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
NYC’s flood risk is high.
The floodplain affects a large geography and most community and council districts.

100 Year Floodplain
FEMA 2015 PFIRM

Population: 400,000 50 of 59 Community Boards
Buildings: 71,500 45 of 51 Council Districts

Buildings:
- 80% 1-4 units
- 7% 5+ units
- 13% nonresidential

Residential Units:
- 30% 1-4 units
- 70% 5+ units
## Future Flood Map
### Flood Risk in Manhattan

<table>
<thead>
<tr>
<th></th>
<th>2015 PFIRMs</th>
<th>2050s Projected</th>
</tr>
</thead>
<tbody>
<tr>
<td>Population in Floodplain</td>
<td>89,100</td>
<td>214,500</td>
</tr>
<tr>
<td>Buildings in Floodplain</td>
<td>3,100</td>
<td>5,900</td>
</tr>
</tbody>
</table>

- Population in Floodplain: **140%** increase from 2015 to 2050s
- Buildings in Floodplain: **90%** increase from 2015 to 2050s
Future Flood Map
Flood Risk in MN CB 1

<table>
<thead>
<tr>
<th></th>
<th>2015 PFIRMS</th>
<th>2050’s Projected</th>
</tr>
</thead>
<tbody>
<tr>
<td>R units in floodplain</td>
<td>39,230</td>
<td>60,050</td>
</tr>
<tr>
<td>Buildings in floodplain</td>
<td>1,750</td>
<td>2,790</td>
</tr>
<tr>
<td>% buildings in MN CB 1</td>
<td>35%</td>
<td>56%</td>
</tr>
</tbody>
</table>

- R units in floodplain: 53% increase
- Buildings in floodplain: 60% increase

NYC Planning
**Flood Resilience Zoning**
Projects at DCP

- **2013**
  - “Flood Text”
  - initial temporary regulations to facilitate recovery

- **2018**
  - “Flood Text Update”
  - improve upon, and make permanent, the Flood Text
How are buildings in the floodplain regulated?

1. **Flood Insurance Rate Maps (FIRMs)**
   - Determine **where floodplain regulations apply**

2. **National Flood Insurance Program**
   - Set up Insurance Rates depending on building elevation and other requirements

3. **Construction Standards (ASCE 24)**
   - Design minimum construction requirements for flood hazard areas

4. **Building Code (DOB)**
   - **Requires** new buildings and substantial improvements to meet FEMA standards

5. **Zoning Resolution (DCP)**
   - Zoning **accommodates** these regulations and improves neighborhood character
Flood resilient construction standards require certain buildings to elevate the lowest floor, as well as mechanical equipment, above the Design Flood Elevation (DFE).
Flood resilient construction
Examples of Residential Buildings

Residential Building with access at grade (wet-floodproofed)

Residential Building Elevated to DFE – 3’ above grade
Flood resilient construction standards require certain buildings to elevate the lowest floor, as well as mechanical equipment, above the Design Flood Elevation (DFE).

Living spaces are elevated above DFE.

Mechanical systems below DFE can be dry floodproofed.

Spaces below DFE need to be dry floodproofed.

Dry floodproof (Water Resistant)
Flood resilient construction
Examples of floodproofing solutions

When the DFE >10’, or when the bump-up has been used, any new or enlarged building must provide streetscape mitigations. For residential buildings, this involves a glazed, at-grade lobby. For mixed-use or commercial buildings, we require:

For mixed-use buildings in commercial districts:
ZR 64-64 requires 50% transparency between 2’-12’ above curb level.
Flood resilient construction
Examples of Commercial Buildings

Commercial Ground Floor
Existing Building with access at grade (deployable flood shields)

Commercial Ground Floor
Elevated to DFE – 2.5’
2013 Citywide Flood Text
Amended zoning in six key areas

1. Height
   Measured from flood elevation

2. Access
   Flexibility for stairs, ramps, lifts

3. Parking
   Flexibility to relocate parking

4. Systems
   Flexibility to relocate/elevate

5. Ground Floors
   Account for costs of new flood risk

6. Streetscape
   Require features to mitigate blank wall
### Lessons learned since 2013

#### DOB Permit Filings in the flood hazard area, 10/2013 – 1/26/2016

<table>
<thead>
<tr>
<th>Category</th>
<th>New buildings</th>
<th>Major alterations</th>
<th>Major alterations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Meet full resiliency standards</td>
<td>100%</td>
<td>10%</td>
<td>3%</td>
</tr>
<tr>
<td>1,021 of 1,021</td>
<td>113 of 1,090</td>
<td>532 of 15,573</td>
<td></td>
</tr>
<tr>
<td>1,021 of 1,021</td>
<td>113 of 1,090</td>
<td>532 of 15,573</td>
<td></td>
</tr>
<tr>
<td>149 (14%) approved</td>
<td>36 (31%) approved</td>
<td>245 (46%) approved</td>
<td></td>
</tr>
<tr>
<td>451 (44%) underway</td>
<td>24 (21%) underway</td>
<td>122 (23%) underway</td>
<td></td>
</tr>
<tr>
<td>179 (17%) complete</td>
<td>0 (0%) complete</td>
<td>9 (1%) complete</td>
<td></td>
</tr>
<tr>
<td>25% rejected/pending</td>
<td>48% rejected/pending</td>
<td>30% rejected/pending</td>
<td></td>
</tr>
</tbody>
</table>

Based on these filings, only **1,600 (2%)** of the **71,000** buildings in the floodplain will be fully flood resilient.
Flood Text Update

Need for a new citywide text amendment

1. Make the provisions of the current, temporary 2013 Flood Text permanent

2. **Fix and improve** provisions based on studies, lessons learned, and outreach

3. Begin to **promote** new development + proactive retrofitting to high resiliency standards
Flood Text II
Fix and improve provisions based on lessons learned

1. **Height**
   Study how to enable property owners to relocate lost subgrade spaces to upper levels

2. **Height**
   Study how to enable property owners to build to higher resiliency standards

3. **Ground Floors**
   Study how to encourage active, visible ground floor uses
Commercial Ground Floors
Improvements and lessons learned

ISSUE

• Bad urban design outcomes due to “squishing” – dark, low-ceilinged establishments.

• Causes lower-grade commercial stock, limits the types of retail tenants and services that can locate in the building, such as restaurants.

• Doesn’t apply to at least half of the floodzone.

• Doesn’t create a zoning incentive to prefer dry floodproofing implementations over wet floodproofing (active over passive).
Flood Text Update
Outreach

DCP plans a robust public engagement process:

As part of this outreach process, DCP will:

- **Partner with stakeholders** to educate and promote awareness of flood risk and resiliency issues
- **Explain how zoning tools** relate to resiliency
- **Explore unique neighborhood issues** through in-depth public presentations and workshops
- **Develop a proposal through an iterative process** that is shaped by feedback

* Schedule is tentative and subject to change
Outreach 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
Thank you!

For more information, and to stay involved, email resilientneighborhoods@planning.nyc.gov
Appendix
FIRM vs. PFIRM

**FIRM**
- 1983; digitized 2007
- Currently used for flood insurance purposes

**PFIRM**
- 2013, revised 2015
- Currently used for building code purposes

**Post-appeal PFIRM**
- Expected 2019+
- Affected geography unknown

Not actual map – illustrative only
Flood insurance rates
Set by FEMA

Raising or retrofitting your building or home will reduce costs

FEMA’s flood insurance premiums are lowest when the lowest inhabited floor (any area not used solely for storage, access or parking) is elevated above the Base Flood Elevation (BFE).

- **4 FEET OR MORE BELOW BFE**: ~$9,000 Annual premium
- **AT BFE**: ~$1,400 Annual premium
- **3 FEET OR MORE ABOVE BFE**: ~$450 Annual premium
The reference for height was changed from grade to the flood level

This change in how zoning envelopes are measured was intended to ensure that a new building in the flood zone need not be significantly smaller than the same building (in the same zoning district) outside of the flood zone. While the average flood elevation above grade is 3’ to 5’, in some areas this change allowed 13’ of extra height.
Bump-up: where DFE is moderate, additional height was given

To ensure the utility of spaces subject to flooding, further height ("the bump-up") is available

**Residential buildings:**

Where the DFE is between 5’-10’ above grade, you can “bump-up” all heights to 10’

**Commercial / mixed buildings:**

Where the DFE is between 5’-12’ above grade, you can “bump-up” all heights to 12’

(depicted at right)

This extra height is designed to promote a full, floodproofed, at-grade story – as opposed to an elevated story at the DFE.
Penalties for complying with new code requirements were lifted

New buildings have a number of new design challenges that existing, grandfathered buildings did not face – these include having to provide ample access to elevated levels (stairs, ramps, and lifts) and locating vital mechanical equipment somewhere other than a cellar. To ensure these did not create a ‘zoning penalty’ these components were exempted from floor area.
To incentivize the costly retrofiting and floodproofing of old buildings, a floor area incentive was provided.

A building owner could floodproof their bottom story, and then add an additional story (or equivalent amount of space) elsewhere in their building, helping to finance a retrofit.
To offset the cost of floodproofing, a floor area incentive was offered

In some areas, where the flood elevation is moderate-to-high above grade, the entire ground floor can be exempted from floor area, without limitation, if it is wet or dry floodproofed, by virtue of a changed definition of a “cellar”. (Cellars are generally exempt from floor area)
Certain zoning design requirements were updated

Elements of zoning which predate the new FEMA PFIRM and did not take significant flood levels (and flood resistant construction difficulties) into account were updated to ensure that new buildings could comply with these requirements while complying with Appendix G – these include street wall location requirements (below)
Certain zoning design requirements were updated

Elements of zoning which predate the new FEMA PFIRM and did not take significant flood levels (and flood resistant construction difficulties) into account were updated to ensure that new buildings could comply with these requirements while complying with Appendix G – these include transparency requirements (depicted below) and ground floor use requirements.
2013 Citywide Flood Text

Streetscape mitigations

When the DFE >10’, or when the bump-up has been used, any new or enlarged building must provide streetscape mitigations. For residential buildings, this involves a glazed, at-grade lobby. For mixed-use or commercial buildings, we require:

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