Proposed Floodplain Regulation Updates

Workshop #4 - Commercial, Mixed-Use, and Multifamily Development

DEPARTMENT OF ENERGY & ENVIRONMENT

June 10, 2021

Workshops to Date

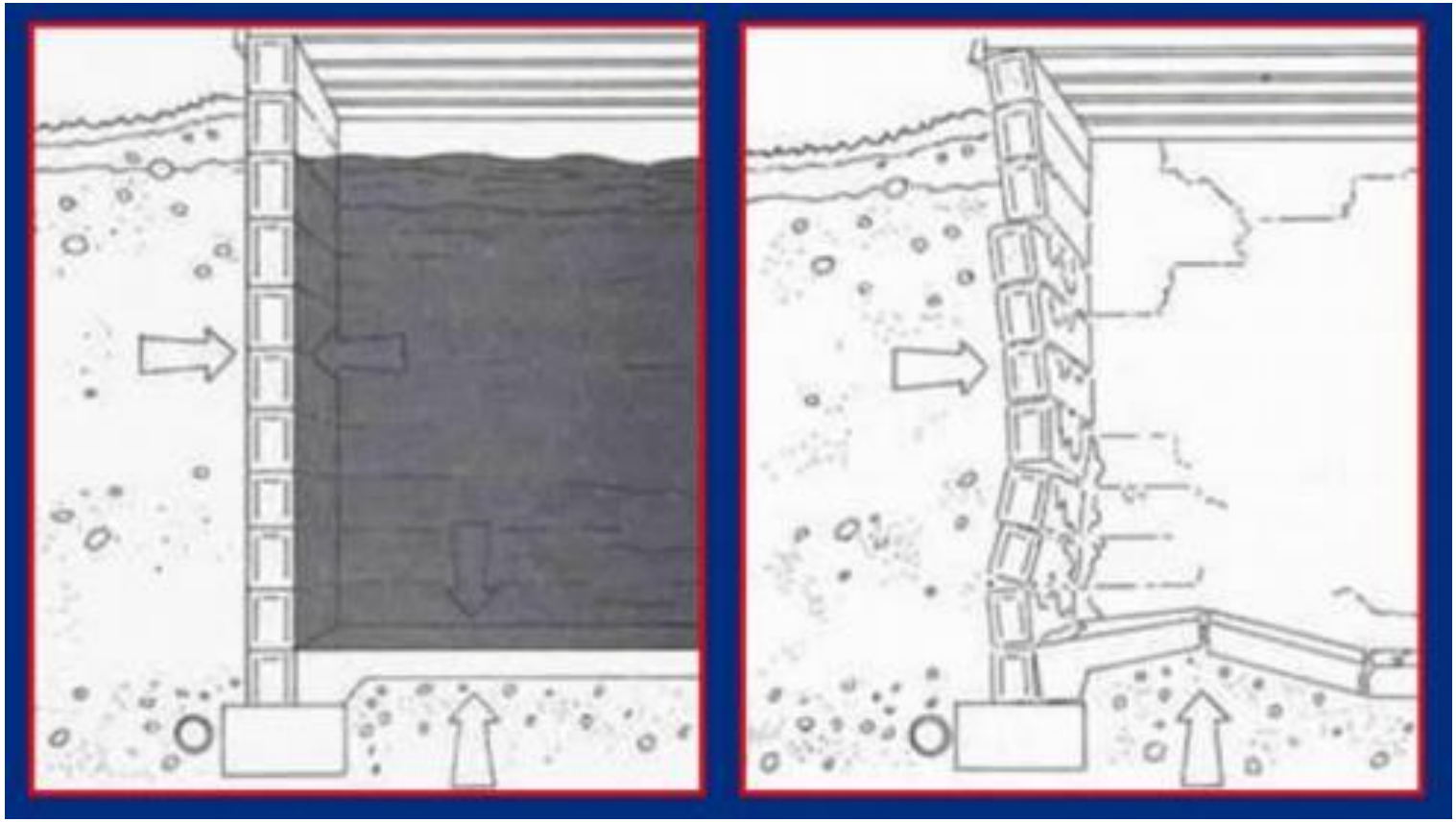
- **Workshop #1** – Tuesday, April 20 – Overview
- **Workshop #2** – Thursday, April 29 – Mapping
- **Workshop #3** – Thursday, May 20 - Vesting and Transition
- **Workshop #4** – Thursday, June 10 - Commercial, Mixed-Use, and Multifamily Development
    - ***Focus:*** *Allowable Uses & Floodproofing Below Grade and Below DFE*

Today's Agenda

- Background
  - Why We Regulate Below Grade Uses
  - Key Terms
- Proposed Regulatory Updates
- Case Studies on Allowable Uses
  - 100-Year vs. 500-Year
- Flood Protection Strategies
- Discussion

Why Do We Regulate Below Grade Uses?

Effects of Hydrostatic Pressure



Dry-floodproofed basements are engineered to withstand external forces and prevent collapse.

Life Safety

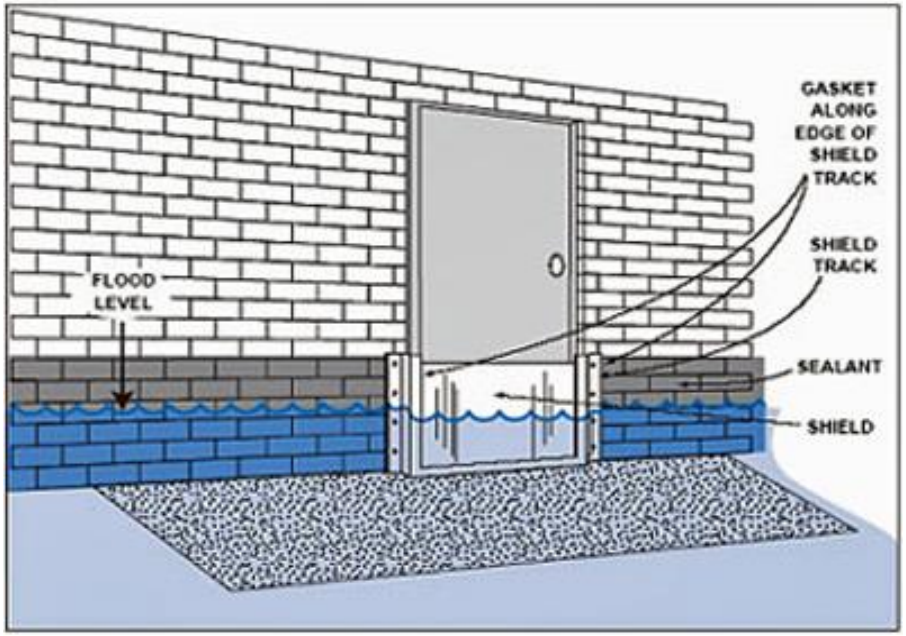
Courtesy ABC 7 Chicago

Courtesy Five Star Waterproofing

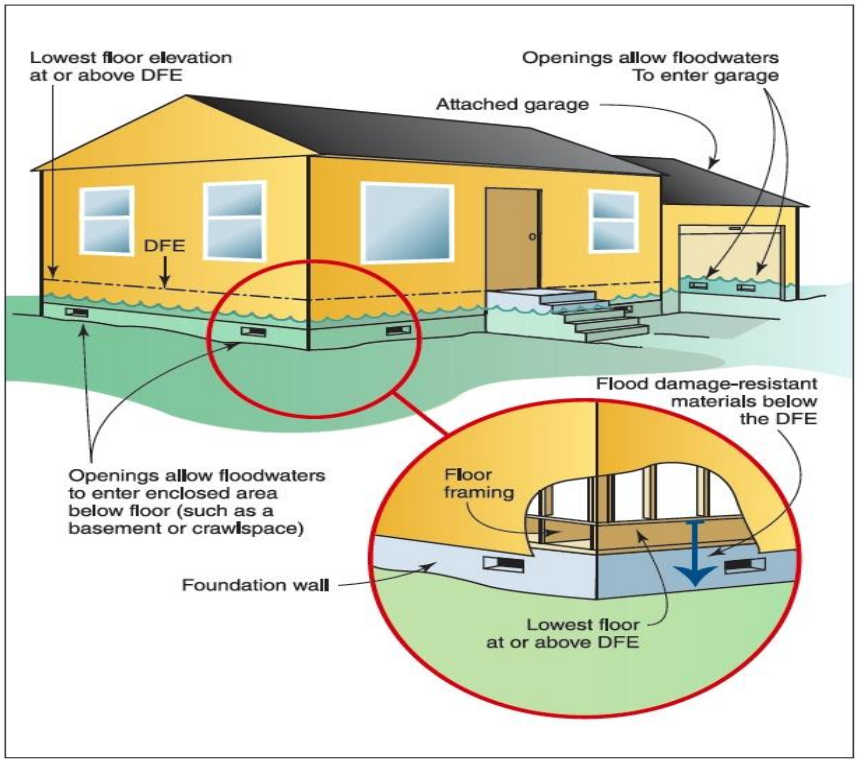
Flooded basements present risks of drowning, electrocution, chemical and sewage exposure, etc.

Key Terms

Dry Floodproofing and Wet Floodproofing



Dry floodproofing - Structure, including the attendant utilities and equipment, is **watertight** with all elements substantially impermeable to floodwater and with structural components having the capacity to **resist flood loads.**



Wet floodproofing – Flood-damage-resistant materials **minimize flood damage** to areas **below the flood protection level** of a structure, which is **intentionally allowed to flood.**

Residential, Nonresidential, & Mixed-Use

- Residential
  - Building and structures and portions thereof in which people live or that are used for sleeping purposes on a transient or nontransient basis. {ASCE 24-14}

- Nonresidential
  - Any building or structure or portion thereof that is not classified residential. {ASCE 24-14}

- Mixed Use
  - Any building or structure that has non-residential and residential portions. {FEMA P-2037}

Ancillary Residential Uses

A portion of building that is used by residents, but not as a dwelling unit. Ancillary residential uses include lobbies, mailrooms, loading docks, and gyms that are available only to residents, but do not include above-grade enclosed areas that are below the design flood elevation and used solely for parking of vehicles, building access, or storage.

Examples:

- Members-only gym = commercial use
- Tenants-only gym = ancillary residential use
- Stairwell landing = access use
- Lobby with chairs, sofa, and TV = ancillary residential use

**Defined by FEMA P-2037 Manual*

Proposed Regulatory Update

What would change? – Mixed Use

Current Flood Hazard Rule:

- Not addressed
- Has been grey area for FEMA
- DCRA Administrative Bulletin in 2016 requires code modification if entire building not elevated above 100-year elevation
- DOEE has required use of 500-year floodproofing standard as condition of support for code modification

Proposed Update:

- Better define mixed use, residential use, non-residential use
- Lowest floor of residential portion must be above DFE
  - Ancillary residential uses in 500-year zone can be dry floodproofed
- Requires 500-year standard (for all buildings)
- Allows dry floodproofing of non-residential portions to DFE, including underground parking by right

What would change? – Below-Grade Uses

Current Flood Hazard Rule:

- All below-grade uses for residential buildings are prohibited in the 100-year floodplain.
- Below-grade parking allowed for mixed-use buildings in the 100-year floodplain subject to a code modification.
- There are no below-grade use restrictions on any building categories in the 500-year floodplain.

Proposed Update:

- All below-grade uses for residential buildings are prohibited in the 100-year floodplain, and dwelling units are prohibited below grade for new construction in the 500-year floodplain.
- Underground parking allowed by-right for mixed-use buildings in the 100-year and 500-year floodplains.

Why 100- vs 500-year Differences?

- In the 100-year floodplain, we are regulated by FEMA in accordance with 44 Code of Federal Regulations 60.3
  - Need to comply with National Flood Insurance Program standards in order to maintain eligibility for subsidized flood insurance and federal disaster assistance.

- In the 500-year floodplain, we have more flexibility because we are regulating locally to adapt to climate change and protect life and property rather than to follow federal regulations.

Regs Enforced on New Construction?

Structure Type	100-year	500-year
Single-Family or Two-Family Home	Yes	Yes
Multi-Family Residential Building	Yes	Yes
Mixed-Use Building	Yes	Yes
Commercial/Industrial Building	Yes	Yes

Regs Enforced on Substantial Improvement?*

Structure Type	100-year	500-year
Single-Family or Two-Family Home	Yes	No
Multi-Family Residential Building	Yes	TBD
Mixed-Use Building	Yes	TBD
Commercial/Industrial Building	Yes	TBD

** All mechanical, electrical, and plumbing equipment must be elevated or floodproofed, even if the project is in an existing structure and does not trigger substantial improvement.*

Allowable Uses Below Grade

Structure Type	100-year	500-year
Single-Family or Two-Family Home	None	Dry Floodproofed Area Limited to Parking, Access, Storage
Multi-Family Residential Building	None	Dry Floodproofed Area Limited to Parking, Access, Storage
Mixed-Use Building	Dry-Floodproofed Area with No Dwelling Units	Dry-Floodproofed Area with No Dwelling Units
Commercial/Industrial Building	Dry-Floodproofed Area	Dry-Floodproofed Area

Case Studies
100-Year Floodplain

New Construction Multifamily Building Uses 100-Year Floodplain

	Parking allowed below grade?	Uses below the Design Flood Elevation (DFE)?
Residential	No.	Wet-floodproofed parking, access storage, or ONLY.
Mixed-Use	Yes, if dry floodproofed in accordance with ASCE 24-14.	Areas must be non-residential and dry-floodproofed in accordance with ASCE 24-14.

Residential-Only **Structure**
100-Year **Floodplain**

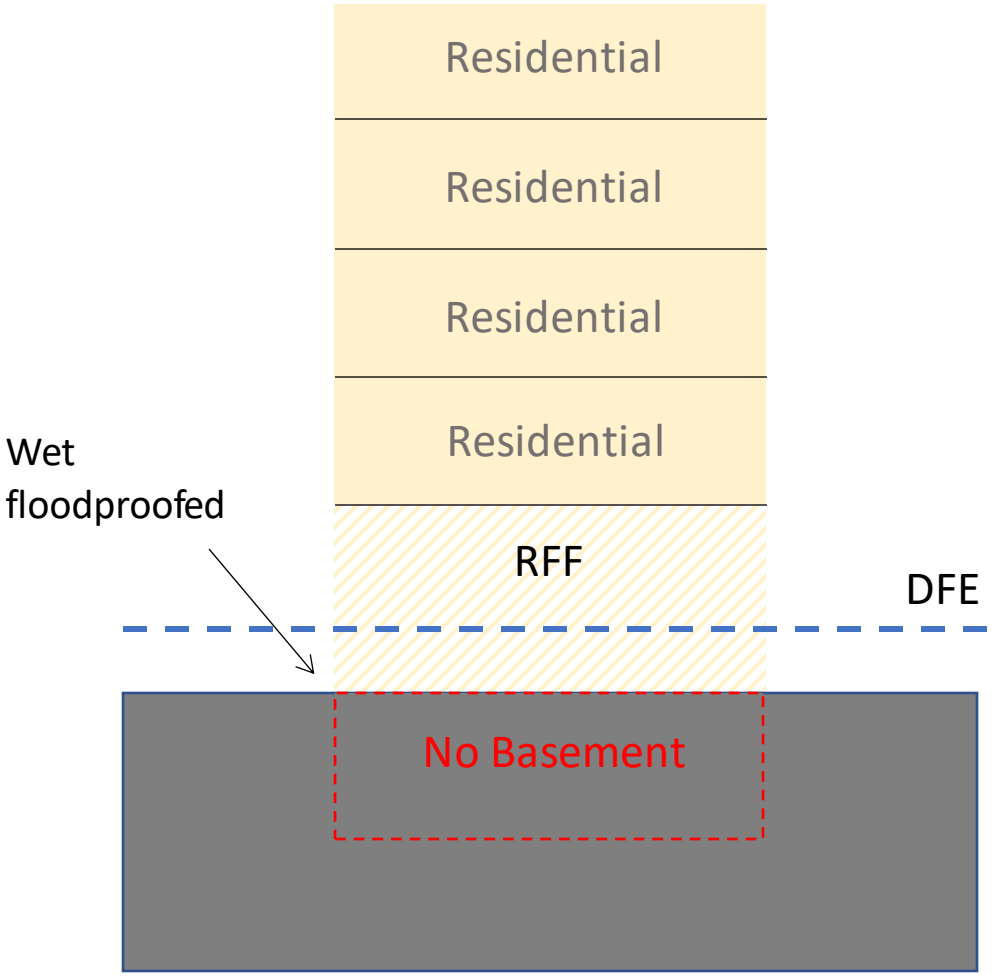
Residential First Floor (RFF) Elevation is below DFE

Allowable RFF use:

- Parking
- Access
- Storage
- ~~Lobby~~
- ~~Resident Only Gym~~
- ~~Mail Room~~
- ~~Residential Units~~

Allowable basement use:

- None



Mixed-Use **Structures**
100-Year **Floodplain**

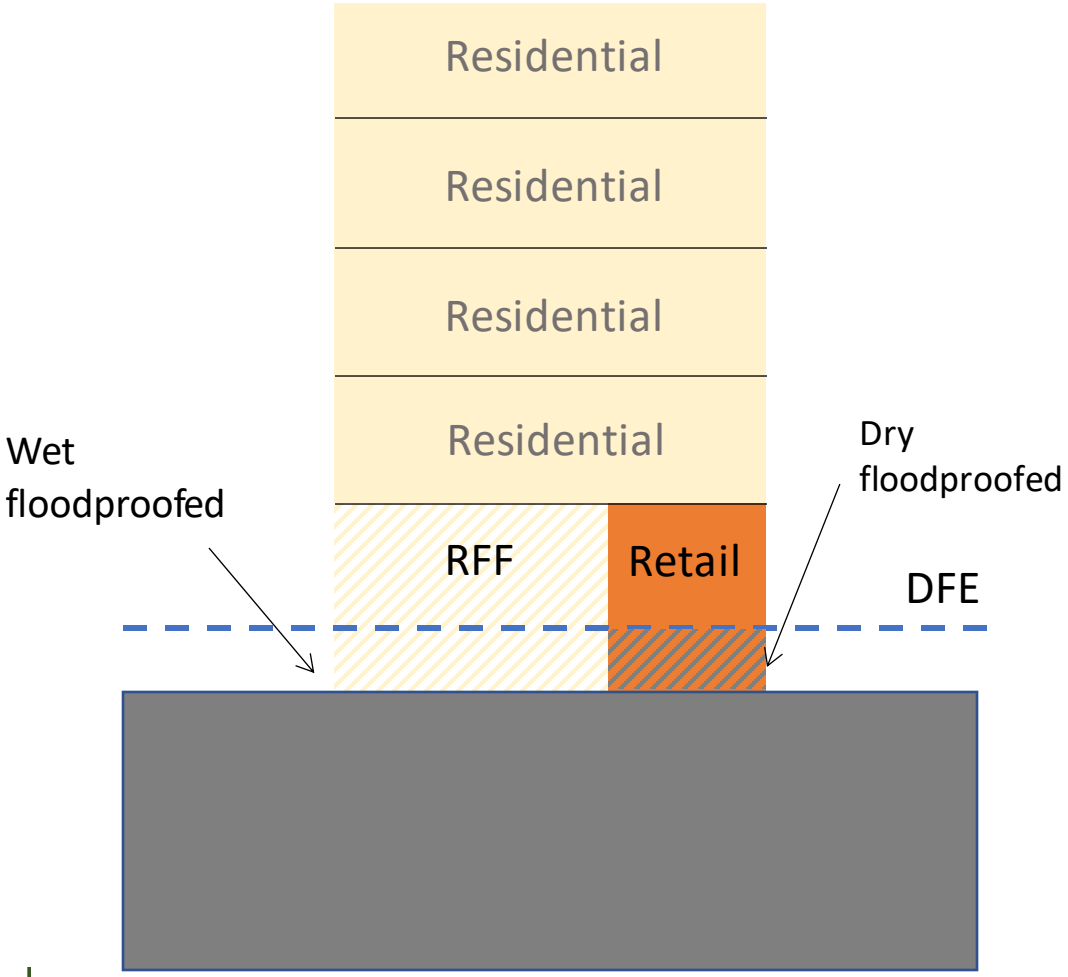
Residential First Floor (RFF) Elevation is below DFE

Allowable RFF use:

- Parking
- Access
- Storage
- ~~Lobby~~
- ~~Resident Only Gym~~
- ~~Mail Room~~
- ~~Residential Units~~

First Floor Retail

- Allowed if Dry Floodproofed



Mixed-Use **Structures**
100-Year **Floodplain**

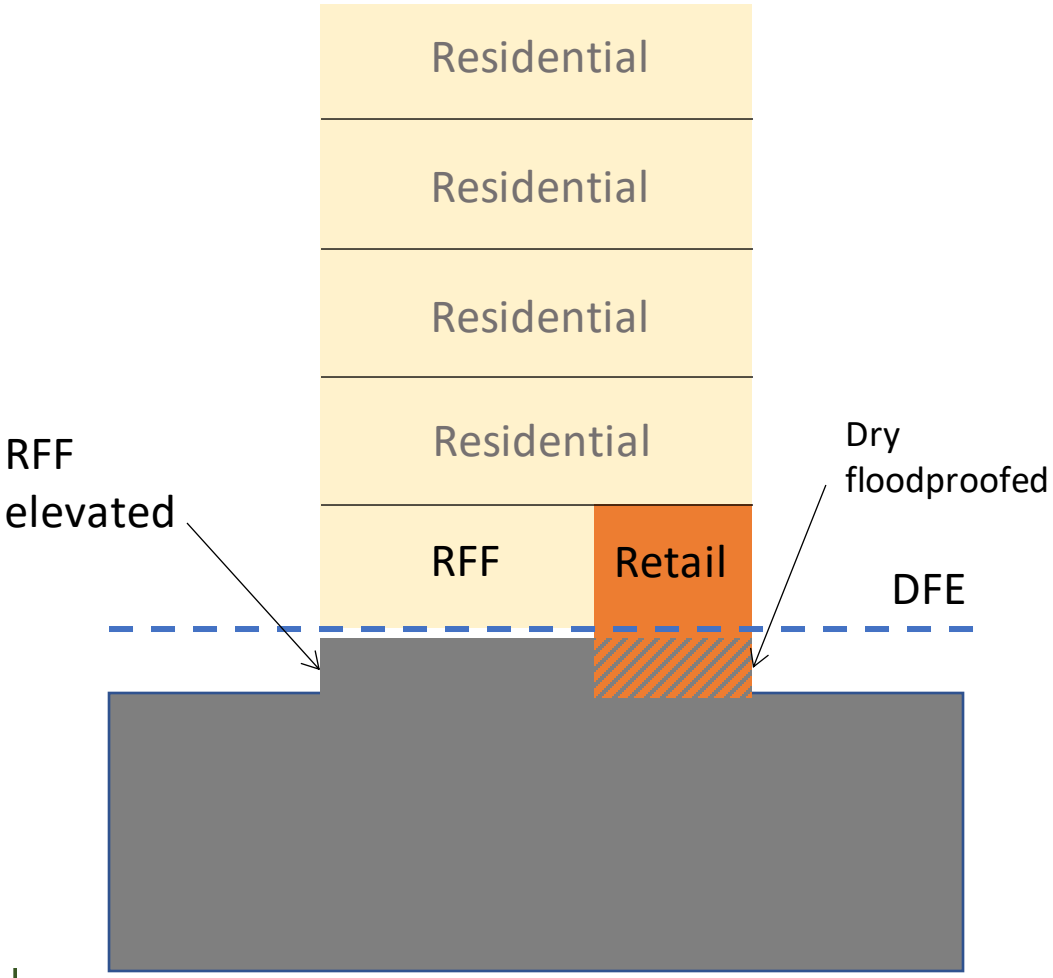
Residential First Floor (RFF) Elevation is above DFE

Allowable RFF use:

- Parking
- Access
- Storage
- Lobby
- Resident Only Gym
- Mail Room
- Residential Units

First Floor Retail

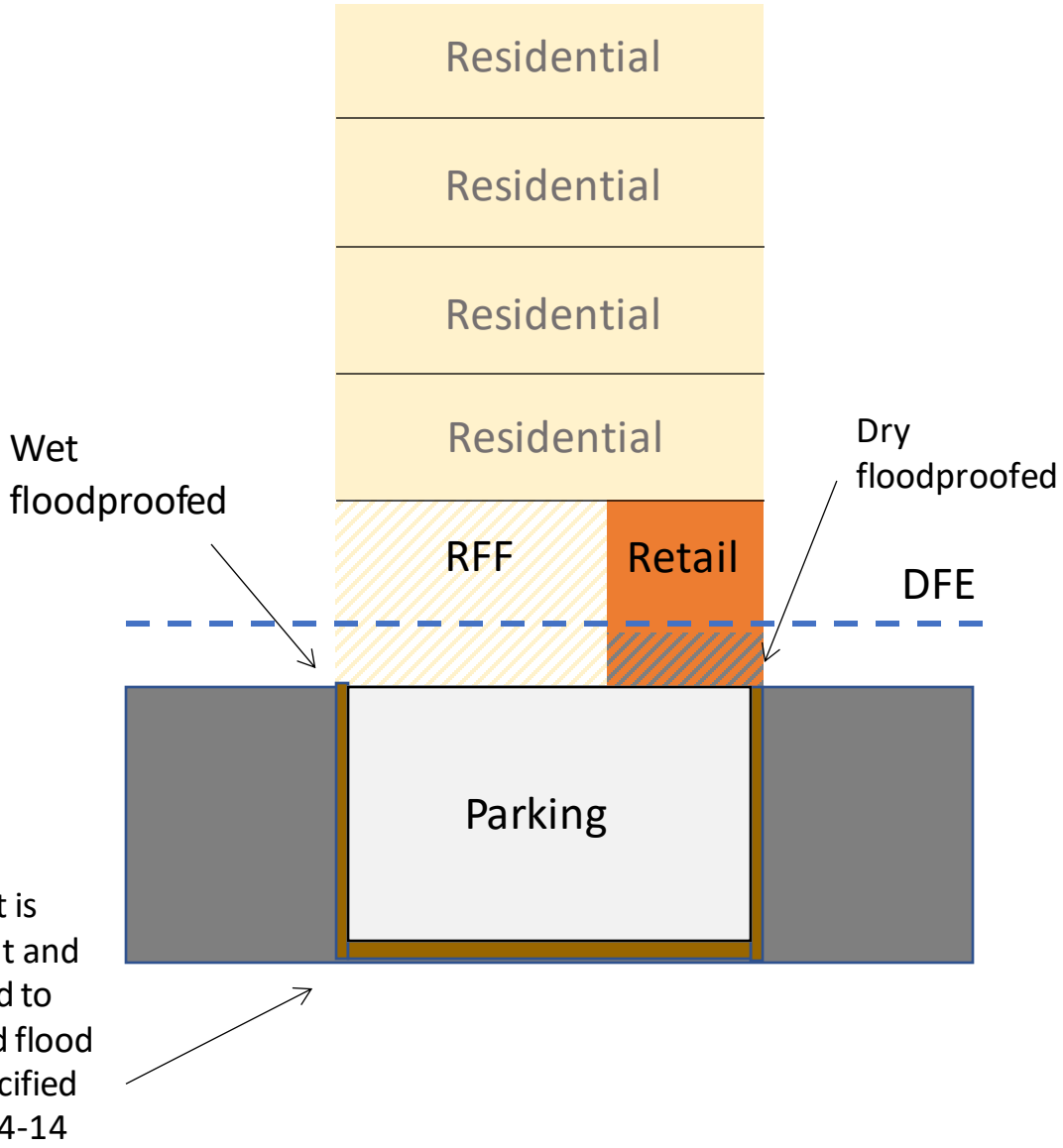
- Allowed if Dry Floodproofed



Mixed-Use **Structures**
100-Year **Floodplain**

Allowable basement use:

- Parking
- Access
- Storage
- Commercial
- ~~Lobby~~
- ~~Resident Only Gym~~
- ~~Mail Room~~
- ~~Residential Units~~



Case Studies
500-Year Floodplain

New Construction Multifamily Building Uses 500-Year Floodplain

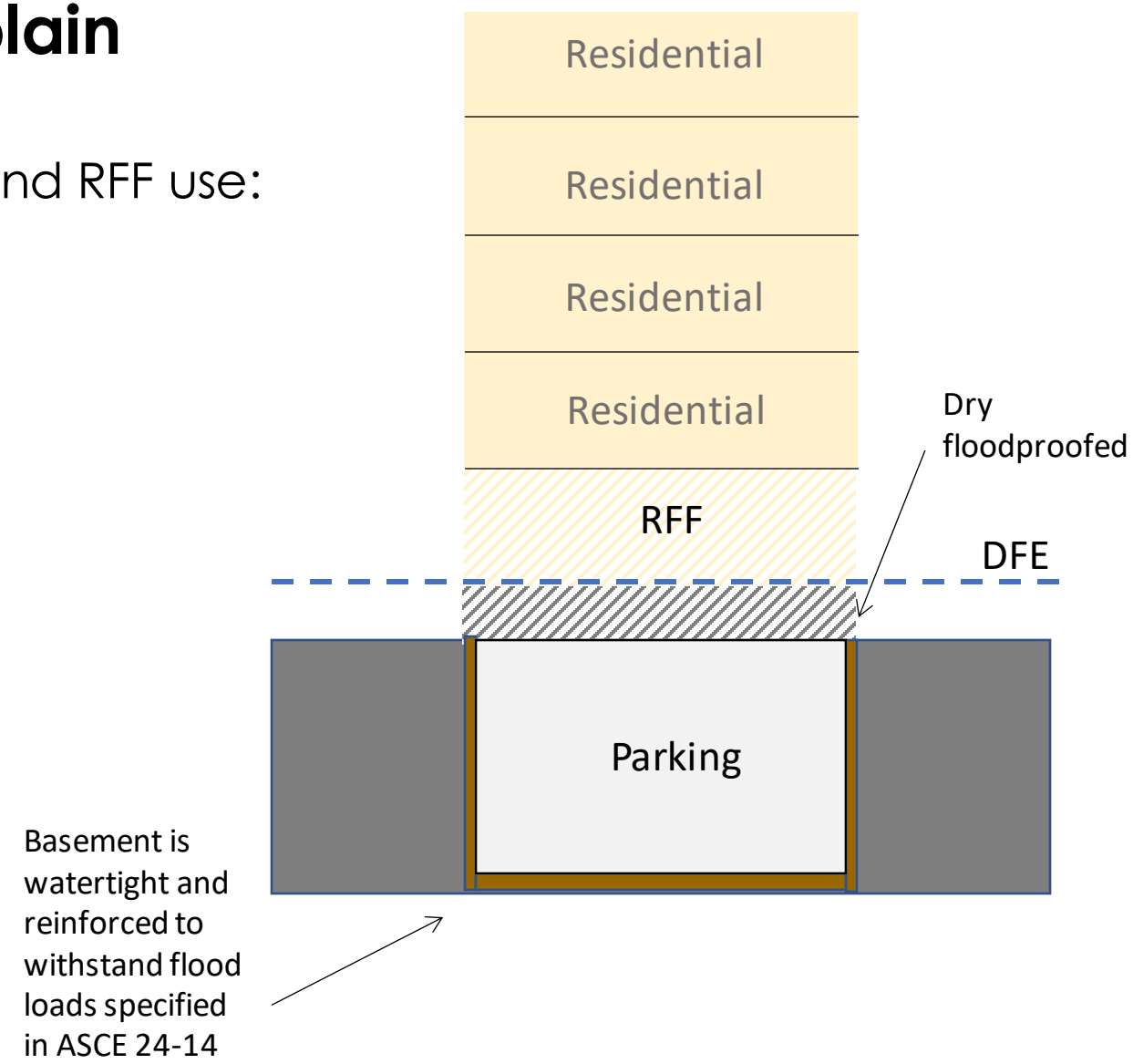
	Parking allowed below grade?	Uses below the Design Flood Elevation (DFE)?
Residential	Yes, if dry floodproofed in accordance with ASCE 24-14.	Wet-floodproofed parking, access, storage. Ancillary residential uses dry-floodproofed in accordance with ASCE 24-14.
Mixed-Use	Yes, if dry floodproofed in accordance with ASCE 24-14.	Wet-floodproofed parking, access, storage. Non-residential uses dry-floodproofed in accordance with ASCE 24-14.

**Dry-floodproofed ancillary residential uses also allowed.*

Residential-Only **Structures**
500-Year **Floodplain**

Allowable basement and RFF use:

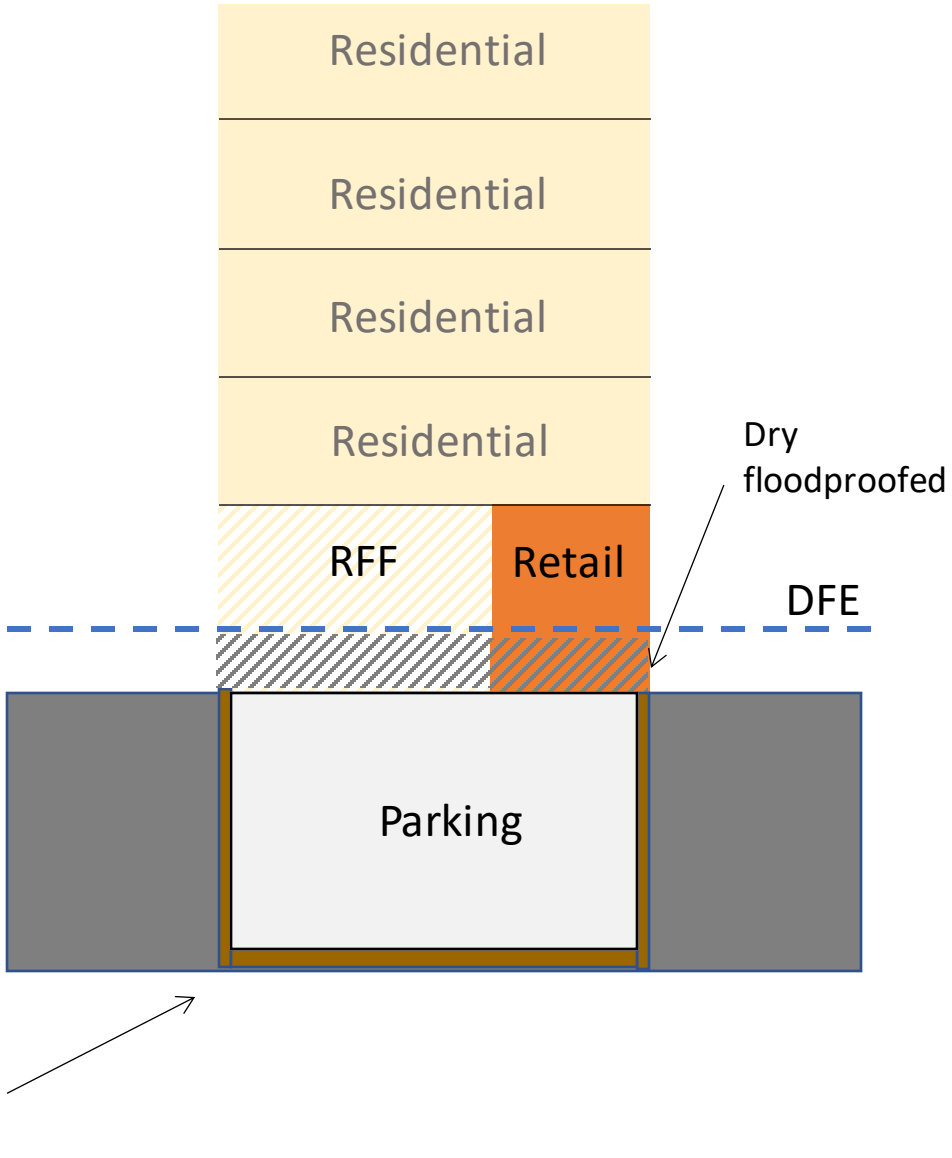
- Parking
- Access
- Storage
- Lobby
- Resident Only Gym
- Mail Room
- ~~Residential Units~~



Mixed-Use **Structures**
500-Year **Floodplain**

Allowable basement and RFF use:

- Parking
- Access
- Storage
- Lobby
- Resident Only Gym
- Mail Room
- Commercial
- ~~Residential Units~~



Flood Protection Strategies

Compliant Flood Protection Strategies

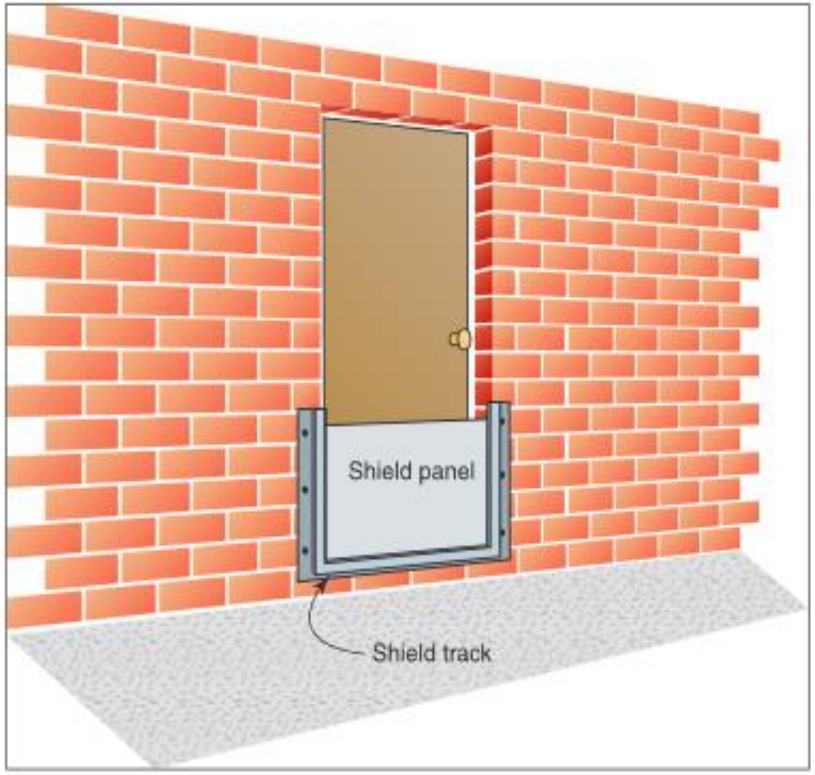
- Dry Floodproofing
  - Can be used for nonresidential uses or nonresidential use portions of mixed-use buildings.
  - Not to be used for residential uses
  - Can be used for ancillary residential uses in 500-year

- Wet Floodproofing
  - Can be used for above-grade parking, access areas, storage in all use categories.
  - Not be used for residential uses, ancillary residential uses, or commercial uses.

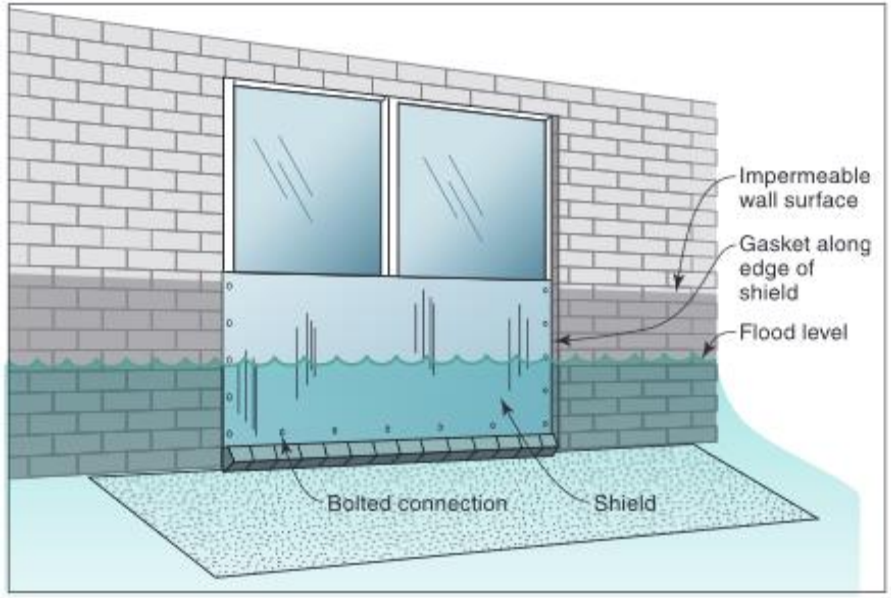
Compliant Flood Protection Strategies

- Elevation
  - The only acceptable method of flood protection for dwelling units in all zones
  - Can be used for ancillary residential uses (leasing office, furnished foyer, tenant amenities, etc.) in the 100-year floodplain.

Dry Flood Proofing of Non-Residential Buildings



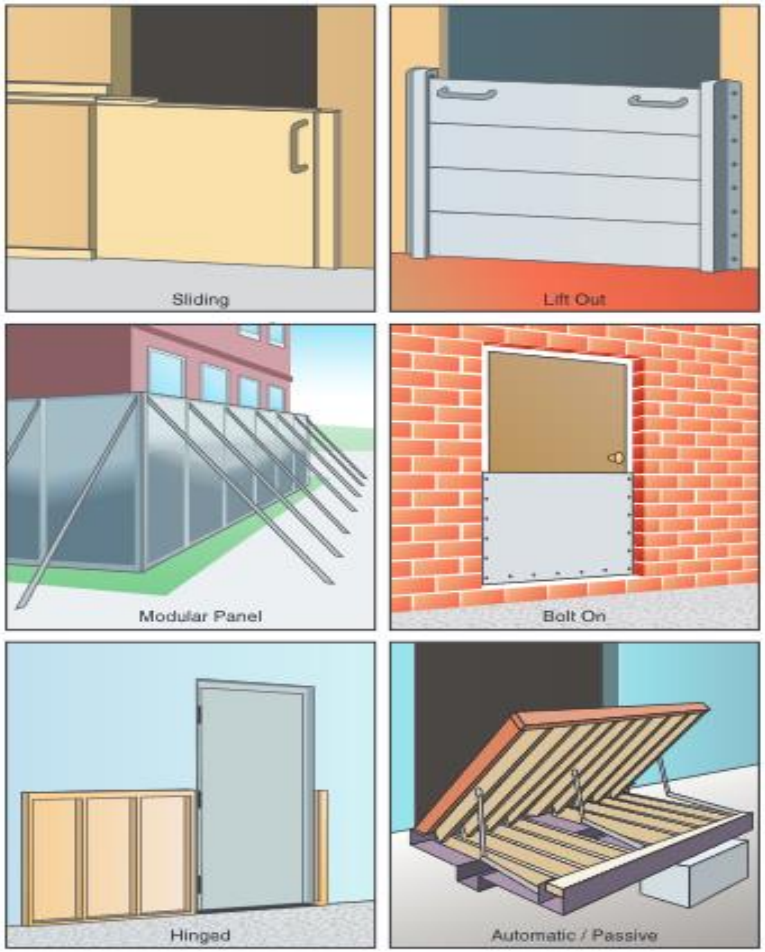
Door with flood shield



Window with flood shield

Diagrams Courtesy of FEMA

Dry Flood Proofing of Non-Residential Buildings



Types of flood shields

Diagrams Courtesy of FEMA

ELEVATE & WET FLOODPROOF

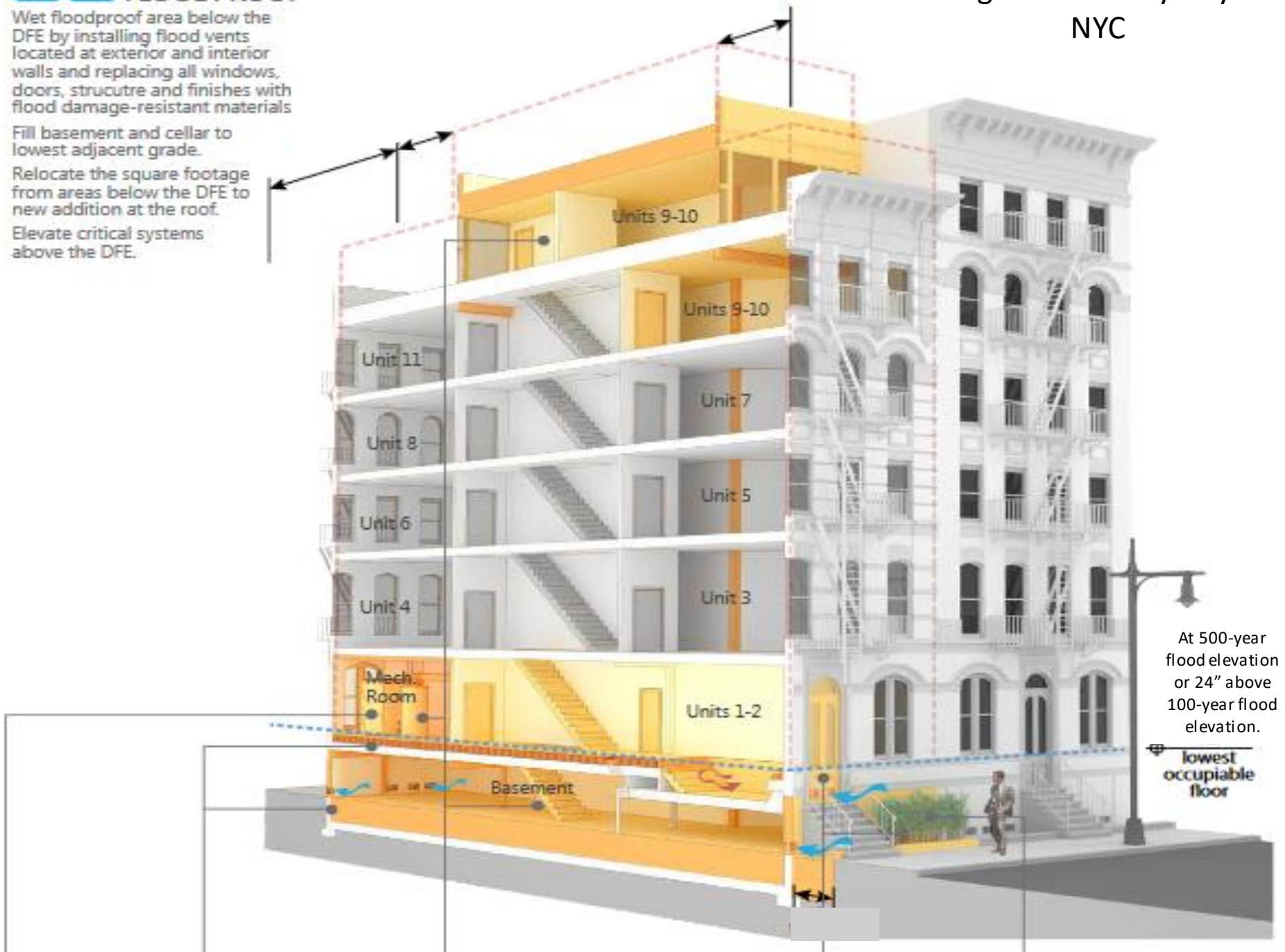
Wet floodproof area below the DFE by installing flood vents located at exterior and interior walls and replacing all windows, doors, strucutre and finishes with flood damage-resistant materials

Fill basement and cellar to lowest adjacent grade.

Relocate the square footage from areas below the DFE to new addition at the roof.

Elevate critical systems above the DFE.

Diagram Courtesy City of NYC



WET & DRY FLOODPROOF

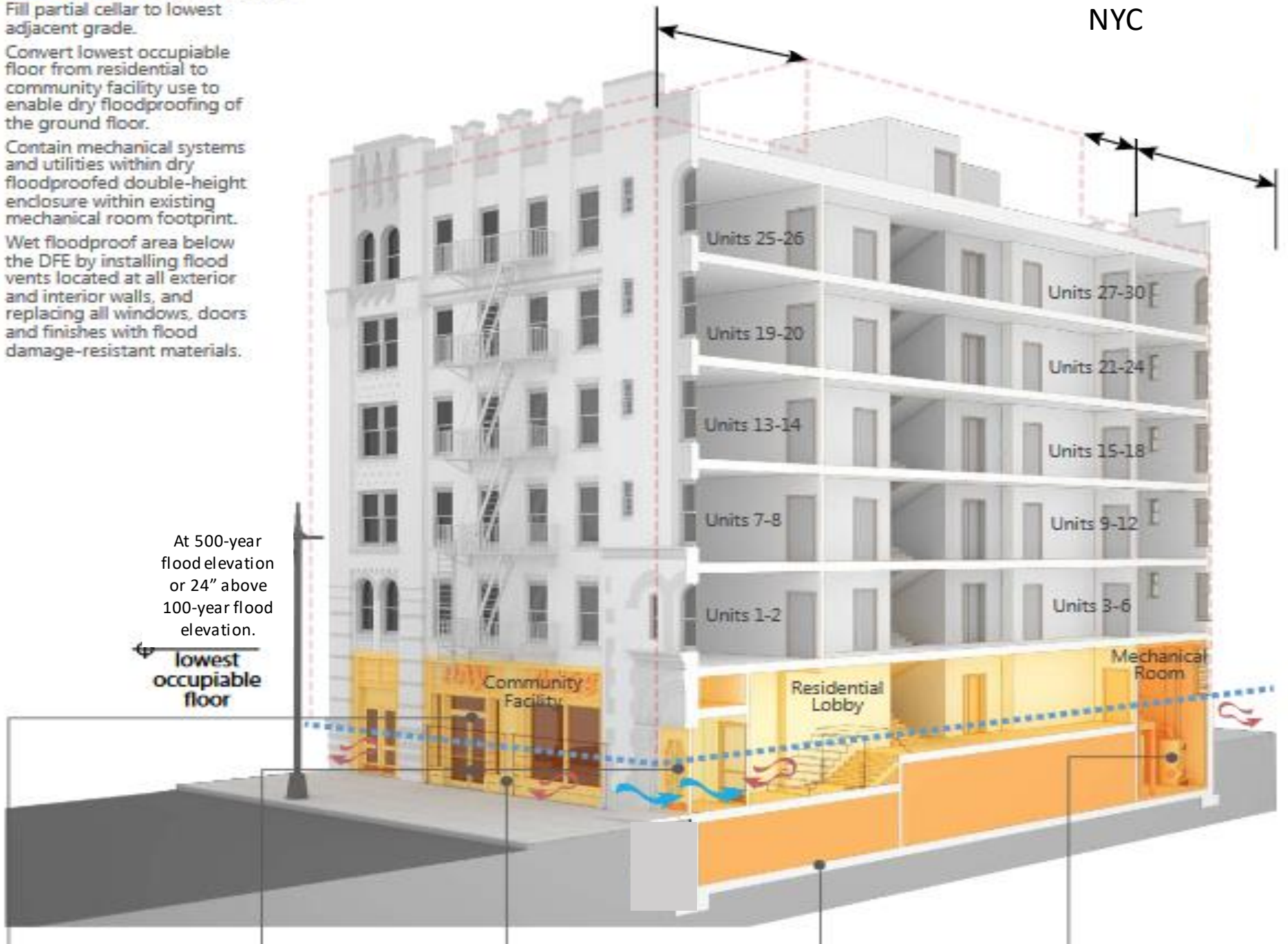
Fill partial cellar to lowest adjacent grade.

Convert lowest occupiable floor from residential to community facility use to enable dry floodproofing of the ground floor.

Contain mechanical systems and utilities within dry floodproofed double-height enclosure within existing mechanical room footprint.

Wet floodproof area below the DFE by installing flood vents located at all exterior and interior walls, and replacing all windows, doors and finishes with flood damage-resistant materials.

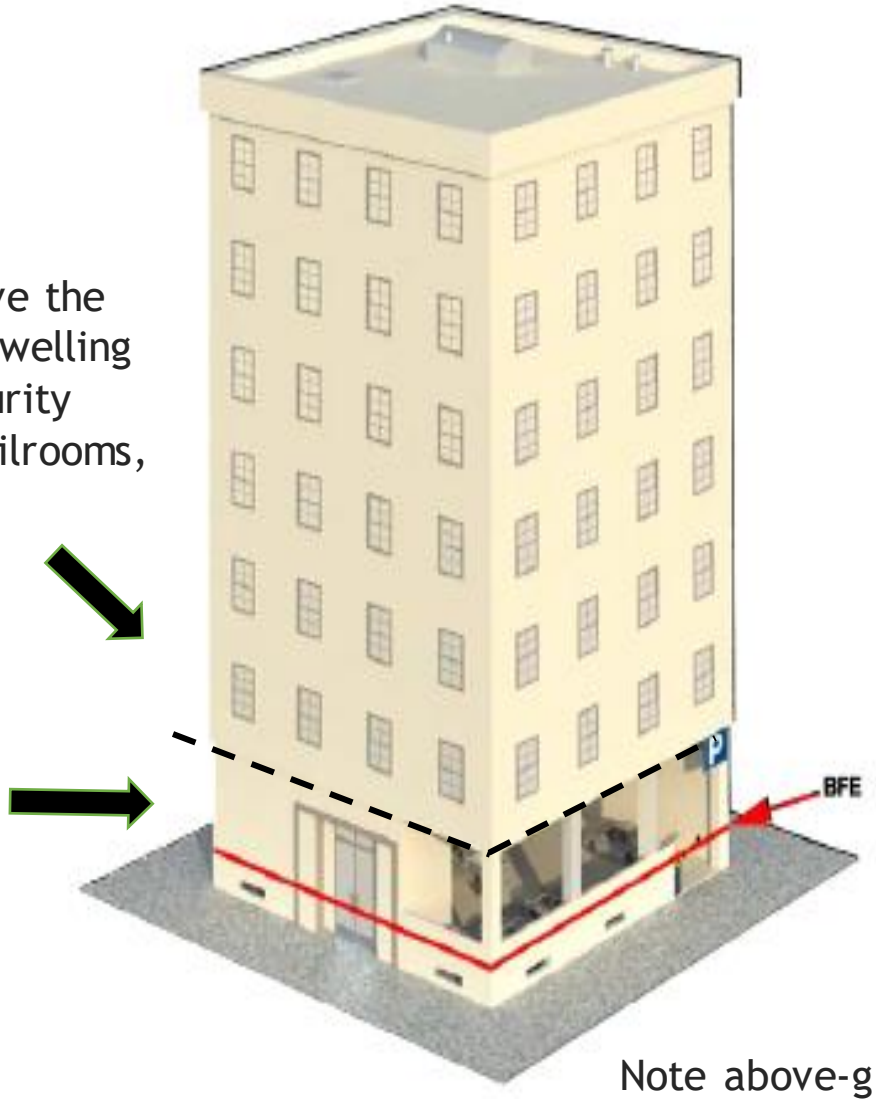
Diagram Courtesy City of NYC



Compliant Residential Use
100-Year Floodplain

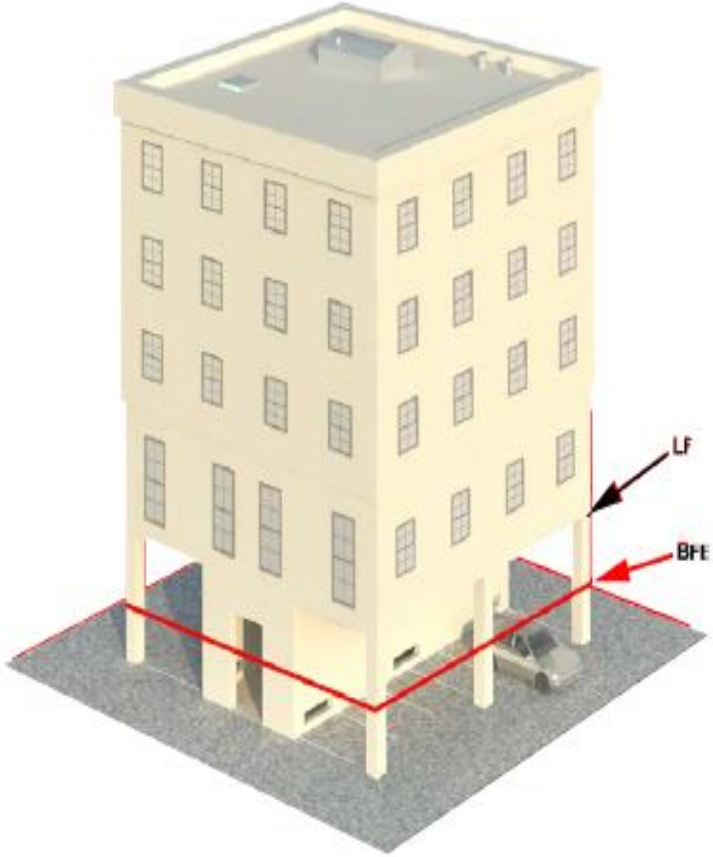
This level is elevated above the DFE and can be used for dwelling units, leasing offices, security desks, tenant lounges, mailrooms, gyms, etc.

This level is located below the DFE. It can be used for parking, access, storage, stairwells, unfurnished vestibules, and elevator waiting areas. It cannot be used for furnished lobbies, security desks, leasing offices, mailrooms, or gyms.

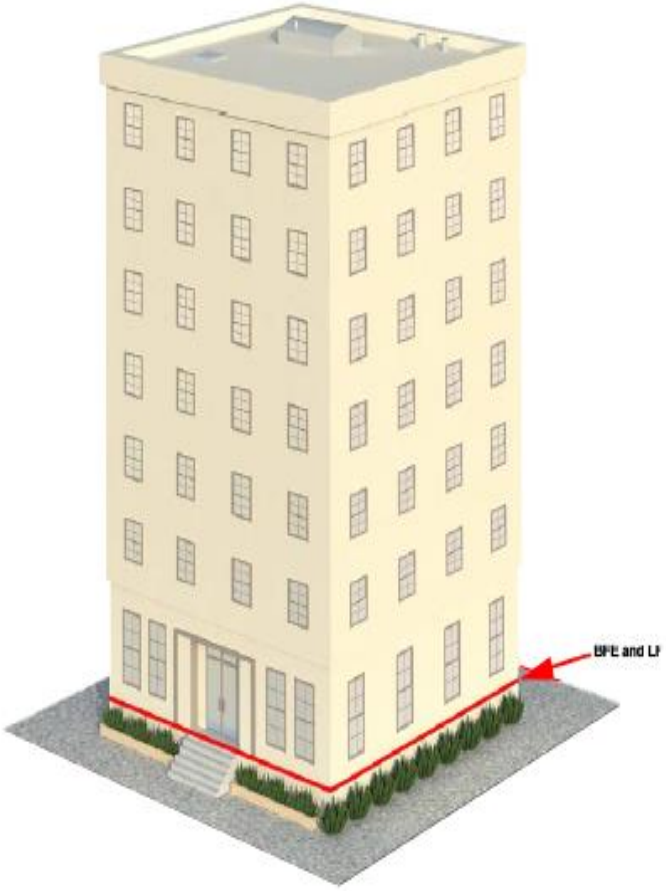


Note above-grade parking and flood vents

Compliant Residential Use
100-Year Floodplain

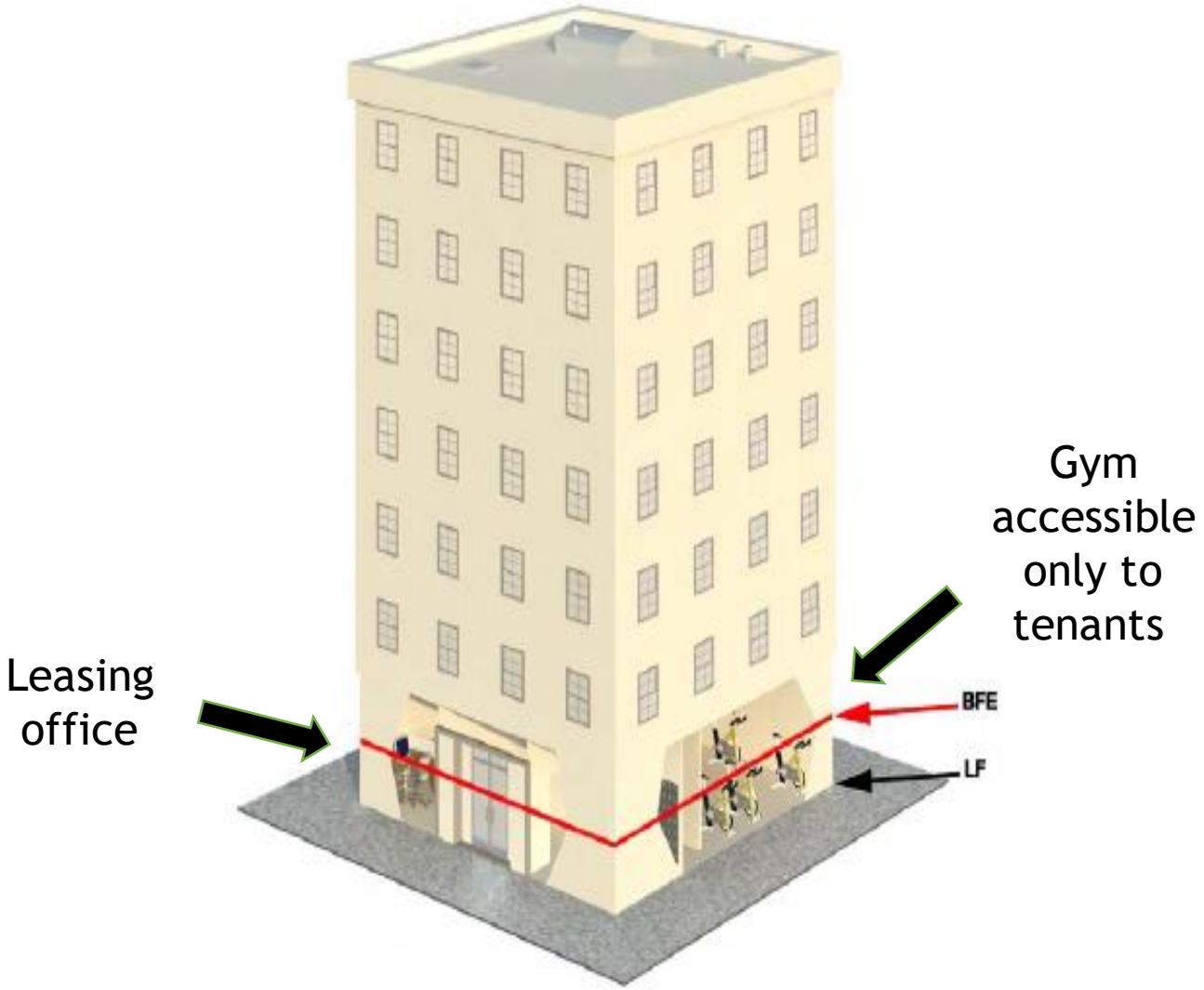


Elevated on piers with wet-floodproofed stairwell.

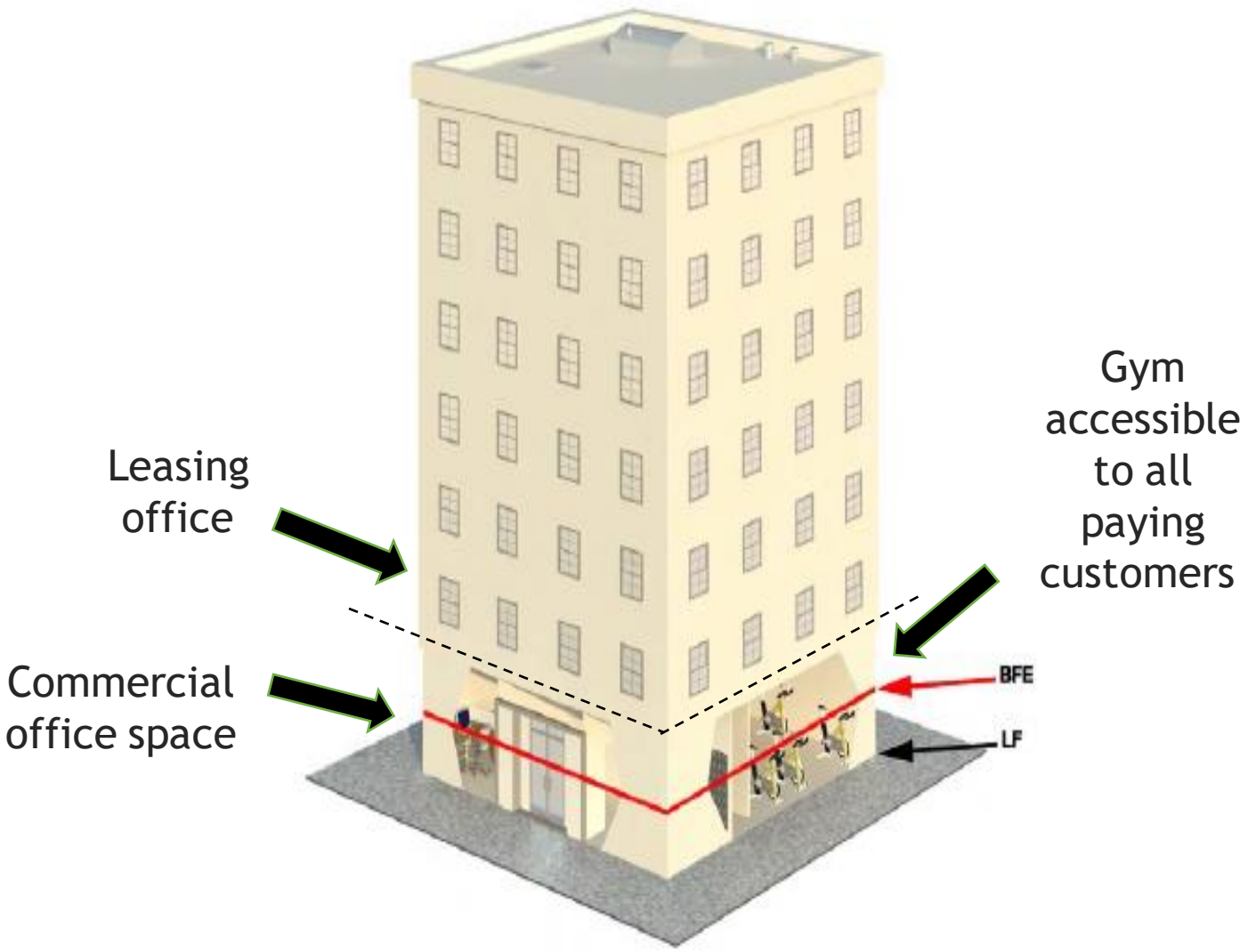


Elevated on slab.

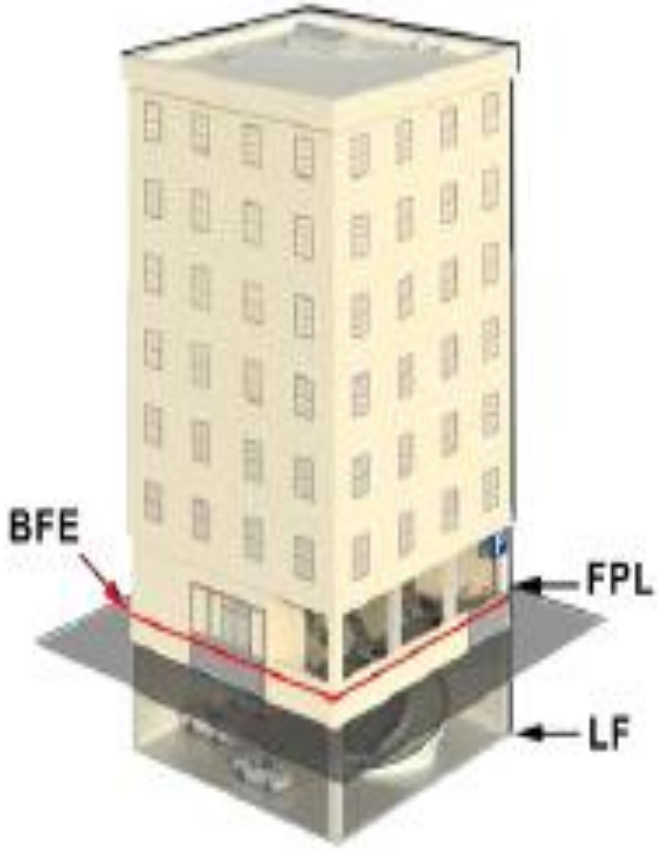
Non-Compliant **Residential Use**
100-Year **Floodplain**



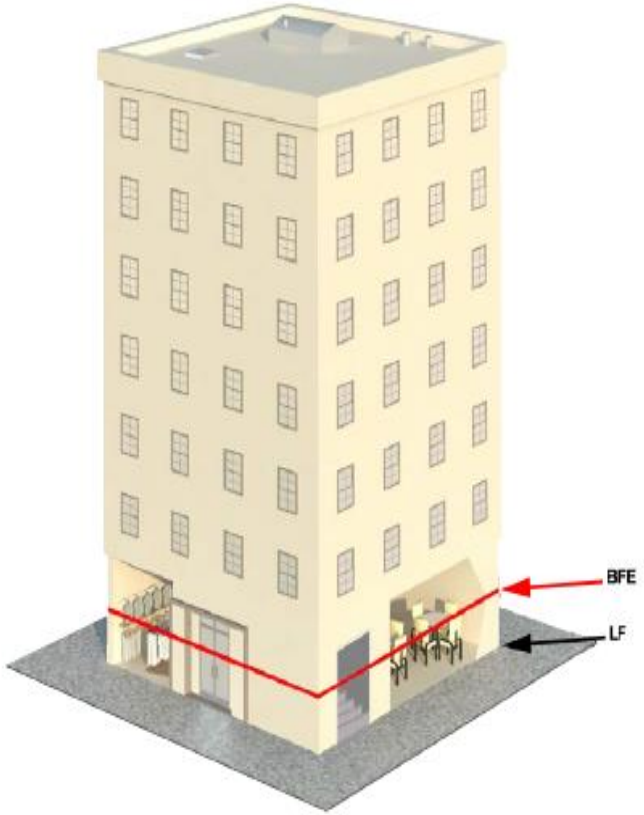
Compliant Mixed-Use
All Floodplains



Other *Compliant* Uses *All* Floodplains



Note deployed flood shield at entrance. Underground parking for mixed-use buildings currently (June 2021) requires an approved code modification, but will be allowed by-right under proposed Regulations



Commercial uses (laundry service and restaurant) are located below DFE but dry-floodproofed. Note separate wet-floodproofed building access for the residential spaces.

Summary – Required Elevations

Structure Type	*Regulations*	***Design Flood Elevation***	*Notes*
General	Current Flood Hazard Rules	**100-Year Flood Elevation + 1.5 feet**	Residential structures must be elevated, while nonresidential structures can be elevated or dry floodproofed.
General	Current DC Construction Codes and Proposed Updated Flood Hazard Rules	**Whichever is higher of:** • **100-Year Flood Elevation + 2 feet, or** • **500-Year Flood Elevation**	Residential structures must be elevated, while nonresidential structures can be elevated or dry floodproofed.
Critical Facility	Proposed Updated Flood Hazard Rules	**500-Year Flood Elevation + 2 feet**	Residential structures must be elevated, while nonresidential structures can be elevated or dry floodproofed.
Structure Located Within the Tidal Shoreline Buffer	Proposed Updated Flood Hazard Rules	**500-Year Flood Elevation + 4.5 feet**	Residential structures must be elevated, while nonresidential structures can be elevated or dry floodproofed.

Comments and Feedback

Regs Enforced on Substantial Improvement?*

Structure Type	100-year	500-year
Single-Family or Two-Family Home	Yes	No
Multi-Family Residential Building	Yes	TBD
Mixed-Use Building	Yes	TBD
Commercial/Industrial Building	Yes	TBD

** All mechanical, electrical, and plumbing equipment must be elevated or floodproofed, even if the project is in an existing structure and does not trigger substantial improvement.*

Options for SI/SD* Structures in the 500-Year Floodplain

- Exempt these uses (Mixed use, multi-family, commercial) from the SI trigger
- Exempt buildings that are below a square footage, unit quantity, or floor quantity threshold from the SI trigger
- Require flood protection but allow choice of either elevation or dry floodproofing
- Require flood protection but allow basements to be wet-floodproofed (vents for water to drain in and equalize pressure, pump to remove water after flood)

**SI = Substantially Improved, SD = Substantially Damaged*

Considerations for Discussion

- Elevation of a multifamily building can be expensive
  - Estimated at $410,000 - $700,000 for a 3-story/6-unit structure depending upon whether existing lowest level is partially above grade or entirely below grade, respectively
- Existing basements may not be rated to withstand hydrostatic pressure
- Homeowners may choose to live with the risk, but renters have no choice
- Balance between flood risk reduction and availability of affordable housing

Interactive Polling!

Thank You!!!

Discussion

Nicholas Bonard
Nicholas.Bonard@dc.gov

Martin Koch
Martin.Koch@dc.gov