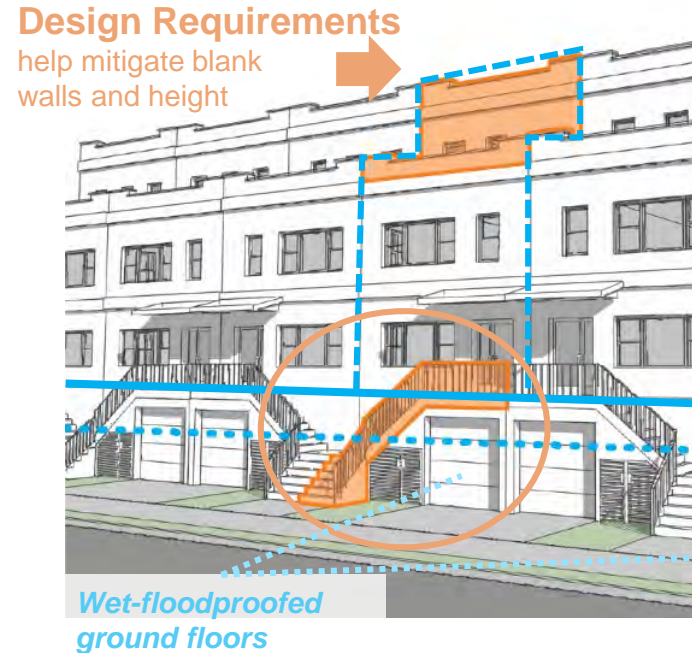
# Zoning for Coastal Flood Resiliency

## 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.*



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

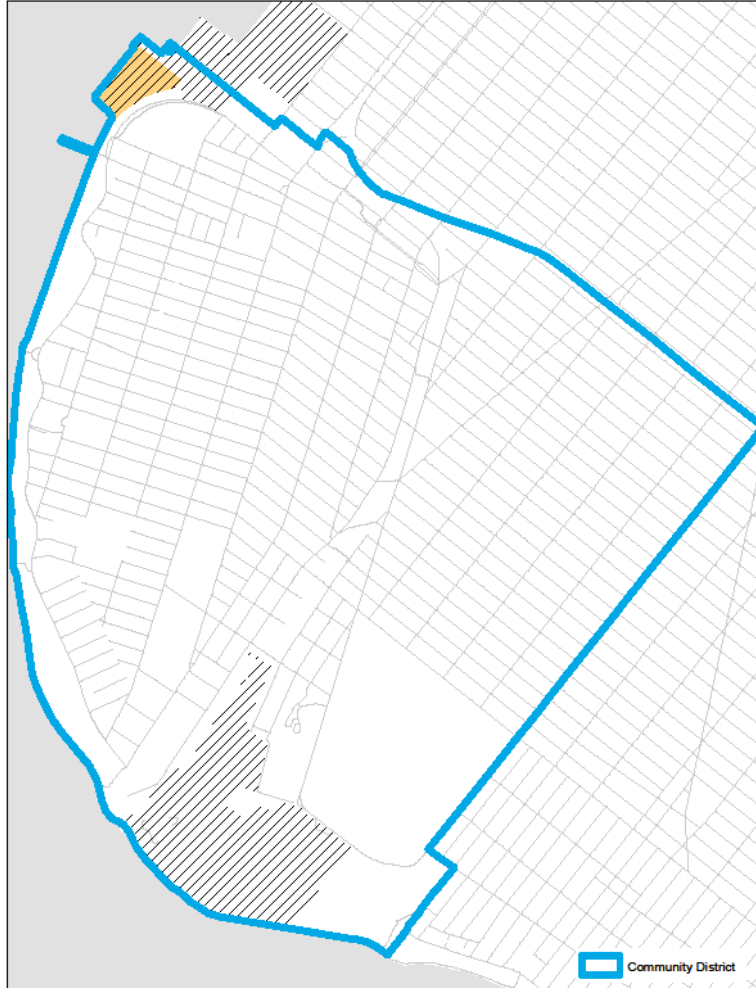


## Residential Buildings

- 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.

# Applicability in Brooklyn Community District 10

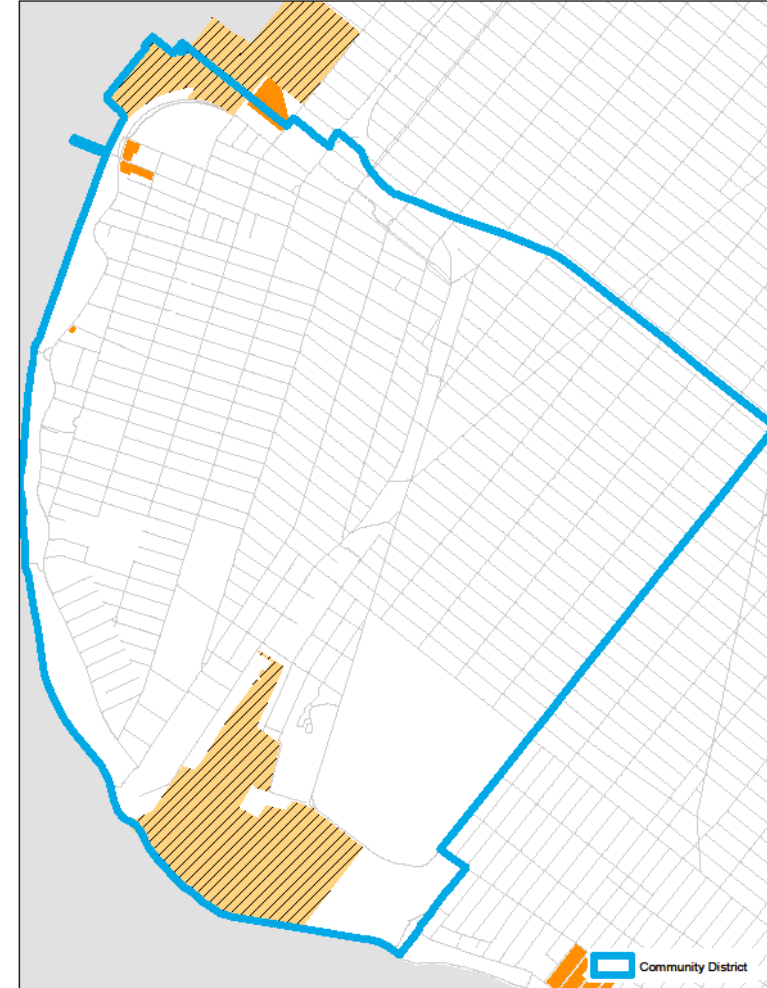
Existing FT1 Optional Rules



 Height can be measured from DFE

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

Proposed Optional Rules



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

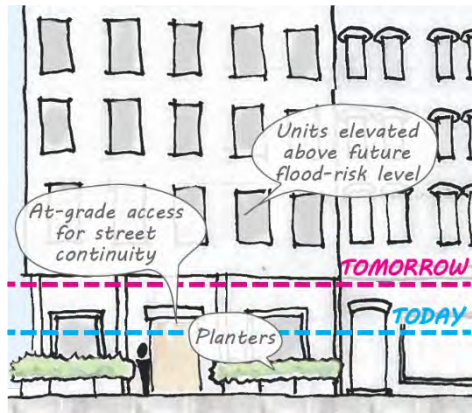
 Height can be measured from up to 5' RP



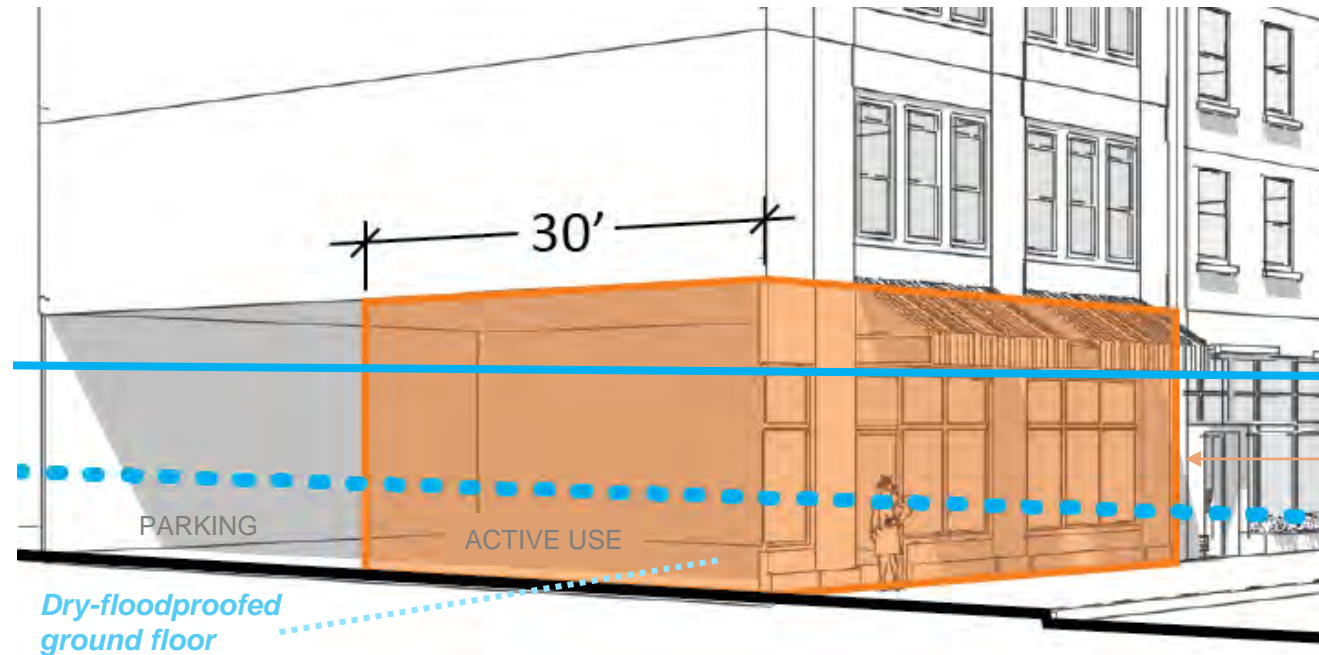
# Zoning for Coastal Flood Resiliency

## 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



**Design Requirements**  
help ensure active ground floors with access at the sidewalk level

## 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



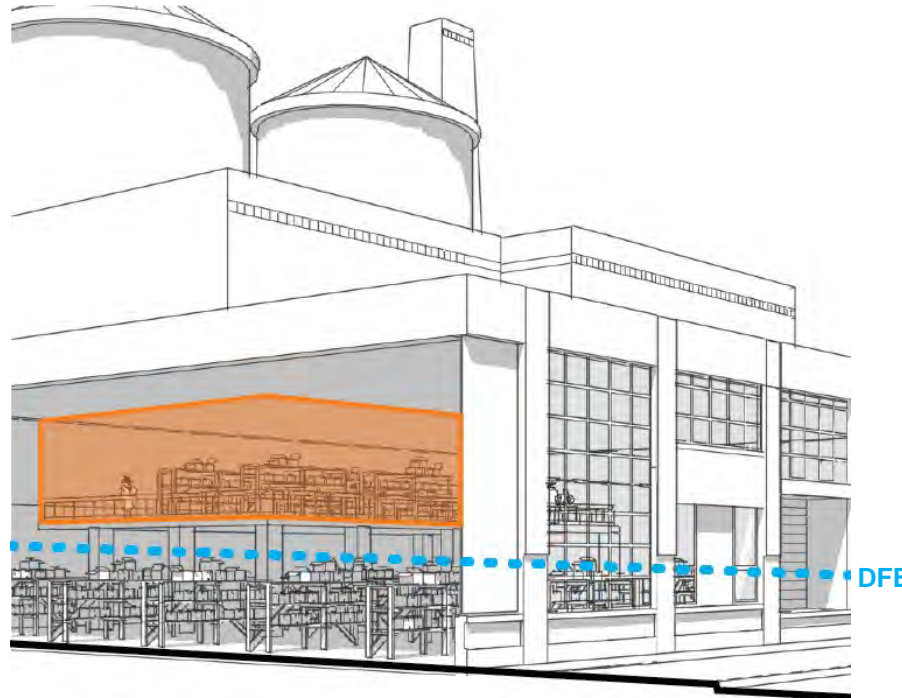
# Zoning for Coastal Flood Resiliency

## Alternatives for the relocation of important equipment

*Building owners would have additional zoning flexibility to relocate mechanical, electrical and plumbing equipment or back-up generators above areas at risk of flooding, including roofs or new separate structures.*

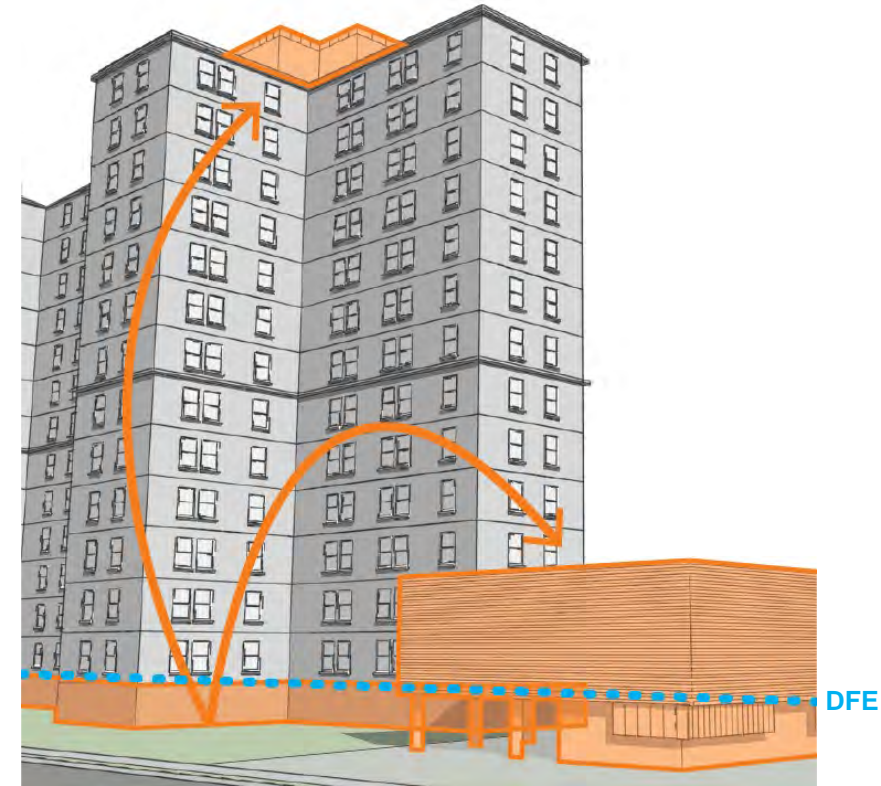


### 3. Allow for adaptation over time through incremental retrofits



#### Floor Area Exemptions

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



#### More flexible permitted obstructions

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

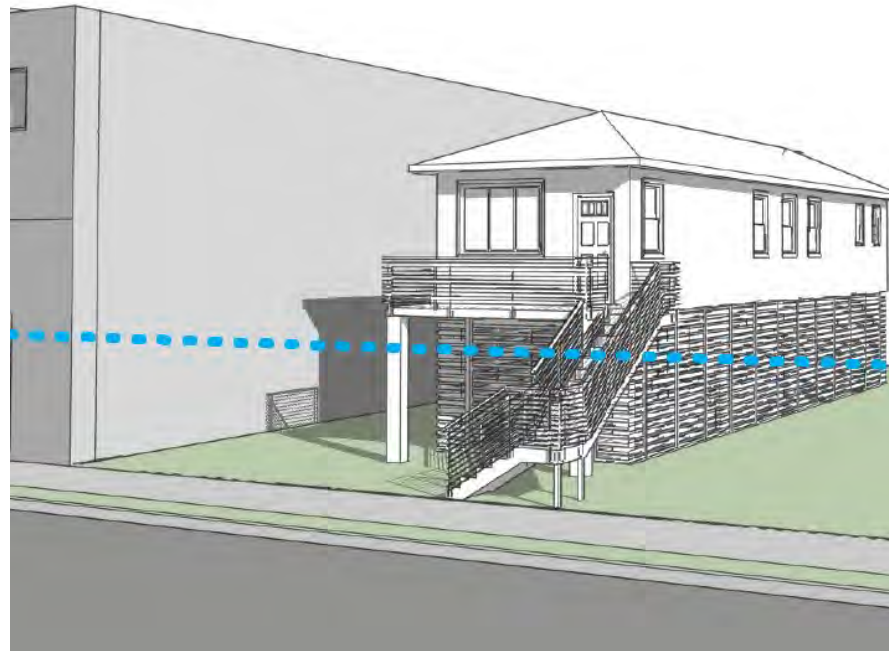
# Zoning for Coastal Flood Resiliency

## 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.*

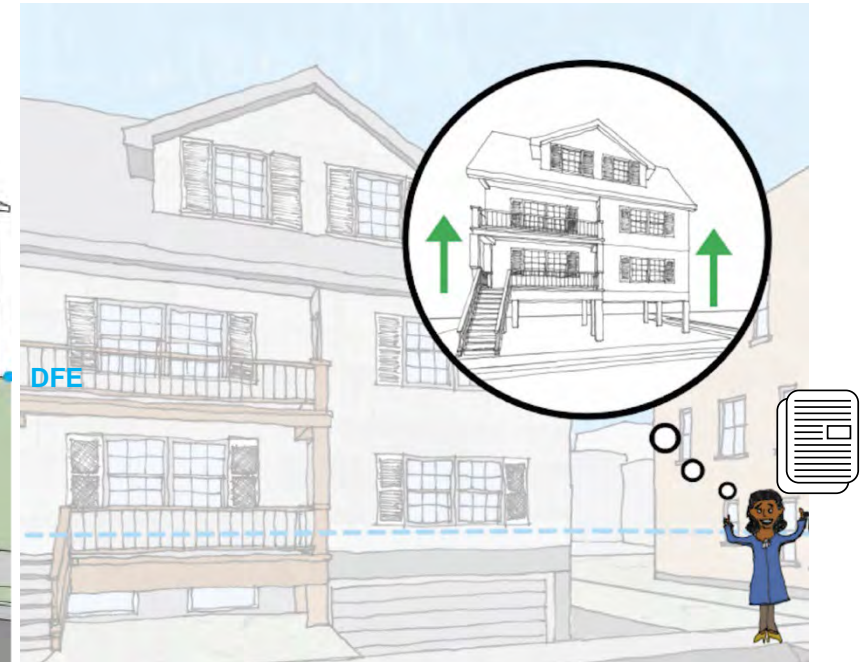


### 4. Facilitate future storm recovery



### 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

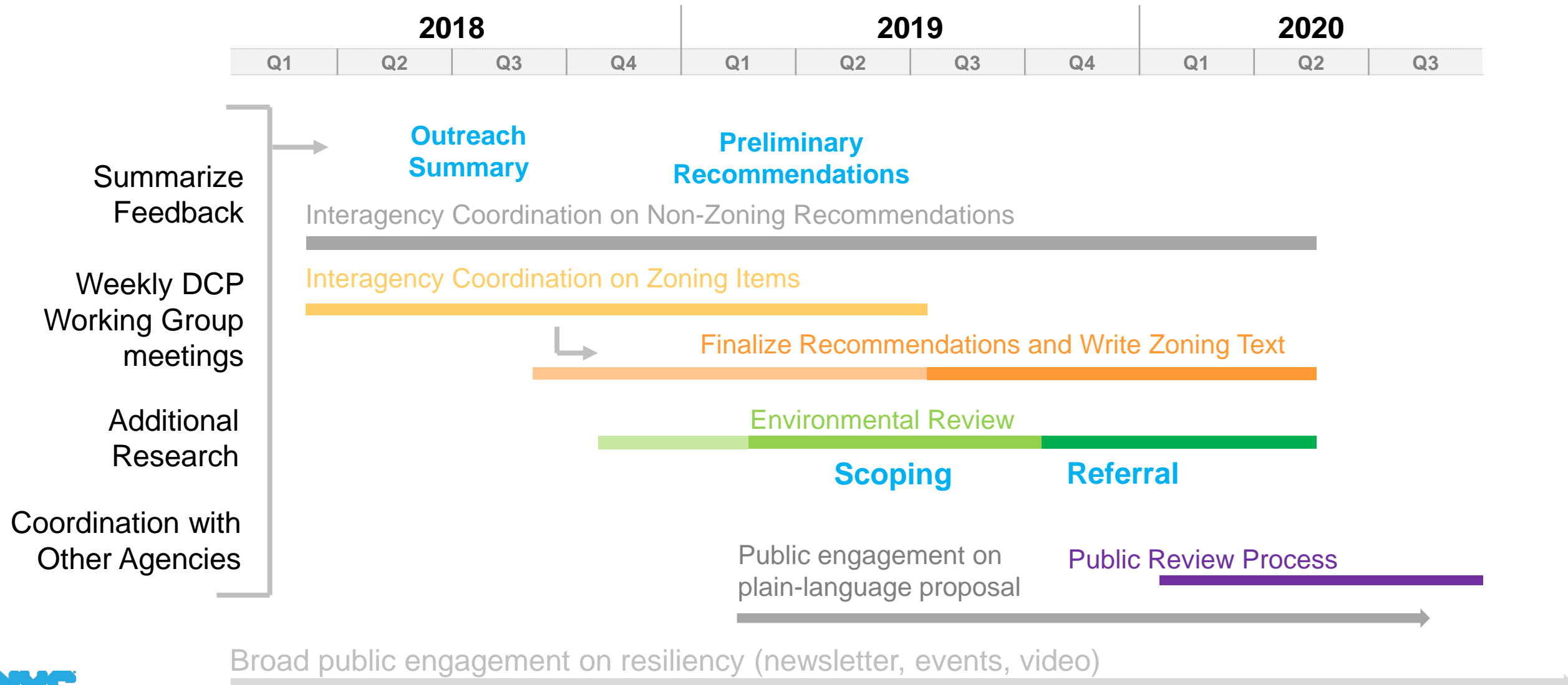
# Zoning for Coastal Flood Resiliency

## 3. Project Timeline & Resources

# Zoning for Coastal Flood Resiliency

## Project Timeline

\* Timeline subject to change



# Resources

**Catie Ferrara Iannitto**  
[cferrara@planning.nyc.gov](mailto:cferrara@planning.nyc.gov)  
 718-780-8280



## NYC Flood Hazard Mapper

[www.nyc.gov/floodhazardmapper](http://www.nyc.gov/floodhazardmapper)

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

[www.nyc.gov/resilientneighborhoods](http://www.nyc.gov/resilientneighborhoods)

### 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.

#### 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.

#### 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

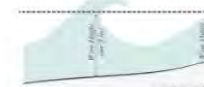
New York City is highly vulnerable to flooding from coastal storms due to its intensively used waterfront and its extensive coastal geography. Floods have the potential to destroy homes and businesses, impair infrastructure, and threaten human safety. With climate change and sea level rise, these risks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

**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.



The 1% annual chance floodplain is divided into three areas of different degrees of flood risk: V and Coastal A Zones are vulnerable to flooding but not sea level change. The maps also show the C Zone, which has a lower annual chance of flooding than the A Zone.

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.

#### 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 the text, guided by community input, will aim to make the text permanent, and to incorporate lessons learned during the recovery and rebuilding process.

#### 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 relevant, 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](http://www.nyc.gov/resilientneighborhoods). \*For the more restrictive of the 2007 FIRMs or 2015 PFIRMs.

NYC Planning | March 2017 | Flood Resilience

### 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.

#### 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.

#### Examples of Flood Resilient Construction

Visit [www.nyc.gov/resilientneighborhoods](http://www.nyc.gov/resilientneighborhoods) to see more examples in the Retrofitting for Flood Risk report.



- Wet floodproofed residential building**
- 1 Site is tied 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

NYC Planning | November 2016 | Flood Resilient Construction