Substantial Improvement/ Substantial Damage Desk Reference

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Preface

When buildings undergo repair or improvement, it is an opportunity for local floodplain management programs to reduce flood damage to existing structures. More than 21,000 communities participate in the National Flood Insurance Program (NFIP), which is managed by the Federal Emergency Management Agency (FEMA). To participate in the NFIP, communities must adopt and enforce regulations and codes that apply to new development in Special Flood Hazard Areas (SFHAs). Local floodplain management regulations and codes contain minimum NFIP requirements that apply not only to new structures, but also to existing structures which are "substantially improved (SI)" or "substantially damaged (SD)."

Enforcing the SI/SD requirements is a very important part of a community's floodplain management responsibilities. There are many factors that local officials will need to consider and several scenarios they may encounter while implementing the SI/SD requirements. This Desk Reference provides practical guidance and suggested procedures to implement the NFIP requirements for SI/SD.

This Desk Reference provides guidance on the minimum requirements of the NFIP regulations. State or locally-adopted requirements that are more restrictive take precedence (often referred to as "exceeding the NFIP minimums" or "higher standards").

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1 Introduction

1.1 Overview

When buildings undergo repair or improvement, it is an opportunity for floodplain management programs to reduce flood damage to existing structures. More than 21,000 communities participate in the National Flood Insurance Program (NFIP) by adopting and enforcing regulations and codes that apply to development in Special Flood Hazard Areas (SFHAs). Local floodplain management regulations and codes contain minimum NFIP requirements that are not only for new structures, but also for existing structures with proposed "substantial improvements" or repair of "substantial damage."

Local officials in communities that participate in the NFIP must determine whether proposed work qualifies as a substantial improvement or repair of substantial damage (referred to as an "SI/SD determination"). If work on buildings constitutes SI/SD, then structures must be brought into compliance with NFIP requirements for new construction, including the requirement that lowest floors be elevated to or above the base flood elevation (BFE). Meeting this requirement can also be accomplished by demolition followed by construction of new buildings that meet the NFIP requirements on the same sites or by relocating buildings to locations outside of the SFHA. In some cases after a disaster, communities have worked with owners to buy damaged homes in order to demolish the buildings and preserve the land as open space. The NFIP defines SI/SD as follows:

- **Substantial improvement (SI)** 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 (or smaller percentage if established by the community) before the "start of construction" of the improvement. This term includes structures that have incurred "substantial damage," regardless of the actual repair work performed.*
- **Substantial damage (SD)** 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. Work on structures that are determined to be substantially damaged is considered to be substantial improvement, regardless of the actual repair work performed.*

The 50 percent threshold was chosen as a compromise between two extremes. One extreme would be to prohibit all investment in existing structures that do not meet minimum NFIP requirements. The other extreme would be to allow structures in flood hazard areas to be improved in any fashion without regard to the flood risk. In the first alternative, there is the potential for causing hardship to those who have located in flood hazard areas without knowledge of the risk because the structure was constructed prior to the designation of the area as flood-prone. These individuals would not be able to improve their structures as damage or age contributed to deterioration. The second alternative provides no mechanism to ensure that increased investment in flood hazard areas will receive needed protection from the flood risk,

thus contributing to the increased peril to life and property. Thus, the threshold of 50 percent is a compromise at a half-way point and was chosen because it conforms to similar building code and zoning standards that also use this threshold.

This Desk Reference is designed for local officials who are responsible for the administration of local codes and regulations, including the SI/SD requirements. It also is intended for State officials who provide technical assistance to communities on the NFIP.

1.2 What is Covered in This Desk Reference?

Enforcing the SI/SD requirements is a very important part of a community's floodplain management responsibilities. There are many factors that local officials will need to consider and several scenarios they may encounter while implementing the SI/SD requirements. This Desk Reference provides guidance and suggested procedures to implement the NFIP requirements for SI/SD. Table 1-1 summarizes the content of each chapter and lists the appendices.

Table 1-1. Desk Reference Organization

Chapter	Description of Content
1: Introduction	Provides an overview of the Desk Reference, other relevant requirements, and suggestions for where to obtain additional help.
2: The NFIP: Roles and Responsibilities	Outlines the purposes of the NFIP, offers an overview of how the program's three components work together to support the long-term reduction of flood losses, and explains the roles and responsibilities of communities, State agencies, and the Federal Emergency Management Agency (FEMA).
3: NFIP Substantial Improvement/ Substantial Damage: Requirements and Definitions	Provides an introduction to the NFIP's SI/SD requirements and lists selected definitions and terms (and compares them with those of the building codes published by the International Code Council, Inc. [ICC]).
4: Making Substantial Improvement and Substantial Damage Determinations	Explains how costs of improvements, costs of repairs, and market values are used to make the SI/SD determination, and describes ways to obtain or to estimate costs and values.
5: Administering Substantial Improvement and Substantial Damage Requirements	Outlines community and property owner responsibilities and provides detailed guidance for local officials who are responsible for administering and enforcing the SI/SD requirements.
6: Factors to Consider and Illustrations of Substantial Improvement and Repair of Substantial Damage	Describes the key aspects of bringing buildings into compliance with all of the NFIP requirements and illustrates examples of improvements and repairs.
7: Substantial Damage in the Disaster Recovery Environment	Offers suggestions to prepare for disasters, an overview of the post-disaster process, methods to estimate costs and market values after major disasters, and describes FEMA's *Substantial Damage Estimator*.
8: Mitigation Projects	Describes the most common types of mitigation projects and briefly summarizes FEMA's five mitigation grant programs.

Table 1-1. Desk Reference Organization (continued)

Appendices	Description of Content
Appendix A	FEMA Regional Offices, NFIP State Coordinating Agencies, and State Hazard Mitigation Offices
Appendix B	References
Appendix C	Glossary and Acronyms
Appendix D	Sample Notice to Property Owners, Worksheet, and Other Material
Appendix E	Sample Letters of Determination

1.3 Relevant Requirements

This Desk Reference provides guidance on the minimum requirements of the NFIP regulations. State or locally-adopted requirements that are more restrictive take precedence (often referred to as "exceeding the NFIP minimums" or "higher standards").

The most common floodplain management requirement that exceeds NFIP minimums and also applies to SI/SD is freeboard – added height to raise the lowest floor above the BFE.

Many States and communities have adopted one or more of the codes in the family of codes published by the International Code Council, Inc. (I-Codes®) or use the I-Codes as the basis of their own codes. These codes contain provisions for buildings in flood hazard areas, including provisions related to substantial improvement and substantial damage. The pertinent codes are the *International Building Code®* (IBC®), *International Residential Code®* (IRC®), and *International Existing Building Code®* (IEBC®). Each references *Flood Resistant Design and Construction* (ASCE 24-05), the national consensus standard produced by the American Society of Civil Engineers, Inc. (ASCE).

Communities that have a building code and floodplain management regulations must administer the more restrictive provisions.

1.4 Answers to Questions About SI/SD

FEMA 213, *Answers to Questions about Substantially Damaged Buildings*, is a FEMA publication that summarizes answers to certain key questions regarding substantial damage and a few questions related to substantial improvement. This SI/SD Desk Reference provides expanded discussion and more detailed guidance on making substantial damage determinations, along with detailed guidance on administering the substantial improvement requirements.

1.5 Where to Get Help

Each State has a designated State Coordinating Agency for the NFIP, with an individual identified as the NFIP State Coordinator. State Coordinators provide a link between the Federal government and local governments on matters related to floodplain management. Additional assistance may be sought from FEMA's Regional Offices. Appendix A includes contact information for FEMA Regional Offices, NFIP State Coordinating Agencies, and State Hazard Mitigation Offices.

FEMA produces extensive guidance materials and publications related to floodplain management. Many NFIP State Coordinating Agencies also publish guidance documents. Appendix B lists references pertinent to administering the SI/SD requirements and other resources for managing development in floodplains. FEMA publications are available from the FEMA library at http://www.fema.gov/library or by calling 1-800-480-2520.

2 The NFIP: Roles and Responsibilities

2.1 Purposes and Overview of the NFIP

The original authorizing legislation for the NFIP was passed in 1968. Congress expressly found that "a program of flood insurance can promote the public interest by encouraging sound land use by minimizing exposure of property to flood losses..."

Thte NFIP is intended to encourage States and local governments to recognize and incorporate flood hazards in their land use and development decisions. In some communities, this is achieved by guiding development to areas with lower risk. When a proposal is made to develop within a flood hazard area, application of the criteria set forth in Federal regulation (Title 44 Code of Federal Regulations [CFR] Section (§) 60.3) is intended to minimize exposure and flood-related damage.

The NFIP is administered by FEMA, which is part of the Department of Homeland Security (DHS). The NFIP has three main elements:

1. Hazard identification and mapping, in which engineering studies are conducted and flood maps are prepared to delineate areas that are predicted to be subject to flooding under certain conditions;

2. Floodplain management criteria, which establish the minimum requirements for communities to adopt and apply to development within mapped flood hazard areas; and

3. Flood insurance, which provides financial protection for property owners to cover flood-related damage to buildings and contents.

Federal flood insurance is designed to provide an alternative to disaster assistance and disaster loans for home and business owners. Disaster assistance rarely comes close to covering all of the costs to repair and clean up. While available to qualified victims, disaster loans do not significantly ease the financial burden due to repayment terms. It is important to remember that disaster assistance is available only after floods have been declared major disasters by the President of the United States. In contrast, flood insurance claims will be paid any time damage from a qualifying flood event occurs.

Another important objective of the NFIP is to break the cycle of flood damage. Many buildings have been flooded, repaired or rebuilt, and flooded again. In some parts of the country, this cycle occurs every couple of years. Before communities adopted floodplain management regulations, people tended to rebuild in the same flood-prone areas using the same construction techniques that did not adequately protect the structure when the first event occurred. On the

other hand, structures built to NFIP floodplain management requirements experience, on average, 80 percent less damage through reduced frequency of inundation and severity of losses.

By encouraging communities to guide development to lower risk areas, and by requiring the elevation of new buildings and certain existing buildings, one of the long-term objectives of the NFIP can be achieved: reducing flood damage and losses. Older buildings may be removed or replaced, or they may be upgraded or modified with techniques that lead to little or no flood damage.

The NFIP establishes distinct responsibilities for the Federal, State, and local levels of government. For local officials who must administer the SI/SD requirements of their regulations and codes, it is important to recognize how these established roles affect responsibilities for SI/SD. As outlined in the NFIP regulations:

- Communities are responsible for regulating all development in mapped flood hazard areas, issuing permits, and enforcing the requirements, including SI/SD requirements for improvements and repairs of buildings.
- States generally are responsible for providing technical assistance to communities, monitoring community programs, and coordinating between communities and the NFIP. Some States also administer regulatory programs and many are engaged in flood hazard mapping initiatives.
- FEMA, through administration of the NFIP, promulgates the minimum regulatory requirements, supports State programs, provides technical assistance, monitors community programs, and produces flood hazard maps.

2.2 The Community's Role

The NFIP regulations contained in 44 CFR § 59.22 and § 60.3 outline the responsibilities that communities must accept in order to become and remain eligible to participate in the NFIP. The key responsibilities include:

- Designate an agency that is charged with the responsibility to administer floodplain management requirements
- Determine whether proposed development activities are located in SFHAs
- Review development proposals to ensure compliance with the requirements of applicable floodplain management regulations and building codes
- Require that new subdivisions and development proposals with more than 50 lots or larger than five acres include BFEs
- Issue or deny permits for floodplain development
- Inspect all development in SFHAs to ensure compliance
- Maintain records of issued permits, elevation data, inspections, and enforcement actions
- Assist in the preparation and revision of floodplain maps

- Help residents obtain information on flood hazards, floodplain map data, and compliant construction measures

For existing buildings that are located in SFHAs, community responsibilities include the following, in addition to the requirements above:

- Determine whether proposed improvements are "substantial improvements;" substantial improvement of buildings triggers requirements for permits and compliance.
- Determine whether work necessary to restore a damaged building to its pre-damage condition constitutes repair of "substantial damage;" repair of substantially damage buildings triggers requirements for permits and compliance.

Chapter 3 describes the NFIP SI/SD requirements and definitions. Chapter 4 outlines making SI/SD determinations; Chapter 5 outlines community responsibilities that are specifically related to administering these requirements. Chapter 6 includes factors to be considered when determining SI/SD and illustrations of substantial improvement and substantial damage. More guidance on administering and enforcing all aspects of local floodplain management regulations is found in FEMA 480, *NFIP Floodplain Management Requirements: A Study Guide and Desk Reference*. Chapter 7 suggests actions that communities can take to prepare for disasters, methods communities can use to obtain the costs to restore the structure and the market value of the structure before the damage occurred to make a substantial damage determination, and also describes a tool that communities can use to facilitate collecting data to make substantial damage determinations, FEMA's *Substantial Damage Estimator*.

2.3 The State's Role

Each State's governor has designated an NFIP State Coordinating Agency. This agency, often referred to as the NFIP State Coordinator's Office, is specifically charged with being a link between Federal, State, and local governments. The NFIP State Coordinator stays current on NFIP issues and can advise communities on specific provisions and any State requirements.

Some States have their own floodplain management statutes and regulations, and some administer regulatory programs pertaining to flood hazards. State requirements related to work on existing buildings must be satisfied in addition to local requirements.

While the explicit role of the NFIP State Coordinator may vary among States, the NFIP regulations [44 CFR § 60.25] outline the following key responsibilities:

- Encourage and provide assistance for communities to qualify for participation in the NFIP
- Guide and assist communities to develop, implement, and maintain floodplain management regulations
- Provide technical assistance to communities
- Participate in training opportunities

- Assist in the delineation of flood-prone areas
- Notify FEMA of problems with community programs, if such problems cannot be resolved through technical assistance

2.4 The Federal Role

Several Federal agencies have programs and responsibilities that relate to flooding, managing flood hazards, and responding to flood events. Only FEMA's role is directly pertinent to the purpose of this Desk Reference.

Located at FEMA Headquarters in Washington, DC, the Flood Insurance and Mitigation Administration (FIMA) implements the three main elements of the NFIP (flood hazard identification, floodplain management, and flood insurance). The Directorate sets National policy, issues interpretations, enrolls communities in the NFIP, researches floodplain construction practices, and administers the flood hazard mapping and flood insurance elements of the program. Specifically, FEMA develops publications to help States and participating communities fulfill their responsibilities and to provide guidance to property owners, architects, engineers, and others proposing to develop in the floodplain.

FEMA implements its program responsibilities through 10 Regional Offices. Each Regional Office has a Mitigation Division that works with States and communities on matters related to the NFIP. Each Regional Office covers four to eight States and territories; together they work with over 21,000 participating communities. The responsibilities of the Regional Offices include:

- Assist the NFIP State Coordinating Agencies
- Advise local officials responsible for administering floodplain management regulations
- Assess community compliance with the minimum NFIP criteria
- Answer questions from design professionals, builders, and the public
- Provide information about flood insurance and respond to questions from citizens
- Maintain and revise flood hazard maps and data
- Provide information and training on many aspects of the NFIP, including administration of the SI/SD requirements
- Work with States and communities to resolve identified problems with community programs

3 NFIP Substantial Improvement/ Substantial Damage: Requirements and Definitions

3.1 Overview

This chapter provides NFIP regulations for substantial improvement and substantial damage, and includes key definitions for implementing the SI/SD requirements (also see the glossary and acronyms in Appendix C). This chapter also compares the NFIP's terminology with terms and definitions used in the I-Codes.

3.2 Introduction to the SI/SD Requirements

The NFIP includes a requirement that new buildings and substantially improved buildings be constructed in ways that minimize or prevent damage during a flood. This requirement grew out of the recognition that there were large numbers of buildings already located in flood-prone areas that would continue to be subject to damage.

The purpose of the SI/SD requirements is to protect the property owner's investment and safety, and, over time, to reduce the total number of buildings that are exposed to flood damage, thus reducing the burden on taxpayers through the payment of disaster assistance. The SI/SD requirements are triggered when the local official determines that the cost of repairing or improving a building in an SFHA equals or exceeds 50 percent of the building's market value (excluding land value).

The SI/SD requirement is similar to common zoning and code requirements that address non-conforming uses and structures. The non-conformance is allowed to continue until a triggering event occurs, such as a change in use or a proposal to undertake significant physical alterations.

Types of work that may trigger SI/SD requirements are described in detail in Chapter 6 and generally include:

- Rehabilitation or remodeling of a building with or without modifying its external dimensions
- Lateral additions that may or may not involve structural modifications of a building
- Vertical additions
- Repair of foundations, including replacing or extending foundations

Understandably, owners are concerned about the costs of bringing buildings into compliance. NFIP flood insurance policies on buildings located in SFHAs include coverage that is available for buildings that are substantially damaged by flood. Called Increased Cost of Compliance (ICC), this coverage is described in Sections 5.6.4 and 7.6.

- Restoration or repair of damage of any origin that is necessary to restore a building to its pre-damaged condition
- Reconstruction of demolished or destroyed buildings on the same site or on the same foundation
- Work on post-Flood Insurance Rate Map (FIRM) buildings
- Work on existing buildings where flood zones or floodways are revised

The intent of the SI/SD requirements is not to discourage routine maintenance. If work requires a permit, then the local official must review all of the work proposed and the cost of all work must be included in the project costs, including work that might otherwise be considered routine maintenance.

Chapter 6 describes how building characteristics and details of proposed work relate to the SI/SD requirements of local floodplain management regulations.

3.3 NFIP Regulations for SI/SD

The NFIP regulations are online at http://www.fema.gov/business/nfip/laws1.shtm. The following excerpts of the regulations pertain to new construction and substantial improvement. The requirements state that communities shall:

> *§ 60.3(a)(3) Review all permit applications to determine whether proposed building sites will be reasonably safe from flooding. If a proposed building site is in a flood-prone area, all new construction and substantial improvements shall (i) be designed (or modified) and adequately anchored to prevent flotation, collapse, or lateral movement of the structure resulting from hydrodynamic and hydrostatic loads, including the effects of buoyancy, (ii) be constructed with materials resistant to flood damage, (iii) be constructed by methods and practices that minimize flood damage, and (iv) be constructed with electrical, heating, ventilation, plumbing, and air conditioning equipment and other service facilities that are designed and/or located so as to prevent water from entering or accumulating within the components during conditions of flooding;*
>
> *§ 60.3(b)(4) Obtain, review and reasonably utilize any base flood elevation and floodway data available from a Federal, State, or other source, including data developed pursuant to paragraph (b)(3) of this section, as criteria for requiring that new construction, substantial improvements, or other development in Zone A on the community's FHBM or FIRM meet the standards in paragraphs (c)(2), (c)(3), (c)(5), (c)(6), (c)(12), (c)(14), (d)(2) and (d)(3) of this section;*
>
> *§ 60.3(c)(2) Require that all new construction and substantial improvements of residential structures within Zones A1-30, AE and AH zones on the community's FIRM have the lowest floor (including basement) elevated to or above the base flood level, unless the community is granted an exception by the Administrator for the allowance of basements in accordance with § 60.6 (b) or (c);*
>
> *§ 60.3(c)(3) Require that all new construction and substantial improvements of non-residential structures within Zones A1-30, AE and AH zones on the community's FIRM (i) have the lowest*

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

§ 60.3(c)(5) Require, for all new construction and substantial improvements, that fully enclosed areas below the lowest floor that are usable solely for parking of vehicles, building access or storage in an area other than a basement and which are subject to flooding shall be designed to automatically equalize hydrostatic flood forces on exterior walls by allowing for the entry and exit of floodwaters. Designs for meeting this requirement must either be certified by a registered professional engineer or architect or meet or exceed the following minimum criteria: A minimum of two openings having a total net area of not less than one square inch for every square foot of enclosed area subject to flooding shall be provided. The bottom of all openings shall be no higher than one foot above grade. Openings may be equipped with screens, louvers, valves, or other coverings or devices provided that they permit the automatic entry and exit of floodwaters;

§ 60.3(c)(6) Require that manufactured homes that are placed or substantially improved within Zones A1-30, AH, and AE on the community's FIRM on sites

(i) Outside of a manufactured home park or subdivision,

(ii) In a new manufactured home park or subdivision,

(iii) In an expansion to an existing manufactured home park or subdivision, or

(iv) In an existing manufactured home park or subdivision on which a manufactured home has incurred "substantial damage" as the result of a flood, be elevated on a permanent foundation such that the lowest floor of the manufactured home is elevated to or above the base flood elevation and be securely anchored to an adequately anchored foundation system to resist floatation collapse and lateral movement.

§ 60.3(c)(7) Require within any AO zone on the community's FIRM that all new construction and substantial improvements of residential structures have the lowest floor (including basement) elevated above the highest adjacent grade at least as high as the depth number specified in feet on the community's FIRM (at least two feet if no depth number is specified);

§ 60.3(c)(8) Require within any AO zone on the community's FIRM that all new construction and substantial improvements of non-residential structures (i) have the lowest floor (including basement) elevated above the highest adjacent grade at least as high as the depth number specified in feet on the community's FIRM (at least two feet if no depth number is specified), or (ii) together with attendant utility and sanitary facilities be completely floodproofed to that level to meet the floodproofing standard specified in § 60.3(c)(3)(ii);

§ 60.3(c)(10) Require until a regulatory floodway is designated, that no new construction, substantial improvements, or other development (including fill) shall be permitted within Zones A1-30 and AE on the community's FIRM, unless it is demonstrated that the cumulative effect of the proposed development, when combined with all other existing and anticipated development, will not increase the water surface elevation of the base flood more than one foot at any point within the community.

§ 60.3(c)(12) Require that manufactured homes to be placed or substantially improved on sites in an existing manufactured home park or subdivision within Zones A-1-30, AH, and AE on the community's FIRM that are not subject to the provisions of paragraph (c)(6) of this section be elevated so that either :

(i) The lowest floor of the manufactured home is at or above the base flood elevation, or

(ii) The manufactured home chassis is supported by reinforced piers or other foundation elements of at least equivalent strength that are no less than 36 inches in height above grade and be securely anchored to an adequately anchored foundation system to resist floatation, collapse, and lateral movement.

§ 60.3(d) [When floodways have been designated] *(3) Prohibit encroachments, including fill, new construction, substantial improvements, and other development within the adopted regulatory floodway unless it has been demonstrated through hydrologic and hydraulic analyses performed in accordance with standard engineering practice that the proposed encroachment would not result in any increase in flood levels within the community during the occurrence of the base flood discharge;*

§ 60.3(e)(4) [When V zones have been designated] *Provide that all new construction and substantial improvements in Zones V1-30 and VE, and also Zone V if base flood elevation data is available, on the community's FIRM, are elevated on pilings and columns so that (i) the bottom of the lowest horizontal structural member of the lowest floor (excluding the pilings or columns) is elevated to or above the base flood level; and (ii) the pile or column foundation and structure attached thereto is anchored to resist flotation, collapse and lateral movement due to the effects of wind and water loads acting simultaneously on all building components. Water loading values used shall be those associated with the base flood. Wind loading values used shall be those required by applicable State or local building standards. A registered professional engineer or architect shall develop or review the structural design, specifications and plans for the construction, and shall certify that the design and methods of construction to be used are in accordance with accepted standards of practice for meeting the provisions of paragraphs (e)(4) (i) and (ii) of this section.*

§ 60.3(e)(5) Provide that all new construction and substantial improvements within Zones V1-30, VE, and V on the community's FIRM have the space below the lowest floor either free of obstruction or constructed with non-supporting breakaway walls, open wood lattice-work, or insect screening intended to collapse under wind and water loads without causing collapse, displacement, or other structural damage to the elevated portion of the building or supporting foundation system. [Note: specifications for breakaway walls not shown.]

3.4 Selected Definitions and Terms

Some of the terms used in this Desk Reference are defined in the NFIP regulations and some have meanings that are based on common usage. This section compares the NFIP terms with those defined and used in the administrative and flood damage-resistant provisions of the family of building codes known as the I-Codes. The I-Codes include the *International Building Code* (IBC) *International Residential Code* (IRC), *International Existing Building Code* (IEBC),

International Mechanical Code®, *International Plumbing Code®*, *the International Fuel Gas Code®*, and a number of other specialty codes.

3.4.1 Definitions: NFIP Regulations

The following are the NFIP definitions of several terms used in this Desk Reference (also see Appendix C for a glossary of related terms and definitions):

- **Floodproofing** means *any combination of structural and non-structural additions, changes, or adjustments to structures that reduce or eliminate flood damage to real estate or improved real property, water and sanitary facilities, structures, and their contents.*
- **Historic structure** means any structure that is:

  (a) Listed individually in the National Register of Historic Places (a listing maintained by the Department of Interior) or preliminarily determined by the Secretary of the Interior as meeting the requirements for individual listing on the National Register;

  (b) Certified or preliminarily determined by the Secretary of the Interior as contributing to the historical significance of a registered historic district or a district preliminarily determined by the Secretary to qualify as a registered historic district;

  (c) Individually listed on a state inventory of historic places in states with historic preservation programs which have been approved by the Secretary of the Interior; or

  (d) Individually listed on a local inventory of historic places in communities with historic preservation programs that have been certified either:

    (1) By an approved state program as determined by the Secretary of the Interior or

    (2) Directly by the Secretary of the Interior in states without approved programs.

- **Lowest floor** means *the lowest floor of the lowest enclosed area (including basement). An unfinished or flood damage-resistant enclosure, usable solely for parking of vehicles, building access, or storage in an area other than a basement area is not considered a building's lowest floor; Provided, that such enclosure is not built so as to render the structure in violation of the applicable non-elevation design requirements of § 60.3.*
- **New construction** means, *for floodplain management purposes, structures for which the "start of construction" commenced on or after the effective date of a floodplain management regulation adopted by a community and includes any subsequent improvements to such structures.*
- **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 that have incurred "substantial damage," regardless of the actual repair work performed. The term does not, however, include either:*

(1) 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 or

(2) Any alteration of a "historic structure," provided that the alteration will not preclude the structure's continued designation as a "historic structure."

The definition of substantial improvement includes structures that have incurred substantial damage. Work necessary to restore a substantially damaged building to its pre-damage condition constitutes a substantial improvement; therefore, the NFIP regulations that refer to substantial improvement also include substantial damage.

3.4.2 Comparison of Definitions and Terms: NFIP and I-Codes

FEMA has determined that the provisions in the I-Codes for the design and construction of flood damage-resistant buildings are consistent with the NFIP requirements. Adoption of a code based on one or more of the I-Codes does not, by itself, meet all of the NFIP requirements, largely because the model codes deal primarily with buildings and structures. To learn more about coordinating local floodplain management regulations with the I-Codes, contact the NFIP State Coordinating Agency or FEMA Regional Office listed in Appendix A. The International Code Council, in coordination with FEMA published *Reducing Flood Losses Through the International Codes®: Meeting the Requirements of the National Flood Insurance Program* for additional guidance.

Many States and communities administer building codes that are based on the model I-Codes. Because the model codes include provisions for SI/SD and local regulations also include SI/SD provisions, it is important to compare terms. In communities that use both codes and regulations to regulate SFHA development, officials need to be familiar with terms used in each, and recognize that some terms are used in one but not the other. Some terms are defined while others are simply used in context with their common meaning. Table 3-1 compares terms that are defined or used by the NFIP with terms used in the I-Codes. Some terms (noted "used in guidance documents") are not defined by the NFIP, but are used in this Desk Reference and various guidance documents listed in Appendix B.

Table 3-1. Comparison of Definitions and Terms in the NFIP and I-Codes

	NFIP	IBC	IRC	IEBC
Addition	Used in the NFIP definition of "substantial improvement." Common NFIP usage: an expansion of a building that increases the total square footage.	An extension or increase in floor area or height of a building or structure.	An extension or increase in floor area or height of a building or structure.	An extension or increase in floor area, number of stories, or height of a building or structure.
Addition, minor	Not defined in NFIP regulations; used in guidance documents. Common NFIP usage: an addition that, based on a determination, is not a "substantial improvement."	Not used in the IBC; included in definition of "Addition."	Not used in the IRC; included in definition of "Addition."	Not used in the IEBC; included in definition of "Addition."
Addition, lateral or horizontal	Not defined in NFIP regulations; used in guidance documents. Common NFIP usage: an addition that extends beyond the existing footprint. May be a minor addition or may be determined to be a "substantial improvement."	Not used in the IBC; included in definition of "Addition."	Not used in the IRC; included in definition of "Addition."	Not used in the IEBC; included in definition of "Addition."
Addition, vertical	Not defined in NFIP regulations; used in guidance documents. Common NFIP usage: an addition that extends a building upward, either by adding an upper story or by elevating the building in-place and constructing a new story underneath. May be determined to be a "substantial improvement;" less likely to be a minor addition.	Not used in the IBC; included in definition of "Addition."	Not used in the IRC; included in definition of "Addition."	Not used in the IEBC; included in definition of "Addition."

NFIP National Flood Insurance Program
IBC International Building Code
IRC International Residential Code
IEBC International Existing Building Code

Table 3-1. Comparison of Definitions and Terms in the NFIP and I-Codes (continued)

	NFIP	IBC	IRC	IEBC
Alteration	Not defined in NFIP regulations; used in the NFIP definitions "start of construction" and "historic structure." Used in NFIP guidance documents.	Any construction or renovation to an existing structure other than repair or addition.	Any construction or renovation to an existing structure other than repair or addition that requires a permit. Also, a change in a mechanical system that involves an extension, addition, or change to the arrangement, type, or purpose of the original installation that requires a permit.	Any construction or renovation to an existing structure other than a repair or addition. Alterations are classified as Level 1, Level 2, and Level 3.
Alteration, Level 1	Not used by the NFIP.	Not used in the IBC.	Not used in the IRC.	403.1 Scope. Level 1 alterations include the removal and replacement or the covering of existing materials, elements, equipment, or fixtures using new materials, elements, equipment, or fixtures that serve the same purpose. [Note: 601.3 requires alterations that constitute SI to comply with flood requirements of the IBC.]
Alteration, Level 2	Not used by the NFIP.	Not used in the IBC.	Not used in the IRC.	404.1 Scope. Level 2 alterations include the reconfiguration of space, the addition or elimination of any door or window, the reconfiguration or extension of a system, or the installation of any additional equipment. (Level 2 alternations must comply with the requirements for Level 1 and Level 2.)
Alteration, Level 3	Not used by the NFIP.	Not used in the IBC.	Not used in the IRC.	405.1 Scope. Level 3 alterations apply where the work area exceeds 50 percent of the aggregate area of the building. (Level 3 alternations must comply with the requirements for Level 1, Level 2, and Level 3.)

Table 3-1. Comparison of Definitions and Terms in the NFIP and I-Codes (continued)

	NFIP	IBC	IRC	IEBC
Building, Elevated-in-Place	Not defined in NFIP regulations; used in guidance documents. Common NFIP usage: a building that is detached from its original foundation and reattached to a new elevated foundation at the same location.	Not used in the IBC (see Addition).	Not used in the IRC (see Addition).	Not used in the IEBC (see Addition).
Building, Existing	Not defined in NFIP regulations; used in guidance documents. NFIP usage: a building that pre-dates the community's first floodplain management regulation (see Pre-FIRM).	[Existing structure means] A structure erected prior to the date of adoption of the appropriate code, or one for which a legal building permit has been issued. See also Section 1612.2.	[Existing building means] Existing building is a building erected prior to the adoption of this code, or one for which a legal building permit has been issued.	[Existing building means] A building erected prior to the date of adoption of the appropriate code, or one for which a legal building permit has been issued.
Building, Relocated	Not defined in NFIP regulations; used in guidance documents. Common NFIP usage: a building that is detached from its original foundation and moved to another location with a new foundation.	Not used in the IBC; scope of IBC includes the movement of buildings.	Not used in the IRC; scope of IRC includes movement of buildings.	409.1 Scope. Relocated buildings provisions shall apply to relocated or moved buildings. [1202.6 requires relocated buildings to comply with the flood requirements of the IBC.]
Habitable (Habitable Space)	Not defined in NFIP regulations; used in guidance documents. Uses allowed for enclosures below the base flood elevation include parking of vehicles, building access, and storage.	A space in a building for living, sleeping, eating, or cooking. Bathrooms, toilet rooms, closets, halls, storage or utility spaces and similar areas are not considered habitable spaces. [Note: habitable spaces are not all equivalent to the uses allowed below the elevated buildings in SFHAs.]	A space in a building for living, sleeping, eating or cooking. Bathrooms, toilet rooms, closets, halls, storage or utility spaces and similar areas are not considered habitable spaces. [Note: habitable spaces are not all equivalent to the uses allowed below the elevated buildings in SFHAs.]	Terms not defined in the IEBC; default to definitions in the IBC.

Table 3-1. Comparison of Definitions and Terms in the NFIP and I-Codes (continued)

	NFIP	IBC	IRC	IEBC
Non-residential	Not defined in NFIP regulations. Used in NFIP regulations and guidance documents; see "Residential."	All occupancies other than "Institutional Group I," "Residential Group R," and dwellings within the scope of the IRC (see "Residential"). [Note: From *ASCE 24-05*, Non-residential – any building or structure or portion thereof that is not classified residential.]	The scope of the IRC includes only "detached one- and two-family dwellings and townhouses not more than three stories above-grade in height with a separate means of egress and their accessory structures."	Terms not defined in the IEBC default to definitions in the IBC.
Pre-FIRM	A building for which construction or substantial improvement occurred on or before December 31, 1974, or before the effective date of an initial FIRM.	Not used in the IBC.	Not used in the IRC.	Not used in the IEBC.
Post-FIRM	A building for which construction or substantial improvement occurred after December 31, 1974, or on or after the effective date of the initial FIRM, whichever is later.	Not used in the IBC.	Not used in the IRC.	Not used in the IEBC.
Reconstruction	Not defined in NFIP regulations; used in the NFIP definition of "Substantial Improvement." Common NFIP usage: rebuilding on same foundation. Another common usage refers to ground-up reconstruction, including a new foundation. In both, the new building is treated as new construction.	Used in the IBC definition of "Repair."	Used in the IRC definition of "Repair."	Used in the IEBC definition of "Repair."
Rehabilitation	Not defined in NFIP regulations; used in the NFIP definition of "Substantial Improvement." Common NFIP usage (including "remodel") to describe work that does not increase square footage.	Used only in the IBC flood damage-resistant provisions	[Appendix J, Existing Buildings and Structures] Any repair, renovation, alteration or reconstruction work undertaken in an existing building. Used in the IRC flood damage-resistant provisions.	Any work, as described by the categories of work defined herein, undertaken in an existing building.

Table 3-1. Comparison of Definitions and Terms in the NFIP and I-Codes (continued)

	NFIP	IBC	IRC	IEBC
Renovation	Not defined in NFIP regulations; used in guidance documents. Dictionary definition is "to restore to a former better state (as by cleaning, repairing, or rebuilding)."	Used in the IBC definition of "Alteration."	Used in the IRC definition of "Alteration."	Used in the IEBC definition of "Alteration."
Repair	Not defined in NFIP regulations; used in the NFIP definition of "Substantial Improvement." Dictionary definition includes (a) act or process of repairing; (b) to restore by replacing a part or putting together what is torn or broken.	The reconstruction or renewal of any part of an existing building for the purpose of its maintenance.	The reconstruction or renewal of any part of an existing building for the purpose of its maintenance.	The restoration to good or sound condition of any part of an existing building for the purpose of its maintenance. 402.1 Scope. Repairs, as defined in Chapter 2, include the patching or restoration or replacement of damaged materials, elements, equipment or fixtures for the purpose of maintaining such components in good or sound condition with respect to existing loads or performance requirements.

Table 3-1. Comparison of Definitions and Terms in the NFIP and I-Codes (continued)

	NFIP	IBC	IRC	IEBC
Residential	Used (but not defined) in the NFIP regulations and guidance documents.	308 Institutional Group I. Institutional Group I includes, among others, the use of a building or structure, or a portion thereof, in which people are cared for or live in a supervised environment, having physical limitations because of health or age are harbored for medical treatment or other care or treatment, or in which people are detained for penal or correctional purposes or in which the liberty of the occupants is restricted. 310.1 Residential Group R. Residential Group R includes, among others, the use of a building or structure, or a portion thereof, for sleeping purposes when not classified as an Institutional Group I or when not regulated by the *International Residential Code* in accordance with Section 101.2. Residential occupancies shall include the following: *[NOTE: list that follows is not shown.]*	R101.2 Scope. The provisions of the *International Residential Code for One- and Two-family Dwellings* shall apply to the construction, alteration, movement, enlargement, replacement, repair, equipment, use and occupancy, location, removal and demolition of detached one- and two-family dwellings and townhouses not more than three stories above-grade in height with a separate means of egress and their accessory structures.	Terms not defined in the IEBC; default to definitions in the IBC.

Table 3-1. Comparison of Definitions and Terms in the NFIP and I-Codes (continued)

	NFIP	IBC	IRC	IEBC
Residential (continued)		*[NOTE: The term "residential is defined in ASCE 24-05, Residential* – (1) buildings and structures and portions thereof where people live, or that are used for sleeping purposes on a transient or non-transient basis; (2) residential structures, including but not limited to one- and two-family dwellings, townhouses, condominiums, multi-family dwellings, apartments, congregate residences, boarding houses, lodging houses, rooming houses, hotels, motels, apartment buildings, convents, monasteries, dormitories, fraternity houses, sorority houses, vacation timeshare properties; and (3) institutional facilities where people are cared for or live on a 24-hour basis in a supervised environment, including but not limited to board and care facilities, assisted living facilities, halfway houses, group homes, congregate care facilities, social rehabilitation facilities, alcohol and drug centers, convalescent facilities, hospitals, nursing homes, mental hospitals, detoxification facilities, prisons, jails, reformatories, detention centers, correctional centers, and prerelease centers.]		

Table 3-1. Comparison of Definitions and Terms in the NFIP and I-Codes (continued)

	NFIP	IBC	IRC	IEBC
Restoration	Used in the NFIP definition of "Substantial Damage." Dictionary definition includes (a) an act of restoring or the condition of being restored; (b) bringing back to a former position or condition.	Used in the definition of "Historic structures" and requirements for historic buildings.	Not used in the IRC.	Used in the IEBC definition of "Repair."
Story	Not used in the NFIP regulations. "Lowest Floor" means the lowest floor of the lowest enclosed area (including basement). An unfinished or flood damage-resistant enclosure, usable solely for parking of vehicles, building access, or storage in an area other than a basement area is not considered a building's lowest floor; Provided, that such enclosure is not built so as to render the structure in violation of the applicable non-elevation design requirements of Section 60.3.	That portion of a building included between the upper surface of a floor and the upper surface of the floor or roof next above (also see "Mezzanine" and Section 502.1). It is measured as the vertical distance from top to top of two successive tiers of beams or finished floor surfaces and, for the topmost story, from the top of the floor finish to the top of the ceiling joists or, where there is not a ceiling, to the top of the roof rafters.	That portion of a building included between the upper surface of a floor and the upper surface of the floor or roof next above.	Terms not defined in the IEBC; default to definitions in the IBC.

4 Making Substantial Improvement and Substantial Damage Determinations

4.1 Overview

Administering the SI/SD requirements requires local officials to perform four major actions: (1) determine costs, (2) determine market values, (3) make SI/SD determinations, and (4) require owners to obtain permits to bring substantially improved or substantially damaged buildings into compliance with the floodplain management requirements. This chapter describes how to determine whether work is a substantial improvement or a repair of substantial damage. The first step is to review estimates of the improvement or repair costs; this step involves deciding which costs to include and exclude. Next, the market value of the structure must be determined. There is more than one way to determine costs and market value, and the local official must examine both for reasonableness and accuracy.

> The I-Codes include, in the administrative provisions, two requirements pertinent to the data necessary to make SI/SD determinations. Applicants must:
>
> - State the valuation of proposed work, and
> - Give other data and information as required by the building official.

Communities must be prepared to explain to permit applicants how they make SI/SD determinations. Local officials should develop written procedures that can help them make and document consistent determinations and improve efficiency, especially in the post-disaster period when large numbers of buildings may be damaged.

Chapter 5 outlines community responsibilities that are specifically related to administering these SI/SD requirements. Chapter 6 describes factors to consider when evaluating permit applications and all aspects of bringing substantially improved and substantially damaged buildings into compliance; it also includes illustrations of improvements and repairs.

Chapter 7 addresses handling substantial damage in the post-disaster period, with recommendations for planning ahead to be prepared for the added workload and demands on staff and resources. It describes some methods that can help communities focus their efforts when many damaged buildings may have to be evaluated. It also describes FEMA's *Substantial Damage Estimator* (SDE) software that communities can use to collect information about damaged buildings in order to make substantial damage determinations.

4.2 Accuracy and Verification

Costs of proposed repairs or improvements and market values are needed to determine whether proposed work is SI/SD. Methods for obtaining this information are described in Sections 4.4 and 4.5, respectively. Local officials are responsible for verifying that the data are complete and reasonable. The local official is responsible for reviewing the validity of all cost estimates provided by applicants, whether prepared by licensed contractors, engineers, architects, professional cost estimators, or by property owners. When work is repair of damage, an inspection visit should be made to verify that the proposed work is all of the work that is necessary to restore the building to its pre-damage condition.

Applicants may disagree with a community's SI/SD determination. In these cases, the burden is on the applicant to provide improved cost estimates or to obtain a professional appraisal of market value. The local official is responsible for reviewing the new information. In some cases, applicants may seek a formal appeal of the local official's decision (Section 5.6.6).

To be consistent, local officials should document their decisions and the documentation should be retained in the community's permit records. A sample worksheet that can be used to document SI/SD determinations is included in Appendix D. Maintaining good records and documentation is especially critical if a community has elected to administer a cumulative SI/SD requirement (Section 5.7.3).

4.3 Making SI/SD Determinations

Work on buildings ranges from routine maintenance and minor repairs (which may not require permits) to work that costs more than 50 percent of a structure's market value. Local officials who are responsible for administering their floodplain management regulations or codes are responsible for determining whether work is SI/SD. Other entities, such as insurance claims adjusters, may make estimates of damage for purposes of adjusting damage claims. However, an adjuster's estimate must not be used to make SI/SD determinations because the estimates of damage that determine the amount of a claim payment may not include all of the costs to repair the building to its pre-damage condition.

Consistency is important. Communities should decide in advance how they will handle significant flood events and develop written procedures for making decisions. It is easier to defend SI/SD determinations if all applicants are treated the same, especially when many buildings have been damaged (see Chapter 7).

Figure 4-1 illustrates an overview of the steps in the SI/SD determination that are described in detail in this Desk Reference. Once the cost of the work and the market value of the structure have been determined, the local official must make a final determination. The work is SI/SD if the ratio of the cost of work to the market value equals or exceeds 50 percent:

$$\frac{\text{Cost of Improvement or Cost to Repair to Pre-Damage Condition}}{\text{Market Value of Building}} \geq 50\%$$

Communities may use a combination of sources for the data needed to make SI/SD determinations. For example, a community may make SI/SD determinations based on applicant-supplied costs of repairs or improvements and community-obtained market values.

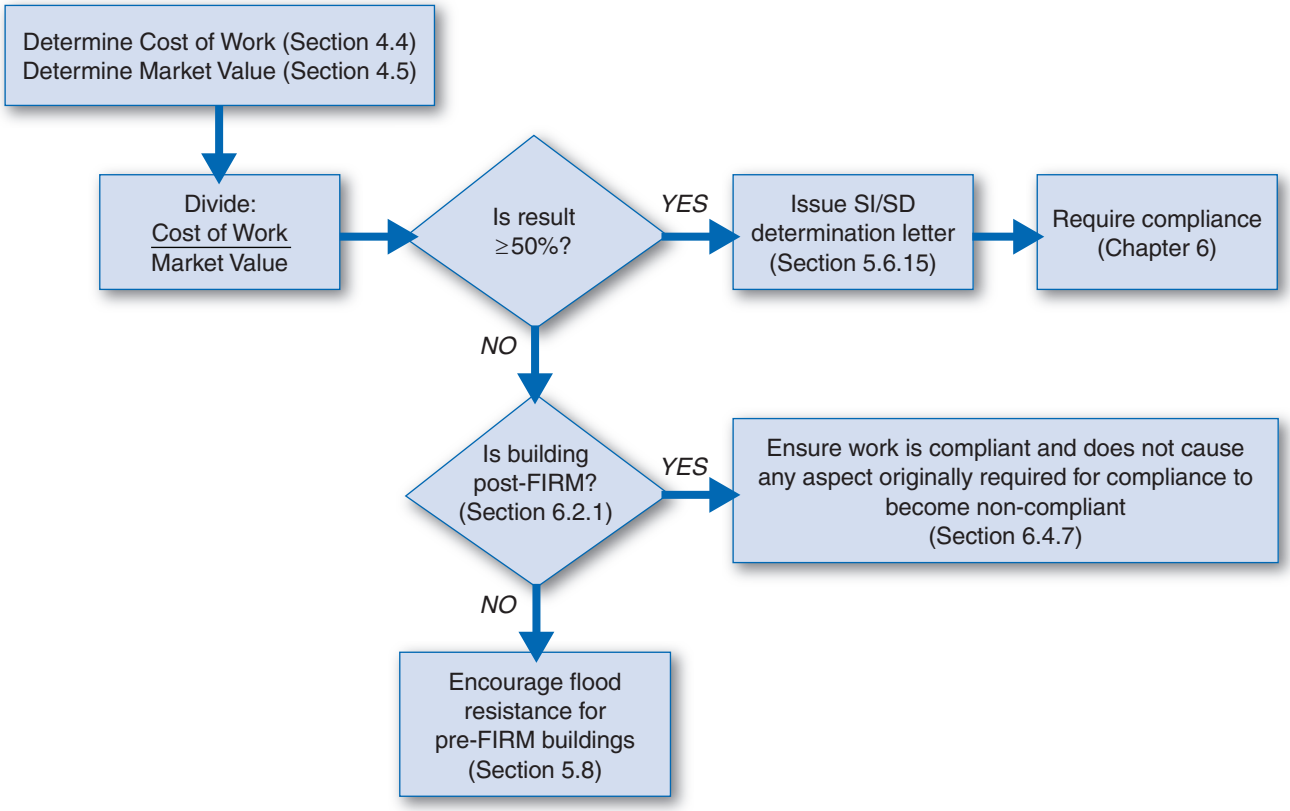


Figure 4-1. Make the SI/SD determination (overview)

4.3.1 SI/SD Provisions in the 2006 and 2009 I-Codes

The IBC and IRC apply to new construction and also to alteration, movement, enlargement, replacement, and repair of existing buildings. The IBC, the IRC, and the IEBC include SI/SD provisions that are consistent with the NFIP's requirements. The specific code provisions are described below:

- **IBC.** The IBC relies on the definitions of "substantial improvement" and "substantial damage" in Section 1612. The code official must determine whether any alteration, repair, or addition to existing buildings, or work associated with a change of occupancy or moved buildings, meets those definitions. Section 1612.1 states that "all new construction of buildings, structures, and portions of buildings and structures, including substantial improvement and restoration of substantial damage to buildings and structures, shall be designed and constructed to resist the effects of flood hazards and flood loads." In addition, the requirements for existing buildings, including historic buildings, are found in IBC Chapter 34.
- **IRC.** The IRC contains detailed administrative provisions in Chapter 1:
  - **R105.3.1.1 Substantially improved or substantially damaged buildings and structures in areas prone to flooding.** This section specifies that the building official shall examine

applications and prepare a finding with regard to the value of the proposed work. If the value equals or exceeds 50 percent of the market value of the building before the damage occurred or the improvement is started, the finding is provided to the board of appeals.

- **R112.2.1 Determination of substantial improvement in areas prone to flooding.** This section requires the board of appeals to determine if a proposal, referred to the board by the building official pursuant to Section R105.3.1.1, constitutes a substantial improvement (or repair of substantial damage). If the proposed work is found to be a substantial improvement or repair of substantial damage, the work must meet the requirements of Section R324 (Flood-Resistant Construction).

- **IEBC.** The IEBC is organized based on the nature of the work: repairs; repair of damaged buildings; alterations (Levels 1, 2, and 3); work associated with change of occupancy classification; additions (horizontal, vertical, new/raised foundations); and relocated or moved buildings. These characterizations of work are similar to those used in Chapter 6 (also see Table 3-1, which lists the definitions and terms used in the IEBC). The provisions of the IEBC that pertain to flood resistance are all triggered by a determination of whether the work constitutes a substantial improvement or a repair of substantial damage. When that occurs, the IEBC requires the building to be brought into compliance with the flood damage-resistant provisions of the IBC (located in IBC Section 1612). The IEBC also includes provisions for historic structures that are located in SFHAs.

4.4 Determining Costs of Improvements and Costs to Repair

The term "costs of improvements" includes the complete costs associated with all of the types of work that are described in Chapter 6. The term "costs to repair" includes the costs of all work necessary to restore a damaged building to its pre-damage condition. Both terms include the costs of all materials, labor, and other items necessary to perform the proposed work. Costs that must be included are described in Section 4.4.1 and certain costs that may be excluded are described in Section 4.4.2. Figure 4-2 illustrates the steps that local officials need to take in order to determine costs for making SI/SD determinations.

The term "substantial damage" refers to the repairs of all damage sustained and cannot reflect a level of repairs that is less than the amount of the damage sustained. If an owner does not intend to repair the damaged building right away or if the owner cannot afford to make all repairs immediately, the local official should inspect the property to determine whether, based on estimates, the work required to restore it to its pre-damage condition will constitute substantial damage. If this is the case, then the cost to repair is compared to the building's market value and the local official should provide written notice to the owner of the substantial damage determination. The local official should include in the written notice information about obtaining permits and about the floodplain management requirements that must be met. Further, sometimes these buildings also are improved beyond their pre-damage condition. If proposed, then the cost of improvements must be included along with the cost to repair to make the SI/SD determination. Note that the substantial damage requirement applies regardless of the cause of damage, such as wind or fire.

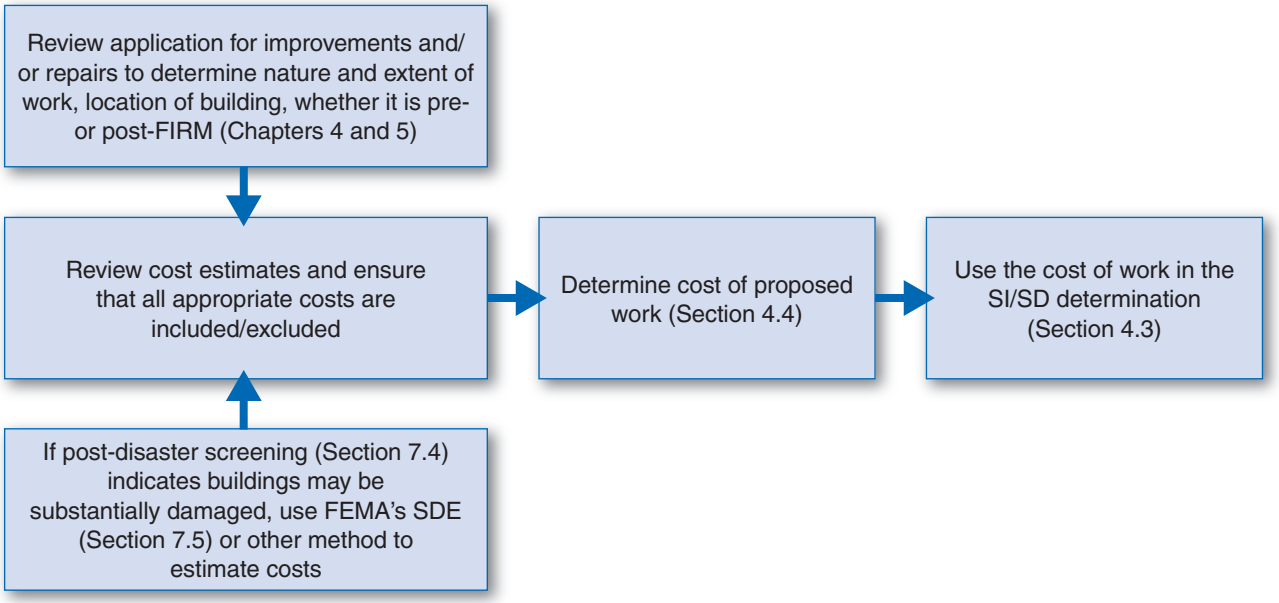


Figure 4-2. Determine the cost of work (overview)

The following topics related to determining costs will be covered in this section:

- Costs that must be included
- Costs that may be excluded
- Acceptable sources of cost information
- Estimates of donated or discounted materials
- Estimates of owner and volunteer labor
- Demolition, debris, and disposal
- Clean-up and trash removal
- Cost exclusions to correct existing health, safety, and sanitary code violations

Local officials will need to determine the necessary level of detail for the costs of improvements and costs of repairs from permit applicants or contractors in order to make a SI/SD determination.

4.4.1 Costs That Must be Included in SI/SD Determinations

Items that must be included in the costs of improvement and the costs to repair are those that are directly associated with the building. The following list of costs that must be included is not intended to be exhaustive, but characterizes the types of costs that must be included:

- Materials and labor, including the estimated value of donated or discounted materials (Section 4.4.4) and owner or volunteer labor (Section 4.4.5)
- Site preparation related to the improvement or repair (e.g., foundation excavation or filling in basements)
- Demolition and construction debris disposal (Section 4.4.6)

- Labor and other costs associated with demolishing, moving, or altering building components to accommodate improvements, additions, and making repairs
- Costs associated with complying with any other regulations or code requirement that is triggered by the work, including costs to comply with the requirements of the Americans with Disabilities Act (ADA)
- Costs associated with elevating a structure when the proposed elevation is lower than the BFE
- Construction management and supervision
- Contractor's overhead and profit
- Sales taxes on materials
- Structural elements and exterior finishes, including:
  - Foundations (e.g., spread or continuous foundation footings, perimeter walls, chain-walls, pilings, columns, posts, etc.)
  - Monolithic or other types of concrete slabs
  - Bearing walls, tie beams, trusses
  - Joists, beams, subflooring, framing, ceilings
  - Interior non-bearing walls
  - Exterior finishes (e.g., brick, stucco, siding, painting, and trim)
  - Windows and exterior doors
  - Roofing, gutters, and downspouts
  - Hardware
  - Attached decks and porches
- Interior finish elements, including:
  - Floor finishes (e.g., hardwood, ceramic, vinyl, linoleum, stone, and wall-to-wall carpet over subflooring)
  - Bathroom tiling and fixtures
  - Wall finishes (e.g., drywall, paint, stucco, plaster, paneling, and marble)
  - Built-in cabinets (e.g., kitchen, utility, entertainment, storage, and bathroom)
  - Interior doors
  - Interior finish carpentry
  - Built-in bookcases and furniture
  - Hardware
  - Insulation

- Utility and service equipment, including:
  - Heating, ventilation, and air conditioning (HVAC) equipment
  - Plumbing fixtures and piping
  - Electrical wiring, outlets, and switches
  - Light fixtures and ceiling fans
  - Security systems
  - Built-in appliances
  - Central vacuum systems
  - Water filtration, conditioning, and recirculation systems

4.4.2 Costs That May be Excluded from SI/SD Determinations

Items that can be excluded are those that are not directly associated with the building. The following list characterizes the types of costs that may be excluded:

- Clean-up and trash removal (Section 4.4.7)
- Costs to temporarily stabilize a building so that it is safe to enter to evaluate and identify required repairs
- Costs to obtain or prepare plans and specifications
- Land survey costs
- Permit fees and inspection fees
- Carpeting and recarpeting installed over finished flooring such as wood or tiling
- Outside improvements, including landscaping, irrigation, sidewalks, driveways, fences, yard lights, swimming pools, pool enclosures, and detached accessory structures (e.g., garages, sheds, and gazebos)
- Costs required for the minimum necessary work to correct existing violations of health, safety, and sanitary codes (Section 4.4.8)
- Plug-in appliances such as washing machines, dryers, and stoves

4.4.3 Acceptable Sources of Cost Information

The costs of improvements and the costs to repair are necessary to make the SI/SD determination. The following are acceptable methods to determine the costs:

- Itemized costs of materials and labor, or estimates of materials and labor that are prepared by licensed contractors or professional construction cost estimators.
- Building valuation tables published by building code organizations and cost-estimating manuals and tools available from professional building cost-estimating services. These sources can be used as long as some limitations are recognized, notably that there are local

variations in costs and the sources do not list all types and qualities of structures. These sources should not be used for structures that are architecturally unique, exceptionally large, or significantly different from the classes of structures that are listed.

- "Qualified Estimate" of costs that are prepared by the local official using professional judgment and knowledge of local and regional construction costs. This approach is most often used post-disaster when there are large numbers of damaged buildings and when permits must be quickly processed.
- Building owners may submit cost estimates that they prepare themselves. If the community is willing to consider such estimates, owners should be required to provide as much supporting documentation as possible (such as pricing information from lumber companies and hardware stores). In addition, the estimate must include the value of labor, including the value of the owner's labor (Section 4.4.5).

FEMA developed the *Substantial Damage Estimator*, summarized in Section 7.5, to provide estimates of building values and costs to repair. In general, this method is most often used in the post-disaster period when local officials need to inspect large numbers of damaged structures and make many substantial damage determinations.

4.4.4 Estimates of Donated or Discounted Materials

To help make improvements or repairs to damaged homes, some organizations and individuals donate materials, and some companies donate or provide materials at a discount. The value placed on all donated or discounted materials should be equal to the actual or estimated cost of such materials and must be included in the total cost. Where materials or servicing equipment are donated or discounted below normal market values, the value should be adjusted to an amount that would be equivalent to that estimated through normal market transactions.

As part of the documentation required for a permit, the applicant should provide cost estimates of the value of donated or discounted materials based on actual or estimated costs. This estimate should be verified by the local official based on professional judgment and knowledge of local or regional material costs. Some communities help non-profit organizations and applicants make these estimates.

4.4.5 Estimates of Owner and Volunteer Labor

The situations described in Section 4.4.4 that involve donated or discounted materials may also involve volunteer labor. Also, property owners may undertake fairly significant improvement and repair projects on their own. In both cases, the normal "market" value or "going rate" for labor must be included in the estimates of the cost of improvements and the costs to repair. After significant events, labor rates may change and should be taken into account.

Labor rates vary geographically and by the nature of the work and trade required. As part of the documentation required for a permit, the applicant should provide an estimate of the value of owner or volunteer labor. The value placed on labor should be estimated based on applicable minimum-hour wage scales for the skill and type of construction work that is done. This

estimate should be verified by the local official based on professional judgment and knowledge of the local or regional construction industry wage scales. Some communities help non-profit organizations and permit applicants make these estimates.

4.4.6 Demolition and Construction Debris Disposal

Demolition and construction debris disposal is not the same as clean-up and trash removal (Section 4.4.7). Virtually any type of work on a building requires some demolition. It may be as little as removing the flooring or an interior wall, or as much as complete removal of a portion of the building and its foundation. Demolition may be part of an improvement project and usually is a necessary part of repairing damage. The costs of demolition, including the costs of disposal of the resulting debris, must be included in the cost of work for the purpose of making the SI/SD determination.

4.4.7 Clean-up and Trash Removal

Clean-up and trash removal are distinguished from demolition and construction debris disposal (Section 4.4.6). Clean-up and trash removal costs are not included in the costs used in the SI/SD determination because they are not related to the actual cost of improving or repairing a building.

Clean-up costs include such work as draining a basement; removing dirt and mud; and cleaning, disinfecting, and drying out buildings. Trash removal includes disposing of trash piled in the interior of the building or accumulated on the lot and related costs (e.g., dumpster, hauling, and tipping fees), as well as removal of abandoned contents and debris related to general clean-up of the structure before the improvement or repairs can be performed.

If clean-up and trash removal are done at the same time as demolition and construction debris disposal, a cost estimate should clearly distinguish between costs that must be included and costs that may be excluded. Local officials can:

- Require property owners to submit itemized costs from all contractors, clearly identifying the costs related to trash disposal and clean-up from those related to demolition necessary to perform the work on the building, or
- Based on judgment and knowledge of local costs, estimate the amounts to be excluded. The permit record should contain documentation of the basis for making this estimate.

4.4.8 Costs to Correct Existing Health, Safety, and Sanitary Code Violations

The definition of substantial improvement provides an exclusion for "[a]ny 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" (emphasis added).

When deciding whether to exclude the costs to correct existing cited health, safety, and sanitary code violations, local officials must consider the following:

- **Correct existing cited violations.** The work must be:
  - Limited to that necessary to correct an existing violation. This means that only work that is directly required for correction can be excluded from the costs of the proposed improvement or repair. All other work must be counted in the estimation of costs.
  - Required to correct an existing violation. This means the condition considered in violation pre-dates the application for a permit (or the date of a damage event) and, importantly, an official who has the authority to enforce the community's health, safety, and sanitary codes must have prior knowledge of the condition and must have verified that it constitutes a violation.
  - Required to correct an existing violation. Violations of a community's health, safety, and sanitary represent threats to public health and safety. Such conditions are considered violations only if they have been identified as violations. The mere presence of a condition that does not conform to current codes does not qualify as a violation.
- **Identified by the local code enforcement official.** To exclude certain costs from the SI/SD determination, an official who has the authority to enforce the community's health and sanitary codes must have knowledge of and have identified the condition, and must have verified or determined that the condition constitutes a violation (normally, this involves issuing a citation or other official notice). Communities might not make a routine practice of inspecting structures in order to document and issue citations for violations. If likely violations of health and sanitary codes are identified by the property owner or contractor during the course of deciding what work to perform and before any improvements or repairs are made, the costs to address those code violations may be excluded, but only if the local official has made the determination that they can be excluded.
- **Minimum necessary to ensure safe living conditions.** To qualify as excludable, the cost of correcting existing violations must be only those costs for the work that is the minimum necessary to address and resolve the violation. Costs of work in excess of the minimum necessary must be included in the SI/SD determination.

For proper treatment of this substantial improvement exclusionary provision, a clear distinction must be made between violations and elements that simply do not meet the present-day design or building code standards. The following examples describe situations where the work performed to meet code requirements must be included in SI/SD determinations and some situations where costs may be excluded:

- Work on a building, or work associated with a change in use or occupancy, may trigger requirements for compliance with the current code. When this occurs, the costs associated with compliance do not qualify for exclusion because the work is not a code violation, but is necessary to meet current code. For example, consider an applicant who applies for a permit to perform work necessary for a change of occupancy from retail space to a restaurant. This will trigger certain code requirements and those costs must be included in the SI/SD determination. Costs that are related to compliance with current code requirements, but are not related to correcting existing violations must be included.

- The owner of a poorly insulated building proposes to rehabilitate it for a new occupant. Although the building does not conform to the current code for energy efficiency, the costs of adding insulation and other energy efficiency work must be included because the lack of adequate insulation is not a health and safety violation.
- An owner proposes to improve a building and has applied for a permit. The owner presents the building official with evidence of termite damage. Termite damage is discovered in the floor joints and the joists are unable to safely support loads required by current code. The building official verifies that it constitutes a violation and cites it as a safety code violation. The minimum cost to correct this violation may be excluded if the violation was cited. If other building components have sustained termite damage that is not a safety code violation, such as damage to non-bearing wall studs and wall trim, the cost to address the damage must be included.
- A restaurant's plumbing system is failing and bathroom fixtures are inoperable. The condition is cited as a violation of the sanitary code. The owner proposes not only to correct the violation but make other improvements, including adding a second bathroom. The costs to correct the failing plumbing system and replace its fixtures may be excluded. The costs of the other improvements, including the second bathroom, must be included.
- In the course of inspecting an abandoned building, the code official cites several conditions as violations that must be corrected before the building can be reoccupied. The building is subsequently purchased and the new owner applies for a permit to not only address the violations, but also to rehabilitate the building. Only the costs to correct the cited violations that are explicitly related to health, sanitary, and safety code requirements may be excluded. All other costs associated with the rehabilitation must be included in the cost of improvements.
- The owner of a home has been notified that the home is not safe to occupy because of violations of the electrical code provisions. Rather than perform only the required repairs, the owner decides to completely renovate the home and submits an application that shows all renovation costs, while excluding the costs associated with all of the electrical work (including replacing all wiring and fixtures, installing more outlets, upgrading the panel board, etc.). The plan reviewer should catch this discrepancy. The only costs that may be excluded are those that are necessary to correct the violation – which means the costs associated with the code violation must be determined before they can be excluded from the SI/SD determination. All other costs associated with the upgrade of the electrical work must be included.

4.5 Determining Market Value

For purposes of making SI/SD determinations, local officials need to determine the "market value" of structures in question. When work is an improvement, the market value is the building's market value "before the 'start of construction' of the improvement." When work is repair of substantial damage, the market value is the building's market value "before the damage occurred." If buildings have not been maintained and have deteriorated over time, then the market value is determined as of the date of the application for the permit to improve or repair the building.

The NFIP regulations do not define "market value." Generally, market value can be explained as the amount an owner would be willing but not obliged to accept, and that a buyer would be willing but not compelled to pay. The term may be defined by State statutes that pertain to zoning, property taxation, or real estate transactions.

Before reviewing options to determine the market value of a structure, it is important to note two basic NFIP requirements:

- Market value must always be based on the condition of the structure before the improvement is undertaken or before the damage occurred.
- Only the market value of the structure is pertinent. The value of the land and site improvements (landscaping, driveway, detached accessory structures, etc.) and the value of the use and occupancy (business income) are not included. Any value associated with the location of the property should be attributed to the land, not the building.

Many communities require the permit applicant to obtain an appraisal of market value from a qualified professional who is licensed to perform appraisals in the State or community where the property is located (Section 4.5.1). In addition, three other methods to estimate market value are covered in this section:

- Assessed value developed for property tax assessment purposes, adjusted to approximate market value (Section 4.5.2)
- Estimates of a structure's actual cash value, including depreciation (Section 4.5.3)
- "Qualified estimates" based on the professional judgment of a local official (Section 4.5.4)

Figure 4-3 illustrates the steps local officials need to take in order to determine market values. Additional guidance on estimating market value following disasters is provided in Chapter 7.

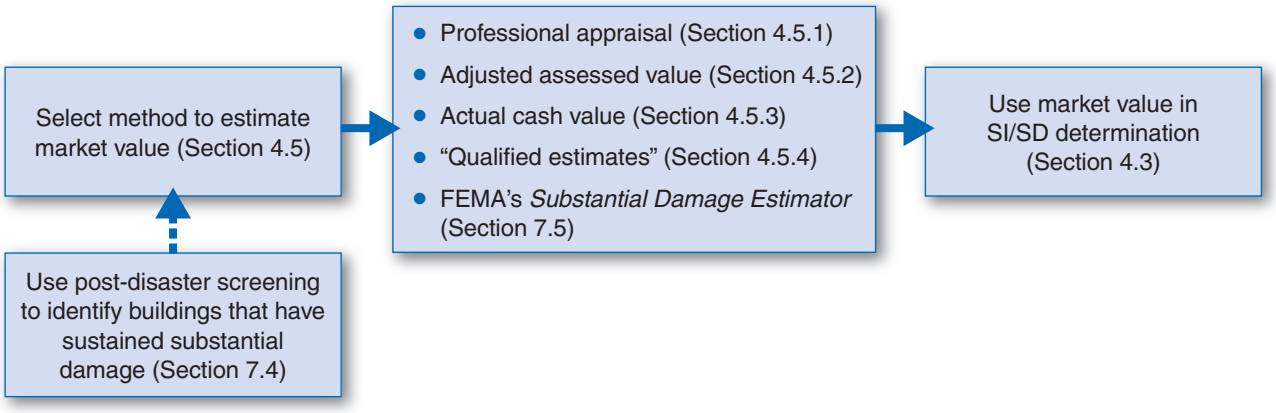


Figure 4-3. Determine the market value (overview)

4.5.1 Professional Property Appraisals

Property appraisals that are prepared by a professional appraiser according to standard practices of the profession are the most accurate and reliable method for determining market value. Professional appraisers should be qualified to appraise the type of property (e.g., residential, commercial, industrial) and should be licensed in the State or community in which the property is located. Most States require professional property appraisers to be licensed and to perform valuation work in accordance with the quality control standards found in the *Uniform Standards of Professional Appraisal Practice*, which are maintained and administered by The Appraisal Foundation (http://www.appraisalfoundation.org). In those States that require use of the standards, local officials should check that market value appraisals prepared to support SI/SD determinations have a statement regarding conformance with this standard.

Appraisal reports should identify intended users, including the property owner, who can then submit it as part of a permit application. In addition, the appraisal should be recent enough to reasonably reflect current market value as of the date of the permit application. When used to determine market value for damaged buildings, the appraisal must reflect the pre-damage condition. The "market approach" for determining market value works best if there are adequate market data and recent sales of comparable properties in the vicinity. Note that using the "income capitalization approach" is not acceptable because it is based on how the property is used, and not the value of structure alone. To separate the market value of a structure from the value of the land on which it is located, appraisers may need to do more research than is normally undertaken in order to reasonably allocate the total value between the structure and the land.

The following are situations where the local official may require the applicant to provide a professional appraisal to determine the market value of a structure:

- When it is written explicitly into the community's floodplain management regulations or required by other local or State codes that independent appraisals shall be used for decisions related to non-conforming use permits.
- When the estimating methods that are used post-disaster (Section 7.4) yield a market value that indicates that the cost of proposed work closely approaches 50 percent of the structure's estimated market value.
- When an applicant disagrees with the community's SI/SD determination.

When a professional appraisal of market value is submitted, the local official is responsible for examining it to determine that it is reasonable for the specific characteristics of the building and to check that it does not include the value of land, land improvements (e.g., landscaping, paving), and accessory buildings. The market value of a non-residential building does not include the value of the use or occupancy. If there is cause to question the appraisal (for example, if it appears to overvalue the structure), the local official may request that another appraisal be provided.

4.5.2 Adjusted Assessed Value

Generally, assessed values or property assessments are determined by the State or local taxing or assessment authority. The assessor's job is to independently estimate the market value of real property. Assessments usually provide both land value and value of improvements, and are used as the basis for determining property taxes. Assessments are revised or adjusted periodically to account for changes in property values. The use of assessed value has some limitations that, if not considered and accounted for, can produce erroneous estimates of market value. These limitations are:

- **Appraisal cycle.** How often are the appraisals done and when was the date of the last appraisal? Market value estimates can be grossly outdated if the cycle is long and the property happens to be in the latter stage of its cycle and has not been appraised for many years.
- **Land values.** In most cases, land values and the value of improvements (structures) thereon will be assessed separately and listed as such in the tax records. In cases where they are not distinguished, a determination of the value of the land will have to be made and subtracted from the total assessed value.
- **Assessment level.** States and local taxing authorities vary in assessment levels (an established statutory ratio between the assessor's estimate of value and the true fair market value). For example, many States use an assessment level of 90 percent. In this case, the assessed values will underestimate market values by 10 percent. In cases where the assessment level is unacceptably low or where the projected ratio of cost of repair to market value is close to 50 percent, adjustments for assessment level must be made.

Local officials who elect to use assessed values for making SI/SD determinations should consult the authority that prepares the assessment values to understand the limitations on use of the data. Usually an adjustment factor is necessary because the assessed values cannot be used as a direct equivalent for current market value. The assessor's office should provide the adjustment factor that, when applied to assessed value, yields the "adjusted assessed value" that can then be used as an estimate of market value. A copy of the adjustment factor justification should be retained with the community's permanent records.

Adjusted assessed value may be used as a screening technique to separate out structures for which the ratio of repair or improvement costs to market value (adjusted assessed value) are obviously less than or greater than 50 percent. In post-disaster situations where no other market value estimates are available or where the number of permit applications is overwhelming, unadjusted assessed values may have to suffice as the definitive estimate of market value.

"Unadjusted assessed values" can be used to help local officials focus their efforts when large numbers of SD determinations must be made, such as after a disaster (Section 7.3.2).

An owner may appeal the use of assessed value, but the burden of proof can be placed on the applicant who can be required to submit an independent professional property appraisal that is prepared by a qualified appraiser.

4.5.3 Actual Cash Value

Actual cash value (ACV) is the cost to replace a building on the same parcel with a new building of like-kind and quality, minus depreciation due to age, use, and neglect. ACV does not consider loss in value simply due to outmoded design or location factors. The concept of ACV is used in both the insurance industry and the construction industry. In most situations, ACV is a reasonable approximation of market value.

A number of commercial sources of construction cost information are available to support estimating the replacement cost of a building, including industry-accepted guides available from companies such as RSMeans (http://www.rsmeans.com) and the Craftsman Book Company (http://www.craftsman-book.com), among others. These sources allow computation of construction costs based on occupancy, square footage, quality, and regional cost variations.

Depreciation accounts for the physical condition of a structure. Depreciation does not take into account functional obsolescence (e.g., outmoded design or construction that pre-dates current codes) or factors that are external to the structure (e.g., reputation of schools or distance to shopping and parks). Commercially available references provide tables and formulas to calculate physical depreciation. These tables and formulas are objective and are used by most professionals in the fields of property appraisal and building inspection. Local officials may consult with a qualified appraiser regarding depreciation, or additional guidance for applying depreciation rates over time is found in FEMA P-784 CD, *Substantial Damage Estimator* (Section 7.5).

4.5.4 Qualified Estimates

A "qualified estimate" of a structure's market value is an estimate developed by a qualified local official who has sufficient experience and professional judgment on which to base such estimates. The local official may be in the building department or in the tax assessor's office. The estimates should be made using the best available information, which may include recent permit records, recent home sales, regional cost data, estimates of depreciation based on knowledge of the pre-damage condition of buildings, and adjustments for unique or distinctive features of individual buildings. Another way that a local official may develop qualified estimates is if professional appraisals have been prepared for a few buildings; in that case, those results may be used to approximate the market values of similar buildings. This approach should be used only if the approaches described above cannot be used. Qualified estimates are most likely to be used in the post-disaster situation after large numbers of buildings have been damaged.

5 Administering Substantial Improvement and Substantial Damage Requirements

5.1 Overview

This chapter covers administrative topics, including community responsibilities and the responsibilities of property owners and permit applicants. It highlights options for informing the public about the SI/SD requirements and the need to get permits. Several matters that arise when reviewing permits are addressed in detail.

Chapter 4 focused on making SI/SD determinations and the data that are necessary to make those determinations, including the cost of improvements, the cost of repairs, and the market value of buildings. Chapter 6 includes illustrations of SI/SD, and explains certain NFIP flood insurance implications related to SI/SD. Chapter 7 recommends ways to handle substantial damage in the post-disaster period, especially when many buildings are damaged. Chapter 8 provides brief descriptions of common types of flood mitigation projects that may be eligible for funding by FEMA's five Hazard Mitigation Assistance grant programs.

5.2 Community Responsibilities

When a community decides to participate in the NFIP, it accepts the responsibility to adopt, administer, and enforce floodplain management provisions that either meet or exceed the minimum NFIP requirements. The following describes the responsibilities that specifically apply to administering the SI/SD requirements:

- Review permit applications to determine whether improvements or repairs of buildings in SFHAs constitute substantial improvement or repair of substantial damage.
- Review descriptions of proposed work submitted by applicants to ensure that all requirements are addressed.
- Review cost estimates of the proposed work submitted by applicants and determine if the costs are reasonable for the proposed work, or use other acceptable methods to estimate the costs.
- Decide the method to determine market value (including which method to use after an event that damages many buildings) and identify the buildings most likely to have sustained substantial damage.

> Even if work on a building is determined to not constitute SI/SD, owners can do a lot to reduce future flood damage. Some recommendations that local officials may wish to encourage are listed in Section 5.8.

- Review market value appraisals, if submitted by applicants, to determine if the appraisals reasonably represent the characteristics of the building and the market value of the structures (excluding land value).
- Determine if proposed improvements are substantial improvements based on the costs of the proposed work compared to the market value of the building.
- Determine if damaged buildings are substantially damaged based on cost estimates for repairs compared to the market value of the building before the damage occurred.
- Issue a letter to the property owner to convey the SI/SD determination. If NFIP-insured buildings are substantially damaged by flooding, this letter is necessary for owners to file an Increased Cost of Compliance (ICC) claim to help pay to bring buildings into compliance (Section 7.6).

Local building officials have the authority to condemn buildings that are judged to be unfit for occupancy. Judging whether to condemn a building and making a determination of substantial damage are separate decisions. A condemned building might not be substantially damaged and a substantially damaged building might not have conditions that warrant condemnation.

- Retain all versions of the Flood Insurance Rate Maps (FIRMs) and allow citizens to access the maps. The most recent map, called the "effective" map, is to be used to regulate development, including substantial improvements. Earlier versions of the maps are necessary to verify BFE data for post-FIRM buildings that pre-date the current effective maps.
- Maintain in the permit file specific information on all development that occurs within the SFHA and make this information available for public inspection. The documentation should include the lowest floor elevations, other pertinent elevations such as for machinery and equipment, and flood protection designs.
- Conduct periodic field inspections during construction to ensure that development complies with issued permits, work with builders and property owners to correct deficiencies and violations, and check for unpermitted development.
- Perform assessments after events that cause damage, inform property owners of the requirement to obtain permits for repairs, and determine whether the damage qualifies as substantial damage.
- Coordinate with property owners and insurance adjusters regarding NFIP flood insurance claims and ICC coverage.

5.3 Property Owner/Applicant Responsibilities

Property owners and applicants for permits have certain responsibilities that are implicit when a community adopts regulations and building codes that apply to their properties. First and foremost, they have a responsibility to comply with the requirements that are enforced by communities, including floodplain management requirements. The following is a summary of those responsibilities pertinent to the SI/SD requirements:

- Find out if a permit is required. Most property owners – and all contractors – understand that permits are required for some types of work. It is common for owners to specify

that contractors obtain permits. However, sometimes owners assume that contractors automatically do so and, as a result, the work may be undertaken without permits. Legally, the responsibility lies with the owner.

- Submit complete information about all proposed improvements and all repairs to be undertaken, including the costs of all work (and valuations of work that the owner or volunteers will perform, including estimated costs of donated materials).
- Share information from insurance claims adjusters, if requested by the local official.
- Provide a professional appraisal of the market value of the building if requested by the local official (or accept the market value estimation made by the local official).
- Comply with the approved plans and limitations specified in the issued permit and the approved construction documents.
- Inform the local official if new work is to be added to the work already authorized by an issued permit. New work must be reviewed to determine whether the community's floodplain management regulations apply.
- Contact the community to schedule inspections at the appropriate times and submit surveyed elevation data when required by the local official.
- Provide "as-built" surveyed elevation data (e.g., FEMA's *Elevation Certificate*) to the local official to determine compliance (the *Elevation Certificate* also is necessary for insurance agents to determine the appropriate rate for NFIP flood insurance policies).
- Maintain enclosed areas below elevated buildings as compliant enclosures by not altering any aspect required by the permit, including limitations on use for parking of vehicles, building access, and storage.

5.4 Important Community Actions

Communities routinely process permit applications for work on existing buildings. For buildings located in SFHAs, work that constitutes substantial improvement triggers the requirement to bring buildings into compliance. Some property owners may view this as an undue burden that may cost them considerably more than the work originally proposed. Therefore, it is important that communities have a well-established process that treats all owners in a consistent manner. This is especially important in communities that have large numbers of buildings in their floodplains that could be damaged by a single event.

The remaining sections of this chapter will describe the following important community actions with respect to SI/SD:

- Informing the public (application forms, websites, handouts)
- Administering the SI/SD requirements
- Exceeding the NFIP minimum floodplain management requirements
- Recommendations to improve flood resistance

5.5 Informing the Public

Most property owners understand that building permits are required when they want to have work done on their buildings. However, they are rarely aware of the requirements that apply when buildings are located in SFHAs. Informing the public about the requirements may alleviate some of the difficulties that can occur when uninformed owners apply for permits. Successful outreach methods employed by communities include:

- Permit counter staff and inspectors are trained and familiar with the SI/SD requirements and other requirements for development in SFHAs and they all convey the same message when talking with property owners and contractors.
- Permit application forms or supplements to applications are designed specifically to capture information about work proposed for buildings in SFHAs.
- Handouts at the permit counter explain floodplain requirements, including the SI/SD requirements.
- Information is posted online about permit requirements, including SI/SD requirements in the SFHA.
- Newsletters and brochures are used for periodic mailings, such as those described in guidance materials developed for the NFIP's Community Rating System (Section 5.7.1).

5.5.1 Permit Application Forms

A permit is required for almost every type of development that is proposed in the mapped SFHA. Local permit application forms should be designed to collect the information needed to make SI/SD determinations. Permit forms should require applicants (or their contractors) to provide detailed descriptions of the proposed work and detailed breakdowns of the costs of work, as this information is essential for making SI/SD determinations. Some communities that have many buildings in their SFHAs have developed detailed permit application forms to help them review proposals for work in SFHAs, including work on existing buildings.

Forms and checklists help ensure that all applicants are treated consistently. They also make it easy for the local official to document SI/SD determinations and to retain that documentation in permanent records.

Appendix D includes a sample notice called "Sample Notice for Property Owners, Contractors, and Design Professionals" that includes a summary of the "50% rule," information about property valuation, a list of items to be included and excluded in the cost of work, and a cost-breakdown sheet. The sample notice includes two affidavits to be signed by the owner and the contractor. The affidavits are used to confirm that the work described in an application is all of the work that will be done.

5.5.2 Websites and Handouts

Most communities have websites designed to provide information for their citizens. Websites often include sections to explain requirements for various permits and approvals. Some even

have online permit application capabilities. Increasingly, citizens, designers, and contractors are turning to websites to learn about regulations and requirements. Posting information online about development requirements in SFHAs is helpful for communities and their citizens.

Despite the increased use of the Internet, most communities still provide printed materials. Many communities distribute newsletters and brochures to their citizens, including materials related to flood hazards, flood insurance, and SFHA construction requirements.

5.6 Administering the SI/SD Requirements

The NFIP requires communities to review all applications for development in SFHAs and to apply their floodplain management regulations and building codes to work that is proposed on existing buildings. Chapter 4 described making SI/SD determinations, estimating costs, and estimating market values. This section addresses several topics that local officials encounter when administering floodplain management regulations and building codes pertaining to SI/SD:

- Combinations of types of work
- Phased improvements
- Incremental repair of damaged buildings
- Damaged buildings
- Special circumstances (involving damaged buildings)
- Appeals of decisions
- Variances to the requirements
- Floodways
- V zones
- Coastal Barrier Resource Areas
- Revisions of the FIRM
- Inspections
- Enforcement and violations
- Recordkeeping
- Issuing SI/SD determination letters
- Rescinding SI/SD determinations

5.6.1 Combinations of Types of Work

It is common for local officials to see applications for combinations of improvements and repairs. In these cases, the combined cost of all work must be used to make the SI/SD determination. For example, it is common for property owners who are making necessary repairs to damaged buildings to also include elective improvements. Communities must require applicants to

provide the estimated costs of all proposed improvements and repairs. The total cost is then used to make the SI/SD determination, comparing it to the pre-damage or pre-improvement market value of the building. Section 6.4 illustrates examples of types of work that local officials may see combined in permit applications.

5.6.2 Phased Improvements

The term "phased improvement" refers to a single improvement that is broken into parts. For a number of reasons, owners may wish to schedule anticipated improvements over a period of time, and they may request separate permits for each phase. Local officials should take care to ensure that phased improvements do not circumvent the substantial improvement requirements.

Concern about phased improvements is one reason why some communities adopt requirements that accumulate the value of improvements over time (Section 5.7.3).

Experienced plan reviewers can usually tell if the work described in a permit application adequately identifies all of the work needed to complete the improvement. One approach is to remind the applicant that the application is a legal document and that it is the applicant's responsibility (or the responsibility of the applicant's design professional or contractor) to accurately complete the application. It is also reasonable for the local official to request that the applicant state, in writing, that the work proposed is all of the anticipated work and that the work can be done for the stated cost estimate.

Some communities address deliberate phasing of improvements in the permit application or other document. Appendix D includes sample affidavits that the community may require be signed by owners and contractors to confirm that the work described in an application is all of the work that will be done.

Other scenarios of phased improvements include:

- **Incomplete work.** Permits should not be issued for work that clearly will not result in a building that can be occupied without additional work. For example, while a community may decide to issue one permit for the foundation, framing, and roof of an addition, and a second permit at a later time to complete the remaining work necessary for occupancy (electrical, plumbing, flooring, etc.), the SI/SD determination must be made prior to issuance of the first permit, and must consider the cost of all work regardless of the number of permits issued.
- **Multiple permits.** Some jurisdictions, especially larger cities and counties, issue separate mechanical, electrical, plumbing, and building permits. If handled by different offices, coordination is especially important so that the value of all work is combined for the SI/SD determination, regardless of the number of permits issued.
- **Consecutive permits.** If an application for a second permit is submitted within a short period of time after the first permit is issued, the local official should examine whether the work covered by the second request is related to improvements to the building. If so, then the work must be evaluated in conjunction with the first permit to determine whether the combination constitutes substantial improvement. The substantial improvement regulations

apply to all of the work that is proposed as the improvement, even if multiple permits are issued. Therefore, the determination of the cost of the improvement should consider all costs of all phases of the work before issuance of the first permit.

- **Modification of issued permits.** A request to modify an existing permit to add work could retroactively trigger substantial improvement. It is common that a permit is issued to repair a damaged structure, and the owner subsequently decides to have some additional improvements done. Whether the community handles this as a modification of the initial permit or issuance of a second permit, care must be taken to reevaluate the SI/SD determination. Local officials must verify that the proposed repair work includes all of the anticipated work, including improvements to the building.
- **Unauthorized work.** If unauthorized work on a building in the SFHA is discovered, the enforcement action taken by the community must include making an SI/SD determination. The costs must include all of the work that has been performed, plus all of the remaining work necessary to complete the project.

5.6.3 Incremental Repair of Damaged Buildings

"Incremental repairs" are similar to phased improvements and refer to a single repair project that is broken into parts. When buildings have sustained damage, regardless of the cause, it is fairly common for some owners to undertake restoration and repairs over a period of time. Sometimes the initial work is only the minimum necessary to make the building safe enough to reoccupy (provided reoccupancy is allowed by the community). Sometimes the owner's financial situation does not allow all of the repairs to be done at the same time.

The definition of "substantial damage" makes it very clear that the substantial damage determination must consider all costs necessary to restore damaged structures to their before-damage condition. Even if an owner elects to perform less work or make repairs over time, the community must require the applicant to provide an estimate of the costs to fully restore the structure. Section 4.4 includes guidance on estimating the costs of work performed by the owner or volunteers and the costs of donated or discounted materials.

5.6.4 Damaged Buildings

Most damage occurs during a single and sudden event, such as a fire, high wind, lightning strike, falling tree, tornado, earthquake, flood, natural gas explosion, etc. However, buildings also may be damaged by causes that are not related to a specific event. These causes include soil settlement, exposure to the elements, termite infestation, vandalism, deterioration over time, and other causes. Regardless of the cause of damage, when owners apply for permits to repair, communities must determine whether the building is substantially damaged.

Property owners should check their insurance policies. Policies that include "law and regulations" coverage may cover costs associated with complying with requirements to bring buildings into compliance with flood provisions in local floodplain ordinances or building codes.

With respect to making substantial damage determinations, costs to repair must include all costs that are necessary to repair a building to its pre-damage condition, even if the owners elect to perform only some repairs or incremental repairs (Section 5.6.3).

Issuance of an SD determination does not necessarily indicate that a building is unsafe, unfit for occupancy, or condemned.

If a community suffers damage to only a few buildings, then the permits for repairs generally can be handled under a community's standard permit processing procedures. Communities that have a large number of buildings in their floodplains should decide in advance how best to handle inspecting damaged buildings and making substantial damage determinations (Chapter 7). In those circumstances, FEMA's *Substantial Damage Estimator* (SDE) software provides an effective and efficient approach for developing reasonable estimates of the values of buildings and costs to repair or reconstruct buildings (Section 7.5).

Local officials should become familiar with the ICC coverage that is part of NFIP flood insurance policies. ICC claims are only paid on buildings in the SFHA that the local official determines to be substantially damaged or that have sustained repetitive flood damage that qualifies under the policy. ICC can provide policyholders with up to $30,000 towards costs necessary to bring a building into compliance with the community's floodplain management requirements. ICC is described in Section 7.6.

5.6.5 Special Circumstances (Damaged Buildings)

Communities should be aware of a number of special circumstances that may arise when dealing with damaged buildings:

- **Change of ownership.** Sometimes owners sell damaged buildings in SFHAs before repairs are undertaken. Change of ownership does not have any bearing on the substantial damage determination. Regardless of whether the determination is made before or after the sale, it is to be based on the value prior to the date of damage.
- **Multiple flood events.** Communities may have to address damage resulting from multiple flood events. All affected structures should be handled consistently:
  - If no repairs are made to a structure after a flood, and a second flood causes additional damage, local officials must include all costs to repair damage from both events. The market value of the building used in making an SI/SD determination is the value prior to the first flood. If that value cannot be determined, the market value prior to the second flood should be used.
  - If some or all repairs are made after a flood (and the cost to repair to the structure was determined to not be substantial damage), and a second flood causes damage that must be evaluated to determine whether the building was substantially damaged, then the market value is the value prior to the second flood.
- **Conditions discovered in the course of doing work.** Occasionally, additional damage is discovered during the course of work that has been authorized by a permit. For example, termite damage or other conditions may not have been identified before the permitted work is started, but it is discovered once work is underway. Such conditions may reduce the

capacity of the load-bearing members or otherwise result in damage to the building. After the condition is revealed, if the work that is required to address the discovered condition triggers a change in the permit, the community must reevaluate the SI/SD determination. The costs of the new work must be added to the cost of the improvement. The market value of the building that was used in the original determination is used in the revised determination.

5.6.6 Appeals of Decisions

An applicant for a permit may appeal a decision, order, or determination that was made by the local official. This occurs most often if there is ambiguous language in a code or regulations that leads to differing interpretations. Typically, appeals are heard by a board designated to hear such cases, which may go by a variety of names (board of appeals, board of adjustments, etc.). In some small communities, the function may be handled by the jurisdiction's governing body (town council, board of selectmen, etc.).

An owner may appeal the local official's finding or determination that the proposed work constitutes SI/SD. The owner may appeal an SI/SD determination on the basis of insufficient information, errors, repair/improvement costs that should be included/excluded, inappropriate valuations of costs for the proposed work, or an inappropriate method to determine the market value of the building.

It is not appropriate for an owner who wishes to build in a manner that is contrary to the regulations and codes to seek an appeal. In those cases, the owner would seek a variance.

5.6.7 Variances to the Requirements

A variance is a grant of relief from the terms of a land use, zoning, or building code regulation. If granted, it allows construction in a manner that is otherwise prohibited. The burden of determining whether to grant a variance rests on the community.

The primary goals of the NFIP and local floodplain management regulations and codes are the reduction of damage and protection of public health and safety. Because a variance from the requirements for construction in SFHAs can create an increased risk to life and property, local officials should carefully consider requests for variances from flood elevation or other floodplain management requirements.

NFIP flood insurance policies on post-FIRM buildings and substantially improved buildings that do not comply with the NFIP requirements, even if authorized by a properly issued variance, are rated according to risk. The cost will be high if a variance allows the lowest floor to be below the BFE (see Figure 6-14 in Section 6.6).

The NFIP regulations do not set forth absolute criteria for granting variances [44 CFR § 60.6]. The regulations outline procedures that communities must follow (see FEMA 480, *Floodplain Management Requirements: A Study Guide and Desk Reference for Local Officials* for additional guidance on handling variances). Variances shall only be issued based on the following:

- A showing of good and sufficient cause;

- A determination that failure to grant the variance would result in exceptional hardship (consistent with usage related to land use and zoning, in this context a "hardship" must be related to the land, not a financial or personal circumstance of the owner);
- A determination that granting the variance will not result in increased flood heights, additional threats to public safety, extraordinary public expense, create nuisances, cause fraud on or victimization of the public, or conflict with existing local laws or regulations; and
- Evidence that the variance is the minimum necessary to afford relief, considering the flood hazard.

As a guiding principle, a variance should pertain to the unique characteristics of the land itself. A properly issued variance may be granted for a parcel of land with physical characteristics so unusual that complying with the regulation or code would create an exceptional hardship for the applicant. However, a variance should not be granted based on the personal circumstances of an individual.

Insufficient justifications for variances to the SI/SD requirements include:

- Inconvenient access to an addition
- Difficult access for those with physical limitations
- Too costly to comply
- The owner does not plan to get flood insurance
- Building will look different
- Building will need a waiver of height limitations

Sometimes variances are sought because the owner or the designer believes they will not be able to meet the community's floodplain management regulations. Usually there are alternative ways to comply that would negate any purported justification for a variance, and local officials should require consideration of those alternatives before acting on variance requests. Typical characteristics of a parcel of land that might justify a variance include an irregularly shaped lot, a parcel with unsuitable soils, or a parcel with an unusual geologic condition below ground level. However, it is unusual that any physical characteristic would give rise to a hardship that would be sufficient to justify issuing a variance to the elevation requirement.

A community that grants a variance based on the above evidence and according to FEMA guidance does not jeopardize its standing in the NFIP. However, FEMA and the States periodically evaluate how effectively communities administer their floodplain management requirements. FEMA becomes concerned when there is a pattern of variances that suggest the practice is used to circumvent requirements.

Communities that administer the I-Codes may handle variances to the flood provisions through their boards of appeals. Unless the State or community has modified or replaced the administrative provisions, the IRC specifies that the building official will review information provided with permit applications for work on buildings in SFHAs. The official will make a finding based on the cost of the proposed work and the market value of the building and, if the results indicate the work is a substantial improvement, the finding is forwarded to the board of appeals for a final determination. Communities have a board of appeals (which might go by another name) to hear and decide appeals of orders, decisions, or determinations made by the building official. The IRC outlines specific responsibilities of the board when hearing matters related to

structures in SFHAs, including:

- **Determination of substantial improvement in areas prone to flooding.** Requires the board of appeals to evaluate the building official's finding regarding the value of proposed improvements to determine if the work constitutes SI/SD.
- **Criteria for issuance of a variance for areas prone to flooding.** Sets forth specific criteria, consistent with the minimum NFIP requirements, to be applied in the review and consideration of variances to the minimum flood hazard area requirements.

5.6.8 Floodways

Local officials must examine proposals for work on buildings that are located in floodways to determine whether the work constitutes SI/SD. If a building is located in a floodway, bringing it into compliance may involve a floodway encroachment analysis. The NFIP regulations require that this analysis be performed for any work that encroaches into a floodway [44 CFR § 60.3(d)(3)]. If the analysis indicates any increase in the BFE, the local official must not allow the proposed work.

> The NFIP defines the floodway as the channel or other watercourse and the adjacent land areas that must be reserved in order to discharge the base flood without cumulatively increasing the water surface elevation more than a designated height. Floodways are delineated along most waterways that are studied using detailed methods.

The analysis that is performed to delineate floodways takes into consideration existing encroachments and obstructions (including buildings) that were present at the time the data were collected for the analysis. This means that proposals for work on existing buildings that are located in a floodway are evaluated based on whether the exterior dimensions (footprint) of the original buildings will be increased, as follows:

- **No change to footprint.** Substantial improvement that does not expand the footprint might be an interior-only renovation or an added story. If the actions necessary to bring the building into compliance do not increase the exterior dimensions, a floodway encroachment analysis is not required. Note that enclosing a deck that is below the BFE to change it to livable space should be treated as an addition even though the work does not increase the footprint; the addition becomes an encroachment in the floodway and an analysis must be prepared.
- **Increase in footprint, substantial improvement.** If work that increases the footprint (including an increase in fill, if used for elevation) involves an addition (or a combination of interior work and an addition) is determined to be a substantial improvement, the building must be brought into compliance. In this case, a floodway encroachment analysis is required because the exterior dimensions will be increased. A permit for the increase in footprint cannot be issued if the analysis indicates any increase in the BFE. An option that may decrease the effects of encroachment is to elevate additions on open foundations (piers or columns).
- **Increase in footprint, non-substantial improvement.** Local officials must review all proposed development in SFHAs and authorize the development by issuing permits. Development includes additions that do not constitute substantial improvements. If located in a floodway, a proposal to expand the exterior dimensions of a building with an addition that is not

a substantial improvement must be supported with a floodway encroachment analysis. Although the NFIP regulations do not require that the addition be elevated and meet all other requirements of the NFIP, the addition may be a potential encroachment into the floodway that must be evaluated. If the floodway analysis indicates any increase in the BFE, a permit cannot be issued for the addition.

5.6.9 V Zones

Local officials must review proposals to improve structures that are located in V zones to determine compliance with the NFIP's V zone provisions, as well as the requirements for substantial improvements found in 44 CFR § 60.3(e). In V zones, new and substantially improved buildings must:

In V zones, a registered professional engineer or architect shall develop or review the structural design, specifications, and plans and shall certify that the design and methods of construction are in accordance with accepted standards of practice to meet the V-zone requirements.

- Be elevated on open foundations (pilings or columns) that allow floodwaters and waves to pass beneath the elevated buildings
- Be elevated so that the bottom of the lowest horizontal structural member of the lowest floor is at or above the BFE
- Have the foundation anchored to resist flotation, collapse, and lateral movement due to the effects of wind and water loads acting simultaneously on all building components
- Have the area beneath the elevated building free of obstructions that would prevent the free flow of floodwaters and waves during a base flood event
- Have utilities and building service equipment elevated above the BFE
- Have the walls of enclosures below the elevated building designed to break away under base flood conditions without transferring loads to the foundation

Section 6.4 describes some of the more common examples of improvements and repairs and descriptions of how property owners and contractors can meet NFIP requirements (also see Tables 6-1a and 6-1b). It is important to note again that work on a post-FIRM building cannot be allowed if it would make the building non-compliant with the floodplain management requirements that had to be met when the building was constructed.

All substantially improved buildings in V zones must be elevated. Floodproofing is not allowed in V zones, even for non-residential buildings.

5.6.10 Coastal Barrier Resource Areas

The Coastal Barrier Resources Act of 1982, and later amendments, prohibits the NFIP from providing flood insurance for structures built or substantially improved after October 1, 1983, in any areas designated as undeveloped coastal barriers. These areas are mapped and designated by Congress as units of the Coastal Barrier Resource System (CBRS) and are shown

on FIRMs. The FIRMs also show areas designated as Otherwise Protected Areas (OPAs), which include portions of coastal barriers that are used primarily for natural resources protection and are owned by Federal, State, and local governments or by certain non-profit organizations.

Permits are required for new construction and for improvements of existing buildings in CBRSs and OPAs. Communities are required to administer their floodplain management regulations even if Federal flood insurance is not available for new buildings and substantially improved buildings in these areas.

Local officials must process permit applications for repairs and improvements to buildings in CBRSs and OPAs. If the work is SI/SD, then it must comply with the minimum requirements of the NFIP. It is important to realize that pre-FIRM buildings in CBRSs and OPAs that qualified for NFIP flood insurance may lose that eligibility if they are substantially improved or sustain substantial damage. Federal flood insurance may be obtained for a structure in the OPA if written documentation certifies that the structure is used in a manner consistent with the purpose for which the area is protected.

5.6.11 Revisions of the FIRM

The NFIP expects communities to maintain copies of all flood hazard maps, even those that have been replaced with revised maps. This is especially important when work is proposed on post-FIRM buildings.

In many communities, flood hazard maps have been revised to reflect new floodplain studies, better flood data, improved topographic data, new encroachments and bridges, and for other reasons. When flood hazard maps are revised, either the SFHAs expand in area and the BFEs increase, or the SFHAs reduce in area and the BFEs decrease. Map revisions may reflect changes in community boundaries, zone designation, new floodway delineations, or changes in floodway boundaries. Also, A zones without BFEs may be studied and shown with BFEs, or waterways that were previously unmapped may be shown with SFHAs.

Communities must maintain all versions of their Flood Insurance Studies (FISs) and flood hazard maps. This is an important responsibility because it affects consideration of work on buildings constructed in compliance with a map that pre-dates a current effective map. Section 6.4.8 describes repairs and improvements on post-FIRM buildings where there have been revisions to the FIRM.

5.6.12 Inspections

Even when building permits and construction plans are complete, proper inspections during construction are important to determine whether any work has deviated from the approved permits and plans. Building inspectors need to understand the flood damage-resistant design and construction requirements that they are to check during inspections. If deviations from the conditions of a permit or plans are discovered early during construction, it will be easier to work with the owner and builder to achieve compliance through corrective actions.

Using a plan review and inspection checklist can make inspections easier because the inspector has a standardized summary of floodplain management requirements. A checklist also

documents the inspection, which can be important if questions arise regarding compliance.

The following inspections are recommended for buildings that are required to be brought into compliance with the floodplain management requirements for new construction and substantial improvements:

- **Footing or Foundation Inspection.** Buildings and additions that are elevated on solid perimeter foundation walls create enclosures below the elevated buildings (e.g., crawlspace or underfloor space). Inspectors should check for the specified number, size, and location of flood openings. The bottom of each flood opening must be no higher than 1 foot above finished exterior grade or interior floor; flood openings should not be confused with underfloor air ventilation openings, which are located just under the floor level. For slab-on-grade (and stemwall) foundations, the lowest floor inspection is also conducted at this time.
- **Lowest Floor Inspection.** The best time to verify compliance with the elevation requirement is after the lowest floor elevation is set, but before further vertical construction takes place. An error in elevation of a foot or two may seem minor, but corrective action can be expensive and complicated if that error is discovered after the walls and roof are in place.
- **HVAC Inspection.** Verify that utilities and mechanical equipment are elevated or designed to prevent water from entering or accumulating within the components during conditions of flooding [44 CFR § 60.3(a)(3)]. Frequently overlooked items include heating, ventilation, and cooling equipment; electrical outlets; plumbing fixtures; and ductwork that is installed under the floor, usually in a crawlspace.
- **Enclosure Inspection.** Inspect enclosures below elevated buildings to ensure that they comply with the limitations on use (parking, building access, or storage), protection of HVAC described above, the use of flood damage-resistant materials, and the specific requirements based on the flood zone (openings in A zones or breakaway walls in V zones).
- **Final Inspection.** A final inspection to document compliance can be performed at the same time as the final inspection to issue the occupancy certificate. During final inspections:
  - Collect the "as-built" documentation of elevations prior to the final sign-off and issuance of occupancy certificates.
  - If used, complete and sign the plan review and inspection checklist and place all inspection reports in the permit file.

The NFIP requires communities to obtain and retain documentation of the lowest floor elevations of new buildings and substantially improved buildings. FEMA's *Elevation Certificate* is designed specifically for this purpose.

FEMA's *Floodproofing Certificate* is designed to satisfy the documentation requirements when non-residential buildings are proposed to be dry floodproofed.

5.6.13 Enforcement and Violations

Proper enforcement of the floodplain management provisions is a critical part of fulfilling a community's responsibility under the NFIP. During construction, violations of the provisions must be resolved as soon as they are discovered and before further construction takes place. What may first appear to be a minor violation could turn out to be a significant issue that not

only exposes property owners and occupants to future flood damage, but results in higher NFIP flood insurance policies.

> The NFIP expects communities to attempt all reasonable actions to bring violations into compliance. When such attempts are unsuccessful, the community should contact the NFIP State Coordinator or the FEMA Regional Office for advice.

If the community has exhausted legal means to remedy a violation and the owner refuses to resolve the matter and bring the building into compliance, the community may cite the structure as a violation in accordance with Sec. 1316 of the National Flood Insurance Act of 1968. This provision allows the NFIP to deny flood insurance on the building that remains in violation, and on all other insurable buildings on the property. Owners who refuse to resolve violations should be informed that denial of flood insurance can have significant consequences: the property may be difficult to sell; the owner may have problems with the mortgage lenders if flood insurance cannot be maintained; and future Federal disaster assistance may be denied.

A community's standing in the NFIP depends on making a good faith effort to successfully resolve violations. By allowing a violation to go unresolved, the community may set a precedent, making it more difficult to take future enforcement actions and potentially jeopardize participation in the NFIP.

5.6.14 Recordkeeping

Obtaining certain documentation and maintaining complete permit records are key responsibilities for communities that participate in the NFIP. Certifications or documentation of the following must be maintained for all new buildings constructed in SFHAs and, if applicable, for buildings that are substantially improved:

- The permit application form and all attachments, including the site plan
- Documentation of the SI/SD determination
- Community letter documenting the SI/SD determination (Section 5.6.15)
- Floodway encroachment analyses (Section 5.6.8)
- Records of inspections of the project while under construction such as obtaining the lowest floor elevations, which is initially obtained after the foundation is in place but prior to further vertical construction, and other pertinent elevations
- Design of engineered openings that are used as alternatives to the prescriptive openings in the walls of enclosures below elevated buildings in A zones (see FEMA Technical Bulletin 1, *Openings in Foundation Walls and Walls of Enclosures Below Elevated Buildings in Special Flood Hazard Areas*)
- In coastal high hazard areas, engineering certifications of designs and construction methods of new and substantially improved buildings (5.6.9)
- Designs for breakaway walls around enclosures below elevated buildings in V zones if prescriptive solutions are not used (see FEMA Technical Bulletin 9, *Design and Construction Guidance for Breakaway Walls Below Elevated Buildings Located in Coastal High Hazard Areas*)

- Evidence that work proposed for listed historic structures will not preclude continued listing (Section 6.5.1)
- Variance proceedings, including justifications and notifications to recipients (Section 5.6.7)
- Record of final inspections of the construction project before the certificate of occupancy is issued, such as location and size of openings, location of utilities, and "as-built" lowest floor elevation
- Certification of the elevation to which any nonresidential building has been floodproofed before the certificate of occupancy is issued

Although the use of checklists is not required by the NFIP, it is a good way to document plan reviews, inspections, and compliance. Some communities use checklists during plan reviews to verify that appropriate flood damage-resistant provisions have been checked and found to satisfy the applicable requirements. Similarly, the use of inspection checklists improves the consistency of inspections and helps verify the flood damage-resistant requirements.

5.6.15 Issuing SI/SD Determination Letters

Local officials should convey SI/SD determinations to property owners in an official letter. Because this letter notifies the owners of a significant requirement, it is recommended that it be sent in a manner that documents receipt by the addressee. Appendix E includes three sample letters to send SI/SD determinations to property owners. One sample is used to notify owners when a local official determines that proposed improvements are substantial improvements. Another sample is used to notify owners when a local official determines that buildings have sustained substantial damage. The third sample is used to notify owners that it has been determined that damage does not constitute substantial damage. The local official should offer to meet with owners or representatives to explain the various aspects required for buildings to meet the community's floodplain management regulations for new buildings, explained in Chapter 6.

> If substantial damage is caused by flooding and the buildings are insured by the NFIP, then the SD determination letter is necessary for owners to file ICC claims under NFIP flood insurance policies to help pay to bring the buildings into compliance with the community's floodplain management requirements (Sections 5.6.4 and 7.6).

5.6.16 Rescinding SI/SD Determinations

Local officials use data to make findings and determinations regarding whether work constitutes substantial improvement or repair of substantial damage. The data, described in detail in Chapter 4, consist of the cost estimates of the proposed improvements or the cost estimates of work that is required to repair damaged buildings to their pre-damage condition, regardless of the amount of work that will be done. The data also include the market values of buildings prior to the improvement or before the damage occurred.

Determinations usually are based on data provided by the owner, the owner's representative, or a contractor. Other sources of repair costs and improvement costs and market value are described in Chapter 4.

Following receipt of an SI/SD determination, property owners may appeal the determination (Section 5.6.6) or may submit new data and request that the initial determination be rescinded. When new data are provided, local officials should evaluate it carefully. Rescinding a determination means the owner's investment in a flood-prone area would take place in a manner that continues the exposure of the existing structure and the investment to flood damage. Communities should thoroughly document and retain evidence of any appeals and changes to SI/SD determinations in their permanent records.

5.7 Exceeding NFIP Minimum Requirements

Some States and communities have adopted requirements for SI/SD that exceed the NFIP minimum requirements to better protect their citizens and property. The NFIP encourages communities to evaluate their own situations, degree of flood risk, and vulnerability of their residential and commercial properties, and to consider adopting requirements that are more restrictive in order to achieve the long-term goal of being more resistant to flood disasters. The more restrictive provisions take precedence. Many communities adopt higher standards in order to qualify for credit under the NFIP's Community Rating System (CRS). Section 5.7.1 is an overview of the CRS, a voluntary program that provides discounts on Federal flood insurance rates.

In terms of higher standards that relate to SI/SD, the two approaches that exceed the NFIP minimums are:

- Lower threshold for SI/SD (Section 5.7.2)
- Cumulative SI/SD (Section 5.7.3)

In 2003, the Association of State Floodplain Managers, Inc. (ASFPM) reported that several States have requirements that exceed the NFIP minimum requirements for substantial improvement. In these cases, State requirements take precedence.

The CRS has three goals:

1. Reduce flood losses
2. Facilitate accurate insurance rating
3. Promote awareness of flood insurance

5.7.1 Community Rating System

The NFIP established the Community Rating System to encourage activities that exceed the NFIP minimum requirements and are effective at reducing flood damage and claims under the NFIP. In communities that apply to the CRS and are verified as implementing certain activities, citizens who purchase Federal flood insurance benefit from discounts on premiums ranging from 5 percent to as much as 45 percent.

For more than 40 years, communities that participate in the NFIP have recognized flood hazards in their construction and development decisions. Until 1990, the NFIP had few incentives

for communities to do more than administer the minimum NFIP regulatory provisions. During those early years, flood insurance rates were the same in every community, even though some elected to exceed the minimum provisions.

The CRS is a voluntary program. Any community that is in full compliance with the regulations of the NFIP is considered to be in "good standing" and may apply for a CRS classification. A community's CRS classification is a ranking based on the credit points calculated for specific floodplain management activities undertaken to meet the goals of the NFIP and the CRS. There are 18 creditable activities organized under 4 categories. One category includes more restrictive requirements for work on existing buildings.

The CRS offers credits to communities that adopt more restrictive requirements for SI/SD.

CRS credits are available to communities that adopt more restrictive SI/SD requirements:

- 43 CRS communities get credit for a lower threshold for SI/SD
- 289 CRS communities get credit for cumulative SI/SD

(Data as of October 2009)

The discount on NFIP flood insurance premiums is only one incentive for communities to undertake activities credited by the CRS. The larger benefits are improved public safety, reduced damage to property and public infrastructure, avoidance of economic disruption and losses, reduction of human suffering, and protection of the environment.

Additional information about the CRS can be found through the appropriate NFIP State Coordinator, the appropriate FEMA Regional Office, by downloading the *Coordinator's Manual* at the CRS Resource Center (http://training.fema.gov/EMIWeb/CRS), or by checking the NFIP CRS section of FEMA's website at http://www.fema.gov/business/nfip/crs.shtm.

5.7.2 Lower Threshold for SI/SD

The NFIP's threshold for determining whether proposed work constitutes substantial improvement, or repair of substantial damage, is 50 percent. Compliance is required when the costs of an improvement or the costs to repair damage equal or exceed 50 percent of a structure's market value.

Adopting a lower threshold, such as 40 percent or 30 percent, is perhaps the easiest way to exceed the NFIP minimum requirement. The concept is simple – compliance is required when the ratio of costs compared to market value equals or exceeds the lower percentage specified in the community's regulations. Communities should make certain that they uniformly apply the lower threshold to all buildings in SFHAs, even after events that cause damage to many buildings, regardless of the cause of the damage.

Additional guidance for regulatory language and implementation of a lower threshold for SI/SD is found in *CRS Credit for Higher Regulatory Standards*, which is accessible online (http:// www.fema.gov/library/viewRecord.do?id=2411).

5.7.3 Cumulative SI/SD

Many pre-FIRM buildings are subject to repetitive flood damage. Because of the nature of many flood hazard areas where repetitive flooding occurs, many of the buildings in these areas are unlikely to sustain the level of damage that qualifies as substantial damage based on the NFIP minimum 50 percent trigger. One way that communities can achieve long-term reduction of flood losses is to adopt a requirement that all improvements and repairs are tracked over time and counted towards the SI/SD determination. Another reason some communities take this approach is to capture "phased improvements," described in Section 5.6.2.

Adopting what is usually referred to as a "cumulative substantial improvement" requirement means that buildings will be brought into compliance with flood damage-resistant standards sooner than if the community administers the minimum NFIP requirement, which applies to each separate application for improvements and repairs.

The following change to the definition of "substantial improvement" is an example of how a cumulative substantial improvement requirement can be implemented (suggested new text is underlined). A more limited approach would be to count only repairs of damage (not improvements) in a cumulative manner. Communities should carefully consider the period of time to specify, whether the "life of the structure" or a specific period of time, such as 5-, 15-, or 30-years.

> *"Substantial improvement" means any <u>combination</u> of repairs, reconstruction, rehabilitation, addition, or other improvement of a structure <u>taking place during [insert period of time selected by the community]</u> the cost of which equals or exceeds fifty percent of the market value of the structure before the work is started. This term includes structures that have incurred 'substantial damage,' regardless of the actual repair work performed.*

A good system for recording and accessing records is necessary to administer a cumulative SI/SD requirement. Each time an owner applies for a permit to make improvements or repairs, the records for that building must be checked. Obviously, this is feasible only if those records are retained over the period of time specified in the regulations.

Tracking the cost of repairs and improvements over time is straightforward but, for the purpose of making SI/SD determinations, the community must have a market value to compare to those costs. Because the market value of a building changes over time, communities need to decide how they will handle those changes. One approach is to obtain the market value each time a permit is obtained, use it in the computation each time, and add the resulting percentages. Communities may choose to accumulate percentages or repair/improvement costs over a set period of years. Table 5-1a illustrates this approach where market value increases steadily, and Table 5-1b illustrates this approach where the market value first decreases and then increases.

Table 5-1a. Tracking Cumulative Substantial Improvements, Determining Market Value for Each Permit Application (shows increases in market value).*

Elapsed time from initial permit application	Current market value (at the time of each permit application)	Cost of improvement	Cost as percentage of current market value	Cumulative percentage
0 year	$100,000	$10,000	10%	10%
3 years	$110,000	$42,000	38%	48%
6 years	$120,000	$10,000	8%	56%

* In this example, the 50 percent threshold is reached with the third permit application.

Table 5-1b. Tracking Cumulative Substantial Improvements, Determining Market Value for Each Permit Application (shows decrease, then increase in market value).*

Elapsed time from initial permit application	Current market value (at the time of each permit application)	Cost of improvement	Cost as percentage of current market value	Cumulative percentage
0 year	$100,000	$10,000	10%	10%
3 years	$90,000	$28,000	31%	41%
6 years	$105,000	$10,800	10%	51%

* In this example, the 50 percent threshold is reached with the third permit application.

Communities will only have records of work for which permits are required. Owners may undertake work that does not require a permit (e.g., patching a roof or replacing a window) and those costs would not count towards the cumulative substantial improvement. It is not the intent of a cumulative substantial improvement requirement to discourage general maintenance and upkeep. However, if any part of the work requires a permit, then all of the proposed work is counted in the SI/SD determination. For example, as part of a project to repair roof damage that involves replacing rafters and underlayment, the owner may decide to replace shingles on an undamaged portion of the roof. The cost of the re-shingling is included in the determination.

Additional guidance for regulatory language and implementation of a cumulative substantial improvement requirement is found in *CRS Credit for Higher Regulatory Standards.*

5.8 Recommendations to Improve Flood Resistance

Local officials can encourage owners to improve the flood resistance of older buildings during the course of repairs and improvements even if owners propose improvements or repairs that do not trigger the SI/SD requirements. Improving resistance can facilitate rapid clean-up and recovery, and reduce repair costs. Whether these actions are applicable to a specific situation depends, in part, on the characteristics of the flood hazard and the building:

- Replace gypsum board or wood paneling below the BFE (preferably below the BFE plus 1 foot or more) with vinyl panels that can be removed to facilitate clean-up and drying before being reinstalled.
- Replace insulation with closed-cell foam insulation that can be cleaned, dried, and replaced.
- Replace flooring and floor finishes with flood damage-resistant materials.
- Relocate mechanical equipment out of basements or other flood-prone spaces and elevate above the BFE.
- Abandon the use of below-grade areas (basements) and fill them in to prevent structural damage.
- Install flood openings in crawlspace foundation walls and garage walls (see FEMA Technical Bulletin 1, *Openings in Foundation Walls and Walls of Enclosures Below Elevated Buildings in Special Flood Hazard Areas*).
- Install backflow devices in sewer lines.
- If sufficient warning time is available from official sources, pre-plan actions to move contents from the lower floors to the higher floors when a warning is issued.

6 Factors to Consider and Illustrations of Substantial Improvement and Repair of Substantial Damage

6.1 Overview

This chapter describes the factors to be considered when evaluating permit applications for improvements and repairs to buildings and includes, in Section 6.4, illustrations of several types of improvements and repairs that could trigger SI/SD determinations. Section 6.3 describes all aspects of the NFIP floodplain management requirements that must be considered when bringing SI/SD buildings into compliance. Section 6.5 describes how certain types of buildings are addressed, including historic structures, manufactured homes, accessory structures, and certain agricultural structures. And finally, Section 6.6 explains the NFIP flood insurance implications related to SI/SD.

6.2 Factors to Consider When Evaluating Permit Applications for Improvements and Repairs

Several factors must be considered when local officials evaluate permit applications for repairs and improvements to buildings:

- Whether the building is pre-FIRM or post-FIRM (Section 6.2.1).
- Whether the building is in an A zone or a V zone (Section 6.2.2).
- Whether the building is located in more than one flood zone (Section 6.2.3).
- Whether the building is residential or non-residential (Section 6.2.4).
- The nature of the proposed repairs and improvements; Section 6.4 illustrates examples of various types of improvements and repairs and how they must meet NFIP requirements.

It is important to emphasize that all work must be included in an SI/SD determination. For example, if a small addition by itself is not a substantial improvement, but if other work on the building is undertaken at the same time, the combined work might be a substantial improvement (see Section 5.6.1).

6.2.1 Pre-FIRM or Post-FIRM

This chapter presents some examples of common improvements and repairs, along with descriptions of measures to comply with the NFIP floodplain management requirements. For purposes

of explaining these examples, this Desk Reference uses the terms "pre-FIRM" and "post-FIRM," which are described below.

Buildings that were constructed before the date of a community's flood hazard map are called "pre-FIRM" because they pre-date the initial FIRM. They are referred to as "existing construction" or existing buildings. They generally pre-date the date of the community's first floodplain management regulations. Most flood-prone, pre-FIRM buildings were built by individuals who did not have sufficient knowledge of the hazard to make informed decisions about the flood risk. Thus, most pre-FIRM buildings were not built with specific measures that reduce exposure to flooding, such as elevating the floor a certain height above the flood level.

Buildings that were constructed after the date of the initial FIRM are called "post-FIRM." These buildings were generally constructed after adoption of the community's first floodplain management regulations and thus should have been built in compliance with the NFIP floodplain management requirements that were in effect at the time of construction.

A building constructed after the date of the initial FIRM is considered new construction (see definition in Chapter 3). All new construction must be built in accordance with the NFIP requirements. Regardless of the size or costs of improvements or repairs made to post-FIRM buildings, the building must remain fully compliant.

All subsequent work on a post-FIRM building must be performed in a manner that ensures the building's continued compliance. Work shall not be allowed if it would make the building non-compliant with the floodplain management requirements that had to be met when the building was constructed.

In summary, how proposals to make improvements or repairs must be evaluated as a function of whether buildings are pre-FIRM or post-FIRM is as follows:

- If a building is pre-FIRM, any proposed improvements or repairs must be evaluated to determine whether the work is a substantial improvement or repair of substantial damage.
- If a building is post-FIRM, any proposed improvements or repairs must be evaluated to ensure that the improvements or repairs comply with the applicable NFIP floodplain management requirements and to ensure that the improvements or repairs do not alter any aspect of the building that would make it non-compliant.

6.2.2 A Zone or V Zone

The term "A zone" includes all zones shown on FIRMs as Zones A, AE, A1-A30, AR, AO, A99, and AH. A zones are shown along riverine bodies of water and along tidally-influenced bodies of water, typically inland of V zones. V zones are flood hazard areas with high velocity wave action where wave heights of 3 feet or more are anticipated. The term "V zone" includes all zones shown on FIRMs as Zones V, VE, and V1-V30. The basic NFIP floodplain management requirements for the design and construction of buildings in A zones and V zones differ somewhat. Some of the key differences are:

- A zone: the lowest floor, including basement, is elevated to or above the BFE.
- V zone: the bottom of the lowest horizontal structural member of the lowest floor is elevated to or above the BFE.

- A zone: enclosures below elevated buildings must have flood openings.
- V zone: the areas below elevated buildings are either free-of-obstructions or enclosed with insect screening, latticework, or breakaway walls.
- A zone: non-residential buildings may be dry floodproofed.
- V zone: dry floodproofing is not allowed for non-residential buildings.
- V zone: new buildings must be located landward of the reach of the mean high tide.

6.2.3 More Than One Flood Zone

Buildings that are located in more than one zone must comply with the requirements of the more restrictive zone. For example, a building that is a substantial improvement that is in both a V zone and an A zone must be designed and constructed to meet the V zone requirements. In riverine A zones, similar situations may occur. A building that is affected by more than one BFE must be elevated to the higher BFE, and a floodway analysis is required even if only a portion of a building encroaches into the floodway.

6.2.4 Residential or Non-Residential

As noted in Section 6.2.2, the requirements for non-residential buildings vary depending on flood zone. In A zones, non-residential buildings may be elevated or dry floodproofed. Section 6.4.1 describes dry floodproofing as a possible method of protecting non-residential buildings in A zones that are substantially improved or substantially damaged. In V zones, substantially-improved non-residential buildings must have the bottom of the lowest horizontal structural member of the lowest floor elevated to or above the BFE.

6.3 Bringing Substantially Improved and Substantially Damaged Buildings into Compliance

If a local official determines that improvements or repairs to a building constitute SI/SD, then the building must be brought into compliance with the NFIP floodplain management requirements for new construction in SFHAs. The key aspects of the NFIP requirements for new construction and SI/SD include:

- Lowest floor elevations (Section 6.3.1)
- Enclosures (Section 6.3.2)
- Basements (Section 6.3.3)
- Utility and building service equipment (Section 6.3.4)
- Flood damage-resistant materials (Section 6.3.5)
- Making buildings reasonably safe from flooding (Section 6.3.6)

For several reasons, owners may decide to demolish existing buildings. If a property owner chooses to construct a new building on the same site, the work is treated as new construction and all requirements for new construction must be met.

The sections below describe these requirements. The examples given below each NFIP requirement describe measures that can be used to bring SI/SD buildings into compliance. These examples are not an exhaustive list of possible ways to meet the NFIP requirements.

6.3.1 Lowest Floor Elevations

For SI/SD buildings that have lowest floors below the BFE, the lowest floor must be elevated to bring the buildings into compliance. In A zones, the lowest floor must be at or above the BFE (non-residential buildings may be dry floodproofed to or above the BFE), and in V zones, the bottom of the lowest horizontal structural member of the lowest floor must be at or above the BFE.

Measures to bring a building into compliance may include meeting a combination of requirements. For example, elevating a building on a new foundation may also require reinforcing the continuous load path and filling in below-grade areas.

There are several solutions that can achieve compliance.
The solution selected for any given building will depend on several factors such as flood zone, the type of foundation, feasibility, and whether the building is residential or non-residential.

Below are examples of measures that can be taken to meet NFIP requirement to bring SI/SD buildings into compliance:

- **Elevation-in-place (A and V zones).** This measure involves detaching the building from its foundation and raising it onto a compliant foundation. Elevation-in-place is most effective for buildings that are on crawlspaces, pilings, or columns. Buildings with basements also may be elevated (see Section 6.3.3 for measures to bring basements into compliance). Slab-on-grade buildings have been elevated-in-place, although the process is more complicated and costly (these buildings may be better candidates for conversion of the ground level to become a compliant enclosure, described below).

An easy-to-read publication that illustrates three elevation options is *Above the Flood: Elevating Your Floodprone House* (FEMA 347).

A more technical document that describes additional options is *Engineering Principles and Practices for Retrofitting Flood-Prone Residential Structures* (FEMA 259).

- **Conversion of the ground level to a compliant enclosure (typically in A zones).** There are instances, typically in A zones, where the first (ground) floor is subject to flooding, but the next higher floor is above the BFE. In these cases, it may be feasible to modify the ground level so that it becomes an enclosure that complies with the NFIP requirements. (This option is unlikely to be applied in V zones because the vertical structural members (piers, pilings, or columns) of older buildings rarely extend high enough.) This option requires that the structure meet all applicable NFIP requirements, including limitations on use of enclosures (parking of vehicles, building access, and storage). Because owners lose living area, conversions usually are combined with the addition of an upper story or an elevated lateral addition (Section 6.4.2).
- **Extend walls upward and raise the floor (A zones only).** This measure leaves the building on its original slab-on-grade foundation. To achieve the necessary elevation of the lowest floor, the roof is removed and the walls are extended high enough to allow a new floor system to

be constructed on top of the slab, with the new floor surface at or above the BFE. The work also may require the windows and doors to be shifted upward. In addition to replacing the roof, the work also involves retrofitting the newly-created "crawlspace" or under-floor space (the space between the original slab and the new floor) to be a compliant enclosure by installing flood openings. In some cases, rather than adding a new floor system, it may be feasible to simply add sufficient thickness to the slab to raise the floor surface to or above the BFE.

- **Conversion of walkout basement to a compliant enclosure (A zones only).** This measure is particularly appealing if the elevation of the floor above the walkout basement is at or above the BFE. If that is the case, converting the walkout basement to a compliant enclosure can be done by limiting the use of the area to parking of vehicles, building access, or storage; removing finish materials; retrofitting the enclosure walls with flood openings; and elevating equipment and utility service. To prevent the enclosure from being a basement as defined by the NFIP, particular attention must be paid to ensuring that the enclosure has at least one side that is at or above grade, which may require lowering the ground surface by re-grading along one or more of the exterior foundation walls.
- **Dry floodproofing modifications (A zone only, non-residential only).** Dry floodproofing measures must be designed and certified by a qualified registered professional engineer or architect. Designers must consider many factors when determining whether a building can be dry floodproofed, including the strength of the building, whether it will be subject to buoyancy once it is made watertight, whether all possible paths for water to enter the building can be properly sealed (floor drains, plumbing fixtures, openings through exterior walls through which utility service is provided, etc.), and whether there is adequate warning time if human intervention is necessary (e.g., to install barriers or closing valves). For guidance, see ASCE 24-05, *Flood Resistant Design and Construction* and FEMA FIA-Technical Bulletin 3, *Non-Residential Floodproofing – Requirements and Certification for Buildings Located in Special Flood Hazard Areas.*

6.3.2 Enclosures

The NFIP regulations allow enclosed areas below elevated buildings provided the enclosures meet certain requirements. The NFIP regulations for enclosures under buildings in A zones are in 44 CFR § 60.3(c)(5), and in § 60.3(e)(5) for enclosures under buildings in V zones. Requirements in these sections include:

- **Limited use.** In all flood zones, the use of enclosures must be limited to parking of vehicles, building access, and storage. Crawlspaces are treated as enclosures.
- **Flood damage-resistant materials.** All construction materials used below the BFE must be flood damage-resistant materials (see FEMA Technical Bulletin 2, *Flood Damage-Resistant Materials Requirements for Buildings Located in Special Flood Hazard Areas*). Materials necessary to meet fire protection code requirements are acceptable.
- **Elevated or protected utility equipment and service.** Given the limitations on use, only the minimum utility equipment and service connections necessary should be located in enclosures under elevated buildings.

- **Flood openings.** In A zones, the walls of enclosed areas must have flood openings to allow for the automatic entry and exit of floodwaters to minimize the potential for damage caused by hydrostatic pressure (see FEMA Technical Bulletin 1, *Openings in Foundation Walls and Walls of Enclosures Below Elevated Buildings in Special Flood Hazard Areas*).
- **Breakaway walls.** In V zones, the walls of enclosed areas must be non-supporting breakaway walls (see FEMA Technical Bulletin 9, *Design and Construction Guidance for Breakaway Walls Below Elevated Buildings Located in Coastal High Hazard Areas*).

6.3.3 Basements

Under the NFIP, new buildings and substantially improved buildings must have their lowest floors (including basements) elevated to or above the BFE (non-residential buildings may have dry-floodproofed basements below the BFE). The NFIP regulations define a basement as "any area of the building having its floor subgrade (below ground level) on all sides." If a local official determines that work constitutes SI/SD of any building that has a basement, the building must be brought into compliance, which includes eliminating the below-grade area.

Measures to eliminate basements below the BFE will, in part, depend on the nature of the basement and surrounding ground elevations. Below are examples of measures that can be taken to meet the requirement:

- **Fill in below-grade areas.** This option is effective only if the elevation of the floor above the below-grade area is at or above the BFE. Compliance is achieved by filling in the below-grade area and converting the remaining headroom to a compliant enclosure.
- **Convert walkout basements to compliant enclosures.** Section 6.3.1 describes how a walkout basement can be modified to become a compliant enclosure (A zone only).
- **Floodproof below-grade areas (A zone, non-residential only).** The NFIP regulations allow non-residential buildings in A zones to have areas that are below-grade on all sides (basements) only if the areas are dry floodproofed. Careful evaluation of the structural integrity of a building must be undertaken to determine if dry floodproofing measures are feasible. For guidance, see FEMA FIA-Technical Bulletin 3, *Non-Residential Floodproofing – Requirements and Certification for Buildings Located in Special Flood Hazard Areas.*

6.3.4 Utility and Building Service Equipment

The NFIP requires that new buildings and substantially improved buildings have utilities, equipment, and appliances elevated to or above the BFE, or be designed to prevent water from entering or accumulating within the equipment components (see 44 CFR § 60.3(a)(3) provided in Section 3.3). This means that SI/SD buildings with utility and building service equipment that is below the BFE must have the equipment either elevated or replaced with components that are designed and installed to be flood damage-resistant. Minimal electric service is allowed below the BFE if it is required to address life safety and electric code requirements for building access and storage.

Below are examples of measures that can be taken to meet NFIP requirements for utility and service equipment:

- **Relocate to elevated areas.** Equipment and utility service must be relocated or elevated when buildings are elevated-in-place or if ground floors are converted to compliant enclosures. When a basement is eliminated, any equipment that was in the basement will be relocated to the elevated portion of the building or to an elevated addition.
- **Elevate on outside platforms.** Equipment located outside of the building, such as heat pumps and air conditioning units, must be elevated on platforms at or above the BFE. Platforms may be independently supported or cantilevered from the foundation.
- **Elevate on platforms inside enclosures.** If a substantially improved building in an A zone has a compliant enclosure, utility equipment (e.g., water heaters, water treatment systems, and heat pumps) may be installed on platforms that raise the equipment to or above the BFE. Note that appliances such as washers, dryers, and freezers should not be installed in enclosures (even if elevated) because they are not compatible with the allowable uses (parking of vehicles, building access, and storage) and they do not meet the mechanical service equipment requirement at 44 CFR § 60.3(a)(3).
- **Provide component protection.** Equipment that must be located on the floor of a compliant enclosure in an A zone may be protected with a barrier to keep water away from the equipment. Typical barriers are constructed of masonry or concrete to a height that is equal to or higher than the BFE and have specially designed doors or panels that are put in place to keep water from entering. This approach is feasible in non-residential buildings provided there is sufficient warning time.

More detail on compliant installations can be found in *Protecting Building Utilities from Flood Damage: Principles and Practices for the Design and Construction of Flood Resistant Building Utility Systems* (FEMA 348).

6.3.5 Flood Damage-Resistant Materials

The NFIP requires that flood damage-resistant materials be used below the BFE. If a building will be elevated-in-place, materials used below the BFE must meet this requirement, including materials used to build an enclosure. For guidance on materials, see FEMA Technical Bulletin 2, *Flood Damage-Resistant Materials Requirements for Buildings Located in Special Flood Hazard Areas.*

Minimal use of certain materials that are not flood damage-resistant materials is allowed below the BFE if specifically required to address life safety and electric code requirements for building access and storage areas.

6.3.6 Making Buildings Reasonably Safe from Flooding

In all flood zones, substantially improved buildings must be "adequately anchored to prevent flotation, collapse, or lateral movement of the structure resulting from hydrodynamic and hydrostatic loads, including the effects of buoyancy" (see 44 CFR § 60.3(a)(3)(i) provided in Section 3.3). In addition, in V zones structures must be "anchored to resist flotation, collapse,

and lateral movement due to the effects of wind and water loads acting simultaneously on all building components" (see 44 CFR § 60.3(e)(4)(ii) provided in Section 3.3). The compliance solution selected for any given building will depend on several factors such as the flood zone in which it is located, the type of foundation, and whether the building is residential or non-residential.

Below are examples of measures that can be taken to meet the NFIP requirement that buildings be reasonably safe from flooding:

- **Continuous load path.** Provide for a continuous load path by connecting the building to the foundation and connecting the roof to the walls. If existing connectors (bolts, nails, screws, straps, etc.) that attach the building to the foundation are inadequate, they should be replaced, reinforced, or augmented to address the requirement that the building be stable under base flood conditions.
- **Foundation bracing.** Pile- or post-supported buildings may require additional bracing. In V zones, bracing that is perpendicular to the approach of waves is an obstacle to the passage of waves and water under the building, and may need to be modified to meet the NFIP requirement to be "free-of-obstruction."

Work that does not require a permit is generally considered to be repairs of normal wear and tear or routine maintenance. Property owners or contractors should check with local officials to determine when work requires a permit.

Once the requirement for a permit is triggered, all work is to be included in the SI/SD determination, even work that would otherwise not require a permit.

6.4 Illustrations of Improvements and Repairs

The following sections and Tables 6-1a and 6-1b present some examples of common improvements and repairs, along with descriptions of measures to comply with the NFIP floodplain management requirements. Several of the examples describe and illustrate a specific type of work or combinations of work that may trigger the SI/SD requirements. Examples are also given of improvements and repairs to pre-FIRM and post-FIRM buildings and what must be done to comply with the new construction requirements of the NFIP. Examples of work include:

- Rehabilitation and remodeling (Section 6.4.1)
- Lateral additions (Section 6.4.2)
- Vertical additions (Section 6.4.3)
- Repair, reinforce, or replace foundations (Section 6.4.4)
- Repair of damaged buildings (Section 6.4.5)
- Reconstruction of demolished or destroyed buildings (Section 6.4.6)
- Work on post-FIRM buildings (Section 6.4.7)
- Work on buildings where flood maps have been revised (Section 6.4.8)

Table 6-1a. Compliance Matrix (A Zones)

Types of Work	Building is Pre-FIRM	Building is Post-FIRM
Rehabilitation (renovate or remodel), not SI	Compliance not required	Work shall comply and shall not be allowed to make the building non-compliant with any aspect of the building that was required for compliance
Rehabilitation (renovate or remodel), SI	Building required to comply	Work shall comply and shall not be allowed to make the building non-compliant with any aspect of the building that was required for compliance (see Note below table)
Lateral addition and Rehabilitation, SI	Addition required to comply; building required to comply	Addition required to comply; building required to comply (see Note below table)
Lateral addition, not SI	Addition not required to comply	Addition required to be elevated to at least the elevation of the existing lowest floor
Lateral addition, SI, not structurally connected	Addition required to comply; building not required to comply	Addition required to comply
Lateral addition, SI, structurally connected	Addition required to comply; building required to comply	Addition required to comply; building required to comply (see Note below table)
Vertical addition above building, not SI	Compliance not required	Work shall comply and shall not be allowed to make the building non-compliant with any aspect of the building that was required for compliance
Vertical addition above building, SI	Building required to comply	Work shall comply and shall not be allowed to make the building non-compliant with any aspect of the building that was required for compliance (see Note below table)
Repair foundation, not SI	Compliance not required	Repairs shall comply and shall not be allowed to make the building non-compliant with any aspect of the building that was required for compliance
Repair foundation, SI	Building required to comply	Building required to comply (see Note below table)
Replace/extend foundation, SI (including "elevate-in-place")	Building required to comply	Building required to comply (see Note below table)
Repair damage, SD	Building required to comply	Work shall comply and shall not be allowed to make the building non-compliant with any aspect of the building that was required for compliance (see Note below table)
Reconstruct new building on existing or new foundation, SI	Reconstructed building required to comply	Reconstructed building required to comply (see Note below table)

Note: If a map revision has resulted in a higher BFE, a post-FIRM building must comply based on the new BFE.

Table 6-1b. Compliance Matrix (V Zones)

Types of Work	Building is Pre-FIRM	Building is Post-FIRM
Rehabilitation (renovate or remodel), not SI	Compliance not required	Work shall comply and shall not be allowed to make the building non-compliant with any aspect of the building that was required for compliance
Rehabilitation (renovate or remodel), SI	Building required to comply	Work shall comply and shall not be allowed to make the building non-compliant with any aspect of the building that was required for compliance (see Note below table)
Lateral addition and Rehabilitation, SI	Addition required to comply; building required to comply	Addition required to comply, and rehabilitation work shall comply and shall not be allowed to make the building non-compliant with any aspect of the building that was required for compliance (see Note below table)
Lateral addition, not SI	Addition not required to comply	Addition required to comply
Lateral addition, SI, not structurally connected	Addition required to comply; building required to comply	Addition required to comply (see Note below)
Lateral addition, SI, structurally connected	Addition required to comply; building required to comply	Addition required to comply; building required to comply (see Note below table)
Vertical addition above building, not SI	Compliance not required	Work shall comply and shall not be allowed to make the building non-compliant with any aspect of the building that was required for compliance
Vertical addition above building, SI	Building required to comply	Work shall comply and shall not be allowed to make the building non-compliant with any aspect of the building that was required for compliance (see Note below table)
Repair foundation, not SI	Compliance not required	Repairs shall comply and shall not be allowed to make the building non-compliant with any aspect of the building that was required for compliance
Repair foundation, SI	Building required to comply	Building required to comply (see Note below table)
Replace/extend foundation, SI (including "elevate-in-place")	Building required to comply	Building required to comply (see Note below table)
Repair damage, SD	Building required to comply	Work shall comply and shall not be allowed to make the building non-compliant with any aspect of the building that was required for compliance (see Note below table)
Reconstruct new building on existing or new foundation, SI	Reconstructed building required to comply	Reconstructed building required to comply (see Note below table)

Note: If a map revision has resulted in a higher BFE, a post-FIRM building must comply based on the new BFE.

6.4.1 Rehabilitation and Remodeling

The NFIP considers rehabilitation and remodeling to include improvements to a building that do not affect the external dimensions nor expand the total area of the building. Rehabilitation may or may not involve structural modification of the building. The local official must review all work proposed for rehabilitation or remodeling to determine whether it constitutes a

substantial improvement. If the work constitutes a substantial improvement, the building must be brought into compliance.

Rehabilitation of pre-FIRM buildings (residential)

Residential buildings that are substantially improved through rehabilitation or remodeling must comply with all applicable NFIP floodplain management requirements for the specific flood zone. Figure 6-1 illustrates the rehabilitation of a residential building that is located in an A zone. The figure illustrates elevation on a solid perimeter wall (crawlspace). Other types of foundations may be used in A zones, including pilings, columns, slabs on fill, and stem walls. Open foundations (pilings and columns) are required in V zones.

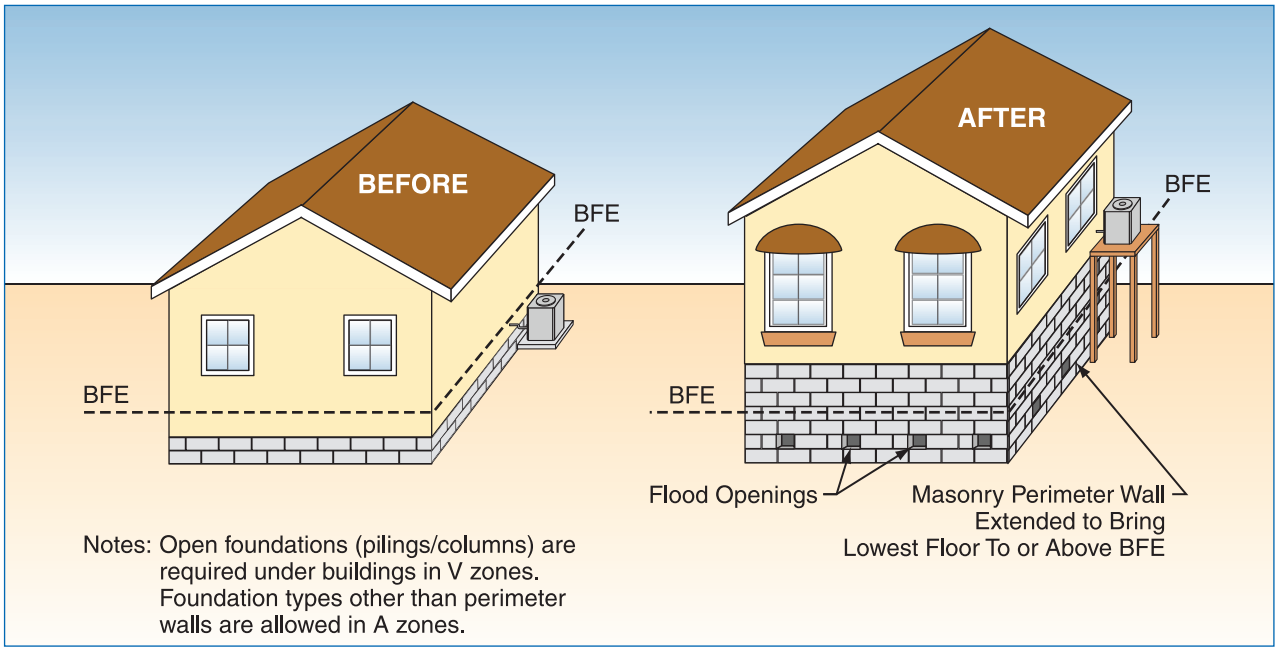


Figure 6-1. Rehabilitation or remodel (no increase in footprint) of residential building in an A zone – the proposed work was determined to be a substantial improvement. The building is brought into compliance by elevating it on an extended perimeter foundation wall, installing flood openings, and raising the HVAC equipment onto a platform.

Rehabilitation of pre-FIRM buildings (non-residential)

Rehabilitation or remodeling work on a non-residential building that is SI/SD triggers the requirement that the lowest floor be elevated (in A and V zones) or dry floodproofed (only in A zones).

Figure 6-2 illustrates the rehabilitation of a non-residential structure in an A zone where a structural engineering analysis indicates the building can be retrofitted with dry floodproofing measures in compliance with the NFIP requirements that require certification of the design by a registered design professional. For additional guidance, see FEMA FIA-Technical Bulletin 3, *Non-Residential Floodproofing – Requirements and Certification for Buildings Located in Special Flood Hazard Areas*. Communities that enforce building codes that refer to ASCE 24-05 for design and construction of buildings in flood hazard areas should be aware that ASCE 24-05 establishes

some specific limitations for floodproofing, including limitations on warning time and the availability of adequate labor to implement floodproofing measures.

Depending on the type of foundation and other constraints, non-residential structures that are located in A zones may be elevated on raised foundations. In this instance, the building must be brought into compliance with all of the applicable floodplain management requirements, including the type of foundation, limitations on use of enclosed areas, installation of openings in any enclosed areas, elevation of utilities and mechanical equipment, and use of flood damage-resistant materials.

In V zones, the only compliance option for non-residential buildings is elevation on open foundations. Dry floodproofing is not allowed in V zones.

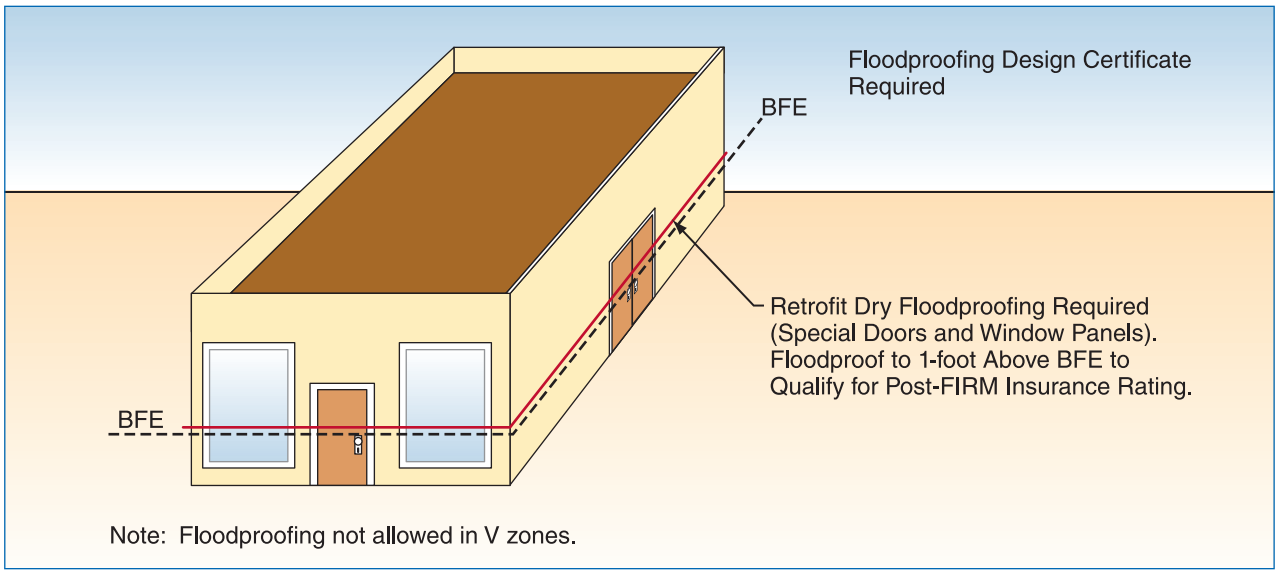


Figure 6-2. Rehabilitation or remodel (no increase in footprint) of non-residential building in an A zone – the proposed work was determined to be a substantial improvement. The building is brought into compliance by retrofit dry floodproofing measures (certification of design by registered design professional is required).

Rehabilitation/repair of a post-FIRM building

Any repairs or improvements associated with the rehabilitation or remodeling of a post-FIRM building must comply with the NFIP requirements and not alter the building in any way that violates those requirements.

If a revised, higher BFE goes into effect and the local official determines that rehabilitation constitutes SI/SD, the entire post-FIRM building must be brought into compliance with the elevation requirement based on the revised BFE.

6.4.2 Lateral Additions

A lateral addition expands the floor area of the building. A lateral addition that involves no alteration of the load-bearing structure of the building, is attached to the building with minimal

connection, and that has a doorway as the only modification to the common wall is considered to be "not structurally connected." A lateral addition that has its load-bearing structure connected to the load-bearing structure of the base building, which typically involves significant alternation of the common wall, is considered "structurally connected."

If a lateral addition is proposed along with other work on the original building, all the work must be considered in the SI/SD determination, regardless of the size or cost of the addition by itself and the cost of improvements to the original building.

As described below and summarized in Tables 6-1a and 6-1b, lateral additions depend on four factors:

- Whether the building is pre-FIRM or post-FIRM,
- Whether the common wall with the original building is modified structurally by more than installing a doorway,
- Whether the addition itself is a substantial improvement, and
- The applicable flood zone.

Structurally Connected and Not Structurally Connected. A noncompliant addition that is below the BFE and "structurally connected" would transfer flood loads imposed on it to the existing building.

An addition that is below the BFE and "not structurally connected" is expected to sustain damage, but should not transfer loads to the existing building.

Lateral additions to pre-FIRM buildings (A zone, residential)

For a project that involves only a lateral addition (i.e., there will be no improvements to the original building, the addition will not be structurally connected to the original building, and only a doorway will be installed in the common wall between the addition and the original building):

- If the cost of the addition compared to the value of the original building constitutes a substantial improvement, only the lowest floor of the addition must be elevated to comply with NFIP requirements (Figure 6-3).
- If the addition is determined to not be substantial improvement, the addition is not required to be elevated. Owners should be reminded that the addition will be subject to flooding and encouraged to consider measures to reduce vulnerability to damage (Section 5.8).

If a proposed lateral addition project also includes rehabilitation or remodeling of the existing building, then the local official must consider the whole project as a combination of work. If the local official determines that the combined cost of the project constitutes substantial improvement, then both the original building and the addition must be elevated and meet all other applicable requirements (Figure 6-4).

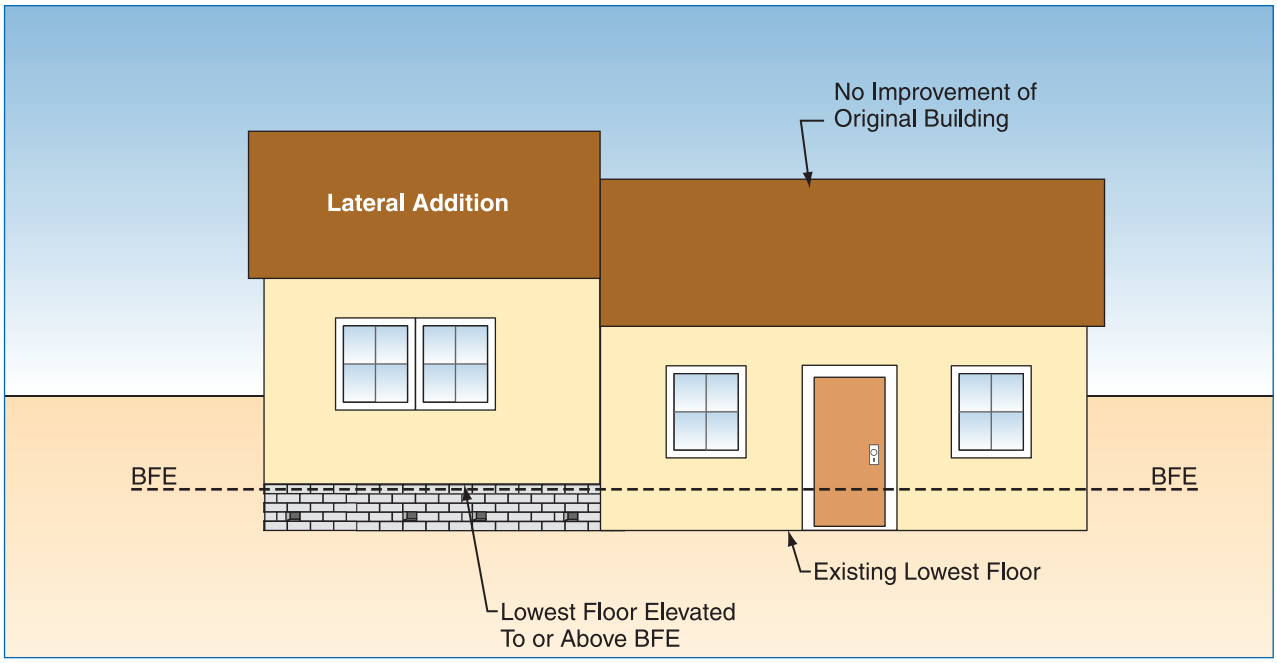


Figure 6-3. Lateral addition to a pre-FIRM building in an A zone – the proposed work is only the addition (no work was performed on the original building and no structural modification was made to the common wall or roof). The addition constitutes a substantial improvement and it complies with all NFIP requirements.

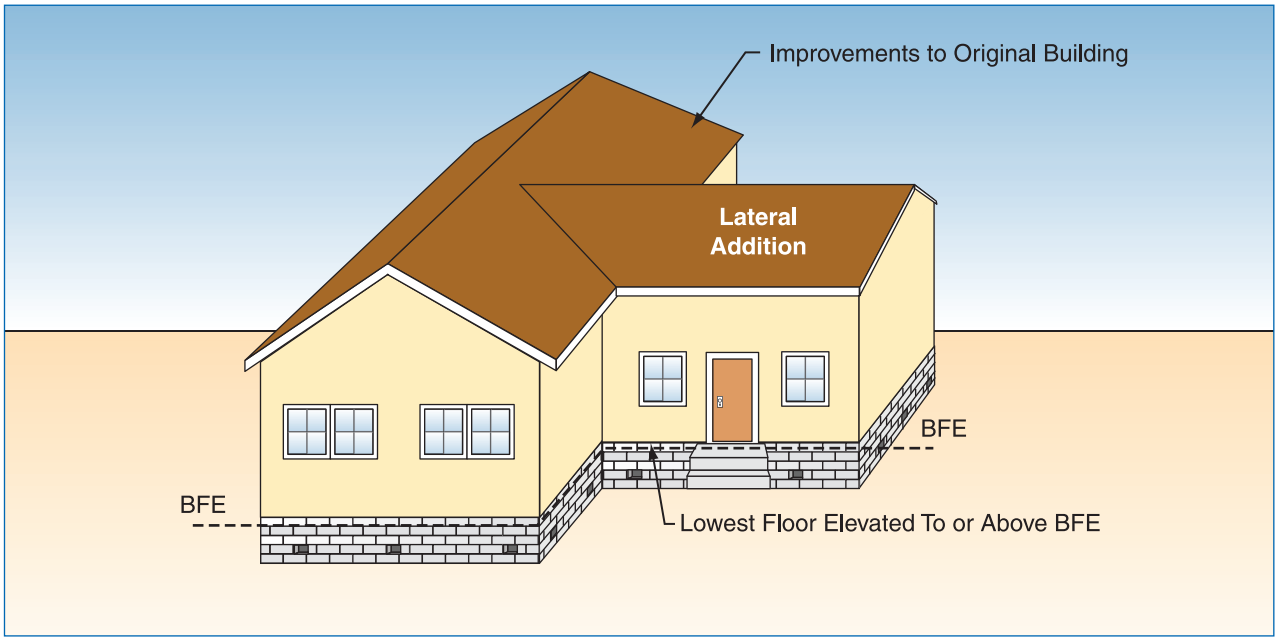


Figure 6-4. Lateral addition to a pre-FIRM building in an A zone – the proposed work includes an addition and work on the original building, including structural modification of the common wall or roof. The proposed work was determined to be a substantial improvement. The addition complies with all requirements and the building is brought into compliance by elevating it on a compliant foundation.

Lateral additions to pre-FIRM buildings (V zone, residential)

Lateral additions to pre-FIRM buildings in V zones are treated differently than additions to buildings in A zones. If a proposed addition (or combination of an addition and other improvements) to a V zone building constitutes a substantial improvement, then the lowest floor of both the original building and the addition must be elevated (Figure 6-5). The pertinent NFIP requirement for elevating both is the "free of obstruction" requirement. The original building must be elevated so that it will not obstruct floodwaters and waves that may damage the addition. For more guidance, see FEMA Technical Bulletin 5, *Free-of-Obstruction Requirements for Buildings Located in Coastal High Hazard Areas.*

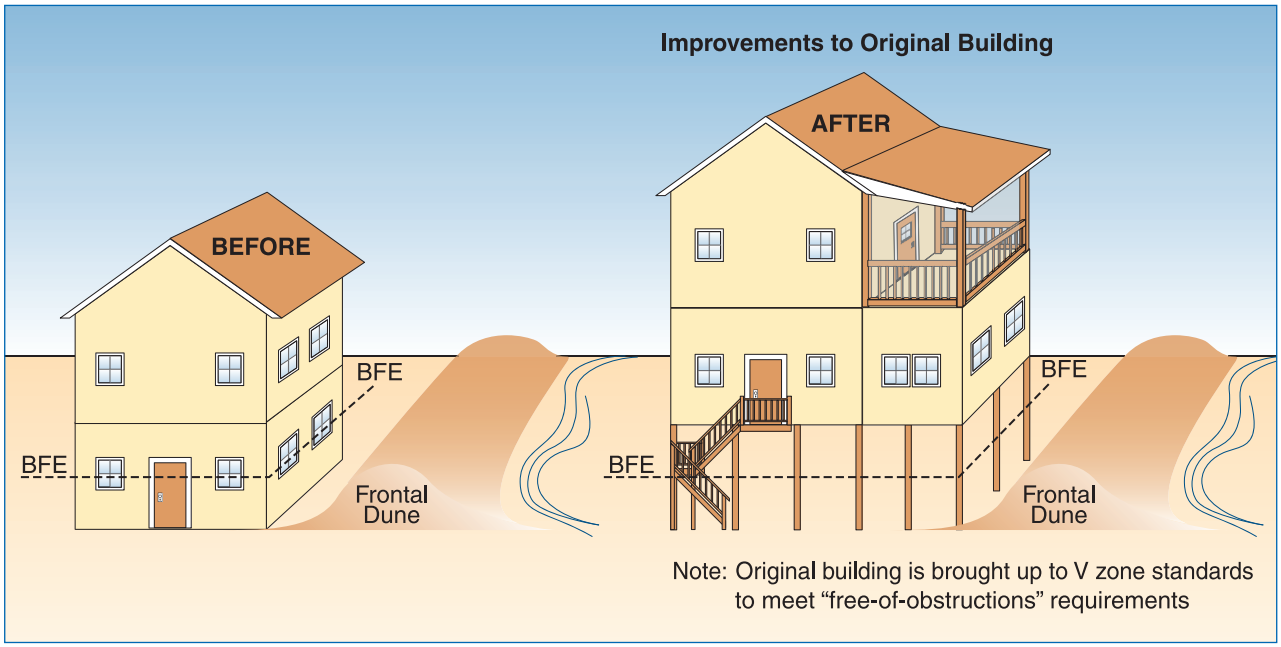


Figure 6-5. Lateral addition to a residential building in a V zone – the proposed work includes work on the original building. The lateral addition and improvements constitute substantial improvement. Both the addition and the original building are brought into compliance by elevating to or above the BFE on an open foundation.

Lateral additions to pre-FIRM manufactured homes

Lateral additions are common improvements to manufactured homes and local officials must determine whether the proposed work constitutes substantial improvement. Costs associated with typical porches and sunrooms may not exceed 50 percent of the market value of the home. However, proposed additions that will be walled with siding, insulated, and used year-round require close examination to determine whether the addition constitutes a substantial improvement.

If a proposed addition to a manufactured home constitutes a substantial improvement, the local official must determine the applicable NFIP elevation requirements; the requirements depend on several factors that are described in Section 6.5.2.

Figure 6-6 illustrates a lateral addition to a pre-FIRM manufactured home – the proposed work includes improvements to the existing home. The existing home in this illustration is located outside a manufactured home park or subdivision and the work constitutes a substantial improvement. Both the addition and the home must be elevated on compliant foundations.

All substantial improvements must be carefully constructed, supported, and anchored to resist flotation, collapse, and lateral movement during base flood conditions so as not to impose unanticipated loads on the original homes. Otherwise, the presence of additions could increase vulnerability to flood loads imposed on supporting piers and anchoring, leading to damage. For more detailed guidance on the installation of manufactured homes in SFHAs, see FEMA P-85, *Protecting Manufactured Homes from Floods and Other Hazards: A Multi-Hazard Foundation and Installation Guide.*

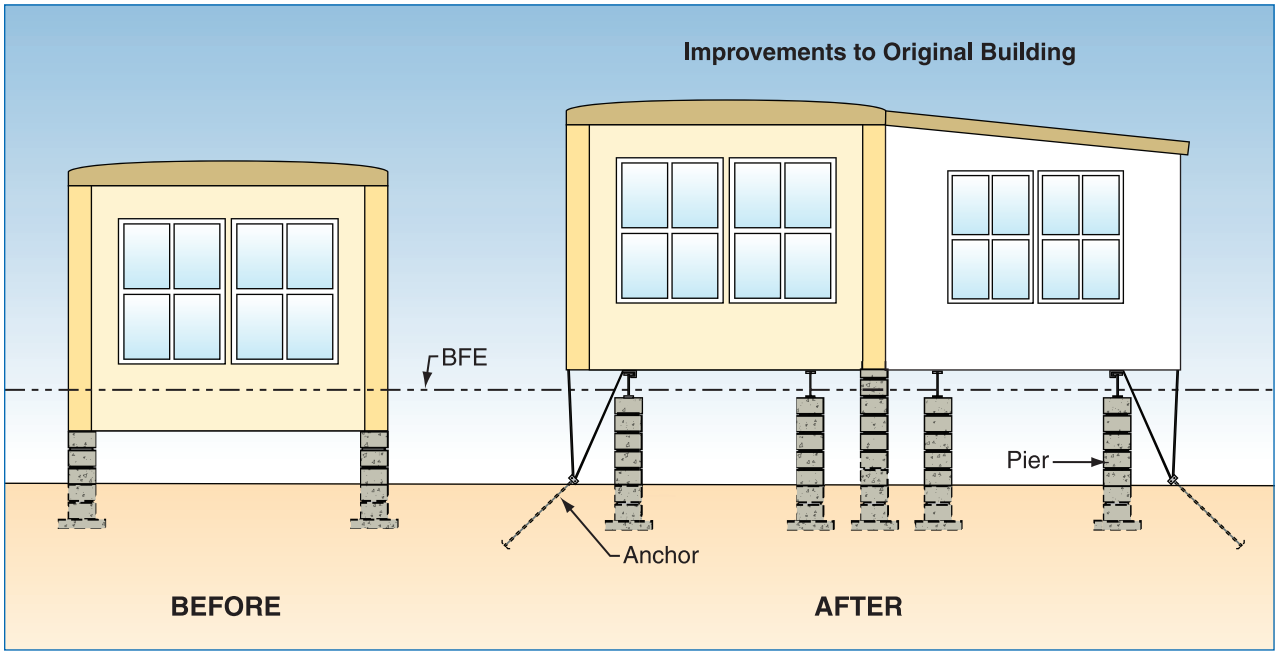


Figure 6-6. Lateral addition to a pre-FIRM manufactured home in an A zone – the proposed work includes improvements to the existing home. The work constitutes substantial improvement. The addition and the home are elevated to or above the BFE.

Lateral additions to pre-FIRM buildings (A zone, non-residential)

If a proposed lateral addition to a non-residential building is determined to be a substantial improvement, but there is no work proposed for the original building and the common wall is modified only by the installation of a door, only the addition must be brought into compliance. The addition must meet NFIP requirements either by elevating the lowest floor to or above the BFE or by dry floodproofing to that elevation (Figure 6-7). If the addition is dry floodproofed, the common wall must also be made watertight.

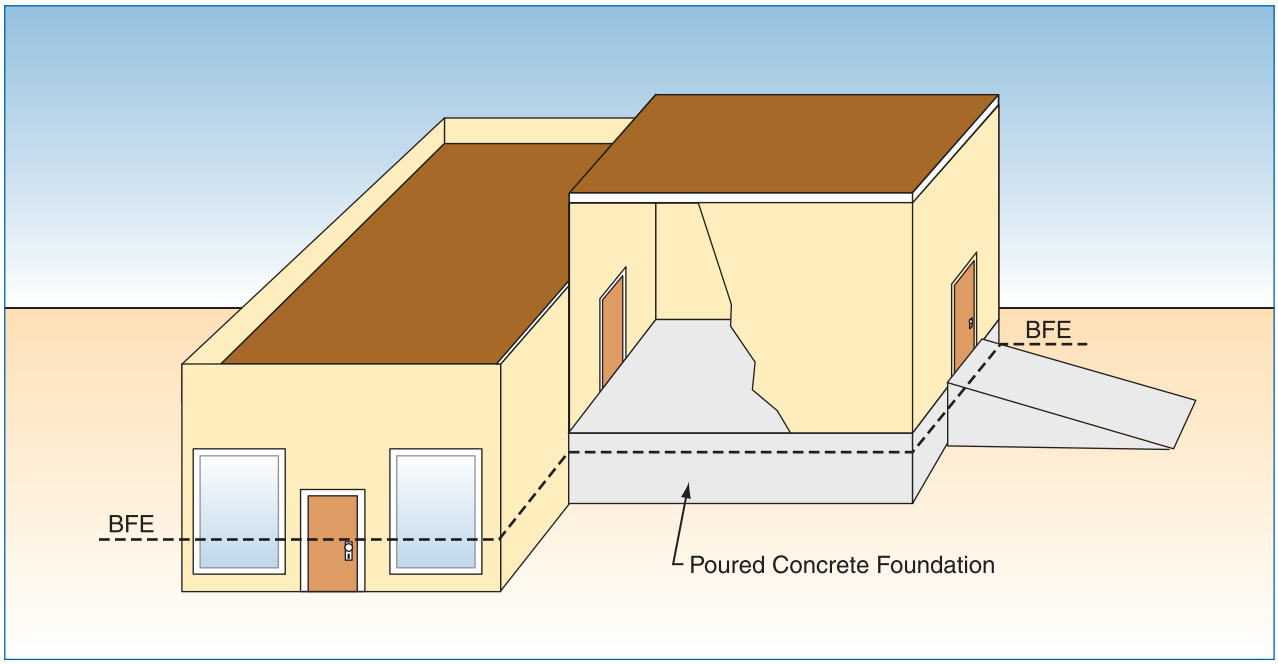


Figure 6-7. Lateral addition to a non-residential building in an A zone – the proposed work is only the addition (no work on the existing building and no structural modification of the common wall or roof). The work constitutes substantial improvement. The addition is elevated to or above the BFE (an alternative would be to dry floodproof only the addition, including the common wall).

Lateral additions to post-FIRM buildings (any zone, residential or non-residential)

Lateral additions to post-FIRM buildings are new construction and must comply with the NFIP requirements, including elevation. If the addition does not comply, then the original building will become non-compliant. Lateral additions must not alter any aspect of the building that had to be met when the building was constructed in compliance with the community's floodplain management regulations. A lateral addition, regardless of its value or size, must be elevated to at least the height of the post-FIRM building. The following summarizes these points:

- In any zone, if the BFE is unchanged, the addition must be elevated and comply with other applicable NFIP requirements, regardless of whether it is SI/SD (Figure 6-8).
- In any zone, if a revised, higher BFE is in effect, a lateral addition that is not a substantial improvement must be elevated at least as high as the original building.
- In any zone, if a lateral addition is a substantial improvement (and structurally connected), both the addition and the building must be brought into compliance. If a revised, higher BFE is in effect, both the original building and the addition must be elevated.
- In A zones, if the lateral addition is a substantial improvement (and not structurally connected), it must be elevated to the effective BFE. The effective BFE may be higher than the BFE in effect when the building was built (Figure 6-9).
- In V zones, if a lateral addition is a substantial improvement (and not structurally connected), both the addition and the original post-FIRM building must be elevated if a revised, higher BFE is in effect, otherwise the free-of-obstruction requirement is not met.

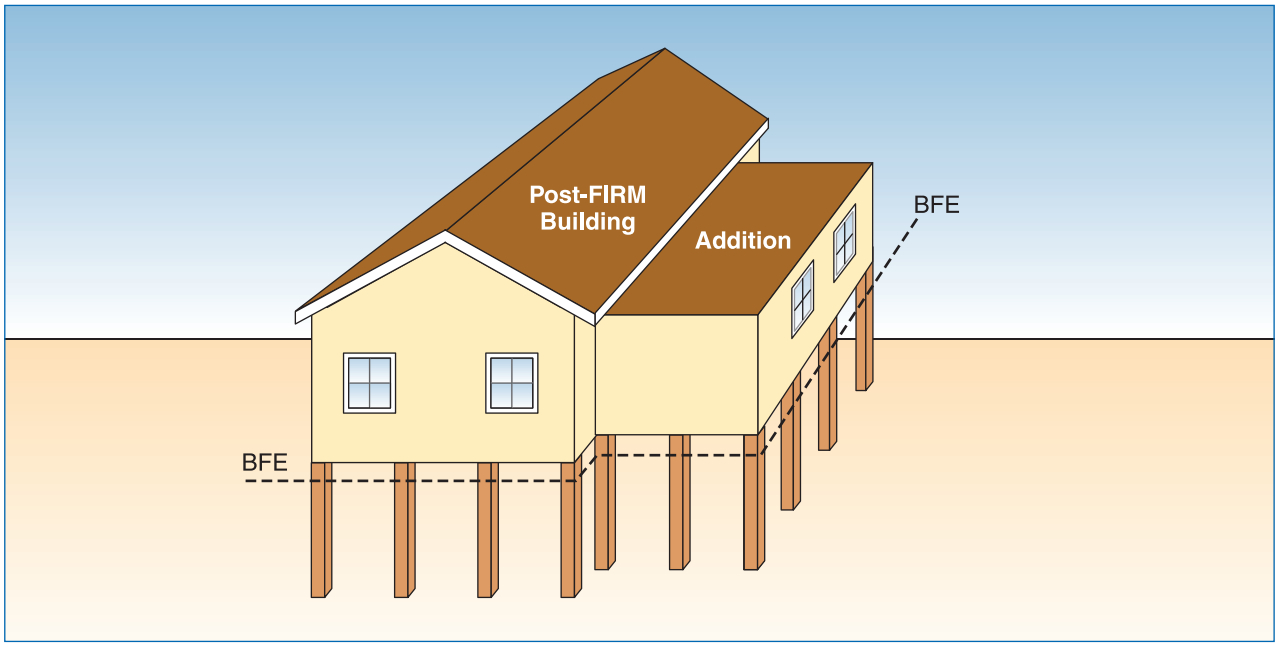


Figure 6-8. Lateral addition to a post-FIRM building in any flood zone (map revision has not changed the effective BFE). All improvements or repairs to a post-FIRM building must comply with the NFIP requirements regardless of the value of that work, and the work shall not compromise any of the NFIP requirements that the building was required to meet when it was initially built.

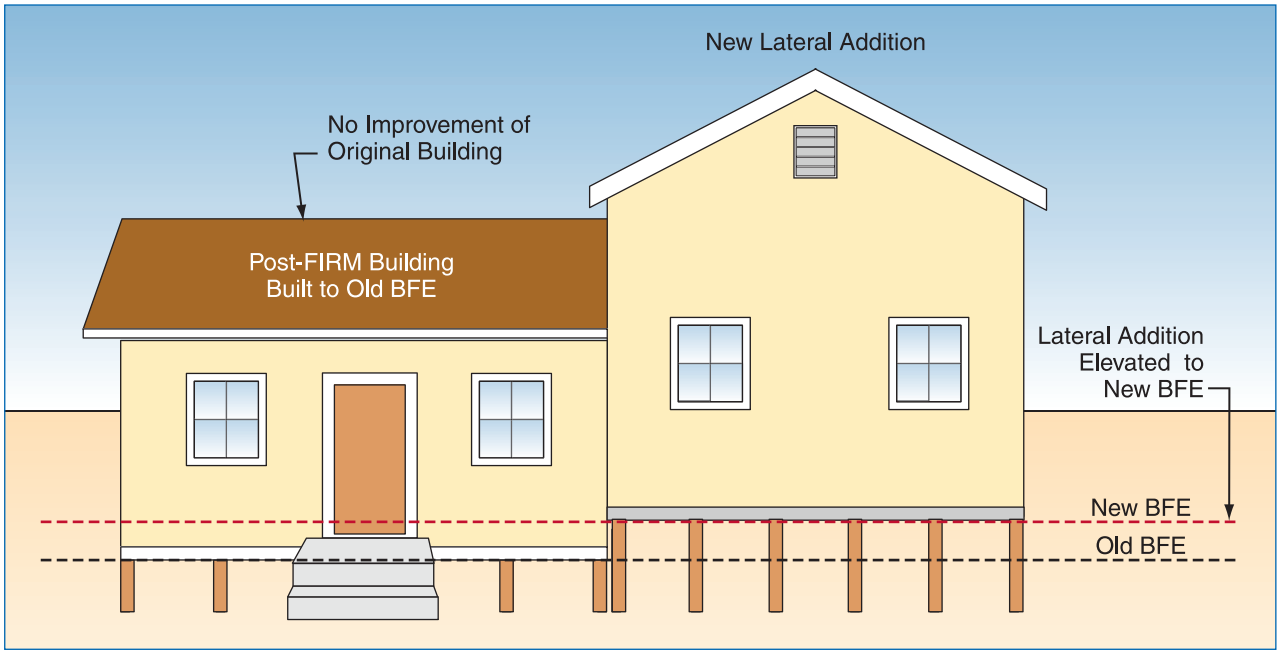


Figure 6-9. Lateral addition to a post-FIRM building in an A zone (a map revision has increased the BFE). The proposed work is a lateral addition with no work in the original building and no structural modification of the common wall or roof. The work constitutes a substantial improvement. Because there is no structural modification, only the addition must comply with the effective BFE which is higher than the BFE when the building was built. If instead the proposed work includes work in the original building or structural modification, the addition and the building must comply with the effective BFE.

6.4.3 Vertical Additions

A vertical addition expands the floor area of a building by either adding an upper story above the original building (Figure 6-10) or elevating the original building and constructing a new story beneath it (Figure 6-11). In both cases, it is likely that work on the load-bearing foundation will be required to carry the added load. Vertical additions may be smaller than the building footprint, such as a loft or bedroom, but the local official must still make an SI/SD determination.

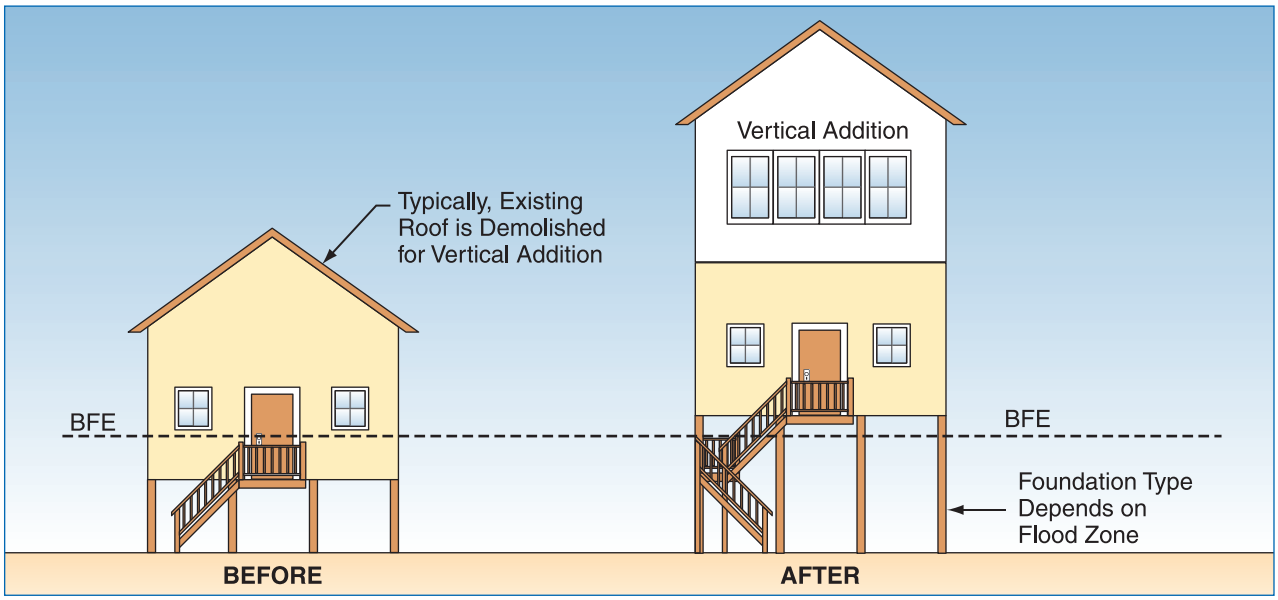


Figure 6-10. Vertical addition to a pre-FIRM residential building (in any zone) – the proposed work is a new upper story that involves structural modification. The work is a substantial improvement. The building is elevated to or above the BFE on a compliant foundation.

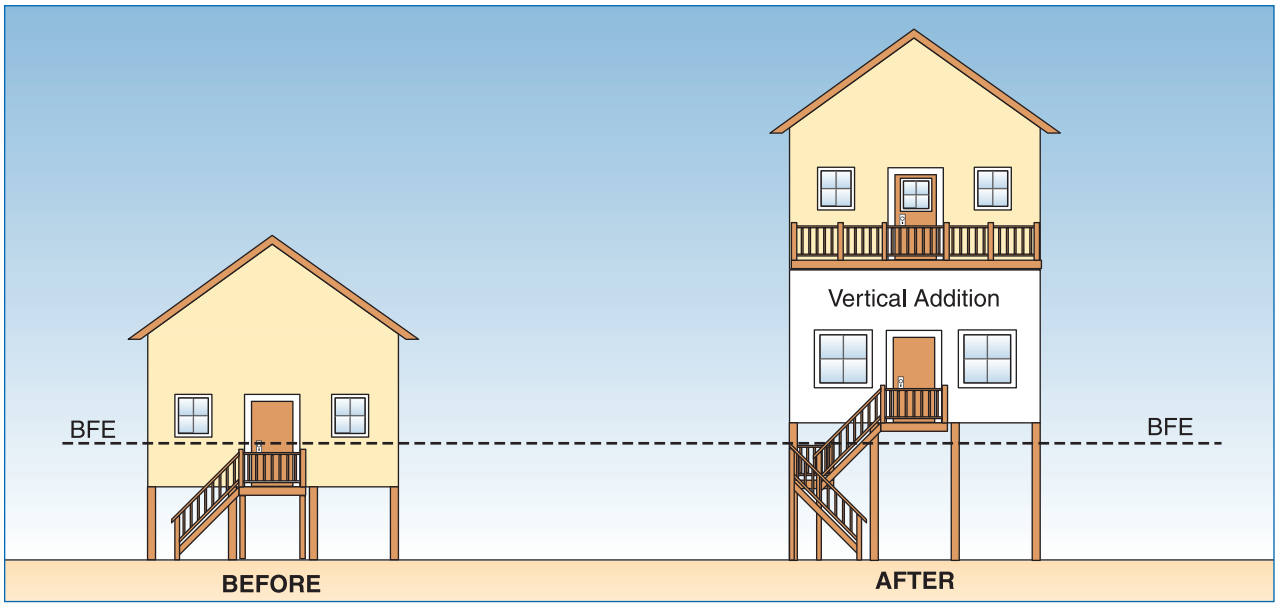


Figure 6-11. Vertical addition to a pre-FIRM residential building (in any zone) – the proposed work is a new lower story that involves structural modification. The work constitutes a substantial improvement. The building and the new lower story are elevated on a compliant foundation.

Vertical additions to pre-FIRM buildings (residential)

If a vertical addition to a pre-FIRM residential building constitutes a substantial improvement, the original building must be elevated to or above the BFE. In addition, the foundation must be modified or reconstructed (and below-grade areas filled in) to be compliant with applicable NFIP requirements based on the flood zone.

Vertical additions to pre-FIRM buildings (non-residential)

Vertical additions may involve adding an upper story above a non-residential building (Figure 6-12). If a vertical addition constitutes a substantial improvement, the original building must be elevated to or above the BFE or dry-floodproofed to the BFE (A zone only). In addition, the foundation must be modified or reconstructed (and below-grade areas filled in) to be compliant with applicable NFIP requirements based on the flood zone.

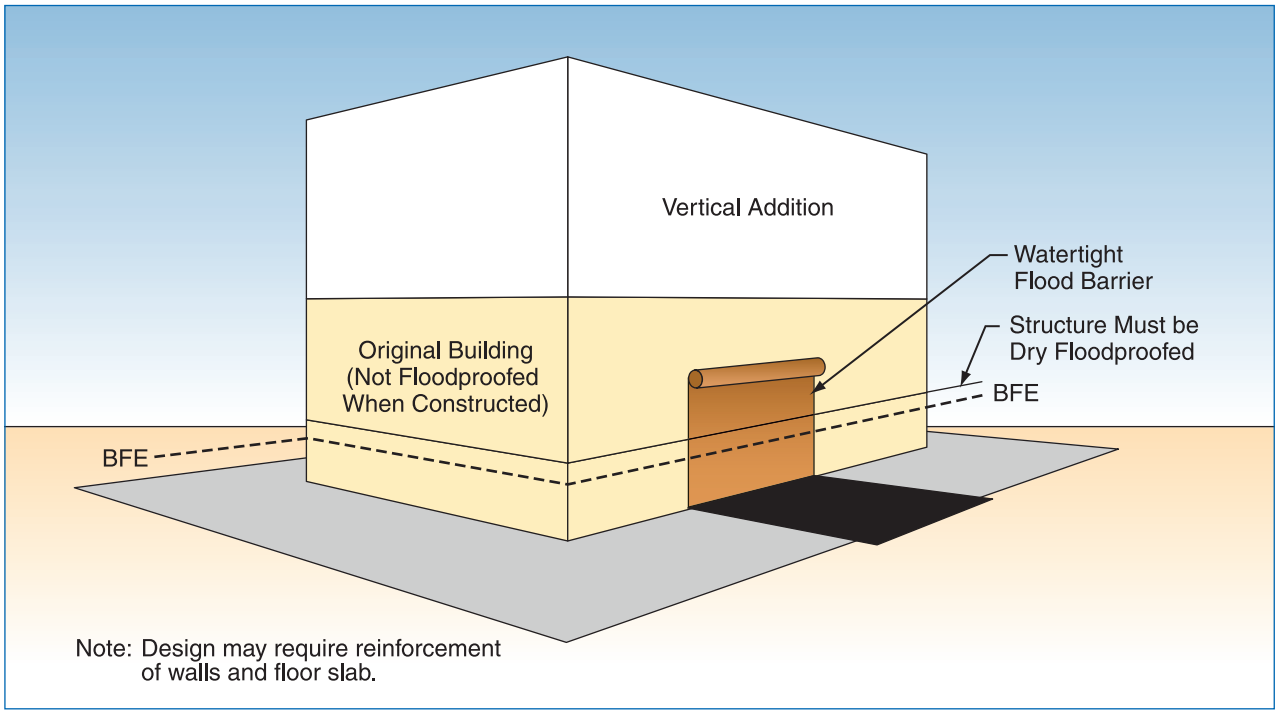


Figure 6-12. Vertical addition to a pre-FIRM, non-residential building in an A zone. The work constitutes a substantial improvement. The building is brought into compliance by retrofit dry-floodproofing measures (certification of design by registered design professional is required). Non-residential buildings can also be brought into compliance by elevation (not shown).

Vertical additions to post-FIRM buildings

Whether a local official will need to evaluate a vertical addition to a post-FIRM building to determine if it is a substantial improvement is related to whether the FIRM has been revised. If a revised, higher BFE is in effect, or if the flood zone changed (or floodway boundary changed), a vertical addition that is a substantial improvement will require that the entire building be elevated to the higher, effective BFE and comply with other applicable NFIP requirements based on the flood zone.

6.4.4 Repair, Reinforce, or Replace Foundations

It is common to repair, reinforce, or replace foundations, especially for older buildings. Foundation work also includes repair of damaged foundations, regardless of whether the damage is caused by a single event (such as a flood or earthquake) or due to deterioration over time.

Work performed on a foundation, either by itself or in combination with other work on a building, may constitute SI/SD. If the work is not a substantial improvement, the structure does not have to be elevated. However, any owner contemplating the replacement of a foundation should investigate the potential savings on the cost of NFIP flood insurance if the building is elevated and the new foundation complies with all of the applicable NFIP requirements. Many owners elect to elevate flood-prone buildings to reduce flood damage. The incremental cost to both replace a foundation and elevate a structure properly to the effective BFE may be offset by the reduction in future damage and annual flood insurance premiums.

In some cases, property owners may elect to elevate a structure, but not to the BFE. The cost to elevate a structure in this fashion must be included when making the SI/SD determination.

Foundation work on pre-FIRM buildings (residential)

If foundation work is determined to be SI/SD, then the building must be elevated in accordance with all applicable NFIP requirements, depending on the flood zone. Figure 6-13 illustrates the construction of a compliant foundation under an existing home.

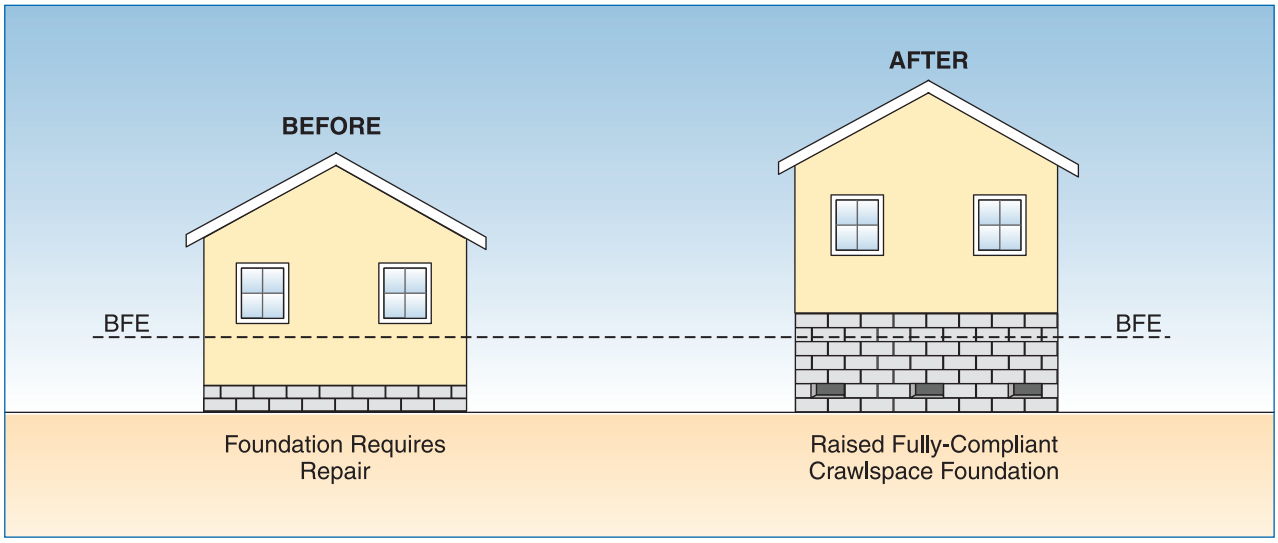


Figure 6-13. New foundation or repair of foundation under a pre-FIRM (in an A zone) residential building. The work was determined to be a substantial improvement. The building is brought into compliance by elevating on a compliant foundation.

Foundation work on pre-FIRM buildings (non-residential)

If the foundation work on a non-residential building is determined to be SI/SD, then the building must be elevated in accordance with all applicable NFIP requirements, depending on the flood zone.

As part of foundation work, owners of non-residential buildings in A zones may propose to retrofit with compliant dry-floodproofing measures. Such proposals must be supported with structural engineering analyses that indicate whether the buildings can be dry floodproofed in compliance with the NFIP requirements. The analyses must be prepared or reviewed by a registered design professional who must sign and seal the dry floodproofing designs. For guidance, see FEMA FIA-Technical Bulletin 3, *Non-Residential Floodproofing – Requirements and Certification for Buildings Located in Special Flood Hazard Areas*. The technical bulletin includes planning considerations regarding warning time, safety of personnel responsible for implementing the measures, and the importance of having an emergency operations plan and a plan for regular inspection and maintenance. ASCE 24-05, the standard for flood damage-resistant design and construction that is referenced by the model building codes, also includes similar requirements and limitations on measures that require human intervention.

6.4.5 Repair of Damaged Buildings

The NFIP requirements for repair of substantially damaged buildings are the same as those described for rehabilitation and remodeling (Section 6.4.1). However, if a proposal for repair also includes an addition to a damaged property, the cost of the addition must be included in the SI/SD determination. If the combination of work is a substantial improvement, then both the addition and the original building must be brought into compliance with the NFIP requirements, depending on the flood zone.

6.4.6 Reconstruction of Demolished or Destroyed Buildings

Any project that involves complete reconstruction, such as rebuilding on the same foundation, is new construction that must comply with all applicable NFIP floodplain management requirements. A building that is totally destroyed or so significantly damaged that it cannot be repaired is a substantially damaged building. Sometimes an owner elects to demolish the building. In these circumstances, if the decision is to reconstruct using the existing foundation, the reconstructed building must meet NFIP requirements for new construction.

6.4.7 Work on Post-FIRM Buildings

All repairs, improvements or modifications to a post-FIRM building are considered new construction (see definition in Chapter 3). Work on a post-FIRM building must not be allowed if it would make the building non-compliant with the floodplain management requirements that had to be met when the building was constructed. Tables 6-1a (A zones) and 6-1b (V zones) identify types of work on post-FIRM buildings and the compliance requirements that apply. In some cases when an addition is involved, the original building has to be brought into compliance.

6.4.8 Work on Buildings Where Flood Maps Have Been Revised

Section 5.6.11 explains that many communities have had revisions to their flood hazard maps. The following illustrate how map revisions that change flood zone designations or modify or add floodway delineations must be taken into consideration:

- If the FIRM has been revised and the SFHA has widened to include more area, that area is now subject to the NFIP requirements. For example, areas that were previously designated X zone may now be shown as A zone or V zone. Improvements and repairs to buildings that were outside of the SFHA but are now in the revised SFHA must be evaluated to determine if the work is SI/SD.
- If the FIRM has been revised and the flood zone or BFE changed, a determination that work is a substantial improvement requires that the building meet NFIP requirements for new construction based on the revised flood zone and revised BFE.
- If the FIRM has been revised and either the floodway boundaries are changed or a floodway is newly delineated, a determination that improvements or repairs to a building are SI/SD may require an encroachment analysis.

6.5 Requirements for Certain Structures

This section describes how SI/SD is addressed for certain types of buildings in accordance with the NFIP floodplain management requirements, including:

- Historic structures (Section 6.5.1)
- Manufactured homes (Section 6.5.2)
- Accessory structures and certain agricultural structures (Section 6.5.3)

6.5.1 Historic Structures

The NFIP gives special consideration to the unique value of designated historic buildings and structures. Provided such structures retain their designations, communities do not have to require them to be brought into compliance if they will be substantially improved or have been substantially damaged. Section 3.4.1 includes the NFIP's definition for "historic structures." The term includes structures that are: (1) listed or preliminarily determined to be eligible for listing in the National Register of Historic Places; (2) certified or preliminarily determined by the Secretary of the U.S. Department of Interior as contributing to the historical significance of a registered historic district or a district preliminarily determined to qualify as a registered historic district; or (3) designated as historic site under a State or local historic preservation program that is approved by the Secretary of the U.S. Department of Interior. The definition does not include structures that are merely old, those that residents refer to as historic, or those that happen to be located in historic districts.

The NFIP floodplain management requirements contain two provisions that are intended to provide relief for historic structures located in SFHAs:

(1) The NFIP definition of "substantial improvement" includes the following exclusion for historic structures: "*Any alteration of a 'historic structure,' provided that the alteration will not preclude the structure's continued designation as an 'historic structure'*." The exclusion also applies to historic structures that have been substantially damaged. This provision allows communities to exempt historic structures from the SI/SD requirements of the NFIP.

(2) The other provision of the NFIP floodplain management regulations that provides relief for historic structures" is the variance criteria at 44 CFR § 60.6(a). This provision states: "*Variances may be issued for the repair or rehabilitation of historic structures upon a determination that the proposed repair or rehabilitation will not preclude the structure's continued designation as a historic structure and the variance is the minimum necessary to preserve the historic character and design of the structure.*" This provision allows communities to handle applications for work on historic structures by issuing variances.

To address the unique needs of preserving historic structures, communities may elect to use one of the two approaches, either granting variances or exempting historic structures from the SI/SD requirements. Whichever approach is selected, it must be used in all cases when improvements or repairs are proposed for historic structures.

Using the variance option allows communities to evaluate individual requests and place conditions on the variance to make historic buildings more flood damage-resistant and to minimize flood damage. However, such conditions should not affect the historic character and design of the building.

It is important to note that additions to historic structures that are located in floodways require additional attention. While additions may not have to meet the substantial improvement requirements, they must still satisfy the NFIP requirements related to floodway encroachments. A floodway encroachment analysis must be provided to demonstrate that an addition will not cause any increase in the BFE (Section 5.6.8).

Applications for improvements to historic structures should be accompanied by two pieces of evidence: (1) documentation that confirms the building is designated an historic structure; and (2) documentation that confirms the proposed work will not preclude the structure's continued designation. Applicants can ask the appropriate qualified entity that makes such designations to review their construction plans. A copy of the findings should be kept in the community's permanent records.

Although compliance is not required for substantial improvement of historic structures, owners should carefully consider the benefits of implementing measures to minimize flood damage. State historic preservation agencies may have resources to help owners evaluate feasible measures. Historic buildings can be elevated on raised foundations, relocated to sites outside of SFHAs, or retrofitted with measures that reduce risk from flooding. FEMA's *Floodplain Management Bulletin: Historic Structures* (FEMA P-467-2) provides guidance for communities and owners of historic structures.

6.5.2 Manufactured Homes

Communities that participate in the NFIP must issue permits for the placement of manufactured homes in SFHAs. This includes the placement of new manufactured homes, replacement of existing manufactured homes, substantial improvement of manufactured homes, and repair of substantially damaged manufactured homes. This requirement applies even if the community does not otherwise regulate the installation of manufactured homes.

The NFIP regulations define the following terms pertaining to manufactured homes:

- **"Manufactured home"** means *a structure, transportable in one or more sections, which is built on a permanent chassis and is designed for use with or without a permanent foundation when attached to the required utilities. The term 'manufactured home' does not include a 'recreational vehicle.'*
- **"Manufactured home park or subdivision"** means *a parcel (or contiguous parcels) of land divided into two or more manufactured home lots for rent or sale.*
- **"New manufactured home park or subdivision"** means *a manufactured home park or subdivision for which the construction of facilities for servicing the lots on which the manufactured homes are to be affixed (including, at minimum, the installation of utilities, the construction of streets, and either final site grading or the pouring of concrete pads) is completed on or after the effective date of floodplain management regulations adopted by a community.*
- **"Expansion to an existing manufactured home park or subdivision"** means *the preparation of additional sites by the construction of facilities for servicing the lots on which the manufactured homes are to be affixed (including the installation of utilities, the construction of streets, and either final site grading or the pouring of concrete pads).*
- **"Existing manufactured home park or subdivision"** means *a manufactured home park or subdivision for which the construction of facilities for servicing the lots on which the manufactured homes are to be affixed (including, at minimum, the installation of utilities, the construction of streets, and either final site grading or the pouring of concrete pads) is completed before the effective date of floodplain management regulations adopted by a community.*

A **manufactured home park** is usually owned by a single owner who rents pads and/or units.

A **manufactured home subdivision** is similar to traditional subdivisions in that each lot is individually owned.

As described below, most manufactured home placements and substantial improvements are subject to the same NFIP performance standards that apply to typical, site-built residential structures. A limited exception to the elevation requirements also is described below: under certain conditions, the exception applies to the placement of manufactured homes in existing manufactured home parks or subdivisions.

In AE, A1-30, and AH zones, the NFIP minimum requirement at 44 CFR § 60.3(c)(6) requires manufactured homes (including substantially improved homes) to be placed on permanent foundations such that their lowest floors are elevated to or above the BFE. In AO zones, the requirement is for lowest floors to be elevated above the highest adjacent grade at least as high as the depth number specified on the FIRM. Manufactured homes must be securely anchored to an adequately anchored foundation system to resist flotation, collapse, and lateral movement.

In V zones, the NFIP minimum requirement at 44 CFR § 60.3(e)(8) requires manufactured homes (including substantially improved homes) to be placed on permanent foundations such that the lowest horizontal structural members (generally the bottom of the chassis frame) are elevated to or above the BFE. Manufactured homes must be securely anchored to an adequately anchored foundation system to resist flotation, collapse, and lateral movement. And, as with other buildings in V zones, foundations must be designed to withstand flood forces.

In both A zones and V zones, the above-described requirements apply to sites that are:

- Outside of a manufactured home park or subdivision (individually owned parcels),
- In a new manufactured home park or subdivision,
- In an expansion to an existing manufactured home park or subdivision, or
- In an existing manufactured home park or subdivision on which a home has incurred substantial damage as a result of a flood.

The exception in the NFIP regulations allows an alternative to the requirement to elevate the lowest floors of manufactured homes to the BFE [44 CFR § 60.3(c)(12) and § 60.3(e)(8)]. The exception is applicable only for placements or substantial improvements on lots in existing manufactured home parks and subdivisions. It allows the chassis of a manufactured home to be elevated on reinforced piers or other foundation elements of at least equivalent strength that are no less than 36 inches in height above grade. Although the NFIP allows this exception, communities should consider requiring full elevation in flood hazard areas where the floodwaters are known to be swift or more than 3 feet deep because these conditions pose greater risk to vulnerable manufactured homes and their occupants.

NFIP requirements for the substantial improvement of manufactured homes are the same as for residential structures. Specifically, a lateral addition that is determined to be a substantial improvement is illustrated in Figure 6-6. In this case, both the addition and the existing manufactured home must be elevated.

For additional information on the placement and substantial improvement of manufactured homes in SFHAs, see FEMA P-85, *Protecting Manufactured Homes from Floods and Other Hazards: A Multi-Hazard Foundation and Installation Guide.*

6.5.3 Accessory Structures and Certain Agricultural Structures

Floodplain management requirements, including the elevation and SI/SD requirements, apply to accessory structures and agricultural structures. Whether improvements, repairs, or additions to agricultural structures are proposed, local officials must make determinations based on costs and market values. If the work is SI/SD, the requirements apply and accessory structures and agricultural structures must be brought into compliance.

FEMA recognizes that wet floodproofing may be appropriate for accessory structures (garages and sheds only) and certain types of agricultural structures. Certain agricultural structures that qualify for this treatment are those located in wide, expansive floodplains, including farm storage buildings, grain bins, corn cribs, and general purpose barns. All other agricultural structures must comply with the NFIP requirements for non-residential structures, Homes that are built on farms are not agricultural structures and they must fully comply with the NFIP

Wet floodproofing means permanent or contingent measures applied to a structure and/or its contents that prevent or provide resistance to damage from flooding by allowing water to enter the structure. For specifics, see FEMA FIA-Technical Bulletin 7, *Wet Floodproofing Requirements for Structures Located in Special Flood Hazard Areas.*

requirements. For additional guidance, see FEMA FIA-Technical Bulletin 7, *Wet Floodproofing Requirements for Structures Located in Special Flood Hazard Areas.*

In accordance with the requirements for issuance of variances (Section 5.6.7), communities may grant variances for substantial improvement of accessory structures and certain agricultural structures to allow the use of wet floodproofing measures in lieu of elevation. However, such variances may be granted only if the following conditions are satisfied:

- For certain agricultural structures, the structure is used solely for the parking of agricultural vehicles and machinery, the storage of crops, or the temporary sheltering of livestock;
- For accessory structures, the structure is used only for parking of vehicles and storage;
- The structure is designed and built in such a manner that results in minimal damage to the structure and its contents, including being anchored to resist flotation, collapse, and lateral movement;
- Flood damage-resistant materials must be used below the BFE;
- Mechanical and utility equipment must be elevated or floodproofed to or above the BFE;
- If in the floodway, the floodway encroachment requirements must be satisfied; and
- There will be no additional threats to public safety.

Communities should carefully evaluate improvements made to accessory structures and agriculture structures. If a property owner intends to change the use of the structure to a residential use or other non-residential use, then the work proposed must be evaluated to determine whether it is a substantial improvement.

6.6 NFIP Flood Insurance Implications

The flood insurance rating structure used by the NFIP uses three primary factors:

- Flood zone (A zone or V zone);
- Date of construction (pre-FIRM or post-FIRM), including the date of construction of substantial improvements; and
- For post-FIRM buildings, the elevation of the lowest floor compared to the BFE as evidenced by surveyed elevation data (or for floodproofed non-residential buildings, the height of the floodproofing relative to the BFE).

Rates used for pre-FIRM structures are called "subsidized" or discounted rates. An NFIP policy can be purchased without providing elevation data that are obtained by a survey.

Rates used for post-FIRM structures (and pre-FIRM structures that are substantially improved) are called "elevation" rates because they depend on the elevation of the lowest floor relative to the BFE. Elevation rates are considered to be "actuarial." To be properly rated, surveyed elevation data are required.

The NFIP requires that substantially improved or substantially damaged buildings be brought into compliance. NFIP flood insurance policies on those buildings are written using rates based on elevation. In most cases, the premium will decrease when a pre-FIRM building is substantially improved and

brought into compliance. The building becomes a post-FIRM building and premiums are calculated using elevation rates.

When questions arise concerning how a proposed improvement might affect a flood insurance policy, it is always best to encourage property owners to obtain a cost estimate from an insurance agent. Table 6-2 indicates how compliance with the SI/SD requirements affects how policies are rated. Figure 6-14 illustrates an example of how the cost of an NFIP policy will vary, depending on how a substantially damaged home is repaired.

Table 6-2. Substantial Improvement and NFIP Flood Insurance Implications

	Description of Work	NFIP Flood Insurance Implications
Pre-FIRM	Interior renovation only, work constitutes SI; whole building brought into compliance by elevating the lowest floor at or above the BFE. *Or* Structurally-connected lateral addition or second story addition, work constitutes SI; whole building brought into compliance.	Policy is written using post-FIRM elevation rates based on a survey of new lowest floor elevation at or above the BFE.
Pre-FIRM	Interior renovation only, work constitutes SI; building is NOT elevated in compliance with the requirements (i.e., it is a violation). *Or* Second story addition, work constitutes SI; building is NOT elevated in compliance with the requirements (i.e., it is a violation).	Policy is written using post-FIRM elevation rates based on a survey of new lowest floor below the BFE, which may result in a significantly higher flood insurance premium. *Or* If the owner refuses to address the violation and bring the building into compliance, the community may cite the structure as a violation in accordance with Sec. 1316 of the National Flood Insurance Act of 1968, which allows the NFIP to deny flood insurance on all insurable buildings on the property (Section 5.6.13).
Pre-FIRM	Lateral addition not structurally connected (connecting door only), work constitutes SI and only the addition is elevated.	Policy is written using subsidized rates because the original building is unchanged.
Post-FIRM	Lateral addition, regardless of value; addition is not elevated, thus, the building is not in compliance (i.e., it is a violation).	Policy is written using elevation rates based on the elevation of the lowest floor of the addition, which may result in a significantly higher flood insurance premium.

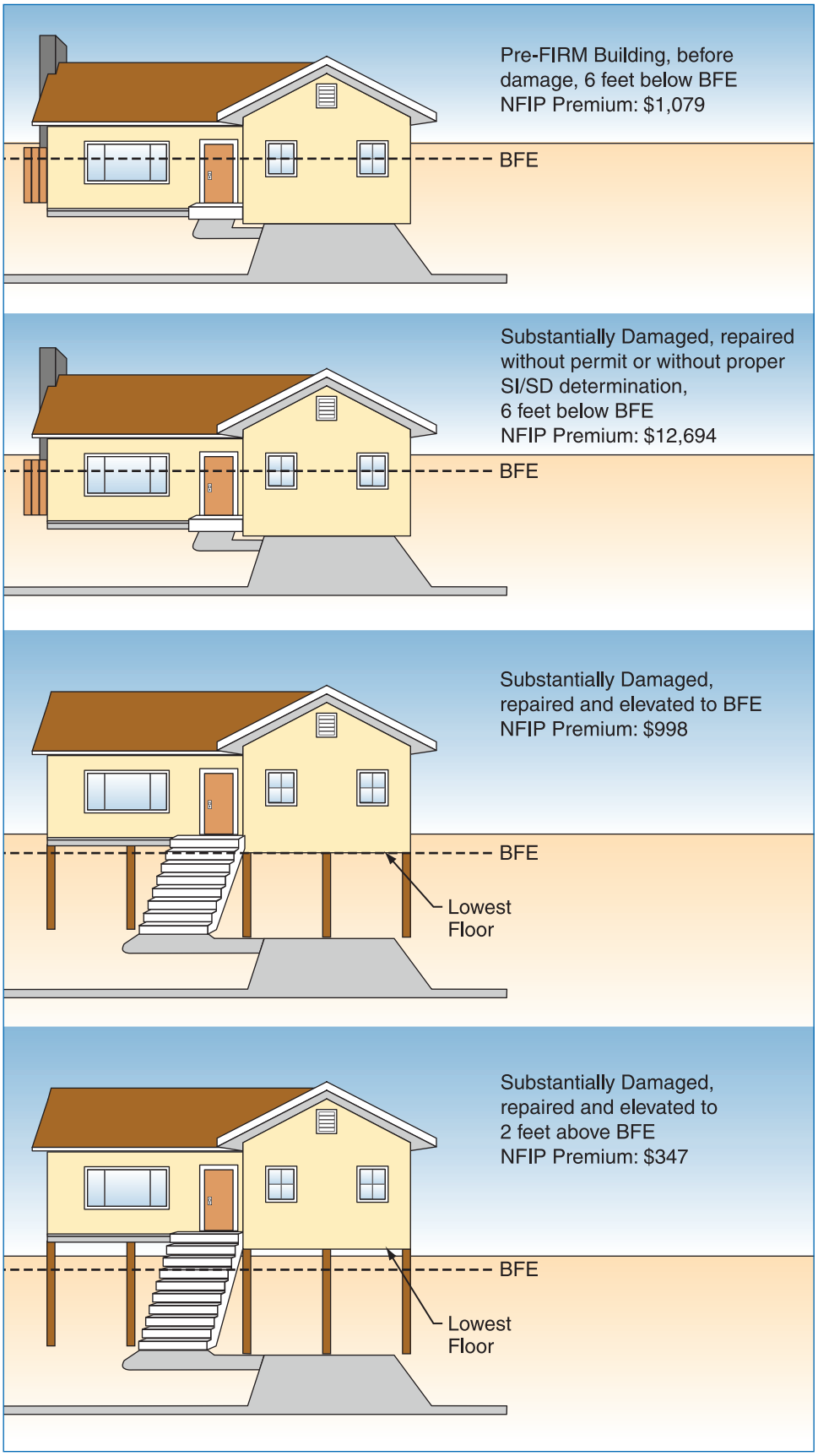


Figure 6-14. The cost of NFIP flood insurance policy varies depending on how a substantially damaged building is repaired. This illustration is for $150,000 in structure coverage with the rates as of October 2009. The figure is for comparison purposes only.

7 Substantial Damage in the Disaster Recovery Environment

7.1 Overview

Waiving permit fees and inspection fees is a common post-disaster action taken by many communities. However, waiving fees does not waive the requirement for permits.

Following a disaster, local officials will often have many additional duties and face the challenge of fulfilling them with few resources. Local officials may encounter a large number of damaged structures and a high volume of permit applications. Most property owners want to repair and rebuild as quickly as possible. Sometimes there is pressure on local officials to waive requirements that are perceived to hamper getting back to normal, including pressure to waive the substantial damage requirements. Yielding to such pressure would expose people and their properties to future damage. The recognition that returning to "normal" leads to repetitive flood damage was one of the driving forces behind the creation of the NFIP. To effectively meet the substantial damage requirements of their local regulations, local officials will have to rapidly perform a large number of inspections and substantial damage determinations.

Developing standard procedures can help communities better manage post-disaster recovery. This chapter describes ways to estimate repair costs and market values for large numbers of damaged buildings. Section 7.5 briefly describes FEMA's *Substantial Damage Estimator* (SDE). The manuals that accompany this computer-based tool include specific recommendations for collecting building data in advance, developing protocols, conducting inspections, and producing reports that support making substantial damage determinations and preparing substantial damage determination letters. Using this tool, and other methods described in this chapter, can help local officials provide reasonable and defensible substantial damage determinations.

This chapter offers guidance for communities to handle the unique challenges following a disaster event and to prepare an effective and efficient response. It also includes a very brief overview of damage assessments and building evaluations that may help local officials after disasters, and describes some effective measures communities can take to clearly communicate the substantial damage requirement in their floodplain management regulations and codes.

7.2 Preparing for Post-Disaster Recovery

There are several ways that communities can effectively administer their floodplain management responsibilities in the post-disaster recovery period. Some successful actions include:

- Brief all elected officials, as soon as possible after the event, of the community's responsibilities to:

  - Issue permits for repair and reconstruction,
  - Make substantial damage determinations for buildings that are located in the mapped SFHA,
  - Explain what it means to bring a substantially damaged building into compliance with current floodplain management standards,
  - Explain NFIP Increased Cost of Compliance insurance coverage (Section 7.6), and
  - Share the materials developed to communicate with citizens.
- Ask electric utility companies and community utility departments to turn on service only if the owner provides a copy of a building permit or evidence that a permit is not required.
- Establish a routine to drive through affected areas to check for unpermitted construction work and ask the police and other departments to report on activities that may not be authorized by permit.
- Depending on the scale and severity of damage, some communities institute a full or partial moratorium on issuing permits. Once the community has evaluated the magnitude, scope, and general location of potentially substantially damaged structures, the community may remove the moratorium. When mitigation projects such as floodplain buyouts, elevation-in-place, or other measures are considered, it may be reasonable to delay rebuilding until the pros and cons of such projects are evaluated (Chapter 8).
- Keep records in a format that allows plotting by a geographic information system (GIS) to easily document the status of each damaged building, including those that have been inspected, those with pending permit applications, those that have been determined to be substantially damaged, those with permits, and those that have been inspected during construction.

Communities that have extensive floodplains and significant numbers of flood-prone buildings are encouraged to plan ahead to handle the workload. Despite good planning, support may be necessary to handle large numbers of damage inspections and permit applications. In addition to support from the State and FEMA, resources may be available from other communities, State floodplain management associations, State building code associations, and organizations that represent engineers and architects. Some States and communities develop mutual aid agreements, interlocal agreements, or some other mechanism to facilitate this post-disaster support. While help may be offered to perform inspections and gather data, the final SI/SD determinations and permit decisions remain the responsibility of the local official in the affected community.

7.2.1 Sources of Assistance

Many technical issues can arise when inspecting damaged buildings and making substantial damage determinations. For matters related to the floodplain management requirements of local regulations and building codes, local officials are encouraged to contact their NFIP State Coordinating Agency or the appropriate FEMA Regional Office (Appendix A). After disasters, training or other assistance may be available from FEMA on how to use SDE such as collecting information on damaged buildings.

7.3 Assessing Building Damage

Although every disaster is unique, local officials can anticipate and prepare for many of the activities that take place after large-scale events. This section is intended to highlight those activities that relate to identifying substantially damaged buildings.

7.3.1 Preliminary Damage Assessments

Immediately after large-scale events that cause major damage, community and State officials typically undertake an initial "windshield review" of the extent of damage. This survey yields a broad characterization of the number of buildings affected and the level of anticipated damage. It usually is a precursor to a decision regarding whether to seek a declaration of the event as a major disaster.

Typically, this initial survey is followed by an official Preliminary Damage Assessment (PDA). PDAs are performed by teams of representatives from FEMA and/or the State. Local building officials and floodplain managers can participate in PDAs, which usually are coordinated by local emergency managers.

Preliminary Damage Assessments are performed to broadly characterize the extent of damage – they are not equivalent to substantial damage determinations.

The PDA augments the initial reports from communities regarding the scope, magnitude, and impact of an event on individuals, families, businesses, and public property. The PDA teams view the damage first-hand, assess the scope of damage, and develop gross estimates of repair costs. The information is used to determine whether Federal disaster assistance should be requested by the Governor and forms the basis for the disaster declaration. The PDA also identifies any unmet needs that may require immediate attention.

Local officials charged with performing building inspections and making substantial damage determinations may find the results of the PDA useful to identify areas where significant damage has occurred and to coordinate their substantial damage inspections.

7.3.2 Rapid Evaluations and Detailed Safety Evaluations

Depending on the scope of an event and severity of damage, some communities conduct a rapid evaluation of damaged areas as a preliminary step before detailed evaluations are performed.

Safety evaluations are performed to identify unsafe buildings – they are not equivalent to substantial damage determinations.

Rapid evaluations, sometimes called "building condition surveys," typically are based on an exterior inspection. They are conducted to:

- Identify buildings that appear to be so damaged that they are unsafe and should not be reentered without a detailed inspection of structural integrity, and
- Identify buildings that appear to have damage sufficient to require a permit before they can be repaired or reoccupied.

These rapid evaluations can also help local officials determine the scope of an event and the level of effort that will be required to perform building-by-building inspections, review permit applications, collect substantial damage data, and perform inspections once recovery work is underway.

One method for conducting rapid evaluations is described in ATC 45, *Field Manual: Safety Evaluation of Buildings after Windstorms and Floods*. This document, produced by the Applied Technology Council (ATC, http://www.ATCouncil.org), is not a manual for making substantial damage determinations. It provides guidelines and procedures for conducting both rapid evaluations and more detailed evaluations to determine whether damaged buildings are safe for use or if entry should be restricted or prohibited.

Most communities perform additional detailed safety evaluations when buildings have sustained significant damage. The purpose of the evaluations is to identify restrictions on building access and use. For complex buildings and many non-residential buildings, the evaluation may lead the local official to conclude that it is appropriate for the owner to submit an independent engineering evaluation. In addition to describing methods for conducting rapid evaluations, ATC 45 includes a method for conducting detailed evaluations. ATC 45 and other sources recommend posting damaged buildings with one of three notices:

- **Inspected** (typically a green placard). This signifies that no apparent hazard was identified, that the original lateral- and vertical-load capacity is not significantly decreased, and there are no restrictions on use or occupancy. It does not mean that work can proceed without a permit.
- **Restricted Use** (typically a yellow placard). This signifies that the safety of the building is questionable or hazardous conditions exist or are believed to exist and warrant restrictions on occupancy and reuse. Further evaluation is necessary (which may or may not be performed by the local official).
- **Unsafe** (typically a red placard). This signifies that an extreme hazard or unsafe situation is present and there may be a significant risk of further damage or collapse. These buildings are unsafe for occupancy or entry, except as authorized by the local official. A "red tag" is not a demolition order, although such an order may be issued depending on subsequent evaluations.

7.4 Using Estimates of Repair Costs and Market Values to Screen for Substantial Damage

Some readily-available data can be used to estimate repair costs and market values. The sources of estimates described below can be used to "screen" damaged buildings for those that are most likely to have sustained substantial damage. Comparing readily-available information on repair costs to readily-available information on market value can give local officials a basic picture of which structures will require more attention and more detailed information in order to make substantial damage determinations. While the sources of information listed below should not be used to make final substantial damage determinations, local officials can use them to organize and focus efforts following a disaster.

When using estimates in this manner, there is no firm rule to determine how close to 50 percent is close enough to warrant requiring additional effort to improve the accuracy of the data. Each community should decide in advance, based on its selected method of making estimates, how close is close enough. For example, as described below, a community may decide to use easily-obtained estimates for screening purposes. The local official may then decide that, using those estimates, if the ratio of estimated costs compared to estimated market value is less than 40 percent, no further evaluation is necessary because the work obviously does not constitute SI/SD. Using that same logic, the community may decide that, if the ratio is greater than 60 percent, no further evaluation is necessary because the work obviously constitutes substantial damage.

Continuing this example, the question then becomes what should the local official do when the ratio, based on estimates, falls between the bounds of 40 percent and 60 percent. The local official may require the applicant to provide a detailed list of costs (materials and labor) and/or to obtain a professional appraisal of the market value of the building (Section 4.5.1). Alternatively, if the local official has evidence that an estimate reflects actual repair costs (or actual market values), those estimated costs and values may be used for the final SI/SD determination.

Local officials will still be responsible for administering their standard permit requirements and procedures for structures that fall outside the parameters of their screening efforts. In the example above, permits will still be required for structures where the ratio is more than 60 percent and those with a ratio of less than 40 percent. Local officials can reexamine the substantial damage requirements during the review of those permit applications.

7.4.1 Insurance Estimates of Repair Costs

Property owners who have insurance will receive estimates of damage from their insurance companies. For a number of reasons, these estimates are not sufficient for local officials to make substantial damage determinations. The basis used by adjusters to estimate damage and the costs to repair are governed by the terms of the insurance policy. The insurance estimate may not cover all costs associated with repairing a structure to its pre-damage condition, which is the basis that communities must use.

Only the community is legally responsible for making SI/SD determinations. Information from insurance claims may help screen for substantial damage, but cannot be used as the basis for final determinations.

After floods, adjusters who handle NFIP claims are instructed to submit an Adjuster Preliminary Damage Assessment form to FEMA if a building appears to have been substantially damaged (FEMA Form 81-109, in Appendix D). The form provides information about a damaged building, including Probable Repair Cost, Building Replacement Cost Value, and Building Actual Cash Value. Local officials can use this information for screening purposes to help identify those buildings that should be examined more closely. Because Federal flood insurance does not cover all damage that local officials must consider when determining substantial damage, the reported Probable Repair Cost may underestimate the total cost to repair. In addition, the Building Replacement Cost Value and the Building Actual Cash Value may not be equivalent to market value. After floods, communities should contact the NFIP State Coordinating Agency or FEMA Regional Office to determine if this information is available.

If insurance claims data are available from property owners for buildings damaged by events other than flooding, the same limitations apply. While local officials may find such data useful for screening, claims data must not be used as a proxy for the costs of repair to make substantial damage determinations.

7.4.2 Unadjusted Assessed Values as Estimates of Market Values

Section 4.5.2 describes using adjusted assessment values that are developed by applying an adjustment factor to property assessment values provided by the local property assessment authority to yield a reasonable estimate of market value. In the post-disaster period, unadjusted assessed values may be used as estimates of building market value to quickly screen damaged buildings to help focus attention on those for which more detailed information has to be provided.

7.4.3 Replacement Cost Values as Estimates of Market Values

Replacement cost value (RCV) means the cost to replace a building on the same parcel with a new building that is intended for the same purpose and using comparable materials and quality (at the present day cost of materials and labor). The concept of RCV is used by the insurance industry and the construction industry. Definitions may vary from State to State.

RCV can be estimated easily, even when a large number of damaged buildings must be assessed. Therefore, local officials may find it useful to use RCV to estimate market values in the post-disaster period to screen all damaged buildings.

The older and more deteriorated a structure is, the greater the potential for a difference between RCV and market value. Thus, local officials who use RCV estimates for screening are advised to set a low threshold for the ratio of cost to repair to RCV, such as 30 percent. In that case, any building that the screening indicates has a ratio value of greater than 30 percent would be examined carefully to ensure that valid cost estimates and market values are used in the substantial damage determinations.

A number of commercial sources of construction cost information are available to support estimating the replacement cost of a building, including industry-accepted guides available from companies such as RSMeans (http://www.rsmeans.com) and the Craftsman Book Company (http://www.craftsman-book.com), among others. These sources allow computation of construction costs based on occupancy, square footage, quality, and regional cost variations.

7.5 Damage Assessments for Substantial Damage Determinations

Communities have choices about how to handle making substantial damage determinations when many buildings have been damaged by a significant event:

- They can proactively inspect buildings soon after the event and use available information to estimate repair costs and market values; those data can then be used to develop substantial damage determinations in advance of owners submitting applications with more detail; or

- They can notify owners of the requirement to get permits and then wait for property owners to apply for permits and make substantial damage determinations at that time, following their normal permit review procedures.

The first option offers a number of benefits that should make it easier to administer the SI/SD requirements. One benefit is to provide property owners with information about the requirement to bring buildings into compliance before they get very far along with their plans to repair. Another benefit is that owners that have Federal flood insurance policies will more quickly receive the community's substantial damage determination that they need in order to submit a claim for ICC coverage to their adjuster (Section 7.6). The second option may pose more of a challenge to the community because many people begin repairs without getting permits. In addition, by the time owners apply for permits, they may have hired design professionals to develop plans for repairs and improvements that do not take into consideration the requirement to bring SI/SD buildings into compliance.

7.5.1 FEMA's Substantial Damage Estimator Software

FEMA's SDE software offers a formalized approach to develop reasonable estimates of building values and reasonable estimates of the cost to repair or reconstruct buildings. The SDE enables local officials to calculate a reasonable and defensible estimate of whether a building has been substantially damaged. Local officials can use these results from the software to make substantial damage determinations.

Communities may request assistance with SDE:

- FEMA offers training workshops on SDE.
- FEMA may deploy personnel to help local officials use SDE after disasters

The SDE is described in the *FEMA Substantial Damage Estimator* (FEMA P-784 CD).[1] This publication includes a User's Manual and a Field Workbook. Together they focus on using the SDE tool to perform field evaluations and post-event data collection, as well as pre-planning before an event.

Originally developed for single-family homes and manufactured homes, the 2010 version of SDE now includes a component that will allow it to be used for common non-residential structures (e.g., office buildings, strip malls, restaurants, grocery stores, convenience stores, department stores, schools, etc.). However, SDE is not designed for estimating damage to unique buildings and buildings designated by State or Federal entities as "historic structures." The SDE also is an effective tool to use even if only one or a few buildings are damaged. The SDE Field Workbook includes worksheets that are useful even if the software is not used. SDE includes worksheets for single/multi-family buildings, manufactured homes, and certain non-residential buildings.

While SDE can be used to evaluate damage by any cause (flood, tornado, earthquake, etc.), flooding is the most frequently-occurring natural hazard. Therefore, the software and companion workbook focus primarily on developing inventories of flood-damaged structures.

1 Replaces and expands the 2001 version of the *Residential Substantial Damage Estimator* (FEMA 311) and the 2003 version of the *RSDE Workbook* (FEMA 311WB).

The SDE software allows the user to develop damage estimates by examining individual building elements. Users are able to estimate damage percentages for each described building element. Using these percentages, SDE produces an aggregate "percent damage" for the structure as a whole.

SDE is customizable, allowing users to develop estimated repair costs and market values, or to input professional estimates or valuations. To develop estimates for repair costs and market value, SDE is intended to be used in conjunction with an industry-accepted, construction cost-estimating guide such as *RSMeans© Residential Cost Data Book*, RSMeans© CostWorks, and the Craftsman© *National Building Cost Manual*. The SDE is designed for use by local officials or others who have some experience and knowledge of residential and non-residential construction costs and practices.

Building-specific attributes that affect the estimates that the software produces are inputted by the user. The required attributes include the quality of construction (low, budget, average, good, and excellent), foundation type, number of stories, square footage, superstructure type, exterior finish, roof covering, and presence of HVAC systems. Additional inputs are requested for non-residential buildings, including building use, presence of elevators, escalators, and fire suppression systems.

Photographs of each inspected building can be uploaded and stored with the software and later retrieved for reports. Fields allow input of latitude and longitude coordinates acquired onsite using a handheld global positioning system (GPS) device. Figure 7-1 shows how the data can be displayed on geographically registered images such as digital aerial photography, Google Earth, and NASA's World Wind.

Users can define their own reports or use one of the ten pre-determined report formats:

1. Community Report for all residential structures
2. Community Report for all non-residential structures
3. Community Report for residential structures that appear to be substantially damaged
4. Community Report for substantially damaged non-residential structures
5. Structure and Percent Damage Report for all residential structures
6. Structure and Percent Damage Report for all non-residential structures
7. Structure and Percent Damage Report for substantially damaged residential structures
8. Structure and Percent Damage Report for substantially damaged non-residential structures
9. Summary Report for all residential structures
10. Summary Report for all non-residential structures

Figure 7-1. SDE data displayed using mapping software.

The Community Reports noted above include the following information (Structure and Percent Damage Reports include only items 1, 2 and 6):

1. Community name and identification number
2. Owner first and last names, building address, community, State, and zip code
3. Basis for value of building (computed actual cash value from the SDE software, adjusted tax assessed value, or professional appraisal)
4. Basis for costs to repair (computed damage from the SDE software, contractor's estimate, or community estimate)
5. Type of structure (single-family, town or row house, manufactured home, or non-residential)
6. Estimate of percent damaged (results of comparing the estimated cost to repair to the estimated building value)

7.6 Increased Cost of Compliance Coverage

NFIP flood insurance policies on buildings include ICC coverage. This coverage was authorized by Congress to help pay the added costs of bringing buildings that are repetitively or

substantially damaged by flooding into compliance with the community's floodplain management requirements for new construction.

ICC claims are paid after direct physical loss caused by flooding and:

- The building is determined by the community to be substantially damaged, or
- If the community has adopted a "repetitive loss" or cumulative substantial improvement provision that requires compliance based on flood damage that occurs two times in a 10-year period ending on the second event, where the cost to repair the damage equals or exceeds 25 percent of the building's pre-damage market value on each occurrence (Section 5.7.3).

An ICC claim can be made regardless of whether a flood results in a Presidential disaster declaration.

In 2010, the ICC coverage could provide up to $30,000 towards the cost of bringing certain flood-damaged buildings into compliance.

ICC payments are made to help pay for the following mitigation options that bring buildings into compliance:

- Elevation (including freeboard if required by the community)
- Relocation
- Demolition
- Dry floodproofing (non-residential buildings only)

Guidance on ICC is available in FEMA 301, *Increased Cost of Compliance Coverage: Guidance for State and Local Officials.* This publication describes the coverage, conditions of eligibility, and the claims process. The roles of the insurance agent, claims adjuster, and policyholder are described. The community's role is described in detail, including the following:

In order for an ICC claim to be paid:

- Local officials must make SD determinations and work with owners to develop measures to bring buildings into compliance.
- Owners must file an ICC claim.
- Adjusters must verify key information and process claims.
- The community issues permits for the work.

- Requiring compliance with all NFIP and local requirements.
- Collecting information and making substantial damage determinations.
- Informing property owners about the requirement to bring buildings into compliance and working with them to determine the appropriate options to achieve compliance.
- Providing the property owner/policyholder a letter with the substantial damage determination; the owner then provides a copy to the claims adjuster to process the ICC claim.
- Issuing permits and inspecting construction.
- Performing final inspections and issuing certificates of occupancy or letters that state the building has been brought into compliance and that no variance was granted; this evidence is required before policyholders can receive the final installment of their ICC claim payments.

7.7 Post-Disaster Permits and Inspections

The occurrence of a disaster that affects a large number of buildings does not alter a community's responsibility to review permit applications, issue permits, inspect construction, and cite violations. All of those actions should be performed as usual (see FEMA 480, *NFIP Floodplain Management Requirements: A Study Guide and Desk Reference for Local Officials*). The only difference will be the volume of work and the number of owners who will need assistance. Chapter 5 of this Desk Reference describes community responsibilities for issuing permits and Chapter 4 offers guidance for estimating repair costs, improvement costs, and market values.

It is important that each permit application be carefully examined. Some damage may not have been readily apparent when post-disaster assessments were performed, some owners may decide to undertake improvements at the same time as repairs, or some owners may postpone repairs for many months. Each of these may alter the determination. Every permit file should contain the documentation necessary to support the finding that the work does – or does not – constitute SI/SD.

Even after a disaster, local officials should not assume that construction will proceed as spelled out in the permit application. Follow-up inspections are vital to ensure that applicants adhere to the permit requirements. Local officials should develop a plan to handle the increased number of permits and inspections.

7.8 Appeals and Variances

After events that cause major damage, owners often seek relief from requirements to comply with building code and floodplain management requirements. There are two mechanisms through which such relief may be processed: appeals and variances.

Owners may appeal decisions, orders, and determinations made by local officials, including substantial damage determinations. Appeals are described in more detail in Section 5.6.6. Even in the post-disaster recovery period, appeals should be handled according to the community's established process.

Owners may request variances. A variance is a grant of relief from the terms of a land use, zoning, building code, or other regulation. If granted, it allows construction in a manner that is otherwise prohibited. Variances are described in more detail in Section 5.6.7.

The NFIP regulation at 44 CFR § 60.6 outlines procedures for granting variances; these procedures must be followed even in the post-disaster recovery period (also see FEMA 480, *NFIP Floodplain Management Requirements: A Study Guide and Desk Reference for Local Officials*). If granted, variances are to provide only the minimum relief necessary. A variance should be rare, and granted only after due consideration.

Especially when damage was caused by flooding, it is difficult to conceive of situations where it can be justified to waive the requirement to elevate buildings that were determined to have been substantially damaged. Local officials are required to advise owners that, even if approved

by a properly granted variance, buildings that have their lowest floors below the BFE may be rated for NFIP flood insurance using very high rates, resulting in costly premiums (see Section 6.6).

7.9 Post-Disaster Communications with Property Owners

Communications with property owners will take place throughout the post-disaster recovery phase. Local officials should recognize that substantial damage determinations may generate a number of questions from home and business owners, and should be prepared to respond to these questions. This section provides local officials with guidance for communicating substantial damage information, and describes the following:

- Information about clean-up and repairs
- Information about permits
- Information about Increased Cost of Compliance coverage
- Interactions during damage inspections
- Providing substantial damage determination letters to owners

7.9.1 Information About Clean-up and Repairs

The initial contacts with property owners are typically related to cleaning up, advising them that inspections must be conducted to determine the safety of buildings, reminding owners not to perform any work that requires a permit until permits are obtained, and advising them that substantial damage determinations must be made and that such determinations trigger the floodplain management requirement to bring buildings into compliance by elevating them (or by dry floodproofing, non-residential buildings only). Local officials can provide information to owners about the kinds of clean-up and repairs that may be performed prior to a substantial damage determination, including work necessary to temporarily stabilize a building so it is safe to enter, as well as trash removal and clean-up.

Unless there are restrictions on entering areas that have sustained major damage, most owners and occupants start to clean up right away. There are many online sources of information to help with clean-up work, including http://www.fema.gov and http://www.redcross.org, among others. Copies of FEMA 234, *Repairing Your Flooded Home* may be available from local offices of the American Red Cross (ARC) or copies may be ordered from the FEMA publication warehouse (see Appendix B for ordering instructions). This booklet was developed in partnership with ARC and FEMA. FEMA has other materials related to recovering from, and coping with, flood damaged property, available online at http://www.fema.gov/hazard/flood/coping.shtm.

7.9.2 Information About Permits

It is extremely important to make sure that property owners are informed about their responsibilities to obtain permits for repairs following disasters. Lack of information about permit requirements can cause many problems in the post-disaster period. FEMA's *SDE Field Workbook*

(Section 7.5.1) includes samples of a press release, a notice that can be posted in affected areas, and a handout that can be used to alert residents that inspections will be performed and permits may be required.

Communities should consider developing and providing guidance to citizens and property owners on:

- The importance of having damaged buildings inspected before repair work is started.
- Activities that require a permit.
- The floodplain management requirements that apply when buildings in the SFHA are substantially damaged.
- Activities that do not require a permit (e.g., disposing of damaged contents and carpeting; cleaning floors, walls, and ductwork; or covering damaged roofs and windows).
- The availability and benefits of ICC coverage that is part of NFIP flood insurance policies on buildings in mapped SFHAs (Section 7.6). FEMA has developed a brochure that explains ICC (FEMA F-663, *Increased Cost of Compliance Brochure*) (see Appendix B for ordering instructions).
- The importance of hiring licensed contractors and cautions about fraudulent and unlicensed entities that may take advantage of victims in areas that have been hit by a significant event.
- The importance of including damage-reduction measures to minimize future flood damage, even if such measures are not required by the community's floodplain management regulations.

7.9.3 Information About Increased Cost of Compliance Coverage

As described in Section 7.6, local officials should remind owners who have NFIP flood insurance policies that ICC coverage may help pay for the cost to bring buildings into compliance with local floodplain management requirements if it is determined that the building has been substantially or repetitively damaged. The local official should also provide guidance to property owners on mitigation options to bring buildings into compliance. Local officials should obtain copies of FEMA F-663, *Increased Cost of Compliance Brochure* and distribute it to property owners as needed.

7.9.4 Interactions with the Public During Damage Assessments

After disasters and while conducting damage assessments, local officials may be faced with many questions from property owners and occupants. Communities are encouraged to set guidelines for interactions between inspectors and owners so that inspectors can efficiently perform their work. Although some assessments may be performed without direct contact with property owners, detailed evaluations and use of FEMA's SDE software tool typically require contact and coordination with owners.

The inspector's job is to inspect damaged buildings and collect data. Local officials should encourage inspectors to refrain from speculating or discussing the likely outcome of substantial

damage determinations. Because the final determination must be made by the local official, discussions in the field may contribute to misinformation and confusion.

Before they are sent out to inspect damaged buildings, a meeting should be held with all inspectors to talk about the importance of consistent communication with owners and occupants. It is a good practice to set up a single point of contact to answer questions from owners, and inspectors should encourage people to call that contact. Not only does this improve the consistency of the information provided, but it will help inspectors get their jobs done more efficiently.

Every inspector should carry an official letter that explains the purpose of the inspection and the requirement for owners to obtain permits for repair work. Inspectors should limit their interactions to collecting data. Some communities may direct inspectors to advise owners if they observe any ongoing work that should be suspended because a permit is required. If materials are available, inspectors can give owners a handout that explains the community's permit requirements and procedures.

7.9.5 Providing Substantial Damage Determination Letters to Owners

After inspections are completed and the data evaluated and substantial damage determinations are made, owners should be provided letters with the results. Appendix E includes examples of three letters:

- Letter to notify property owners of a determination that work constitutes substantial improvement
- Letter to notify property owners of a determination that work constitutes repair of substantial damage
- Letter to notify property owners of a determination that work does not constitute repair of substantial damage

Communities that have developed mitigation plans may hold meetings or distribute materials to explain mitigation options and FEMA's mitigation grant programs (Chapter 8).

Understandably, people will have many questions about the determinations, including whether it can be appealed, what it means to bring a building into compliance, and how they can access the NFIP's ICC claim payment (if they have NFIP flood insurance). As noted above, designating a single point of contact or contacts to discuss these questions with owners will ensure consistency.

8 Mitigation Projects

8.1 Overview

This chapter provides brief descriptions of common types of flood mitigation projects that are eligible for funding by FEMA's five mitigation grant programs. Brief summaries of those programs are included. Because program priorities and policies change from time to time, communities that are interested in these programs should obtain current information from their State Hazard Mitigation Offices (see Appendix A).

Many buildings that are damaged by flooding were built before communities adopted floodplain management regulations and Flood Insurance Rate Maps. Many of these pre-FIRM buildings have experienced repetitive flooding and some are vulnerable to significant floods and are likely to sustain substantial damage at some time. Communities may seek mitigation grants to address both problems.

Some of FEMA's grant programs are funded annually and can be used to support projects in the "pre-event" period: Pre-Disaster Mitigation (PDM); Flood Mitigation Assistance (FMA); Repetitive Flood Claims (RFC); and Severe Repetitive Loss (SRL). One program, the Hazard Mitigation Grant Program (HMGP), is available only after major disasters are declared by the President. Many post-disaster mitigation projects include buildings that have sustained substantial damage. Projects that acquire properties, remove flood-prone buildings, and deed-restrict the land to open space, obviate the need for owners to bring buildings into compliance. Projects involving other measures that directly affect a building, such as elevation-in-place or dry floodproofing (non-residential buildings only in A zones), must be conducted in compliance with the community's floodplain management regulations and codes.

HMGP and PDM are funded by general Treasury funds. FMA, RFC, and SRL are authorized under the NFIP and are funded by income collected by the NFIP. The NFIP-funded programs are focused primarily on mitigating flood losses sustained by NFIP-insured buildings, specifically those that have received multiple flood insurance claims, called repetitive loss properties.

8.2 Mitigation Planning

In accordance with 44 CFR Part 201, State and local governments and Indian Tribal governments must have hazard mitigation plans as a condition for receiving hazard mitigation grants. The most common types of projects used to mitigate flood losses are described in Section 8.3 and FEMA's mitigation grant programs are briefly described in Section 8.4.

Mitigation planning refers to a process that leads a planning committee through a framework of steps to develop a mitigation plan. The primary objective of the planning process is to facilitate development of strategies that will reduce damage, protect people and property, and improve resistance to natural hazards. The process involves four basic steps:

1. Organize resources
2. Identify hazards and assess risks
3. Develop a mitigation plan
4. Implement the plan and monitor progress

While eligible applicants for FEMA grant programs must have FEMA-approved mitigation plans, the benefits of mitigation planning go beyond simply qualifying for those funds. States, communities, higher education institutions, and other entities that undertake mitigation planning also consider the value of actions that improve disaster resistance by modifying programs and policies, such as adoption of more restrictive development standards, and initiating efforts to inform citizens about risks and steps they can take to reduce damage.

FEMA's guidance documents related to mitigation planning are online at http://www.fema.gov/plan/mitplanning/index.shtm.

8.3 Types of Flood Mitigation Projects

This section provides brief descriptions of the most common types of mitigation projects that are implemented to reduce exposure to flooding. In practice, a single project may involve using one or more of these project types.

8.3.1 Identifying Flood Mitigation Projects

While mitigation planning is the first step, each property needs to be evaluated individually to determine which method is appropriate. Communities that engage in flood mitigation projects have many factors to evaluate before identifying the most effective type or types of activities that will both solve their problems and also meet other community objectives. Only communities can make those decisions, although many States help communities evaluate the many factors to consider. FEMA offers several tools to facilitate decision-making:

- *National Flood Mitigation Data Collection Tool* (FEMA 497). This tool was developed for nationwide use to gather information about flood-prone structures in order to determine potentially appropriate long-term mitigation measures. The goal is a standardized, systematic approach to collecting and interpreting property data and mitigation project development. While the focus of the tool is data collection for repetitive loss properties, it can be used to gather information related to flood risk, building construction, and building value for any structure.
- *Reducing Damage from Localized Flooding: A Guide for Communities* (FEMA 511). This non-technical guide is intended to help local officials and others understand what can be done to reduce localized flood damage. It focuses on a community's capability to minimize its existing localized flood problems and avoid future problems. It outlines the types of actions that can be taken, explains why they are important and what their potential benefits are, and points the reader to other sources.

- *Selecting Appropriate Mitigation Measures for Floodprone Structures* (FEMA 551). This manual provides guidance for interpreting data collected with the *National Flood Mitigation Data Collection Tool* and other sources, in order to develop detailed proposals for flood mitigation projects. The manual assumes that areas that are considered high priority for mitigation have been identified and the community is evaluating which types of mitigation measures will address specific problems. It identifies technical issues associated with mitigation measures and includes references to other documents that provide more detailed guidance.

FEMA 511 and FEMA 551 describe measures that reduce flood damage. Some of those measures may not result in full compliance and cannot be used to satisfy the requirement to bring substantially-damaged buildings into compliance. Some of the measures described may not be eligible for FEMA grant funding.

8.3.2 Property Acquisition/Demolition and Relocation

FEMA and the States have encouraged communities to acquire and remove flood-prone buildings since the early 1990s. A property acquisition project involves the purchase of properties that have sustained flood damage or that may be subject to severe or repetitive flooding. Eligible acquisition projects are those where the property owner voluntarily participates. Buildings are either demolished or physically removed. Local and/or State governments agree to deed restrict the property so that it remains in open space in perpetuity to fulfill natural and beneficial floodplain functions. Acquisition projects can be planned to meet compatible objectives, including passive recreation, environmental education, or wetlands mitigation.

8.3.3 Building Elevation

An elevation project involves detaching a building from its foundation and placing it on an NFIP- and code-compliant, taller foundation. The structure must be elevated as required by local regulations to be at or above the BFE or the post-disaster advisory BFE, if applicable. Although the costs and elevation methods vary, buildings with all types of foundations have been elevated, including those on crawlspaces, piers, or pilings. The cost to elevate a structure can vary greatly, depending on the elevation method used, condition of the structure, and the height above grade and other construction requirements. Elevation methods that require significant demolition or the construction of new living space may not be eligible for Federal grant funds. Communities interested in property elevation should consult their State Hazard Mitigation Office and FEMA's program guidance.

Communities consider elevation instead of acquisition projects for many reasons: for buildings that are structurally sound; to avoid disconnected, publicly-owned lots; for buildings in areas with extensive floodplains where alternative sites are not available; and for buildings in highly attractive areas. While elevation-in-place projects reduce flood damage, other flood-related risks and needs continue. Communities will still have to provide warnings, residents will still have to be evacuated, emergency shelters will have to be opened, and lives will be disrupted.

8.3.4 Relocation

If flood-prone buildings are structurally sound, and if acceptable receiving sites are close by, a relocation project may be viable. Physically relocating buildings to sites outside of the SFHA reduces the risk of future flood damage and the vacated land can be retained in open space. Relocating a building is similar to elevation-in-place because the building must be detached from its foundation and placed on a new foundation. The difference is the process and equipment required to move a building over the distance and terrain to the receiving site.

8.3.5 Floodproofing for Non-Residential Structures or Historic Structures

Dry floodproofing involves sealing non-residential structures to be watertight so that floodwaters do not enter the building during base flood conditions. Modifications may include structural strengthening of walls, special doors and closures for other openings, application of waterproof membranes, measures to handle seepage, and other measures. A structural evaluation is necessary to determine whether a structure can withstand anticipated flood loads, especially hydrostatic pressure and buoyancy. Currently, only non-residential structures and residences that are listed as historic structures may be dry floodproofed.

Compliance with the NFIP requirements cannot be achieved by using wet floodproofing measures in which floodwater is allowed to enter a building. An owner may elect to implement these measures unless a determination finds the work would constitute substantial improvement.

8.3.6 Other Types of Projects

Other types of projects may reduce flood damage, but are not direct solutions for individual buildings that are substantially improved, unless the SFHA is revised:

- **Stormwater management.** Stormwater management or drainage improvements can reduce the frequency and severity of flooding, but a property owner cannot propose such improvements in place of bringing a substantially damaged building into compliance. The exception is if a drainage project results in a revision of the SFHA in which the building is located, which may mean the building is no longer in the SFHA.
- **Minor localized flood reduction projects.** For larger buildings or groups of buildings, one option may be to install or modify culverts, floodgates, or minor floodwall systems that protect an individual structure. Engineering analyses are necessary to determine if these measures are feasible and to determine their impacts on flood elevations. Only if a project qualifies for a map revision that removes areas from the SFHA would buildings no longer be subject to the SI/SD requirements. To be eligible under FEMA's FMA, SRL, and RFC grants, the mitigation activity must protect structures that are insured by the NFIP.

8.4 FEMA's Mitigation Grant Programs

FEMA administers five mitigation grant programs. Fact sheets for the programs are available online at http://www.fema.gov/media/fact_sheets/mitigation.shtm. A chart that compares

the programs (authorities, purpose, priorities, available funds, applicant and subapplicant eligibility, eligible project types, cost-share requirements, eligible management costs, planning requirements, application and review procedures, and deadlines) and links to descriptions of each program are found at http://www.fema.gov/government/grant/hma/grant_resources.shtm, which also lists other resources to support mitigation planning and mitigation projects.

8.4.1 Elements Common to All Grant Programs

All of FEMA's grant programs have certain required elements in common:

- **Application submission.** State emergency management agencies or similar offices of the States may apply directly to FEMA. Local governments and other applicants must submit applications through the State as subapplicants. Depending on the grant program, applications may be ranked by the State, FEMA, or a national evaluation panel.
- **Mitigation plan requirements.** All States must have a FEMA-approved hazard mitigation plan. Except for the RFC program, local governments and Indian Tribal governments also must have FEMA-approved hazard mitigation plans.
- **Feasibility and effectiveness requirement.** Projects must be both technically feasible and effective at mitigating the flood hazard. Engineering analyses and project plans and specifications may be required to demonstrate feasibility and effectiveness.
- **Cost-effectiveness requirement.** Hazard mitigation assistance grants only fund cost-effective mitigation projects. A benefit-cost analysis is a well-established method for quantitatively comparing benefits and costs of projects.
- **Environmental and historic preservation.** Applicants must answer a series of environmental and historic preservation review questions. All projects must meet the requirements of applicable Federal, State, Indian Tribal, and local laws, implementing regulations, and Executive Orders.
- **Flood insurance requirement.** For structures that will remain in the SFHA after a mitigation project is implemented, flood insurance policies must be maintained after the project is completed.
- **Non-Federal match.** Recipients must provide the non-Federal share of the costs and cover all costs that are determined to be ineligible for funding by the grants. Many communities require property owners to cover these costs and some States may provide matching funds.

> Each year, FEMA issues guidance for each grant program. Some priorities and limitations may change from year to year. Communities that are interested in these programs should contact their State Hazard Mitigation Officers (Appendix A).

8.4.2 Pre-Disaster Mitigation Program

The PDM program is a nationally competitive program that provides funds to States, local governments, and Indian Tribal governments for implementation of cost-effective hazard mitigation activities that complement a comprehensive mitigation program. The program provides applicants with an opportunity to raise risk awareness and reduce disaster losses through use of

grant funds to develop all-hazard mitigation plans and flood mitigation plans and to implement mitigation projects.

Each year's funding level is determined by Congress. A limit is placed on the maximum amount that a single project can receive and recipients must provide a cost-share of at least 25 percent of a project's eligible costs. In addition to supporting development of mitigation plans, PDM funds can be used for flood mitigation projects, including:

- Elevation of existing public or private structures to at least the BFE or higher, if required by FEMA or if required by State or local regulations
- Voluntary acquisition and demolition or relocation of structures and real property for conversion to open space in perpetuity
- Relocation of public and private structures outside of the SFHA
- Dry floodproofing non-residential buildings and certain residences that are listed as historic structures
- Stormwater management projects to reduce or eliminate long-term risk from flood hazards
- Localized flood reduction projects
- Protective measures for utility infrastructure to reduce or eliminate flood damage

8.4.3 Hazard Mitigation Grant Program

HMGP funds are available following a Presidential disaster declaration. Eligible applicants include States, local governments, Indian Tribal governments, and some private non-profit organizations. Communities may apply for HMGP assistance on behalf of affected individuals and businesses, and all funds must be used to reduce or eliminate losses from future disasters. FEMA allows a portion of the funds to be used to support development of mitigation plans. At a minimum, recipients must provide a cost-share of at least 25 percent of a project's eligible costs.

HMGP provides each State that receives a major disaster declaration an amount of funding that is determined on a formula that is based on a percentage of funds spent by FEMA under the Public Assistance and Individual Assistance programs. Under the formula, States with approved Standard State Mitigation Plans receive 15 percent for the first $2 billion of estimated aggregate amounts of disaster assistance, 10 percent for disaster assistance amounts between $2 billion and $10 billion, and 7.5 percent for amounts between $10 billion and $35.333 billion. States with approved Enhanced State Mitigation Plans receive 20 percent for the first $2 billion of estimated aggregate amounts of disaster assistance and the same percentages when assistance amounts exceed $2 billion.

HMGP funds can be used for eligible activities that reduce damage from any natural hazard. Examples of flood mitigation projects that have been funded include:

- Elevation of existing public or private structures to at least the BFE or higher, if required by FEMA or if required by State or local regulations

- Voluntary acquisition and demolition or relocation of structures and real property for conversion to open space in perpetuity
- Relocation of public and private structures outside of the SFHA
- Dry floodproofing non-residential buildings and certain residences that are listed as historic structures
- Stormwater management projects to reduce or eliminate long-term risk from flood hazards
- Localized flood reduction projects
- Protective measures for utility infrastructure to reduce or eliminate flood damage

Eligible subgrantees submit grant applications to the State, which sets mitigation priorities, performs technical reviews, and offers technical assistance. FEMA conducts the final eligibility review to ensure that all projects are compliant with Federal regulations, including the Federal law that requires States and communities to have FEMA-approved mitigation plans in place prior to receipt of HMGP project funds.

8.4.4 Flood Mitigation Assistance Program

The FMA program provides funding to States and communities for measures that reduce or eliminate the long-term risk of flood damage to buildings, manufactured homes, and other structures that are insured by the NFIP. Each State's allocation is based on its percentage of NFIP policies. Subapplicants must be participating in the NFIP (not suspended or withdrawn). The program provides grants for mitigation planning and projects with the goal of reducing insurance claims, especially repetitive claims. All applicants must have a FEMA-approved hazard mitigation plan. At a minimum, recipients must provide a cost-share of at least 25 percent of a project's eligible costs. The non-Federal cost share may be reduced to 10 percent if the State has a FEMA-approved mitigation plan that also addresses how the State has and will continue to reduce the number of severe repetitive loss properties. Examples of eligible projects include:

- Elevation of existing public or private structures to at least the BFE or higher, if required by FEMA or if required by State or local regulations
- Voluntary acquisition and demolition or relocation of structures and real property for the purpose of creating open space
- Relocation of structures outside of the SFHA
- Dry floodproofing of existing non-residential structures and certain residences that are listed as historic structures
- Minor localized flood reduction projects where 50 percent of the structures that directly benefit from the mitigation activity are insured by the NFIP

8.4.5 Repetitive Flood Claims Program

The RFC program is designed to reduce or eliminate the long-term risk of flood damage to structures that are insured by the NFIP and have received one or more NFIP flood insurance

claim payments. RFC funds may only be used in a State or community that is participating in the NFIP and that cannot meet the requirements of the FMA due to lack of cost share or lack of capacity to manage grants. RFC grants are awarded to applicants on a nationwide basis without reference to State allocations, quotas, or other formula-based allocations. All grants are eligible for up to 100 percent Federal assistance.

Eligible mitigation activities include:

- Elevation of existing public or private structures to at least the BFE or higher, if required by FEMA or if required by State or local regulations
- Voluntary acquisition and demolition or relocation of structures and real property for the purpose of creating open space
- Relocation of structures outside of the SFHA
- Dry floodproofing of existing non-residential structures and certain residences that are listed as historic structures
- Minor localized flood reduction projects where 50 percent of the structures that directly benefit from the mitigation activity are insured by the NFIP

Awards are prioritized to fund projects that create the greatest amount of savings to the NFIP based on benefit-cost analyses. A FEMA-approved State/Tribal standard or enhanced hazard mitigation plan is required for eligibility. A local mitigation plan is not required.

8.4.6 Severe Repetitive Loss Program

The SRL program provides funds to assist States, Indian Tribal governments, and local governments that participate in the NFIP to implement projects that reduce or eliminate long-term flood risks to certain properties, thus reducing claims paid by the NFIP. To be eligible, a property must qualify under the statutory definition that requires that it:

- Be a residential property currently insured by the NFIP, and
- Have incurred flood losses that resulted in either (1) four or more flood insurance claim payments that each exceeded $5,000 with at least two of the payments occurring within a 10-year period, or (2) two or more flood insurance claims payments that cumulatively exceeded the value of the property

The SRL requires a specific consultation process that includes property owner notification and information gathering. Applicants are required to follow the specific process to make mitigation offers. SRL property owners who decline a formal offer under the SRL program will be subject to an increase in their insurance premiums.

SRL funds are allocated annually to States, Territories, and Indian Tribal governments based on the number of severe repetitive loss properties in their respective jurisdictions, with certain "target states" receiving 90 percent of available funds. "Non-target states" compete for the remaining 10 percent of available funds. Grants may provide up to 75 percent of a project's

eligible costs. The non-Federal cost share may be adjusted to 10 percent if the State has a FEMA-approved mitigation plan that also addresses how the State has and will continue to reduce the number of severe repetitive loss properties. Eligible SRL activities include:

- Voluntary acquisition and demolition or relocation of structures and real property for the purpose of creating open space.
- Relocation of structures outside of the SFHA.
- Elevation of existing public or private structures to at least the BFE or higher, if required by FEMA or if required by State or local regulations.
- Floodproofing measures only for residences that are listed as historic structures.
- Minor localized flood reduction projects where 50 percent of the structures that directly benefit from the mitigation activity are insured by the NFIP.
- Mitigation reconstruction, which involves the demolition and rebuilding of structures. It is allowed only when traditional elevation methods are not feasible. Grant-eligible costs are limited. Applicants should check with their State Hazard Mitigation Office for current guidance.

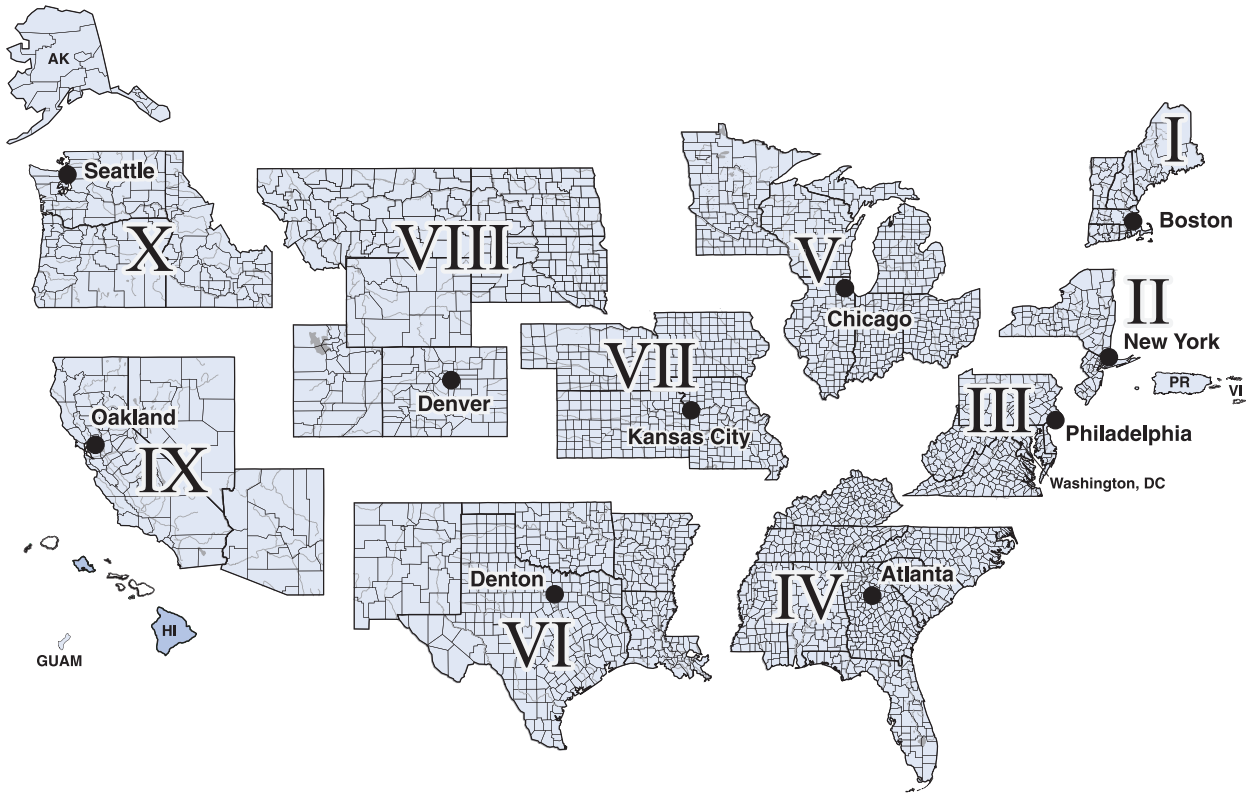
8.5 Additional Information

FEMA's mitigation assistance programs provide the opportunity to help communities and property owners address substantially damaged structures. While the programs differ based on their statutory requirements, they share a common goal of reducing loss of life and property due to natural hazards, including flooding. To learn more, visit FEMA's websites referenced above or contact the appropriate State Hazard Mitigation Officer (Appendix A).

A FEMA Regional Offices, NFIP State Coordinating Agencies, and State Hazard Mitigation Offices

FEMA Offices

The addresses and telephone numbers of FEMA Headquarters and the 10 FEMA Regional Offices are listed below. Staff members of the Regional Office for your area can give you more information about retrofitting, hazard mitigation, and the National Flood Insurance Program.



FEMA HEADQUARTERS

500 C Street, SW.
Washington, DC 20472
(202) 646-2500, (800) 621-FEMA (3362)
TTY: (800) 462-7585

REGION I – CT, MA, ME, NH, RI, VT

99 High Street, Sixth Floor
Boston, MA 02110
(617) 956-7506

REGION II – NJ, NY, PR, VI
26 Federal Plaza, Suite 1337
New York, NY 10278-0002
(212) 680-3600

REGION III – DC, DE, MD, PA, VA, WV
615 Chestnut Street
One Independence Mall, Sixth Floor
Philadelphia, PA 19106-4404
(215) 931-5608

REGION IV – AL, FL, GA, KY, MS, NC, SC, TN
3003 Chamblee Tucker Road
Atlanta, GA 30341
(770) 220-5200

REGION V – IL, IN, MI, MN, OH, WI
536 South Clark Street, Sixth Floor
Chicago, IL 60605-1521
(312) 408-5500

REGION VI – AR, LA, NM, OK, TX
Federal Regional Center
800 North Loop 288
Denton, TX 76209-3698
(940) 898-5399

REGION VII – IA, KS, MO, NE
9221 Ward Parkway, Suite 300
Kansas City, MO 64114-3372
(816) 283-7063

REGION VIII – CO, MT, ND, SD, UT, WY
Denver Federal Center, Building 710
P.O. Box 25267
Denver, CO 80255-0267
(303) 235-4800

REGION IX – AZ, CA, HI, NV, American Samoa, Guam, Commonwealth of the Northern Mariana Islands, Republic of the Marshall Islands, Federated States of Micronesia
1111 Broadway, Suite 1200
Oakland, CA 94607-4052
(510) 627-7100

REGION X – AK, ID, OR, WA
Federal Regional Center
130 228th Street, SW.
Bothell, WA 98021-8627
(425) 487-4600

On October 1, 2009, as part of FEMA's Digital Vision initiative, FEMA discontinued general distribution of paper mapping products, including Flood Insurance Rate Maps (FIRMs) and Flood Insurance Study (FIS) reports. Electronic copies of FIRMs and FIS reports are available from the FEMA Map Service Center online at http://msc.fema.gov. For additional information, call the FEMA Map Service Center toll-free at 1-877-336-2627 or contact them by mail at the following address:

FEMA Map Service Center
PO Box 1038
Jessup, MD 20794-1038

NFIP State Coordinating Agencies

ALABAMA
Department of Economic and Community Affairs
Office of Water Resources
401 Adams Avenue, Suite 434
P.O. Box 5690
Montgomery, AL 36103-5690
Phone: (334) 353-0853, (877) 252-9283
Fax: (334) 242-0776
http://www.adeca.alabama.gov/water/

ALASKA
Alaska Department of Community and Economic Development
550 West 7th Avenue, Suite 1770
Anchorage, AK 99501-3510
Phone: (907) 269-4500
http://www.commerce.state.ak.us/

ARIZONA

Arizona Department of Water Resources
3550 North Central Avenue
Phoenix, AZ 85012-2105
Phone: (602) 771-8657
Fax: (602) 771-8691
http://www.azwater.gov/

ARKANSAS

Arkansas Natural Resources Commission
101 East Capitol, Suite 350
Little Rock, AR 72201-3823
Phone: (501) 682-3969
Fax: (501) 682-3991
http://www.anrc.arkansas.gov/

CALIFORNIA

California Department of Water Resources
2825 Watt Avenue, Suite 100
Sacramento, CA 95821
Phone: (916) 574-1475
Fax: (916) 574-1478
http://www.water.ca.gov/

COLORADO

Colorado Water Conservation Board
1313 Sherman Street, Room 721
Denver, CO 80203
Phone: (303) 866-3441
Fax: (303) 866-4474
http://cwcb.state.co.us/

CONNECTICUT

Department of Environmental Protection
79 Elm Street
Hartford, CT 06106
Phone: (860) 424-3537
Fax: (860) 424-4075
http://www.ct.gov/dep/

DELAWARE

Department of Natural Resources and Environmental Control
89 Kings Highway
Dover, DE 19901
Phone: (302) 739-9921
Fax: (302) 739-6724
http://www.dnrec.delaware.gov/

DISTRICT OF COLUMBIA

Department of the Environment
Watershed Protection Division
51 N Street, NE., Room 5021
Washington, DC 20002
Phone: (202) 535-2248
Fax: (202) 535-1364
http://app.doh.dc.gov/services/administration_offices/environmental/watershed/watershed_division.shtm

FLORIDA

Division of Emergency Management
2555 Shumard Oak Boulevard
Tallahassee, Florida 32399-2100
Phone: (850) 413-9816
http://www.floridadisaster.org/

GEORGIA

Department of Natural Resources
7 Martin Luther King, Jr., Drive, Suite 440
Atlanta, GA 30334
Phone: (404) 656-6382
Fax: (404) 656-6383
http://www.gadnr.org/

GUAM

Guam Department of Public Works
Post Office Box 2877
Agana, Guam 96910
Phone: (671) 646-3131
Fax: (671) 649-6178
http://www.dpw.guam.gov

HAWAII

Hawaii Department of Land and Natural Resources
1151 Punchbowl Street
P.O. Box 373
Honolulu, HI 96809
Phone: (808) 587-0267
Fax: (808) 587-0283
http://hawaii.gov/dlnr/

IDAHO

Department of Water Resources
322 East Front Street
Boise, ID 83720
Phone: (208) 287-4928
Fax: (208) 287-6700
http://www.idwr.idaho.gov/

ILLINOIS

Illinois Department of Natural Resources
Office of Water Resources
One Natural Resources Way
Springfield, IL 62702-1271
Phone: (217) 782-4428
Fax: (217) 785-5014
http://dnr.state.il.us/OWR/

INDIANA

Indiana Department of Natural Resources
402 W. Washington Street, Room W264
Indianapolis, IN 46204-2748
Phone: (317) 234-1107
Fax: (317) 233-4579
http://www.state.in.us/dnr/

IOWA

Iowa Department of Natural Resources
Wallace State Office Building
Des Moines, IA 50319
Phone: (515) 281-8942
Fax: (515) 281-8895
http://www.iowadnr.com/

KANSAS

Department of Agriculture
109 SW 9th Street, 2nd Floor
Topeka, KS 66612-1283
Phone: (785) 296-5440
Fax: (785) 296-4835
http://www.ksda.gov/

KENTUCKY

Division of Water
14 Reilly Road
Frankfort, KY 40601
Phone: (502) 564-3410
Fax: (502) 564-9003
http://www.water.ky.gov/

LOUISIANA

Louisiana Department of Transportation and Development
Office of Public Works
Floodplain Management Section
1201 Capitol Access Road
P.O. Box 94245, Capitol Station
Baton Rouge, LA 70804-9245
Phone: (225) 274-4354
Fax: (225) 274-4351
http://www.dotd.state.la.us/

MAINE

State Planning Office
184 State Street (street)
38 State House Station (mailing)
Augusta, ME 04333-0038
Phone: (207) 287-8063
Fax: (207) 287-6489
http://www.state.me.us/spo/

MARYLAND

Department of the Environment
1800 Washington Boulevard, Suite 430
Baltimore, MD 21230
Phone: (410) 537-3775
Fax: (410) 537-3751
http://www.mde.state.md.us/

MASSACHUSETTS

Department of Conservation and Recreation
Flood Hazard Management
251 Causeway Street, Suite 700
Boston, MA 02114
Phone: (617) 626-1406
Fax: (617) 626-1349
http://www.mass.gov/dcr/

MICHIGAN

Department of Environmental Quality
525 West Allegan Street
P.O. Box 30473
Lansing, MI 48909-7958
Phone: (517) 373-7917
Fax: (517) 373-9965
http://www.michigan.gov/deq

MINNESOTA

Department of Natural Resources
500 LaFayette Road, Box 32
St. Paul, MN 55515-4032
Phone: (651) 259-5713
Fax: (651) 296-0445
http://www.dnr.state.mn.us/

MISSISSIPPI

Emergency Management Agency
Office of Mitigation
1 Mema Drive
P.O. Box 5644
Pearl, MS 39208
Phone: (601) 933-6884
Fax: (601) 933-6805
http://www.msema.org/

MISSOURI

State Emergency Management Agency
2302 Militia Drive
P.O. Box 116
Jefferson City, MO 65102
Phone: (573) 526-9141
Fax: (573) 526-9198
http://sema.dps.mo.gov/

MONTANA

Montana Department of Natural Resources and Conservation
Floodplain Management Program
1424 9th Avenue
Helena, MT 59620-1601
Phone: (406) 444-6654
Fax: (406) 444-0533
http://dnrc.mt.gov/wrd/water_op/floodplain/default.asp

NEBRASKA

Department of Natural Resources
301 Centennial Mall South
Lincoln, NE 68509-4876
Phone: (402) 471-3932
Fax: (402) 471-2900
http://www.dnr.ne.gov/

NEVADA

Division of Water Resources
901 South Stewart Street, Suite 2002
Carson City, NV 89701
Phone: (775) 684-2884
Fax: (775) 684-2811
http://water.nv.gov/

NEW HAMPSHIRE

Office of Energy and Planning
4 Chenell Drive, 2nd Floor
Concord, NH 03301
Phone: (603) 271-1762
Fax: (603) 271-2615
http://www.nh.gov/oep/

NEW JERSEY

Department of Environmental Protection
401 East State Street
P.O. Box 419
Trenton, NJ 08625
Phone: (609) 984-0859
Fax: (609) 984-1908
http://www.state.nj.us/dep/

NEW MEXICO

Department of Homeland Security and Emergency Management
13 Bataan Boulevard
P.O. Box 1628
Santa Fe, NM 87504-1628
Phone: (505) 476-9617
Fax: (505) 471-9695
http://www.nmdhsem.org/

NEW YORK

Department of Environmental Conservation
625 Broadway
Albany, NY 12233-3507
Phone: (518) 402-8146
Fax: (518) 402-9029
http://www.dec.ny.gov/

NORTH CAROLINA

Department of Crime Control and Public Safety
Division of Emergency Management
1812 Tillery Place, Suite 105
Raleigh, NC 27604-1356
Phone: (919) 715-5711
Fax: (919) 715-0408
http://www.ncem.org/

NORTH DAKOTA

State Water Commission
900 East Boulevard Avenue
Bismark, ND 58505-0850
Phone: (701) 328-4898
Fax: (701) 328-3747
http://www.swc.state.nd.us/

OHIO

Department of Natural Resources
2045 Morse Road, Building B-2
Columbus, OH 43229
Phone: (614) 265-6752
Fax: (614) 265-6767
http://www.dnr.state.oh.us/

OKLAHOMA

Water Resources Board
3800 North Classen
Oklahoma City, OK 73118
Phone: (918) 581-2924
Fax: (405) 530-8900
http://www.owrb.ok.gov/

OREGON

Department of Land Conservation Development
635 Capitol Street, NE, Suite 150
Salem, OR 97301-2540
Phone: (503) 373-0050
Fax: (503) 375-5518
http://www.lcd.state.or.us/

PENNSYLVANIA

Department of Community and Economic Development
Commonwealth Keystone Building
400 North Street, 4th Floor
Harrisburg, PA 17120-0225
Phone: (717) 720-7396
Fax: (717) 783-1402
http://www.newpa.com/

PUERTO RICO

Planning Board
Centro Gubernamental Roberto Sanchez Vilella
P.O. Box 41119, Minillas Station
Santurce, PR 00940-90985
Phone: (787) 727-4444
Fax: (787) 268-6858
http://www.jp.gobierno.pr/

RHODE ISLAND

Emergency Management Agency
645 New London Avenue
Cranston, RI 02920
Phone: (401) 462-7048
Fax: (401) 944-1891
http://www.riema.ri.gov/

SOUTH CAROLINA

Department of Natural Resources
1000 Assembly Street, Suite 345C
P.O. Box 167
Columbia, SC 29201
Phone: (803) 734-9120
Fax: (803) 734-9106
http://www.dnr.sc.gov/

SOUTH DAKOTA

Office of Emergency Management
118 West Capitol Avenue
Pierre, SD 57501
Phone: (605) 883-3238
Fax: (605) 773-3580
http://www.oem.sd.gov/

TENNESSEE

Department of Economic and Community Development
Tennessee Tower Building
312 8th Avenue North, 10th Floor
Nashville, TN 37243-0607
Phone: (615) 741-2211
Fax: (615) 741-0607
http://www.state.tn.us/ecd/bizdev_idg.htm

TEXAS

Water Development Board
1700 North Congress Avenue
P.O. Box 13231
Austin, TX 78711-3231
Phone: (512) 463-3509
Fax: (512) 475-2053
http://www.twdb.state.tx.us/

UTAH

Department of Public Safety
Division of Comprehensive Emergency Management
State Office Building, Room 1110
Salt Lake City, UT 84114
Phone: (801) 538-3332
Fax: (801) 538-3772
http://www.cem.utah.gov/

VERMONT

Department of Environmental Conservation
103 South Main Street, Building 10 N
Waterbury, VT 05671
Phone: (802) 241-1554
Fax: (802) 244-5141
http://www.anr.state.vt.us/dec/dec.htm

VIRGIN ISLANDS

Department of Planning and Natural Resources
C.E. King Airport, Terminal Building
2nd Floor
St. Thomas, VI 00802
Phone: (340) 774-3320
Fax: (340) 775-5706
http://www.dpnr.gov.vi/

VIRGINIA

Department of Conservation and Historic Resources
Division of Dam Safety and Floodplain Management
203 Governor Street, Suite 206
Richmond, VA 23219
Phone: (804) 786-3914
Fax: (804) 371-2630
http://www.dcr.virginia.gov/

WASHINGTON

Department of Ecology
P.O. Box 47690
Olympia, WA 98504-7600
300 Desmond Drive, SE
Lacey, WA 98503
Phone: (360) 407-6796
Fax: (360) 407-6902
http://www.ecy.wa.gov/

WEST VIRGINIA

Division of Homeland Security and Emergency Management
Capitol Building 1, Room EB-80
1900 Kanawha Boulevard
Charleston, WV 25305-0360
Phone: (304) 965-2331
Fax: (304) 965-3216
http://www.wvdhsem.gov/

WISCONSIN

Department of Natural Resources
101 South Webster
Madison, WI 53702
Phone: (608) 266-8037
Fax: (608) 266-3093
http://dnr.wi.gov/

WYOMING

Office of Homeland Security
Herschler Building, 1st East
122 West 25th Street
Cheyenne, WY 82002
Phone: (307) 777-4910
Fax: (307) 635-6017
http://wyohomelandsecurity.state.wy.us/main.aspx

State Hazard Mitigation Offices

ALABAMA

Alabama Emergency Management Agency
5898 County Road 41
P.O. Drawer 2160
Clanton, AL 35046-2160
(205) 280-2200
http://www.ema.alabama.gov

ALASKA

Alaska Department of Homeland Security and Emergency Management
P.O. Box 5750
Ft. Richardson, AK 99505-5750
(907) 428-7000
http://www.ak-prepared.com

AMERICAN SAMOA

Emergency Management Coordinating Office
P.O. Box 1086
Pago Pago, American Samoa 96799
(684) 699-6415

ARIZONA

Division of Emergency Management
5636 E. McDowell Road
Phoenix, AZ 85008
(602) 244-0504
http://www.dem.azdema.gov

ARKANSAS

Department of Emergency Management
Bldg. 9501
Camp Joseph T. Robinson
North Little Rock, AR 72199
(501) 683-6700
http://www.adem.arkansas.gov

CALIFORNIA

California Emergency Management Agency
3650 Shriever Avenue
Mather, CA 95655
(916) 845-8510
http://www.calema.ca.gov

COMMONWEALTH OF THE NORTHERN MARIANA ISLANDS

Emergency Management Office
P.O. Box 10007
Saipan, Mariana Islands 96950
(670) 322-9529

COLORADO

Division of Emergency Management
9195 East Mineral Avenue
Suite 200
Centennial, CO 80112
(720) 852-6600
http://dola.colorado.gov/dem/index.html

CONNECTICUT

Department of Emergency Management and Homeland Security
25 Sigourney Street
6th Floor
Hartford, CT 06106-5042
(860) 256-0800
http://www.ct.gov/demhs/site/default.asp

DELAWARE

Delaware Emergency Management Agency
165 Brick Store Landing Road
Smyrna, DE 19977
(302) 659-3362
http://dema.delaware.gov

DISTRICT OF COLUMBIA

Homeland Security and Emergency Management Agency
2720 Martin Luther King Jr. Avenue, SE
Washington, DC 20032
(202) 727-6161
http://dcema.dc.gov/dcema/site/default.asp

FLORIDA

Florida Division of Emergency Management
2555 Shumard Oak Boulevard
Tallahassee, FL 32399
(850) 413-9816
http://www.floridadisaster.org

GEORGIA

Georgia Emergency Management Agency
935 East Confederate Avenue, SE
P.O. Box 18055
Atlanta, GA 30316
(404) 635-7000
http://www.gema.state.ga.us

GUAM

Guam Homeland Security/Office of Civil Defense
221B Chalan Palasyo
Agana Heights, Guam 96910
(671) 475-9600

HAWAII

Hawaii Department of Emergency Management
650 South King Street
Honolulu, HI 96813
(808) 723-8960
http://www.honolulu.gov/dem

IDAHO

Idaho Bureau of Homeland Security
4040 Guard Street
Building 600
Boise, ID 83705-5004
(208) 422-3040
http://www.bhs.idaho.gov/Pages/Contact.aspx

ILLINOIS

Illinois Emergency Management Agency
2200 South Dirksen Parkway
Springfield, IL 62703
(217) 782-2700
http://www.state.il.us/iema/

INDIANA

Department of Homeland Security
Indiana Government Center South
302 West Washington Street, Room E-208
Indianapolis, IN 46204
(317) 232-3986
http://www.in.gov/dhs

IOWA

Iowa Homeland Security and Emergency Management Division
7105 NW 70th Avenue
Camp Dodge, Bldg. W-4
Johnston, IA 50131
(515) 725-3231
http://www.iowahomelandsecurity.org

KANSAS

Kansas Division of Emergency Management
2800 Southwest Topeka Blvd.
Topeka, KS 66611-1287
(785) 274-1409
http://www.accesskansas.org/kdem/

KENTUCKY

Kentucky Division of Emergency Management
100 Minuteman Parkway Bldg. 100
Frankfort, KY 40601-6168
(502) 607-1682
http://www.kyem.ky.gov

LOUISIANA

Louisiana Office of Homeland Security and Emergency Preparedness
7667 Independence Blvd.
Baton Rouge, LA 70806
(225) 925-7500
http://gohsep.la.gov

MAINE

Maine Emergency Management Agency
72 State House Station
45 Commerce Drive
Augusta, ME 04333
(207) 624-4400
http://www.state.me.us/mema/

MARYLAND

Maryland Emergency Management Agency
5401 Rue Saint Lo Drive
Reisterstown, MD 21136
(410) 517-3625
http://www.mema.state.md.us/MEMA/index.jsp

MASSACHUSETTS

Massachusetts Emergency Management Agency
400 Worcester Road
Framingham, MA 01702-5399
(508) 820-2000
http://www.state.ma.us/mema

MICHIGAN

Emergency Management and Homeland Security Division
Michigan Department of State Police
4000 Collins Road
Lansing, MI 48909-8136
(517) 333-5042
http://www.michigan.gov/msp

MINNESOTA

Minnesota Homeland Security and Emergency Management
444 Cedar Street, Suite 223
St. Paul, MN 55101-6223
(651) 201-7400
http://www.hsem.state.mn.us/

MISSISSIPPI

Mississippi Emergency Management Agency
P.O. Box 5644
Pearl, MS 39288-5144
(601) 933-6362
http://www.msema.org

MISSOURI

Missouri State Emergency Management Agency
2302 Militia Drive
P.O. Box 116
Jefferson City, MO 65102
(573) 526-9100
http://www.sema.dps.mo.gov/semapage.htm

MONTANA

Montana Disaster and Emergency Services
P.O. Box 4789
Ft. Harrison, MT 59636-4789
(406) 324-3000
http://www.dma.mt.gov/des

NEBRASKA

Nebraska Emergency Management Agency
1300 Military Road
Lincoln, NE 68508-1090
(402) 471-7421
http://www.nema.ne.gov

NEVADA

Nevada Division of Emergency Management
2478 Fairview Drive
Carson City, NV 89701
(775) 687-0300
http://www.dem.state.nv.us

NEW HAMPSHIRE

New Hampshire Department of Safety Homeland Security and Emergency Management
33 Hazen Street
Concord, NH 03305
(603) 271-2231
http://www.nh.gov/safety/divisions/shem

NEW JERSEY

New Jersey Office of Emergency Management
P.O. Box 7068
West Trenton, NJ 08628-0068
(609) 538-6050
http://www.state.nj.us/njoem/

NEW MEXICO

New Mexico Department of Homeland Security and Emergency Management
P.O. Box 27111-87502
13 Bataan Blvd.
Santa Fe, NM 87504
(505) 476-9600
http://www.nmdhsem.org

NEW YORK

New York State Emergency Management Office
1220 Washington Avenue, Suite 101
Building # 22
Albany, NY 12226-2251
(518) 292-2301
http://www.semo.state.ny.us/

NORTH CAROLINA

North Carolina Division of Emergency Management
4713 Mail Service Center
Raleigh, NC 27699-4713
(919) 733-3867
http://www.ncem.org

NORTH DAKOTA

North Dakota Emergency Management
P.O. Box 5511
Fraine Barrecks Lane, Bldg. 35
Bismarck, ND 59506-5511
(701) 328-8181
http://www.nd.gov/des

OHIO

Ohio Emergency Management Agency
2855 West Dublin-Granville Road
Columbus, OH 43235-2206
(614) 889-7150
http: //ema.ohio.gov

OKLAHOMA

Oklahoma Emergency Management Agency
2401 Lincoln Blvd.
Suite C51
Oklahoma City, OK 73105
(405) 521-2481
http://www.ok.gov/OEM

OREGON

Office of Emergency Management
3225 State Street
Salem, OR 97309-5062
(503) 378-2911
http://www.oregon.gov/OMD/OEM/index.shtml

PENNSYLVANIA

Pennsylvania Emergency Management Agency
2605 Interstate Drive
P.O. Box 3221
Harrisburg, PA 17110-9463
(717) 651-2001
http://www.pema.state.pa.us

PUERTO RICO

Puerto Rico Emergency Management
P.O. Box 966597
San Juan, PR 00906-6597
(787) 724-0124
http://www.gobierno.pr/AEMEAD/Inicio

RHODE ISLAND

Rhode Island Emergency Management Agency
645 New London Avenue
Cranston, RI 02920
(401) 946-9996
http://www.riema.ri.gov

SOUTH CAROLINA

South Carolina Emergency Management Division
2779 Fish Hatchery Road
West Columbia, SC 29172
(803) 37-8500
http://www.scemd.org

SOUTH DAKOTA

South Dakota Division of Emergency Management
118 West Capitol Avenue
Pierre, SD 57501
(605) 773-3178
http://www.oem.sd.gov

TENNESSEE

Tennessee Emergency Management Agency
3041 Sidco Drive
Nashville, Tennessee 37204
(615) 741-0001
http://www.tnema.org

TEXAS

Texas Division of Emergency Management
P.O. Box 4087
Austin, TX 78773-0220
(512) 424-2138
http://www.txdps.state.tx.us/dem/pages/index.htm

UTAH

Utah Division of Emergency Services and Homeland Security
State Office Building, Room 1110
Salt Lake City, UT 84114-1710
(801) 538-3400
http://www.des.utah.gov

VERMONT

Vermont Emergency Management Agency
Department of Public Safety
Waterbury State Complex
103 S. Main Street
Waterbury, VT 05671-2101
(802) 242-8721
http://www.dps.state.vt.us/

VIRGINIA

Department of Emergency Management
10501 Trade Court
Richmond, VA 23236-3713
(804) 897-6500
http://www.vaemergency.com/index.cfm

VIRGIN ISLANDS

Virgin Islands Territorial Emergency Management
2-C Contant, A-Q Bldg.
St. Thomas, VI 00820
(340) 774-2244

WASHINGTON

Washington Military Department
Emergency Management Division
Bldg. 20, MS TA-20
Camp Murray, WA 98430-5122
(253) 512-7000
http://www.emd.wa.gov/

WEST VIRGINIA

West Virginia Division of Homeland Security and Emergency Services
Building 1, Room EB-80
1900 Kanawha Blvd., East
Charleston, WV 25305-0360
(304) 558-5380
http://www.wvdhsem.gov

WISCONSIN

Wisconsin Emergency Management
2400 Wright Street
Madison, WI 53707-7865
(608) 242-3232
http://emergencymanagement.wi.gov/

WYOMING

Wyoming Department of Homeland Security
122 West 25th Street
Herschler Building, 1st Floor East
Cheyenne, WY 82002
(307) 777-4663
http://wyohomelandsecurity.state.wy.us/main.aspx

B References

FEMA publications are available for download free of charge at http://www.fema.gov/library. Publications can also be obtained in hardcopy format from the FEMA Distribution Center by submitting an order by regular mail, phone, or fax, Monday through Friday, between 8 a.m. and 5 p.m. Eastern Standard Time. Please provide the FEMA publication number, title, and quantity of each publication requested, along with your name, address, zip code, and daytime telephone number.

FEMA Distribution Center
P.O. Box 430
Buckeystown, MD 21717
1-800-480-2520
240-699-0525 (fax)

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C Glossary and Acronyms

Glossary

Key terms and definitions are addressed in Chapter 3. The following are additional terms used in this Desk Reference.

A

Accessory structure – A structure that is on the same parcel of property as a principal structure, the use of which is incidental to the use of the principal structure.

Agricultural structure – A structure used exclusively for agricultural purposes such as storage of farm machinery and equipment, grain bins and silos, corn cribs, and general purposes barns for feeding and raising livestock. Homes located on farms are not agricultural structures.

B

Base flood – The flood having a 1-percent chance of being equaled or exceeded in any given year, commonly referred to as the "100-year flood." The base flood is the national standard used by the NFIP and all Federal agencies for the purposes of requiring the purchase of flood insurance and regulating new development.

Base flood elevation (BFE) – The elevation of the base (1-percent annual chance or 100-year) flood compared to a specified datum, usually the National Geodetic Vertical Datum of 1929, or the North American Vertical Datum of 1988.

Basement – Any area of a building having its floor subgrade (below ground level) on all sides.

Breakaway wall – A wall that is not part of the structural support of the building and is intended through its design and construction to collapse under specified lateral loading forces, without causing damage to the elevated portion of the building or supporting foundation system.

D

Determination, SI/SD – The result of comparing the costs of a proposed improvement (or costs to repair substantial damage) to the market value of a structure for the purposes of determining whether the resulting ratio equals or exceeds a certain percentage (50 percent in the NFIP minimum requirements).

E

Elevation Certificate – FEMA Form 81-31, a form developed by FEMA to collect surveyed elevations and other information about a building that is necessary to obtain flood insurance. The *Elevation Certificate* and instructions are available online at http://www.fema.gov/library/viewRecord.do?id=1383.

Enclosure or enclosed area – Areas created by a crawlspace or solid walls that fully enclose areas below elevated buildings that are below the BFE.

F

Federal Emergency Management Agency (FEMA) – The Federal agency that, in addition to carrying out other activities, administers the National Flood Insur¬ance Program.

Flood Insurance Rate Map (FIRM) – The official map of a community on which FEMA has delineated both the SFHAs and the risk premium zones applicable to the community.

Flood opening – An opening in a foundation or enclosure wall that allows automatic entry and exit of floodwaters (see FEMA Technical Bulletin 1 for descriptions of "non-engineered opening" and "engineered opening").

Floodway – The channel of a river or other watercourse and the adjacent land areas that must be reserved in order to discharge the base flood without cumulatively increasing the water surface elevation more than a designated height.

Floodproofing – Any combination of structural and non-structural additions, changes, or adjustments to structures that reduce or eliminate flood damage to real estate or improved real property, water and sanitary facilities, structures, and their contents.

***Floodproofing Certificate* –** FEMA Form 81-65, a form developed by FEMA that is to be completed, signed and sealed by a licensed professional engineer or licensed architect to certify that the design of the floodproofing and the proposed methods of construction are in accordance with the requirements. The *Floodproofing Certificate* is available online at http://www.fema.gov/library/viewRecord.do?id=1600.

H

Historic structure – Any structure that is:

(a) Listed individually in the National Register of Historic Places (a listing maintained by the Department of Interior) or preliminarily determined by the Secretary of the Interior as meeting the requirements for individual listing on the National Register;

(b) Certified or preliminarily determined by the Secretary of the Interior as contributing to the historical significance of a registered historic district or a district preliminarily determined by the Secretary to qualify as a registered historic district;

(c) Individually listed on a state inventory of historic places in states with historic preservation programs which have been approved by the Secretary of the Interior; or

(d) Individually listed on a local inventory of historic places in communities with historic preservation programs that have been certified either:

(1) By an approved state program as determined by the Secretary of the Interior or

(2) Directly by the Secretary of the Interior in states without approved programs.

Hydrodynamic load – The load imposed on an object, such as a foundation element or enclosure wall, by water flowing against and around it.

Hydrostatic load – The load imposed on an object, such as an enclosure wall, by a standing mass of water.

N

New construction – Structures for which the "start of construction" commenced on or after the effective date of a floodplain management regulation adopted by a community and includes any subsequent improvements to such structures.

P

Post-FIRM – A building for which construction or substantial improvement occurred after December 31, 1974, or on or after the effective date of an initial Flood Insurance Rate Map (FIRM), whichever is later.

Pre-FIRM – A building for which construction or substantial improvement occurred on or before December 31, 1974, or before the effective date of an initial FIRM.

R

Registered Design Professional – An individual who is registered or licensed to practice their respective design profession as defined by the statutory requirements of the professional registration laws of the State or jurisdiction in which the project is to be constructed.

S

Special Flood Hazard Area (SFHA) – An area delineated on a Flood Insurance Rate Map as being subject to inundation by the base flood and designated as Zone A, AE, A1-A30, AR, AO, AH, A99, V, VE, or V1-V30.

Substantial damage – 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 – 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 that have incurred "substantial damage," regardless of the actual repair work performed. The term does not, however, include either:

(1) 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 or

(2) Any alteration of a "historic structure," provided that the alteration will not preclude the structure's continued designation as a "historic structure."

V

Violation – The failure of a structure or other development to be fully compliant with the community's floodplain management regulations.

Acronyms

A

ACV actual cash value

ADA Americans with Disabilities Act

ASCE American Society of Civil Engineers, Inc.

ASFPM Association of State Floodplain Managers, Inc.

ATC Applied Technology Council

B

BFE base flood elevation

C

CBRS Coastal Barrier Resource System

CFR Code of Federal Regulations

CRS Community Rating System

D

DHS Department of Homeland Security

F

FEMA Federal Emergency Management Agency

FHBM Flood Hazard Boundary Map

FIA Federal Insurance Administration

FIRM Flood Insurance Rate Map

FIS Flood Insurance Study

FMA Flood Mitigation Assistance (grant program)

G

GIS geographic information system

GPS global positioning system

H

HMGP Hazard Mitigation Grant Program

HVAC Heating, ventilation, and air conditioning

I

IBC *International Building Code®*

I-Codes The family of codes published by the International Code Council, Inc.

ICC Increased Cost of Compliance (NFIP flood insurance coverage)

ICC International Code Council, Inc.

IEBC *International Existing Building Code®*

IRC *International Residential Code®*

N

NFIP National Flood Insurance Program

O

OPA Otherwise Protected Area

P

PDA Preliminary Damage Assessment

PDM Pre-Disaster Mitigation (grant program)

R

RCV replacement cost value

RFC Repetitive Flood Claims (grant program)

RLP Repetitive Loss Property

S

SDE *Substantial Damage Estimator*

SEI Structural Engineering Institute

SFHA Special Flood Hazard Area

SI/SD substantial improvement/substantial damage

SRL Severe Repetitive Loss (grant program)

D Sample Notices to Property Owners, Sample Affidavits, and Other Material

These samples are offered to illustrate specific points in the Desk Reference. States and communities should examine them carefully before use.

- Sample Substantial Improvement/Damage Notice to Property Owners (see Sections 5.5.1 and 5.6.2.)
- Substantial Improvement Worksheet for Floodplain Construction (for additions, rehabilitations, improvements or damage repairs; see Section 6.4)
- Adjuster Preliminary Damage Assessment (FEMA Form 81-109; see Section 7.4.1)

Sample Notice for Property Owners, Contractors, and Design Professionals

[This example is based on the NFIP minimum requirements.]

TO: Property Owners, Contractors, and Design Professionals

FROM: Local Official

SUBJECT: Notice for Work on Existing Buildings in Special Flood Hazard Areas
Substantial Improvement / Substantial Damage Worksheets

The *Community's* floodplain management regulations and codes specify that all new buildings to be constructed in Special Flood Hazard Areas (SFHAs) (regulated floodplains) are required to have their lowest floors elevated to or above the base flood elevation (BFE). The regulations also specify that **substantial improvement** of existing buildings (remodeling, rehabilitation, improvement, or addition) or buildings that have sustained **substantial damage** must be brought into compliance with the requirements for new construction. Please note that a building may be substantially damaged by any cause, including fire, flood, high wind, seismic activity, land movement, or neglect. It is important to note that all costs to repair a substantially damaged building to its pre-damage condition must be identified.

There are several aspects that must be addressed to achieve compliance with the floodplain management requirements. The requirements depend on several factors, including the flood zone at your property. The most significant compliance requirement is that the lowest floor, as defined in the regulations/code, must be elevated to or above the BFE. Please plan to meet with this department to review your proposed project, to go over the requirements, and to discuss how to bring your building into compliance.

Our regulations define these terms:

> **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 that have incurred "substantial damage," regardless of the actual repair work performed. The term does not, however, 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 that 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."

To make the substantial improvement determination or the substantial damage determination, we compare the cost of the proposed improvement or repairs to the market value of the building (excluding land, accessory structures, and landscaping). If the resulting ratio equals or exceeds 50 percent, the existing building must be brought into compliance with the floodplain management requirements for new buildings.

$$\frac{\text{Cost of Improvement or Cost to Repair to Pre-Damage Condition}}{\text{Market Value of Building}} \geq 50\%$$

Please note:

- You must provide an estimate of the cost to perform the proposed improvements or repairs. If your building has been damaged, the cost estimate must include all work required to repair the building to its pre-damage condition. The cost estimate must include all labor and materials. If the work will be done by a contractor, the contractor’s overhead and profit must be included. If the work will be done by the owner or volunteers, market rates must be used to estimate the cost of materials and the value of labor. Attached to this notice is a list of costs that must be included and costs that are excluded. After we review the cost estimate, we may require that it be broken down to show all materials and labor estimates.
- You must provide a market value appraisal of the building that is prepared by a professional appraiser according to standard practices of the profession. We will review the appraisal to determine that it accurately describes your building and does not include the value of the land, accessory buildings, and landscaping. Alternatively, we will use the tax assessment value of your building as the estimate of the market value of the building before the work is performed.

If you have any questions regarding this information, please contact _____

Attachments:

Requirements for Applications for Permits for Substantial Improvements and Repair of Substantial Damage

Costs for Substantial Improvements and Repair of Substantial Damage

Owner’s Affidavit

Contractor’s Affidavit

Requirements for Applications for Permits for Substantial Improvements and Repair of Substantial Damage

Please contact _____ if you have questions about the substantial improvement and substantial damage requirements. Your building may have to be brought into compliance with the floodplain management requirements for new construction.

Applications for permits to work on existing buildings that are located in Special Flood Hazard Areas must include the following:

- Current photographs of the exterior (front, rear, sides)
- If your building has been damaged, include photographs of the interior and exterior; provide pre-damage photos of the exterior, if available
- Detailed description of the proposed improvement (rehabilitation, remodeling, addition, etc.) or repairs
- Cost estimate of the proposed improvement or the cost estimate to repair the damaged building to its before-damage condition
- Elevation certificate or elevation survey
- You may submit a market value appraisal prepared by a licensed professional appraiser or we will use the tax assessment value of the building
- Owner's affidavit (signed and dated)
- Contractor's affidavit (signed and dated)

Costs for Substantial Improvements and Repair of Substantial Damage

Included Costs

Items that must be included in the costs of improvement or costs to repair are those that are directly associated with the building. The following list of costs that must be included is not intended to be exhaustive, but characterizes the types of costs that must be included:

- Materials and labor, including the estimated value of donated or discounted materials and owner or volunteered labor
- Site preparation related to the improvement or repair (foundation excavation, filling in basements)
- Demolition and construction debris disposal
- Labor and other costs associated with demolishing, moving, or altering building components to accommodate improvements, additions, and making repairs
- Costs associated with complying with any other regulation or code requirement that is triggered by the work, including costs to comply with the requirements of the Americans with Disabilities Act (ADA)
- Costs associated with elevating a structure to an elevation that is lower than the BFE
- Construction management and supervision
- Contractor's overhead and profit
- Sales taxes on materials
- Structural elements and exterior finishes, including:
  - Foundations (e.g., spread or continuous foundation footings, perimeter walls, chainwalls, pilings, columns, posts, etc.)
  - Monolithic or other types of concrete slabs
  - Bearing walls, tie beams, trusses
  - Joists, beams, subflooring, framing, ceilings
  - Interior non-bearing walls
  - Exterior finishes (e.g., brick, stucco, siding, painting, and trim)
- Structural elements and exterior finishes (cont.):
  - Windows and exterior doors
  - Roofing, gutters, and downspouts
  - Hardware
  - Attached decks and porches
- Interior finish elements, including:
  - Floor finishes (e.g., hardwood, ceramic, vinyl, linoleum, stone, and wall-to-wall carpet over subflooring)
  - Bathroom tiling and fixtures
  - Wall finishes (e.g., drywall, paint, stucco, plaster, paneling, and marble)
  - Built-in cabinets (e.g., kitchen, utility, entertainment, storage, and bathroom)
  - Interior doors
  - Interior finish carpentry
  - Built-in bookcases and furniture
  - Hardware
  - Insulation
- Utility and service equipment, including:
  - HVAC equipment
  - Plumbing fixtures and piping
  - Electrical wiring, outlets, and switches
  - Light fixtures and ceiling fans
  - Security systems
  - Built-in appliances
  - Central vacuum systems
  - Water filtration, conditioning, and recirculation systems

Excluded Costs

Items that can be excluded are those that are not directly associated with the building. The following list characterizes the types of costs that may be excluded:

- Clean-up and trash removal
- Costs to temporarily stabilize a building so that it is safe to enter to evaluate required repairs
- Costs to obtain or prepare plans and specifications
- Land survey costs
- Permit fees and inspection fees
- Carpeting and recarpeting installed over finished flooring such as wood or tiling
- Outside improvements, including landscaping, irrigation, sidewalks, driveways, fences, yard lights, swimming pools, pool enclosures, and detached accessory structures (e.g., garages, sheds, and gazebos)
- Costs required for the minimum necessary work to correct existing violations of health, safety, and sanitary codes
- Plug-in appliances such as washing machines, dryers, and stoves

Owner's Affidavit: Substantial Improvement or Repair of Substantial Damage

Property Address:

Parcel ID Number:

Owner's Name:

Owner's Address/Phone:

Contractor:

Contractor's License Number:

Date of Contractor's Estimate:

I hereby attest that the description included in the permit application for the work on the existing building that is located at the property identified above is all of the work that will be done, including all improvements, rehabilitation, remodeling, repairs, additions, and any other form of improvement. I further attest that I requested the above-identified contractor to prepare a cost estimate for all of the work, including the contractor's overhead and profit. I acknowledge that if, during the course of construction, I decide to add more work or to modify the work described, that the [*insert community*] will re-evaluate its comparison of the cost of work to the market value of the building to determine if the work is substantial improvement. Such re-evaluation may require revision of the permit and may subject the property to additional requirements.

I also understand that I am subject to enforcement action and/or fines if inspection of the property reveals that I have made or authorized repairs or improvements that were not included in the description of work and the cost estimate for that work that were the basis for issuance of a permit.

Owner's Signature:

Date:

Notarized:

Contractor's Affidavit: Substantial Improvement or Repair of Substantial Damage

Property Address:

Parcel ID Number:

Owner's Name:

Owner's Address/Phone:

Contractor:

Contractor's License Number:

Date of Contractor's Estimate:

I hereby attest that I have personally inspected the building located at the above-referenced address and discussed the nature and extent of the work requested by the owner, including all improvements, rehabilitation, remodeling, repairs, additions, and any other form of improvement.

At the request of the owner, I have prepared a cost estimate for all of the improvement work requested by the owner and the cost estimate includes, at a minimum, the cost elements identified by the [community] that are appropriate for the nature of the work. If the work is repair of damage, I have prepared a cost estimate to repair the building to its pre-damage condition. I acknowledge that if, during the course of construction, the owner requests more work or modification of the work described in the application, that a revised cost estimate must be provided to the [*insert community*], which will re-evaluate its comparison of the cost of work to the market value of the building to determine if the work is substantial improvement. Such re-evaluation may require revision of the permit and may subject the property to additional requirements.

I also understand that I am subject to enforcement action and/or fines if inspection of the property reveals that I have made or authorized repairs or improvements that were not included in the description of work and the cost estimate for that work that were the basis for issuance of a permit.

Owner's Signature:

Date:

Notarized:

Substantial Improvement Worksheet for Floodplain Construction

(for reconstruction, rehabilitation, addition, or other improvements, and repair of damage from any cause)

Property Owner: _____

Address: _____

Permit No.: _____

Location: _____

Description of improvements: _____

Present Market Value of structure ONLY (market appraisal or adjusted assessed value, BEFORE improvement, or if damaged, before the damage occurred), not including land value: $ _____

Cost of Improvement -
Actual cost of the construction** (see items to include/exclude) $ _____

Include volunteer labor and donated supplies.

Ratio = $\frac{\textbf{Cost of Improvement (or Cost to Repair)}}{\textbf{Market Value}}$ X 100 _____ %

If ratio is 50 percent or greater (**Substantial Improvement**), entire structure including the existing building must be elevated to the base flood elevation (BFE) and all other aspects brought into compliance.

Important Notes:

1. Review cost estimates to ensure that all appropriate costs are included or excluded.
2. If a residential pre-FIRM building is determined to be substantially improved, it must be elevated to or above the BFE. If a non-residential pre-FIRM building is substantially improved, it must be elevated or dry floodproofed to the BFE.
3. Proposals to repair damage from any cause must be analyzed using the formula shown above.
4. Any proposed improvements or repairs to a post-FIRM building must be evaluated to ensure that the improvements or repairs comply with floodplain management regulations and to ensure that the improvements or repairs do not alter any aspect of the building that would make it non-compliant.
5. Alterations to and repairs of designated historic structures may be granted a variance or be exempt under the substantial improvement definition) provided the work will not preclude continued designation as a “historic structure.”
6. Any costs associated with directly correcting health, sanitary, and safety code violations may be excluded from the cost of improvement. The violation must have been officially cited prior to submission of the permit application.

Determination completed by: _____

Date: _____

DEPARTMENT OF HOMELAND SECURITY FEDERAL EMERGENCY MANAGEMENT AGENCY ADJUSTER PRELIMINARY DAMAGE ASSESSMENT	*NATIONAL FLOOD INSURANCE PROGRAM*	*O.M.B. No. 1660-0005* *Expires September 30, 2010*

Privacy Act Statement

The information requested is necessary to process the subject loss. The authority to collect the information is Title 42, U.S. Code, Section 4001 to 4028. It is voluntary on your part to furnish the information. However, omission of an item may preclude processing of the form. The information will not be disclosed outside of the Federal Emergency Management Agency, except to the servicing agent, acting as the government's fiscal agent; to claims adjusters to enable them to confirm coverage and the location of insured property; to certain Federal, State, and Local Government agencies for determining eligibility for benefits and for verification of nonduplication of benefits; to the Department of Justice for purposes of litigation or as required by law; and to State and Local agencies for acquisition and relocation-related projects, consistent with the National Flood Insurance Program and consistent with the routine uses described in the program's system of record. Failure by you to provide some or all of the information may result in delay in processing or denial of this claim and/or application.

Paperwork Burden Disclosure Notice

Public reporting burden for this form is estimated to average 15 minutes per response. The burden estimate includes the time, effort or financial resources expended by persons to generate, maintain, retain, disclose, or provide information to the Mitigation Division or its agent. You are not required to respond to this collection of information unless a currently valid OMB control number and expiration date is displayed in the upper right corner of the these forms. Send comments regarding the accuracy of the burden estimate and suggestions for reducing the burden to: Information Collections Management, Department of Homeland Security, Federal Emergency Management Agency, 500 C Street, S.W., Washington, DC 20472, Paperwork Reduction Project (1660-0005). **NOTE: Do not send your completed form to this address. Send completed forms to: NFIP Bureau & Statistical Agent, Certification Coordinator, P.O. box 310 , Lanham, MD 20703-0310.**

WYO COMPANY	DATE OF LOSS	ADJUSTER	FICO NUMBER

This form is to be used for advisory purposes in helping FEMA and communities identify potential substantially damaged buildings. The adjuster will use "replacement cost" when completing this form; however, the community is required under the National Flood Insurance Program to use "market value" in determining substantial damage.

PLEASE PRINT LEGIBLY

POLICY HOLDER	POLICY NUMBER

PROPERTY ADDRESS *(include zip code)*

**PROBABLE REPAIR COST	BUILDING REPLACEMENT COST VALUE	BUILDING ACTUAL CASH VALUE
	$	$

POLICY HOLDER	POLICY NUMBER

PROPERTY ADDRESS *(include zip code)*

**PROBABLE REPAIR COST	BUILDING REPLACEMENT COST VALUE	BUILDING ACTUAL CASH VALUE
	$	$

POLICY HOLDER	POLICY NUMBER

PROPERTY ADDRESS *(include zip code)*

**PROBABLE REPAIR COST	BUILDING REPLACEMENT COST VALUE	BUILDING ACTUAL CASH VALUE
	$	$

**This is an estimate of the cost to repair the building to its pre-flood condition.

Privacy Act Statement

The information requested is necessary to process the subject loss. The authority to collect the information is Title 42, U.S. Code, Section 4001 to 4028. It is voluntary on your part to furnish the information. However, omission of an item may preclude processing of the form. The information will not be disclosed outside of the Federal Emergency Management Agency, except to the servicing agent, acting as the government's fiscal agent; to claims adjusters to enable them to confirm coverage and the location of insured property; to certain Federal, State, and Local Government agencies for determining eligibility for benefits and for verification of agencies for acquisition and relocation-related projects, consistent with the National Flood Insurance Program and consistent with the routine uses described in the program's system of record. Failure by you to provide some or all of the information may result in delay in processing or denial of this claim and/or application.

PAPERWORK BURDEN DISCLOSURE NOTICE

Public reporting burden for the collection of information titled Claims for National Flood Insurance Program (NFIP) is estimated to average 6 hours per response. The burden estimate includes the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and submitting these forms. You are not required to respond to this collection of information unless a currently valid OMB control number and expiration date is displayed in the upper right corner of the these forms. Send comments regarding the accuracy of the burden estimate and suggestions for reducing the burden to: Information Collections Management, Department of Homeland Security, Federal Emergency Management Agency, 500 C Street, S.W., Washington, DC 20472, Paperwork Reduction Project (1660-0005). **NOTE: Do not send your completed form to this address.**

FEMA Form No.	Title	Burden Hours
81-40	Worksheet-Contents-Personal Property	2.5 Hours
81-41	Worksheet-Building	2.5 Hours
81-41A	Worksheet-Building (Cont'd)	1.0 Hours
81-42	Proof of Loss	.08 Hours
81-42A	Increased Cost of Compliance	2.0 Hours
81-43	Notice of Loss	.07 Hours
81-44	Statement as to Full Cost to Repair or Replacement Cost Coverage, Subject to the Terms and Conditions of this Policy	.10 Hours
81-57	National Flood Insurance Program Preliminary Report	.07 Hours
81-58	National Flood Insurance Program Final Report	.07 Hours
81-59	National Flood Insurance Program Narrative Report	.08 Hours
81-63	Cause of Loss and Subrogation Report	1 Hour
81-96	Manufactured (Mobile) Home/Travel Trailer Worksheet	.50 Hours
81-96A	Mobile Home/Travel Trailer Worksheet (Continued)	.25 Hours
81-98	Increased Cost of Compliance (ICC) Adjuster Report	.42 Hours
81-109	Adjuster Preliminary Damage Assessment	.25 Hours
81-110	Adjuster Certification Application	.25 Hours

E Sample Letters of Determination

- Letter to Notify Property Owners of a Determination That Work Constitutes Substantial Improvement
- Letter to Notify Property Owners of a Determination That Work Constitutes Repair of Substantial Damage
- Letter to Notify Property Owners of a Determination That Work Does NOT Constitute Repair of Substantial Damage

Sample Letter to Notify Property Owners of a Determination That Work Constitutes Substantial Improvement

Notice of Substantial Improvement Determination (Residential)

Dear Property Owner:

We have reviewed your recent application for a permit to [describe proposed improvement/addition] your existing home that is located in a mapped Special Flood Hazard Area. As required by our floodplain management regulations and/or building code, we have determined that the proposed work constitutes substantial improvement of the building. This determination is based on a comparison of the cost estimate of the proposed work to the market value of the building (excluding land value). When the costs equal or exceed 50 percent of the market value of the building, the work is substantial improvement.

As a result of this determination, you are required to bring the building into compliance with the flood damage-resistant provisions of the regulations and/or code [cite pertinent sections].

We would be pleased to meet with you and your designated representative (architect/builder) to discuss how to bring your home into compliance. There are several aspects that must be addressed to achieve compliance. The most significant requirement is that the lowest floor, as defined in the regulations/code, must be elevated to or above the base flood elevation (BFE) [or the elevation specified in the regulations/code]. You may wish to contact your insurance agent to understand how raising the lowest floor higher than the minimum required elevation can reduce NFIP flood insurance premiums.

Please resubmit your permit application along with plans and specifications that incorporate compliance measures. Construction activities that are undertaken without a proper permit are violations and may result in citations, fines, or other legal action.

Sample Letter to Notify Property Owners of a Determination That Work Constitutes Repair of Substantial Damage

Notice of Substantial Damage Determination (Residential)

Dear Property Owner:

We have reviewed your recent application for a permit to repair your existing home that was damaged by [insert cause of damage]. The building is located in a mapped Special Flood Hazard Area. As required by our floodplain management regulations and/or building code, we have determined that the building has been substantially damaged. This determination is based on a comparison of the cost estimate of the work required to restore the building to its pre-damage condition to the market value of the building (excluding land value). When the cost to repair equals or exceeds 50 percent of the market value of the building, the work is repair of substantial damage.

As a result of this determination, you are required to bring the building into compliance with the flood damage-resistant provisions of the regulations and/or code [cite pertinent sections].

We would be pleased to meet with you and your designated representative (architect/builder) to discuss how to bring your home into compliance. There are several aspects that must be addressed to achieve compliance. The most significant requirement is that the lowest floor, as defined in the regulations/code, must be elevated to or above the base flood elevation (BFE) [or the elevation specified in the regulations/code]. You may wish to contact your insurance agent to understand how raising the lowest floor higher than the minimum required elevation can reduce NFIP flood insurance premiums.

If the damage was caused by flooding and if you have a flood insurance policy from the National Flood Insurance Program, you should contact your adjuster to discuss the Increased Cost of Compliance (ICC) coverage. This coverage may provide a claim payment to help pay for work required to bring your home into compliance. Your adjuster can explain that the ICC claim may also be used to pay certain costs associated with demolishing and rebuilding your home, or moving your home to a site outside of the floodplain.

Please resubmit your permit application along with plans and specifications that incorporate compliance measures. Construction activities that are undertaken without a proper permit are violations and may result in citations, fines, or other legal action.

Sample Letter to Notify Property Owners of a Determination That Work Does NOT Constitute Repair of Substantial Damage

Notice of Determination (Residential)

Dear Property Owner:

We have reviewed your recent application for a permit to repair your existing building that was damaged by [insert cause of damage]. The building is located in a mapped Special Flood Hazard Area. As required by our floodplain management regulations and/or building code, we have determined that the work proposed to repair the damage does not constitute repair of substantial damage. This determination is based on a comparison of the cost estimate of the work required to restore the building to its pre-damage condition to the market value of the building.

Please be advised that we will make another determination if you elect to perform work other than what is necessary to repair the damage, such as additional renovations or upgrades or building an addition. Construction activities that are undertaken without a proper permit are violations and may result in citations, fines, or other legal action.

FEMA

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