



# V Zone Building Design and Performance Certificate



Hancock County  
Mississippi

For New Construction, Substantial Improvements, and the repair of damage to buildings in  
Coastal Special Flood Hazard Areas (Zone V)

To be completed by a Registered Engineer or Architect

Building Owner \_\_\_\_\_ Flood Insurance Policy # \_\_\_\_\_

Mailing Address \_\_\_\_\_

City \_\_\_\_\_ State \_\_\_\_\_ Zip Code \_\_\_\_\_

Building Location \_\_\_\_\_

Latitude \_\_\_\_\_ Longitude \_\_\_\_\_ County \_\_\_\_\_

Other Legal Description \_\_\_\_\_

Within City Limits? Yes \_\_\_ No \_\_\_

## SECTION I: Flood Insurance Rate Map (FIRM) data

NOTE: This Certificate is NOT a substitute for an Elevation Certificate

Community Name \_\_\_\_\_ Community ID Number \_\_\_\_\_ FIRM Panel Number \_\_\_\_\_

Panel Suffix \_\_\_\_\_ FIRM Zone \_\_\_\_\_ Date of FIRM Panel \_\_\_\_\_ Date of Index \_\_\_\_\_

## SECTION II: Elevation Information

Record elevation to the one tenth (1/10) of a foot

1. Elevation of the bottom of the Lowest Horizontal Structural Member ..... feet
2. Base Flood Elevation (BFE) ..... feet
3. Elevation of Lowest Adjacent Grade (LAG) ..... feet
4. Foundation type: Piling \_\_\_ Post \_\_\_ Pier \_\_\_ Column \_\_\_ Fill \_\_\_ Shear Wall \_\_\_ Enclosed Wall \_\_\_

Foundation Description: \_\_\_\_\_

5. Approximate depth of scour / erosion used for foundation design ..... feet
6. Embedment depth of pilings or foundation below LAG ..... feet
7. Datum used: NGVD 1929 \_\_\_\_\_ NAVD 1988 \_\_\_\_\_ Other \_\_\_\_\_

**SECTION III: V-Zone Certification Statement**

NOTE: This Certificate does NOT substitute for an Elevation Certificate

I certify that I have developed or reviewed the structural design, plans, and specification for construction and that the design and methods of construction to be used are in accordance with accepted standards of practice for meeting the following provisions:

- ◆ The bottom of the lowest horizontal structural member of the lowest floor (excluding piles and columns) is elevated to or above the BFE; and
- ◆ The pile and column foundation and structure attached thereto is anchored to resist flotation, collapse, and lateral movement due to the effects of the wind and water loads acting simultaneously on all building components. Water loading values used are those associated the base flood. Wind loading values are those required by the applicable State or local building code. The potential for scour and erosion at the foundation has been anticipated for conditions associated with the base flood, including wave action.

**SECTION IV: Breakaway Wall Certification Statement**

NOTE: This section must be certified by a registered engineer or architect when breakaway walls exceed a design safe loading resistance of 20 pounds per square foot.

I certify that I have developed or reviewed the structural design, plans, and specifications for construction and that the design and methods of construction to be used for the breakaway walls are in accordance with accepted standards of practice for meeting the following provisions:

- ◆ Breakaway wall collapse shall result from a water load less than that which would occur during the base flood; and
- ◆ **The elevated portion of the building and supporting foundation system shall not be subject to collapse, displacement, or other structural damage due to the effects of wind and water loads acting simultaneously on all building components (wind and water loading values to be used are defined in Section III).**

**SECTION V: Certification**

Signature below certifies \_\_\_\_\_ Section III; \_\_\_\_\_ Section IV

Certifier's Name \_\_\_\_\_ Company Name \_\_\_\_\_

Title \_\_\_\_\_ License Number \_\_\_\_\_

Street Address \_\_\_\_\_

City \_\_\_\_\_ State \_\_\_\_\_ Zip Code \_\_\_\_\_

Signature \_\_\_\_\_ Date \_\_\_\_\_ Telephone Number \_\_\_\_\_

# V-Zone Design and Construction Certification



FEMA



HOME BUILDER'S GUIDE TO COASTAL CONSTRUCTION FEMA 499/August 2005 Technical Fact Sheet No. 5

**Purpose:** To explain the certification requirements for structural design and construction in V zones.

## Structural Design and Methods of Construction Certification

As part of the agreement for making flood insurance available in a community, the National Flood Insurance Program (NFIP) requires the community to adopt a floodplain management ordinance that specifies minimum design and construction requirements. Those requirements include a **certification of the structural design and the methods of construction**.

Specifically, NFIP regulations and local floodplain management ordinances require that:

1. a **registered professional engineer or architect** shall **develop or review** the **structural design, specifications, and plans** for the construction, and
2. a **registered professional engineer or architect** shall **certify that the design and methods of construction** to be used are in accordance with accepted standards of practice for meeting the following criteria:

- the **bottom of the lowest horizontal structural member of the lowest floor** (excluding the pilings or columns) is elevated to or above the Base Flood Elevation (BFE); and
- the pile or column foundation and structure attached thereto is **anchored to resist flotation, collapse, and lateral movement due to the effects of wind and water loads acting simultaneously** on all building components. Water loading values used shall be those associated with the Base Flood. Wind loading values used shall be those required by applicable state or local building standards.

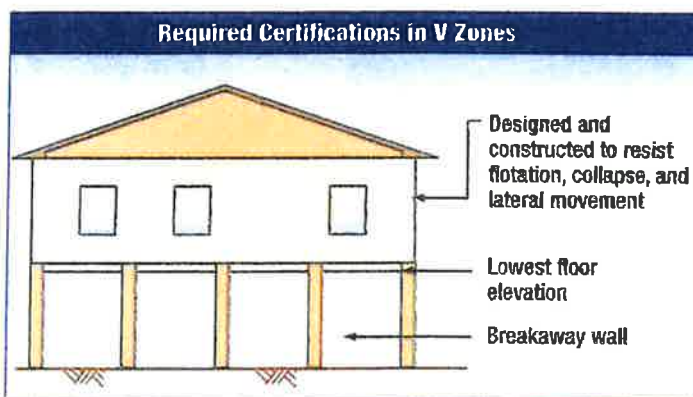
The community, through its inspection procedures, will verify that the building is built in accordance with the certified design.

## Completing the V-Zone Certification

There is no single V-zone certificate used on a nationwide basis. Instead, local communities and/or states have developed their own certification procedures and documents.

Registered engineers and architects involved in V-zone construction projects should **check with the authority having jurisdiction regarding the exact nature and timing of required certifications**.

Page 2 shows a sample certification form developed by one state. It is intended to show one of many possible ways by which a jurisdiction may require that the certification and supporting information be provided. In this instance, three certifications are included on the form (Lowest Floor Elevation, Design and Methods of Construction, Breakaway Wall Collapse).



## Other Certifications Required in V Zones

- Lowest Floor Elevation, by a surveyor, engineer, or architect (see Fact Sheet No. 4)
- Breakaway Wall Collapse, by a registered professional engineer or architect (see Fact Sheet No. 27)

**The Design and Methods of Construction certification should take into consideration the NFIP Free-of-Obstruction requirement for V zones: the space below the lowest floor must be free of obstructions (e.g., free of any building element, equipment, or other fixed objects that can transfer flood loads to the foundation, or that can cause floodwaters or waves to be deflected into the building), or must be constructed with non-supporting breakaway walls, open lattice, or insect screening. (See NFIP Technical Bulletin 5-93 and Fact Sheet No. 27.)**

# Enclosures and Breakaway Walls



FEMA



NAHB  
RESEARCH  
CENTER

HOME BUILDER'S GUIDE TO COASTAL CONSTRUCTION FEMA 499/August 2005 Technical Fact Sheet No. 27

**Purpose:** To discuss requirements and recommendations for enclosures and breakaway walls below the Base Flood Elevation (BFE).

## Key Issues

- Spaces below elevated buildings can be used only for building access, parking, and storage.
- Areas enclosed by solid walls below the BFE ("enclosures") are subject to strict regulation under the National Flood Insurance Program (NFIP). Note that some local jurisdictions enforce stricter regulations for enclosures.
- Non-breakaway enclosures are prohibited in V-zone buildings. Breakaway enclosures in V zones must meet specific requirements and must be certified by a registered design professional.
- Enclosures (breakaway and non-breakaway) in A-zone buildings must be built with flood-resistant materials and equipped with flood openings that allow water levels inside and outside to equalize (see Fact Sheet No. 15).
- For V zones, enclosures below the elevated building will result in higher flood insurance premiums.
- Breakaway enclosure walls should be considered expendable, and the building owner will incur substantial costs when the walls are replaced.

## Space Below the BFE – What Can it Be Used For?

NFIP regulations state that the area below an elevated building can be used only for **building access, parking, and storage**. These areas must not be finished or used for recreational or habitable purposes. No mechanical, electrical, or plumbing equipment is to be installed below the BFE.

## What Is an Enclosure?

An "**enclosure**" is formed when any space below the BFE is enclosed on all sides by walls or partitions. A V-zone building elevated on an open foundation (see Fact Sheet No. 11), without an enclosure or other obstructions below the BFE, is said to be free-of-obstructions, and enjoys favorable flood insurance premiums (a building is still classified free-of-obstructions if insect screening or open wood lattice is used to surround space below the BFE). See FEMA Technical Bulletin 5-93, *Free of Obstruction Requirements* for more information.



## WARNING

Home builders and homeowners should consider the long-term effects of the construction of enclosures below elevated residential buildings and post-construction conversion of enclosed space to habitable use in A zones and V zones. Designers and owners should realize that (1) enclosures and items within them are likely to be destroyed even during minor flood events, (2) enclosures, and most items within them, are not covered by flood insurance and can result in significant costs to the building owner, and (3) even the presence of properly constructed enclosures will increase flood insurance premiums for the entire building (the premium rate will increase as the enclosed area increases). Including enclosures in a building design can have significant cost implications.

This *Home Builder's Guide to Coastal Construction* recommends the use of insect screening or open wood lattice instead of solid enclosures beneath elevated residential buildings.



**Breakaway walls that failed under the flood forces of Hurricane Ivan.**

Enclosures can be divided into two types. *breakaway* and *non-breakaway*.

- **Breakaway** enclosures are designed to fail under Base Flood conditions without jeopardizing the elevated building – **any below-BFE enclosure in a V zone must be breakaway**. Breakaway enclosures are permitted in A zones but must be equipped with flood openings.
- **Non-breakaway** enclosures, under the NFIP can be used in an A zone (they may or may not provide structural support to the elevated building), but they must be equipped with flood openings to allow the automatic entry and exit of floodwaters. **The Home Builder's Guide to Coastal Construction recommends their use only in A zone areas subject to shallow, slow-moving floodwaters without breaking waves.**



Open wood lattice installed beneath an elevated house in a V zone.

### Breakaway Walls

Breakaway walls must be designed to break free under the larger of the design wind load, the design seismic load, or 10 psf, acting perpendicular to the plane of the wall. If the loading at which the breakaway wall is intended to collapse exceeds 20 psf, **the breakaway wall design must be certified**. When certification is required, a registered engineer or architect must certify that the walls will collapse under a water load associated with the Base Flood and that the elevated portion of the building and its foundation will not be subject to collapse, displacement, or lateral movement under simultaneous wind and water loads. (See the sample certification at the bottom of page 2 of Fact Sheet No. 5.) **Utilities should not be attached to or pass through breakaway walls.**

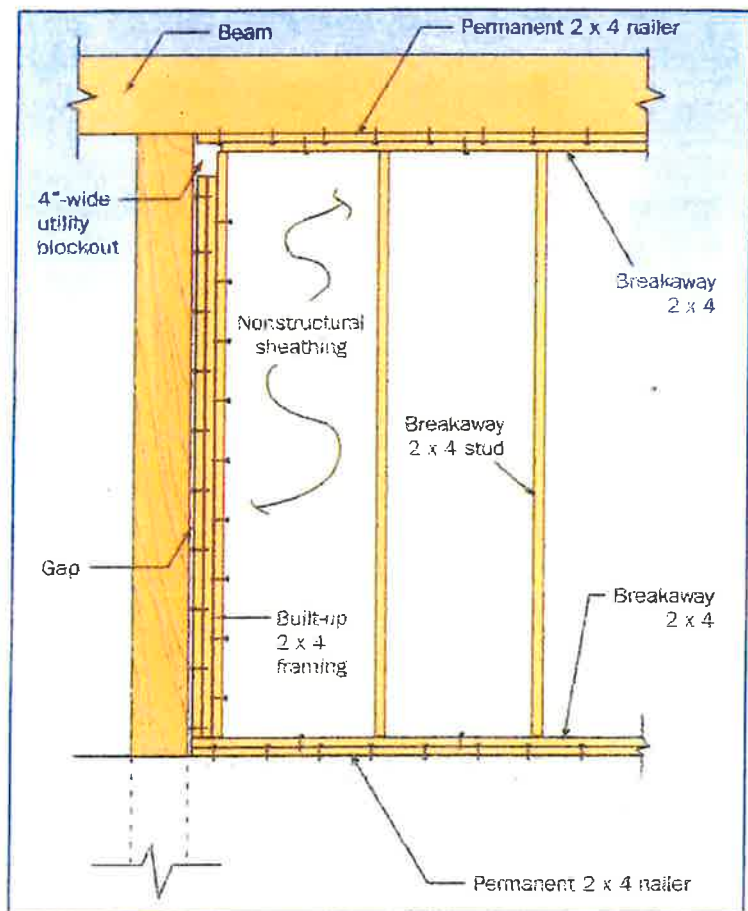
### Flood Openings

Where permitted and used in A zones, foundation walls and enclosures must be equipped with openings that allow the **automatic entry and exit of floodwaters**.

Note the following:

- Flood openings must be provided **in at least two of the walls** forming the enclosure.
- **The bottom of each flood opening** must be **no more than 1 foot above the adjacent grade** outside the wall.
- **Louvers, screens, or covers** may be installed over flood openings as long as they do not interfere with the operation of the openings during a flood.
- Flood openings may be **sized** according to either a prescriptive method (1 square inch of flood opening per square foot of enclosed area) or an engineering method (which must be certified by a registered engineer or architect).

Details concerning flood openings can be found in FEMA Technical Bulletin 4-93, *Openings in Foundation Walls*.



Recommended breakaway wall construction.

## Other Considerations

Enclosures are strictly regulated because, if not constructed properly, they **can transfer flood forces to the main structure** (possibly leading to structural collapse). There are other considerations, as well:

- Owners may be tempted to convert enclosed areas below the BFE into habitable space, leading to life-safety concerns and uninsured losses. Construction without enclosures should be encouraged. Contractors **should not stub out utilities in enclosures**; utility stub-outs make it easier for owners to finish and occupy the space.
- Siding used on non-breakaway portions of a building should not be extended over breakaway walls. Instead, a clean separation should be provided so that any siding installed on breakaway walls is structurally independent of siding elsewhere on the building. Without such a separation, the failure of breakaway walls can result in damage to siding elsewhere on the building.
- Breakaway enclosures in V zones will result in **substantially higher flood insurance premiums** (especially where the enclosed area is 300 square feet or greater). Insect screening or lattice is recommended instead.
- If enclosures are constructed in **A zones with the potential for breaking waves, open foundations with breakaway enclosures are recommended** in lieu of foundation walls or crawlspaces. If breakaway walls are used, they must be equipped with flood openings that allow flood waters to enter the enclosure during smaller storms. Breakaway enclosures in A zones will **not** lead to higher flood insurance premiums.
- Garage doors installed in below-BFE enclosures of V-zone buildings — even reinforced and high-wind-resistant doors — must meet the performance requirement discussed in the **Breakaway Walls** section on page 2 of this fact sheet. Specifically, the doors must be designed to break free under the larger of the design wind load, the design seismic load, or 10 psf, acting perpendicular to the plane of the door. If the loading at which the door is intended to collapse is greater than 20 psf, **the door must be designed and certified to collapse under Base Flood conditions**. See the **Breakaway Walls** section of this fact sheet for information about certification requirements.



**Siding on the non-breakaway portions of this elevated building was extended over breakaway enclosure walls and was damaged when breakaway walls failed under flood forces.**