

Repairs, Remodeling, Additions, and Retrofitting



FEMA



HOME BUILDER'S GUIDE TO COASTAL CONSTRUCTION FEMA 499/August 2005 Technical Fact Sheet No. 30

Purpose: To outline National Flood Insurance Program (NFIP) requirements for repairs, remodeling, and additions, and opportunities for retrofitting in coastal flood hazard areas (some communities may have more restrictive requirements). To provide recommendations for exceeding those minimum requirements.

Key Issues

- Existing **pre-FIRM* buildings that sustain substantial damage or that are substantially improved will be treated as new construction**, and must meet the NFIP's flood-resistant construction requirements (e.g., lowest floor elevation, foundation, and enclosure requirements). (See box on next page for definitions of substantial damage and substantial improvement.)
- Work on pre-FIRM* **buildings that are not substantially damaged or substantially improved** is not subject to NFIP flood-resistant construction requirements.**
- Work on post-FIRM* **buildings that are not substantially damaged or substantially improved** must meet at least the NFIP's flood-resistant construction requirements that were in effect when the building was originally constructed.**
- Your Authority Having Jurisdiction (AHJ) will determine whether the building is substantially damaged or substantially improved when you apply for permits.
- With a couple of minor **exceptions** (e.g., code violations and historic buildings), **substantial damage** and **substantial improvement** requirements **apply to all buildings in the flood hazard area**, whether or not a flood insurance policy is in force.
- Buildings damaged by a flood and covered by flood insurance may be eligible for additional payments through the **Increased Cost of Compliance (ICC)** policy provisions. Check with an insurance agent and the AHJ for details.
- Repairs and remodeling – either before or after storm damage – provide many **opportunities for retrofitting** homes and making them more resistant to storm damage (see Figure 1).
 - * Existing pre-FIRM (Flood Insurance Rate Map) buildings are buildings constructed before the jurisdiction's first adoption of a floodplain management ordinance. Post-FIRM buildings are buildings constructed after the jurisdiction adopted these regulations.
 - ** See Fact Sheet No. 2 for recommended requirements for exceeding the NFIP regulatory requirements in V zones and in A zones in coastal areas.

Note: Repairs, remodeling, additions, and retrofitting may also be subject to other community and code requirements, some of which may be more restrictive than the NFIP requirements. Check with the AHJ before undertaking any work.



Figure 1 Storm-damaged homes need repairs, but also provide opportunities for renovation, additions, and retrofitting. Review substantial damage and substantial improvement regulations before undertaking any work.

Factors That Determine Whether and How Existing Buildings Must Comply With NFIP Requirements

Rules governing the applicability of NFIP new construction requirements to existing buildings are confusing to many people – this fact sheet and **Fact Sheet No. 2** provide guidance on the subject.

When repairs, remodeling, additions, or improvements to an existing building are undertaken, four basic factors determine whether and how the existing building must comply with NFIP requirements for new construction:

- **value of damage/work** – whether the value of the building damage and/or work triggers substantial damage or substantial improvement regulations (see box below)
- **nature of work** – whether the work involves remodeling of a building; expansion of a building, either laterally or vertically (an addition); reconstruction of a destroyed, damaged, or purposely demolished building; or relocation of an existing building
- **pre-FIRM or post-FIRM building** – different requirements may apply to pre-FIRM buildings
- **flood hazard zone** – different requirements may apply in V zones and A zones

A Zones Subject to Breaking Waves and Erosion.

Home Builder's Guide to Coastal Construction (HGCC) Recommendations: Treat buildings and lateral additions in A zones subject to breaking waves and erosion like V-zone buildings. Elevate these lateral additions (except garages) such that the bottom of the lowest horizontal structural member is at or above the BFE. For garages (in A zones subject to breaking waves and erosion) below the BFE, construct with breakaway walls.

Two other factors occasionally come into play (consult the AHJ regarding whether and how these factors apply):

- **code violations** – NFIP regulations allow communities to exclude from substantial damage and substantial improvement calculations the cost of certain work to correct existing violations of state or local health, sanitary, or safety code requirements that have been cited by a code official.
- **historic structures** – a building that is on the National Register of Historic Places or that has been designated as historic by federally certified state or local historic preservation offices (or that is eligible for such designation) may be exempt from certain substantial damage and substantial improvement requirements, provided any work on the building does not cause the building to lose its historic designation.

Substantial Damage and Substantial Improvement

It is not uncommon for existing coastal buildings to be modified or expanded over time, often in conjunction with the repair of storm damage. *All repairs, remodeling, improvements, additions, and retrofitting to buildings in flood hazard areas must be carried out in conformance with floodplain management regulations adopted by the community pertaining to **substantial damage** and **substantial improvement**.*

What Is Substantial Damage?

Substantial damage is damage, **of any origin**, where the cost to restore the building to its pre-damage condition equals or exceeds **50 percent of the building's market value before the damage occurred**.

What Is Substantial Improvement?

Substantial improvement is any reconstruction, rehabilitation, addition, or improvement of a building, the cost of which equals or exceeds **50 percent of the building's pre-improvement market value**.

When repairs and improvements are made at the same time, all costs are totaled and compared with the 50-percent-of-market-value threshold.

Note that some jurisdictions have enacted more restrictive requirements – some use a less-than-50-percent damage/improvement threshold. Some track the cumulative value of damage and improvements over time. Consult the AHJ for local requirements.

What Costs Are Included in Substantial Damage and Substantial Improvement Determinations?

- all **structural items and major building components** (e.g., foundations; beams; trusses; sheathing; walls and partitions; floors; ceilings; roof covering; windows and doors; brick, stucco, and siding; attached decks and porches)

- **interior finish elements** (e.g., tile, linoleum, stone, carpet; plumbing fixtures; drywall and wall finishes; built-in cabinets, bookcases and furniture; hardware)
- **utility and service equipment** (e.g., HVAC equipment; plumbing and wiring; light fixtures and ceiling fans; security systems; built-in appliances; water filtration and conditioning systems)
- market value of **all labor and materials** for repairs, demolition, and improvements, including management, supervision, overhead, and profit (do not discount volunteer or self labor or donated/discounted materials)

What Costs Are Not Included in Substantial Damage and Substantial Improvement Determinations?

- **design costs**, including plans and specifications, surveys, and permits
- **clean-up**, debris removal, transportation, and landfill costs
- **contents** (e.g., furniture, rugs, appliances not built in)
- **outside improvements** (e.g., landscaping, irrigation systems, sidewalks and patios, fences, lighting, swimming pools and hot tubs, sheds, gazebos, detached garages)

Below are some examples of remodeling, additions, or repairs to buildings described in Fact Sheet No. 2 that illustrate the NFIP substantial damage and substantial improvement requirements. Check with the AHJ before undertaking any work even if the building is not substantially damaged or being substantially improved. The AHJ may have adopted more restrictive requirements than the NFIP requirements.

Substantial Improvement and Substantial Damage Examples

Example 1. Renovation/Remodeling

This example addresses the renovation/remodeling of an existing building that does not affect the external dimensions of the building.

If the cost of remodeling a building is equal to or greater than 50 percent of the market value of the building, the work constitutes a substantial improvement and the existing building must meet current NFIP requirements for new construction (see Figure 2).

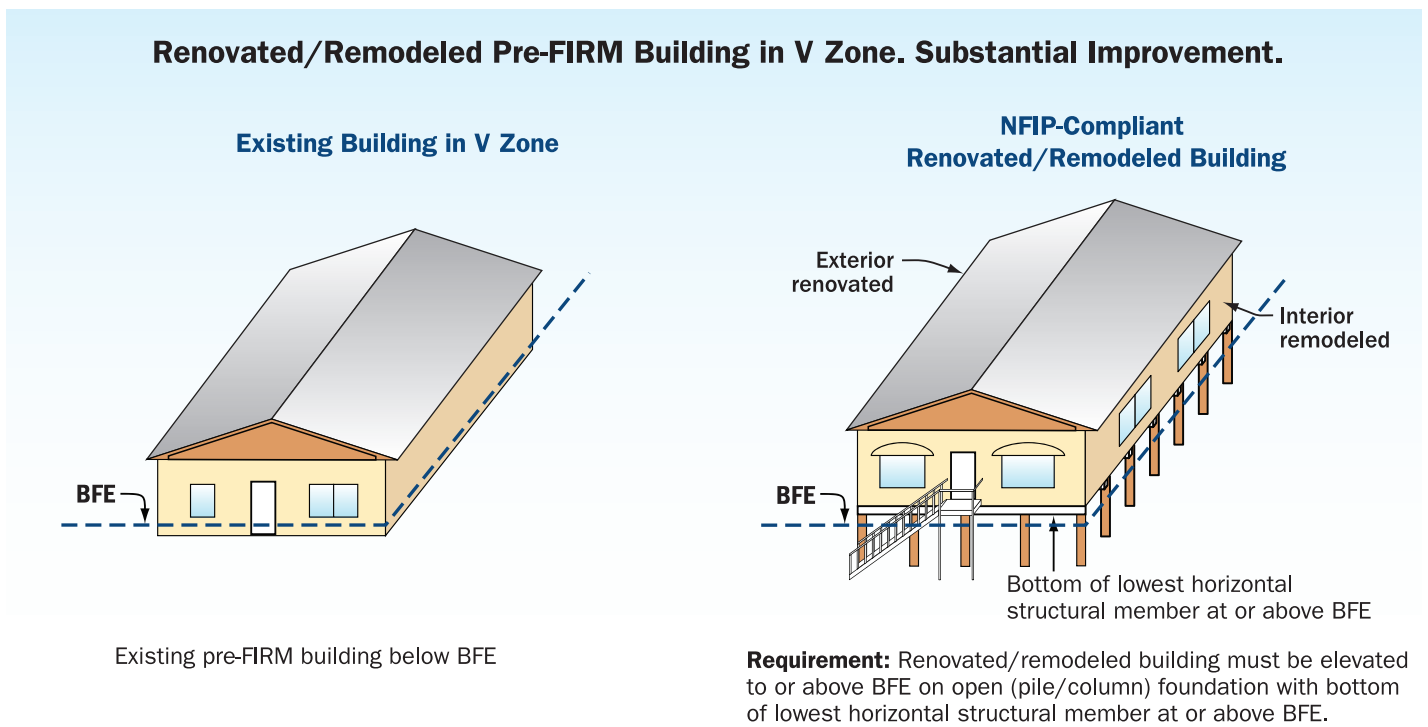


Figure 2 Substantial improvement: Renovated/remodeled building in a V zone.

Example 2. Lateral Addition

- If a **lateral addition** constitutes a **substantial improvement to a V-zone building**, **both the addition and the existing building must comply** with the current floor elevation, foundation, and other flood requirements for new V-zone construction (see Figure 3).
- If a **lateral addition** constitutes a **substantial improvement to an A-zone building**, **only the addition must comply** with the current floor elevation, foundation, and other flood requirements for new construction, as long as the alterations to the existing building are the minimum necessary.* Minimum alterations necessary means the existing building is not altered, except for cutting an entrance through the existing building wall into the addition, and except for the minimum alterations necessary to tie the addition to the building. If more extensive alterations are made to the existing building, it too must be brought into compliance with the requirements for new construction.
- * However, **the Home Builders Guide to Coastal Construction (HGCC) recommends that both the existing building and the addition be elevated to the current BFE, in a manner consistent with current NFIP requirements, and using a V-zone-type foundation in A zones subject to breaking waves or erosion.**
- If a **lateral addition does not constitute a substantial improvement**, see **Fact Sheet No. 2 for HGCC recommendations.**

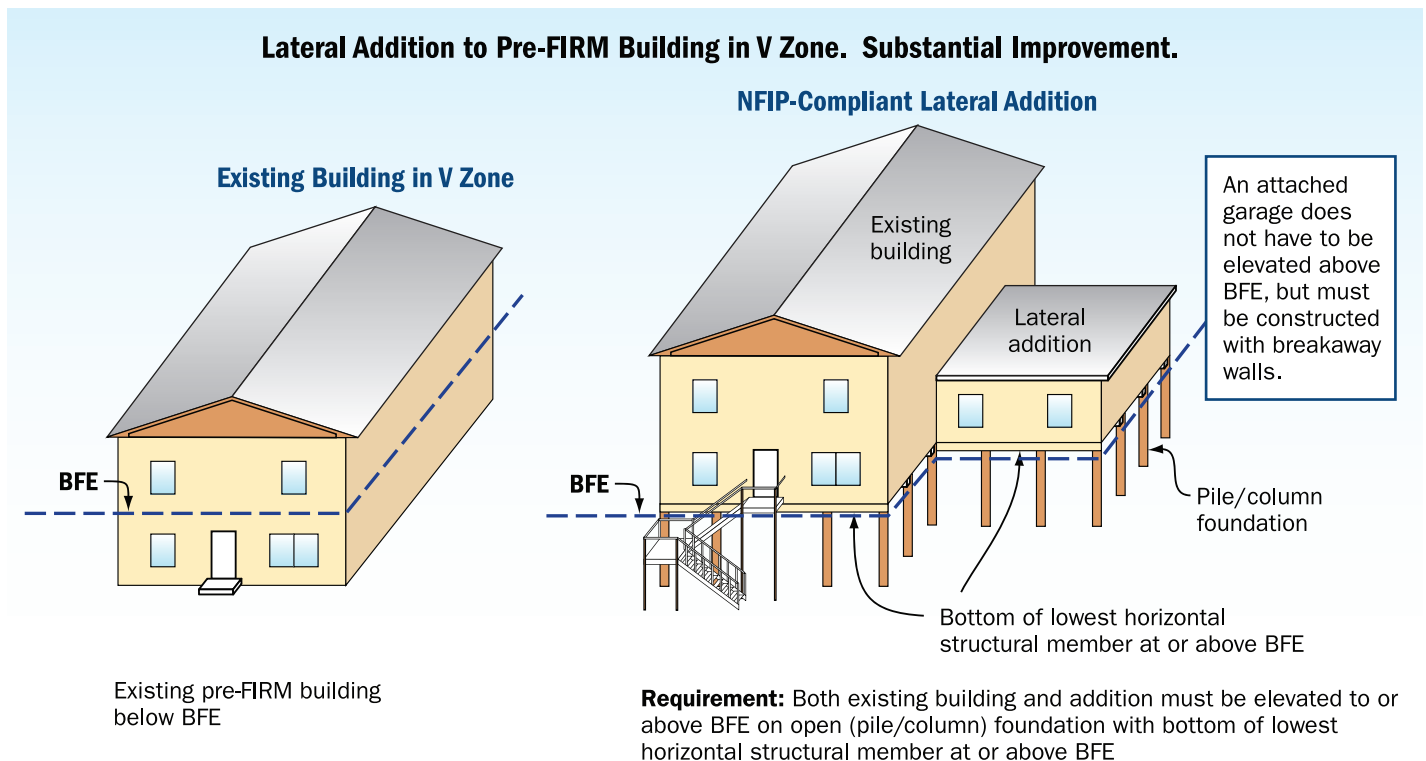


Figure 3 Substantial improvement: Lateral addition to a pre-FIRM building in a V zone.

Example 3. Vertical Addition

- If a **vertical addition to a V-zone or A-zone building** constitutes a **substantial improvement**, **both the addition and the existing building must comply** with the current floor elevation, foundation, and other flood requirements for new construction (see Figures 4 and 5).
- If a **vertical addition does not constitute a substantial improvement**, see **Fact Sheet No. 2 for HGCC recommendations.**

Note: For requirements concerning enclosures below elevated buildings, see Fact Sheet No. 27.

Example 4. Reconstruction of a Destroyed or Razed Building

In all cases (*pre-FIRM* or *post-FIRM*, *V zone* or *A zone*) where an **entire building is destroyed, damaged, or purposefully demolished or razed**, the replacement building is considered “new construction” and **the replacement building must meet the current NFIP requirements**, even if it is built on the foundation of the original building.

Example 5. Moving an Existing Building

When an existing building is **moved to a new location or site in a V zone or A zone**, the work is considered “new construction” and **the relocated building must comply with current NFIP requirements**.



Figure 4 Vertical addition to a home damaged by Hurricane Fran. Pre-existing 1-story home became the second story of a home elevated to meet new foundation and floor elevation requirements.

Vertical Additions to Pre- and Post-FIRM Buildings in V Zone. Substantial Improvement.

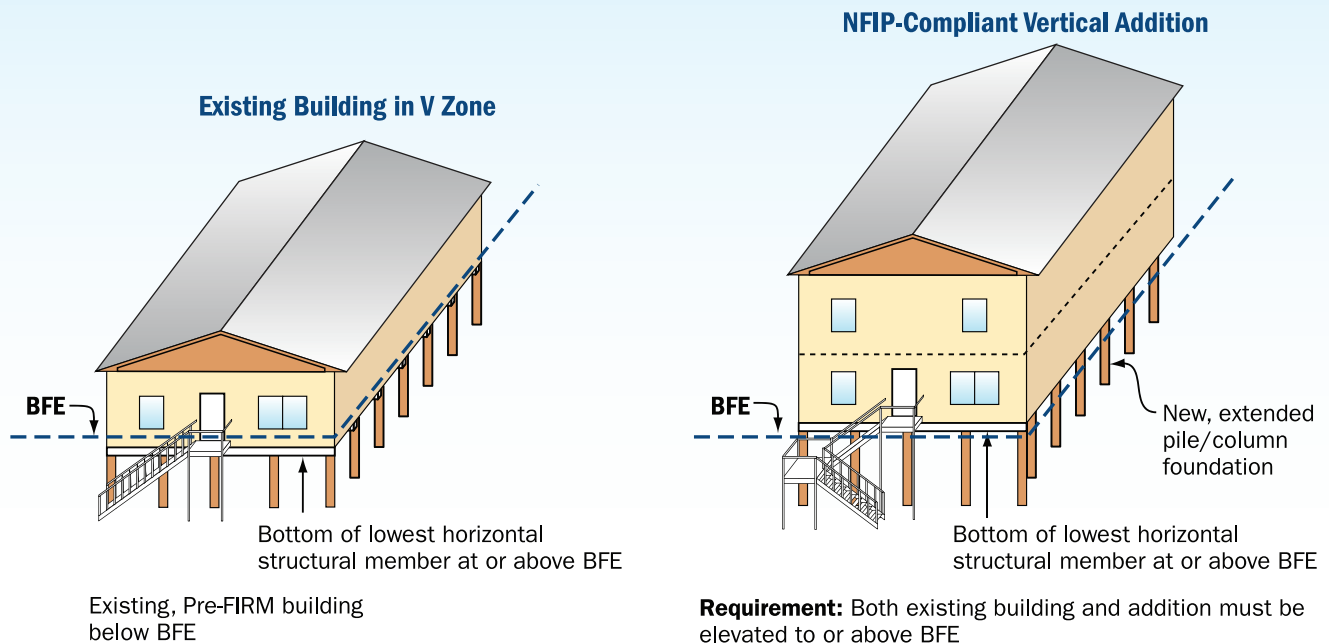


Figure 5 Substantial improvement: Vertical addition to a pre-FIRM building in a V zone.

Insurance Implications

Designers and owners should know that the work described above may have insurance consequences.

In general, most changes to an existing building that result from less-than-substantial damage, or that do not constitute substantial improvement, will not change the status from pre-FIRM to post-FIRM and thus would not affect the insurance rate. However, failure to comply with the substantial damage or substantial improvement requirements of the NFIP will result in a building's status being changed and may result in higher flood insurance premiums.

Retrofit Opportunities

Retrofit opportunities will present themselves every time repair or maintenance work is undertaken for a major element of the building. Improvements to the building that are made to increase resistance to the effects of natural hazards should focus on those items that will potentially return the largest benefit to the building owner. For example:

- When the **roof covering** is replaced, the attachment of the sheathing to the trusses or rafters can be checked, and hurricane/seismic connectors can be installed at the rafter-to-wall or truss-to-wall connections. When reroofing, tear-off is recommended in lieu of re-covering.
- **Gable ends** can be braced in conjunction with other retrofits, or by themselves.
- If **siding** or **roof sheathing** has to be replaced, hurricane/seismic connectors can be installed at the rafter-to-wall or truss-to-wall connections, the exterior wall sheathing attachment can be checked, and structural sheathing can be added to shearwalls. Adding wall-to-foundation ties may also be possible.
- Exterior **siding** attachment can be improved with more fasteners at the time the exterior is re-coated.
- **Window, door, and skylight** reinforcement and attachment can be improved whenever they are accessible.
- When **windows** and **doors** are replaced, glazing and framing can be used that is impact-resistant and provides greater UV protection.
- Hurricane **shutters** can be added at any time (see Fact Sheet No. 26).
- **Floor-framing-to-beam connections** can be improved whenever they are accessible.
- **Beam-to-pile connections** can be improved whenever they are accessible.
- At any time, deficient **light-gauge metal connectors** that are accessible should be replaced with stainless steel connectors, where available. **Heavier-gauge metal connectors** can be replaced with either stainless steel connectors or metal connectors with heavier galvanizing.
- When **HVAC equipment** is replaced, the replacement equipment should be more durable — so that it will last longer in a coastal environment — and should be elevated to or above the BFE and adequately anchored to resist wind and seismic loads.
- **Utility attachment** can be improved when the outside equipment is replaced or relocated.
- In the **attic space**, at any time, **straps** should be added to rafters across the ridge beam, straps should be added from rafters to top wall plates, and gable wall framing should be **braced**. In addition, the uplift resistance of the roof sheathing can be increased through the application of Engineered Wood Association AFG-01-rated structural **adhesive** at the joints between the roof sheathing and roof rafters or trusses. The adhesive should be applied in a continuous bead and extended to the edges of the roof (where some of the highest uplift pressures occur). At the last rafter or truss at gable ends, where only one side of the joint is accessible, wood strips made of quarter-round molding may be embedded in the adhesive to increase the strength of the joint. For more information about the use of adhesive, see **Additional Resources**, below.
- At any time, reinforcement or replacement of **garage doors** with new wind- and debris-resistant doors can be considered. However, the ability of the adjacent walls and building to accommodate the increased wind loads and flood loads (transferred from the garage door to the building) should first be determined. If the existing building cannot accommodate the increased loads transferred from the new/reinforced garage door, the structure will first require reinforcement. This may or may not be feasible. Also, in a V zone, the new/reinforced garage door must be designed and certified to break away during the Base Flood (see Fact Sheet No. 27).
- To minimize the effects of corrosion, **metal light fixtures** can be replaced at any time with fixtures that have either wood or vinyl exteriors. However, wood may require frequent treatment or painting.
- To minimize the effects of corrosion, carbon steel **handrails** can be replaced at any time with vinyl-coated, plastic, stainless steel, or wood handrails. However, wood may require frequent treatment or painting.

Additional Resources

Clemson University Department of Civil Engineering and South Carolina Sea Grant Extension Program. *Not Ready to Re-Roof? Use Structural Adhesives to Strengthen the Attachment of Roof Sheathing and Holding on to Your Roof – A guide to retrofitting your roof sheathing using adhesives.* (http://www.haznet.org/haz_outreach/outreach_factsheets.htm)

FEMA. 1991. *Answers to Questions about Substantially Damaged Buildings.* FEMA 213. (<http://www.fema.gov/hazards/floods/lib213.shtm>)

FEMA. 2000. *Coastal Construction Manual*, Chapter 14. FEMA-55. (<http://www.fema.gov/hazards/floods/lib55.shtm>)