DRY-FLOODPROOFING:
RECENT CASE STUDIES IN NYC

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Association of State Floodplain Managers
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Cleveland, OH
Snapshot of Bryan Cave Leighton Paisner

- Global law firm with 1,400 highly skilled lawyers
- Nearly 400 lawyers in real estate department
- 31 offices across North America, Europe, the Middle East and Asia
- The firm is known for its relationship-driven, collaborative culture, diverse legal experience and industry-shaping innovation
- Range of integrated capabilities, including some of the most active M&A, real estate, financial services, litigation and corporate risk practices in the world
Agenda

- Dry-Floodproofing: Regulatory Overview
- Case Study 1: 67 Vestry Street, Manhattan
- Case Study 2: 215 N. 10th Street, Brooklyn

Note: Both case studies are presented as schematic designs, and this presentation does not provide design details needed to demonstrate compliance with NFIP and the NYC Building Code.
# Regulatory Overview

<table>
<thead>
<tr>
<th>Source</th>
<th>Guidance</th>
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</table>
| 44 CFR § 60.3 | FEMA TB 3  
FEMA P 936  
References ASCE 24  
References IBC  
References USACE 1995 |
| International Building Code  
Includes ASCE 24-14 | IBC Commentary  
ASCE 24-14 Annex  
ASCE Interpretations |
| Local Codes  
e.g., New York City Building Code based on IBC | In NYC: Buildings Bulletins (i.e. flood-proof glazing) |
Regulatory Overview

44 CFR 60.3 Community Obligations for A-Zones:

- **Building Sites:**
  - New construction
  - Substantial improvements

- **Subdivisions**
  - Flood damage generally
  - Utilities
  - Drainage

- **Water Supply and Sanitary Sewer Systems**

- **Recreational Vehicles**
Regulatory Overview

44 CFR 60.3 Community Obligations for A-Zones:

- **Building Sites:**
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- **Recreational Vehicles**

Dry floodproofing for nonresidential buildings
Regulatory Overview

Figure 2-13. Basic building components exposed to flood loads
Regulatory Overview

44 CF 60.3 (c) [T]he community shall:

... 

(3) Require that all new construction and substantial improvements of non-residential structures within Zones A1-30, AE and AH zones on the community's firm

(i) [elevate] or,

(ii) together with attendant utility and sanitary facilities, be designed so that below the base flood level the structure is watertight with walls substantially impermeable to the passage of water and with structural components having the capability of resisting hydrostatic and hydrodynamic loads and effects of buoyancy;

...
Regulatory Overview

Dry floodproofing (44 CF 60.3(c)(3)):
“the structure is watertight with walls substantially impermeable to the passage of water”
Regulatory Overview

FEMA TB 3-93

• “The building must be watertight (i.e., floodwaters must not enter the building envelope)”

• “The building’s walls must be ‘substantially impermeable to the passage of water.’”
Regulatory Overview

FEMA P-936 - 13

Chapter 3: Dry Floodproofing
• Continuous impermeable walls
• Flood shields for openings in exterior walls

Chapter 4: Floodwalls and Levees
• Barriers between the building and floodwaters
Regulatory Overview

FEMA P-936 - 13

Chapter 3: Dry Floodproofing

- Continuous impermeable walls
- Flood shields for openings in exterior walls

Figure 3-10. Types of flood shields
Regulatory Overview

FEMA P-936 - 13

Chapter 3: Dry Floodproofing

- Continuous impermeable walls
- Flood shields for openings in exterior walls

Figure 3-10. Types of flood shields
Regulatory Overview

Walls vs. Openings
Regulatory Overview

FEMA P-936 - 13

Chapter 3: Dry Floodproofing

- Continuous impermeable walls
- Flood shields for openings in exterior walls

Figure 3-10. Types of flood shields
Regulatory Overview

IBC, ASCE 24 – 14

• Section 6.2.2
Regulatory Overview

IBC, ASCE 24 – 14

Formal Interpretation

11/29/16
Regulatory Overview

IBC, ASCE 24 –

Formal Interpretation:

11/29/16
Regulatory Overview

NYC Local Ordinance (IBC-2012/ASCE 24/05)

- Extensive Local Amendments:
  - Maintenance of all required means of egress for egress/ingress during flood (ASCE 24 6.2.2)
  - Provision of alternate paths for any egress blocked by shields (ASCE 24 6.2.2)
  - Prohibition of temporary stairs for (i) residential portions of mixed buildings and (ii) buildings to be occupied during floods and (G308.7.2)
    - exception for existing buildings
  - Strict alteration provisions for non-SI/SD > sometimes requires dry floodproofing anyway
Regulatory Overview

NYC Local Ordinance (IBC-2012/ASCE 24/05)

- Extensive Local Amendments:
  - Prohibition of dry floodproofing for certain systems (G 304.1.2):
    - Electronically supervised sprinkler/standpipe control valves and
      workflow alarms
    - Fire pumps/sprinkler booster pumps
    - Fire alarm control panels for fire extinguishing systems
    - Fire alarm zoning indicator (5 feet above DFE)
    - Fuel oil piping fill/vent (3 feet above DFE)
    - Pluming FAI and relief vents
    - Plumbing backflow preventers
Regulatory Overview

NYC Local Ordinance (IBC-2012/ASCE 24/05)

- **Extensive Local Amendments:**
  - Allowance for wave-resisting dry floodproofing in coastal A zones (G304.3)
  - Allowance for flood shields, temporary stairs and foundations to project into public right-of-way:
    - 6” above grade, 12” below grade as-of-right (BC 322.1.1, 3202.2.2)
    - Greater distances with DOT permission (34 RCNY 7-04(a)(37))
  - Requirement to construct to greater of FIRMS/PFIRM (G 102.2.2)
  - Special inspection of flood shields (G105.4)
  - Notations on C of O for dry floodproofed spaces (G106.4)
  - Definition of “Non-residential” (G 201.2)
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Note: Both case studies are presented as schematic designs, and this presentation does not provide design details needed to demonstrate compliance with NFIP and the NYC Building Code.
Case Study 1: 67 Vestry Street
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1897 A & P
Great Atlantic and Pacific Tea Company

2016
Photo:
https://commons.wikimedia.org/w/index.php?curid=52319953
Case Study 1: 67 Vestry Street

2019

“Substantial Improvement”
Case Study 1: 67 Vestry Street

- NYC DOB Substantial Improvement/Damage Rule:

1) Assessment Roll Option
2) Appraisal Option

§3606-01 Alteration applications; determinations of market value and substantial improvement.

(a) Scope. This rule provides application submission requirements for alterations to structures located in areas of special flood hazard, provides the method for determining the market value of a structure, and provides the method for determining whether repairs, reconstructions, rehabs, additions or improvements constitute a substantial improvement.

(b) References. See Section BC G201.2 (definitions of market value of structure, substantial damage, and substantial improvement) and Section 28-104.7.11.

(c) Applicant’s statement. Applicants shall include in every alteration application the statement: “Work proposed in this application (is/is not) included in a substantial improvement as defined by Section BC G201.2 and 1 RCNY 3606-01.”

(d) Calculation of market value. To determine the market value of a structure, the applicant shall use either of the two calculation methods below:
Case Study 1: 67 Vestry Street

- **Effective FIRM (2007)**
  - AE Zone 10 (NGVD 29)
    - $\approx 8.9$ (NAVD 88)

- **PFIRM (2013/2015)**
  - AE Zone 12 (NAVD 88)
  - not in LIMWA
Case Study 1: 67 Vestry Street

- **NYC Local Ordinance:**
  - BC G102.2.2
  - “Effect of preliminary flood insurance study and rate maps”

- **More Restrictive of:**
  - 2007 Effective FIRMs
  - 2013/2015 PFIRMs
Case Study 1: 67 Vestry Street

- **Effective FIRM (2007)**
  - AE Zone 10 (NGVD 29)
    - \( \approx 8.9 \) (NAVD 88)

- **PFIRM (2013/2015)**
  - AE Zone 12 (NAVD 88)
  - not in LIMWA
Case Study 1: 67 Vestry Street

Oblate Spheroid

NGVD > NAVD in Manhattan

<table>
<thead>
<tr>
<th>NGVD Elevations</th>
<th>To obtain NAVD Equivalency:</th>
<th>NAVD Elevations</th>
</tr>
</thead>
<tbody>
<tr>
<td>11.040 to 11.109</td>
<td>( \rightarrow ) Subtract between 1.040 and 1.109</td>
<td>10.000</td>
</tr>
<tr>
<td>12.752</td>
<td>( \rightarrow ) Subtract between 1.040 and 1.109</td>
<td>11.643 to 11.712</td>
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<tr>
<td>10.000</td>
<td>( \rightarrow ) Subtract between 1.040 and 1.109</td>
<td>8.891 to 8.960</td>
</tr>
</tbody>
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Case Study 1: 67 Vestry Street
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Grade: 6’-7” below DFE
Cellar: 14’-1” below DFE
Case Study 1: 67 Vestry Street

PROPOSED NORTH ELEVATION

- Wet Floodproofed
- Solid Panels/Glazing
- Flood Shields
Case Study 1: 67 Vestry Street

- Wet Floodproofed
- Dry Floodproofed
- Temporary Stairs/Platforms
- Elevated
- Solid Dry Floodproofing
- Flood Shields
Case Study 1: 67 Vestry Street
Case Study 1: 67 Vestry Street

- Wet Floodproofed
- Dry Floodproofed
- Temporary Stairs/Platforms
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FLOOD SHIELD DETAILS
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Case Study 2: 215 N. 10th Street

- **Effective FIRM (2007)**
  - AE Zone 10 (NGVD 29)
    - ≈ 8.9 (NAVD 88)

- **PFIRM (2013/2015)**
  - X Zone
Case Study 2: 215 N. 10th Street

**NYC Local Ordinance:**
- BC G102.2.2
- “Effect of preliminary flood insurance study and rate maps”

**More Restrictive of:**
- 2007 Effective FIRMss
- 2013/2015 PFIRMss
Case Study 2: 215 N. 10th Street

- **Effective FIRM (2007)**
  - AE Zone 10 (NGVD 29)
    - $\approx 8.9$ (NAVD 88)

- **PFIRM (2013/2015)**
  - X Zone
Case Study 2: 215 N. 10th Street
Case Study 2: 215 N. 10th Street

Grade: 2'-4" below DFE
Subcellar: 17'-4" below DFE
Case Study 2: 215 N. 10th Street

Wet Floodproofed
Solid Panels/Glazing
Flood Shields
Case Study 2: 215 N. 10th Street

- Elevated
- Wet Floodproofed
- Dry Floodproofed
- Temporary Stairs/Platforms
- Solid Dry Floodproofing
- Flood Shields
Case Study 2: 215 N. 10th Street

TYPICAL PLAN DETAIL AT STRUCTURAL GLAZED ALUMINUM FLOOD PANEL STOREFRONT SYSTEM

TYPICAL SECTION DETAIL AT STRUCTURAL GLAZED ALUMINUM FLOOD PANEL STOREFRONT SYSTEM
Case Study 2: 215 N. 10th Street
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