UNIT 9

Administrative Issues Relating to NFIP Requirements

Sometimes the wisdom of Solomon is called for in carrying out my job.

An Old Lament

Overview

This unit covers how to address a number of administrative problems, including regulating development where flood elevation data are not provided, permitting accessory structures, enclosures below the base flood elevation, basements, elevation certificates, and inspections. It also covers some administrative issues that frequently arise such as regulating substantial improvements to existing structures resulting from flood-related damage and/or modifications, and flood map change issues involving restudies and map maintenance, amendments, and revisions of such maps.

Content

A. Introduction 4

B. Addressing Administrative Problems 5

Commonly Asked Questions 5
Regulating Development in Unnumbered A Zones 8
Permitting Accessory Structures 10
Enclosures below Base Flood Elevation 11
Basements 12
Elevation Certificates 13
Determining the Lowest Floor from Building Diagrams 14
Inspection of Floodplain Development 14
Learning Check #1 16

C. Substantial Damage and Improvement Regulations 18

Substantially Damaged or Improved Property 18
Calculating Market Value 19
Calculating Costs of Improvement 20
Ways to Substantially Improve Structures 23
Rehabilitation of an Existing Structure 23
Construction of Additions 23
Reconstruction of a Destroyed or Razed Structure 27
Repair to Substantially Improved Structure 27
Substantial Improvement Requirements 30
Pre-FIRM Structures 30
Post-FIRM Structures 31
Historic Structures 31

Code Violation Exemptions 33
Increased Cost of Compliance Coverage 34
Summary 35
Learning Check # 2 36

D. Flood Insurance Map Changes 38
Requesting Map Changes 40
Effect of Map Revisions on Flood Insurance Rates 41
Learning Check #3 43

Answers to Learning Checks 44

References

Federal Emergency Management Agency

1996 *Amendments and Revisions to National Flood Insurance Program Maps: Application/Certification Forms and Instructions for Letters of Map Amendment, Conditional Letters of Map Amendment, Letters of Map Revision (Based on Fill), and Conditional Letters of Map Revision (Based on Fill).* MT-1, FEMA FORM 81-87 Series.

1996 *Wet Floodproofing Requirements for Structures Located in Special Flood Hazard Areas in accordance with the National Flood Insurance Program.* Technical Bulletin 7-93, FIA-TB-7.

1995 *Managing Floodplain Development in Approximate Zone A Areas: A Guide for Obtaining and Developing Base (100-Year) Flood Elevations.* Includes the computer program *QUICK-2: Computation of Water Surface Elevations in Open Channels*, Version 1.0. FEMA 265.

1993 *Openings in Foundation Walls for Buildings Located in Special Flood Hazard Areas in Accordance with the National Flood Insurance Program.* Technical Bulletin 1-93, FIA-TB-1.

1993 *Flood-Resistant Materials Requirements for Buildings Located in Special Flood Hazard Areas in Accordance with the National Flood Insurance Program.* Technical Bulletin 2-93, FIA-TB-2.

1993 *Non-Residential Floodproofing—Requirements and Certification for Buildings Located in Special Flood Hazard Areas in accordance with the National Flood Insurance Program.* Technical Bulletin 3-93, FIA-TB-3.

1993 *Free-of-Obstruction Requirements for Buildings Located in Coastal High Hazard Areas in Accordance with the National Flood Insurance Program.* Technical Bulletin 5-93, FIA-TB-5.

1991 *Answers to Questions about Substantially Damaged Buildings*. Federal Insurance Administration, National Flood Insurance Program Community Assistance Series, FEMA 213.

A. Introduction

In addition to understanding the administrative procedures of local land use regulations, administrators have to deal with the special provisions that apply to construction or reconstruction in identified floodplains within the community. Most administrators may not review floodplain permit applications with sufficient regularity to acquire the knowledge and skills to ensure that permitted development takes place consistent with the purposes of the ordinance. Everyone needs help from time to time to deal with the variety of situations that arise. This is the second of three consecutive units in this document developed to assist those responsible for administering the local floodplain management ordinance to carry out their responsibilities.

This unit first addresses administrative issues relating to the floodplain management criteria of the National Flood Insurance Program through a consideration of:

- Commonly asked questions from meetings and training sessions for local officials
- Regulating development in unnumbered A Zones (one of the more perplexing problems facing local administrators)
- Permitting accessory structures
- Enclosures below the base flood elevation
- Use of elevation certificates, and
- Inspection of floodplain development

Second, this unit addresses community responsibilities for permitting substantial improvements and the repair and reconstruction of “substantially damaged” buildings

Finally, the database for floodplain management is dynamic, resulting from new information, studies, development, and other changes in the floodplain that affect the present data. The end of the unit discusses why flood maps may need to be changed from time to time, the basis for valid changes, how to request changes, and the processes.

B. Addressing Administrative Problems

What are the common issues and concerns that local administrators face? The following is a list of twelve commonly asked questions.

Commonly Asked Questions

1. *What techniques can the local Administrator use to estimate the BFE in unnumbered A Zones (approximate Zone A study areas).* A summary discussion is provided later in this unit and in more detail in Appendix F. The Federal Emergency Management Agency has also developed a report that provides guidance on this matter, *Managing Floodplain Development in Approximate Zone A Areas: A Guide for Obtaining and Developing Base (100-year) Flood Elevations* (FEMA-265, 1995).

2. *Can offsetting measures be carried out to negate the impact of further development in the community-adopted floodway?* NFIP community participation standards set forth a procedure for allowing an increase in the BFE under certain circumstances. It is summarized in Part C of Unit 6. The key criteria is that the increase would affect no *existing* structures. An alternative would be for the developer to buy the structures. Also it is common for the developer to purchase a "floodway easement" on that portion of the properties that are affected by a rise in BFE.

3. *Who makes determination of substantial improvement or substantial damage?* The local floodplain management administrator or designee. FEMA has developed a substantial damage estimator computer program which is currently being field tested. For further information on this program, contact the North Carolina Division of Emergency Management or the FEMA regional office.

4. *How is market value determined for the substantial damage policy?* Sound guidance may be found in *Answers to Questions about Substantially Damaged Buildings* (FEMA-213, 1991). According to this document (question 21) acceptable estimates of market value can be obtained from the following sources:

   - Independent appraisals by a professional appraiser
   - Detailed estimates of the structure's Actual Cash Value

- Property appraisals used to tax assessment purposes
- The value of buildings taken from NFIP claims data
- "Qualified estimates" based on sound professional judgment made by staff of the local building department or local or state tax assessor's office

There are limitations to the use of some of these methods for estimating market value.

5. *What should be done when ground surveys show that the development site is above the BFE?* Record the data and issue the permit. Then, if the developer or owner wants the property removed from the Special Flood Hazard Area designation, they can request a Letter of Map Amendment. It is their responsibility to apply for a map amendment, not the community's. The procedure is discussed in Part D of this unit.

6. *Conversely, what should be done if site surveys show that areas considered outside the 100-year floodplain on published maps are in fact below the BFE?* These areas are actually subject to the community's floodplain management ordinance. The BFE's published in the Flood Insurance Study set the level for flood protection purposes. The maps are a graphic portrayal of that information. Since FEMA usually does not have detailed topographic mapping to use in preparing the flood maps, the flood boundaries are interpolated, which accounts for numerous inaccuracies. The BFE in relation to the actual ground elevation sets the floodplain limits for regulatory purposes.

7. *What should be done if a developer prepares a detailed flood study to obtain approval for a large-scale development, particularly in an unnumbered A Zone?* It is the community's responsibilities to submit new flood information to FEMA within six months in accordance with § 65.3 of 44CFR. The community can pass that responsibility onto the developer by requiring submittal of a Letter of Map Revision as a condition of development approval.

8. *A number of FEMA forms may be used in local floodplain management. Most have expiration dates. Can these forms be used after those dates?*

   - Letter of Map Amendment (LOMA) and Letter of Map Revision (LOMR)—must use the current MT-1 or MT-2 forms.

- Elevation Certificate—must use form dated May 1990 or later. (A new form will be issued in late 1998, which will supercede all previous versions.)
- Application to join NFIP—use forms of any date.
- Engineering No-Impact Certification—form in Appendix I.
- Floodproofing Certificate—use form 85-31.

Note that a reproducible copy of each of the above forms (except MT-2) can be found in Appendix I.

9. *What are the flood insurance requirements for existing development when a community joins the NFIP, i.e., what triggers a requirement to purchase flood insurance?* It is the responsibility of the lender to determine if and when flood insurance is required for a loan-secured property after a community joins the NFIP or the FIRMs are revised.

10. *Is there a differentiation made, for floodplain management and flood insurance purposes, between BFE increases caused by previous study errors, new methodologies, or restudies, and those caused by community or watershed developments?* No. All revisions to the flood maps are treated the same with regard to community responsibility to use the new information and to use the new BFEs, flood zones, boundaries, etc., for flood insurance rating and flood zone determination. Many increases in BFEs in urban areas are due to watershed changes. If a community has allowed or ignored illegal development in a floodway, FEMA may require the community to perform or pay for the re-analysis. There may also be the issue of requiring retrofitting of structures that were post-FIRM and are now below the BFE as a result of a rise in the BFE due to the new development.

11. What de*velopment requires or does not require a local permit?* Any development as discussed in Section C of Unit 8 and as defined in the North Carolina Model Flood Damage Prevention Ordinances found in Appendix D.

12. *How long should floodplain development permits be kept on file?* Keeping of records is a requirement to participate in the NFIP and there is no “statute of limitations” as to how long they should be kept. Communities should keep an annual log of all floodplain permits (see sample log, Figure 9-1) and keep a copy of the permit, site plan,

elevation certificate, and significant supporting documentation and certifications. It is not necessary to keep the entire building plans longer than is required for local code purposes. However, the community that allows below-BFE enclosures should include the ground floor plan of any buildings built in the floodplain in their permanent files in case of a future violation issue.

Regulating Development in Unnumbered A Zones

Regulating development in unnumbered A Zones is one of the more perplexing problems facing local administrators because their community's floodplain maps may contain a large number of such zones. This is particularly true for county Flood Insurance Studies. The identification of Zone A SFHAs indicates the presence of a flood hazard. The data available to define that hazard is limited. Therefore, the local community must make every effort to make reasonable use of any flood data available in order to achieve a reasonable measure of flood loss reduction. *They have the ultimate responsibility for establishing the base flood elevation for unnumbered A zones on their community's FIRM.*

"Approximate studies" were discussed in Unit 4 and covered earlier in this unit. Further guidance on how to regulate development in unnumbered A Zones is provided below:

1. Try to obtain a base flood elevation (BFE). Detailed studies may have been performed for large developments. Local, state, or other federal agencies may have performed studies or could do so. Estimates might be made using topographic maps and/or historic flood data.

2. Building elevation requirements:

LOG FLOODPLAIN DEVELOPMENT PERMITS

Permit No./Date	Address	Use or Building Type	Base Flood Elevation	Elevation of Lowest Floor	Date Constructed

Figure 9-1

- When a BFE is available or estimated, the lowest floor, as well as mechanical and electrical equipment, must be elevated to or above the estimated BFE.

- When the BFE is not available, the floor level, as well as mechanical and electrical equipment, must be elevated in accordance with whichever one of the following will result in the highest elevated level:

- at or above any observable high-water marks or historical flood heights (FEMA recommends an additional two feet margin of safety)
- two feet above highest adjacent natural grade (FEMA recommends at least three feet, the required two feet plus one foot for added protection)

- Although not required, the lowest floor must be five feet or more above natural grade in order to qualify for the most reasonable flood insurance rates.

3. All other A Zone construction standards apply [44 CFR §60.3(c)].

4. Elevation Certificates are required. *If an estimated BFE is used and referenced to the NGVD, a registered land surveyor must prepare the certificate.* If no estimated BFE is available, the local floodplain management administrator may complete the certificate because the measurement is from ground level, not from NGVD. *Flood insurance rates may be lower when a BFE has been established or estimated in an A Zone and the lowest floor is elevated to or above that estimated BFE.*

5. Detailed flood studies may be required. If any proposed development is larger than 5 acres, or has more than 50 lots, and any portion of the project impacts an unnumbered A-Zone, the developer is required to have a detailed engineering study and topographic survey prepared to establish the BFE and identify its boundary on the project site.

More detailed guidance on how to address regulating development in unnumbered A Zones is found in Appendix F, "Floodplain Management Using Approximate Studies." The appendix includes a portion of a 1995 FEMA publication on this subject.

Permitting Accessory Structures

Accessory structures represent a minimal investment (less than $3,000 if a community adopts the NC Model Ordinance) and are not "habitable." Farm buildings and detached garages of greater cost are also allowed to be treated as "accessory" provided they are not habitable, i.e., barns, haysheds, carports, storage sheds, home greenhouses, gazebos, etc. Confined animal buildings, crop storage bins, farm machine shops, and milking parlors are examples of

farm buildings that cannot be treated as accessory structures and that must be elevated to or above the BFE.

Elevating the floor level of accessory structures to or above the BFE *is not required*. However, the building must be constructed of flood-resistant materials below BFE. Utility systems and equipment must be protected to the BFE (generally by elevating), and subject to use of a ground-fault interrupt (GFI) circuit for any electrical outlets, switches, and service that must be provided below the BFE. Note that if it desired to heat and/or air condition all or a portion of an accessory structure, that portion of the entire structure must have the lowest floor elevated to or above the BFE.

All structures must be anchored to resist flotation and lateral movement and designed to be flood resistant in a manner similar to any other structure. Openings must be provided to equalize hydrostatic pressure.

In some cases in the coastal areas, a setback may be required under CAMA regulations.

If the applicant desires to obtain flood insurance for an accessory building whose floor is below the BFE, it will be rated actuarially. This may result in very expensive insurance premiums. The applicant should be so advised by the local ordinance administrator.

More detailed guidance on how to address accessory structures is found in Appendix E, Excerpts from *Local Administrator's Handbook for Floodplain Management*, NC Division of Emergency Management, and in *Wet Floodproofing Requirements*, FIA-TB-7 (FEMA 1996). Many communities must go through a variance process to approve accessory structures that represent more than a minimal investment threshold.

Enclosures below Base Flood Elevation

Standards for enclosures below the base flood elevation were discussed in Unit 6. A summary of these standards and further elaboration are presented here:

- Uses allowed in such areas are parking, limited storage, and building access.
- Hydrostatic openings must be provided to relieve the pressure of floodwaters on the exterior walls.

- Flood resistant materials must be used below the BFE.
- The number of switches and outlets for electrical service must be the minimum necessary for adequate safety and security. A ground-fault interrupt circuit must be provided.
- No heating, air conditioning, and other utilities should be provided to enclosed areas below BFE.
- Any interior partitioning must be the minimum necessary for safety and security purposes.

More detailed guidance on how to address enclosures below the base flood elevation is found in Appendix E, excerpts *from Local Administrator's Handbook for Floodplain Management*, NC Division of Emergency Management.

Basements

In some communities, the issue of basements may arise on occasion. A basement is defined as any area of a building having its floor below ground level on all sides. An enclosed area below grade on three sides but with a "walkout" directly to ground level is not a basement. Conversely, if one has to *step-up* to walk out of an enclosed area, it is likely a basement. In either instance, local ordinance regulations require that the floor be elevated to or above the BFE.

There are some important distinctions relevant to flood insurance coverage regarding unfinished basements and other enclosed non-habitable areas below the BFE. In either classification these areas are to be used only for parking, incidental storage, and building access. For basements, coverage is provided for damage to foundations, load-bearing walls, heating and air conditioning, and other structural and functional systems, *but not to the contents, finished floors*, etc.

Finally, the top of the basement floor is *always* used as the reference level floor for insurance rating in post-FIRM construction.

Elevation Certificates

NFIP-participating communities must collect and maintain certificates of lowest floor elevations for all new floodplain construction and substantial improvements to existing floodplain structures. The recommended method is to use FEMA's Elevation Certificate or a FEMA-approved community version. The elevation should be measured as soon as the lowest floor is in place, but before further vertical construction continues, thereby providing time to correct any problems that may exist. This data must be provided by a registered land surveyor, except in unnumbered A Zones without an estimated BFE.

Detailed guidance on how to address Elevation Certificates is found in Appendix E, Excerpts from *Local Administrator's Handbook for Floodplain Management*, NC Division of Emergency Management.

Common Elevation Certificate issues identified are:

- Checking the form to ensure that the surveyor has provided the needed information
- Determining the flood zone for the development site
- Determining the base flood elevation for the site
- Estimating BFE's in unnumbered A Zones
- Determining the reference level floor (often confusing to surveyors)
- Provision of both the Community Map Number and the Community Identification Number
- Annexations
- Using current FIRM information
- Determining whether the structure is pre-FIRM vs. post-FIRM development
- Elevating a building above the BFE
- What if the natural grade is above the BFE
- What is the highest adjacent grade
- The Coastal Barrier Resource System (COBRA zones)

- Recommended enhancements to a completed Elevation Certificate

Determining the Lowest Floor from Building Diagrams

Included in the detailed guidance provided in Appendix E is a copy of FEMA's Elevation Certificate and instructions on how to complete the form. *In these instructions are eight diagrams containing descriptions of various types of buildings to determine reference levels for building floors. The reference level floor is that level of the building used for insurance purposes.*

It is worth noting here that if a crawlspace floor is below grade on *all sides*, it is defined as a basement by the NFIP. Thus, the crawl space floor would be the lowest floor elevation of the building and the reference level for flood insurance rating. A structure could be assessed a lower flood insurance premium if the crawlspace were built *above* grade. The resulting high flood insurance rates could be avoided by ensuring that the floor of the crawlspace is at or above natural grade on at least one side of the building.

Determining the lowest floor reference level is an important duty of both the local administrator and those completing the elevation certificates. *Understanding the eight diagrams contained in the Elevation Certificate instructions is very important in the completion of these duties.*

Inspection of Floodplain Development

Inspection of all floodplain development is the responsibility of communities that participate in the NFIP. Scheduled inspections throughout the development process minimize and prevent unnecessary violations. Site inspections ensure that the structure design which was proposed and approved during the permitting process is consistent with actual construction, and give the community an opportunity to intervene if construction is not consistent with the local floodplain management ordinance.

Inspections for compliance with the ordinance can be planned to correspond with the Footing Inspection (Section 308.2), the Foundation Inspection (308.4), and the Certificate of Compliance Inspection (308.8) of the North Carolina State Building Code.

Detailed guidance on how to address inspection of floodplain development is found in Appendix E, "Excerpts from *Local Administrator's Handbook for Floodplain Management*," NC Division of Emergency Management.

Included in this detailed guidance are “Permitted Items Checklist” forms for items below the BFE in both A and V Zones.

Please complete Learning Check # 1 before proceeding.

Learning Check #1

Purpose: To review some of the common floodplain management issues that local administrators face.

Directions: Answer the following questions.

1. A developer proposes to add to an existing factory located in the floodway of Adkin Branch in the City of Kinston. The addition will cause further increases in the Base Flood Elevation. What offsetting measures can the developer employ to negate the impact of the proposed addition?

2. A BFE, referenced to the NGVD, is estimated for a proposed development in an unnumbered "A" Zone along Briery Run. Who prepares the required Elevation Certificate?

3. If no estimated BFE is used, who prepares the Certificate?

4. When the BFE is not available, to what level must the first floor, as well as mechanical and electrical equipment, be elevated?

5. Flood insurance rates are (higher) (lower) when a BFE has been established or estimated in an A Zone.

6. Who ultimately has the responsibility for establishing the BFE for unnumbered A zones on a community's FIRM?

7. How long should floodplain development permits be kept on file?

8. List three general requirements for accessory structures to be located in identified floodplains.

9. Elevating the floor level of accessory structures to the BFE (is) (is not) required.

10. List three standards for enclosures below the Base Flood Elevation.

11. A basement is defined as

12. For basements insurance coverage is *not* provided for

13. When should Elevation Certificates be obtained from the developer or owner of a proposed floodplain development?

14. Why is determining the lowest floor reference level an important duty of both the local administrator and those completing the Elevation Certificate?

15. Inspections for compliance with the floodplain management ordinance can be planned to correspond with what three required inspections under the North Carolina Building Code?

C. Substantial Damage and Improvement Regulations

Previous sections of this course have focused on a program of rules and regulations to prevent or reduce damage from floods. *But what happens when a flood occurs and community residents incur substantial damage to their homes, including manufactured homes? Or, when the owner wishes to make a substantial improvement (such as an addition) to an existing structure?* Substantial damage may also occur from fire, wind, tornado, hail, or a combination of sources. Substantial improvement likewise may be a combination of repair, renovation, or additions. If the cost of improvements or the cost to repair the damages exceeds 50 percent of the market value of the building, it must be retrofitted and brought up to current floodplain management standards. The state NFIP coordinating agency or FEMA regional staff can provide assistance with these issues.

Communities participating in the NFIP have certain responsibilities involving permitting substantial improvements and the repair and reconstruction of "substantially damaged" buildings. Substantially damaged buildings in coastal counties also have to meet CAMA rules. After a flood or other cause of damage, the local administrator must be involved in reviewing permit applications for buildings that have been damaged.

This section addresses the definition of substantial damage and/or improvement, ways to calculate the market value of a building, and ways to calculate the cost of improvement.

Substantially Damaged or Improved Property

SUBSTANTIALLY DAMAGED STRUCTURE

A structure is substantially damaged when damage of any origin is sustained whereby the cost of restoring the structure to its before-damaged condition would equal or exceed 50% of the market value of the structure before the damage occurred.

"Substantial damage" means damage of any origin sustained by a structure whereby the cost of restoring the structure to its before damaged condition would equal or exceed 50 percent of the market value of the structure before the damage occurred. "Substantial improvement" means any reconstruction, rehabilitation, addition, or other improvement of a structure, the cost of which equals or exceeds 50 percent of the market value of the structure before the "start of construction" of the improvement. This term includes structures which have incurred substantial damage, regardless of the actual repair work performed. However, the term *does not include* either (1) Any project for improvement of a structure to correct existing violations of state or local health, sanitary, or safety code specifications that have been identified by the local code enforcement official and are the minimum necessary to assure safe living conditions, or (2) any alteration of a historic

structure, provided that the alteration will not preclude the structure's continued designation as a "historic structure."

For example, this means that, if the value of a building (less the value of the land, other site improvements, and "location value") is $50,000 and a $25,000 or greater improvement is proposed, the "substantial improvement" definition is met and the floodplain regulations for new construction apply to the improvements and/or the addition.

SUBSTANTIAL IMPROVEMENT

$$\frac{\text{COST OF IMPROVEMENT}}{\text{MARKET VALUE}} = \text{50\% OR MORE}$$

Likewise, if the cost necessary to fully repair the structure to its before-damaged condition is equal to or greater than 50% of that structure's market value before damages, then the structure must be elevated (or floodproofed if it is non-residential) to or above the level of the base flood, and meet other applicable local ordinance requirements.

If a structure is deemed substantially damaged under CAMA rules, the owner must apply for a permit to rebuild. That means the structure will be subject to the latest regulations, including the setback requirements.

Under CAMA rules, a structure is substantially damaged when the cost of repairing the building to make it habitable is greater than half of the physical value of the building. The Division of Coastal Management (DCM) does not include items such as cabinets, furniture, carpeting, security systems, and central vacuum units in its calculation.

Following Hurricane Fran, a number of property owners were confused by the difference in the FEMA threshold and the CAMA threshold. DCM and FEMA worked together after that storm to ensure that the "substantial damage computer estimator" (now being field tested) will calculate both.

Calculating Market Value

In common parlance, "market value" is the price that a willing buyer and seller can agree upon. However, market value for property is different than that of the building itself. Market value of developed property varies widely due to the desirability of its location. For example, two houses of similar size, quality, and condition will be priced on the market at widely different values if one is on the coast or in the best school district or closer to town than the other. However, the value of the building materials and labor that went into both houses will be nearly the same. The market value of a structure also reflects its original quality, subsequent improvements, physical age of building components, and current conditions of maintenance.

For the purposes of determining substantial improvement, market value pertains *only* to the structure in question. It *does not* pertain to the land, landscaping, or detached accessory structures on the property.

Acceptable estimates of market value can be obtained from the following sources:

- Independent appraisals by a professional appraiser for the building separate from the land, etc.
- Detailed estimates of the structure's *actual cash value*, i.e., the replacement cost for a building less a depreciation percentage based on age and condition. The actual cash value may be used as a substitute for market value based on the preference of the community.
- Property appraisals used for tax assessment purposes with an adjustment recommended by the tax appraiser to reflect market conditions (adjusted assessed value).
- The value of buildings taken from NFIP claims data (usually actual cash value).
- Qualified estimates based on sound professional judgment made by staff of the local building department or local or state tax assessor's office.

Some market value estimates are often used only as screening tools (i.e., NFIP claims data and property appraisals for tax assessment purposes) to identify those structures where the substantial improvement ratios are obviously less than or greater than 50 percent (i.e., less than 40 percent or greater than 60 percent). For structures that fall between the 40 percent and 60 percent range, more precise market value estimates are sometimes necessary.

Calculating Costs of Improvement

The *cost of improvement* must be calculated. This includes a detailed cost estimate for the addition, remodeling, reconstruction, or for repair of all damages sustained by the home, prepared and signed by a licensed general contractor or developed by the building official. The cost of improvements does not include items not considered a permanent part of the structure, such as plans, surveys, permits, gazebos, pools, and fences. See Figure 9-2 for a list of all items to be included or excluded in the cost of improvements.

COST OF IMPROVEMENT

A computer-based program has been developed to calculate the amount of damage to a structure from an event, in order to address the substantial improvement issue. More information concerning this program and its availability may be obtained from contacting the NFIP state coordinating agency or the FEMA regional office.

Acceptable estimates for the "cost of repair" or damage sustained can be obtained from the following sources:

- Itemized estimates made by licensed contractors or other professional estimators in the construction industry.

  For insured structures, the monetary damage estimated by the claims adjuster (structure only, not contents). Claims estimates of the damages sustained may be used primarily as a screening method to determine if a structure has been substantially damaged, but many communities require submittal of the final insurance adjuster's report.

- Qualified estimates of the amount of damage sustained or cost of repairs can be made by the local building permit department using professional judgment and knowledge of local and regional construction costs. This is usually necessary in the case where an unmanageable number of permits must be processed in a major post-disaster situation.

- Building code valuation tables published by the major building code groups. These tables can be used for determining estimates for particular replacement items if the type of structure in question is listed in the tables.

- Damage assessment field surveys conducted by building inspection departments, emergency management or tax assessment agencies, or other professional state or local officials. Such damage assessments should estimate the total monetary damage sustained to the structure.

The FEMA publication, *Answers to Questions About Substantially Damaged Buildings (*FEMA-213*)*, provides more detailed information. It can be obtained through the state NFIP coordinating agency or FEMA regional office (or publications warehouse at 1-800-480-2520).

SUBSTANTIAL DAMAGE and SUBSTANTIAL IMPROVEMENT

Items to be Included

All structural elements, including:

Spread or continuous foundation footings and pilings
Monolithic or other types of concrete slabs
Bearing walls, tie beams, and trusses
Floors and ceilings
Attached decks and porches
Interior partitions walls

Exterior wall finishes (*e.g.*, brick, stucco, or siding) including painting and decorative moldings
Windows and doors
Reshingling or retiling a roof
Hardware

All interior finishing elements, including:

Tiling, linoleum, stone, or carpet over subflooring
Bathroom tiling and fixtures
Wall finishes (e.g., drywall, painting, stucco, plaster, paneling, marble, or other decorative finishes)
Kitchen, utility, and bathroom cabinets
Built-in bookcases, cabinets, and furniture
Hardware

All utility and service equipment, including:

HVAC equipment
Repair or reconstruction of plumbing and electrical services
Light fixtures and ceiling fans
Security systems
Built-in kitchen appliances
Central vacuum systems
Water filtration, conditioning, or recirculation systems

Also:

Labor and other costs associated with moving or altering undamaged building components to accommodate improvements or additions
Overhead and profits

Items to be Excluded

Plans and specifications

Survey costs

Permit fees

Cost to demolish storm-damaged building components

Outside improvements, including:

Landscaping
Sidewalks
Fences
Yard lights
Swimming pools
Screened pool enclosures
Sheds
Gazebos
Detached structures (including garages)
Landscape irrigation systems

Figure 9-2

Ways to Substantially Improve Structures

Generally, structures are substantially improved in one of four ways, or with combinations thereof:

- By rehabilitation of an existing structure
- By construction of lateral or vertical additions
- By reconstruction of a destroyed or razed structure
- By repair of a substantially damaged structure

Rehabilitation of an Existing Structure

Rehabilitation is defined as an improvement made to an existing structure that does not affect the external dimensions of the structure. If the rehabilitation cost is less than 50 percent of the structure's market value, then methods to reduce flood damages will include use of flood resistant materials and installation of electrical, heating and air conditioning units above base flood elevation (Figure 9-3). For substantial renovations, the ordinance will require that an existing structure be elevated and/or the basement filled to meet the elevation standard (Figure 9-4).

Construction of Additions

Additions are improvements that increase the square footage of a structure. Commonly, this includes the structural attachment of a bedroom, kitchen, den, recreational room, or other type of addition to an existing structure.

Lateral additions. When an addition is a substantial improvement, the addition must be elevated or floodproofed, providing that improvements to the *existing* structure are minimal. Figures 9-5, 9-6, 9-7, and 9-8 illustrate lateral additions that are compliant. Depending on the flood zone and project details, the existing building may not have to be elevated as well.

In A Zones only, if significant improvements are made to the existing structure (e.g., kitchen makeover), both it and the addition must be elevated and otherwise brought into compliance (see Figure 9-6).

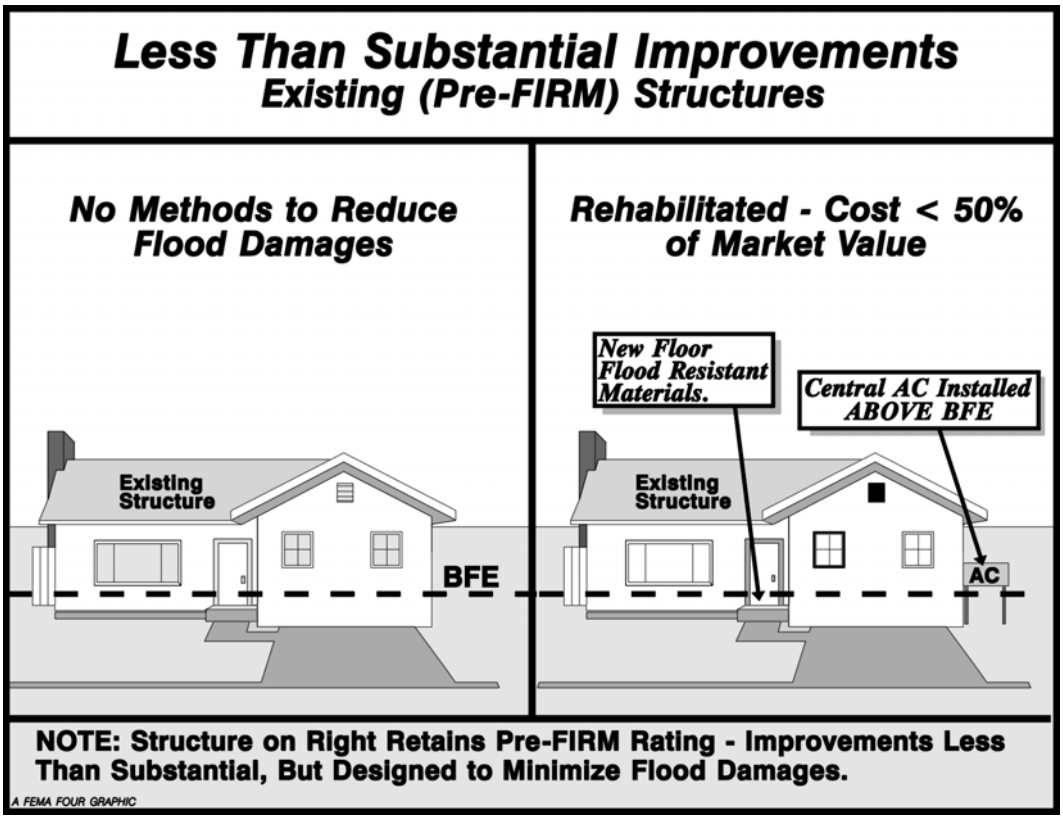

Figure 9-3

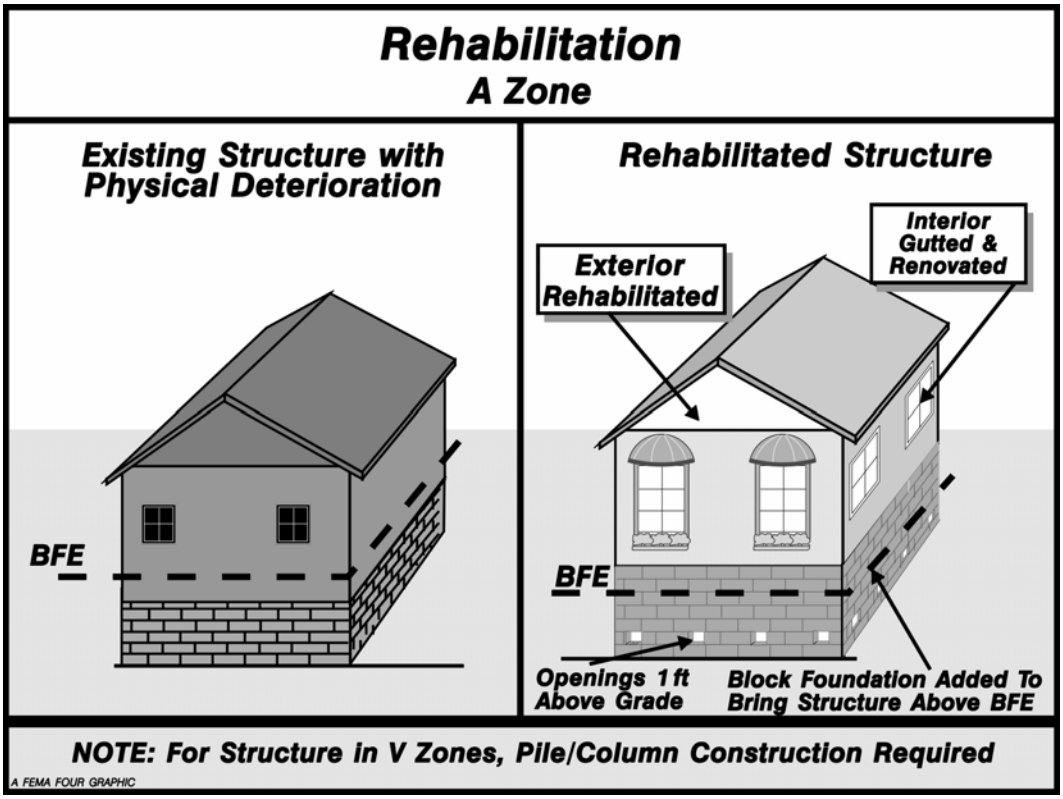

Figure 9-4

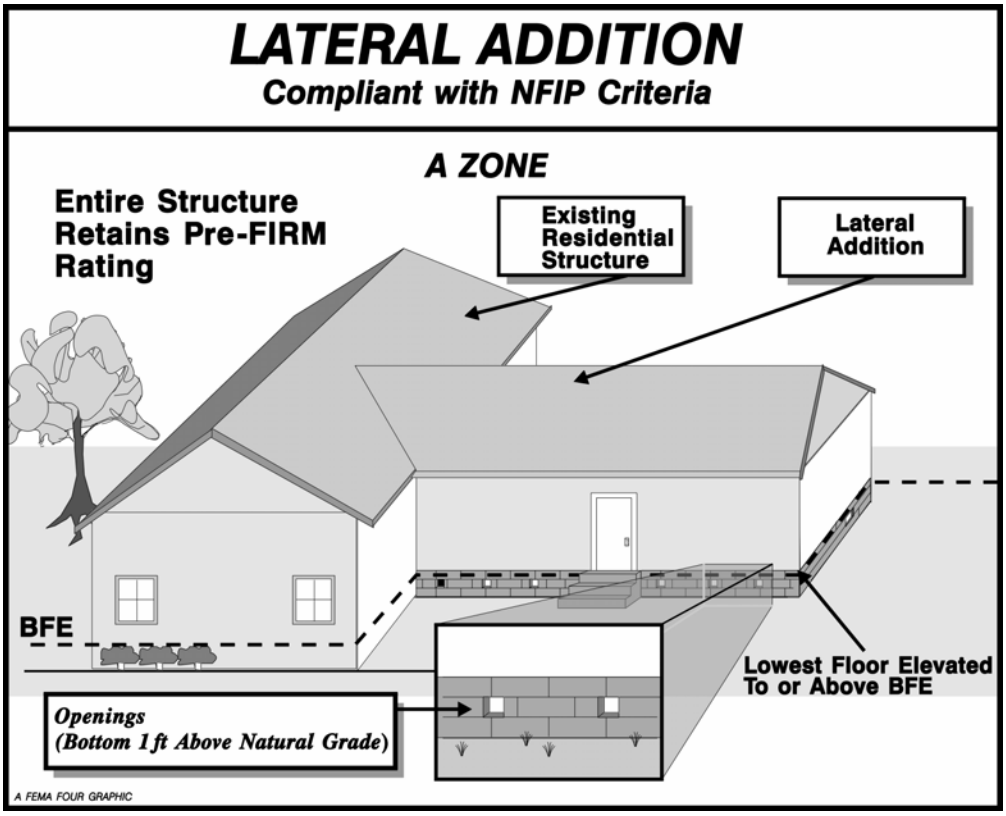

Figure 9-5

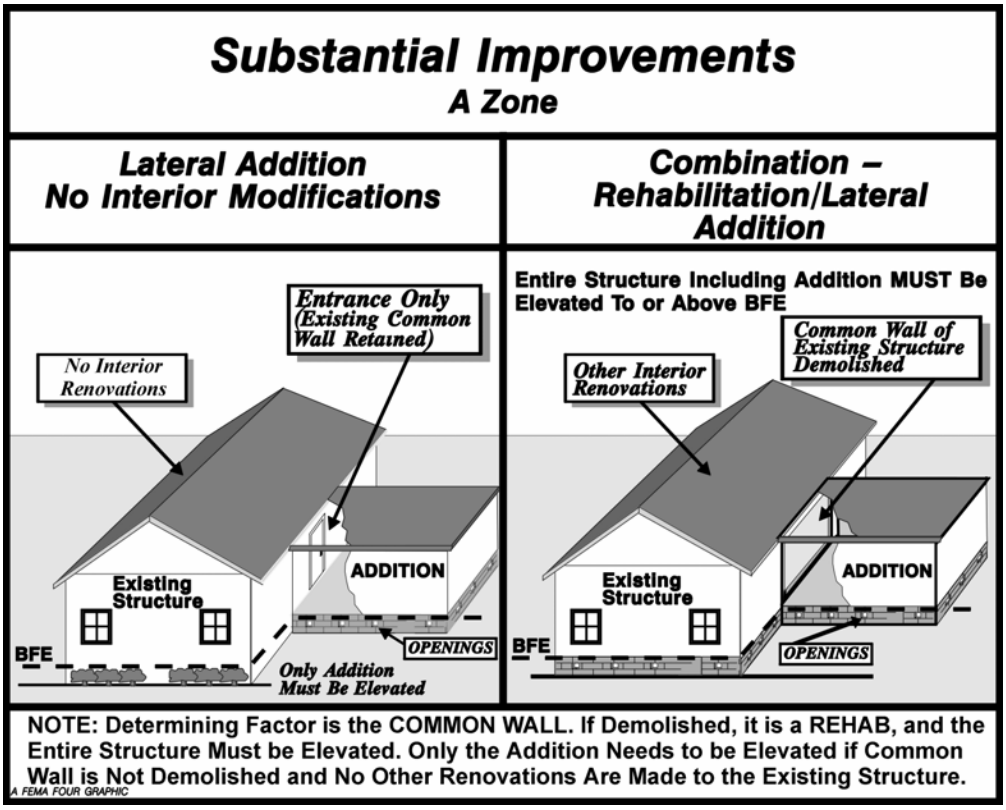

Figure 9-6

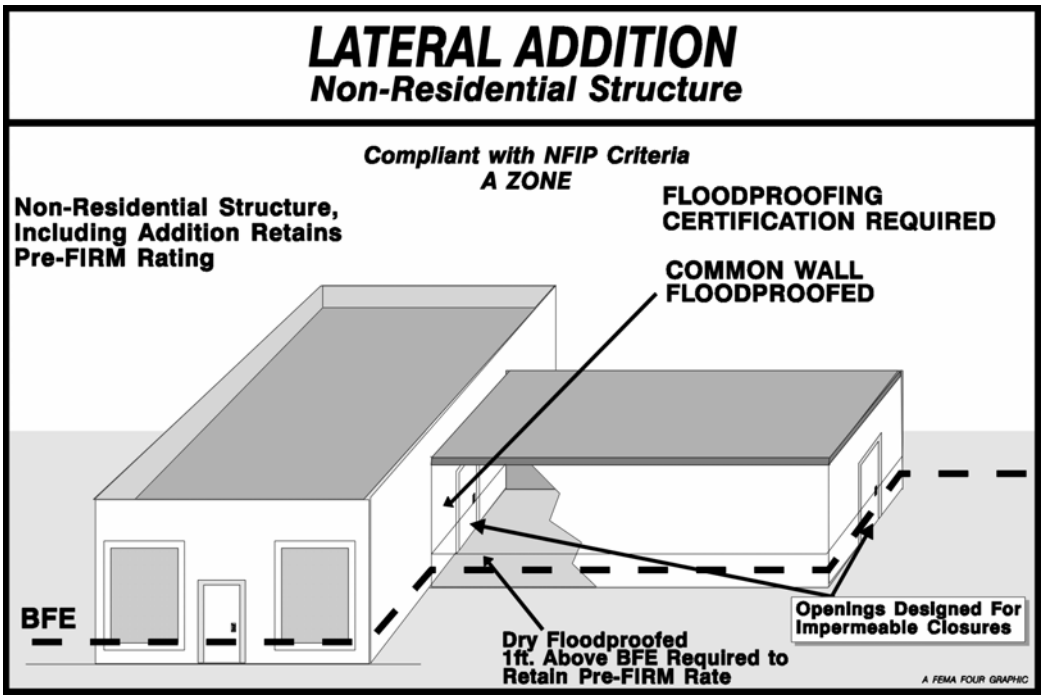

Figure 9-7

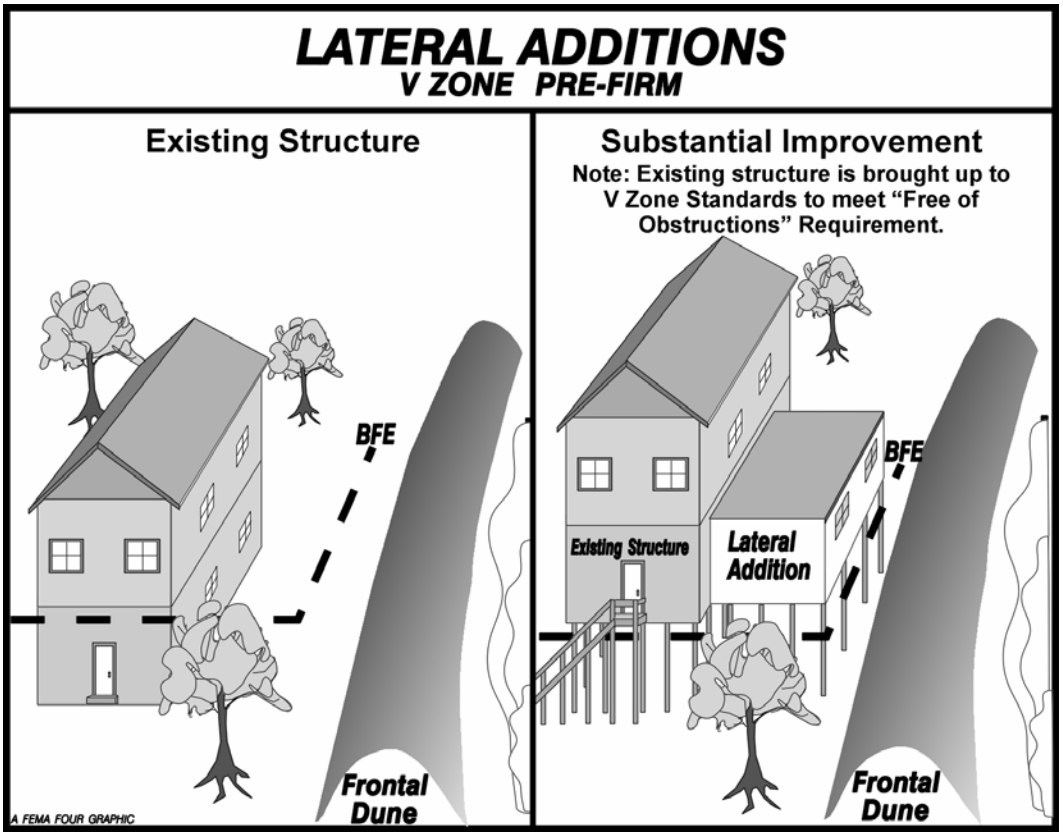

Figure 9-8

However, if the common wall is not removed (50 percent surface area remains) and only minimal changes are made to the existing structure, it does not have to be elevated (floodproofing is allowed for a non-residential structure). Some states and many communities require that *both* the existing structure and lateral additions be elevated, in *all* cases.

In V Zones, the existing structure always has to be elevated, placed on an engineered foundation system, etc., when an addition is proposed that constitutes a substantial improvement (Figure 9-8). This is due to the "free-of obstruction" standard whereby the lower existing structure would obstruct the storm surge, causing damage to the addition.

Vertical additions. The entire structure must be elevated when the proposed substantial improvement is a full or partial second floor (see Figures 9-9 and 9-10).

Reconstruction of a Destroyed or Razed Structure

Reconstructions are cases where an entire structure is destroyed, damaged, purposefully demolished, or razed, and a new structure is built on the old foundation or the slab. It also applies when an existing structure is moved to a new site. Reconstruction is, quite simply, "new construction." Figure 9-11 shows a reconstructed building in an A Zone.

Repair to Substantially Improved Structure

Repairs to substantially damaged structures are considered to be substantial improvements.

To determine if a damaged structure meets criteria for substantial damage, the cost of repairing the structure to its before-damaged condition is compared to the market value of the structure prior to the damage. The estimated cost of the repairs must include all costs necessary to fully repair the structure to its before-damaged condition. If equal to or greater than 50% of that structure's market value before damages, then the structure must be elevated (or floodproofed if it is non-residential) to or above the level of the base flood, and meet other applicable local ordinance requirements.

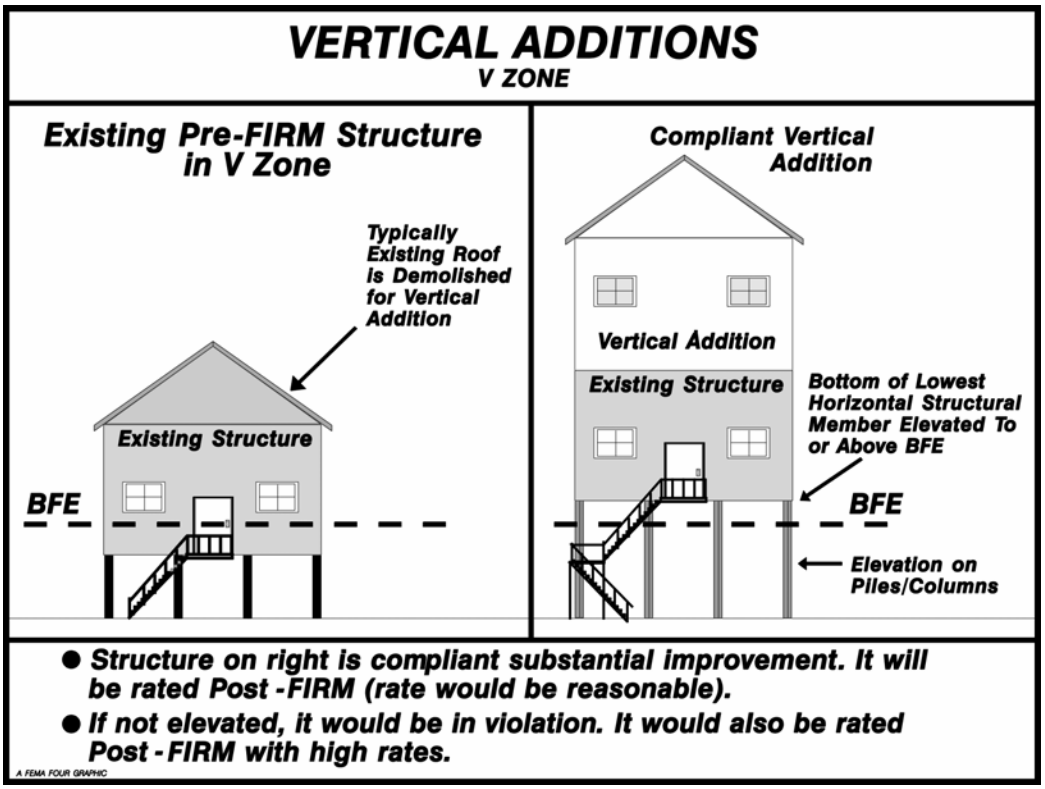
VERTICAL ADDITIONS
V ZONE
Existing Pre-FIRM Structure in V Zone
Typically Existing Roof is Demolished for Vertical Addition
Existing Structure
BFE
Compliant Vertical Addition
Vertical Addition
Existing Structure
Bottom of Lowest Horizontal Structural Member Elevated To or Above BFE
BFE
Elevation on Piles/Columns
● Structure on right is compliant substantial improvement. It will be rated Post-FIRM (rate would be reasonable).
● If not elevated, it would be in violation. It would also be rated Post-FIRM with high rates.
A FEMA FOUR GRAPHIC

Figure 9-9

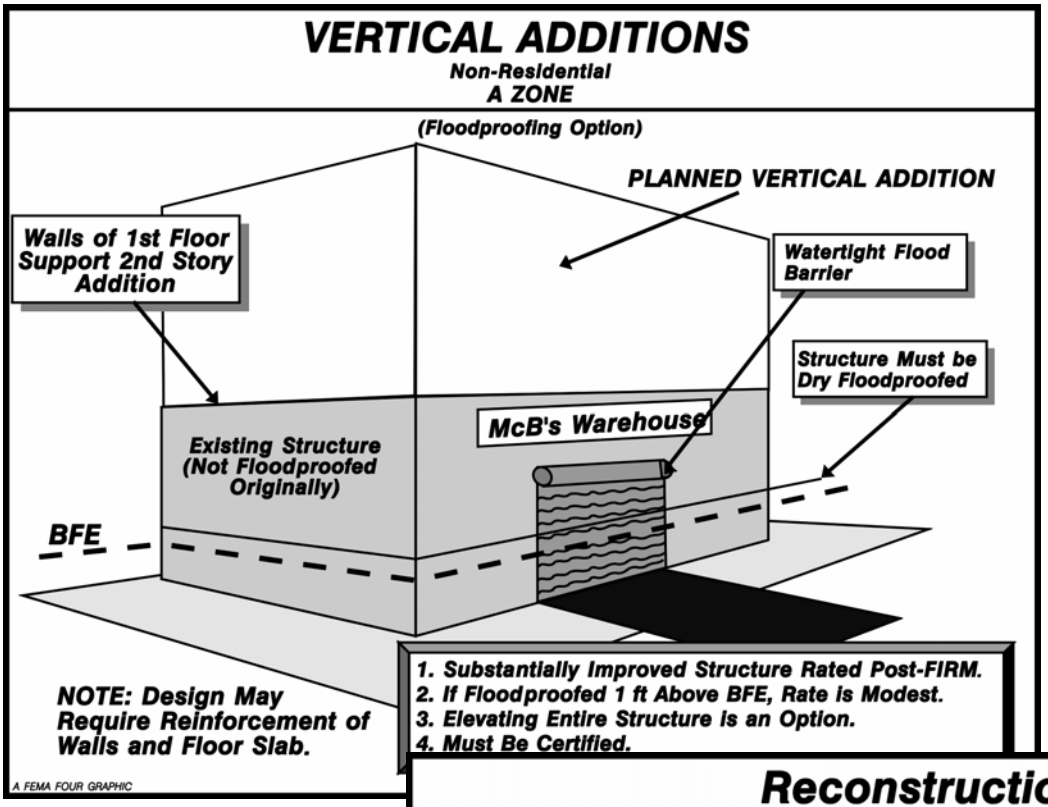
VERTICAL ADDITIONS
Non-Residential
A ZONE
(Floodproofing Option)
PLANNED VERTICAL ADDITION
Walls of 1st Floor Support 2nd Story Addition
Watertight Flood Barrier
Structure Must be Dry Floodproofed
McB's Warehouse
Existing Structure (Not Floodproofed Originally)
BFE
NOTE: Design May Require Reinforcement of Walls and Floor Slab.
1. Substantially Improved Structure Rated Post-FIRM.
2. If Floodproofed 1 ft Above BFE, Rate is Modest.
3. Elevating Entire Structure is an Option.
4. Must Be Certified.
A FEMA FOUR GRAPHIC

Figure 9-10

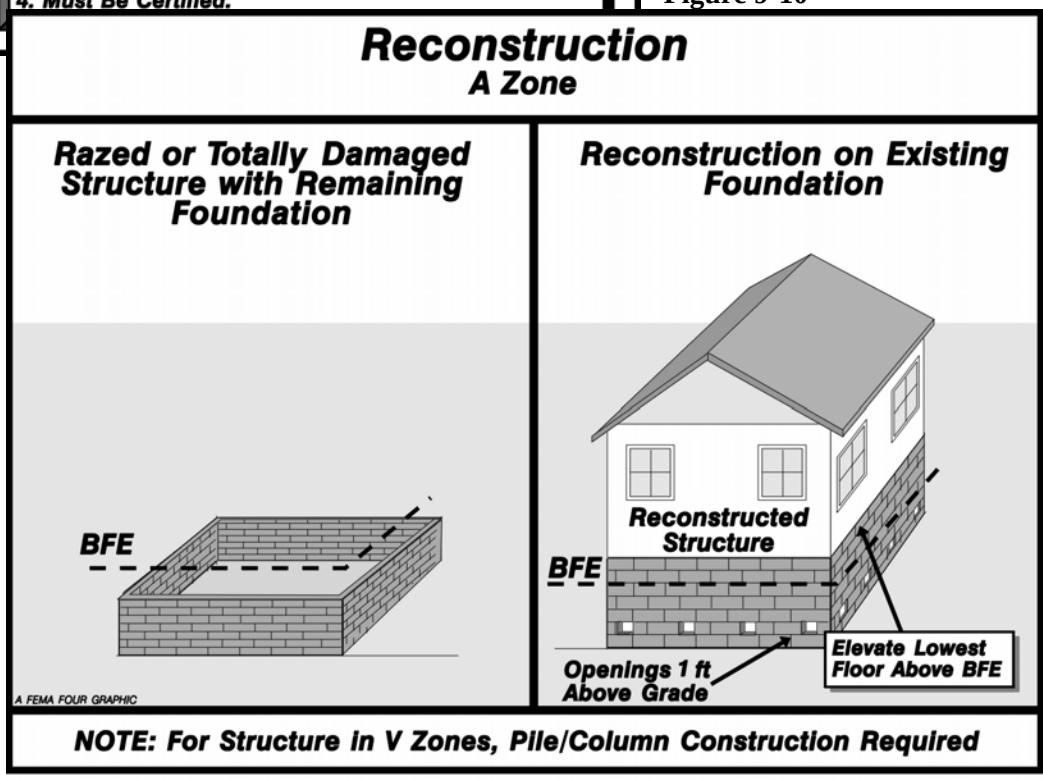
Reconstruction
A Zone
Razed or Totally Damaged Structure with Remaining Foundation
BFE
A FEMA FOUR GRAPHIC
Reconstruction on Existing Foundation
Reconstructed Structure
BFE
Openings 1 ft Above Grade
Elevate Lowest Floor Above BFE
NOTE: For Structure in V Zones, Pile/Column Construction Required

Figure 9-11

Substantial Improvement Requirements

A substantially improved structure (one with repairs equal to or greater than 50% of market value) must be brought into compliance with the local ordinance for new construction. Some of these requirements are described below. Much of the information will be familiar because the terminology and some of the requirements were covered in Unit 6. There are different requirements for structures built before issuance of the Flood Insurance Rate Map versus those built afterward.

Pre-FIRM Structures

The substantial improvement provision applies to all pre-FIRM structures. Pre-FIRM structures are those that were constructed, or for which the start of construction, occurred before the effective date of the community's first FIRM.

Note that the entire structure will have to be elevated to the new BFE if more than minimal changes are made to the existing house, or if the addition is vertical, or if the house is in a V Zone.

Post-FIRM Structures

Substantial improvements made to a post-FIRM structure must meet the requirements of the current ordinance, including areas where map revisions have taken place and the BFE has increased. Moreover, all additions to post-FIRM structures must meet current floodplain management ordinance requirements regardless of the size or cost of the addition. All additions to post-FIRM buildings are defined as new construction. This also applies to additions below elevated buildings, i.e., an owner cannot enclose and legally occupy an area below BFE.

The following illustrations show less-than-substantial improvements to post-FIRM construction (Figure 9-12) and substantial improvements to post-FIRM construction where map revisions have taken place, causing a rise in the BFE or change in flood zone (Figure 9-13).

Any renovation, reconstruction or additions to structures built after the first FIRM should already meet all of the community's floodplain regulations (if the substantial improvement or a lower threshold is set by the community).

Historic Structures

Historic structures are exempted from the substantial improvement requirements subject to the following criteria. The exemption can be granted administratively if the current NFIP definitions of substantial improvement and historic structure are included in the local ordinance. Or they can be granted through a variance procedure. In either case, they are usually granted subject to conditions. If the improvements to a historic structure meet the following criteria and are approved by the community, the building will retain its pre-FIRM flood insurance rating.

Is the building a bona-fide "historic structure"? The first thing to check is whether the structure proposed for an exemption is truly historic. Since many older buildings are not considered historic, FEMA worked with the Secretary of Interior to develop a definition of "historic structure" consistent with federal historic preservation standards [see Appendix B]. In addition to the National Register of Historic Places, the Secretary of Interior recognizes two other types of historic inventories as meeting federal criteria for designating a "historic structure": federally certified state programs operated through a State Historic Preservation

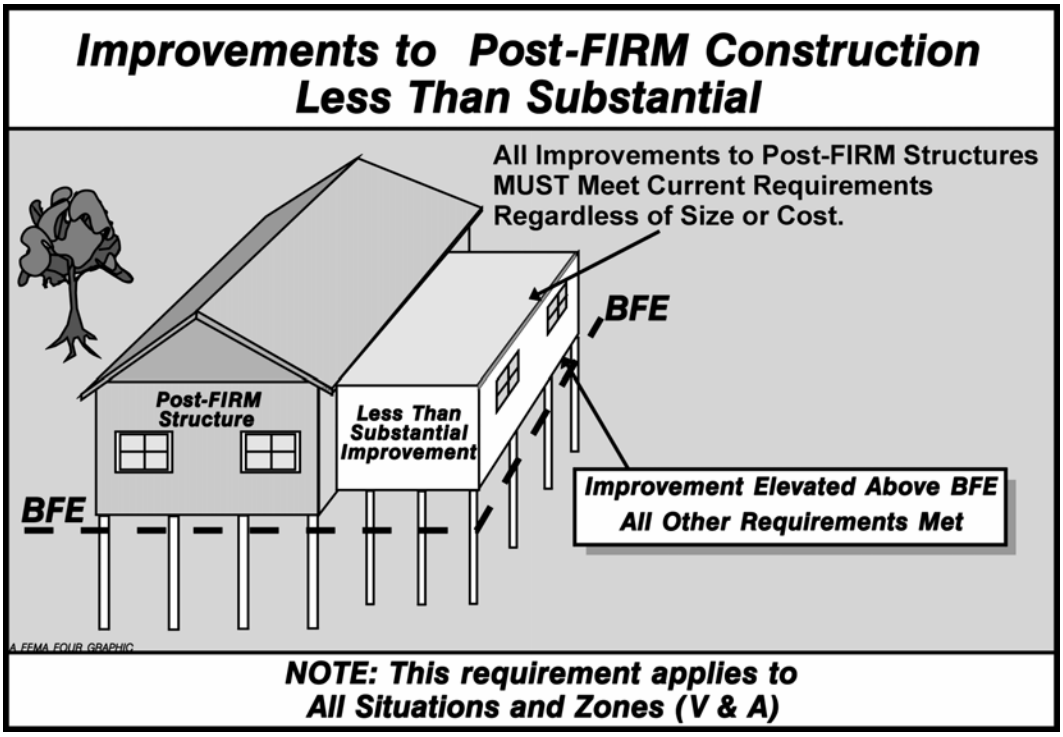

Figure 9-12

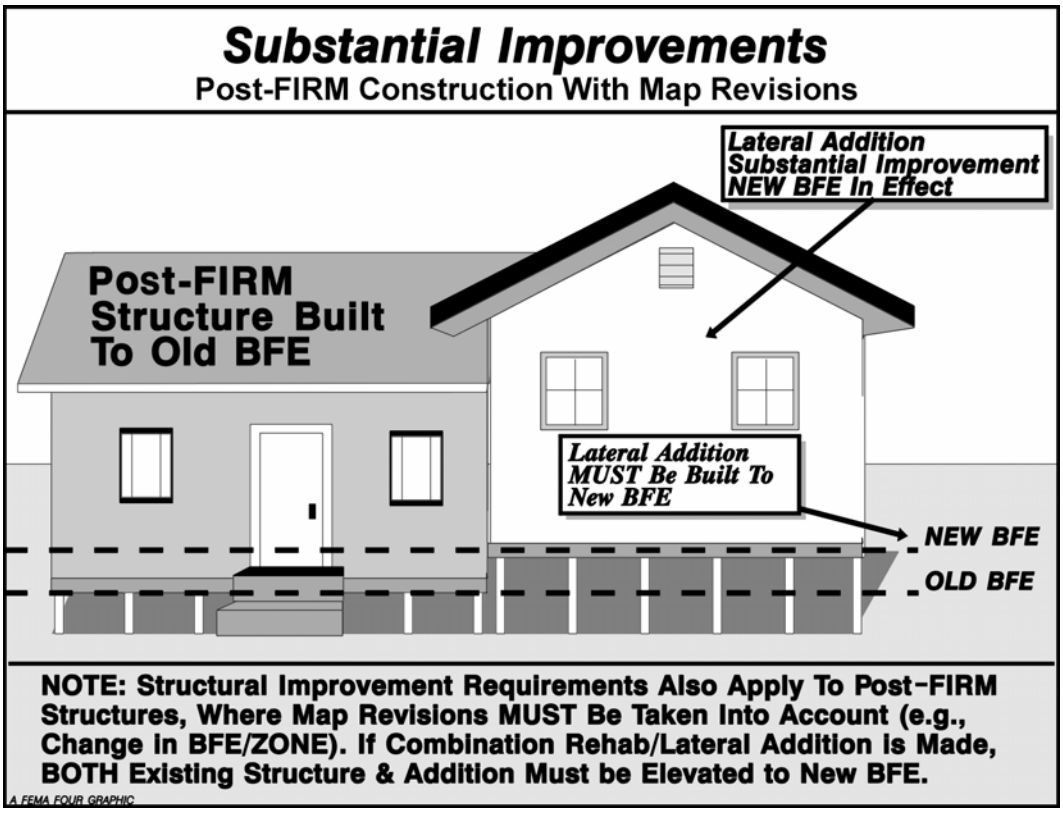

Figure 9-13

Officer, and federally certified local historic preservation boards within selected communities. Structures are listed in the National Register or on a federally recognized state or local inventory in one of two ways, as an individual building, or as a primary, secondary, or other contributing building in a designated historic district. Structures are either currently listed or may be determined to be eligible for listing. Only a federally certified state or local historic preservation program can make such determinations. Either the State Historic Preservation Office or federally certified local historic preservation board should be consulted to determine if a structure proposed for exemption is indeed "historic."

Will the proposed remodeling, addition, or renovation maintain the historic status of the structure? If the proposed improvements to the structure will result in it being removed from or ineligible for the National Register or federally certified state or local inventory, then the proposal cannot be granted an exemption from the substantial improvement rule. The best way to make such determinations is to seek written review and approval of proposed plans by the local historic preservation board, if it is federally-certified, or by the State Historic Preservation Office. If the plans are approved, the local administrator can grant the exemption. If not, no exemption can be permitted.

Are all possible means being taken to reduce future flood damages? Even though the exemption to the substantial improvement rule means the building does not have to be elevated to or above BFE, or be renovated with flood-resistant materials that are not historically sensitive, there are many things that can and should be done to reduce the flood damage potential. For example, mechanical and electrical equipment could be located above BFE or otherwise floodproofed; the lowest floor of an addition could be elevated to or above BFE with the change in floor elevation disguised externally; or the lowest floor of an addition could be built with flood-resistant materials and provided with hydrostatic openings. Consult the state NFIP coordinating agency or the FEMA regional office for advice.

Code Violation Exemptions

The current NFIP definition of substantial improvement includes another exemption, as follows: "Any project for improvement of a structure to correct existing violations of state or local health, sanitary, or safety code specifications which have been identified by the local code enforcement official and which are the minimum necessary to assure safe living conditions."

Please note the key words in this exemption: *correct* existing violations, *identified* by the local official, and *minimum* necessary to assure safe conditions. This language was included in order to avoid penalizing property owners *who had no choice* but to make improvements to their buildings or face condemnation or revoking of a business license. This exemption was intended for *involuntary* improvements. For example, a restaurant owner must remodel and enlarge the kitchen in order to meet current local and state health and safety codes.

Unfortunately, many property owners and builders pressure the local building official to exclude "code violation corrections" from their voluntary improvement proposals. There are "code violations" in all structures built prior to enactment of the current code. In many cases, those elements must be brought up to code as part of an improvement project. This is a very different case from a code violation citation that forces a property owner to correct those violations and make improvements that were otherwise not planned. Again, for further advice on this issue, please consult with the state NFIP coordinating agency or the FEMA regional office.

Increased Cost of Compliance Coverage

Beginning June 1, 1997, the NFIP offered additional coverage to all holders of structural flood insurance policies to assist with the added costs of meeting building code requirements that take effect after a home or business becomes flood damaged. This coverage, called "Increased Cost of Compliance" (ICC), is mandatory for all new and renewed flood insurance policies except for contents-only or individually-owned-condominium-unit policies. Although all flood insurance policyholders pay for the coverage, only those in special flood hazard areas (Zones A and V) can file and receive payment for ICC claims.

The National Flood Insurance Reform Act of 1994 authorized ICC to address the common financial problems experienced by owners of substantially damaged property in making their buildings flood resistant. Claims are limited to $15,000 per structure, in addition to policy limits for direct, physical damage from flooding. Claims can be filed if the community determines that a building is substantially damaged or has been repetitively damaged. In the case of repetitive damage, flood insurance claims must have been filed at least twice in ten years with the damage equaling or exceeding 25 percent of the structure's market value at the time of each flood. In addition, the state or community must have a

substantial loss and repetitive damage provision in its floodplain management ordinance that is being enforced.

The options that a policyholder can use to comply with the community's floodplain management ordinance are:

- Elevation
- Relocation
- Demolition
- Floodproofing for non-residential buildings in FEMA-certified communities

To receive a claim payment under ICC, the building must actually be elevated, floodproofed, demolished, or relocated within two years after the damage occurs.

More information about ICC and guidance for property owners as well as local officials is available from the FEMA regional office. Suggested language will also be provided if a community wishes to revise the flood damage ordinance in order to take advantage of the repetitive-loss provisions of the ICC.

Summary

Additional information on substantial damages and improvements may be found in the publication *Answers to Questions about Substantially Damaged Buildings* (FEMA 213). This home study course will not provide answers to every situation encountered within the community. Do not hesitate to ask for assistance from the state NFIP coordinating agency and the FEMA regional office.

Please complete Learning Check # 2 before proceeding.

Learning Check # 2

Purpose: To review substantial damage improvement issues.

Directions: Answer the following questions.

1. What is defined as a "substantial improvement?"

2. List two acceptable methods of estimating market value.

3. A detailed estimate of the cost of improvements must be prepared and signed by

4. List three ways that structures can be substantially improved.

5. Permitted renovations involving substantial improvements to structures (may require) (do not require) that the entire structure be elevated to or above the BFE.

6. When a lateral addition is a substantial improvement, the (entire structure) (addition) must be elevated or floodproofed, providing the improvements to the existing structure are minimal.

7. The (entire structure) (addition) must be elevated when the proposed substantial improvement involves a vertical addition such as a full or partial second floor.

8. Reconstruction of a structure on an existing foundation (allows the lowest floor of the structure to be placed on the foundation without regard to the BFE) (requires that the lowest floor be placed at or above the BFE).

9. All improvements to post-FIRM structures must meet the same floodplain management requirements as the original structure (regardless of size or cost) (only if the improvements are "substantial").

10. As a result of map revisions the BFE has increased in the community. In this case, substantial improvements, through a lateral addition to a structure (can be built using the old BFE) (are required to be built using the revised BFE).

11. If the required improvements to a *historic* structure would (retain) (destroy) or (maintain) (alter) its historic significance, it may be excluded from the substantial improvement regulations.

D. Flood Insurance Map Changes

New Terms
LOMA
LOMR
CLOMR

From time to time, communities or individuals may find it necessary for a FIRM or floodplain mapping designations to be corrected or changed. There are two methods FEMA uses to make map changes. The first is to actually change the map and reprint new copies. The other method is to issue a letter that describes the map change.

FEMA issues a letter describing a map change when the revision can be adequately described in writing or through use of a small annotated map panel, such as when only one lot is affected. There are two types of letters: a **Letter of Map Amendment** or **LOMA,** and a **Letter of Map Revision** or **LOMR**. The LOMA or LOMR officially amends or revises the effective NFIP map. A **Conditional Letter of Map Revision** or **CLOMR** can also be issued based on proposed filling to indicate that when a project is completed, it will qualify for a map revision or a LOMR.

Common reasons why a map may need to be changed are:

1. **To correct non-flood-related features,** such as a change in the community's corporate limits. The local government should send the correct information to its FEMA regional office. However, the community does not need a new map if it has annexed an area that is shown on the county's FIRM. It can regulate floodplain development using the county's FIRM and flood data. Since it is very expensive to reprint and redistribute flood maps, corporate boundary changes are usually only made only when maps are revised for new or better flood data.

2. **To reflect better ground elevation data.** FIRM maps do not always represent site specific ground elevations. If there is better information on natural ground elevations, the applicant may apply to have the map information reflect the better topographic information. This is usually accomplished via a LOMA, but if a large area is affected, this better topographic information should be submitted to the FEMA regional office so that revision of the map may be initiated.

3. **To reflect changes in ground elevations in the floodplain.** If there has been a substantial change in ground elevation (for example, fill is placed in the floodplain in order to raise building sites above the base flood elevation), the applicant may request a map change to reflect the new ground information. This is usually accomplished via a LOMR,

but if a large area is affected, the map panel will be reprinted or an "annotated" FIRM panel will be issued with the LOMR.

PROPOSED CHANGES

Because of the legal significance of NFIP maps, information supporting revisions must be *scientifically* and *technically* accurate.

4. **To revise the flood data.** A request may be made to revise the existing study, based on a new flood study. The applicant must demonstrate that the original study was in error or that the new study is based on more accurate or better technical data. This is often submitted as a LOMR, but if a large area is affected, the map panel will be reprinted or an "annotated" FIRM panel will be issued with the LOMR

5. **To submit new flood data**. When a flood study is prepared for a development in an unnumbered A Zone, the data must be submitted to FEMA with six months. This is usually done via a LOMR.

6. **To reflect a flood control project.** If a new levee, reservoir, or channel modification affects the flow of the base flood, the community must request that the map be revised to reflect the new conditions or new (lower) base flood elevations. The map cannot be changed until the project is actually constructed and/or operating. Again, the LOMR process is used.

   It is important to note that many small projects, such as channel clearing or retention basins in new subdivisions, do not have a measurable effect on the base flood and therefore, do not warrant a change. The request for a change needs to be carefully prepared by an engineer under the employment of the community who knows FEMA's flood study guidelines.

New Terms

Restudy

Limited Map Maintenance Program

Amendment

Revision

FEMA has four approaches to changing NFIP maps: restudies, limited map maintenance projects, amendments, and revisions. A **restudy** is a new flood insurance study for some or all of the community. For example, FEMA may decide to conduct a restudy where development in a small watershed has substantially changed stormwater runoff conditions over the 15 or 20 years since the original FIS was completed. Or, if growth is occurring along streams without BFEs, detailed studies will be prepared.

A **Limited Map Maintenance Program** (LMMP) project is like a small scale restudy and is limited in size and cost. It is frequently used for studies in unnumbered A Zones.

MAP REVISION CATEGORIES

- Appeals
- Map Revisions
- Map Amendments

An **amendment** is used to remove an area that was inadvertently included in the A or V Zone. This typically happens because of the problem of accurately locating the floodplain boundary on a topographic map. Better ground elevation data can be used to amend a FIRM.

FEMA will make map amendments based on the information submitted by the applicant. An amendment doesn't challenge the FIS, it is a request to show that certain areas are higher than the base flood elevation and the zone designation for that parcel should be changed.

Map **revisions** are used for all other cases. Revisions can be challenges to the flood elevations, incorporation of new data that become effective after a flood control project, proposals to place fill in the floodplain, or proposals to change the floodplain or floodway boundaries or inclusion of new flood studies.

All requests for a restudy, amendment, or a revision must be approved or made by the community, since they affect the local floodplain management program.

A restudy or limited map maintenance project will generally result in a new map. Sometimes amendments and revisions result in a reprinted map. However, this can be very expensive and is only done if the change affects a large area. For smaller areas, FEMA issues a Letter of Map Amendment or Letter of Map Revision.

LOMAs and LOMRs should be noted on the community's master flood maps and filed by panel number in an accessible location. They are public records the community must maintain.

NFIP maps are not changed based on proposed filling projects. However, an applicant may request a **Conditional Letter of Map Revision** or **CLOMR** based on proposed filling. This will inform the builder and others (e.g., the bank financing the project), than when the project is completed, it will qualify for a map revision or a LOMR. There is a fee charged for conditional letters.

Requesting Map Changes

Requests to *amend* NFIP maps are submitted using FEMA MT-1 (included in Appendix I). Requests to *revise* NFIP maps are submitted on FEMA Form MT-2. FEMA MT-1 is also used for conditional letters of map revision based on new fill. These forms are available from the FEMA regional office.

Except for a single-lot LOMA and LOMR-F, requests for map changes should be carefully completed by a qualified engineer. The number one reason why a request for a map change is denied is because the applicant did not submit adequate technical data to validate the needed change. The property owner is encouraged to complete and apply for a single-lot LOMA and LOMA-F with assistance from the local administrator and the land surveyor who certifies the elevation data.

Effect of Map Revisions on Flood Insurance Rates

In situations where the FIRM is revised and republished, the Federal Insurance Administration has adopted "grandfather rules." These rules recognize policyholders that have insured properties built in compliance with a previous FIRM and/or maintained continuous property coverage.

For such properties, the insured would have the option of using the current rating criteria for that property or having the premium rate determined by using the BFE and/or flood zone on the FIRM that was in effect when the building was originally constructed (for those built in compliance) or when coverage was first obtained (for those with continuous coverage). This provides a cost saving to the insured when the new FIRM map would result in a higher premium rate.

If a new policy is applied for, the rates can be based on the FIRM zone and the BFE on the old map in effect on the date the building was constructed *if* proper documentation is submitted. The documentation must show that the building was built in compliance with the FIRM map in effect at the time of construction. It must also show that the building has not been altered in any way that results in a reference level, for rating purposes, lower than the BFE on that FIRM (such as enclosing the area below an elevated building). If such alteration has occurred, then the new FIRM map has to be used for insurance rating.

If a building is substantially improved or substantially damaged, the building must be re-rated using the FIRM in effect at the time that the substantial improvement occurred. A newer FIRM can always be used if it will result in a more favorable rating.

For further information, call the regional Computer Sciences Corporation (CSC) office (mentioned in Appendix G) or see the "rating" unit of a current *Flood Insurance Manual*, which is used by insurance agents. FEMA regional offices and most state NFIP offices have a set of all

historic flood maps for each community, to be used to determine the appropriate zone and BFE in effect at the date of construction.

Please complete Learning Check # 3 before proceeding.

Learning Check #3

Purpose: To review flood insurance map changes issues.

Directions: Answer the following questions.

1. List three reasons why a floodplain map may need to be changed.

2. The owner of a property on Three Flipper Trail in the Village of Bald Head Island feels that the Flood Insurance Rate Map is inaccurate. The property has a house that looks like it's in the floodplain according to the FIRM. However, the owner believes that the house is on high ground, well above the flood level. What should the owner do to get the map corrected?

3. The owner of land on Old Pink Hill Road in the City of Kinston wants to develop the area in 1/2 acre residential lots. The owner plans to fill enough floodplain area to give each lot a buildable site out of the floodplain. However, the owner cannot get financial backing because potential investors don't want to invest in floodplain lots that no one will want. The owner cannot do the filling without financial resources and cannot get those resources as long as the sites are in the floodplain. What can the owner do?

Answers to Learning Checks

Answers to Learning Check # 1

1. A developer proposes to add to an existing factory located in the floodway of Adkin Branch in the City of Kinston. The addition will cause further increases in the Base Flood Elevation. What offsetting measures can the developer employ to negate the impact of the proposed addition? ***If there are structures in the area that would be impacted by the increased flood level, they must be purchased and razed, moved, or elevated above the increased floodway elevation. The developer may purchase a "floodway easement" on that portion of the properties affected by the increase***.

2. A BFE, referenced to the NGVD, is estimated for a proposed development in an unnumbered "A" Zone along Briery Run. Who prepares the required Elevation Certificate? ***A registered land surveyor.***

3. If no estimated BFE is used, who prepares the Certificate? ***The local administrator may prepare it.***

4. When the BFE is not available, to what level must the first floor, as well as mechanical and electrical equipment, be elevated? ***The highest of either (a) one foot above any observable high-water marks or historical flood heights or (b) two feet above highest adjacent natural grade (FEMA recommends at least three feet, the required two feet plus one foot for added protection).***

5. Flood insurance rates are (higher) (***lower***) when a BFE has been established or estimated in an A Zone.

6. Who ultimately has the responsibility for establishing the BFE for unnumbered A zones on a community's FIRM? ***The community.***

7. How long should floodplain development permits be kept on file? ***They should keep copies of the permit and supporting documentation indefinitely***.

8. List three general requirements for accessory structures to be located in identified floodplains.

Not habitable	***Constructed of flood-resistant material below BFE***
Minimal investment	***Openings provided to equalize water pressure***
Must be anchored	***Utility systems and equipment must be protected to BFE***

9. Elevating the floor level of accessory structures to the BFE (is) (***is not***) required.

10. List three standards for enclosures below the Base Flood Elevation. ***Compare your answers with those listed on pages 9-11 and 9-12***.

11. A basement is defined as ***any area of a building having its floor below ground level on all sides***.

12. For basements insurance coverage is *not* provided for ***contents, finished floors, and other non-essential structural and functional systems.***

13. When should Elevation Certificates be obtained from the developer or owner of a proposed floodplain development? ***As soon as the lowest floor is in place, before vertical construction continues in order to correct any problems that may exist and at completion to ensure the floor level was not altered during construction***.

14. Why is determining the lowest floor reference level an important duty of both the local administrator and those completing the Elevation Certificate? ***It is used for both floodplain management and flood insurance rate purposes***.

15. Inspections for compliance with the floodplain management ordinance can be planned to correspond with what three required inspections under the North Carolina Building Code? ***Footing, Foundation, Certificate of Compliance***

Answers to Learning Check #2

1. What is defined as a "substantial improvement?" ***When the cost of any repair, reconstruction or improvement equals 50 percent or more of its market value***.

2. List two acceptable methods of estimating market value. ***Independent appraisals by a professional appraiser. Detailed estimates of the structure's actual cash value. Qualified estimates made by local staff***.

3. A detailed estimate of the cost of improvements must be prepared and signed by ***a licensed general contractor***.

4. List three ways that structures can be substantially improved.

   Rehabilitation ***Reconstruction***
   Addition ***Substantially damaged***

5. Permitted renovations involving substantial improvements to structures **(*may require*)** (do not require) that the entire structure be elevated to or above the BFE.

6. When a lateral addition is a substantial improvement, the (entire structure) **(*addition*)** must be elevated or floodproofed, providing the improvements to the existing structure are minimal.

7. The **(*entire structure*)** (addition) must be elevated when the proposed substantial improvement involves a vertical addition such as a full or partial second floor.

8. Reconstruction of a structure on an existing foundation (allows the lowest floor of the structure to be placed on the foundation without regard to the BFE) (***requires that the lowest floor be placed at or above the BFE***).

9. All improvements to post-FIRM structures must meet the same floodplain management requirements as the original structure (***regardless of size or cost***) (only if the improvements are "substantial").

10. As a result of map revisions the BFE has increased in the community. In this case, substantial improvements, through a lateral addition to a structure (can be built using the old BFE) (***are required to be built using the revised BFE***).

11. If the required improvements to a historic structure would (retain) (***destroy***) or (maintain) (***alter***) its historic significance, it may be excluded from the substantial improvement regulations.

Answers to Learning Check #3

1. List three reasons why a floodplain map may need to be changed.
   To show a change in the community's corporate limits.
   To reflect better ground elevation data for an area.
   To reflect changes in ground elevations, such as placing fill in the floodplain.
   To revise the existing study based on a new flood study prepared by another source.
   To reflect data from a study prepared for a development in an unnumbered A zone.
   To reflect changes as a result of a levee, reservoir or channel modification.

2. The owner of a property on Three Flipper Trail in the Village of Bald Head Island feels that the Flood Insurance Rate Map is inaccurate. The property has a house that looks like it's in the floodplain according to the FIRM. However, the owner believes that the house is on high ground, well above the flood level. What should the owner do to get the map corrected? ***If the property is at natural grade, the owner can have an elevation survey done and, if the ground elevation is above BFE, can apply to FEMA for a Letter of Map Amendment***. ***However, if fill was used to raise the house site, both the lowest adjacent grade elevation and lowest floors must be above the BFE in order to apply for a Letter of Map Revision.***

3. The owner of land on Old Pink Hill Road in the City of Kinston wants to develop the area in 1/2 acre residential lots. The owner plans to fill enough floodplain area to give each lot a buildable site above the BFE. However, the owner cannot get financial backing because potential investors don't want to invest in floodplain lots that no one will want. The owner cannot do the filling without financial resources and cannot get those resources as long as the sites are in the floodplain. What can the owner do? ***The owner may request a Conditional Letter of Map Revision from FEMA based on the proposed filling***.