

# NFIP

# New Hampshire's Floodplain Management Program

## Fact Sheet #3

## Preventing Common Building Violations

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According to a report that evaluated the National Flood Insurance Program (NFIP), it concluded that the most common types of violation were mechanical and utility equipment located below the base flood elevation (BFE) and flood openings that do not meet the NFIP requirements. These two types of violations accounted for 50.6 percent of the violations found within the report's sample assessment.

The report concluded that more education and outreach was needed to address these two common violations. Therefore, the purpose of the following information is to help explain the requirements and include references where more information can be found to help prevent these violations from continuing.

### Flood Openings in Residential Structures

One of the main NFIP requirements in a community's floodplain regulations (and in NH's state building code) is that the lowest floor of residential structures must be located at or above the BFE. In many instances, in order to get the lowest floor up to or above the BFE, foundation walls are used which create an enclosure (i.e. crawlspace).

Enclosures are allowed below the BFE but they must meet certain criteria. The purpose of the following criteria is to allow the automatic entry and exit of floodwaters so that interior and exterior pressures of the floodwaters will equalize during a flood and therefore will reduce damage to the enclosure and the structure during a flood event.

Enclosures located below the BFE must meet the following NFIP minimum criteria.

# Preventing Common Building Violations

## 1. Unfinished Area/Limited Uses

The enclosed area must be unfinished or flood resistant and used only for the parking of vehicles, building access, or storage. This area will be subject to water entering and exiting so it should be designed and used to handle wetness.

## 2. No Basements or Areas Below Ground on All Sides

The area cannot be a basement or any other area in which its floor is below the ground on all sides. An area with a floor below the ground on all sides would act as a bathtub as water entered the enclosure and would not allow floodwaters to easily and quickly move out of the enclosure.

## 3. Flood Openings

The enclosed area must have flood openings. Flood openings are a series of small openings installed in the enclosure's walls. The purpose of the flood openings is to relieve the pressure of the floodwater on the exterior enclosure walls by allowing floodwaters to enter the enclosure and put pressure on the interior walls, which will equalize the pressure on the enclosure walls. Structures with enclosures that do not have openings are at risk of damage or collapse due to the uneven pressure the floodwaters will have on the enclosure walls.

Designs for flood openings must either meet or exceed the following minimum criteria:

1. A minimum of two openings with a total net area of not less than 1 square inch for every 1 square foot of enclosed area subject to flooding must be provided. The openings should be installed on at least two sides of each enclosed area to decrease the chances that all opening could be blocked with floating debris.
2. The bottom of each opening must be no higher than 1 foot above the higher of the final interior or exterior grades under the opening.
3. The openings may be equipped with screens, louvers, valves, or other coverings or devices—provided that they permit the automatic entry and exit of floodwaters. The openings must remain open at all times.

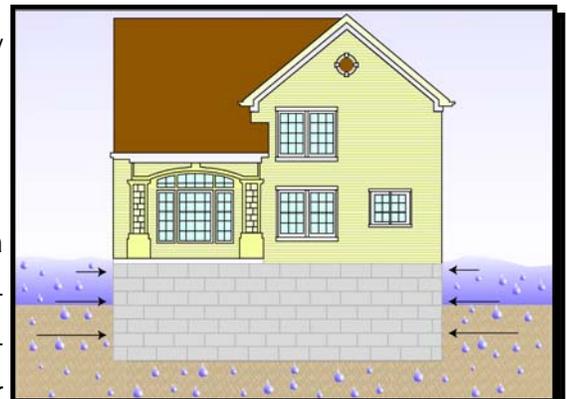


Illustration of the pressure water places on an enclosure's walls. This pressure is known as hydrostatic pressure.

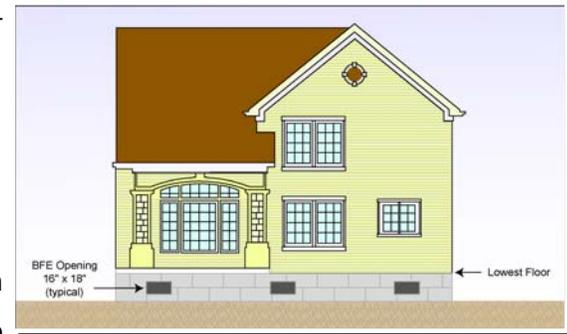


Illustration of a house with an enclosure below the BFE that includes flood openings.

# Preventing Common Building Violations

An alternative to meeting criteria #1 above for those who want unique or individually designed openings is having the openings designed and certified by a registered engineer or architect. The openings must still be designed to automatically allow the entry and exit of floodwaters.

## How Openings Affect Flood Insurance Rates

It is not only important for community officials to ensure enclosures below the BFE meet the NFIP requirements to prevent flood damage to the structure but also to prevent the homeowner from paying a high cost for flood insurance. Flood insurance rates are directly tied to how a structure is built and its compliance with the NFIP requirements. If an enclosure below the BFE does not meet the NFIP requirements then the floor of that enclosure becomes the “lowest floor” of the structure. Since the lowest floor is below the BFE, flood insurance rates will be much higher than if it was at or above the BFE as required.

## Mechanical and Utility Equipment

The NFIP requires that electrical, heating, ventilation, plumbing, and air conditioning equipment, and other service facilities are designed and/or located so as to prevent water from entering or accumulating within the components during conditions of flooding. Therefore, these mechanical and utility components are prohibited below the BFE (except for the minimum electric service required to address life safety and electric code requirements).

## Elevation Certificate

One of the best things a community official can do to ensure that enclosures below the BFE are built in compliance is to require the submittal of FEMA’s Elevation Certificate. The purpose of the Elevation Certificate is to gather elevation information necessary to ensure compliance with community floodplain regulations.

On the next page is a sample Elevation Certificate that is marked up to show where community officials should verify that enclosures below the BFE, flood openings, and mechanical and equipment of new or substantially improved structures are compliant with the previously mentioned NFIP requirements.

### Information Resources

#### **FEMA How To Guides:**

<http://www.fema.gov/library/viewRecord.do?id=3262>

- Raise or Floodproof HVAC Equipment
- Raise Electrical System Components

#### **FEMA’s Protecting Building Utilities from Flood Damage**

<http://www.fema.gov/hazard/flood/pubs/pbuffd.shtml>

#### **FEMA Technical Bulletins:**

<http://www.fema.gov/plan/prevent/floodplain/techbul.shtml>

- Openings in Foundation Walls and Walls of Enclosure (TB1, Aug 2008)
- Flood Damage Resistant Materials Requirements (TB2, Aug. 2008)

# Preventing Common Building Violations

Verifying Compliance for New or Substantially-Improved Structures with the NFIP's Minimum Regulations

U.S. DEPARTMENT OF HOMELAND SECURITY  
Federal Emergency Management Agency  
National Flood Insurance Program

## ELEVATION CERTIFICATE

OMB No. 1660-0008  
Expires March 31, 2012

Important: Read the instructions on pages 1-9.

### SECTION A - PROPERTY INFORMATION

A1. Building Owner's Name John Smith		For Insurance Company Use:	
A2. Building Street Address (including Apt., Unit, Suite, and/or Bldg. No.) or P.O. Route and Box No. 123 Main Street		Policy Number	
City Waterville State NA ZIP Code 12345		Company NAIC Number	
A3. Property Description (Lot and Block Numbers, Tax Parcel Number, Legal 12A)			
A4. Building Use (e.g., Residential, Non-Residential, Addition, Accessory, etc.)			
A5. Latitude/Longitude: Lat. _____ Long. _____			
A6. Attach at least 2 photographs of the building if the Certificate is being used for a new building.			
A7. Building Diagram Number _____			
A8. For a building with a crawlspace or enclosure(s):			
a) Square footage of crawlspace or enclosure(s) <u>700</u> sq ft		b) Square footage of attached garage _____ sq ft	
b) No. of permanent flood openings in the crawlspace or enclosure(s) within 1.0 foot above adjacent grade <u>10</u>		c) No. of permanent flood openings in the attached garage within 1.0 foot above adjacent grade _____	
c) Total net area of flood openings in A8.b <u>720</u> sq in		d) Total net area of flood openings in A9.b _____ sq in	
d) Engineered flood openings? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No		e) Engineered flood openings? <input type="checkbox"/> Yes <input type="checkbox"/> No	

Verify that Item A8(c) is equal or greater than Item A8(a). If Item A8(c) is equal or greater, then the crawlspace/enclosure is compliant. If Item A8(c) is less, then the crawlspace/enclosure is not compliant.

### SECTION B - FLOOD INSURANCE RATE MAP (FIRM) INFORMATION

B1. NFIP Community Name & Community Number Waterville 123456		B2. County Name Brown		B3. State NA	
B4. Map/Panel Number 120	B5. Suffix C	B6. FIRM Index Date 01/01/2000	B7. FIRM Panel Effective/Revised Date 01/01/2000	B8. Flood Zone(s) AE	B9. Base Flood Elevation(s) (Zone AO, use base flood depth) 200.5

B10. Indicate the source of the Base Flood Elevation (BFE) data or base flood depth entered in Item B9.

FIS Profile  FIRM  Community Determined  Other (Describe) \_\_\_\_\_

B11. Indicate elevation datum used for BFE in Item B9:  NGVD 1929  NAD 1983

B12. Is the building located in a Coastal Barrier Resources System (CBRS) area?  Yes  No  
Designation Date \_\_\_\_\_  CBRS

Verify that Item C2(a) is equal or greater than Item B9. If Item C2(a) is greater, then it is compliant. If Item C2(a) is not greater, verify that Item A8 (a-d) is correctly completed. If it is, then Item C2(a) is not considered the Lowest Floor and is not required to be equal or greater than B9. If Item A8 (a-d) is not completed or is not correct then Item C2(a) is considered the Lowest Floor and must be equal or greater than Item B9 to be compliant.

### SECTION C - BUILDING ELEVATION INFORMATION

C1. Building elevations are based on:  Construction Drawings\*  
\*A new Elevation Certificate will be required when construction of the building is completed.

C2. Elevations - Zones A1-A30, AE, AH, A (with BFE), VE, V1-V30, V (with BFE), below according to the building diagram specified in Item A7. Use the same datum as in Item B9.  
Benchmark Utilized \_\_\_\_\_ Vertical Datum \_\_\_\_\_  
Conversion/Comments \_\_\_\_\_

a) Top of bottom floor (including basement, crawlspace, or enclosure floor)	<u>197.75</u>	Check the measurement unit used for this elevation: <input checked="" type="checkbox"/> feet <input type="checkbox"/> meters (Puerto Rico only)
b) Top of the next higher floor	<u>205.00</u>	<input checked="" type="checkbox"/> feet <input type="checkbox"/> meters (Puerto Rico only)
c) Bottom of the lowest horizontal structural member (V Zones only)	_____	<input type="checkbox"/> feet <input type="checkbox"/> meters (Puerto Rico only)
d) Attached garage (top of slab)	_____	<input type="checkbox"/> feet <input type="checkbox"/> meters (Puerto Rico only)
e) Lowest elevation of machinery or equipment servicing the building (Describe type of equipment and location in Comments)	<u>210.00</u>	<input checked="" type="checkbox"/> feet <input type="checkbox"/> meters (Puerto Rico only)
f) Lowest adjacent (finished) grade next to building (LAG)	<u>197.55</u>	<input checked="" type="checkbox"/> feet <input type="checkbox"/> meters (Puerto Rico only)
g) Highest adjacent (finished) grade next to building (HAG)	<u>202.00</u>	<input checked="" type="checkbox"/> feet <input type="checkbox"/> meters (Puerto Rico only)
h) Lowest adjacent grade at lowest elevation of deck or porch (if applicable) or lowest elevation of structural support	_____	<input type="checkbox"/> feet <input type="checkbox"/> meters (Puerto Rico only)

If Item C2(a) is less than Item B9 but Item A8(a-d) is completed correctly, then Item C2(b) is considered the Lowest Floor. If so, then Item C2(b) must be equal or greater than Item B9 to be compliant.

Verify that Item C2(f) is equal or less than Item C2(a). If Item C2(f) is equal or less, then the Bottom Floor is at or above the ground on all sides (no basement). If Item C2(f) is greater, then the Bottom Floor is below the ground on all sides and is considered a basement.

Verify that Item C2(e) is equal or greater than Item B9 in order to be compliant.

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Building Street Address (Include Apt. Unit, Suite, or P.O. Box) \_\_\_\_\_ Policy Number \_\_\_\_\_

For a structure in Zone AO, verify in Item E1(a) that the top of bottom floor is the required number of feet (see text box below) ABOVE the HAG. If Item E1(a) is not ABOVE HAG, verify that Item A8 (a-d) is correctly completed. If it is, then the bottom floor is not considered the Lowest Floor and is not required to be above HAG. If Item A8 (a-d) is not completed or is not compliant then the bottom floor is considered the Lowest Floor and must be the required number of feet (see text box below) ABOVE the HAG to be compliant.

For a structure in Zone A, in Item E1(a) verify that the top of bottom floor is at least 2 feet ABOVE the HAG. If not, the structure will be rated with a higher flood insurance premium.

## SECTION E - BUILDING ELEVATION INFORMATION (SURVEY NOT REQUIRED)

## AO AND ZONE A (WITHOUT BFE)

For Zones AO and A (without BFE), complete Items E1-E5. If the Certificate is intended to satisfy a LOMR-F request, complete Sections A, B, and C. For Items E1-E4, use natural grade, if available. Check the measurement used. In Puerto Rico, use meters.

For LOMR-F request, complete Sections A, B, and C. For Items E1-E4, use natural grade, if available. Check the measurement used. In Puerto Rico, use meters.

- E1. Provide elevation information for the following and check the appropriate boxes to show whether the elevation is above or below the highest adjacent grade (HAG) and the lowest adjacent grade (LAG).
- a) Top of bottom floor (including basement, crawlspace, or enclosure) is 3.2  feet  meters  above or  below the HAG.
  - b) Top of bottom floor (including basement, crawlspace, or enclosure) is 1.1  feet  meters  above or  below the LAG.
- E2. For Building Diagrams 6-9 with permanent flood openings provided in Section A Items 8 and/or 9 (see pages 8-9 of Instructions), the next higher floor (elevation C2.b in the diagrams) of the building is \_\_\_\_\_  feet  meters  above or  below the HAG.
- E3. Attached garage (top of slab) is 3.0  feet  meters  above or  below the HAG.
- E4. Top of platform of machinery and/or equipment servicing the building is 3.2  feet  meters  above or  below the HAG.
- E5. Zone AO only: If no flood depth number is available, is the top of the building elevated in accordance with the community's floodplain management ordinance?  Yes  No  Unknown. The local official's name and title are \_\_\_\_\_ information in Section G.

Check here if attachments

For a structure in Zone AO with flood openings indicated in Item A8 (a-d), verify that Item E2 is ABOVE the HAG by the required number (see text box below). If the next higher floor is BELOW the required number, the structure is not compliant and will result in a higher flood insurance premium.

Verify that Item E1(b) is at or above the LAG to be in compliance. If Item E1(b) is below the LAG, the bottom floor is considered a basement and the Lowest Floor, which is not in compliance and will result in a higher flood insurance premium.

For a structure in Zone A with flood openings indicated in Item A8(a-d), verify that Item E2 is at least 2 feet ABOVE HAG. If the next higher floor is less than 2 feet ABOVE HAG, it will result in a higher flood insurance premium.

Check here if attachments

## SECTION G - COMMUNITY OFFICIAL CERTIFICATION

The local official who is authorized by law or ordinance to administer the code and G of this Elevation Certificate. Complete the applicable item(s) and sign.

- G1.  The information in Section C was taken from other documentation and is authorized by law to certify elevation information. (Indicate the source in the comments area below.)
- G2.  A community official completed Section E for a building located in the community.
- G3.  The following information (Items G4-G9) is provided for community information.

G4. Permit Number \_\_\_\_\_ G5. Date Permit Issued \_\_\_\_\_

- G7. This permit has been issued for:  New Construction  Substantial Improvement
- G8. Elevation of as-built lowest floor (including basement) of the building: \_\_\_\_\_ in \_\_\_\_\_
- G9. BFE or (in Zone AO) depth of flooding at the building site: \_\_\_\_\_  feet  meters (PR) Datum \_\_\_\_\_
- G10. Community's design flood elevation \_\_\_\_\_  feet  meters (PR) Datum \_\_\_\_\_

For a structure in Zone AO, verify that Item E4 is above the required number (see text box below).

For a structure in Zone A, verify that Item E4 is at least 2 feet ABOVE HAG. If not, the structure will be rated with a higher flood insurance premium.

For LOMR-F request, complete Sections A, B, C (or E), and G8 and G9.

For LOMR-F request, complete Sections A, B, C (or E), and G8 and G9. For LOMR-F request, complete Sections A, B, C (or E), and G8 and G9. For LOMR-F request, complete Sections A, B, C (or E), and G8 and G9.

For LOMR-F request, complete Sections A, B, C (or E), and G8 and G9.

### Zone AO Flood Elevation Requirements

The lowest floor of a structure in Zone AO must be located at a certain required number.

The depth number indicated on the FIRM and recorded in Item B9 OR if no depth number is indicated the top of bottom floor must be at least 2 feet ABOVE HAG.

Title \_\_\_\_\_  
Telephone \_\_\_\_\_  
Date \_\_\_\_\_

Check here if attachments