GUIDE FOR COMMUNITIES PARTICIPATING IN THE NATIONAL FLOOD INSURANCE PROGRAM IN ARKANSAS

VOLUME 3

NFIP REQUIREMENTS
ORDINANCE ADMINISTRATION
SUBSTANTIAL IMPROVEMENT/DAMAGE

(Chapters 5, 6, 7 and 8)

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March 2008

TO: LOCAL FLOODPLAIN ADMINISTRATOR
of Communities Participating in the National Flood Insurance Program

Flooding continues to be a major problem for communities in Arkansas. Through the National Flood Insurance Program (NFIP), many citizens can now insure their property against flood losses. At the same time, future losses can be reduced by proper management of flood-prone areas.

This guide is intended to assist local officials of communities, which are participating in the NFIP, in managing their floodplains. Further assistance may be obtained by contacting the Arkansas Natural Resources Commission.

We acknowledge the assistance of the Federal Emergency Management Agency (FEMA), through the Community Assistance Program - State Support Services Element, in the preparation of this guide. Through such programs the efforts of Federal, State and Local governments can be effective in reducing future flood losses.

J.Randy Young, P.E., Executive Director

ORIENTATION

A. INTRODUCTION

This guide is contained in four (4) volumes. Chapters are numbered consecutively throughout the document. The Orientation and Table of Contents are repeated at the beginning of each volume.

This guidebook is intended to provide Floodplain Administrators and other local officials with tools in managing development in the floodplain as a participating community in the National Flood Insurance Program (NFIP). Any questions should be directed to the Floodplain Management Program of the Arkansas Natural Resources Commission (ANRC). Floodplain Administrators should read through this guide to familiarize themselves with its contents.

Each floodplain administrator should become familiar with the community's floodplain management regulations, usually contained in the form of an ordinance, code or some combination.

The evaluation of development permits is also very important. Special attention should be given to non-structural developments, such as placement of fill and alterations of stream channels, and to the "floodway" requirements. Some communities have separate "floodway" maps and Flood Insurance Study (FIS) booklets. Some have "floodways" included on the Flood Insurance Rate Maps (FIRMs). Generally, if the FIRM has "base flood elevations" on any part of the floodplain, the community has a "floodway " map.

Remember, that how the floodplain administrator conducts his or her business can have significant consequences for property owners and occupants of the floodplain. Whether it's savings on a flood insurance bill or protection from a flood, there will come a time when conscientious floodplain management will be rewarded.

The responsibility for reducing flood losses is shared by all units of government - local, state and federal - and the private sector.

Fulfilling this responsibility depends on having the knowledge and skills to plan and implement needed floodplain management measures. The fundamental floodplain management program that most others are built on is the National Flood Insurance Program (NFIP).

The NFIP provides the maps and regulatory basis for local floodplain management. It is also the primary source of insurance protection for flood-prone properties. Its success depends on the people responsible for administering its mapping, regulatory and insurance aspects.

This document can serve two purposes. First, it can be used as a study guide to enhance the knowledge and skills of local officials responsible for administering and enforcing local floodplain management regulations. It is also intended to broaden their understanding of floodplain management strategies that can be applied at the local level.

Second, the study guide can be used as a desk reference that you can refer to when specific issues arise as you implement your floodplain management ordinance. Guidance is included on how to handle many of these issues and information provided that will help you explain the requirements to citizens of your community. References are included on where to find more information or guidance on many issues. The FEMA documents that are referenced are available from the FEMA Distribution Center at 1-800-480-2520. The address is: Federal Emergency Management Agency, Attention: Publications, PO Box 2012, Jessup, MD 20794-2012. Most of these publications can also be can be downloaded from the FEMA website, http://www.fema.gov.

While any interested person may use this study guide and desk reference, it is written specifically for the local official who is responsible for administering his or her community's floodplain management regulations. Thus, references to "you," assume that you are a local official.

STUDY GUIDE OBJECTIVES

Upon completing this study guide, you should:

1. Be familiar with flood hazards and how human development interacts with the natural process of flooding.

2. Understand the purpose of the NFIP and your community's role in it.

3. Understand the basis for flood maps and data.

4. Be able to use floodplain studies and maps to support your floodplain management program.

5. Be able to explain the minimum regulatory requirements of the NFIP.

6. Be familiar with additional regulatory standards that your community could adopt.

7. Understand your responsibilities in administering your community's floodplain regulations for new construction.

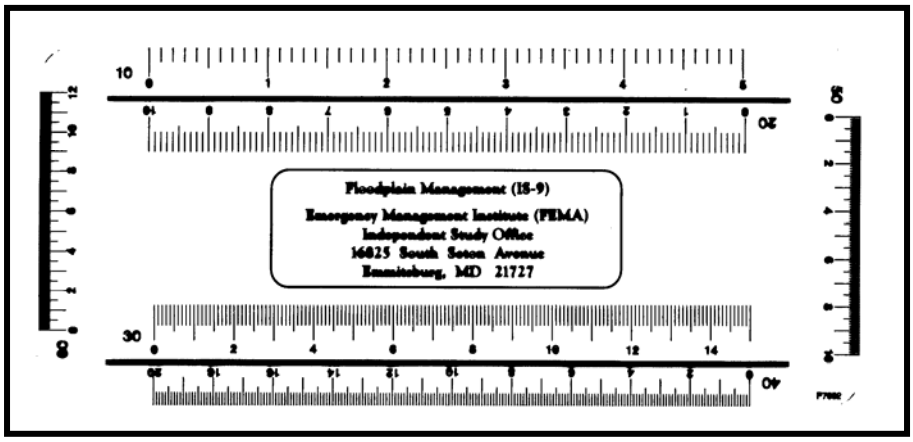
8. Understand how to administer your community's floodplain regulations for repairs and improvements to existing buildings.

9. Be familiar with how flood insurance policies are written and how they relate to your community's regulations.

10. Be prepared to administer your floodplain regulations following a disaster.

These 10 objectives are the topics of the chapters in this study guide.

Engineers Scale. You should obtain a clear plastic engineer's scale or similar measuring devise for use in several of the exercises in Volume 4, Appendix H, of this study guide and for day-to-day implementation of your ordinance. A scale helps convert measurements on a map to distance on the ground.



B. USING THE STUDY GUIDE

To administer a floodplain management program, you need to know about regulations and procedures under the National Flood Insurance Program. This study guide is designed to prepare you to serve as your community's floodplain management administrator. As you can tell by the number and size of these volumes, you need to acquire a daunting amount of information. Most of what you need is covered in these pages, as these documents are a comprehensive guide to the NFIP and your role as administrator. By design, this study guide will help you learn. Key words and phrases appear with underlines and they are listed in the glossary in Appendix D. Each chapter has frequent learning checks and a comprehensive review at the end. Be sure to do all of these – you learn best when you practice using the materials. The study guide does not have an index. However, each of the ten chapters covers a specific topic or area. At the beginning of each volume is a detailed Tables of Contents. You should be able to find where an issue is addressed in the study guide by scanning the Table of Contents. Special "Arkansas Inserts" supplement the main text.

WHERE TO GET HELP

For help in understanding any of the course content, contact your FEMA Regional Office or NFIP State Coordinator. These offices are listed in Appendices A and B.

C. ACKNOWLEDGMENTS

This study guide and desk reference is based on **FEMA Publication 480: National Flood Insurance Program (NFIP) Floodplain Management Requirements: A Study Guide and Desk Reference for Local Officials.** The FEMA document has been expanded by including information specific to Arkansas. Detailed discussions of coastal floodplains and other topics which do not affect Arkansas have also been omitted. Still, the increase in number of pages has led to a division of the single volume guide into four (4) volumes.

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CHAPTER 5
THE NFIP FLOODPLAIN MANAGEMENT REQUIREMENTS

A. THE NFIP'S REGULATIONS

For a community to participate in the National Flood Insurance Program, it must adopt and enforce floodplain management regulations that meet or exceed the minimum NFIP standards and requirements. These standards are intended to prevent loss of life and property, as well as economic and social hardships that result from flooding.

The NFIP standards work – as witnessed during floods in areas where buildings and other developments are in compliance with them. Nationwide each year, NFIP-based floodplain management regulations help prevent more than $1 billion in flood damages.

This chapter focuses on the minimum NFIP criteria. In some instances, more restrictive state standards may exist, and they must also be met by communities in the NFIP. They are the subject of the next chapter.

NFIP REGULATIONS

The NFIP requirements can be found in Chapter 44 of the ***Code of Federal Regulations*** **(44 CFR)**. Revisions to these requirements are first published in the ***Federal Register***, a publication the Federal Government uses to disseminate rules, regulations and announcements.

Most of the requirements related to your community's ordinance are in Parts 59 and 60. These are included in Appendix E along with the mapping regulations of Parts 65 and 70.

Figure 5-1 shows how the regulations are organized. The sections are referred to in shorthand, such as 44 CFR 60.1 - Chapter 44, ***Code of Federal Regulations***, Part 60, Section 1. In this course, excerpts are shown in boxes:

> **44 CFR 59.2(b)** To qualify for the sale of federally-subsidized flood insurance a community must adopt and submit to the **Administrator** as part of its application, flood plain management regulations, satisfying at a minimum the criteria set forth at Part 60 of this subchapter, designed to reduce or avoid future flood, mudslide (i.e., mudflow) or flood-related erosion damages. These regulations must include effective enforcement provisions.
>
> **NOTE: Administrator** in the Federal Register refers to the Federal Insurance Administrator.

As noted in Chapter 2, when your community joined the NFIP, it agreed to abide by these regulations. When your community's FIRM was published, it had to submit its ordinance to FEMA to ensure that it met these requirements.

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Subpart A—Requirements for Flood Plain Management Regulations

60.1 Purpose of subpart
60.2 Minimum compliance with floodplain management criteria
60.3 Floodplain management criteria for floodprone areas
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(b) When there is a map, but not flood elevations
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60.4 Floodplain management criteria for mudslide (i.e., mudflow)-prone areas
60.5 Floodplain management criteria for flood-related erosion-prone areas.
60.6 Variances and exceptions
60.7 Revisions of criteria for floodplain management regulations
60.8 Definitions

Subpart B—Requirements for State Floodplain Management Regulations

Subpart C—Additional Considerations in Managing Flood-Prone, Mudslide (i.e., Mudflow)-Prone, and Flood-Related Erosion-Prone Areas

Figure 5.1. 44 CFR Parts 59 and 60

Many state NFIP coordinators have prepared model flood damage prevention ordinances to assist communities in meeting the NFIP requirements, so it is likely that your community adopted an ordinance based on the state model. The Arkansas model ordinance is included in this volume.

NOTE: Periodically, the NFIP regulations are revised to incorporate new requirements or clarify old ones. These changes are published in the Federal Register. Some revisions require local ordinance amendments. Your community may or may not have made the amendments needed to stay updated. Before you complete this chapter, you should check with your state NFIP coordinator or FEMA Regional Office to verify that your ordinance is currently in full compliance with the latest NFIP

COMMUNITY TYPES

NFIP regulations identify minimum requirements that communities must fulfill to join and stay in the program. The requirements that apply to a particular community depend on its flood hazard and the level of detail of the data FEMA provides to the community. The specific requirements are in Section 60.3, and apply to communities as follows:

- 60.3(a) FEMA has not provided any maps or data.
- 60.3(b) FEMA has provided a map with approximate A Zones
- 60.3(c) FEMA has provided a FIRM with base flood elevations
- 60.3(d) FEMA has provided a FIRM with base flood elevations and a map that shows a floodway

Two important notes:

The NFIP requirements are minimums. As noted in 44 CFR 60.1(d), "Any floodplain management regulations adopted by a State or a community which are more restrictive than the criteria set forth in this part are encouraged and shall take precedence."

These requirements are cumulative. A 60.3(c) community must comply with all appropriate requirements of sections 60.3(a) and (b). For example, 60.3(a) includes basic requirements for subdivisions and utilities that are not repeated in the later sections. *All* communities in the NFIP must comply with these subdivision and utility requirements.

For example, a 60.3(c) community must use the base flood elevations provided on the FIRM. If that community has an approximate A Zone without a BFE, it must comply with the requirements of 60.3(b) for that area.

The rest of this chapter explores the requirements of 44 CFR 60.3. It is organized by subject matter, so it will not correspond with the sections in 44 CFR. Where appropriate, the specific section numbers are referenced.

You should be able to identify where the requirements discussed in this chapter appear in your ordinance. If you cannot find a specific reference or if you are not comfortable with your ordinance's regulatory language, contact your state NFIP coordinator or FEMA Regional Office. FEMA and your state will expect you to enforce these minimum requirements as agreed to. If you don't think your ordinance language is clear or up to date, you should consider an amendment to remove any doubt.

This chapter covers the minimum requirements for participation in the NFIP. As noted, communities are encouraged to enact regulatory standards that exceed these minimums and that are more appropriate for local conditions.

The Community Rating System (CRS) is a part of the NFIP that rewards communities that implement programs that exceed the minimums. It is explained in more detail in Chapter 9, Section C. Where provisions that can receive CRS credit are mentioned in this course, they are highlighted with the CRS logo.

B. MAPS AND DATA

Flood maps and flood data were discussed in Chapters 3 and 4. This section builds on that information, covering the NFIP requirements as to when and how a community must use those maps and data.

Basic rule #1: Check to make sure you have the latest flood maps and data published by FEMA. You must use the latest maps to administer your floodplain management ordinance.

NFIP MAPS AND DATA

A community must adopt and enforce floodplain management regulations based on data provided by FEMA (44 CFR 60.2(h)). This includes the floodplain boundaries, base flood elevations, FIRM zones and floodway boundaries shown on your current Flood Insurance Rate Map, Flood Boundary Floodway Map and/or Flood Insurance Study.

> 44 CFR 60.2(h): The community shall adopt and enforce flood plain management regulations based on data provided by the [Federal Insurance] Administrator. Without prior approval of the Administrator, the community shall not adopt and enforce flood plain management regulations based upon modified data reflecting natural or man-made physical changes.

This requirement does not prevent a community from adopting and enforcing regulations based on data more restrictive than that provided by FEMA. For example, a community may want to regulate to an historical flood which was higher than the BFEs shown on the FIRM. However, such data must be approved by the FEMA Regional Office before it is used.

This requirement also does not prevent a community from using other technical data to identify and regulate floodprone areas not shown on FEMA maps. For example, many cities and urban counties map and regulate areas on small tributary streams that are not shown on the FIRM.

The community always has a say in what the latest maps and data should be. FEMA will send you proposed revisions to the official FIRM and you will have time to review them and submit your comments to FEMA before they are published. You also have a formal 90-day appeals period during which to submit your appeals before BFEs are made final. If you disagree with the FEMA data at any time and have scientific or technical data to support your position, you should submit a request for a map revision as noted in Chapter 4, Section D, ***Maintaining and Revising NFIP Maps***.

Annexations: If a property is in a recently annexed area that does not show up on your community's map, use the county's map and base flood elevations (BFEs) to determine the flood protection requirements. In fact, you should formally adopt the county's FIRM in your ordinance to strengthen your basis for regulating areas not currently shown on your FIRM.

Exceptions: The basic rule does not cover every situation. Four occasions where a community may vary from the effective FIRM and other data provided by FEMA are:

- When the FEMA data disagree with ground elevations.
- When the FEMA data are insufficient. This occurs in approximate A Zones where base flood elevations and floodway boundaries are not provided with the FIRM.
- When FEMA has provided draft revised data.
- When FEMA provides "advisory" flood hazard data.

These situations are discussed below.

Note: these situations only apply to the use of flood data for floodplain management purposes. Insurance agents and lenders must use the current FIRM when determining insurance rates and whether flood insurance is required. If a person wants to vary from the current FIRM to obtain different premium rates or to not have to purchase a flood insurance policy, the FIRM must be officially revised or amended.

WHEN FIRM AND GROUND DATA DISAGREE

The BFEs published in the Flood Insurance Study set the level for flood protection purposes. The maps are a graphic portrayal of that information.

Since FEMA usually does not have detailed topographic mapping to use in preparing the flood maps, the flood boundaries are interpolated between cross sections using whatever topographical information is available. This can result in inaccuracies in drawing the boundaries on the map.

The BFE in relation to the actual ground elevation sets the floodplain limits for regulatory purposes. When ground surveys show that a development site is above the BFE, you can record the data and issue the permit. Then, if the developer or owner wants the property removed from the Special Flood Hazard Area designation, he or she can request a Letter of Map Amendment or LOMA.

It is up to them to apply for a map change, not you. The procedure is discussed in Chapter 4, Section D.

Conversely, if site surveys show that areas considered outside the 100-year floodplain on published maps are in fact below the BFE, you should require protection of new buildings to the BFE. Even though a site may be technically outside the mapped SFHA, you are not doing future occupants any favors by ignoring the known flood hazard.

REGULATING APPROXIMATE A ZONES

The second occasion where you may vary from the data provided by FEMA is in approximate A Zones. Approximate A Zones are those areas not studied by the detailed hydrologic/hydraulic methods. These areas are shown as “unnumbered A zones” on the FIRM and “approximate 100-year flood zones” on the Flood Boundary Floodway Map. The FIS will not contain specific base flood elevations for approximate study areas nor will there be a floodway/fringe designation on the FBFM.

> ***44 CFR 60.3(b)*** *When the Administrator has designated areas of special flood hazards (A zones) by the publication of a community's FHBM or FIRM, but has neither produced water surface elevation data nor identified a floodway or coastal high hazard area, the community shall:…*
>
> > ***(3)*** *Require that all new subdivision proposals and other proposed developments (including proposals for manufactured home parks and subdivisions) greater than 50 lots or 5 acres, whichever is the lesser, include within such proposals base flood elevation data;*
> >
> > ***(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 …*

Regulating development in approximate or unnumbered A Zones is one of the tougher jobs you’ll face, especially in counties that have large areas of such zones. 44 CFR Section 60.3(b)(4) requires that you make every effort to use any flood data available in order to achieve a reasonable measure of flood protection. Further, many states and local ordinances require a base flood elevation before a permit can be issued for any development.

Here are some tips in obtaining data needed for unnumbered A Zones. Whichever method you use, be sure to record on the permit records where the flood elevation came from. This will help you be consistent with future development in the same area.

- Check with your state NFIP coordinator. Some states have regulations or guidance on how to obtain regulatory data. Some have repositories of data or may help conduct a new study.
- Check with local flood control, sanitary or watershed districts. Like state agencies, they may have their own programs for developing new flood data.
- If a body of water forms a boundary between two communities, the community on the other side may have a detailed study. Such base flood data are valid for both sides of a body of water.

- Ask the U.S. Army Corps of Engineers, U.S. Department of Agriculture/Natural Resources Conservation Service, or U.S. Geological Survey if they have knowledge of any flood studies, unpublished reports, or any data that may pertain to the area in question.
- If the property is along a stream that is near state highway structures such as bridges or culverts, the state highway department may have done a flood study to properly size the structure.
- If the property is on a river with a power-generating dam, the dam owner may have had to conduct a study for federal licensing.
- See if your engineer or the developer will conduct a study to calculate BFEs.

Data obtained from one of these other sources should be used as long as they:

- Reasonably reflect flooding conditions expected during the base flood,
- Are not known to be technically incorrect, and
- Represent the best data available.

The FEMA publication ***Managing Floodplain Development in Approximate Zone A Areas: A Guide for Obtaining and Developing Base (100-Year) Flood Elevations*** provides information on a number of methodologies for developing BFEs in approximate A zones. These methodologies range from detailed methods that produce BFEs and perform floodway analyses similar to those developed for a Flood Insurance Study to simplified methods that can be used in isolated areas where more costly studies cannot be justified.

If your community has approximate A Zones that are likely to be developed, you should get a copy of this document and have your engineer review it. You can also download **FEMA's Quick-2** software for computing flood elevations from the FEMA flood hazard mapping website.

Small developments

If the project is an isolated building, such as a single-family home in an undeveloped area or a subdivision or other development that does not meet the thresholds in 44 CFR Section 60.3(b)(3), you still must ensure that the building is protected from flood damages by meeting the requirements of 44 CFR 60.3(a)(3). This paragraph requires you to determine if the site is reasonably safe from flooding and, if it is not, that you ensure the building is constructed with methods and practices that minimize flood damages and meets other construction requirements. In nearly all cases the only way to do this is to require that the building be elevated to above an elevation that you determine.

There are several possible ways of establishing this elevation:

- Walk the site with the property owner and find a site on high ground for the building. Sometimes by this method alone you can determine a safe building site or establish a safe building elevation, particularly in the floodplain of a small stream. Sometimes detailed topographic maps are available that may help.
- Use historical records or the flood of record (the highest known flood level for the area). It may be that a recent flood was close to the base flood. If records of the recent flood can be used, base your regulatory flood elevations on them (or add a foot or two to the historical flood levels to provide a margin of error). Before you do this, get a second opinion from your state NFIP coordinator, FEMA Regional Office or other agency that is familiar with the flood data you want to use.
- Require protection to a set elevation such as at least five feet above grade. Only use this approach if you feel confident that the five feet of elevation will provide adequate flood protection to the building.
- Require the permit applicant to develop a base flood elevation or develop one yourself using one of the methods in the FEMA publication ***Managing Floodplain Development in Approximate Zone A Areas: A Guide for Obtaining and Developing Base (100-Year) Flood Elevations.*** This will usually require the services of an engineer, but will be worth the additional expense if it is the only way to make sure the building is protected from flood damage. There are several methods of determining BFEs at varying costs and levels of detail.

The first three methods are not as good as requiring protection to a BFE. However, they may be more appropriate for small isolated projects where the costs of developing BFE information will be high relative to the cost of the building. The third approach will result in lower flood insurance rates than if the building had no protection, but the rates are not as favorable as they would be if a BFE were calculated. Examples of the possible rates are discussed in Chapter 9, Section B.

Larger developments

You are encouraged to discuss the flood hazard as early as possible in discussions with subdividers and developers of large areas. If a subdivision or planned chapter development will be partially in the floodplain, there may be ways to avoid building in the flood hazard area, which can save the developer the cost of a flood study.

> 44 CFR 60.3(b)(3): [Communities must] Require that all new subdivision proposals and other proposed development (including proposals for manufactured home parks and subdivisions) greater than 50 lots or 5 acres, whichever is the lesser, include within such proposals BFE data.

Any subdivision or other large development that meets this threshold must be evaluated to determine if the proposed site is in an approximate A Zone and whether BFEs are required. If BFEs are required, the developer must conduct the required study (the community, state or other agency may provide assistance). While the study must provide BFEs, you may want to require a floodway delineation and inclusion of other data needed to ensure that the building sites will be reasonably safe from flooding.

BFE data are required for the affected lots in the subdivisions shown in **Figure 5-2** and **Figure 5-3**. **Figure 5-2** shows a 76-lot subdivision with several lots clearly affected by an approximate Zone A area. The subdivision depicted in **Figure 5-3** is only 12 lots, but BFEs are required because the subdivision covers more than five acres and clearly shows buildable sites affected by an approximate Zone A area.

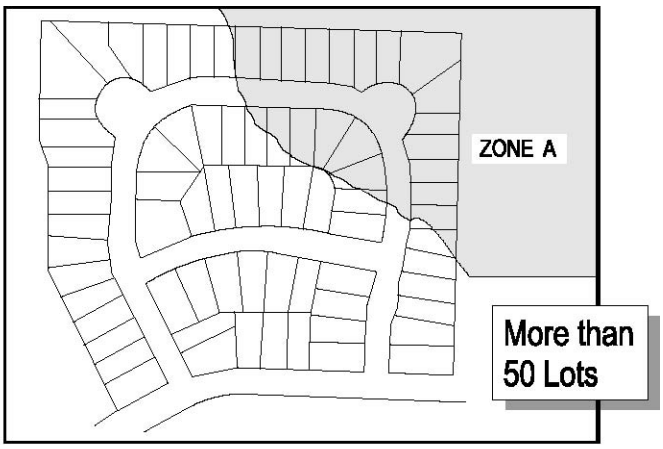


Figure 5-2: Proposed 76-lot subdivision

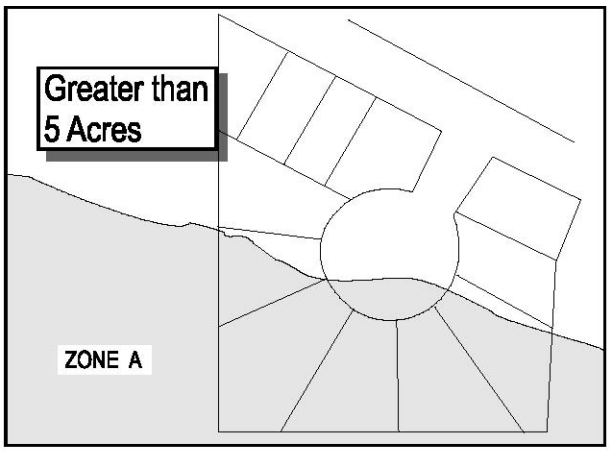


Figure 5-3: Proposed 6.7-acre subdivision

In **Figure 5-4**, the entire approximate Zone A area is to be left as open space. If the planned subdivision shows the floodplain is contained entirely within an open space lot, it may not be necessary to conduct a detailed engineering analysis to develop BFE data.

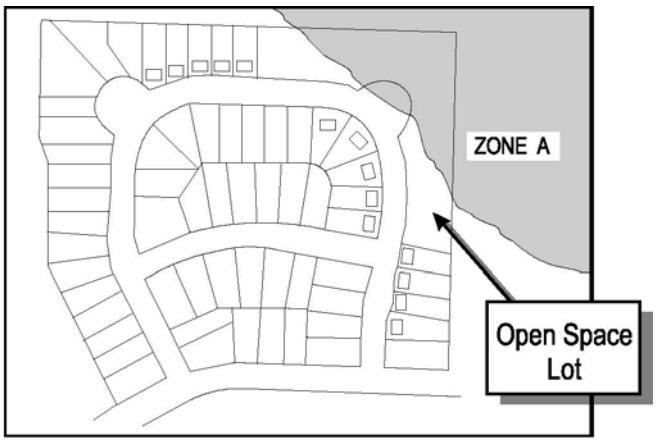


Figure 5-4: Proposed 76-lot subdivision

> ***44 CFR 65.3****: As soon as practicable, but not later than six months after the date such information becomes available, a community shall notify the Administrator of [map] changes by submitting technical or scientific data in accordance with this part.*

When a developer prepares a detailed flood study in an approximate A Zone, you must submit the new flood information to FEMA within six months. The community can pass that cost on to the developer by requiring that he or she submit a request for a Letter of Map Revision as a condition of approving the development.

> **See Volume 2, Arkansas Insert 2 for more information on obtaining or determining base flood elevations in approximate Zone A areas.**

NFIP/CRS

CRS credit is provided if BFEs, floodways and related regulatory data are provided in areas not mapped by the NFIP. This credit can be found in Activity 410, Section 411, of the ***CRS Coordinator's Manual*** or the *CRS Application*.

DRAFT REVISED NFIP DATA

The third situation where a community may vary from the official FEMA data is when FEMA has sent some preliminary data to the community for review. Communities are required to "reasonably utilize" the data from a draft or preliminary FIRM or flood insurance study.

Four scenarios are possible:

- Where the original FIRM shows an A Zone with *no* BFEs: Use the draft information. In the absence of other elevation or floodway data, the draft information is presumed to be the best available.
- Where the original FIRM shows an AE Zone *with* a BFE or floodway and the revision *increases* the BFE or *widens* the floodway: The draft revised data should be used. However, if the community disagrees with the data and intends to appeal, the existing data can be presumed to be valid and may still be used until the appeal is resolved.
- Where the original FIRM shows an AE Zone *with* a base flood elevation or floodway and the revision *decreases* the BFE or *shrinks* the floodway: The existing data should be used. Because appeals may change the draft data, the final BFE may be higher than the draft. If you were to allow new construction at the lower level as shown in the draft, the owners may have to pay higher flood insurance premiums.
- Where the original FIRM shows a B, C or X Zone: NFIP regulations do not require that the draft revised data be used. However, you are encouraged to use the draft data to regulate development, since these areas are subject to a flood hazard.

If the community intends to appeal preliminary data, it must be done during the official appeals period. Otherwise, you will have to wait for the new map to become official and submit a request for a map amendment or revision.

For more information on this issue, see ***Use of Flood Insurance Study (FIS) Data As Available Data*, FEMA Floodplain Management Bulletin 1-98**, available from FEMA.

CLOMRs: The above four scenarios are also relevant for a Conditional Letter of Map Revision or CLOMR. Note the *conditional* part of a CLOMR. A CLOMR provides that *if* a project is constructed as designed, the BFEs can be revised or modified (or the property in question can be removed from the SFHA) ***AFTER*** the as-built specifications are submitted ***AND*** the final LOMR is issued.

A permit cannot be issued based on a lower BFE proposed by a CLOMR until the final LOMR is issued. However, you can issue a permit for that part of the work not dependent on the changes that will result from the LOMR and condition the full permit upon receipt of the final LOMR.

ADVISORY FLOOD HAZARD DATA

Sometimes FEMA issues advisory data after a major flood where it was found that the FIRM and/or flood insurance study underestimated the hazard. This information is provided so communities can ensure that reconstructed buildings are protected from the true hazard, not the one shown on the FIRM.

When you receive such advisory information, you should “reasonably utilize” it. If your community agrees with the information, the ordinance should be revised to adopt it. If it disagrees with the data, you should be ready to explain why the community is not requiring construction and reconstruction to be protected. You and your community are not helping residents if you allow them to rebuild without protection from a known hazard.

For more information on this issue, see ***Use of Flood Insurance Study (FIS) Data As Available Data*, FEMA Floodplain Management Bulletin 1-98**.

C. PERMIT REQUIREMENTS

Permits are required to ensure that proposed development projects meet the requirements of the NFIP and your ordinance. Once a person applies for a permit, you can review the plans and make sure the project complies.

Basic rule #2: A permit is required for all <u>development</u> in the SFHA shown on your FIRM.

The first step, therefore, is to get people to apply for a permit.

DEVELOPMENT PERMIT

The NFIP requirements are keyed to "development" in the floodplain. "Development" means "any man-made change to improved or unimproved real estate." This includes, but is not limited to:

- Construction of new structures
- Modifications or improvements to existing structures
- Excavation
- Filling
- Paving
- Drilling
- Driving of piles
- Mining
- Dredging
- Land clearing
- Grading
- Permanent storage of materials and/or equipment

44 CFR 60.3(a)(1) *["60.3(a) communities" that do not have a FIRM must] Require permits for all proposed construction or other development in the community, including the placement of manufactured homes, so that it may determine whether such construction or other development is proposed within flood-prone areas;*

If you are a 60.3(a) community, you do not have a FIRM. Consequently, you must require a permit for all development projects throughout your community.

You must review each project's location to determine if it has a flood risk. If it does, the best way to protect a new building from flood damage is to obtain a BFE for the site and require that the building be elevated or protected to or above that BFE.

Building permits

Most communities have long had a system for issuing building permits, but many have not had a permit system for "development." Regulating all development in floodplains is essential because fill or other material can obstruct flood flows just as structures can.

Because a "building permit" often covers only construction or modifications of buildings, this study guide uses the term "development permit." You should check your permit system to ensure that in the floodplain, permits are being required for ***ALL*** projects that meet the definition of development, not just "building" projects. Make sure you regulate the following in addition to the traditional building projects:

- Filling and grading.
- Excavation, mining and drilling.
- Storage of materials.
- Repairs to a damaged building that do not affect structural members.
- Temporary stream crossings
- Activities by other government agencies, such as roads, bridges and school buildings

If your building permit system does not require permits for these activities, you need to revise your system, enact a new type of "development permit" or otherwise ensure that people apply for a permit for these non-building projects.

Small projects

You have some discretion to exempt obviously insignificant activities from the permit requirement, such as planting a garden, farming, putting up a mailbox or erecting a flagpole. You may also want to exempt routine maintenance, such as painting or re-roofing.

The key is whether the project will present a new obstruction to flood flows, alter drainage or have the potential to be a substantial improvement. These determinations can only be made by the permit official, not the builder, so make sure your exemptions are clear. There should be no possibility of a misunderstanding resulting in construction of a flood flow obstruction or a substantial improvement without a permit.

Some communities specifically exempt small projects in their ordinances. This is the recommended approach, as it avoids challenges that the permit official arbitrarily decides what projects need permits. Check with your state coordinating agency and/or FEMA Regional Office before you do this. You may be able to exempt projects (other than filling, grading or excavating) valued at less than, say, $500.

PERMITS FROM OTHER AGENCIES

44 CFR 60.3(a)(2) requires all NFIP communities to ensure that other federal and state permits have been obtained. You should not issue your local permit until you are certain that the other agencies' requirements are met.

The purpose of this requirement is to help assure that coordination occurs between various levels of government on projects impacting on floodplains. The requirement has the added benefit of protecting permit applicants by making sure they are aware of and obtain all of the permits necessary for a floodplain development prior to making irreversible financial investments. Permit applicants are not well served if they are allowed to proceed with a project only to have work stopped later by a Federal or State agency because they have not obtained proper permits.

Some communities allow their permit officials to issue the local permit on the condition that other required permits are obtained. However, this is not as effective as holding the local permit until the applicant can show that the other agencies have issued or will issue their permits.

Otherwise, the project may get under way before you are sure that it meets all legal requirements.

To implement this requirement, you're encouraged to develop a list of what permits are required in your jurisdiction. Your state NFIP coordinator should be able to help.

These development activities may require a state permit:

- Construction in floodways or other designated areas. Stream crossings or projects that affect navigable rivers.
- Installation of septic systems.
- Subdivision standards or subdivision plat or lot filing requirements.
- Manufactured housing (mobile home) park or tie-down requirements.
- Public health facilities, such as hospitals and nursing homes.
- Alteration of sand dunes.
- Operating a landfill or hazardous materials storage facility.

The more common federal regulations that may require a permit include:

- **U.S. Army Corps of Engineers Section 404** - permits for wetlands filling
- **U.S. Army Corps of Engineers Section 10** - permits for work in navigable waterways
- **U.S. Fish and Wildlife Service** - consultations required under Sections 7 and 10 of the Endangered Species Act of 1973.

You should also check with your county; sewer, sanitary or flood control district; water management district; and any other local or regional agency that may regulate certain types of development in the floodplain.

D. ENCROACHMENTS

Once a permit application is received and the proposed project is ready for review, the next job is to ensure that the project will not impose flood problems on other properties.

Basic rule #3: Development must not increase the flood hazard on other properties.

This is more of a concern in riverine situations where a project may dam or divert flowing water onto other properties or increase flood flows downstream. To prevent this, communities adopt floodways to designate those areas where flood flows are most sensitive to changes brought by development.

Communities must regulate development in these floodways to ensure that there are no increases in upstream flood elevations. For streams and other watercourses where FEMA has provided BFEs, but no floodway has been designated, the community must review developments on a case-by-case basis to ensure that these increases do not occur.

REGULATORY FLOODWAYS

44 CFR 59.1 *Definitions: "Regulatory floodway" means 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.*

As explained in Chapter 3, Section B, the floodway is the central portion of a riverine floodplain needed to carry the deeper, faster moving water. Buildings, structures and other development activities - such as fill - placed within the floodway are more likely to obstruct flood flows, causing the water to slow down and back up, resulting in higher flood elevations.

A floodway is included with most riverine Flood Insurance Studies (FIS) and will generally be shown on the Flood Insurance Rate Map (FIRM). Some of the older Flood Insurance Studies will have a separate floodway map. The community officially adopts its “regulatory floodway” in its floodplain management ordinance.

ENCROACHMENT REVIEW

All projects in the regulatory floodway must undergo an encroachment review to determine their effect on flood flows and ensure that they do not cause problems. Development projects in the flood fringe by definition do not increase flood heights above the allowable level, so encroachment reviews are not needed.

44 CFR 60.3(d)(3): [In the regulatory floodway, communities must] 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.

The objective of this requirement and the floodplain management ordinance is to ensure that the floodway is reserved to do its natural job: carrying floodwater. The preferred approach is to avoid all development there.

Once your community adopts its floodway, you must fulfill the requirements of 44 CFR 60.3(d). The key concern is that each project proposed in the floodway must receive an encroachment review, i.e., an analysis to determine if the project will increase flood heights. You may also want to require that this review determine if the project will cause increased flooding downstream. Note that the regulations call for preventing **ANY** increase in flood heights. This doesn't mean you can allow a foot or a tenth of a foot – it means zero increase. If you do not limit the increase to zero, small increases in flood heights from individual developments will cumulatively have significant impacts on flood stages and flood damages. Under NFIP minimum requirements, it is assumed that there will be no cumulative effects since the permissible rise for any single encroachment is zero.

Projects, such as filling, grading or construction of a new building, must be reviewed to determine whether they will obstruct flood flows and cause an increase in flood heights upstream or adjacent to the project site.

Projects, such as such as grading, large excavations, channel improvements, and bridge and culvert replacements, should also be reviewed to determine whether they will remove an existing obstruction, resulting in increases in flood flows downstream.

Your community may conduct the encroachment review, or you may require the developer to conduct it. Most local permit officials are not qualified to make an encroachment review, so most require that this be done by an engineer at the developer's expense.

As the permit reviewer, it is the community's job to ensure that an activity will not cause a problem. You have two options for doing this: For every project you could require the applicant's engineer to certify that there will be no rise in flood heights or you can make the determination for minor projects.

Encroachment certification: To ensure that the encroachment review is done right, you may want to require the developer to provide an encroachment certification. This is often called a **"no-rise" certification** because it certifies that the development project will not affect flood heights. An example of a form developed by the North Carolina state coordinating agency is shown in **Figure 5-5**.

The certification must be supported by technical data, which should be based on the same computer model used to develop the floodway shown on the community's map.

"NO-RISE" CERTIFICATION

This is to certify that I am a duly qualified registered professional engineer licensed to practice in the State of _____

It is further to certify that the attached technical data supports the fact that proposed _____ (Name of Development) will not impact the 100-year flood elevations, floodway elevations, or floodway widths on _____ ___ (Name of Stream) at published sections in the Flood Insurance Study for ____ _____(Name of Community) dated _____ (Study Date) and will not impact the 100-year flood elevations, floodway elevations, or floodway widths at unpublished cross-sections in the vicinity of the proposed development.

Attached are the following documents that support my findings:

_____

_____

Date: _____

Signature: _____

Title:_____ {SEAL}

Figure 5-5: Example no-rise certification

Although your community is required to review and approve the encroachment review, you may request technical assistance and review from the FEMA Regional Office or state NFIP Coordinator. If this alternative is chosen, you must review the technical submittal package and verify that all supporting data are included in the package before sending it to FEMA.

Minor projects: Some projects are too small to warrant an engineering study and the certification. Many of these can be determined using logic and common sense: a sign post or telephone pole will not block flood flows. Barbed wire farm fences that will be pushed over or ripped out early in the flood may also be permitted without a certification; however, larger more massive fences could be an obstruction to flood flows and may require an engineering study and certification. A driveway, road or parking lot at grade (without any filling) won't cause an obstruction, either.

Building additions, accessory buildings, and similar small projects can be located in the conveyance shadow. This is the area upstream and downstream of an existing building or other obstruction to flood flows. Flood water is already flowing around the larger obstruction, so the addition of a new structure will not change existing flood flow.

Determining the limits of the conveyance shadow is illustrated in **Figure 5-6**. Small structures located completely within the shadow can be permitted without the engineering analysis needed for a no-rise certification.

Note: Just because a small structure can be located in the conveyance shadow, it is still preferable to keep all development out of the floodway. Don't forget: all buildings must be elevated or otherwise protected from the base flood.

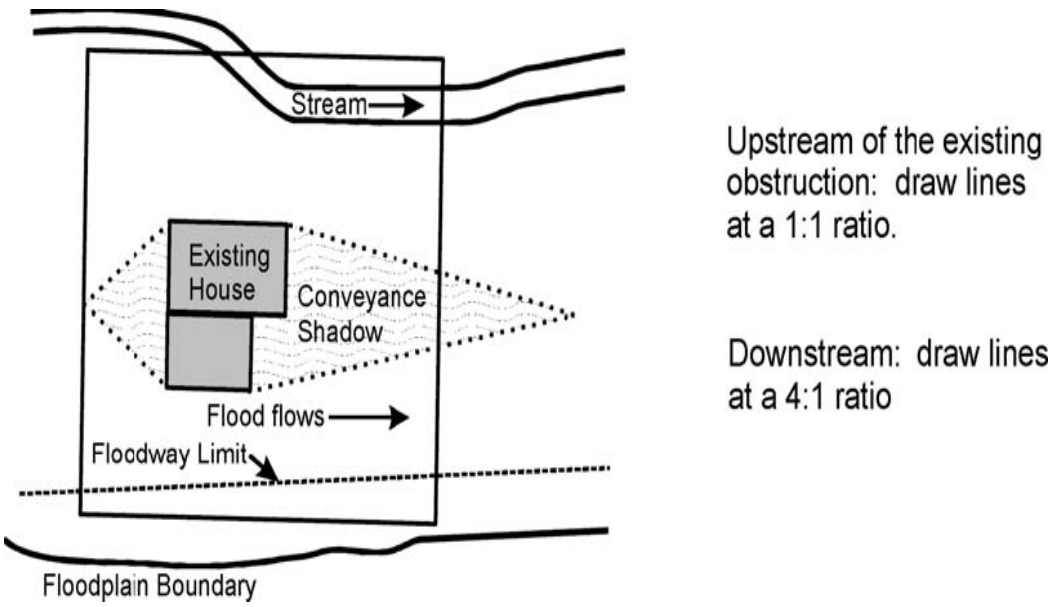


Figure 5-6. Determining the conveyance shadow

STREAMS WITHOUT FLOODWAY MAPS

If your community has a FIRM with base flood elevations along rivers or streams, but no mapped floodway, you must evaluate all development to ensure that it will not increase flood stages by more than one foot.

> **44 CFR 60.3(c)(10):** [Communities must] 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.

For the purposes of administering your ordinance, you should treat the entire riverine floodplain as a floodway. You should require the same encroachment certification to ensure that a development project will not obstruct flood flows and cause increased flooding on other property. This approach is recommended for all other riverine floodplains without a mapped floodway.

In riverine floodplains where no floodway has been designated, the review must demonstrate 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, and
- Is consistent with the technical criteria contained in Chapter 5 (Hydraulic Analyses) of the **Flood Insurance Study: Guidelines and Specifications for Study Contractors, FEMA-37, 1995**.

This review must be required for all development projects, although you may make the same judgments on minor projects as for floodways. You should pay particular attention to developments that may create a greater than one-foot increase in flood stages, such as bridges, road embankments, buildings and large fills.

Note: In some states, floodways are mapped based on allowing flood heights to increase by less than one foot. In those states, the encroachment certification must be based on that more restrictive state standard, not the FEMA standard that allows a one-foot rise.

ALLOWABLE INCREASES IN FLOOD HEIGHTS

In some situations, it may be in the public interest to allow increase in flood heights greater than those allowed under the NFIP regulations.

For example, it would be hard to build a flood control reservoir without affecting flood heights. Because a dam would have a major impact on flood heights, there needs to be a way to permit such projects, especially those that are intended to reduce flooding.

However, when the project will change the flood level, maps must be changed to reflect the new hazard.

> 44 CFR 60.3(d)(4) Notwithstanding any other provisions of § 60.3, a community may permit encroachments within the adopted regulatory floodway that would result in an increase in base flood elevations, provided that the community first applies for a conditional FIRM and floodway revision, fulfills the requirements for such revisions as established under the provisions of § 65.12, and receives the approval of the Administrator.

If your community proposes to permit an encroachment in the floodway or the floodplain that will cause increases in the BFE in excess of the allowable level, you're required to apply to the FEMA Regional Office for *conditional* approval of such action prior to permitting the project to occur.

As part of your application for conditional approval, you must submit:

- A complete application and letter of request for conditional approval of a change in the FIRM or a Conditional Letter of Map Revision (CLOMR), along with the appropriate fee for the change (contact the FEMA Regional Office for the fee amount).
- An evaluation of alternatives which, if carried out, would not result in an increase in the BFE more than allowed, along with documentation as to why these alternatives are not feasible.
- Documentation of individual legal notice to all affected property owners (anyone affected by the increased flood elevations, within and outside of the community) explaining the impact of the proposed action on their properties.
- Concurrence, in writing, from the chief executive officer of any other communities affected by the proposed actions.
- Certification that no structures are located in areas which would be affected by the increased BFE (unless they have been purchased for relocation or demolition).
- A request for revision of BFE determinations in accordance with the provisions of 44 CFR 65.6 of the FEMA regulations.

Upon receipt of the FEMA conditional approval of the map change and prior to approving the proposed encroachments, you must provide evidence to FEMA that your community's floodplain management ordinance incorporates the post-project condition BFEs.

E. NEW BUILDINGS IN A ZONES BUILDINGS

Basic rule #4: New, substantially improved or substantially damaged buildings must be protected from damage by the base flood.

In this course, the term “building” is the same as the term “structure” in the NFIP regulations. Your ordinance may use either term.

44 CFR 59.1 Definitions: "Structure" means, for flood plain management purposes, a walled and roofed building, including a gas or liquid storage tank, that is principally above ground, as well as a manufactured home.

The term “building” or “structure” does not include open pavilions, bleachers, carports and similar structures that do not have at least two rigid walls and a roof.

How to determine if a building is substantially improved or substantially damaged is discussed in Chapter 8. In this chapter, consider the term “building” as an all-encompassing term that includes substantial improvements and repairs of substantial damage to a building.

Residential and nonresidential buildings are treated differently. A residential building must have a higher level of protection - if it is to be built in the floodplain, it must be elevated above the BFE. Nonresidential buildings, on the other hand, may be elevated or floodproofed (made watertight below the BFE).

ELEVATION

44 CFR 60.3(c)(2) [Communities must] 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…

In Zones A1-A30, AE and AH, all new construction and substantial improvements of residential structures must be elevated so that the lowest floor (including the basement) is elevated to or above the BFE. This can be done in one of three ways:

- Elevation on fill.
- Elevation on piles, posts, piers or columns.
- Elevation on walls or a crawlspace.

Fill

Fill can be used by itself or in conjunction with other types of foundations to raise the lowest floor of a building above the BFE. However, restrictions to the use of fill apply in floodways where fill would cause an increase in flood.

Some communities require or encourage the use of fill to elevate residential buildings because they consider fill a safer construction method since the building itself is not in contact with floodwaters. Other communities limit the use of fill in the flood fringe to protect flood storage capacity or require compensatory storage, which is discussed in Chapter 6, Section C.

Where fill is the method of choice, it should be properly designed, installed in layers and compacted. Simply adding dirt to the building site may result in differential settling over time.

The fill should also be properly sloped and protected from erosion and scour during flooding. To provide a factor of safety for the building and its residents, it is recommended that the fill extend 10 – 15 feet beyond the walls of the building before it drops below the BFE.

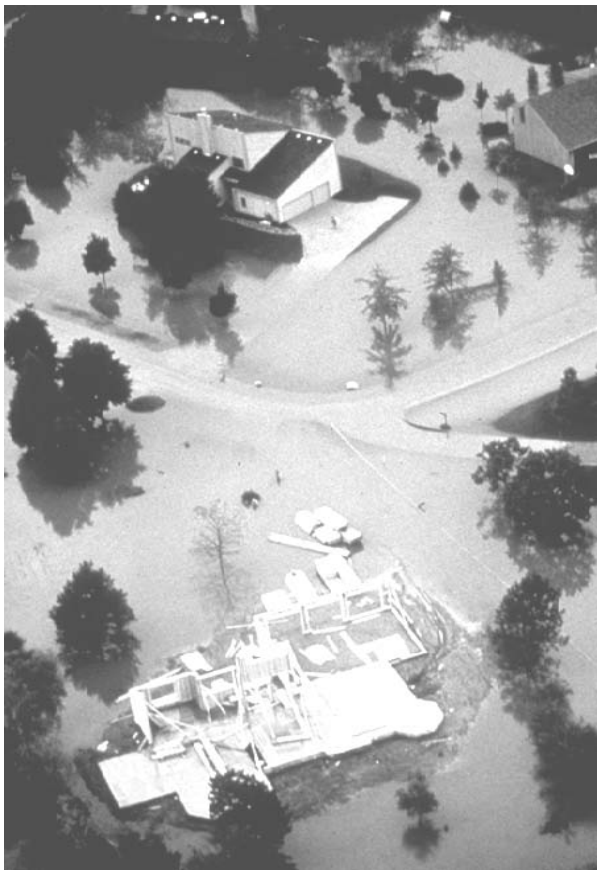


Figure 5-7. These two new buildings Elevated on fill were not damaged by This 100-year flood.

Piles, posts, piers or columns

Piles, piers, posts or columns are appropriate foundations for elevating buildings above the BFE where there is deeper flooding, fill is not feasible or not allowed, or for areas with high velocity flooding. Where flooding is likely to have high velocities or waves, leaving the area below the building free of obstruction with no lower area enclosure is preferred. As illustrated in **Figure 5-8**, this permits unrestricted flow of floodwater under the building. There will be less force applied to the building by floodwaters and less impact on flood heights than if solid walls were used.

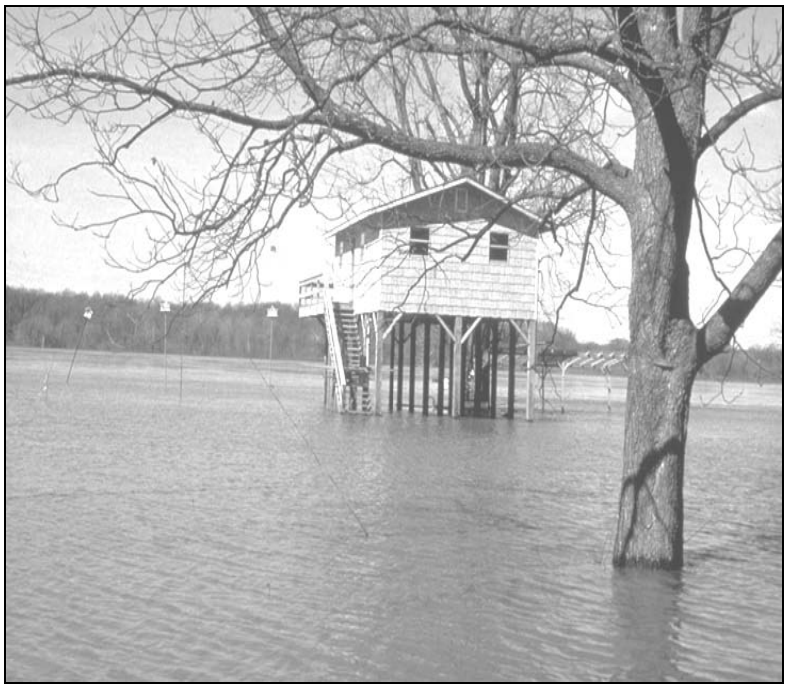


Figure 5-8. Elevation on piers

Walls or crawlspace

The third elevation technique is to build on solid walls. In shallower flooding areas, this elevation technique is the same as creating a crawlspace - a foundation of solid walls that puts the lowest floor above the flood level. In deeper flooding areas this often results in elevating the building a full story and creation of an enclosed area below the BFE.

When solid walls are used, care must be taken to ensure that hydrostatic or hydrodynamic pressure does not damage the walls. As discussed in Chapter 1, Section B, these water pressures can cause a solid wall to collapse damaging the elevated portion of the building.

There are two ways to prevent this:

- Stem walls can be used on two sides parallel to the flow of water. The other two sides are kept open (**Figure 5-9**). This minimizes the obstruction to floodwaters and lessens pressure on the foundation.
- The walls can be built with openings large enough to allow floodwaters to flow in and out, preventing differential pressures on the walls. Openings are required any time there is a fully enclosed area below the BFE. This is discussed in more detail in the later section on enclosures.

Figure 5-9. Building elevated on parallel stem walls

Figure 5-10. Building elevated on crawlspace with openings

When a crawlspace is used to elevate the building above the base flood elevation, it creates an enclosed area below the BFE that must meet all requirements that apply to enclosures including the openings requirement (see the sections of this Chapter on Enclosures and Openings). In addition the floor of the crawlspace must be at or above the lowest adjacent grade to the building to minimize hydrostatic pressures against the crawlspace walls and the ponding of water within the crawl space after a flood.

Recently FEMA issued a policy allowing communities to permit construction of crawlspaces with their floors below grade in the Special Flood Hazard Area (SFHA) under certain conditions. Communities that wish to allow below-grade residential crawlspace construction must require that the interior grade of the crawlspace is no more than two feet below the lowest adjacent grade, the height of the crawlspace measured from the interior grade of the crawlspace to the top of the crawlspace wall does not exceed four feet at any point, and the building meets other limitations. These communities must adopt these requirements as part of their floodplain management ordinance. Below-grade crawlspaces that meet these requirements will not be considered basements, but the buildings will still have higher flood insurance rates than if the same crawlspace had its floor at or above lowest adjacent grade.

Technical Bulletin 11-01 ***Crawlspace Construction for Buildings Located in Special Flood Hazard Areas*** provides a best practices approach for crawlspace construction. While communities may allow below-grade crawlspace construction, the Technical Bulletin continues to recommend that the interior of the crawl-space be backfilled so that the interior grade is level to or higher than the lowest adjacent grade (LAG) to the building. The Technical Bulletin offers appropriate considerations and guidance for below-grade crawlspace construction. Communities that wish to allow below-grade crawlspaces should refer to the Technical Bulletin for the specific requirements that must be incorporated into their floodplain management ordinance.

How high?

NFIP regulations require that the lowest floor of a building must be elevated above the BFE. Note three things about this minimum requirement:

1. The term "lowest floor" includes a basement because all usable portions of a building must be protected from flood damage.

2. The minimum requirement is to elevate to the BFE. In the next chapter, we will discuss freeboard, an extra margin of protection that requires the lowest floors to be one or more feet above the BFE.

> **44 CFR 59.1**. Definitions: "Lowest Floor" means the lowest floor of the lowest enclosed area (including basement). An unfinished or flood 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.

3. In A Zones, under the minimum NFIP requirement, the lowest floor is measured from the top of the floor (**Figure 5-11**). However, all portions of the building below the BFE must be constructed with flood resistant materials and building utility systems (including ductwork) must be elevated above the BFE or floodproofed (made watertight) to that elevation.

To meet these requirements, it is recommended that buildings on elevated foundations, such as piles or a crawlspace, have supporting beams or floor joists and building utility systems elevated to or above the BFE to protect them from flood damage. This is generally easier than using flood resistant materials for floor support systems or floodproofing building utility systems.

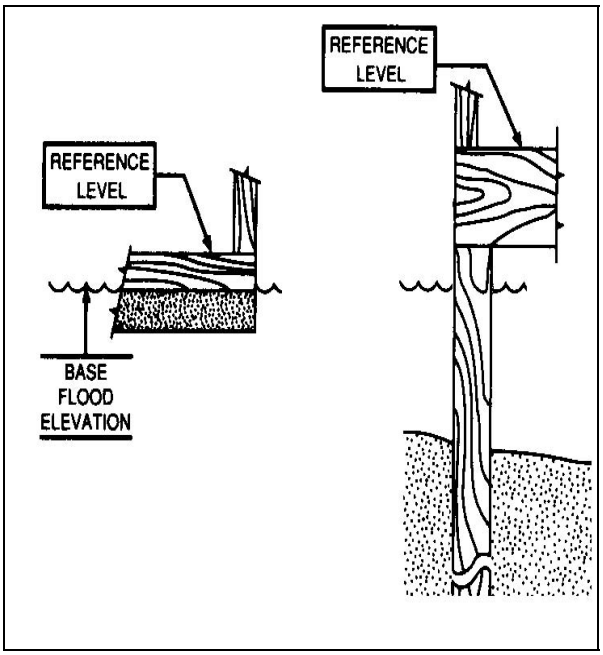


Figure 5-11. In A Zones: the top of the floor is the reference level

Elevation Certificate

Because most new buildings built in the floodplain are residences, elevating them is one of the most important requirements of the NFIP. To ensure that a building is elevated above the BFE, the lowest floor is surveyed and an elevation certificate is obtained and kept by the local permit office. This is discussed in more detail in Chapter 7, Section G.

ENCLOSURES

Enclosures are areas created by a crawlspace or solid walls that fully enclose areas below the BFE. They deserve special attention for two reasons:

- The walls of enclosed areas are subject to flood damage from hydrostatic and hydrodynamic forces.
- People are tempted to convert enclosures that are intended to be flooded into areas that can sustain damage in a flood.

NFIP regulations allow certain uses in enclosures below the BFE because they can be designed so that they are subject to minimal flood damage. Three uses are allowed:

- building access
- vehicle parking
- storage.

The storage permitted in an enclosed lower area should be limited to that which is incidental and accessory to the principal use of the structure. For example, if the structure is a residence, storage should be limited to items such as lawn and garden equipment, bicycles, and snow tires which either have a low damage potential or that can be easily moved to the elevated portion of the building if there is a flood.

The floodplain regulation requirements can be easier to accept if owners and builders are encouraged to think about the enclosed lower areas as usable space. If a building has to be elevated, say, five feet above grade, the owner should be encouraged to go up eight feet. This allows the lower area to be used for parking - and provides three extra feet of flood protection.

However, if the lower area is enclosed, there is a tendency for the owner to forget about the flood hazard and convert the enclosure to a bedroom or other finished room. This must be prevented.

Since floodwaters are intended to enter the enclosure - it must be built of flood-resistant materials (see the section on flood-resistant materials do determine which are acceptable). Not allowed are finishings such as carpeting, paneling, insulation (both cellulose and fiberglass) and gypsum wallboard (also known as drywall and sheet rock).

Utilities that serve the upper level also must be protected from flood damage. Consequently, a furnace cannot be put in an enclosure unless it is located above the BFE. This is explained in more detail in ***Engineering Principles and Practices for Flood Damage-Resistant Building Support Utility Systems*, FEMA 348, November 1999**. When the lower area enclosure is used to provide access to the upper level, a stairway can be designed that provides this access yet is resistant to flood damage. Installing an elevator is more difficult, but there are ways to design and install an elevator that will face minimal flood damage, as explained in ***Elevator Installation for Buildings Located in Special Flood Hazard Areas*, FIA-TB-4, FEMA 1993**.

Openings

As noted in Chapter 1, solid walls can collapse from hydrostatic pressure if floodwaters get too deep outside the building. To prevent this, an enclosure must have openings to allow floodwaters to enter and leave, thus automatically equalizing hydrostatic flood forces on both sides of the walls.

> **44 CFR 60.3(c)(5)** [Communities must] 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.

You can be sure the openings are adequate by using one of two methods.

The first method is to have the design meet or exceed the following three criteria:

1. The bottom of the openings must be no higher than one foot above grade (see Figure **5-12**).

2. The openings shall be installed on at least two walls of the enclosure to ensure that at least one will work if others get blocked or plugged.

3. Provide a minimum of two openings having a net area of not less than one square inch for every square foot of enclosed area that is subject to flooding. If the area of the enclosure is 1,000 square feet, the area of the openings combined must total at least 1,000 square inches.

   For example, removing a concrete block from a block wall results in an 8” x 16” or 128 square inches opening (see **Figure 5-12**). To determine how many openings would be needed, divide the square footage of the floor area by 128.

   Example 1: 1,280 square foot house = 10 inches/opening — 10 openings will be needed 128 square

   Example 2: 2,000 square foot house = 15.62 inches/opening — 16 openings will be needed 128 square

   If the opening is covered by a standard crawlspace vent cover or grate, the net area of the opening must be used and the number of openings increased accordingly. Net areas can be found on manufacturers specifications or estimated if specifications are not available.

The second method of meeting the requirement is to have the design certified by a registered professional engineer or architect as meeting the requirement to automatically equalize hydrostatic forces on exterior walls by allowing for the entry and exit of floodwaters. Under some circumstances it may be possible to vary the size or location of the openings based on this certification.

Openings may be equipped with screens, louvers, valves or other coverings or devices to keep animals out of the enclosure. However, any covering must permit the automatic flow of floodwater in both directions.

The opening sizes in the previous examples and in **Figure 5-12** are based on the size of standard crawlspace vents, which most building codes require to be installed in a crawlspace for ventilation purposes. Often these are located close to the floor in order to circulate air around the floor joists.

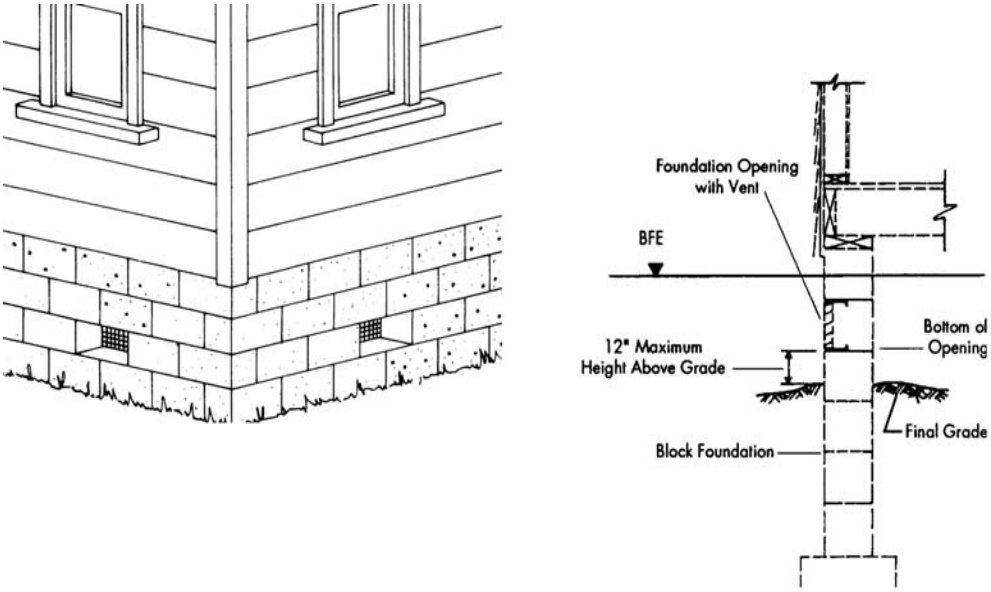


Figure 5-12. Opening locations in solid foundation wall

Air vents are located well above the ground in an elevated house and would not meet the NFIP requirement that the bottom of the opening be within one foot of grade. However, NFIP requirements and building codes can be satisfied by the same vents if they meet the three criteria listed above. There are special so-called “flood vents” which are designed to satisfy NFIP requirements. While they are not readily available at most hardware stores, suppliers are available on the Internet.

Garage doors cannot be used to satisfy this requirement because they do not permit the automatic flow of floodwaters. However, garage doors may have vents in them that meet the above criteria.

Openings are not required for stem wall foundations that have been backfilled with a concrete floor slab poured that is supported by the fill.

For further guidance, refer to ***Openings in Foundation Walls*, FIA-TB-1 (FEMA 1993)**.

Use

Enclosed areas are designed to be flooded and can be used only for parking vehicles, storage or access to the elevated living area - uses that can be designed so they are subject to little or no flood damage.

The type of storage permitted in an enclosed lower area should be limited to that which is incidental and accessory to the principal use of the structure. For instance, if the structure is a residence, the enclosure should be limited to storage of lawn and garden equipment, snow tires, and other low damage items, which can be conveniently moved to the elevated part of the building.

The interior portion of an enclosed area should not be partitioned or finished into separate rooms, except to separate the garage from the access and storage areas.

If a building is elevated eight feet or more, regulating the use of the enclosure presents special problems. Over time, the owner may forget the flood hazard and want to convert the floodable area into a finished room. Such an action would increase the flood damage potential for the building and violate the conditions of the building permit.

However, because the room is hidden behind walls, it can be very hard for the permit office to catch such a conversion. You should carefully check new building plans for signs, such as roughed in plumbing and sliding glass doors that indicate that the owner may expect to finish the area in the future. You should also clearly state on your permit what the limitations are on construction and use of the enclosed area.

One way to help prevent conversions is to have the owner sign a nonconversion agreement. An example developed by the North Carolina State NFIP Coordinator is in **Figure 5-13**.

This DECLARATION made this ___ day of _____, 20__, by _____ ("Owner") having an address at _____

WITNESSETH:

WHEREAS, the Owner is the record owner of all that real property located at _____ in the City of _____ in the County of _____, designated in the Tax Records as _____.

WHEREAS, the Owner has applied for a permit or variance to place a structure on that property that either (I) does not conform, or (2) may be noncompliant by later conversion, to the strict elevation requirements of Article _____ Section _____ of the Floodplain Management Ordinance of _____ ("Ordinance") and under Permit Number _____ ("Permit").

WHEREAS, the Owner agrees to record this DECLARATION and certifies and declares that the following covenants, conditions and restrictions are placed on the affected property as a condition of granting the Permit, and affects rights and obligations of the Owner and shall be binding on the Owner, his heirs, personal representatives, successors and assigns.

UPON THE TERMS AND SUBJECT TO THE CONDITIONS, as follows:

1. The structure or part thereof to which these conditions apply is: _____ _____.

2. At this site, the Base Flood Elevation is _____ feet above mean sea level, National Geodetic Vertical Datum.

3. Enclosed areas below the Base Flood Elevation shall be used solely for parking of vehicles, limited storage, or access to the building. All interior walls, ceilings and floors below the Base Flood Elevation shall be unfinished or constructed of flood resistant materials. Mechanical, electrical or plumbing devices shall not be installed below the Base Flood Elevation.

4. The walls of the enclosed areas below the Base Flood Elevation shall be equipped and remain equipped with vents as shown on the Permit.

5. Any alterations or changes from these conditions constitute a violation of the Permit and may render the structure uninsurable or increase the cost for flood insurance. The jurisdiction issuing the Permit and enforcing the Ordinance may take any appropriate legal action to correct any violation.

6. Other conditions: _____

   _____.

In witness whereof the undersigned set their hands and seals this _____ day of _____, 20 __.

_____ _____ (Seal)
Owner

_____ _____ (Seal)
Witness

Figure 5-13: Example Nonconversion agreement

FLOODPROOFING

Nonresidential buildings must be elevated or floodproofed. If they are elevated, they must meet the same standards as for residential buildings that were just reviewed. Elevation is the preferred method of flood protection because it is more dependable. Elevated commercial and industrial buildings can often be designed so that they can continue to operate during a flood reducing or eliminating business disruptions. Also, it will generally prove to be less expensive to elevate a non-residential building than to floodproof it. However, there will be situations where floodproofing may be the only feasible alternative for protecting a nonresidential building.

44 CFR 59.1. *Definitions: "Floodproofing" means any combination of structural and non-structural additions, changes, or adjustments to structures which reduce or eliminate flood damage to real estate or improved real property, water and sanitary facilities, structures and their contents.*

44 CFR 60.3(c)(3) *[Communities must] 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;*

44 CFR 60.3(c)(4) *[Communities must] Provide that where a non-residential structure is intended to be made watertight below the base flood level, (i) a registered professional engineer or architect shall develop and/or review structural design, specifications, and plans for the construction, and shall certify that the design and methods of construction are in accordance with accepted standards of practice for meeting the applicable provisions of paragraph (c)(3)(ii) or (c)(8)(ii) of this section, and (ii) a record of such certificates which includes the specific elevation (in relation to mean sea level) to which such structures are floodproofed shall be maintained with the official designated by the community under §59.22(a)(9)(iii);*

For the purposes of regulating new construction, floodproofing is defined measures incorporated in the design of the building so that below the BFE:

- Walls are watertight (substantially impermeable to the passage of water),
- Structural components can resist hydrostatic and hydrodynamic loads and effects of buoyancy, and
- Utilities are protected from flood damage.

Most floodproofing is appropriate only where floodwaters are less than three feet deep, since walls and floors may collapse under higher water levels.

A registered professional engineer or architect must prepare the building plans and certify the floodproofing measures, preferably using the **FEMA Floodproofing Certificate** form. This is discussed in more detail in Chapter 7, Section G.

Floodproofing techniques that require human intervention are allowed but should be discouraged. Human intervention means that a person has to take some action before the floodwater arrives, such as turn a valve, close an opening or switch on a pump. There are many potential causes of failure for these techniques, including inadequate warning time, no person on duty when the warning is issued, the responsible person can't find the right parts or tools, the person is too excited or too weak to install things correctly, and/or the electricity fails.

Before you approve plans for a building that relies on human intervention to be floodproofed, you should make sure that there are plans and precautions to keep such problems from occurring. Techniques that rely on human intervention should only be allowed in areas with adequate warning time and in situations where there will be someone present who is capable of implementing or installing the required measures.

More information on floodproofing can be found in **Chapter 6** and FEMA's **Technical Bulletin 3-93, *Non-Residential Floodproofing Requirements and Certification for Buildings Located in Special Flood Hazard Areas* (FIA-TB-3. 1993)**.

How high?

The minimum NFIP requirement is to floodproof a building *to the BFE*. However, when it is rated for flood insurance, one foot is subtracted from the flood-proofed elevation. Therefore, a building has to be floodproofed *to one foot above the BFE* to receive the same favorable insurance rates as a building elevated to the BFE. Chapter 9, Section B, discusses this in more detail.

BASEMENTS

For the purposes of the NFIP, a basement is defined as any area that is sub-grade on all sides. The "lowest floor" of a building with a basement is the top of the basement floor. Since the "lowest floor" of a residential building must be at or above the BFE, it will be highly unusual to construct a basement in a floodplain that meets these requirements.

44 CFR 59.1 Definitions: "Basement" means any area of the building having its floor subgrade (below ground level) on all sides.

Note that "walkout basements," "daylight basements" or "terrace levels" are usually subgrade on only three sides, with the downhill side at or above grade. Thus, they are not considered basements for either floodplain management or flood insurance rating purposes (but they are still the lowest floor of a building for floodplain management and insurance rating purposes). If these areas are used only for parking, access, or storage and they meet other ordinance requirements, they can be regulated as enclosures below an elevated building and not be considered the lowest floor of the building.

On the other hand, cellars, the lower level of a split-level or bi-level house, garden apartments and other finished floors below grade are considered basements under NFIP regulations.

Since the lowest floor of a residential building must be above the BFE, the only way to build a residential basement in the floodplain under NFIP minimum requirements is if it is elevated on fill and surrounded by fill. Floodproofed nonresidential basement are allowed, provided they meet the requirements discussed in the previous section on floodproofing.

BASEMENT EXCEPTIONS

A few communities have obtained exceptions to the NFIP regulations that allow them to permit floodproofed residential basements. The soil types and flooding conditions in these communities allow construction of floodproofed basements that are not subject to damage by hydrostatic or hydrodynamic forces.

A community may apply for an exception to allow floodproofed residential basements if it can demonstrate flood depths are less than five feet, velocities are less than five feet per second, there is adequate warning time for the site and it has appropriate construction requirements. This exception is explained in 44 CFR 60.6(c).

Buildings with floodproofed basements must have their design certified by a registered engineer or architect and are more difficult and more expensive to construct than buildings elevated above the BFE. Improperly designed or constructed basements can collapse or otherwise fail resulting in major damage to the structure.

BASEMENTS AND LOMR- F AREAS

It has become a common practice in some areas of the country to fill an area to above the BFE and then obtain a Letter of Map Revision based on fill (LOMR-F) to remove the land from the floodplain. Once the land is no longer in the floodplain, the builder obtains permits to build residences with basements below the BFE. This practice has raised a number of issues and concerns:

- The procedure was being used to get around community floodplain management ordinances.
- Buildings with basements below BFE were being built too close to the edges of these fills that could be subject to severe flood damage if the basement walls are subjected to hydrostatic pressure from surface water or groundwater during flooding.
- LOMR-Fs for nearly identical buildings were being granted or not granted based on the date the LOMR was applied for and not on the risk to the building.

FEMA issued a final rule on May 4, 2001 revising LOMR-F procedures to address these issues. The new procedure places responsibility back in the hands of the community by requiring that, before a LOMR-F is granted, the community sign a community acknowledgement form and make findings that:

- The project, including any buildings, meets all the requirements of the community's floodplain management ordinance, and
- Any existing or future development on the filled area is "reasonably safe from flooding".

FEMA will not act on a LOMR-F request without this acknowledgement.

44 CFR 65.2(c) "Reasonably safe from flooding" means that base flood waters will not inundate the land or damage structures to be removed from the SFHA and that any subsurface waters related to the base flood will not damage existing or proposed buildings."

FEMA has issued **Technical Bulletin 10-01** ***Ensuring That Structures Built on Fill In or Near Special Flood Hazard Areas Are Reasonably Safe From Flooding*** to provide guidance on how to make the determination that an area is "reasonably safe from flooding". The risk to buildings built in these areas will vary depending on soil conditions, the location of the building relative to the edge of the fill, and whether the building will have a basement below the BFE.

The safest method of constructing a building on filled land removed from the SFHA is to elevate the entire building above BFE. If basements are to be built in these areas, Technical Bulletin 10-01 provides a simplified method for determining whether those basements will be "reasonably safe from flooding".

Communities have asked for guidance on how they can ensure that future buildings placed on the property will be "reasonably safe from flooding" since, once the LOMR-F is issued, the land is no longer in the SFHA and generally is not subject to their floodplain management ordinance. Communities have several options they can use.

They can withhold signing the acknowledgement until the LOMR-F applicant provides sufficient information on the location and type of proposed buildings to evaluate those building sites against the criteria in Technical Bulletin 10-01. For example, the community could require submission of a subdivision plat or grading plan showing future building locations.

They could adopt or use other requirements that allow them to ensure any future buildings on the filled property remain reasonably safe from flooding. For example, a community may have building code requirements to ensure that any future basements are properly constructed to resist damage from groundwater.

Technical Bulletin 10-01 provides a number of other alternatives for ensuring that unimproved land is "reasonably safe from flooding" and stays that way. Communities have the option of requiring that the applicant submit any engineering information necessary to make the determination.

The criteria in Technical Bulletin 10-01 can also be used to ensure that buildings built with basements that are adjacent to the floodplain are constructed in a way that minimizes potential damages from groundwater during a flood.

For further information, see **Technical Bulletin 10-01** ***Ensuring that structures Built on Fill in or Near Special Flood Hazard Areas are Reasonably Safe from Flooding in Accordance with the National Flood Insurance Program (TB 10-01)***.

ANCHORING

> 44 CFR 60.3(a)(3) …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…

Both elevated and floodproofed buildings must be properly anchored to stabilize them against flood forces. This means anchoring the building to its foundation and ensuring that the foundation won't move. Therefore, you need to make sure there is adequate protection against hydrostatic and hydrodynamic forces and erosion and scour that can undercut the foundation.

In areas of shallow flooding and low flood velocities, normal construction practices suffice. Additional anchoring measures, such as reinforcing crawlspace walls, using deeper footings, using extra bolts to connect the sill to the foundation, or installing rods to connect the cap to the sill, should be required in two situations:

- Where the flood flows faster than five feet per second.
- In manufactured or mobile homes (see the section on Manufactured Homes for details).

In some areas it may be necessary to use foundations such as piles or piers which provide less resistance to floodwaters.

If your community has any of these conditions, you should see if there are state standards that take these into account, such as manufactured housing (mobile home) tie-down regulations. If not, it is recommended that the builder's architect or engineer sign a statement saying the design of the building includes "anchoring adequate to prevent flotation, collapse and lateral movement" during the base flood.

FLOOD-RESISTANT MATERIAL

Whether a building is elevated or floodproofed, it is important that all parts exposed to floodwaters be made of flood-resistant materials (**Figure 5-14**). This includes all portions of the building below the BFE including foundation elements such as floor beams and joists and any below BFE enclosures.

> **44 CFR 60.3(a) (3)** …If a proposed building site is in a flood-prone area, all new construction and substantial improvements shall (ii) be constructed with materials resistant to flood damage…

"Flood-resistant materials" include any building product capable of withstanding direct and prolonged contact with floodwaters without sustaining significant damage. "Prolonged contact" means at least 72 hours, and "significant damage" is any damage requiring more than low-cost cosmetic repair (such as painting).

- Concrete, concrete block or glazed brick
- Clay, concrete or ceramic tile
- Galvanized or stainless steel nails, hurricane clips and connectors (in areas subject to saltwater flooding)
- Indoor-outdoor carpeting with synthetic backing (do not fasten down)
- Vinyl, terrazzo, rubber or vinyl floor covering with waterproof adhesives.
- Metal doors and window frames.
- Polyester-epoxy paint (do not use mildew-resistant paint indoors, especially on cribs, playpens or toys because it contains an ingredient that is toxic)
- Stone, slate or cast stone (with waterproof mortar)
- Mastic, silicone or polyurethane formed-in-place flooring. Styrofoam insulation
- Water-resistant glue
- Pressure treated (.40 CCA minimum) or naturally decay resistant lumber, marine grade plywood

Figure 5-14: Flood-resistant materials

For further details on flood-resistant material requirements, refer to FEMA **Technical Bulletin 2-93, *Flood-Resistant Materials Requirements for Buildings Located in Special Flood Hazard Areas*.**

ACCESSORY STRUCTURES

Certain accessory structures may not qualify as “buildings.” For example, open structures, such as carports, gazebos and picnic pavilions that do not have at least two rigid walls, are not “buildings” and do not have to be elevated or flood-proofed.

In some cases, low-cost accessory buildings may be wet-floodproofed and do not have to be elevated or dry floodproofed. These structures could include detached garages and small boathouses, pole barns and storage sheds. Such structures must meet these requirements:

- The owner must obtain a variance (contact your FEMA Regional Office on procedures for this type of variance),
- The building must be used only for parking or storage,
- The building must have the required openings to allow floodwaters in and out,
- The building must be constructed using flood resistant materials below the BFE,
- The building must be adequately anchored to resist floatation, collapse, and lateral movement, and
- All building utility equipment including electrical and heating must be elevated or floodproofed.

Wet floodproofing involves using flood-resistant materials below the BFE and elevating things subject to flood damage above the BFE. Items that should be installed above the BFE include electrical boxes, switches and outlets. Only the minimum amount of electrical equipment required by code may be located below the BFE, and that equipment must be flood damage resistant.

For additional guidance, see ***Wet Floodproofing Requirements*, FIA-TB-7, FEMA 1994, and *Engineering Principles and Practices for Flood Damage-Resistant Building Support Utility Systems*.**

MANUFACTURED HOMES

> **44 CFR 59.1** Definitions: "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 homes include not only manufactured homes that meet HUD manufactured home standards, but also older mobile homes that pre-date these standards.

Elevation

Generally, manufactured homes must meet the same flood protection requirement as “stick built” or conventional housing. Since they are usually residential buildings, they must be elevated so the lowest floor is above the BFE.

44 CFR 59.1 Definitions: "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.

44 CFR 59.1 Definitions: “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 a 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 the floodplain management regulations adopted by the community.

44 CFR 60.3(c)(6) Require that manufactured homes placed or substantially improved within Zones A1-30, AH, and AE on the communities 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 or subdivision on which a manufactured home has sustained “substantial damage” as the result of a flood, be elevated on a permanent foundation such 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.

44 CFR 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.

44 CFR Section 60.3(c)(6) establishes the basic elevation and anchoring requirements that apply to most manufactured home placements including those outside of manufactured home parks and subdivision and in new manufactured home parks and subdivisions. These manufactured homes must have their lowest floors at or above the BFE. These requirements also apply to manufactured homes placed in expansions to existing manufactured home parks and on sites where manufactured homes are substantially damaged by a flood. As with stick-built housing, all parts of the manufactured home below the BFE must be constructed with flood resistant materials and building utility systems must either be elevated or made watertight to the BFE. The best way to meet this requirement is to elevate the bottom of the manufactured home chassis to this elevation. See FEMA’s ***Manufactured Home Installation in Flood Hazard Areas*, FEMA-85,** for additional guidance.

44 CFR Section 60.3(c)(12) allows for a limited exemption to elevating to the BFE for sites in existing manufactured housing (mobile home) parks. These older manufactured home parks were established before Flood Insurance Rate Maps (FIRMs) were issued for the community and before the community adopted a floodplain management ordinance that meets NFIP requirements. In such older parks, a newly placed manufactured home chassis must be "supported by reinforced piers or other foundation elements of at least equivalent strength that are no less than 36 inches in height above grade."

This exemption does not apply to repairing or replacing a manufactured home on a site in an existing manufactured home park where a manufactured home has been substantially damaged by a flood.

This exemption is a compromise that tries to balance the flood hazard against the severe economic impacts on some manufactured home park owners that would result if elevation to the BFE were required. There are often practical difficulties in elevating manufactured homes to the BFE in many of the older parks due to small lot sizes and the split ownership of the manufactured home and the lot itself. The exemption may not be necessary or appropriate for your community, especially if manufactured home parks are able to meet the requirement to elevate to the BFE. In other areas, the flood hazard may be so severe that the exemption may put lives and property at too great a risk. Many states have not included this exemption in their model ordinances and it may not be in your regulations.

Anchoring

44 CFR 60.3(c)(6) …[Manufactured homes must] be elevated on a permanent foundation … and be securely anchored to an adequately anchored foundation system to resist flotation, collapse and lateral movement.

A "permanent foundation" means more than a stack of concrete blocks. It should include a below-grade footing capable of resisting overturning, the depth needs to account for frost depth and expected scour, the footing must be sized appropriately for the site's soil bearing capacity, and the design needs to account for seismic and other hazards.

The following types of permanent foundations can be used:

- Reinforced piers,
- Post-tensioned piers
- Posts,
- Piles,
- Poured concrete walls,

- Reinforced block walls, or
- Compacted fill.

"Adequately anchored" means a system of ties, anchors and anchoring equipment that will withstand flood and wind forces. The system must work in saturated soil conditions. Usually this means over-the-top or frame tie-downs in addition to standard connections to the foundation.

Most states have manufactured home tie-down regulations. Check with your state NFIP coordinator to see if your state's regulations also meet the NFIP anchoring standard. If so, you need only make sure that the state requirement is met for each new manufactured home installed in your floodplain.

If not, see FEMA's ***Manufactured Home Installation in Flood Hazard Areas*, FEMA-85**, for additional guidance on anchoring. The anchoring requirement does apply in an existing (pre-FIRM) manufactured housing or mobile home park. Even if the manufactured home is not elevated above the BFE, the anchoring system must still withstand the forces of a flood over the first floor.

Evacuation: In some areas, there is adequate warning time to remove a manufactured home from harm's way. Protecting such property should not be discouraged, so FEMA allows an evacuated manufactured home to be put back on the original site in an existing manufactured home park without having to meet the requirements for siting a new manufactured home. Since much can go wrong in trying to evacuate a manufactured home, evacuation is not a substitute for permanently protecting the manufactured home by elevating it to or above the BFE.

PLACEMENT OF TEMPORARY STRUCTURES IN SPECIAL FLOOD HAZARD AREAS (SFHAs)

In order to effectively reduce the risk of future loss of lives and property during a flood event, it is important for communities to permit all development in the Special Flood Hazard Area (SFHA), including temporary structures. **Examples of a temporary structure may be: a recreational vehicle, a manufactured home used as an office on a construction site; a commercial stand placed during festivals for temporary retailing; or trailers and other structures used by traveling amusement companies.**

Communities must place certain conditions on the placement of temporary structures within SFHAs in order to effectively manage floodplain areas. Prior to the issuance of a building permit for the placement of a temporary structure in a SFHA, as designated on the flood hazard map, the following guidelines must be met:

1. All applicants for a temporary structure in an SFHA must submit to the community's building official, prior to the issuance of a building permit, a specified time period for which the temporary use will be permitted and a plan for the removal of such structures in the event of a flood warning notification.

2. The removal plan must include the following information:

   a. The name, address and phone number of the individual responsible for the removal of the temporary structure.

   b. The time at which the structure will be removed (i.e., of immediately upon flood warning notification).

   c. A copy of a contract or other suitable instrument of agreement with a trucking company to ensure the availability of removal for removal of the structure when needed**.**

   d. Designation accompanied by documentation of a location outside the SFHA to which the temporary structure will be moved.

3. The above information must be presented in writing to the community building official for review and approval, prior to the issuance of a temporary building permit for the floodplain.

The community may wish to add other conditions as appropriate.

It should be noted that while a plan for removal of temporary structures in the event of a flood warning notification is generally good procedure from a preparedness standpoint, removal of these structures may not always be possible in a flash flood situation where evacuation may be limited to persons only. Permit applicants should be made aware.

RECREATIONAL VEHICLES

44 CFR 59.1 Definitions: "Recreational vehicle" means a vehicle which is:

(a) built on a single chassis;

(b) 400 square feet or less when measured at the largest horizontal projection;

(c) designed to be self-propelled or permanently towable by a light duty truck; and

(d) designed primarily not for use as a permanent dwelling but as temporary living quarters for recreational, camping, travel, or seasonal use.

A recreational vehicle placed on a site in an SFHA must:

- Meet the elevation and anchoring requirements for manufactured homes, OR
- Be on the site for fewer than 180 consecutive days, OR
- Be fully licensed and ready for highway use. “Ready for highway use” means that it is on its wheels or jacking system is attached to the site only by quick disconnect type utilities and has no permanently attached additions.

The purpose of this requirement is to prevent recreational vehicles from being permanently placed in the floodplain unless they are as well protected from flooding as a manufactured home.

The NFIP does not have minimum requirements for recreational vehicle parks or campgrounds other than the limitations on the placement of recreational vehicles. Recreational vehicle parks and campgrounds are often good uses for floodplains, particularly when flooding usually occurs during seasons when these facilities are not in use or where there is plenty of warning time prior to a flood. **These facilities should not be permitted in flash flood areas since there may be loss of life if flooding occurs as well as loss of the recreational vehicles.**

HAZARDOUS MATERIALS

The community should not allow hazardous materials to be placed in the SFHA unless they are protected from floods. This includes elevating materials in or on a structure which is securely anchored to eliminate significant movement during a flood. If satisfactory protection cannot be provided, hazardous materials should be located outside the floodplain. See Chapter 6 for more information.

LIQUID PETROLEUM GAS (LPG) TANKS

LPG tanks located in the SFHA must be properly anchored to eliminate flotation during a flood. Once dislodged, these tanks can cause obstruction of bridge openings, ram into other structures, or explode. Whether placed in service at the time an adjoining structure is constructed or alone at a later date, a permit is required if the LPG tank is in the SFHA.

AO AND AH ZONES

AO Zones are shallow flooding areas where FEMA provides a base flood depth. Since there is no BFE, the rules read a little differently.

All new construction and substantial improvements of residential structures shall 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, or
- At least two feet if no depth number is specified.

All new construction or substantial improvements of nonresidential structures shall meet the above requirements or, together with attendant utility and sanitary facilities, be floodproofed to the same elevation.

AH Zones are also shallow flooding areas, but have BFEs. Buildings in AH zones must meet the same requirements as in AE zones.

In AO and AH Zones, adequate drainage paths are required around structures on slopes to guide floodwater around and away from proposed structures. (Requiring this throughout the community is a good idea, as it will prevent local drainage problems from causing surface flooding.)

A99 AND AR ZONES

An A99 Zone is an SFHA that will be protected by a Federal flood control project that is currently under construction and which meets specified conditions.

An AR Zone is an SFHA that used to be a B, C or X Zone that used to be protected by an accredited flood control system. The system has been decertified but is in the process of being restored to provide protection to the base flood level.

When the flood control systems are completed or restored, the areas in A99 and AR Zones are expected to be remapped and taken out of the SFHA. Until then, they are treated as SFHA for insurance purposes and there are some floodplain management requirements.

A99 and AR Zones are special situations - few exist. If you have one, you should contact your state NFIP coordinating agency or FEMA Regional Office for guidance on regulatory requirements for you situation.

F. OTHER REQUIREMENTS

The primary thrust of the NFIP regulations is to protect insurable buildings and reduce future exposure to flood hazards. However, there are some additional requirements that help ensure that the buildings stay habitable and additional flood problems are not created.

SUBDIVISIONS

As noted in Section B of this chapter, once you obtain base flood elevations for a subdivision or other large development, new buildings must be properly elevated or floodproofed. These subdivisions and developments must also be reviewed to ensure they are reasonably safe from flood damage.

> **44 CFR 60.3(a)(4)** [The community must] Review subdivision proposals and other proposed new development including manufactured home parks or subdivisions, to determine whether such proposals will be reasonably safe from flooding. If a subdivision proposal or other proposed new development is in a flood-prone area, any such proposals shall be reviewed to assure that (i) all such proposals are consistent with the need to minimize flood damage within the flood-prone area, (ii) all public utilities and facilities, such as sewer, gas, electrical, and water systems are located and constructed to minimize or eliminate flood damage, and (iii) adequate drainage is provided to reduce exposure to flood hazards;

This review applies to subdivisions and other development, such as apartments, parks, shopping centers, schools and other projects.

If a site is floodprone, the builder should:

- Minimize flood damage by locating structures on the highest natural-ground.
- Have public utilities and facilities located and constructed so as to minimize flood damage.
- Provide adequate drainage for each building site.

The site plans of new development and proposed plats for subdivisions can usually be designed to minimize the potential for flood damage while still achieving the economic goals of the project. For example, lot size could be reduced and the lots clustered on high ground, with building sites having views of the floodplain. See Chapter 6 for ideas on how subdivisions can be designed to minimize flood damages.

WATER AND SEWER SYSTEMS

44 CFR 60.3(a)(5) [The community must] Require within flood-prone areas new and replacement water supply systems to be designed to minimize or eliminate infiltration of flood waters into the systems; and

44 CFR 60.3(a)(6) [The community must] Require within flood-prone areas (i) new and replacement sanitary sewage systems to be designed to minimize or eliminate infiltration of flood waters into the systems and discharges from the systems into flood waters and (ii) onsite waste disposal systems to be located to avoid impairment to them or contamination from them during flooding.

The objective of these requirements is to ensure that a building that is protected from flood damage can still be used after the flood recedes.

In most instances, these criteria can be met through careful system design. Manholes should be raised above the 100-year flood level or equipped with seals to prevent leakage. Pumping stations should have electrical panels elevated above the BFE.

On-site waste disposal systems should be located to ensure they will not release contamination in a flood and can be used after flood waters recede. The first objective should be to locate the system outside the flood hazard area, if that is feasible. At a minimum, an automatic backflow valve should be installed to prevent sewage from backing up into the building during flooding.

WATERCOURSE ALTERATIONS

44 CFR 60.3(b)(6) [The community must] Notify, in riverine situations, adjacent communities and the State Coordinating Office prior to any alteration or relocation of a watercourse, and submit copies of such notifications to the [Federal Insurance] Administrator;

The community must notify adjacent communities and the appropriate state agency prior to altering or relocating any river or stream within its jurisdiction. Copies of such notifications must be submitted to the FEMA Regional Office.

44 CFR 60.3(b)(7) [The community must] Assure that the flood carrying capacity within the altered or relocated portion of any watercourse is maintained;

Any alteration or relocation of a watercourse should not increase the community's flood risks or those of any adjacent community. This could happen if the watercourse's capacity to carry flood flow is reduced because a smaller or less-efficient channel is created, or by modifications to the floodway as a result of the project. You must ensure that the altered or relocated channel has at least the capacity of the old channel. For any significant alteration or relocation, you should consider requiring the applicant to have an engineer certify that the flood-flow carrying capacity is maintained and that there will be no increase in flood flows downstream.

After altering a watercourse, the developer has created an artificial situation and must assume responsibility for maintaining the capacity of the modified channel in the future. Otherwise, flooding is likely to increase as the channel silts in, meanders or tries to go back to its old location.

Federal and state permits may be required for any alteration or relocation activity. It is recommended that the community require the submittal and approval of a CLOMR from FEMA for large-scale proposals (see CLOMR procedures discussion in Chapter 4, Section D).

CHAPTER 6

ADDITIONAL REGULATORY MEASURES

INTRODUCTION

44 CFR 60.1(d) The criteria set forth in this subpart are minimum standards for the adoption of flood plain management regulations by flood-prone… communities. Any community may exceed the minimum criteria under this Part by adopting more comprehensive flood plain management regulations utilizing the standards such as contained in Subpart C of this part. In some instances, community officials may have access to information or knowledge of conditions that require, particularly for human safety, higher standards than the minimum criteria set forth in Subpart A of this part. Therefore, any flood plain management regulations adopted by a State or a community which are more restrictive than the criteria set forth in this part are encouraged and shall take precedence.

The NFIP regulatory standards are minimums. They may not be appropriate for every local situation or unique circumstances.

Therefore, states and communities are encouraged to enact more restrictive requirements where needed to better protect people and properties from the local flood hazard.

This chapter reviews the more common approaches to this.

Many of these more restrictive requirements are eligible for credit under the Community Rating System (CRS), a program which provides insurance premium discounts to policyholders in communities with more restrictive flood-plain management programs (see Chapter 9, Section C). Where CRS credit is provided, it is highlighted with this CRS logo.

A. TAKING

Why not simply tell people that they can't build in the floodplain? If we did, we wouldn't have to worry about new buildings getting flooded and the regulations would be simple to administer: Just say "No."

While this regulatory standard appears desirable, it has one fatal legal problem: It could be a "taking."

The Fifth Amendment to the Constitution states, "Nor shall property be taken for public use without just compensation." The Constitution contains this provision because in England, the king could take property and use it for his own purpose - such as quartering troops or hunting - without compensation.

The term "taking" has come to mean any action by a government agency that relieves a person of his or her property without payment.

Government agencies possess the authority to acquire privately owned land. Under the power of eminent domain, they can acquire land without the owner's agreement provided the acquisition clearly is for a demonstrably public purpose and official condemnation proceedings are followed. Some common examples of eminent domain actions are:

- Purchase of land for roads and public works projects.
- The development of public park land.
- Utility acquisition of rights of way for transmission lines, etc.

Courts have ruled that a taking may also occur when the government enacts a law, standard or regulation that limits the use of the land to the extent that the owner has been deprived of all of his or her economic interest in using the property. Thus, the government has "taken" the property under a legal provision known as "inverse condemnation".

In cases where a court has found a taking, the governmental body has been required to compensate the property owner. Often, though, the regulations are retracted as applied to that property.

Usually, courts undertake a complicated balancing of public and private interests in deciding a taking issue. The courts will consider such factors as:

- Regulatory objectives.
- The harm posed by uncontrollable development.
- Reasonableness of the regulations.
- Severity of the economic impact upon the private property owner.

Very restrictive floodplain regulations and the regulatory standards of the NFIP have been challenged as a taking in a number of cases. **Figure 6-1** summarizes important cases challenging the legality or constitutionality of NFIP or similar land use regulations.

Most NFIP criteria are performance standards that do not prohibit development of a floodplain site provided the performance standards are met. For example, development in the floodway is prohibited only if it increases flood heights. Permit applicants who can find a way to develop in the floodway without increasing the flood problem are permitted to do so. These performance-oriented standards of the NFIP have never been ruled as a taking. This is highly significant, given that more than 20,000 communities administer floodplain management ordinances.

Although it may be more costly to build according to the NFIP standards and, in some instances, it may not be economical to develop a property, the performance standard is a valid exercise of the police power because it is based on a legitimate public purpose: preventing flood damage. Floodway requirements in particular are defensible because they prevent the actions of one property owner from increasing flood damage to his or her neighbors.

The NFIP regulatory criteria have not lost a taking case because they allow any floodprone site to be built on as long as precautions are taken to protect new structures and neighboring property from flood damage. The owners are not denied all economic uses of their properties as long as their construction accounts for the level of hazard.

Some courts have supported regulatory standards that are more restrictive than NFIP regulations, such as complete prohibitions of new buildings or new residences in the floodway. These cases tied the prohibition to the hazard and the need to protect the public from hazards created by the development.

Regulations need to be reasonable. For example, a complete prohibition of development in a shallow flooding area where there is no velocity may not be considered as “reasonable” by a court.

The rationale does not always have to be tied to property damage. For example, in upholding the State’s prohibition of new buildings in the floodway, the Illinois Supreme Court noted that while buildings could be protected, the residents would be surrounded by moving water during floods, preventing access by emergency vehicles.

“The prohibition takes into consideration not only the concern about preventing further flooding, but also the concern about the need to provide disaster relief services and the need for the expenditure of state funds on shelters and rescue services for victims of flooding.” (Beverly Bank v. Illinois Department of Transportation, September 19, 1991).

The lesson is that before your community enacts a regulatory provision that severely restricts the use of property, your community's attorney should review the provision to be sure it will not be overturned as a taking. Regulatory standards that are reasonable, tied to the hazard and support public objectives should be upheld.

Case	Issue	Decision/Impact
Village of Euclid v. Ambler Realty Company (1926)	The use of police power to regulate land use	The court upheld the basic concept of zoning.
Turnpike Realty Co. v. Town of Dedham (1972)	Challenge to the constitutionality of the NFIP	The court upheld the floodplain management regulations.
Just v. Marienette (1972)	A wetland regulatory case	The court decided that a landowner does not have the unlimited right to use the land for a purpose which is unsuited to its natural state or that will injure the rights of others.
Texas Landowners Association v. Harris (1978)	Challenge to the validity of the NFIP and its mitigation requirements	The courts held that the NFIP was reasonable. A community could not claim a taking if insurance or disaster relief was denied for failure to comply with NFIP standards, because they are benefits, not rights.
First Evangelical Lutheran Church of Glendale v. Los Angeles County, LA (1987)	Whether a temporary building moratorium that was deemed a taking would require compensation	The U.S. Supreme Court held that temporary regulatory takings could require compensation. This case was sent back to the state to decide if a taking had occurred. The state endorsed the floodplain regulations and held that the regulations were not a taking.
Adolph v. FEMA (1988)	Whether the parish floodplain management regulations adopted constituted a taking	The court upheld that the NFIP as a whole is not a taking, nor are the parish regulations.
April v. City of Broken Arrow (1989)	Whether two Oklahoma floodplain ordinances constituted a taking (requirement for elevation of new homes to 1 foot above the 100-year flood elevation)	The courts accepted the general proposition that local public officials must be afforded reasonable *elasticity* in planning and implementing legitimate state interests and held that regulations were valid.
Lucas v. South Carolina Coastal Council (1992)	South Carolina Supreme Court—whether the South Carolina Beachfront Management Act constituted a taking. U.S. Supreme Court—whether the property owner was entitled to compensation for his alleged "total loss of value" attributed to the Beachfront Management Act	The South Carolina Supreme Court ruled that the Act did not constitute a taking and reversed the trial court's award of $1.2 million to Lucas. The U.S. Supreme Court ruled that where the value of a property is essentially "destroyed" by regulation, compensation should be paid.
Dolan v. Tigard (1994)	Imposition of a floodplain bike path as a condition of a permit to expand commercial structures	The U.S. Supreme Court found that the business owners should not be required to construct a bike path to obtain the permit.

Figure 6-1. Selected cases of challenges to land use regulations

B. STATE REGULATORY STANDARDS

All states now allow communities to regulate development to the NFIP standards. Some states also require that their communities regulate to a higher standard for certain aspects of floodplain management.

This section reviews the more common state requirements. If your ordinance was based on a state model, you should be compliant with all state requirements as well as the NFIP standards.

According to a 1995 survey by the Association of State Floodplain Managers (ASFPM), 24 states have some kind of riverine standards more restrictive than those of the NFIP. Of those, 10 require that communities regulate to the higher standard; three states have opted to implement and enforce the higher standard directly; and 10 states use a combination of both approaches.

Eight states prohibit buildings or residences from their floodways at least in some areas. Twelve states allow less than the NFIP's one-foot rise in the flood-way. States are more likely to regulate some or all of the floodways than the flood fringes, because they require more technical expertise than those that apply to the fringe and because the impacts of floodway development are more extensive, often going beyond local corporate limits.

The ASFPM survey found that 32 states have enacted some regulations governing shoreline development. For states with ocean or bay coasts, this regulatory authority is usually implemented under the state's coastal zone management program. All the Great Lakes states have lakeshore regulatory standards or permit programs, usually administered as part of state shoreland management programs.

Twenty-three states now have standards for their coastal high hazard areas that exceed those of the NFIP. Sixteen states regulate areas subject to coastal erosion. Sixteen states have regulations or standards to preserve or protect sand dunes and 16 states regulate or set higher standards for lakeshore areas.

Nineteen states have stricter building construction requirements than does the NFIP. The most common additional standard is freeboard (requiring new buildings to be elevated higher than the base (100-year) flood level). This standard may apply to all buildings in the floodplain or only to certain types, such as new jails, hospitals, nursing homes, mobile home parks, or hazardous materials facilities.

Here are some other common state regulatory requirements:

- 25 states either directly regulate the handling and storage of stormwater in their jurisdictions or establish standards that communities must meet.

- 30 states have regulations or standards for the control of erosion and sediment.

- 23 have either direct regulations or state standards to restrict or prohibit some or all development within a certain distance from bodies of water.
- 16 of those have setbacks for coastal and/or lakeshore areas.
- 14 states have special rules for areas that lie below dams or are protected by levees.
- 30 states have adopted measures to regulate hazardous materials in flood-plains.
- states have special public health standards that apply to floodplains

Twenty-four state governors have issued a directive to their state agencies on floodplain management. Most of these were implemented to meet the minimum NFIP requirements but many go beyond them. Five states have wetlands policy set by executive order, five have orders on hazard mitigation or disaster recovery, and two states have other resource protection executive orders that affect flood-plains.

For more information on which states have which requirements, see ***Flood-plain Management 1995: State and Local Programs*****, Association of State Floodplain Managers, 1995**.

C. HIGHER REGULATORY STANDARDS

FEMA has established minimum floodplain management requirements for communities participating in the NFIP. Communities must also enforce more restrictive State requirements. However, communities should seriously consider enacting regulations that exceed the minimum state and federal criteria.

In fact, the NFIP requires communities to at least consider additional measures which are found in 44 CFR 60.22, Planning Considerations for Floodprone Areas. They are summarized in **Figure 6-2**.

(a) The floodplain management regulations adopted by a community for floodprone areas should:
- (1) Permit only that development of floodprone areas which
- (i) is appropriate in light of the probability of flood damage
- (ii) is an acceptable social and economic use of the land in relation to the hazards involved
- (iii) does not increase the danger to human life
- (2) Prohibit nonessential or improper installation of public utilities and public facilities.

(b) In formulating community development goals after a flood, each community shall consider:
- (1) Preservation of the floodprone areas for open space purposes
- (2) Relocation of occupants away from floodprone areas
- (3) Acquisition of land or land development rights for public purposes
- (4) Acquisition of frequently flood-damaged structures.

(c) In formulating community development goals and in adopting floodplain management regulations, each community shall consider at least the following factors:
- (1) Human safety
- (2) Diversion of development to areas safe from flooding
- (3) Full disclosure to all prospective and interested parties
- (4) Adverse effects of floodplain development on existing development
- (5) Encouragement of floodproofing to reduce flood damage
- (6) Flood warning and emergency preparedness plans
- (7) Provision for alternative vehicular access and escape routes
- (8) Minimum retrofitting requirements for critical facilities
- (9) Improvement of local drainage to control increased runoff
- (10) Coordination of plans with neighboring community's floodplain management programs
- (11) Requirements for new construction in areas subject to subsidence
- (12) Requiring subdividers to furnish delineations for floodways
- (13) Prohibition of any alteration or relocation of a watercourse
- (14) Requirement of setbacks for new construction within V Zones
- (15) Freeboard requirements
- (16) Requirement of consistency between state, regional
- (17) Requirement of pilings or columns rather than fill to maintain storage capacity and local comprehensive plans
- (18) Prohibition of manufacturing plants or facilities with hazardous substances
- (19) Requirements for evacuation plans

Figure 6-2: NFIP planning considerations (44 CFR 60.22)

Some of the more common approaches taken by communities to better regulate floodplain development are explained in this section.

LOCATION RESTRICTIONS

Where the hazard is so severe that certain types of development should be prohibited, a location restriction provision may be appropriate. Some communities prohibit some or all development in all or parts of their floodplains. A common approach is to prohibit particular structures in the floodway or areas exceeding certain flood depths or velocities.

Because this is the most restrictive higher regulatory provision, location restriction language has to be drafted carefully to avoid a taking challenge. Sometimes, a community can tie transfers of development rights or other benefits to a development that avoids the flood hazard area. These types of “win – win” situations benefit everyone and reduce the potential for challenging the ordinance.

Highly hazardous areas

Prohibiting development makes sense in high hazard areas, where people are exposed to a life-threatening situation even though buildings could be protected from flood damage. For example, it would be appropriate to prohibit development at the apex of an alluvial fan or along a narrow floodplain in a stream valley that is susceptible to flash flooding.

Subdivision design

Undeveloped land, still in large tracts, offers the best opportunity to limit where certain types of development will be located. When a developer wants to subdivide the land, communities have many tools to arrange the development so that buildings are kept out of the floodplain or at least the building sites are located in the least hazardous areas of the floodplain. This has two advantages over simply requiring the buildings to be protected from flooding:

- Buildings aren’t isolated by floodwaters, putting a strain on local emergency services to guard them or evacuate or rescue their occupants, and

- The neighborhood will have waterfront open space and recreation areas – a valuable amenity in most communities.

A housing development can be clustered, as shown in **Figure 6-3**, so the developer can sell the same number of home sites as a conventional subdivision. Check your state laws on whether cluster development can be mandated or just encouraged during the subdivision review process.

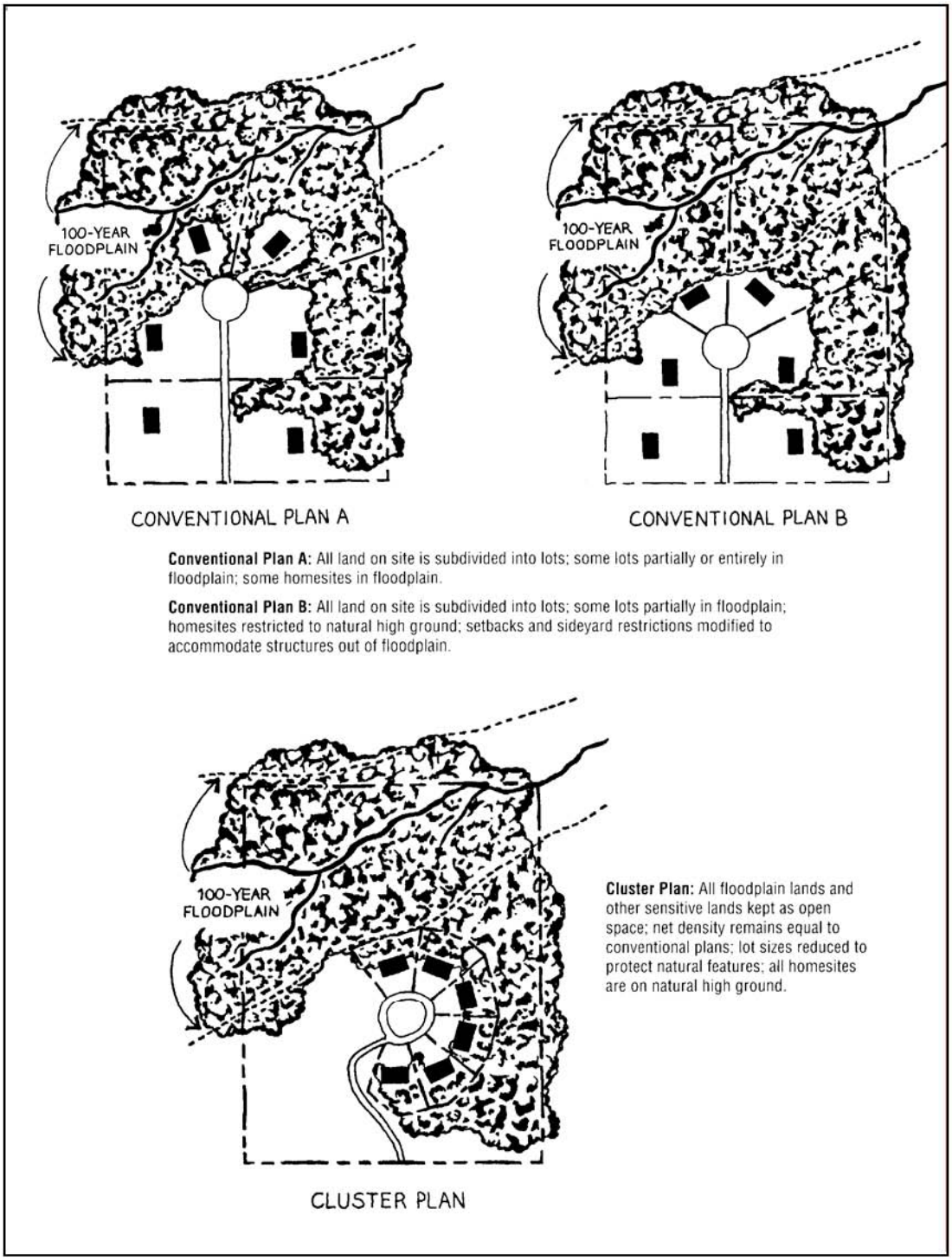


Figure 6-3. Clustering can keep buildings out of smaller floodplains

(Source: Subdivision Design in Flood Hazard Areas)

As explained in pages 17-25 of the American Planning Association's ***Subdivision Design in Flood Hazard Areas***, the planner's toolbox contains other tools for encouraging developers to avoid floodplains. A density transfer can be used to, say, trade development rights with a flood-free site. Credits or bonuses can be given to increase the allowable density if the developer puts building sites on high ground or does not disturb a wetland.

The planned chapter development (PUD) approach offers developers flexibility in planning the entire area. For example, a PUD may have a cluster development with houses closer together than allowed under normal zoning lot line setbacks.

Subdivision and planning regulations also can mandate that a certain portion of a development be set aside as open space for recreation or stormwater management purposes. Developers find that it is cheaper to put the open space in the floodplain than to put buildings there that have to incorporate the more expensive floodplain requirements. Linear parks and greenways that connect the open space areas through a community are becoming more and more popular and help sell new developments.

The Community Rating System credits land development criteria that discourage development in floodplains under Activity 430LD in the *CRS Coordinator's Manual* and the *CRS Application*. See also *CRS Credit for Higher Regulatory Standards* for example regulatory language.

Setbacks

Setbacks may be used to keep development out of harm's way while at the same time achieving other community purposes. Setback standards establish minimum distances that structures must be positioned - set back - from river channels and coastal shorelines. Setbacks can be defined by vertical heights or horizontal distances.

While floodplain boundaries are defined by vertical measures, horizontal set-backs also provide protection from flood damage, especially in coastal areas where the effects of waves decrease further inland.

Setbacks from watercourses have been used to minimize the effect of non-point sources of pollution caused by land development activities, timber harvesting and agricultural activities. Solid waste landfills and on-site sewage disposal systems often are restricted within certain distances of a body of water.

The Community Rating System credits setbacks that prevent disruption to shorelines, stream channels and their banks under Activity 430, Section 431.g.2 in the *CRS Coordinator's Manual* and the *CRS Application*. See also *CRS Credit for Higher Regulatory Standards* for example regulatory language.

Manufactured homes

Many communities have adopted provisions prohibiting the placement of manufactured (mobile) homes in the floodway. Check your ordinance. This used to be a minimum requirement of the NFIP and may still be on your books.

Natural areas

The natural functions and values of floodplains coupled with their hazardous nature have led communities to promote and guide the less intensive use and development of floodplains. More and more municipalities are requiring that important natural attributes such as wetlands, drainage ways and floodplain areas be set aside as open space as a condition to approving subdivision proposals. The Community Rating System provides substantial credit for preserving floodplain areas as open space. If buildings and filling are prohibited, credit is found under Activity 420 Open Space Preservation, Section 421.a in the *CRS Coordinator's Manual* and the *CRS Application*. If the area has been kept in or restored to its natural state, more credit is provided under Section 421.c.

Low-density zoning

When a community prepares its land use plan and zoning ordinance, it should consider what uses and densities are appropriate for floodplains. If buildings are not prohibited entirely, the community should zone its floodplains for agricultural or other low-density use to reduce the number of new structures.

For example, it's better to have a floodplain zoned for agricultural or conservation use with a minimum lot size of 20 or 40 acres than to allow four single-family homes to every acre. In some areas, "residential estate" zones with minimum lot sizes of two to five acres provide lots large enough that homes can be built out of the floodplain.

Some states have land use planning laws that require local plans before enacting a zoning ordinance. Some - including Oregon, Florida, New Hampshire and Hawaii - mandate that local plans account for floods and other natural hazards.

The Community Rating System provides substantial credit for zoning floodplains with low-density uses under Activity 430LZ Low Density Zoning in the *CRS Coordinator's Manual* and the *CRS Application*.

BUILDING REQUIREMENTS

Freeboard

Freeboard is an additional height requirement above the base flood elevation (BFE) that provides a margin of safety against extraordinary or unknown risks. This reduces the risk of flooding and makes the structure eligible for a lower flood insurance rate.

While not required by the NFIP standards, your community is encouraged to adopt at least a one-foot freeboard to account for the one-foot rise built into the concept of designating a regulatory floodway and the encroachment requirements where floodways are not identified.

Other reasons for considering a freeboard are that it:

- Accounts for future increases in flood stages if additional development occurs in the floodplain.
- Accounts for future flood increases due to upstream watershed development.
- Acts as a hedge against backwater conditions caused by ice jams and debris dams.
- Reflects uncertainties inherent in flood hazard modeling, topography, mapping limitations and floodplain encroachments.
- Provides an added measure of safety against flooding.
- Results in significantly lower flood insurance rates due to lower flood risk.

Freeboard safety factors are common in the design of flood control projects and floodplain development. Many communities have incorporated freeboard requirements into the elevation and floodproofing requirements stipulated by the NFIP. Freeboard requirements adopted by communities range from six inches to four feet.

When constructing a new elevated building, the additional cost of going up another foot or two is usually negligible. Elevating buildings above the flood level also reduces flood insurance costs for current and future owners.

Figure 9-3 (Volume 4) shows the insurance rates for a post-FIRM single-family dwelling. Note that the higher the building is above the BFE, the lower the rate. These rates are based on the true or actuarial cost of insuring a building in the floodplain. By adding one foot of freeboard above the BFE, the cost for the first layer of coverage is reduced from 45 cents per $100 of coverage to 26 cents. This shows how the extra foot reduces the potential for flood damage.

The Community Rating System credits freeboard under Activity 430, Section 431.a in the *CRS Coordinator's Manual* and the *CRS Application*. See also *CRS Credit for Higher Regulatory Standards* for example regulatory language.

Foundation standards

Without a safe and sound foundation, an elevated building can suffer damage from a flood due to erosion, scour or settling. The NFIP regulations provide performance standards for anchoring new buildings and foundation and fill placement standards for floodproofed buildings and V Zones.

However, the NFIP performance standards do not specify how a building's foundations are to be constructed. Especially in areas where an engineer's certificate is not required by the NFIP regulations, more specific foundation construction standards would help protect buildings from flood damage.

One option is to require that a registered professional engineer or architect certify the adequacy of elevated building foundations and the proper placement, compaction and protection of fill when it is used in building elevation. This is an ordinance requirement in the New Orleans area where subsidence threatens so many buildings.

The national model building codes address building foundations and the proper placement, compaction and protection of fill. You and your building department should review how these standards are enforced.

The Community Rating System credits foundation protection under Activity 430, Section 431.b in the *CRS Coordinator's Manual* and the *CRS Application*. See also *CRS Credit for Higher Regulatory Standards* for example regulatory language.

SAFETY REQUIREMENTS

Critical facilities

For some activities and facilities, even a slight chance of flooding poses too great a threat. These should be given special consideration when formulating regulatory alternatives and floodplain management plans.

The following are examples of the types of critical facilities that should be given special attention:

- Structures or facilities that produce, use, or store highly volatile, flammable, explosive, toxic and/or water-reactive materials.
- Hospitals, nursing homes and housing likely to have occupants who may not be sufficiently mobile to avoid injury or death during a flood.
- Police stations, fire stations, vehicle and equipment storage facilities, and emergency operations centers that are needed for flood response activities before, during and after a flood.
- Public and private utility facilities that are vital to maintaining or restoring normal services to flooded areas before, during and after a flood.

A critical facility should not be located in a floodplain. Communities often prohibit critical or hazardous facilities or uses from the floodway, or the entire floodplain. While a building may be considered protected from the base flood, a higher flood or an error on the builder's or operator's part could result in a greater risk than the community is willing to accept.

If a critical facility must be located in a floodplain, then it should be designed to higher protection standards and have flood evacuation plans. The more common standards - freeboard, elevation above the 500-year floodplain and elevated access ramps - should be required.

According to Executive Order 11988, federal agencies must meet rigorous alternative site evaluations and design standards before funding, leasing or building critical facilities in the 500-year floodplain. Executive Order 11988 is discussed further in Section E of this chapter.

NFIP/CRS

The Community Rating System provides credits for prohibiting critical facilities from the 500-year floodplain or requiring them to be protected from damage by the 500-year flood in Activity 430. See the *CRS Coordinator's Manual* and the *CRS Application*. See *CRS Credit for Higher Regulatory Standards* for example regulatory language.

Hazardous materials

While prohibiting or protecting hazardous materials from the floodplain makes sense, it would be wise to have specific standards in your ordinance. The following lists were taken from the Corps of Engineers' Flood Proofing Regulations. The first is of items that are extremely hazardous or vulnerable to flood conditions so they should be prohibited from the SFHA or even the 500-year floodplain:

Acetone
Ammonia
Benzene
Calcium carbide
Carbon disulfide
Celluloid
Chlorine
Hydrochloric acid
Prussic acid
Magnesium
Nitric acid
Oxides of nitrogen
Phosphorus
Potassium
Sodium
Sulfur

The following items are sufficiently hazardous that larger quantities they should be prohibited in any space below the base flood elevation

Acetylene gas containers
Storage tanks
Lumber /buoyant items
Gasoline
Charcoal/coal dust
Petroleum products

Larger quantities of the following items should be prohibited in any space below the base flood elevation

Drugs
Food products
Matches/sulfur products
Soaps/detergents
Tires

Figure 6-4: Four people died in a 1978 flood in this critical facility.

This nursing home in Rochester, Minnesota, was isolated by high velocity floodwaters. Because there was no dry land access, firefighters could not rescue the occupants.

Naturally, there are some areas with floodplains so extensive that a developer cannot be expected to connect his development to high ground. As with all regulatory standards, you must carefully weigh the local hazard, the regulation's objectives, and the costs and benefits of meeting the standard before you draft new ordinance language.

The Community Rating System has credited dry land access provisions under Activity 430, Section 431.i in the *CRS Coordinator's Manual* and the *CRS Application*.

ENCROACHMENT STANDARDS

Some states and communities are not comfortable with allowing development in the flood fringe to increase flood heights by up to a foot. A one-foot increase in flood heights will increase the potential for flood damage to floodprone buildings and affect properties that were otherwise not threatened by the base flood. This is especially true in flat areas where a one-foot increase can extend the floodplain boundary by blocks.

These states and communities require floodway mapping and encroachment studies to allow a smaller surcharge, usually 0.5 or 0.1 foot. Twelve states require that regulatory maps use a smaller floodway mapping surcharge than the NFIP's one-foot minimum standard. This results in a wider floodway, but less potential for increased flood losses due to future development.

In Minnesota, one watershed district took another regulatory approach, enacting regulations that restricted encroachments in the flood fringe to 20 percent of the total floodplain area. In Washington State, some communities treat higher velocity and deeper flood fringe areas as floodways and make development in those areas comply with the floodway construction standards.

The Community Rating System credits more restrictive floodway mapping standards under Activity 410 Additional Flood Data, Section 411.c in the *CRS Coordinator's Manual* and the *CRS Application*.

COMPENSATORY STORAGE

The NFIP floodway standard in 44 CFR 60.3(d) restricts new development from obstructing the flow of water and increasing flood heights. However, this provision does not address the need to maintain flood storage. Especially in flat areas, the floodplain provides a valuable function by storing floodwaters. When fill or buildings are placed in the flood fringe, the flood storage areas are lost and flood heights will go up because there is less room for the floodwaters. This is particularly important in smaller watersheds that respond sooner to changes in the topography.

For this reason, some communities adopt more restrictive standards that regulate the amount of fill or buildings that can displace floodwater in the flood fringe. One simple approach is to prohibit filling and buildings on fill - all new buildings must be elevated on columns or flow-through crawlspaces.

Check your statutory authority, because in some states buildings are allowed only if they are on fill. Some communities prefer buildings on fill because flood-waters do not come in contact with the building's foundation and it provides a safe spot above flood levels outside the building walls.

Another approach is to require compensatory storage to offset any loss of flood storage capacity. The developer is required to offset new fill put in the floodplain by excavating an additional floodable area to replace the lost flood storage area. This should be done at "hydraulically equivalent" sites - fill put in below the 10-year flood elevation should be compensated by removal of soil below that elevation elsewhere in the floodplain.

The Community Rating System credits both water quantity and water quality stormwater management regulations and plans under Activity 450 in the *CRS Coordinator's Manual* and the *CRS Application*. See also *CRS Credit for Stormwater Management* for example regulatory language.

STORMWATER MANAGEMENT

A floodplain management program in an urbanizing area must confront the increase in flood flows caused by development within the watershed. As forests, fields and farms are covered by impermeable surfaces like streets, rooftops and parking lots, more rain runs off at a faster rate. In an urbanized area, the rate of runoff can increase fivefold or more.

Changes in the surface drainage system compound this problem. Stormwater runoff travels faster on streets and in storm drains than it did under pre-development conditions. As a result, flooding is more frequent and more severe (**Figure 1-7** in Volume 1). Efforts to reduce the impact of increased runoff that results from new development in a watershed are known as stormwater management.

One way to reduce the impact of stormwater from new development is to require the developer to restrict the rate at which the increased runoff leaves the property. The developer must build a facility to store stormwater runoff on the site.

Under stormwater detention, the stored water is held for release at a restricted rate after the storm subsides. Under stormwater retention, stormwater runoff is held for later use in irrigation or groundwater recharge, or to reduce pollution.

As an alternative to using a uniform standard for all areas, many communities regulate development according to a master plan that analyzes the combined effects of existing and expected development on stormwater and flood flows in the watershed. Such watershed-specific regulations may allow different amounts of runoff for different areas in order to control the timing of increased flows into the receiving streams.

Instead of requiring developers to build stormwater facilities on-site, a plan may require them to contribute funds for a regional facility. By planning the runoff from entire watersheds, this approach can be more effective in reducing increases in downstream flooding.

Stormwater management also has water quality aspects, and includes efforts to reduce erosion and the entry of sediment and pollutants into receiving streams.

NFIP/CRS

The Community Rating System credits both water quantity and water quality stormwater management regulations and plans under Activity 450 in the *CRS Coordinator's Manual* and the *CRS Application*. See also *CRS Credit for Stormwater Management* for example regulatory language.

TEMPORARY MORATORIUM

Following a flood, a number of communities have imposed moratoriums on rebuilding in the damaged area, effectively prohibiting floodplain development. Often, temporary measures are put in place after a flood to allow time to plan for acquisition, relocation, or redevelopment of the area, or to install flood control projects.

A temporary moratorium should specify when it will be lifted, such as “within three months or when the plan is completed, whichever is sooner.” An open ended moratorium may be viewed by a court as a taking, since the owner has no idea when he or she will be allowed to build or rebuild.

D. FLOOD HAZARDS OF SPECIAL CONCERN

The mapping and regulatory standards of the NFIP do not completely address every flood problem in the United States. Certain floodplains and flood-related hazards are more destructive and harder to map than riverine, coastal and shallow flooding.

Chapter 1 introduced these flood hazards, so we won't discuss them in detail here. This section reviews the more common regulatory standards appropriate to each hazard.

In addition to regulations, communities should address these special hazards in their planning, public information, hazard disclosure and flood warning programs.

More information on these hazards and the Community Rating System credit for mapping and managing them is found in *CRS Credit for Special Hazard Areas*.

DAM BREAKS

Almost every state has a dam safety office that has identified high hazard dams. The designation is based on both the height of the dam and the amount of development at risk downstream.

Should a dam give way, the area covered by the resulting flood downstream is called the dam breach inundation area. Dam breach analyses may have been done for some of the dams upstream of your community, in which case you can obtain a map of the area subject to inundation. (Check with your state dam safety office that the map was prepared using an approved method.)

Close to the dam, the dam breach inundation area is likely to be larger than the base floodplain. A regulatory program should encompass such areas outside the base floodplain. It should also take into account the lack of warning time a dam break would pose.

Regulatory standards

Typical measures include:

- Prohibiting construction of buildings in the dam breach inundation area.
- Prohibiting siting of critical facilities in the dam breach inundation area.
- Requiring new buildings to be elevated above the BFE or the dam breach elevation, whichever is higher.
- Requiring dam owners to maintain their facilities.
- Requiring dam owners to establish warning systems if their dams are in danger of failing.

For more information, contact your state dam safety office or the Association of State Dam Safety Officials, Lexington, Kentucky.

CRS credit for dam failure regulations is provided in Activity 630 Dam Safety, Section 631.b of the *CRS Coordinator's Manual* and the *CRS Application*.

E. ENVIRONMENTAL PROTECTION MEASURES

Flooding may not occur often enough in your area to be viewed as a problem in need of a solution. This may make it difficult to obtain the public and political support needed to carry out local floodplain management measures designed solely to reduce future flood losses.

Support often can be gained by associating flood loss reduction with broader community concerns and goals. A larger constituency for managing the community's floodplains can be built if other interests realize that their needs can be met through their involvement and support in flood protection. This, in turn, brings more resources and expertise into play.

Then, too, designing and packaging funding proposals to meet a number of community goals can boost your chances of obtaining outside resources. One approach is to tie the need to manage the floodplain to protect your community's economic well-being with the need to protect and maintain the natural resources and functions of the floodplain. These resources and functions can be of considerable benefit to the community, a benefit often unrealized or underestimated.

STRATEGIES

Preservation and restoration are the two basic approaches to protecting a floodplain's natural resources. Preservation strategies focus on strict control or prohibition of development in sensitive or highly hazardous areas. Restoration strategies focus on actions to improve the quality or functioning of degraded floodplains.

It is not always possible - or necessary - to make a distinction between the two strategies.

Chapter 1 contained an overview of the tools that can be used to preserve and protect a floodplain's natural and cultural resources. They include:

- Floodplain, wetland and coastal barrier regulations.
- Development and redevelopment policies.
- Land acquisition and preservation.
- Information and education.
- Tax adjustments.

This section focuses on the development controls and regulatory standards you can use to protect natural resources or minimize harm to them. These measures, used by all levels of government, are among the most effective means available for protecting natural resources of floodplains and reducing flood damage.

FEDERAL REGULATIONS

Federal regulations and those in many states protect resources by limiting the ways, location and extent to which these resources may be modified. Two federal regulations can have far-reaching impact:

- **NEPA**: When a federal agency proposes to fund a project located in a flood hazard area, the National Environmental Policy Act (NEPA) requires an evaluation of the project's environmental impact as part of the decision-making process. The evaluation should include the impact on flooding as well as water and air quality.
- **EO 11988: Executive Order 11988** Floodplain Management requires federal agencies to check NFIP maps to see if a proposed project will be in a floodplain. If one is, the agency must follow an eight-step process to determine whether there is a feasible alternative to location in the floodplain. If not, the project must include flood damage reduction measures. In short, Federal agencies must meet the same or more restrictive development standards as do private property owners under the community's NFIP regulations.

WETLAND PROTECTION

The federal regulation that local permit officials see most often is the program established by Section 404 of the Clean Water Act. Jointly administered by the Corps of Engineers and the U.S. Environmental Protection Agency, the Section 404 program regulates the discharge of dredged or fill material into U.S. waters, including adjacent wetlands.

The Section 404(b)(1) guidelines provide extensive environmental criteria for judging permit applications while emphasizing the need to prevent avoidable losses of aquatic resources, as well as the need to minimize adverse environmental impacts.

All coastal states and many inland states have their own wetlands regulations. Because inland wetlands generally receive less protection than coastal or "tidal" wetlands, many communities establish regulations that are more restrictive than the Federal or state programs.

The desire to reduce the cumulative impacts of wetland losses has led many jurisdictions to adopt a "no net loss of wetlands" policy. No net loss is addressed either in terms of acreage or the functional value of the wetlands. Despite these programs and other such efforts, as recent as 1989 it was estimated that the country was losing 300,000 – 450,000 acres of wetlands each year.

RARE AND ENDANGERED SPECIES

Undeveloped floodplains may contain habitat for rare and endangered species of plants and animals. On the federal level, the Endangered Species Act of 1973 directs federal agencies not to undertake or assist projects that would adversely affect any endangered species.

The Act also requires an “incidental take permit” when it appears that the habitat of a rare or endangered species will be “taken” or impacted by a non-federal activity. Communities should coordinate their permit review with this program which is administered by the U.S. Fish and Wildlife Service.

Many states have programs to identify rare and endangered species and to acquire or regulate tracts that are home to them. Some states and communities have sensitive areas regulations or a similar approach that protects such habitats.

ON-SITE SEWAGE DISPOSAL

Most states and municipalities regulate the design, location and placement of on-site sewage systems. Because the objective of such programs is to prevent surface and subsurface contamination, there are many requirements to selecting a proper site and designing a system that will work in a flood.

Less than desirable locations for on-site systems include areas with high groundwater tables, impervious soils, certain types of porous soils, and the potential for flooding. These characteristics often coincide with floodplains.

Regulations that restrict where septic systems can go often mean that a property owner cannot build in or near the floodplain.

FACILITIES SITTING

Stringent government regulations restrict the siting of critical facilities —hazardous waste facilities, nuclear power plants, hospitals, police and fire stations —in a floodplain area.

States and your community also may have siting regulations that discourage or prevent dangerous or hazardous development in floodplain areas. These include storage of hazardous materials, sanitary landfills and related activities.

WATER QUALITY RESTRICTIONS

Since the enactment of the Clean Water Act in 1972 and related state legislation, more care is being given to the regulation of direct discharges of pollutants into waterways. Federal and state point source regulations focus on wastewater treatment plants and industrial sites where polluted water is piped to a stream or lake at a single point.

Non-point sources of pollutants are harder to regulate. If stormwater is not collected and sent to a wastewater treatment plant, it flows directly into a body of water. On its way, stormwater collects sediments from soil erosion as well as road oil, pesticides, lawn treatment chemicals and other pollutants. There is no treatment facility to clean this runoff water.

Regulatory approaches for non-point sources include buffer zones or stream setbacks where there are on-site disposal systems, timber harvesting, tilling of soil, mining, or development in general. These requirements are often part of, or complement, state or local stormwater management regulations.

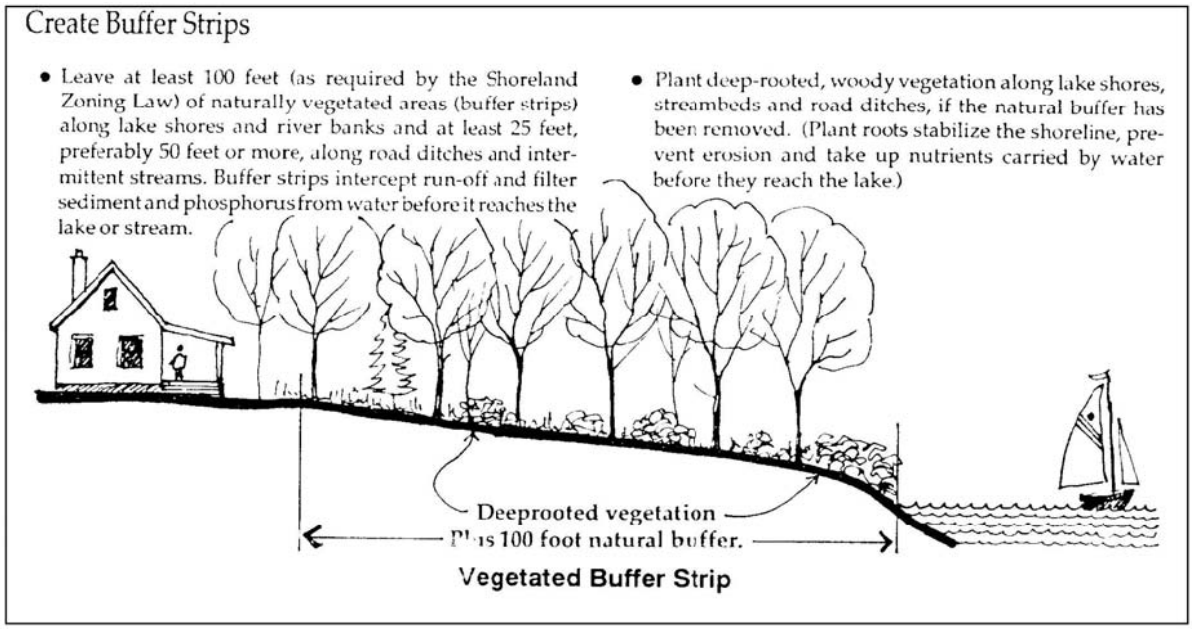


Figure 6-6: Buffer strips.

Source: Environmental Management: A Guide for Town Officials, Maine Department of Environmental Protection, 1992

SPECIAL DESIGNATIONS

Stream corridors often possess special value for an area, region or state. These corridors are given special designations - such as a wild or scenic river - and are afforded an extra level of recognition and protection.

While such programs are not necessarily regulatory in nature, they do encourage proper planning and land use control, discourage unwanted development, and guide federal and state actions.

The Community Rating System credits preserving areas for their natural functions under Activity 420 Open Space Preservation. Credit for prohibiting critical facilities in floodplains and for prohibiting on-site sewage treatment, landfills and other hazardous use or threats to public health, is provided in Activity 430 Higher Regulatory Standards, respectively. Water quality regulations are credited in Activity 450 Stormwater management.

WATERSHED MANAGEMENT

The source of floodwaters is often far away from the floodplain. Removal of vegetation from upland areas and paving of formerly water-retaining forests and pastures has accelerated runoff in many areas. Existing or future flooding conditions cannot be improved by managing floodplains alone. It takes an effort over the entire watershed to reduce the impact of flooding on a community.

It is one matter for a community to approach flood damage reduction community-wide. This is often complicated by the involvement of more than one political unit. Often more than one town, city or county are involved in activities which affect flooding in a common area. This is particularly true in large urban areas such as Little Rock. In nearly every situation, there is also an interaction between city or town and the county. It is important that political units work together to reduce the flood potential. In fact, community officials and floodplain managers from each community can contribute ideas to their neighbors and make floodplain management itself more “manageable.”

ADD ANOTHER FOOT FOR EXTRA PROTECTION

Despite advances in the fields of science and engineering, we really do not know how soon and how deep a given site will flood. Scientists use past experiences to predict or estimate future flooding. Some differences from predictions are a result of imperfect knowledge of the future weather or climate. Others results from not fully considering how man will impact the floodplain.

It has been well documented that the increase in suburban and urban development has increased runoff and, in some areas, dramatically increased flooding. What the future climate will bring is uncertain.

It is, therefore, highly recommended that both published and estimated base flood elevations be considered **minimum.** Developers should be cautioned that “Flood elevations are the minimum established by FEMA or estimated using accepted methods.” They may wish to increase the level of protection for developments through additional elevation or level of floodproofing. **A minimum of at least one food is recommended.** Developers may wish to increase floor elevations for structures to save on flood insurance cost. See Chapter 9 for how rates are affected by elevation.

F. FLOODPROOFING TECHNIQUES

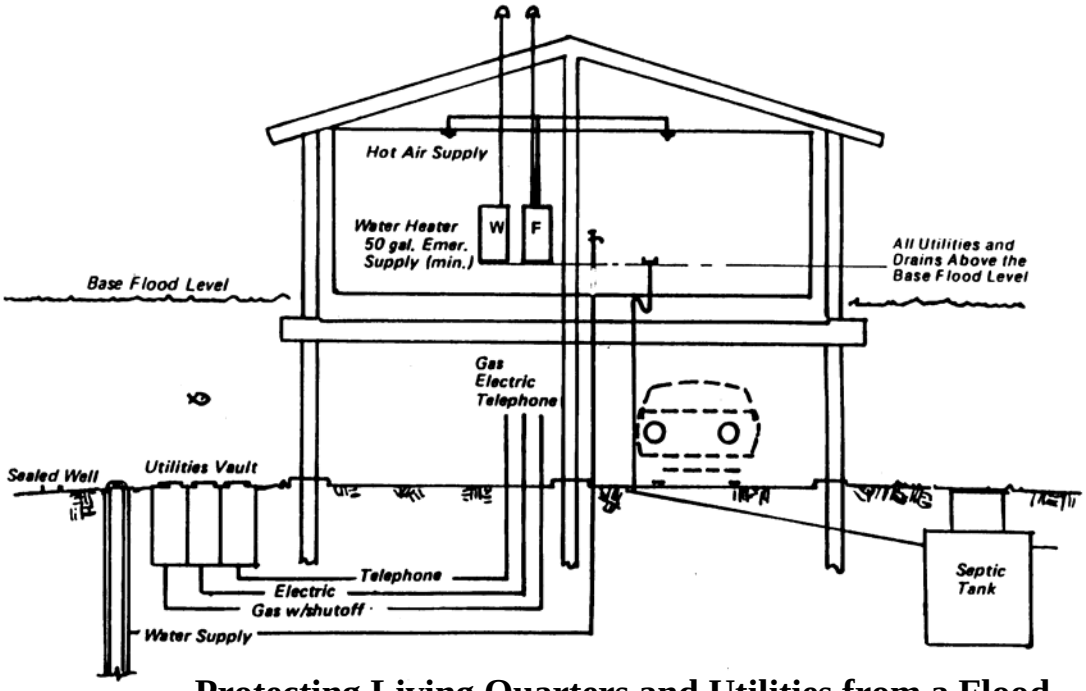
Floodproofing is a process for preventing or reducing flood damages to the structure and/or to the contents of buildings located in flood hazard areas. For the most part, it involves altering or changing existing properties. However, it can be incorporated into the design and construction of new buildings. There are three general approaches to floodproofing:

- Raising or moving the structure
- Constructing barriers to stop floodwater from entering the building
- Wet Floodproofing

These approaches are explained in greater detail in the following paragraphs along with some additional floodproofing items to consider before and during a flood.

Elevation

Raising or moving a structure so that floodwaters cannot reach damageable portions of it is an effective floodproofing approach. One technique is to raise the structure in place so that the lowest floor is above the expected level of floodwaters. This is commonly referred to as **"elevation."** The structure is jacked up and set on cribbing and a new or extended foundation is constructed underneath the structure. In areas where flooding is likely to have high velocities or waves, elevation on piles or columns without enclosing the lower area is the only recommended floodproofing technique.



Protecting Living Quarters and Utilities from a Flood

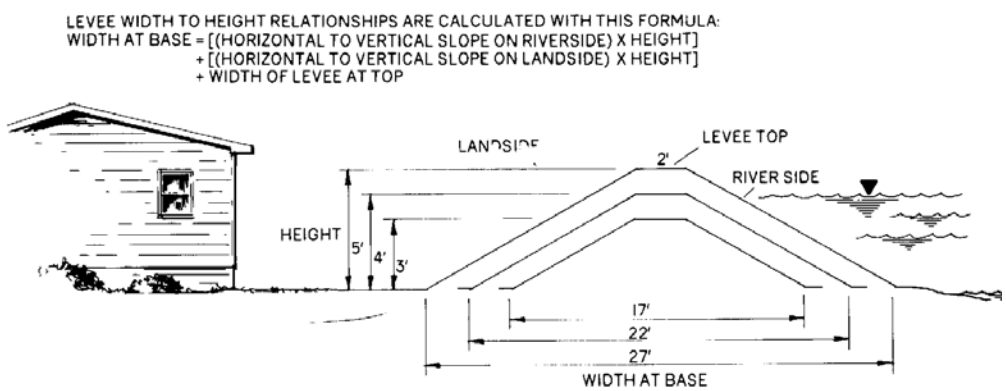
Cost is an important factor to consider in elevating structures. Lighter wood frame buildings are easier and cheaper to raise than masonry buildings. Masonry buildings not only are more expensive to raise, but are susceptible to cracks. If homeowners opt for elevation of the building, they must not then place contents or materials susceptible to flood damage on the new lower level.

Relocation

second technique is to move the building to another location where floodwaters cannot reach it. This technique is commonly referred to in floodproofing literature as **"relocation."** Relocation of the structure can be to a flood-free location on the same lot or to another flood-free location. There are many qualified contractors experienced in relocating or elevating buildings.

Berm or Levee

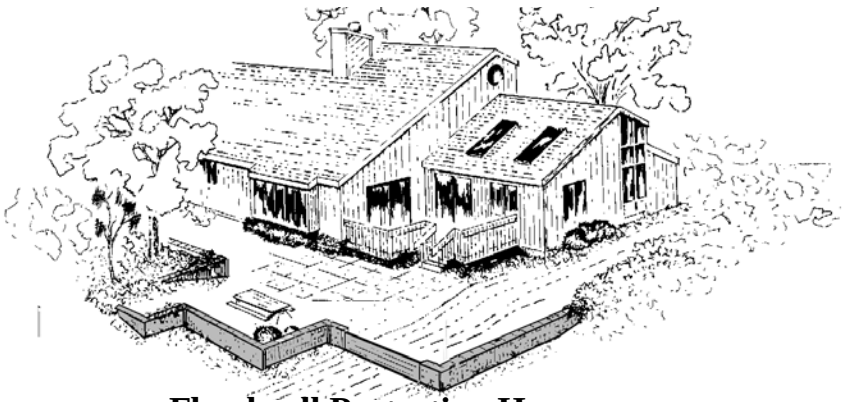
A **berm** is typically an earthen structure, constructed from local compacted fill that stops floodwater from reaching the building. To be effective over periods of time, berms must be constructed out of suitable materials (i.e. impervious soils) and with correct side slopes. **Levees**, which are similar to berms, are also earthen structures of compacted local fill. Levees are usually constructed along riverbanks to prevent the floodwaters from spilling over and flooding structures. Berms, on the other hand, serve the same purpose but usually are constructed closer to the structures themselves. Both berms and levees are generally appropriate for floodproofing a home where floodwaters are less than six feet deep. Levees can be constructed in areas where floodwaters exceed six feet deep, but the cost and the land area required for these levees usually make them impractical for the average homeowner.



Levee Width to Height Relationships

Floodwalls

Floodwalls are usually constructed out of reinforced concrete and anchored into the ground. Floodwalls, because of their greater cost, would normally be considered only on lots that are too small to have room for berms or levees or where flood velocities may erode earthen berms or levees. Other considerations such as aesthetics and possible obstructions such as trees, etc., would also cause a homeowner to consider floodwalls rather than a berm or levee. Berms, levees, and floodwalls may not be appropriate for homes with basements since they are more susceptible to underseepage.



Floodwall Protecting House

Dry Floodproofing

The second technique that can be used to construct a barrier against floodwaters is known as **"dry floodproofing."** With this technique, a building is sealed so that floodwaters cannot get inside. All areas below the flood protection level are made watertight. Walls are coated with waterproofing compounds or impermeable sheeting. Openings such as doors, windows, sewer lines, and vents are closed with permanent closures or removable shields, sandbags, valves, etc.

This floodproofing technique is only appropriate where floodwaters are less than three feet since most walls and floors in buildings will collapse under higher water levels. A professional engineer should be consulted when considering dry f1oodproofing since threat of collapse from hydrostatic pressure is a major concern with this technique.

The dry floodproofing technique is not as successful on buildings with crawl spaces or basements since those structures are difficult to protect from underseepage. Finally, dry floodproofing is frequently used where there is insufficient space for a berm or levee. Some of the disadvantages of this technique are that many waterproofing compounds are not made to withstand the pressures of the water and will deteriorate over time. Also, closures on windows and doorways are dependent on adequate warning time for installation, as well as the presence of someone to install them correctly.

Wet Floodproofing

The third overall approach to floodproofing involves modifying a structure to allow floodwaters inside, but ensuring that there is minimal damage to the building's structure and to its contents. This type of protection is called "**wet floodproofing**." Wet floodproofing allows the floodwaters to enter the structure. The building is modified so that utilities and furnaces are protected or relocated to an area above the anticipated flood level. Wet floodproofing is often used when dry floodproofing is not possible or is too costly. Wet floodproofing is generally appropriate in cases where an area is available above flood levels to which damageable items can be relocated or temporarily stored. This approach is also appropriate for structures with basements and where other floodproofing measures will not be effective.

There are a number of factors to be considered in wet floodproofing a structure. For example, moving contents is dependent on adequate warning time and the action of someone who knows what to do. Flooding areas that contain sources of electricity or hazardous materials creates a safety hazard. Also, after the flood, there will still be the need for clean up when wet floodproofing is employed.

Additional Considerations

1. Basement Protection

Flooding in basements and the lower levels of split-level houses is especially difficult to prevent. These areas are susceptible to seepage under berms, floodwalls, or dry flood proofed walls. Flooding of below-grade areas may occur through sewer pipes and drainage sumps, which are direct connections to flooded areas or from high groundwater caused by flooding. The basic sources of basement flooding and ways to prevent that flooding vary according to the type of flooding.

The first source of flooding in basements is failure or overload of the subdrainage system's sump pump. Installing alternate power sources, improving pump maintenance, and adding or increasing the size or number of pumps could eliminate this source of flooding.

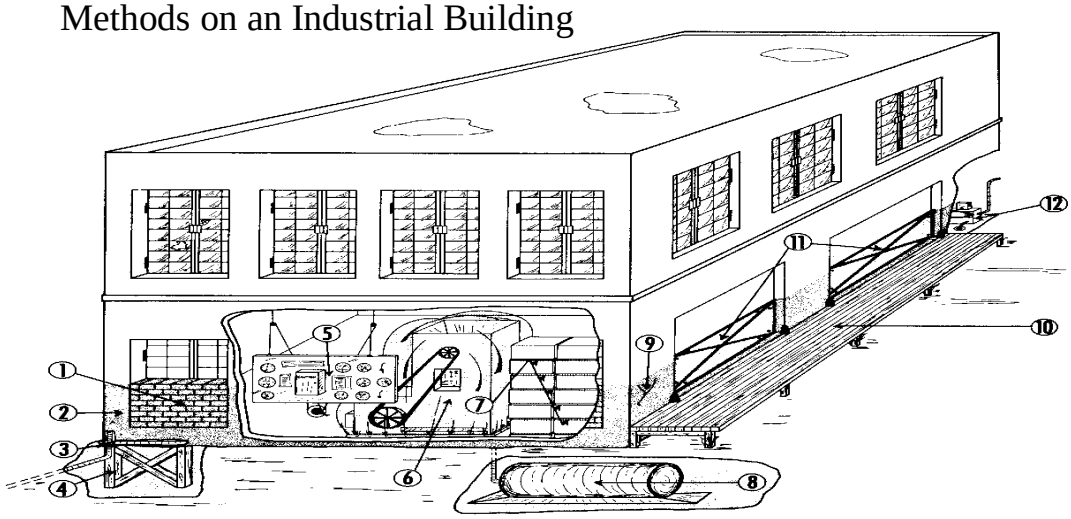
Water backing up from sewer lines represents a second source of basement flooding. This could be eliminated by installing in-line valves or check (oneway) valves, installing standpipes, or converting the sewer system to an overhead sewer system.

Seepage through cracks in the walls, a third source of basement flooding, may be eliminated by sealing the walls with waterproofing compounds that are available commercially.

The fourth source of basement flooding is surface water flooding. Sealing basement windows and other above ground openings could prevent surface flooding from entering a basement.

In cases where flooding causes high groundwater, hydrostatic pressures are usually too great to allow dry floodproofing a basement. Therefore, wet floodproofing by moving basement equipment and contents and allowing the water to enter the basement is often the only available means of reducing damages (see Wet Floodproofing).

Use of Multiple Floodproofing Methods on an Industrial Building



EXPLANATION

1. Permanent closure of opening with masonry
2. Thoroseal coating to reduce seepage
3. Valve on sewer line
4. Underpining
5. Instrument panel raised above expected flood level
6. Machinery protected with polyethylene covering
7. Strips of polyethylene between layers of cartons
8. Underground storage tank properly anchored
9. Cracks sealed with hydraulic cement
10. Rescheduling has emptied the loading dock
11. Steel bulkheads for doorways
12. Sump pump and drain to eject seepage

2. **Emergency Measures**

Emergency measures are temporary and usually implemented after a flood warning is issued. They are not permanent floodproofing installations and they require removal and clean-up after floodwaters have receded. Emergency measures fall into two basic categories: keeping the water out of the structure and protecting or moving damageable contents.

The most common measure used to keep water out of the structure is by erecting a sandbag wall. This requires a considerable amount of time, money, and manpower. Other temporary barriers can be erected with sand, rock, and lumber provided they are made watertight with impermeable sheeting.

Contents are best protected by moving them to higher floors of the structure or to higher ground. Some commercial establishments have modified their equipment by installing quick utility disconnects and placing them on pallets so that they may be easily moved on short notice.

Emergency measures are only effective if there is sufficient warning time to implement them. They may also be used to temporarily supplement a floodproofing technique where floodwaters will exceed the design level of the permanent measure. An example is sandbagging the top of a floodwall or levee.

General Cautions Applicable to Floodproofing

- Floodproofed buildings should **NEVER** be occupied during a flood! This is hazardous and life-threatening. Flooding conditions can change without warning and floodproofing installations can fail rapidly without allowing occupants ample time or opportunity to escape to safe ground.

- Most floodproofing techniques should be formulated and designed by experienced personnel (engineers or contractors) to ensure adequate consideration of all factors that could affect the techniques' effectiveness.

- Floodproofing techniques cannot be installed and forgotten. Maintenance must be performed on a scheduled basis to ensure that the floodproofing techniques adequately protect the structures over time.

- Floods may exceed the level of protection provided. Therefore, when any of the floodproofing techniques are chosen, considerations should be given to, purchasing flood insurance as well as securing the property and vacating the premises during flood events.

Advantages of Floodproofing

Where floodproofing is appropriate, it has several advantages over other ways of reducing flood damages. Individual property owners without waiting for government action can undertake floodproofing and it can provide protection in areas where large structural projects, such as construction of dams or major waterway improvements, are not warranted.

CHAPTER 7

ORDINANCE ADMINISTRATION

INTRODUCTION

Generally, the NFIP does not have specific requirements on how local ordinances should be administered. Administrative requirements vary from state to state due to differences in state enabling legislation. In addition FEMA wants to provide communities the flexibility to establish administrative procedures that are compatible with their other regulations and ordinances.

The NFIP does require that the local ordinance be legally enforceable and en-forced uniformly throughout the community (44 CFR 60.1(b)). There are also some record keeping requirements that assist in verifying community and building compliance with the regulations.

If FEMA finds that a community's program is not in full compliance with its NFIP obligation, then it may require certain administrative adjustments to the program. How the program is administered, though, is dependent on the State's enabling legislation and the administrative practices currently used or established by the community.

This chapter, therefore, is primarily a series of recommended administrative procedures. Those items that are NFIP requirements are highlighted in the "44 CFR" regulation boxes.

A. THE ORDINANCE

This reference guide assumes that your community has a floodplain regulation ordinance in effect. While the reference guide does not provide a model ordinance or ordinance language, it does describe the significance of your ordinance, and provides guidance on how to enforce some of its provisions.

If you need to enact or revise your floodplain regulations, contact your state NFIP coordinator to see if there is a model appropriate to your state laws and flooding conditions that you could use as a foundation for your local ordinance.

STATUTORY AUTHORITY

As used in this reference guide, ordinance is the generic term for a law passed by a local government. In some states it is called a “by-law” or some other name.

In all states, the authority to enact an ordinance comes from state law.

Communities are created by their state. Their powers are granted by and limited by state law or statutory authority, which is also known as enabling legislation. Your state has a specific law or set of laws authorizing your community to enact and enforce floodplain regulations. That law probably sets these parameters:

- The purpose and limits of the regulatory authority - for example, your community may not be able to regulate development projects undertaken by state agencies or public utilities.
- Minimum regulatory standards - many states mandate a certain building code or floodway encroachment standard.
- Prerequisites for enacting or amending the ordinance - a zoning ordinance may have to be based on a comprehensive plan or be adopted only after a public hearing.
- Requirements for issuing variances or allowing special uses.
- Prerequisites for the administering official - the community may have to have a certified building official enforce its building code.

Some state laws provide for state oversight of local regulations. In some cases, developers must apply to the state for a permit. In other cases, they may appeal to the state if they feel the community has not interpreted the regulations correctly.

In most states, local laws are subject to “Dillon’s rule,” named after a judge named Dillon who ruled in the 19th Century that because local governments are created by state government, they can do only what state laws specifically authorize.

If an action is not authorized by statute, a community cannot do it.

At one time, some communities did not have the statutory authority to implement the minimum NFIP regulatory requirements. FEMA worked with those states, so now all communities (cities and counties) should have all the authority they need to fulfill their NFIP obligations.

In some states, larger communities may be granted home rule. A home rule community is authorized to do anything that is not prohibited by statute. However, zoning and building laws are usually specific enough that even home rule communities must follow their provisions.

TYPES OF ORDINANCES

Floodplain regulations are usually found in one of four types of regulations: zoning ordinances, building codes, subdivision regulations, sanitary regulations, and "stand alone" ordinances. Each is explained below.

Zoning ordinance

A zoning ordinance regulates development by dividing the community into zones or districts and setting development criteria for each district. Two approaches address development in floodprone areas: separate districts and overlay zoning.

In a separate district, the floodplain can be designated as one or more separate zoning districts that only allow development that is not susceptible to damage by flooding. Appropriate districts include public use, conservation, agriculture, and cluster or planned chapter developments that keep buildings out of the floodplain, wetlands and other areas that are not appropriate for intensive development.

Overlay zoning adds special requirements in areas subject to flooding. The areas can be developed in accordance with the underlying zone, provided the flood protection requirements are met. As illustrated in **Figure 7-1**, there may also be setbacks or buffers to protect stream banks and shorelines or to preserve the natural functions of the channels and adjacent areas.

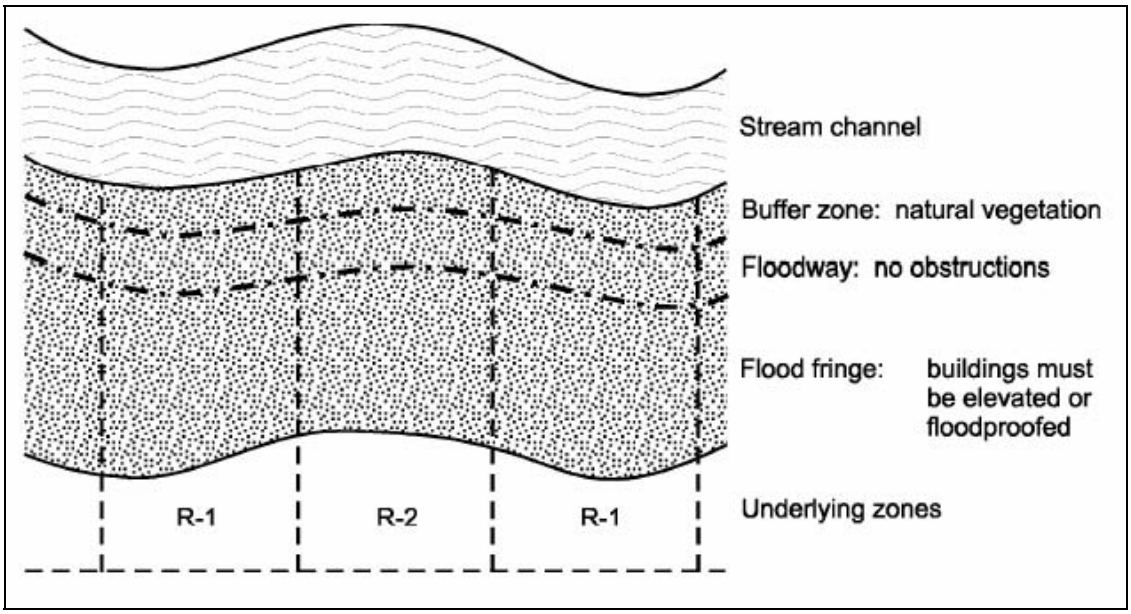


Figure 7-1. Example of overlay zoning

Building codes

A ***building code*** establishes construction standards for new buildings. Building codes generally do not establish site or location requirements. These requirements are implemented through subdivision or zoning ordinances or other land development regulations.

Many communities have adopted one of these national model building codes:

- The **National Building Code of the Building Officials and Code Administrators** (**BOCA**) has its flood resistant design and construction standards in Chapter 31.
- The **Standard Building Code of the Southern Building Code Congress International** (**SBCCI**) incorporates by reference the SBCCI Standard for Floodplain Management as its flood resistant design and construction standard.
- The **Uniform Building Code of the International Conference of Building Officials** (**ICBO**) includes flood resistant design and construction standards in a separate appendix that must be adopted by reference.
- The One and Two Family Dwelling Code of the **Code Administrators and Building Officials** (**CABO**) has no flood resistant design and construction standards but does have drainage provisions.
- The **International Codes** (**I-Codes**) of the International Code Council include the **International Building Code** (**IBC**), the **International Residential Code** (**IRC**), and several codes covering building utility systems and existing buildings. The I-Codes are consistent with all NFIP requirements related to the construction of flood resistant buildings.

- The **National Fire Protection Association** (**NFPA**) has issued the **NFPA 5000 Building Construction and Safety Code**. This code also is consistent with all NFIP requirements related to the construction of flood resistant buildings.

Many, but not all, NFIP regulatory requirements appear in parts of these codes

FEMA worked closely with the International Code Council and the National Fire Protection Association in developing their codes to assure consistency with NFIP requirements. Those NFIP requirements that relate to the actual construction of buildings are reflected in the bodies of the International Building Code and International Residential Code. Requirements related to building utilities are contained in the International Plumbing Code, International Mechanical Code, International Fuel Gas Code, and the International Private Sewage Disposal Code. The other NFIP requirements, such as administrative provisions, and requirements that apply to floodways, subdivisions and manufactured homes are contained in Appendix G of the International Building Code. Communities that adopt the I-codes have the option of either adopting Appendix G or addressing these other NFIP requirements through other codes and regulations.

Similarly, NFIP requirements that relate to the actual construction of buildings are reflected in the body of the NFPA 5000 Code. The other NFIP requirements are included in Annex C of the NFPA 5000 Code. Communities that adopt the NFPA 5000 Code have the option of either adopting Annex C or addressing these other NFIP requirements through other codes and regulations.

FEMA supported incorporation of NFIP flood resistant construction requirements into the I-Codes and the NFPA code because it felt these requirements could be more effectively administered as part of a building code with full involvement of the community's building department. However, there will be challenges in adopting either the I-Codes of the NFPA 5000 Code that your community will need to address.

- Make sure that all applicable NFIP requirements are met in either the I-Codes or the NFPA 5000 Code or your other codes and ordinances.

- Make sure that your State or community has not amended the I-Codes or the NFPA 5000 Code in a way that makes them inconsistent with NFIP minimum requirements.

- Designate which community agencies are responsible for meeting various NFIP requirements and establish administrative procedures to assure that coordination occurs between these agencies on individual development proposals.

- If a State agency directly enforces the I-Codes or NFPA 5000 Code for certain categories of buildings, make sure you work out similar procedures with that State agency.

FEMA and the International Code Council have jointly developed a publication that provides a comprehensive explanation of how the International Code Series can be used to meet the requirements of the NFIP. The publication is entitled ***Reducing Flood Losses Through the International Code Series*** and is available from the following code groups: Building Official and Code Administrators International, Inc. (8009) 214-4321;

International Conference of Building Officials (888) 699-0541, and
Southern Building Code Congress International, Inc. (888) 447-2224.

If your community will be adopting the I-Codes, you should obtain a copy of this publication. This publication may also be of interest to communities adopting the NFPA 5000 Code since many of the administrative and implementation issues are the same no matter which code you adopt.

Subdivision regulations

Subdivision regulations govern how land will be divided into single lots. They set construction and location standards for the infrastructure the developer will provide, including roads, sidewalks, utility lines, storm sewers and drainageways.

As noted in Chapter 6, Section C, subdivision regulations offer an opportunity to keep buildings out of the floodplain entirely with cluster developments.

They can also require that every lot have a buildable area above the BFE, include dry land access and meet other standards that provide more flood protection than a building code can.

Sanitary regulations

The NFIP's requirements for water and sewer system protection are some-times best located in the regulations that set the construction standards for these systems.

"Stand alone" ordinance

Many, if not most, communities in the NFIP have enacted a separate ordinance that includes all the NFIP regulatory requirements, usually based on a FEMA or state model.

The advantage of doing this is that one ordinance contains all floodplain development standards. Developers can easily see what is required of them, and FEMA and the state can easily see if your community has adopted the latest requirements.

The disadvantage to a separate ordinance is that it may not be coordinated with other building, zoning or subdivision regulations. Some communities have found that by adopting a stand alone model, they adopt standards that are inconsistent or even contrary to the standards in the other regulations. For example, your building code may require crawlspace vents to be high, near the floor joists, while the floodplain ordinance requires them to be no more than one foot above grade.

If you have a stand alone ordinance, you should review its provisions with all other offices and ordinances that regulate land development and building construction. Make sure that others know the floodplain regulations and that there are no internal inconsistencies. For example, a floodplain ordinance administered by the city engineer may not be coordinated with the permit process conducted by the building department.

CONTENTS

Whether your floodplain regulations are in one ordinance or several, they should have these provisions:

- Purpose: Why was the ordinance adopted? What are its objectives? This provision helps set the tone for regulatory standards. For example, if the only purpose of the ordinance is to meet the NFIP minimum building requirements, a court may rule that it should not have higher regulatory standards that protect life safety.
- Definitions: What technical terms are needed? Most ordinances have to define terms like “development,” “building,” “base flood elevation” and “lowest floor” in order for the regulations to be clearly understood.
- Adoption of flood data: Your community needs to adopt the flood maps, profiles and other regulatory flood data. This provision may need to be amended when new studies are published or new areas are annexed.
- Requirement for a development permit: Your ordinance must have a development permit process. Relying on your community’s building code or zoning ordinance permit process may not be sufficient because those pro-grams may not require permits for all development, including fill, mining, etc.
- Construction standards: This is the meat of the ordinance. It should cover all of the NFIP standards discussed in Chapter 5 and additional regulatory standards required by the state or that the community deems appropriate. The standards should include provisions for:
    - Building protection standards (elevation, floodproofing, anchoring)
    - Standards for manufactured (mobile) homes and manufactured home parks
    - Construction standards peculiar to the flood zones in your community, such as V, AO, AH and A99
    - Construction in the floodway and standards for encroachments where floodways are not mapped
    - Standards for subdivisions
    - Standards for water and sewer service
    - Rules on water course alterations
- Designation of administrator: The community must officially designate one person responsible for administering the ordinance. This provision may list that person’s duties, as detailed in the next section.

- Appeals process: The regulations need to provide a way for people to appeal or request a variance when they feel that the construction standards are overly harsh or inappropriate. This process should be handled by a separate body, such as a board of appeals or planning commission; it should not be left up to the decision of a single person, such as the administrator.
- Enforcement: The ordinance must have enforcement procedures clarifying penalties for violations. These are usually fines and orders to correct the violation.
- Abrogation and greater restriction: This is a legal provision that specifies that the ordinance take precedence over less restrictive requirements.
- Severability: This is a statement that the individual provisions are separable and if any one is ruled invalid, it does not affect the rest of the ordinance.

B. THE ADMINISTRATOR

The state grants communities the police powers to adopt, administer and en-force local codes and regulations, including floodplain regulations. Generally, elected officials delegate authority for ordinance administration and enforcement to a subordinate officer.

A local floodplain administrator might be an existing local staff person, such as the building inspector, community zoning official, engineer or planner. The community also might contract to have the job done by the county, regional planning agency, another jurisdiction or authority, or a private firm.

Throughout this reference guide, the person designated as responsible for ad-ministering the floodplain management ordinance is called “the administrator.” This reference guide also assumes that you are the administrator, so the terms “you” and “the administrator” are used interchangeably.

DUTIES

In general, the administrator is responsible for ensuring that development activities comply with the floodplain management regulations and other applicable codes and ordinances.

Duties of the administrator vary depending on the kind, size and characteristics of the community. However, certain responsibilities are common to all ordinance administrators. Here is a list of such duties:

Understand the regulations: This is the most important of all of your duties and is the main subject of this reference guide. A sound working knowledge of the general and technical provisions of various federal, state and local regulations is essential. You must be able to explain them to others, to review permit applications for compliance, and to provide adequate interpretations.

Ensure that permits are applied for: Often people do not realize that they need to apply for a permit for a project in the floodplain. You need to ensure that the public is informed as to when permits are needed and how they are obtained. Anyone engaged in a development project without a permit must be told to stop and apply for one.

Correct violations: You must evaluate complaints, conduct investigations and use legal recourse when necessary to correct violations.

Process permit applications: Your primary role is to review permit applications for compliance with applicable local regulations. This involves:

- Collecting permit fees, where applicable.
- Assessing the accuracy and completeness of the application.

- Evaluating site plans, topographic data, building design plans and other technical data.
- Identifying deficiencies and devising ways to correct them.
- Issuing or denying the permit.
- Helping applicants pursue appeals or requests for variances.

Coordinate with other programs: Responsibility for permit review may re-side in your office or be shared with other offices, such as public works, planning and zoning, code enforcement or housing departments. Depending on your duties, your may be involved in coordinating permit reviews.

You must advise the applicant of any need for additional local, state or federal permits for the proposed development. Your office could have copies of the permit application forms or advise applicants whom to contact.

One of your NFIP responsibilities is to notify adjacent communities and the state NFIP coordinating agency prior to any alteration or relocation of a water-course. You must submit evidence of such notification to the FEMA Regional Office.

You should also notify adjacent communities of plans for a substantial commercial development or large subdivision that could affect their flood hazard areas.

Ensure projects are built according to approved permits: You or your staff must perform periodic and timely on-site inspections to confirm visually that development is following the approved plans. The best way to do this is with a series of inspections at appropriate stages in the construction process, as discussed later in this chapter. A certificate of use or occupancy is a final permit that allows the owner to use the building. It should not be given until a final inspection confirms that everything was done according to the approved plans.

Take enforcement actions: When noncompliant activities are uncovered, you must act to resolve the situation. This may involve issuing stop-work orders or other violation notices, coordinating enforcement procedures with the community's attorney, or appearing in court.

Keep records: You should have on hand a sufficient supply of current permit applications, variance requests and other administrative forms. A project file should be kept for each development permit application.

Maintain and update flood data and maps: As noted in Chapter 4, Section D, your community should maintain an adequate supply of maps showing the regulatory floodplain for your office and the public to use. All map corrections and notices of map revisions should be recorded and denoted on administrative maps, with the details kept in an indexed file.

You should also cooperate with federal, state and local agencies, and private firms, undertaking flood studies. You must submit any new floodplain data to the FEMA Regional Office within six months of their development. Community staff should review revisions to maps (including Conditional Letters of Map Revision and Letters of Map Revision) to ensure they meet your regulations.

You must notify the FEMA Regional Office and the state within one year of an annexation or when your community has assumed or relinquished authority to adopt or enforce floodplain management regulations for a particular area. The NFIP has special procedures that need to be followed to ensure that these areas are properly mapped and regulated and remain eligible for flood insurance.

> **44 CFR 59.22(a)(9)(v)** Upon occurrence, [the community must] notify the Administrator in writing whenever the boundaries of the community have been modified by annexation or the community has otherwise assumed or no longer has authority to adopt and enforce flood plain management regulations for a particular area. In order that all FHBMs and FIRMs accurately represent the community's boundaries, include within such notification a copy of a map of the community suitable for reproduction, clearly delineating the new corporate limits or new area for which the community has assumed or relinquished flood plain management regulatory authority.

You must notify the FEMA Regional Office and the state within six months of physical changes that can affect flooding conditions, such as channel modifications or upstream detention.

> **44 CFR 65.3.** A community's base flood elevations may increase or decrease resulting from physical changes affecting flooding conditions. As soon as practicable, but not later than six months after the date such information be-comes available, a community shall notify the Administrator of the changes by submitting technical or scientific data in accordance with this part. Such a sub-mission is necessary so that upon confirmation of those physical changes affecting flooding conditions, risk premium rates and flood plain management requirements will be based upon current data.

Update the ordinance: If your community is notified of changes in federal or state laws and/or regulations that would require changing your floodplain management ordinance, you must revise your ordinance within six months.

> **44 CFR 60.7.** From time to time Part 60 may be revised as experience is acquired under the Program and new information becomes available. Communities will be given six months from the effective date of any new regulation to revise their flood plain management regulations to comply with any such changes.

Similarly, if you are given new flood data by FEMA, you have six months to update your ordinance to adopt the data and the regulatory requirements appropriate for that level of data (Chapter 5, Section A, Community Types relates the level of data to the regulatory requirements).

44 CFR 60.2(a) A flood-prone community … will be given a period of six months from the date the Administrator provides the data set forth in § 60.3(b), (c), (d), (e) or (f), in which to meet the requirements of the applicable paragraph.

A certified copy of any ordinance revision should be submitted to the FEMA Regional Office and to the state NFIP coordinating agency promptly after adoption.

QUALIFICATIONS

Your state may set minimum requirements for the person who administers the floodplain management ordinance, such as requiring that the post be held by a certified building official. A few states are encouraging or requiring that the ordinance be administered by a "certified floodplain manager," a new certification that may be conferred by your state, the floodplain management association in your state, or the Association of State Floodplain Managers (ASFPM). Information on the ASFPM certification program can be obtained at http://www.floods.org .

In most instances, there are no specific qualifications or prerequisites for a floodplain administrator. This does not mean just anyone can do any part of the job of administering the ordinance. One of your jobs is to make sure that the person with the right qualifications helps you. You will probably need help from three other professions:

- Some tasks should be conducted by an engineer experienced in hydrologic and hydraulic studies, such as reviewing a developer's flood study before you accept new flood elevations.
- You will need help from a registered land surveyor to complete Elevation Certificates. While there are limited instances where a properly appointed local administrator can complete an Elevation Certificate, most states require that such work only be done by a registered land surveyor.
- You should always consult your community's attorney before you initiate an enforcement action.

TRAINING

In many cases, only you will have the expertise needed to administer your ordinance. As the administrator, you will probably be your community's primary source of information on:

- The basic NFIP requirements.
- Additional requirements of your ordinance.
- How to use the NFIP maps and regulatory flood data.
- How maps are reviewed and revised.

- When permits are needed.
- Whether a proposed project meets the ordinance's standards.
- Whether a completed project complies with the approved plans.
- What records are needed.
- How to deal with citizens and builders.
- How to deal with violations.
- How floodplain development regulations and flood insurance rating are related.
- Where citizens and builders can get more information or help.

These topics are not taught at any high school or college. To learn these things you will need additional training. Here are some ways to get it:

- Read this study guide and make use of the learning checks.
- Spend time with the floodplain administrator in a neighboring community.
- Check with the FEMA Regional Office and/or the state NFIP coordinator before you issue your first few permits or certificates of occupancy.
- Request a Community Assistance Visit whereby a FEMA or state person will visit you and review your procedures.
- Attend a workshop put on by your state NFIP coordinator.
- Attend a meeting or conference of your state or national floodplain management association (contact the state coordinator for information about these associations).
- If available before you take a certification test, attend a recommended training or refresher course.
- Attend the Emergency Management Institute.
- Visit FEMA's web site periodically (http://www.fema.gov).
- Order and review the publications listed in Appendix C.

The Emergency Management Institute (EMI) in Emmitsburg, Maryland, provides several courses related to the administrator's job. While you may not need to take the resident course that covers the same information as this study guide, EMI offers three others that would be helpful:

- National Flood Insurance Program/Community Rating System
- Digital Hazard Data (how to use digital FIRMs and other data)
- Retrofitting Floodprone Residential Buildings

These courses are designed to give you step-by-step practical knowledge and experience. In addition, by attending an EMI course you meet other local administrators from around the country from whom you also can learn the ins and outs of floodplain management administration.

EMI courses run Monday through Friday, two to four times a year. They are free for state and local officials. Generally FEMA will pay transportation to Emmitsburg and will house you in dormitories on campus. For more information, See Appendix G, ask your local emergency manager, or call EMI at 800/238-3358.

LIABILITY

Ordinance administrators naturally fear they could be sued if a person gets flooded or if a building that they permit is damaged by a flood. Debated nation-ally for some time, this issue has been studied extensively by Dr. Jon Kusler, a nationally known attorney in floodplain management law.

Dr. Kusler summarized his most recent findings in ***Floodplain Management in the United States: An Assessment Report***, Volume 2, prepared for the Federal Interagency Floodplain Management Task Force, 1992.

Excerpts from that report are quoted here. However, your community's legal department should provide more specific guidance.

- Government agencies are generally not liable for flood damage unless the flood was caused by a government action. “Except in a few instances, governments are not liable for naturally occurring flood damages. Government has, in general, no duty to construct dams, adopt regulations, or carry out other hazard reduction activities unless required to do so by a statute. It is only where a government chapter causes flood damages or in-creases natural flood damages that liability may arise.” (*Floodplain Management in the United States: An Assessment Report*, Volume 2, *Page 1012*)
- Liability is based on negligence; a community is well defended by a properly administered program. “In general, government chapters are not 'strictly or absolutely' responsible for increased flood damages. Liability usually results only where there is a lack of reasonable care. ... Where the standard of reasonable care is judicially applied to an activity, the seriousness of foreseeable threat to life or economic damage is an important factor in determining reasonableness of conduct. In general, the more serious the anticipated threat, the greater the care the government entity must exercise. (*Floodplain Management in the United States: An Assessment Re-port*, Volume 2, *Page 1013*)

- Policy or discretionary actions are more defensible than nondiscretionary, ministerial actions. It is better to have clear standards spelled out in the ordinance adopted by your governing board than to leave a lot of interpretation up to the administrator. “As a general rule, courts do not hold legislative bodies or administrative agencies liable for policy decisions or errors in judgment where the legislature or agency exercises policymaking or discretionary powers. But they often hold agencies responsible for failure to carry out nondiscretionary duties or for negligence in carrying out ministerial actions.” (*Floodplain Management in the United States: An Assessment Report*, Volume 2, *Page 1013*)
- “... from a legal perspective it may be desirable to submit proposed standards ... to a community's legislative body (e.g., community council) for debate and approval. Due to the special way legislative decisions are treated by the courts, legislative judgments, particularly those of a discretionary nature, are less likely to result in a successful liability suit than are agency decisions. Courts generally defer to legislative judgment.” (*Flood-plain Management in the United States: An Assessment Report*, Volume 2, *Page 1017*)
- Government employees are usually protected from liability suits. “Although governments may be liable for increased flood or drainage losses in a broad range of contexts, government employees are usually not personally liable for planning, permit issuance, operation of dams, adoption of regulations or other activities. ... No personal liability results where a government employee acts in good faith, within the scope of his or her job, and without malice. Successful lawsuits for hazard-related damages against government employees under common law theories or pursuant to Section 1983 of the Civil Rights Act are apparently nonexistent.” (*Flood-plain Management in the United States: An Assessment Report*, Volume 2, *Pages 1013 - 1014*)

Based on these findings, you can protect yourself from lawsuits by:

- Adopting sound and appropriate flood protection standards: Remember, NFIP standards are minimums. Buildings should not be allowed in a mountainous floodplain with no warning time and very high velocities, even though the NFIP minimums would allow it. If you know flooding could be or has been higher than the BFE shown on the FIRM, you are not doing your residents any favors by allowing them to build buildings ex-posed to a known hazard.
- Becoming technically competent in the field: You won't be sued if you have ensured that the project was properly constructed. There is no grounds for a suit if no one is damaged by flooding: “... 'liability can be avoided if flood damages are avoided.' From a legal perspective, this is a sound philosophy.” (*Floodplain Management in the United States: An Assessment Report*, Volume 2, *Page 1017*)

- Insuring the community: Your community may want to purchase liability insurance or establish a self-insurance pool or plan to protect itself.
- Encouraging property owners to buy flood insurance coverage. If people are compensated for any flood losses, they are less likely to file a lawsuit.
- Adopting an ordinance provision that exempts the community from liability. Several states' model ordinances have language like the following:

The **Association of State Floodplain Managers** has produced a valuable report about legal liability risks facing those communities that do not take adequate steps to require mitigation where the risk is known (**www.floods.org**).

Disclaimer of Liability:

(I). The degree of flood protection required by this ordinance is considered reasonable for regulatory purposes and is based on avail-able information derived from engineering and scientific methods of study.

(II). Larger floods may occur or flood heights may be increased by man-made or natural causes.

(III). This ordinance does not imply that development either inside or outside the SFHA will be free from flooding or damage.

(IV). This ordinance does not create liability on the part of the City or any officer or employee therefore for any flood damage that results from reliance on this ordinance or any administrative decision made lawfully thereunder. (***Floodplain Management in Northeastern Illinois***, Illinois Department of Natural Resources, 1996, p. 56)

C. DEVELOPMENT PERMITS

Once the ordinance is in force, any development or change in land use requires authorization, generally in the form of a permit from the local administrator or agency. This section of Chapter 7 discusses the permit review process that leads to approval or denial of an application.

This discussion reviews a standard process. It is not a mandatory process, but it does ensure that all of your NFIP requirements will be met. If your community has a permit process that has proven successful, you should review this section to see if there are things you would want to add to your process.

Figure 7-2 shows the permit process that forms the organization for this section. To facilitate your work, you may want to develop your own checklist. An example developed by the State of South Carolina is at the end of this section in **Figure 7-3**.

WHEN A PERMIT IS REQUIRED

A permit is required for almost any development-related change to the flood-plain, including but not limited to:

- Construction of new structures
- Modifications or improvements to existing structures
- Excavation
- Filling
- Paving
- Drilling
- Driving of piles
- Mining
- Dredging
- Land clearing
- Grading
- Permanent storage of materials and/or equipment

While most communities have issued building permits for some time, many don't have a permit system that covers such a wide range of activities. The regulation of all development in floodplains is essential because fill or other material can obstruct flood flows just as structures can.

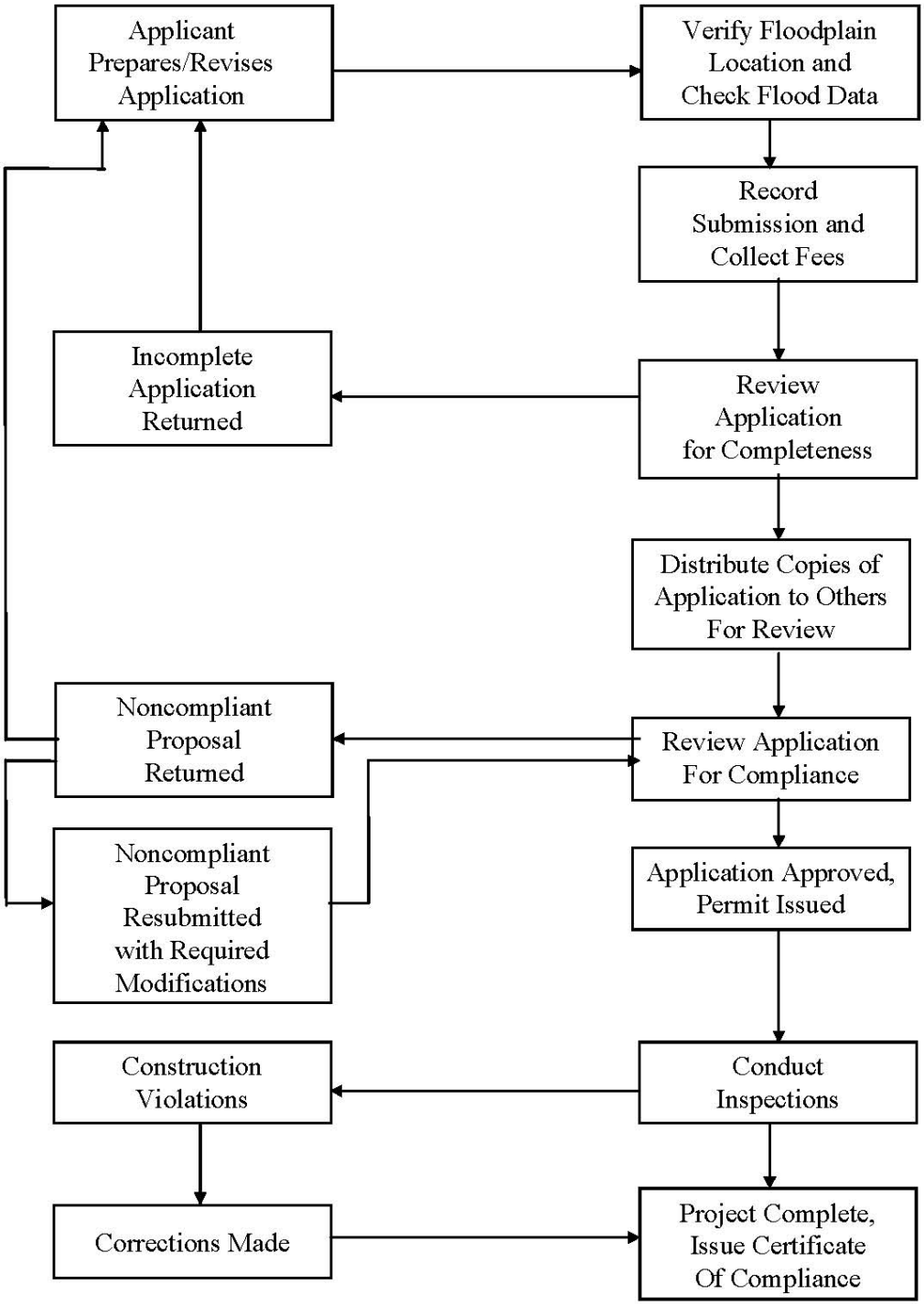


Figure 7-2. Permit process flow chart

EXEMPTIONS

Your statutory authority may limit your community's ability to regulate some development. The most common limitation is over activities by federal agencies, tribal lands, state agencies, other local governments, and public utilities. Check with your state NFIP coordinator to determine what is exempt from a local ordinance.

> **44 CFR 60.1(b)** These regulations must be legally-enforceable, applied uniformly throughout the community to all privately and publicly owned land within flood-prone … areas, and the community must provide that the regulations take precedence over any less restrictive conflicting local laws, ordinances or codes.

You cannot exempt activities by your own community government. Just because the public works department doesn't get a permit from the building department does not mean that it doesn't have to follow the NFIP rules that govern all development within your statutory authority.

If State actions are exempt from your permit authority, your state should have adopted floodplain management requirements that are comparable to your ordinance. This is usually done in the form of a governor's executive order or by adopting state floodplain management regulations. Similarly, Federal agency activities are subject to the provisions of **Executive Order 11988** Floodplain Management that references NFIP requirements. In both situations the state or federal agency should be applying the same or similar requirements to their actions as would be applied through your floodplain management ordinance. If there are activities being conducted in your floodplain by a State or Federal agency that are not meeting State floodplain management requirements or the requirements of Executive Order 11988, contact your FEMA Regional Office.

You do have some discretion to exempt obviously insignificant activities from the permit requirement—such as planting a garden, farming, putting up a mailbox or erecting a flagpole. Other projects, such as reroofing and replacing siding, will not affect flood flows or be substantial improvements. See also the discussion on the NFIP's development permit requirements in Chapter 5, Section C.

Some communities specify exempt projects in their ordinances. Check with your state coordinating agency and/or FEMA Regional Office before you do this, because you don't want to exempt projects that could be considered floodway violations or substantial improvements or otherwise not meet NFIP minimum requirements.

PERMIT APPLICATION FORM

A good administrative form can serve as a checklist for identifying the kinds of information that should accompany a permit application.

Your community should have its own permit application form. **Figure 7-4***,* at the end of this section, is the model form developed by the state of North Carolina. It contains all the required information for a floodplain development permit application. Your form may be different, but the review process is the same.

Note: If you use the form in **Figure 7-4** to develop your own permit application program, be sure to include all other state and local requirements. You may want to include checklists of items you will need to look at.

Where a particular activity that is required by the NFIP regulations is mentioned in this chapter's text, the reference to 44 CFR Part 60 is included in brackets (e.g. [44 CFR 60.3(c)(5)]). These activities must be included in the permit process in order for the community to remain in full compliance with the NFIP.

Forms are a valuable and necessary tool in reviewing development proposals for regulatory compliance. When designed properly, they can be the most efficient way to get information that is essential to conducting an effective and thorough review. The forms should be revised periodically to remain current with changes in the floodplain management ordinance and to include pertinent information.

APPLICATION REVIEW

Submission of a development permit application starts the permit process.

Before submitting an application, the prospective applicant often will contact you to obtain a copy of the regulations, locate the proposed site in relation to the NFIP maps, determine flood elevations, or gather procedural and technical information needed to complete the application.

This informal part of the permit process can be important in guiding the applicant to locate and design the development in compliance with local regulations. It also can help the applicant to prepare a complete application, avoiding unnecessary delays at the outset.

Some communities ensure that the permit process will go smoothly by having a formal pre-application meeting with a developer to review a preliminary plan.

REVIEW FOR COMPLETENESS

The application package should contain all the administrative forms, plans, blueprints and technical documentation required for you to review the proposed project for regulatory compliance. If the application package is incomplete, the review can't go forward. The applicant should be advised of missing documents and told that the review will not start until the missing documents are submitted.

Some states and communities require that a permit be issued within so many days of receipt of the application. You should not officially "receive" the application or log it in until it has been reviewed and determined to be complete.

You should review the package in a timely manner. The review should include the following procedures:

1. Make sure all administrative forms are completed satisfactorily and properly signed*.* Scan the administrative forms to ensure that all questions have been answered. If important items are left blank or not addressed completely, bring them to the attention of the applicant for completion.

Inaccurate information also should be brought to the attention of the applicant. Your review should be halted until deficiencies are corrected.

2. Briefly review site plans, grading and excavation plans, and building design plans for completeness. Depending on the specificity or detail of the administrative forms, the various plans that accompany the application will pro-vide the technical data needed for a thorough review.

The site plan is a critical component of floodplain development proposals. Such a plan should show:

- Location of property lines.
- Required set backs lines and easements.
- Topographic information, such as contour lines or spot elevations.
- Streets.
- Watercourses.
- Existing and proposed structures.
- Proposed building elevations of all new construction and the existing lowest floor for substantially improved or substantially damaged structures.
- All clearing, filling and other proposed changes to the ground.
- Floodway and floodplain boundaries.
- Base flood elevations.

When a plan is prepared by a registered professional architect, engineer or land surveyor, it should be stamped with the license seal to certify technical accuracy.

3. Ensure that all necessary certifications are included and properly signed. The applicant must provide all completed certifications needed for the permit review.

Based on the minimum NFIP requirements, four situations would require the filing of certified documents with the permit application:

- **Floodway encroachment**: If any part of the proposed project is to be located in a designated floodway, the applicant must submit an engineering certification and documentation demonstrating that the proposed encroachment would not result in any increase in base flood heights. If the project is in a riverine floodplain where no floodway has been adopted, the certification would show that there the project will not exceed the allow-able increase a flood heights. This certification could be the same as the **No-Rise Certification** shown in Figure 5-5. [44 CFR 60.3(c)(10) and (d)(3)]
- **Floodproofed building**: In the event a nonresidential structure is to be floodproofed, the applicant must submit a statement from a registered professional engineer or architect certifying that the design and methods of construction meet these standards [44 CFR 60.3(c)(4)]. A second, as-built, certificate is also required to be submitted later.
- **Enclosures below the lowest floor**. Chapter 5, Section E covered the requirements for openings in enclosures. If an applicant designs an enclosure below the lowest floor using an alternative to the NFIP standard, a registered professional architect or engineer must certify the design [44 CFR 60.3(c)(5)]. If a full-story enclosure is planned below the elevated lowest floor, you should require the applicant to sign a non-conversion agreement such as the one in **Figure 5-13**.

4. Ensure that all necessary federal and state permits are being obtained. You must review the application package to determine whether federal and state permits are necessary [44 CFR 60.3(a)(2)]. To help you and the applicant, you might include the agency or program names as a checklist on your permit application form.

When obtaining federal and state approval takes a long time, you may condition issuance of your permit on the applicant's obtaining such permits later. The applicant should provide documentation to the administrator stating that the required federal and state permits have been applied for, and that portion of the project affected by needed permits will not proceed until those permits are issued.

For example, getting a Section 404 wetlands permit from the Corps of Engineers may take several months. Under such circumstances, you may issue a local permit with the stipulation that the applicant must have obtained all required permits before beginning construction. You can verify this at your first inspection.

5. Submit copies of appropriate parts of the application package to other departments for review. Depending on the type and size of the proposed development and on the regulatory responsibilities of other departments or offices in your community, the applicant should submit a sufficient number of copies to allow for others' review.

Here are some departments and agencies who might need to review a portion of the application:

- Building department.
- Zoning department.
- Engineer's office.
- Health department (septic system approval).
- FEMA Regional Office (for assistance in evaluating a no-rise floodway application, change to a floodway delineation or other activity that will result in a map revision).
- State NFIP coordinating agency (state permit requirements, alteration or relocation of a watercourse).
- U.S. Army Corps of Engineers (404 permit, technical assistance).
- Environmental Protection Agency.
- U.S. Fish and Wildlife Service (incidental take permits under Section 10 of the Endangered Species Act of 1973).
- State public health agency (permits for hospitals, nursing homes, etc.).
- Natural Resources Conservation Service (impact of subdivisions and other large development on the natural resources of the area).
- Adjacent communities (alteration or relocation of a watercourse).
- If your office hasn't done this already, you should contact these agencies, determine what, if anything, they need to review, and prepare a checklist for permit applicants that advise them of the other approvals that will be needed.

REVIEW FOR COMPLIANCE

Now that you have a complete application package, follow these recommended procedures to verify that the project will meet all of your ordinance requirements.

1. Examine site information. Check the site plan to ensure that the plotted floodplain and floodway boundaries appear accurately plotted. Look for possible obstructions in the floodway and other potential violations. Inspect the plan carefully and compare it with the FIRM, floodway map and profile

Some project sites may be located close to the boundaries of the SFHA. Be-cause the map scale is small, or it is difficult to pinpoint the project site, you may have trouble determining whether the project will be in or out of the SFHA. See Chapter 4, Section B, on making floodplain and floodway boundary determinations.

Remember, a floodplain development permit is required only if the planned structure is located within the SFHA. For example, while the applicant's property may be located partially in the SFHA, the proposed structure would be built on land outside the SFHA. In this case, floodplain regulations would not apply and no special floodplain development permit is needed. However, if clearing, grading, filling, or road or bridge construction associated with erecting the structure is within the SFHA, a permit is necessary.

> Note that while you can use better ground elevation data to determine that a building location is above the BFE (and therefore outside the SFHA), the property will remain in the SFHA on the FIRM. That means that it is still subject to the flood insurance purchase requirement and the rates will be set at SFHA rates. It is the owner's responsibility to submit a request for a Letter of Map Amendment (LOMA) in order to have the FIRM reflect the better data (see Unit 4, Section D for more information on LOMAs).

2. Review building plans. If a building site is in the SFHA, all buildings must be protected to the BFE or higher.

> *In this reference guide, the term "building" is the same as the term "structure" in the NFIP regulations. Your ordinance may use either term. The terms are re-viewed in more detail in Unit 5. Section E.*

The application package must include building design plans that show:

- The kind and potential use of the structure.
- The elevation of the lowest floor.
- The type of foundation system.
- The existence of any enclosure below the lowest floor, along with electrical and plumbing plans for the area, location of openings and materials proposed for use in an enclosure below the BFE.
- The height to which a nonresidential structure is to be floodproofed and the complete list of floodproofing techniques to be used, with detailed drawings

Any conflict or inconsistency with applicable regulations will require adjustments to the building plans.

3. Have the community's engineer review engineering documents. As listed previously, depending on the type and location of the structure being proposed, as many as three engineering documents or certifications are needed to show compliance with NFIP requirements concerning floodway encroachment, floodproofing and enclosures below the lowest floor.

All engineering documents should be examined by your community's staff engineer, or a consulting engineer available to perform reviews, to ensure that acceptable technical standards were used and that calculations are correct. If your community does not have a staff engineer, the state NFIP coordinating agency or FEMA Regional Office may be able to help review the data.

APPLICATION APPROVAL OR DENIAL

Once you complete your review of the permit application papers for completeness and technical compliance with the ordinance, a decision on the application is due.

If the proposed development is in compliance with regulations, issue a permit. The permit becomes the official authorization from the community allowing the applicant to proceed, based on the information submitted in the application package. A sample permit developed by the North Carolina state NFIP coordinator is shown in **Figure 7-5**.

Somewhere in the permit record, such as the approved plans, the application form or the permit form itself, a record should be kept of the base flood elevation and the required floor elevation. There should also be a general statement that all construction will be in accordance with all codes and ordinances (see Section 1, item 6 in **Figure 7-4**).

The day a permit is issued is the date of the "start of construction," provided construction begins within 180 days. Used for insurance rating purposes, this date determines what FIRM was in effect when the building was built, regardless when ground was broken or construction was finished.

For regulatory purposes, a permit may be effective or valid for a certain period of time, according to the standard used in your other regulations. If at the end of this period the project is not complete, the permit technically expires. However, ordinances routinely provide for the permit officer to issue written extensions to allow completion of the development under the conditions of the original permit.

If the application is not in compliance with local regulations, the permit should be denied. The applicant then can choose to:

- Withdraw the permit application.
- Redesign the project to bring it into compliance with regulations.
- Appeal to the Board of Appeals.
- Ask for a variance to the regulations.

While you may not be formally required to disclose the reasons for denying an application, it is good policy to do so in writing. This tells the applicant what areas are noncompliant so that if he or she wishes to resubmit the application, appropriate corrections can be made.

Appeals and variances are covered in Section F of this chapter. Clarifying the deficiencies for the applicant also can help reduce the number of appeals of administrative and regulatory decisions you make.

Building Permit Number: _____

Applicant's Name:	Owner's Name:
Site Address, Tax #, Parcel #:	Address:
Telephone:	Telephone:

I. All development - Base Flood Elevation Data provided.

A. The as-built elevation certification from a registered land surveyor or professional engineer has been submitted? " Yes " No
B. The lowest floor elevation is at or above the required lowest floor elevation? " Yes " No
C. Electrical, heating, ventilation, plumbing, air conditioning equipment (including duct work) and other service facilities are located above BFE or floodproofed? " Yes " No

II. Development in Zones A, AE, A1-A30 and AH.

A. Solid foundation perimeter walls located below BFE.:
1. There are at least two (2) openings? " Yes " No
2. Square footage of enclosed area subject to flooding _____
3. Square inches of venting required
4. Square inches per opening (multiply l by w) _____
5. Number of required vents (3 above divided by 4 above) _____
6. Foundation contains the minimum number of vents? " Yes " No
7. The bottom of each opening is no higher than one (1) foot above grade? " Yes " No
8. Any cover on openings will permit the automatic flow of floodwaters in both directions? " Yes " No

B. Base flood elevation and/or floodway data not available or AO Zones:
1. The lowest floor is at least three (3) feet above the highest adjacent grade? " Yes " No
2. The development meets the setback requirements of the ordinance? " Yes " No
3. If 2 above was "no", has a No-Rise Certification been submitted? " Yes " No
Reviewer's Name: _____ Date reviewed: _____

C. Floodway data is provided.
1. Did this development encroach in the floodway? " Yes " No
2. Do the actual field conditions meet the proposed actions and technical data requirements? " Yes " No
3. If C1 was "yes", has a No-Rise Certification been submitted? " Yes " No
Reviewer's Name: _____ Date reviewed: _____

III. Development in Zones V, VE, and V!-V30, VO (Coastal High Hazard Areas).
A. Development location complies with all coastal setback requirements? " Yes " No
B. Structure is securely anchored to pilings or columns and certification by a registered, professional architect or engineer has been submitted? " Yes " No
Reviewer's Name: _____ Date reviewed: _____
C. Walls permitted below the base flood elevation consist of decorative lattice work or, where permitted, are breakaway and have been certified by a registered, professional architect or engineer? " Yes " No
Reviewer's Name: _____ Date reviewed: _____

Local Administrator's Signature: _____ Date : _____

Figure 7-3. Sample permit review checklist

(Developed by the South Carolina Department of Natural Resources)

Application #____
Page 1 of 4

SAMPLE
FLOODPLAIN DEVELOPMENT PERMIT APPLICATION

This form is to be filled out in duplicate.

SECTION I: General Provisions (APPLICANT to read and sign):

1. No work of any kind may start until a permit is issued.
2. The permit may be revoked if any false statements are made herein.
3. If revoked, all work must cease until permit is re-issued.
4. Development shall not be used or occupied until a Certificate of Compliance is issued.
5. The permit will expire if no work is commenced within six months of issuance.
6. Applicant is hereby informed that other permits may be required to fulfill local, state, and federal regulatory requirements.
7. Applicant hereby gives consent to the Local Administrator or his/her representative to make reasonable inspections required to verify compliance.
8. THE APPLICANT, CERTIFY THAT ALL STATEMENTS HEREIN AND IN ATTACHMENTS TO THIS APPLICATION ARE, TO THE BEST OF MY KNOWLEDGE, TRUE AND ACCURATE.

(APPLICANT'S SIGNATURE) _____ DATE _____

SECTION 2: Proposed Development (To be completed by **APPLICANT**)

	NAME	ADDRESS	TELEPHONE
APPLICANT			
BUILDER			
ENGINEER			

PROJECT LOCATION:

To avoid delay in processing the application, please provide enough information to easily identify the project location. Provide the street address, lot number or legal description (attach) and, outside urban areas, the distance to the nearest intersecting road or well-known landmark. A sketch attached to this application showing the project location would be helpful.

_____

_____

_____

Figure 7-4a. Sample floodplain development permit application form

(Developed by the North Carolina Division of Emergency Management)

DESCRIPTION OF WORK (Check all applicable boxes): Application # _____

Page 2 of 4

A. STRUCTURAL DEVELOPMENT

ACTIVITY	STRUCTURE TYPE
❑ New Structure	❑ Residential (1-4 Family)
❑ Addition	❑ Residential (More than 4 Family)
❑ Alteration	❑ Non-residential (Floodproofing? ❑ Yes)
❑ Relocation	❑ Combined Use (Residential & Commercial)
❑ Demolition	❑ Manufactured (Mobile) Home (In Manufactured Home Park? ❑ Yes)
❑ Replacement	

ESTIMATED COST OF PROJECT $ _____

B. OTHER DEVELOPMENT ACTIVITIES

❑ Clearing ❑ Fill ❑ Mining ❑ Drilling ❑ Grading
❑ Excavation (Except for Structural Development Checked Above)
❑ Watercourse Alteration (Including Dredging and Channel Modifications)
❑ Drainage Improvements (Including Culvert Work)
❑ Road, Street or Bridge Construction
❑ Subdivision (New or Expansion)
❑ Individual Water or Sewer System
❑ Other (Please specify)_____

After completing SECTION 2, APPLICANT should submit form to the Local Administrator for review.

SECTION 3: Floodplain Determination (To be completed by the Administrator)

The proposed development is located on FIRM Panel No. _____, Dated _____.

The Proposed Development:

❑ Is NOT located in a Special Flood Hazard Area (Notify the applicant that the application review is complete and NO FLOODPLAIN DEVELOPMENT PERMIT IS REQUIRED).

❑ Is partially located in the SFHA, but building/development is not.

❑ Is located in a Special Flood Hazard Area
FIRM zone designation is _____.
"100-Year" flood elevation at the site is: _____ft. NGVD (MSL)
❑ Unavailable

❑ Is located in the floodway.
FBFM Panel No. _____ Dated _____
(if different from the FIRM panel and date)

❑ See Section 4 for additional instructions.

SIGNED _____ DATE _____

Figure 7-4b. Sample floodplain development permit application form

(Developed by the North Carolina Division of Emergency Management)

Application # _____

Page 3 of 4

SECTION 4: Additional Information Required (To be completed by Local Administrator)

The applicant must submit the documents checked below before the application can be processed:

- ❑ A site plan showing the location of all existing structures, water bodies, adjacent roads, lot dimensions, and proposed development.

- ❑ Development plans, drawn to scale, and specifications, including where applicable: details for anchoring structures, proposed elevation of lowest floor (including basement), types of water-resistant materials used below the first floor, details of floodproofing of utilities located below the first floor, and details of enclosures below the first floor.

Also, _____

- ❑ Subdivision or other development plans. (If the subdivision or other development exceeds 50 lots or 5 acres, whichever is the lesser, the applicant must provide "100-year" flood elevations if they are not otherwise available).

- ❑ Plans showing the extent of watercourse relocation and/or landform alterations.

- ❑ Change in water elevation (in feet) _____ ❑ Meets ordinance limits on elevation increases ❑ YES ❑ NO

- ❑ Top of new compacted fill elevation _____ ft. NGVD (MSL).

- ❑ Floodproofing protection level (non-residential only) _____ ft. NGVD (MSL). For floodproofed structures, applicant must attach certification from registered engineer or architect.

- ❑ Certification from a registered engineer that the proposed activity in a regulatory floodway will not result in any increase in the height of the "100-year" flood. A copy of all data and hydraulic/hydrologic calculations supporting this finding must also be submitted.

- ❑ Other: _____

_____

SECTION 5: PERMIT DETERMINATION (To be completed by **LOCAL ADMINISTRATOR**)

I have determined that the proposed activity: A. ❑ Is B. ❑ Is not

in conformance with provisions of Local Law # _____, 19___. The permit is issued subject to the conditions attached to and made part of this permit.

SIGNED_____DATE_____

If Box A is checked, the Local Administrator may issue a Development Permit upon payment of designated fee. If Box B is checked, the Local Administrator will provide a written summary of deficiencies. Applicant may revise and resubmit an application to the Local Administrator or may request a hearing from Board of Appeals.

Application # _____

Figure 7-4c. Sample floodplain development permit application form

(Developed by the North Carolina Division of Emergency Management)

APPEALS: Appealed to Board of Appeals? ❑ Yes ❑ No
Hearing date:_____
Appeals Board Decision - Approved? ❑ Yes ❑ No

Reasons/Conditions:_____

_____

_____

SECTION 6: AS-BUILT ELEVATIONS (To be submitted by **APPLICANT** before Certification of Compliance is issued)

The following information must be provided for structures that are part of this application. This section must be completed by a registered professional engineer or a licensed land surveyor (or attach a certification to this application). Complete 1 and 2 below.

1. Actual (As-Built) Elevation of the top of the lowest floor, including basement (in Coastal High Hazard Areas, bottom of lowest horizontal structural member of the lowest floor, excluding piling(s) and columns) is: _____ ft. NGVD (MSL).

2. Actual (As-Built) Elevation of floodproofing protection is _____ft. NGVD (MSL).

SECTION 7: COMPLIANCE ACTION (To be completed by **LOCAL ADMINISTRATOR**)

The **LOCAL ADMINISTRATOR** will complete this section as applicable based on inspection of the project to ensure compliance with the community's local law for flood damage prevention.

INSPECTIONS DATE: _____ BY_____ DEFICIENCIES? ❑ Yes ❑ No
DATE_____ BY_____ DEFICIENCIES? ❑ Yes ❑ No
DATE_____ BY_____ DEFICIENCIES? ❑ Yes ❑ No

SECTION 8: CERTIFICATE OF COMPLIANCE (To be completed by **LOCAL ADMINISTRATOR**)

Certificate of Compliance issued: DATE_____ BY_____

Figure 7-4d. Sample floodplain development permit application form

(Developed by the North Carolina Division of Emergency Management)

No._____

FLOODPLAIN DEVELOPMENT PERMIT

Specify for what purpose the permit is issued—
New construction, alterations, fill, excavation, other

ISSUED TO:_____

ADDRESS:_____

PROJECT ADDRESS:_____
(if different from permittee's address)

ISSUED BY:_____
Floodplain Management Administrator

DATE:_____
(This permit expires 180 days from this date)

THIS PERMIT MUST BE POSTED ON THE PREMISES IN A CONSPICUOUS PLACE SO AS TO BE CLEARLY VISIBLE FROM THE STREET.

Figure 7-5. Sample permit form

D. INSPECTIONS

You can't assume that construction and development will proceed as spelled out in the permit you've approved. Follow-up conversations and inspections are vital to ensure that the applicant adheres to the permit's requirements.

Taking a hands-off attitude toward construction can create many problems for both the project's owners and your community.

The most effective way to ensure compliance is to inspect the site frequently during construction. This is particularly important in the early phases of work on a building because that's when errors in location or elevation of the lowest floor can be found and corrected. An inspection program also puts builders, developers and property owners on notice that the community will insist that projects are completed in compliance with regulations.

We recommend a series of three inspections for every project, especially any project that involves construction of a building.

FIRST INSPECTION

Do this inspection before ground is broken. Ideally, this site visit should be after the site is staked out to allow you to check the plans in relation to the ground and lot boundaries. With plans in hand, you should determine that the site as identified on the proposed plans is consistent with actual ground conditions.

Check the following:

- The location of the floodplain and floodway boundaries.
- Setbacks from lot lines, channel banks, etc.
- Floodway encroachments, if applicable.

If the building, filling, etc., as staked out is in violation of the approved plans or of the ordinance requirements, you must tell the developer to make revisions.

The project must not be allowed to proceed until you have gone back and verified that it is in compliance.

SECOND INSPECTION

Schedule your second inspection of a project involving a new building or addition to a building just before installation of the lowest floor. You need to ensure that the lowest floor will be built at the height stipulated in the permit application, and that the foundation is the type specified in the plans.

The type of foundation dictates your schedule:

- If the building is on a slab foundation, the inspection is best done when the forms are placed. You can check the proposed floor elevation by checking the elevation of the top of the forms. If the forms are high enough, you can approve the pouring the slab.
- If the building is on an elevated foundation (crawlspace, piles, etc.), the inspection is best done when the foundation is completed. If the top of the foundation is high enough, you can approve placement of the floor.
- If the building is to be floodproofed and the floodproofing technique is easy to identify - such as a reinforced concrete stem wall up to the BFE plus freeboard - this inspection should be conducted when that portion of the project is completed.

Making sure a structure is properly elevated is the key to the entire regulatory process. If this doesn't happen, the permit process is pretty much for naught. Therefore, an inspection at the point of initial construction, where changes to the height of the foundation can be made without major difficulty, is best. Once the foundation is poured or laid, it can be very expensive for the property owner to changes the building location or the elevation of the lowest floor.

Checking elevations

You can confirm the floor elevation at this stage in one of two ways. First, you can have the builder submit a survey of the floor elevation. This survey must be done by a surveyor or engineer.

The alternative approach is to check for yourself:

- Before construction or sometimes as part of the first inspection, the developer's surveyor or your engineer can shoot an elevation reference mark to a nearby stationary object such as a tree or telephone pole. The mark should be at the same elevation as the height to which the lowest floor should be elevated.
- During the second inspection, you can use a hand level to determine whether the lowest floor will be as high as the reference mark.
- This will give you a rough estimate that the building will be close to the correct elevation. A hand level will not give accurate elevations so, if you are in doubt obtain, a survey.

Note: Neither approach relieves the builder of having to provide an as-built elevation or floodproofing certificate when the project is done. It simply verifies that the building will be elevated or floodproofed to the proper elevation before it is too late to make changes.

During your second inspection, also check:

- Whether any fill meets the necessary compaction, slope and protection standards contained in your regulations.
- The building's location matches the permit application plans.
- The number and size of crawlspace or enclosure openings.
- Whether any part of the project encroaches into the floodway.

THIRD INSPECTION

The third and last inspection is conducted as the project nears completion. The purpose of this "final" inspection is to:

- Ensure that the foundation and floor elevation has not been altered since the second inspection.
- Obtain an as-built elevation or floodproofing certificate.
- Verify that enclosures below the lowest floors have adequate openings.
- Ensure that nothing subject to flood damage, such as a furnace or air conditioning chapter, has been located below the lowest floor.
- Check for floodway encroachments.
- Check the anchoring system used in securing manufactured homes.
- You may wish to obtain photographs during the final inspection to document compliance and retain the photographs in the permit file. These photographs can be useful if the property owner later makes alterations to the building without obtaining permits. Be sure to document the date and circumstances under which the photographs were taken.

Certificate of occupancy

After the project passes final inspection, many communities issue a document called a certificate of occupancy, certificate of compliance or use permit.

This certificate allows the owner to move in to the newly constructed building or addition. Usually a new building cannot be sold until the seller has this certificate; some utility companies will not start service until the certificate is presented.

Before a certificate is completed, you must make sure that all needed documents are received and checked. You must have an elevation certificate and the other forms noted in the later section on record keeping.

LATER INSPECTIONS

Certifying a structure for occupancy is the final step in the permit process. However, the property must remain in compliance with your ordinance and the conditions under which the permit was issued.

Your office should periodically check to ensure that the property continues to remain in compliance over time. Later inspections are particularly important when a structure contains an enclosure below the lowest floor. Such areas can be easily modified and made into habitable spaces in violation of regulations.

In some states, communities do not have the statutory authority to go onto private property to look for violations. This can make it hard, if not impossible, to verify whether an enclosed area has been modified. If this is true in your community, your ordinance should prohibit enclosures or limit their allowable size to less than 300 square feet. Allow larger enclosures only if they have wood lattice or screening so you can tell from the street if changes have been made.

E. ENFORCEMENT

Adequate, uniform and fair enforcement means two things:

- All development in a floodplain must have a permit.
- All development with a permit must be built according to the approved plans.

In order to ensure that development is meeting these requirements, you must monitor the floodplain, and where necessary, conduct an inspection of a property. Some permit officials have statutory limits on where they can go to inspect a potential violation. Be sure to review your authority to access onto private property with your attorney.

If you discover development activities without permits or contrary to the approved plans, you must enforce your ordinance. You have several methods for enforcing your ordinance. This section explores these methods.

VOLUNTARY COMPLIANCE

The best approach is to convince the developer or property owner that com-plying with the ordinance is in his or her own best interest. This may take some explanation of the flood hazard and how the rules protect the property (or neighboring properties) from that hazard.

If the issue is protection of a building, the flood insurance rate table in **Figure 9-3** can show how expensive insurance could be. Even if the developer or the current property owner is not interested in flood insurance, future owners may want it and probably will be required to purchase it as a condition of a mortgage or loan. Expensive flood insurance may make the building very difficult to sell.

Should voluntary efforts not work, here are the other compliance tools you have.

ADMINISTRATIVE STEPS

Your first steps in enforcement involve what you can do as an ordinance administrator. Be sure to review these with your community's attorney before you start:

- Contact the property owner or building contractor in person or by telephone to explain your concerns.
- Notify the property owner (in writing) of the nature of the violations and what to do to correct them.
- Post a violation notice on the property.

If a problem is found during construction of a permitted project, you have additional tools:

- If the violation is a serious one, or if the problem still exists after a follow-up inspection, you can issue a stop-work order or revoke the permit.
- You can withhold the certificate of occupancy until the problem is corrected. Usually utilities will not be turned on or a bank loan will not be closed until the certificate of occupancy is issued.

LEGAL RECOURSES

If your administrative measures do not bring results, go back to your community's attorney and discuss the next steps. Your attorney can take the case to court and request two additional enforcement measures be brought to bear.

You can help the attorney by having complete records of all correspondence and meetings with the person accused of the violation. You should also identify what section of the ordinance was violated, when and how, and what was specifically allowed in the approved permit.

You should advise the attorney about what actions can be taken that will bring the project into compliance. Depending on the violation, these actions could include removing the building (or other project), retrofitting the building to protect it, applying for a variance, or revising the maps to remove the problem from the floodplain, floodway, etc.

Fine. Your ordinance should establish a maximum fine per offense. Usually each day a violation continues is considered a separate offense. This approach encourages a quick remedy to the problem.

A per-day fine for a summary offense from a local district justice or magistrate can be difficult to get because many courts would believe that such a severe financial penalty does not fit the infraction. However, the threat of seeking the fine may be sufficient to persuade a property owner to remedy the violation.

Recordation. Depending on your statutory authority, you may be able to record the violation in the property's deed records. This will inform potential purchasers as well as "cloud the deed," making it hard for the owner to sell the property or the buyer to obtain title insurance. This approach is more appropriate for new developments that are likely to be sold in the near future.

Injunction. An injunction is a court order to stop further noncompliant con-duct. A temporary restraining order will be issued if the activity can be shown to be a danger to the public and that immediate irreparable harm can occur.

Housing court. Dealing with your state or county's judicial system can be expensive and difficult. Your case has to wait its turn and compete with many cases for attention.

To speed up the enforcement process, some communities enact special enforcement ordinances to create a municipal housing court or a building court. This is a local judicial body that has several advantages:

- The judge or administrative judge will be familiar with housing or building code law.
- The community has more control over when cases will be heard.
- Such courts usually are less formal. For example, the defendant may not have to have an attorney present.

The establishment of these courts varies by state law. Your attorney or state department of local government affairs or housing can provide more information on how it can work in your community.

SECTION 1316

Section 1316 of the National Flood Insurance Act authorizes FEMA to deny flood insurance to a property declared by a State or community to be in violation of their floodplain management regulations.

Section 1316 is used when all other legal means to remedy the violation have been exhausted and the structure is still noncompliant. Section 1316 is a way the NFIP can support communities in the enforcement of their ordinances. Check with your state NFIP coordinator or FEMA Regional Office on how Section 1316 works in your state.

If invoked under Section 1316, denying flood insurance means:

- The property may be difficult or impossible to sell.
- The market value of the property may fall.
- The cost of suffering flood damage without insurance may be too great a risk for the property owner.
- Lending institutions holding the property's mortgage may threaten to fore-close.
- Any permanent reconstruction will be denied disaster assistance.

In some cases a Section 1316 insurance denial will be sufficient to convince the property owner to correct the violation. Section 1316 also has the advantage of limiting any taxpayer liability if the building is damaged by a flood, as the owner will be ineligible for an insurance claim and disaster assistance.

If a structure that has received a Section 1316 declaration is made compliant with the community's floodplain management ordinance, then the Section 1316 declaration can be rescinded by the community and flood insurance eligibility restored.

F. APPEALS, SPECIAL USES AND VARIANCES

Generally, procedures for Appeals, special uses and variances are specified by state law. They require judgment calls involving several people, as ordinances typically do not allow only one person to decide these issues. Here is when they can occur and how they are usually handled.

Appeals

Ambiguous language or differing interpretations can lead the applicant and permit office to disagree. Your ordinance should have a process for referring these disagreements to a board of appeals or adjustment which will interpret the ordinance and settle the dispute.

Special uses

Some regulations require that certain situations be given a special review to determine if they should be allowed and, if so, whether conditions should be attached to the permit. While the NFIP sets construction standards for all buildings, your community may have decided that residences should not be allowed in a floodway and that floodproofed nonresidential buildings should be allowed only if certain conditions are met. Some official body needs to determine if a special use permit or if a conditional permit should be issued.

Variances

Zoning ordinances, building codes and floodplain management regulations cannot be written to anticipate every imaginable situation. A process for issuing variances gives a builder a way to seek permission to vary from the letter of the rules because of a special situation.

A variance can mean that the minimum standards of the NFIP may not be met by a project due to a special local circumstance. Because of this, most of this section is devoted to variances.

Boards

In all three cases, the applicant submits a request to a knowledgeable board of arbiters. Typically, variances and special or conditional use permits are handled by the planning commission or other body that is responsible for writing and amending the ordinance. Appeals are usually handled by a separate board of appeals or board of adjustments. Sometimes all three processes are handled by the same body and sometimes, especially in smaller communities, that body is the city council or governing board.

These boards do not have authority to change the ordinance, just to apply or interpret the ordinance's provisions. They may or may not have authority to make a final decision. If not, they make recommendations to the governing board which makes the final decision.

VARIANCES

A ***variance*** is a grant of relief by a community from the terms of a land use, zoning or building code regulation. Because a variance can create an increased risk to life and property, variances from flood elevation or other requirements in the flood ordinance should be rare.

Granting variances is a local decision that must be based on not only NFIP criteria, but also on state law and other provisions the community may wish to require. Your community's review board must consider the fact that every newly constructed building adds to the local government's responsibilities and remains a part of the community for the indefinite future.

Variances are based on the general principal of zoning law that they pertain to a piece of property and are not personal in nature. Though standards vary from state to state, in general a variance is granted for a parcel with physical characteristics so unusual that complying with the ordinance would create an exceptional hardship to the applicant or surrounding property owners. Those characteristics must:

- Be unique to that property and not shared by adjacent parcels.
- Pertain to the land, not to any structure, its inhabitants or the property owners.

Characteristics 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. It is difficult, however, to imagine any physical characteristic that would give rise to a hardship sufficient to justify issuing a variance to a flood elevation requirement. There are usually alternative ways to construct a compliant building even in these situations.

Your community should grant variances based only on a structure-by-structure review. Never grant variances for multiple lots, phases of subdivisions or entire subdivisions.

NFIP requirements

NFIP regulations do not address appeals, special uses or conditional permits. Follow the procedures used in your zoning ordinance or building code as these are usually prescribed by state law.

Because variances may expose insurable property to a higher flood risk, NFIP regulations set guidelines for granting them. The guidelines, which are designed to screen out situations in which alternatives other than a variance are most appropriate, appear in 44 CFR 60.6(a). They are summarized in Figure 7-6.

A review board hearing a variance request must not only follow procedures given in the NFIP criteria, it must consider the NFIP criteria in making its decision. When the NFIP guidelines are followed, few situations qualify for a variance.

Good and sufficient cause. The applicant must show good and sufficient cause for a variance. Remember, the variance must pertain to the land, not its owners or residents. Here are some common complaints about floodplain rules that are **NOT** good and sufficient cause for a variance:

- The value of the property will drop somewhat.
- It will be inconvenient for the property owner.
- The owner doesn't have enough money to comply.
- The property will look different from others in the neighborhood.
- The owner started building without a permit and now it will cost a lot to bring the building into compliance

Hardship. The concept of unnecessary hardship is the cornerstone of all variance standards. Strict adherence to this concept across the country has limited the granting of variances.

***The applicant has the burden of proving unnecessary hardship*.** Reasons for granting the variance must be substantial; the proof must be compelling. The claimed hardship must be exceptional, unusual and peculiar to the property involved. Financial hardship, inconvenience, aesthetic considerations, physical handicaps, personal preferences or the disapproval of one's neighbors do not qualify as exceptional hardships.

The local board must weigh the applicant's plea of hardship against the purpose of the ordinance. Given a request for a variance from floodplain elevation requirements, the board must decide whether the hardship the applicant claims outweighs the long-term risk to the owners and occupants of the building would face, as well as the community's need for strictly enforced regulations that protect its citizens from flood danger and damage.

When considering variances to flood protection ordinances, local boards continually face the difficult task of frequently having to deny requests from applicants whose personal circumstances evoke compassion, but whose hardships are simply not sufficient to justify deviation from community-wide flood damage prevention requirements.

1. Variances shall not be issued by a community within any designated regulatory floodway if any increase in flood levels during the base flood discharge would result;

2. Variances may be issued by a community for new construction and substantial improvements to be erected on a lot of one-half acre or less in size contiguous to and surrounded by lots with existing structures constructed below the base flood level, in conformance with the procedures of paragraphs (a) (3), (4), (5) and (6) of this section;

3. Variances shall only be issued by a community upon...

(I). a showing of good and sufficient cause,
(II). a determination that failure to grant the variance would result in exceptional hard-ship to the applicant, and
(III). a determination that the granting of a variance will not result in increased flood height, additional threat to public safety, extraordinary public expense, create nuisances, cause fraud on or victimization of the public, or conflict with existing local laws or ordinances;

4. Variances shall only be issued upon a determination that the variance is the mini-mum necessary, considering the flood hazard, to afford relief;

5. A community shall notify the applicant in writing over the signature of a community official that..
.

(I). the issuance of a variance to construct a structure below the base flood level will result in increased premium rates for flood insurance up to amounts as high as $25 for $100 of insurance coverage and;
(II). such construction below the base flood level increases risks to life and property. Such notification shall be maintained with a record of all variance actions as required in paragraph (a) (6) of this section.

6. A community shall...

(I). maintain a record of all variance actions, including justification for their issuance, and
(II). report such variances issued in its annual or biennial report submitted to the [Federal Insurance] Administrator.

7. Variances may be issued by a community for new construction and substantial improvements and for other development necessary for the conduct of a functionally dependent use provided that...

(I). the criteria of paragraphs (a) (1) through (a) (4) of this section are met, and
(II). the structure or other development is protected by methods that minimize flood damages during the base flood and create no additional threats to public safety.

Figure 7-6: NFIP variance criteria (44 CFR 60.6(a))

These problems can be resolved through other means, even if the alternatives to a variance are more expensive or complicated than building with a variance, or if they require the property owner to put the parcel to a different use than originally intended, or to build elsewhere.

Here are two examples:

Example 1. A small undeveloped lot is surrounded by lots on which buildings have been constructed at grade. The ordinance requires new buildings to be constructed at a level several feet above grade.

If the owner were to build a new house, it would look different, Potential buyers would ask questions and find out about the flood problem in the area. If it were built on fill, the lot might drain onto the neighbors' property.

This situation probably would not warrant a variance because the owner does not face an exceptional hardship. Appearance is not a hardship and no action should be taken to hide the hazard from others. There are ways to elevate a building without creating a drainage problem, such as elevating the building on pilings or a crawlspace, or grading the fill to drain away from adjoining properties.

Example 2. A property owner seeks a variance because he or she would have to spend several thousand dollars to elevate a house to comply with the ordinance, and several thousand more to build a wheelchair ramp or an elevator to provide access for a handicapped member of the family.

While financial considerations are important to property owners and the needs of a handicapped person must be accommodated, these difficulties do not put this situation in the category of "exceptional hardships" because:

- The characteristics that result in the claimed hardship do not pertain to the property but are personal.
- A variance is not needed to provide day-to-day access to the building, which can be provided by building a ramp or elevator.
- Having a handicapped person occupy a floodprone dwelling raises a critical public safety concern.

If a variance is granted and the building is constructed at grade, the handicapped or infirm person must leave when floodwaters begin to rise, yet he or she may need help to do so. This poses an unnecessary danger to the handicapped person and places an extra demand on the community's emergency services personnel, who may be called upon to rescue the resident in the event of a flood.

On the other hand, if the building is properly elevated, the handicapped person either can be evacuated or can survive the flood simply by remaining at home safely above the floodwaters.

In effect, the variance would not relieve the property owner of his or her difficulty, but likely only postpone and perhaps ultimately increase it. It would not help the community, either, as the building will be susceptible to damage long after the current owners are gone.

It would be more prudent for both the owner and the community if the variance were denied and the home built at the proper elevation with handicapped access. This would ensure the safety of all family members when floodwaters rise, as well as protect the property owner's and the community's investment in the property.

Public safety and expense. Flood damage prevention ordinances are intended to help protect the health, safety, well-being and property of the local citizens. Variances must not create threats to public safety or nuisances.

Because it would increase damage to other property owners, no variance may be issued within a regulatory floodway that will result in any increase in 100-year flood levels (44 CFR 60.6(a)(1)).

Fraud and victimization. Variances must not defraud or victimize the public. Any buildings permitted below the BFE face increased risk of damage from floods, and future owners of the property - and the community - are subject to all the costs, inconvenience, danger and suffering that those increased flood damages may bring.

Future owners may purchase the property, unaware that because of a variance, it is subject to potential flood damages and can be insured only at high rates.

Minimum variation necessary. A variance is a request to vary from the rules, not to ignore them. Any variance should allow only minimum deviation from the local requirements.

For example, even if an applicant can justify not elevating a building above the BFE, the review board should not automatically allow the building to be built at grade. The board should still require as much elevation as possible, to provide some flood protection without causing exceptional hardship.

In considering variances, the review board should use local technical staff expertise and recommendations from the building, planning, zoning or engineering departments. The local technical staff should consider varying other requirements in order to provide the needed flood protection. For example, it may be more appropriate to issue a variance to the front yard setback requirement in order to get the building out of the floodway.

Flood insurance rates. While a variance may allow deviation from building standards specified in a local ordinance, flood insurance rates and the flood insurance purchase requirement - which must be enforced by lending institutions - cannot be waived.

This can create severe financial consequences for a property owner, as insurance rates for a building built below BFE can be substantially higher than those for elevated buildings. A variance from elevation requirements - the most common kind of variance requested - increases the risk to a building, and that increased risk is reflected in higher annual insurance premiums (Figure 9-3).

If a variance is requested to construct a building below the BFE, you must notify the applicant (in writing) that granting the variance will result in increased flood insurance premium rates, up to $25 per $100 of coverage. In many in-stances, the variance-induced rates will be so high as to make the building essentially uninsurable because the owners cannot afford the premium. (**In one case in Arkansas, a property owner was quoted $55,000 for an annual premium for a $250,000 house which was 9 feet below the base flood. The annual flood insurance premium was $25,000 - on a $100,000 building.**)

The original owner who applied for a variance may not care, but if approved, the variance's impact may matter a great deal to subsequent potential owners who cannot afford the property's high insurance rates. The result may be owner abandonment; your community could be left with a vacant, flood-damaged and essentially uninsurable building.

Figures 7-7 through **7-12** illustrate the premiums for a single-family home protected to different levels. They provide a clear picture of the cost of actuarial post-FIRM flood insurance rates and, therefore, the true risk to which the building is being exposed.

You should give these two pages of illustrations to anyone considering seeking a variance to save construction costs. A variance may save money in the short term, but over the long run, the owner will pay much more in insurance premiums or, if uninsured, in flood losses.

Note: These premiums are for the purposes of this example. Insurance rates vary, based on location, date of construction and lowest floor elevation, and must be computed case-by-case. The premiums shown for the next series of illustrations were computed based on $100,000 in building coverage. Current rates for these buildings may be different than those shown.

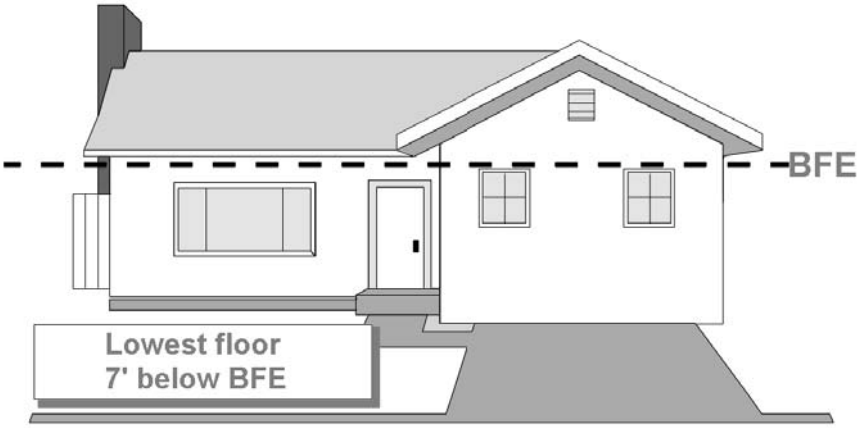


Figure 7-7. Pre-FIRM building—1995 insurance rate: $595

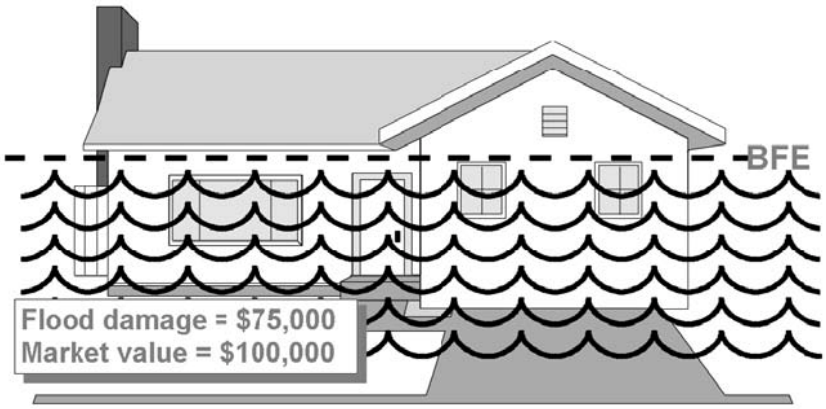


Figure 7-8. Pre-FIRM building—substantially damaged by 1997 flood

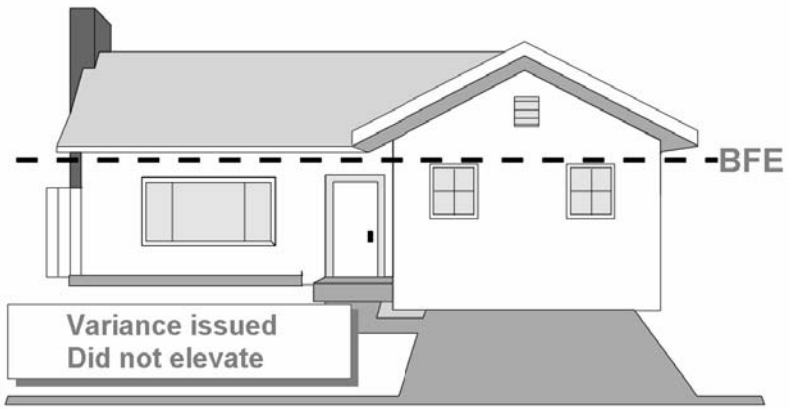


Figure 7-9. Repaired—variance issued and building is not elevated to or above the BFE (building is 7 feet below BFE); actuarial rate: $3,090

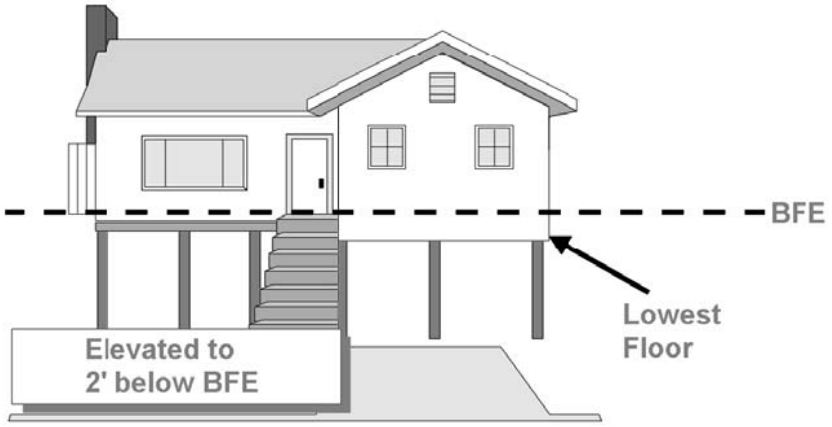


Figure 7-10. Repaired—variance allowed. Elevated to 2' below BFE; actuarial rate: $1,140

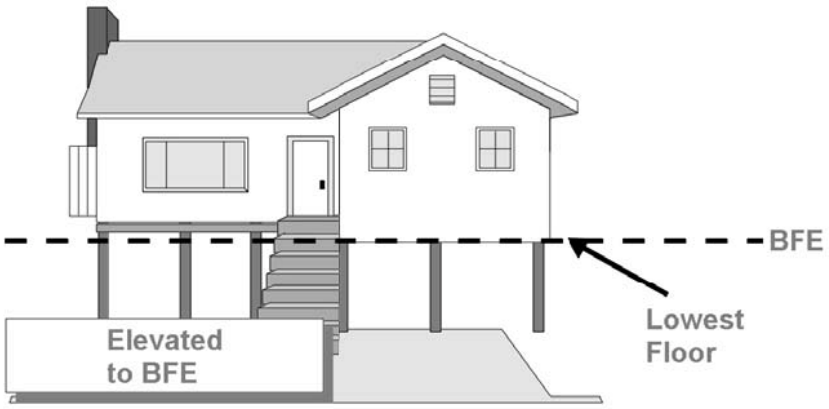


Figure 7-11. Repaired—elevated to BFE; actuarial rate: $351

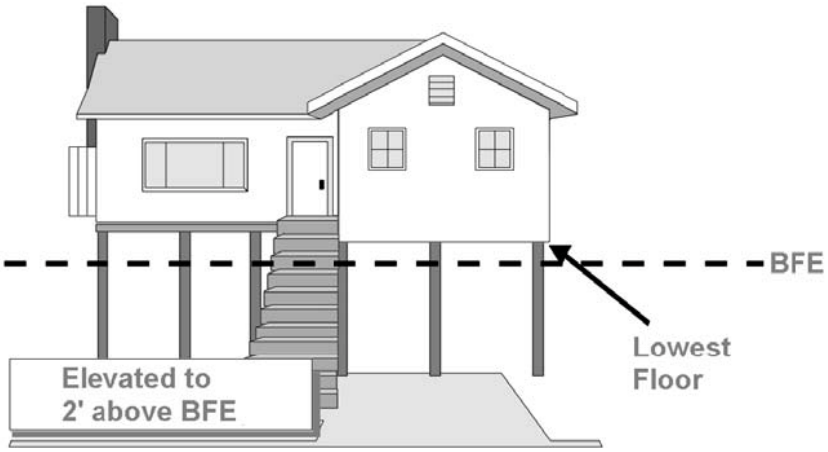


Figure 7-12. Repaired—elevated 2 feet above BFE; actuarial rate: $216

Historic buildings

A variance may be issued for the reconstruction, rehabilitation or restoration of historic structures if the variance is the minimum necessary to preserve the historic character and design of the structure. “Historic structures” are those listed in the National Register of Historic Places or the State Inventory of Historic Places, or that contribute to a historic district.

Changes to the structure must not destroy or alter the characteristics that made it an historic building. A certified local historic board or the state historic preservation officer must review and approve remodeling, renovations and additions before granting a variance. Whatever mitigation measures can be taken to reduce future flood damage must be required - such as elevating an air conditioner or using flood-resistant materials.

Many older buildings are not considered historic, so the first thing to check is whether the structure proposed for an exemption is historic. Look for it on a list maintained by:

- The National Register of Historic Places.
- Federally-certified state programs operated through a state historic preservation officer.
- A federally-certified local historic preservation board.

Structures are listed in the National Register or on a federally-recognized state or local inventory in one of two ways: as an individual building, or as a primary, secondary, or other contributing building in a designated historic district.

Structures are either listed or may be eligible to be listed. Only a federally-certified state or local historic preservation program can make such determinations. Either the state historic preservation office or federally-certified local historic preservation board should be consulted to determine if a structure proposed for the historic exemption is indeed historic.

Figure 7 – 13. Definition of "historic building"

Functionally dependent use

A variance may be issued for new construction, substantial improvements and other development necessary for the conduct of a functionally dependent use. A functionally dependent use is one that must be located or carried out close to water—such as a docking or port facility necessary for the unloading of cargo or passengers, shipbuilding and ship repair.

A functionally dependent use variance could be issued provided that:

- There is good and sufficient cause for providing relief from the regulations.
- The variance will be the minimum necessary to provide relief.
- The variance does not cause a rise in the 100-year flood level within a regulatory floodway.

The structure or other development must be protected by methods that minimize flood damage during the base flood and create no additional threats to public safety. One way of accomplishing this is to use wet-floodproofing techniques such as using flood resistant materials, elevating mechanical equipment, locating offices above the BFE, using ground fault interrupt electrical circuits, or developing an emergency plan to remove contents before a flood.

Records

The community must keep a record of all variances and the rationale for granting them. These are subject to review by FEMA or the state NFIP coordinator during a Community Assistance Visit.

The records must include a copy of the written notification to the applicant that the issuance of a variance to construct a building below the BFE will result in increased flood insurance premium rates as high as $25 per $100 of coverage, and such construction below the BFE increases risk to life and property.

It is recommended that the variance findings, conditions and authorization be recorded in the county deed records. This provides a means of permanently notifying future or prospective owners about the terms and conditions of the variance.

G. RECORDS

Records show what you approved and what you told the developer, forming a “paper trail” needed for administrative or legal proceedings related to development projects. Such records are vital if the project violates your ordinance. They also give future owners information about the property.

Records are also checked by FEMA or the state to determine if your community is in full compliance with the NFIP.

This section reviews what records you must - or should - keep to meet your community’s obligation to the NFIP.

PERMIT FILE

Your community should have a permit record system that is keyed to a geographical identifier (not just a building permit number) such as: street address, lot and block number, township, section and range, or county appraiser’s property ID number.

You should have a file for each permit application. The files should have some indicator on the folder to show that it is a floodplain permit, such as a different color file folder or file label.

Permit files should contain copies of these items, as appropriate:

- The permit application form and all attachments, including the site plan.
- All correspondence pertinent to the project.
- Flood and floodway data prepared by the developer.
- Engineering analyses of floodway encroachments and watercourse alterations.
- Special engineering designs for enclosures below the BFE.
- In coastal high hazard areas, engineering certifications of designs and construction methods of new and substantially improved buildings.
- In coastal high hazard areas, certification of specially designed breakaway walls.
- Any variances or appeals proceedings.
- Records of inspections of the project while under construction.
- Documentation of the “as-built” lowest floor elevation of all new and substantially improved buildings.
- Certification of the elevation to which any nonresidential building has been floodproofed.
- Certificates of compliance or occupancy.

Keeping these records is a requirement to participate in the NFIP; there is no statute of limitations as to how long they should be kept. You may want to keep a separate log or record of floodplain permits so you can readily retrieve those floodplain projects to show FEMA or the state NFIP coordinator.

It is not necessary to keep the entire building plans and other documents longer than is required for local code purposes. However, if you allow below-BFE enclosures, your files should include the ground floor plan of those buildings in case of a future violation issue.

ELEVATION CERTIFICATE

Your permit file needs an official record that shows how high new buildings and substantial improvements were elevated. This is needed both to show compliance with the ordinance and for the owner to obtain a flood insurance policy.

There is no mandated form for keeping building elevation records, but we strongly recommend that you use **FEMA's Elevation Certificate Form (FEMA Form 81-31)**. A blank copy is in Appendix F

If your community is participating in the Community Rating System, the FEMA form must be used for new construction and substantial improvements to existing buildings. Insurance agents writing flood insurance policies also must use the form to properly rate many types of buildings. Accordingly, FEMA encourages communities to use the form to help their residents obtain flood insurance without additional cost.

The FEMA form is an eight-page packet. It includes the two-page FEMA Form 81-31, Elevation Certificate, and instructions on how to complete it. Additional copies of the packet are available in bulk at no cost by calling 800/638-6620, ext. 2 (customer service).

There is a software version of the FEMA Elevation Certificate. It can be ordered at no charge by calling the CRS order number, 317/848-2898. If you use the software version, or keep elevation records on a computer database, you also need to keep the original signed "hard copy" of the surveyor's certification.

The responsibility for obtaining and filing an elevation certificate rests on the local permit official. Part or all of the form may be completed by a land surveyor, engineer, architect, or local official authorized by ordinance to provide floodplain management information. Most communities require the permit applicant to obtain the elevation certificate. (Depending on state law, if you are comfortable with using a transit or level you, as the floodplain ordinance administrator, can check the finished elevations and certify them for the record.)

You may give property owners or surveyors blank forms and expect them to complete the entire form. This practice does not relieve local officials in CRS communities from the requirement to ensure that the forms are complete and accurate. In non-CRS communities, the permit official should at least double-check the form to ensure that it is complete and that Sections A, B and D (on property, map and community information) are correct. You may wish to fill out Section B of the form and provide it to the surveyor to ensure that the map information on the Elevation Certificate is correct.

Annexations. The FEMA Elevation Certificate form is self-explanatory. One problem arises when a community annexes or extends its planning or regulatory jurisdiction over Special Flood Hazard Areas for the unincorporated areas of a county or an adjacent community. Some communities enroll in the NFIP before a Flood Hazard Boundary Map or FIRM has been issued for them.

Both situations lead to considerable confusion as to flood zone determination, as well as knowing which community number and panel numbers should be used on Elevation Certificates and other NFIP documents.

Flood zone determination: If the subject property is located within areas annexed from the county or within an area of extraterritorial planning jurisdiction, use the county flood maps to determine the appropriate flood zone.

Community Identification Number: In item 1 of Section B of the FEMA form ("Community Number"), use the municipality's NFIP ID number once a property is annexed or included in an extraterritorial planning jurisdiction.

Flood Map Panel Number: For property located in annexed areas or in the extraterritorial jurisdiction, for item 2 of Section B ("Panel Number"), use the entire county ID and panel number - "370087 0005," not just "0005." For sites within the "area not included," state "No NFIP Map."

FLOODPROOFING CERTIFICATE

Floodproofing means making a building watertight or substantially impermeable to floodwaters. It is an option only allowed for nonresidential buildings.

Designs for a floodproofed building must account for flood warning time, uses of the building, mode of entry to and exit from the building and the site, floodwater velocities, flood depths, debris impact potential and flood frequency.

FEMA's **Technical Bulletin 3-93, *Non-Residential Floodproofing Requirements and Certification for Buildings Located in Special Flood Hazard Areas*,** has a detailed discussion on each of these considerations.

For insurance rating purposes, the building's floodproofed design elevation must be at least one foot above the BFE to receive rating credit. If floodproofed only to the BFE, the floodproofing credit cannot be used, resulting in higher flood insurance rates.

44 CFR Sections 60.3(b)(5) and (c)(4) require the community to obtain and maintain a registered professional engineer's certification that a nonresidential building was properly floodproofed. You are encouraged to use the one-page FEMA certification form included in Appendix F because it fulfills NFIP insurance rating needs as well as floodplain management requirements.

NO-RISE CERTIFICATION

As discussed in Chapter 5, Section D, your ordinance requires that riverine flood-plains be free of encroachments that will cause an increase in flood levels. Where a floodway has been mapped, construction in the flood fringe is assumed to not be a problem.

You need to document that a project in the floodway - or in a riverine flood-plain where the floodway hasn't been mapped - will not cause in increase in flood heights. An engineering analysis must be conducted before you can issue a permit. Your permit file needs a record of the results of this analysis, usually in the form of a no-rise certification or an equivalent document.

The **engineering or no-rise certification** must be supported by technical data and signed by a registered professional engineer. The supporting technical data should be based on the standard step-backwater computer model used to develop the 100-year floodway shown on your FIRM or Flood Boundary and Floodway Map and the results tabulated in your Flood Insurance Study.

Although communities are required to review and approve the no-rise submittal, they may request technical assistance and review from the FEMA Regional Office. However, if this alternative is chosen, you must review the technical package and verify that all supporting data, listed in succeeding paragraphs, are included in the package before forwarding it to FEMA.

Figure 5-5 is a sample no-rise certification form developed by the North Carolina NFIP coordinating agency. Before using it, check with your state NFIP coordinating agency or FEMA Regional Office for additional guidance or requirements.

BIENNIAL REPORT

Every two years, participating communities must complete a form describing the community's progress in the previous two years in implementing floodplain management measures [44 CFR 59.22]. A copy of a biennial report appears in **Figure 7-14**.

FEMA sends the one-page form to your chief elected official. It must be completed and returned to FEMA within 30 days.

The only way you can complete the biennial report is to have complete and accessible permit records. You need to keep track of:

- Changes in community boundaries.
- Physical or topographical changes that affect flood hazard areas.
- Amendments to your floodplain ordinance.
- The number of building permits issued in the floodplain.
- The number of variances issued.

You also need to be able to tell FEMA:

- The number of people and number of buildings in the floodplain.
- Whether you would like any floodplain management assistance.

FEDERAL EMERGENCY MANAGEMENT AGENCY
NATIONAL FLOOD INSURANCE PROGRAM

O.M.B. No. 3067-0018
Expires Oct. 31, 2005

Biennial Report for
Calendar Year 2001 and 2002

REGULAR PROGRAM
(With Base Flood Elevations)

RETURN TO:
Federal Emergency Management Agency
Biennial Report Coordinator
P.O. Box 1038
Jessup, Maryland 20794-1038

INSTRUCTIONS

1. This report should be completed by the locally designated Floodplain Manager (e.g., your City Manager, City Planner, Building Inspector, etc.).
2. Please return this report within 45 days of receipt to the address above, or fax it to 1-800-358-9620. If you would like to respond via the Internet, go to www.floodmaps.fema.gov/br and use the following PIN number _____.

For more information, contact the FEMA Map Assistance Center toll free at 1-877-FEMA-MAP (1-877-336-2627).

SECTION I – Changes in your community that may have affected flood hazard areas:
If you answer "yes" to any question in this section, please be prepared to provide explanatory information and/or technical data including, when appropriate, your own community map or a copy of the Flood Insurance Rate Map showing the areas affected. Do not send this information at this time. FEMA may contact you by phone in the near future for this information.

	Yes	No
A. Does your community have any changes to the base data on your Flood Insurance Rate Maps? (e.g., adding/correcting street, adding Letters of Map Revision, or annexations/corporate limit changes)	☐	☐
B. Have the characteristics of watersheds in your community changed to the extent that your floodplain needs to be restudied? (e.g., major landuse changes due to urbanization, deforestation, wildfires, or stream relocation due to erosion/siltation)	☐	☐
C. Does your community have information that may be incorporated into a Flood Insurance Rate Map? (e.g., watershed studies or Base Flood Elevations established by developers)	☐	☐
D. Has there been a significant man-made change affecting your designated flood hazard areas? (e.g., levees, bridges, culverts, extensive filling, excavation, or stream channelization)	☐	☐

SECTION II – Community Floodplain Management Data during the last 2 years (calendar years 2001-2002 only):

	Yes	No
A. Has your community updated its floodplain management ordinance during the reporting period? If so, please send a copy of the new law to the return address identified above.	☐	☐
B. How many building **permits** were granted within the last 2 calendar years for new structures (including substantial improvements to existing structures) in the designated flood hazard areas shown on your community's Flood Insurance Rate Map?	☐	
C. How many **variances** to your local floodplain management ordinance were granted within the last 2 calendar years for new structures or substantial improvement to existing structures in designated flood hazard areas shown on your community's Flood Insurance Rate Map? Please provide ONLY the number of variances granted for structures with the lowest floor below the Base Flood Elevation.	☐	
D. Is your community in need of technical assistance in improving local floodplain management, such as regulation interpretation, planning, enforcement procedures, floodproofing, or a community visit?	☐	☐

E. Please update the demographic information for your community that was provided to FEMA when your community last reported to the National Flood Insurance Program. If any numbers are NOT correct or a "0" appears, please provide the revised number in the space below. If precise data are not available, please provide your best estimate.

	Permanent Year-Round Population	1-4 Family Structures	All other Structures
1. In your entire community (including flood hazard areas)			
2a. In your flood hazard areas only.			

2b. How did you determine the number of structures in the flood hazard areas? ☐ GIS data ☐ best estimate ☐ tax map overlays ☐ other (explain) _____

NAME, TITLE, SIGNATURE, AND E-MAIL ADDRESS	PHONE NO. (with area code)	Date	
		Month	Year

FEMA Form 81-29, Feb. 03

Retain a copy of this report for your records
REPLACES ALL PREVIOUS EDITIONS

Figure 7-14. Example Biennial Report

CHAPTER 8

SUBSTANTIAL IMPROVEMENT AND SUBSTANTIAL DAMAGE

INTRODUCTION

In previous chapters we focused on the rules and regulations that prevent or reduce damage from floods to new buildings. But what happens when the owner wishes to make an improvement, such as an addition, to an existing building? What if a building is damaged by a fire, flood or other cause?

Basic rule: If the cost of improvements or the cost to repair the damage exceeds 50 percent of the market value of the building, it must be brought up to current floodplain management standards.

That means an existing building must meet the requirements for new construction.

People who own existing buildings that are being substantially improved will be required to make a major investment in them in order to bring them into compliance with the law. They will not be happy. If the buildings have just been damaged, they will be financially strapped and your elected officials will want to help them, not make life harder for them.

For these reasons, it is easy to see that this basic rule can be difficult to administer. It is also the one time when your regulatory program can reduce flood damage to existing buildings. That's why this course devotes this chapter to administering the substantial improvements and substantial damage regulations.

In this reference guide, the term "building" is the same as the term "structure" in the NFIP regulations. Your ordinance may use either term. The terms are reviewed in more detail in Chapter 5, Section E.

A. SUBSTANTIAL IMPROVEMENT

44 CFR 59.1. Definitions: *"Substantial improvement" means any reconstruction, rehabilitation, addition or other improvement to a structure, the total cost of which equals or exceeds 50 percent of the market value of the structure before the start of construction of the improvement.*

This section provides information on determining whether a building has been substantially improved and on what NFIP requirements apply.

PROJECTS AFFECTED

All building improvement projects worthy of a permit must be considered. These include:

- Remodeling projects
- Rehabilitation projects
- Building additions
- Repair and reconstruction projects (these are addressed in more detail in Section B on substantial damage)

If your community does not require permits for, say, reroofing, minor maintenance or projects under a certain dollar amount, then such projects are not subject to the substantial improvement requirements. However, if you have a larger project that includes reroofing, etc., then it must include the entire cost of the project.

One problem you may face is a builder trying to avoid the requirement by applying for a permit for only part of the job and then later applying for another permit to finish the work. If both applications are together worth more than 50% of the value of the building, the combined project should be considered a substantial improvement and subject to the rules.

FEMA requires that the entire improvement project be counted as one. In order to help you enforce this, you may want to count all applications submitted over, say, one year as one project. Check with your attorney on whether your ordinance clearly gives you the authority to do this and be sure to spell it out in the permit papers given to the applicant.

Some communities require that improvements be calculated cumulatively over several years. All improvement and repair projects undertaken over a period of five years, 10 years or the life of the structure are added up. When they total 50 percent, the building must be brought into compliance as if it were new construction.

The Community Rating System credits keeping track of improvements to enforce a cumulative substantial improvement requirement. It also credits using a lower threshold than 50 percent. These credits are found under Activity 430, Section 431.c and d in the *CRS Coordinator's Manual* and the *CRS Application*. See also *CRS Credit for Higher Regulatory Standards* for example regulatory language.

Post-FIRM buildings

The rules do not address only pre-FIRM buildings—they cover *all* buildings, post-FIRM ones included.

In most cases, a post-FIRM building will be properly elevated or otherwise compliant with regulations for new construction. However, sometimes a map change results in a higher BFE or change in FIRM zone. A substantial improvement to a post-FIRM building may require that the building be elevated to protect it from the new, higher, regulatory BFE.

It should be remembered that all additions to a post-FIRM building must be elevated at least as high as the BFE in effect when the building was built. (You can't allow a compliant building to become noncompliant by allowing additions at grade.) If a new, higher BFE has been adopted since the building was built, additions that are substantial improvements must be elevated to the new BFE.

THE FORMULA

A project is a substantial improvement if:

$$\frac{\text{Cost of improvement project}}{\text{Market value of the building}} \geq 50 \text{ percent}$$

For example, if a proposed improvement project will cost $30,000 and the value of the building is $50,000:

$$\frac{\$30{,}000}{\$50{,}000} = 0.6 \text{ (60 percent)}$$

The cost of the project exceeds 50 percent of the building's value, so it is a substantial improvement. The floodplain regulations for new construction apply and the building must meet the post-FIRM construction requirements. If the project is an addition, only the addition has to be elevated (see the examples later in this section).

The formula is based on the cost of the project and the value of the building. These two numbers must be reviewed in detail.

Project cost

The cost of the project means all structural costs, including

- all materials
- labor
- built-in appliances
- overhead
- profit
- repairs made to damaged parts of the building worked on at the same time

A more detailed list is included in **Figure 8-1**.

To determine substantial improvement, you need a detailed cost estimate for the project, prepared by a licensed general contractor, professional construction estimator or your office.

Your office must review the estimate submitted by the permit applicant. To verify it, you can use your professional judgment and knowledge of local and regional construction costs, or you can use building code valuation tables published by the major building code groups. These tables can be used for determining estimates for particular replacement items if the type of structure in question is listed in the tables.

There are two possible exemptions you should be aware of: 1) improvements to correct code violations do not have to be included in the cost of an improvement or repair project and 2) historic buildings can be exempted from substantial improvement requirements. These are explained in more detail later on.

Market value

In common parlance, market value is the price a willing buyer and seller agree upon. The market value of a structure reflects its original quality, subsequent improvements, physical age of building components and current condition.

However, market value for property can be different than that of the building itself. Market value of developed property varies widely due to the desirability of its location. For example, two houses of similar size, quality and condition will have far different prices if one is on the coast, or in the best school district, or closer to town than the other - but the value of the building materials and labor that went into both houses will be nearly the same.

For the purposes of determining substantial improvement, market value pertains only to the structure in question. It does not pertain to the land, landscaping or detached accessory structures on the property. Any value resulting from the location of the property should be attributed to the value of the land, not the building.

Items to be included

— All structural elements, including:
— Spread or continuous foundation footings and pilings
— Monolithic or other types of concrete slabs
— Bearing walls, tie beams and trusses
— Floors and ceilings
— Attached decks and porches
— Interior partition walls
— Exterior wall finishes (brick, stucco, siding) including painting and moldings
— Windows and doors
— Reshingling or retiling a roof
— Hardware
— All interior finishing elements, including:
— Tiling, linoleum, stone, or carpet over subflooring
— Bathroom tiling and fixtures
— Wall finishes (drywall, painting, stucco, plaster, paneling, marble, etc.)
— Kitchen, utility and bathroom cabinets
— Built-in bookcases, cabinets, and furniture
— Hardware
— All utility and service equipment, including:
— HVAC equipment
— Plumbing and electrical services
— Light fixtures and ceiling fans
— Security systems
— Built-in kitchen appliances
— Central vacuum systems
— Water filtration, conditioning, or recirculation systems
— Cost to demolish storm-damaged building components
— --- Labor and other costs associated with moving or altering undamaged building components to accommodate improvements or additions
— --- Overhead and profits

Items to be excluded

— Plans and specifications
— Survey costs
— Permit fees
— Post-storm debris removal and clean up
— Outside improvements, including:
— Landscaping
— Sidewalks
— Fences
— Yard lights
— Swimming pools
— Screened pool enclosures
— Detached structures (including garages, sheds and gazebos)
— Landscape irrigation systems

Figure 8-1. Items included in calculating cost of the project

Acceptable estimates of market value can be obtained from these sources:

- An independent appraisal by a professional appraiser. The appraisal must exclude the value of the land and not use the “income capitalization approach” which bases value on the use of the property, not the structure.
- Detailed estimates of the structure’s actual cash value - the replacement cost for a building, minus a depreciation percentage based on age and condition. For most situations, the building’s actual cash value should approximate its market value. Your community may prefer to use actual cash value as a substitute for market value, especially where there is not sufficient data or enough comparable sales.
- Property values used for tax assessment purposes with an adjustment recommended by the tax appraiser to reflect current market conditions (adjusted assessed value).
- The value of buildings taken from NFIP claims data (usually actual cash value).
- Qualified estimates based on sound professional judgment made by the staff of the local building department or tax assessor’s office.

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

SUBSTANTIAL IMPROVEMENT EXAMPLES

Example 1. Minor rehabilitation

A rehabilitation is defined as an improvement made to an existing structure which does not affect the external dimensions of the structure.

If the cost of the rehabilitation is less than 50 percent of the structure's market value, the building does not have to be elevated or otherwise protected. However, it is advisable to incorporate methods to reduce flood damage, such as use of flood-resistant materials and installation of electrical, heating and air conditioning chapters above the BFE.

Figure 8-2 shows a building that had a small rehabilitation project. Central air conditioning was installed and the electrical system was upgraded. The value of the building before the project was $60,000. The value of the project was $12,000:

$\frac{\$12,000}{\$60,000} = 0.2$ (20 percent)

The project costs less than 50 percent of the building, so this is not a substantial improvement.

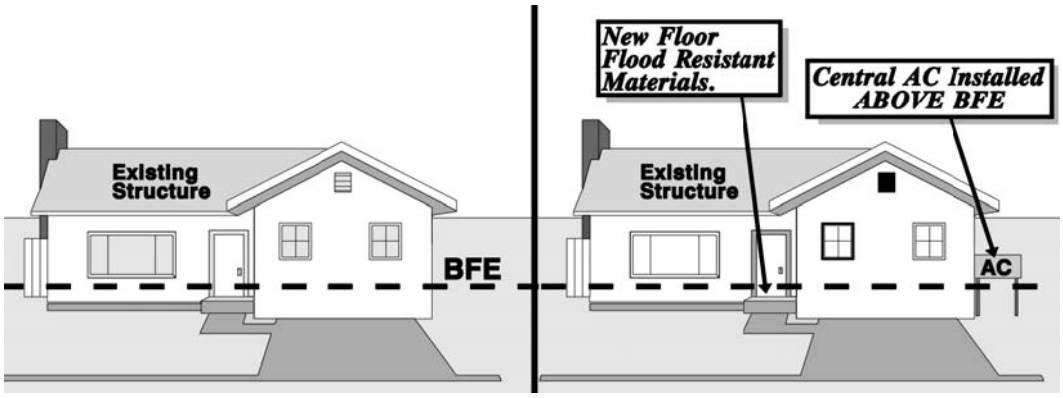


Figure 8-2. Minor rehabilitations use flood-resistant methods and materials

Neither structure would benefit from post-FIRM flood insurance rates because they are not elevated.

Note: To gauge what happens to flood insurance premiums if a substantially improved building is not brought up to post-FIRM standards, see **Figures 7-7** through **7-12**.

Example 2. Substantial rehabilitation

If the rehab costs more than 50 percent of the value of the building, your ordinance requires that an existing structure be elevated and/or the basement filled to meet the elevation standard.

Figure 8-3 shows a building that has been allowed to run down. It's market value is $35,000. To rehab it will require gutting the interior and replacing all wallboard, built-in cabinets, bathroom fixtures and furnace. The interior doors and flooring will be repaired. The house will get new siding and a new roof. The cost of this rehab will be $25,000:

$\frac{\$25,000}{\$35,000}$ = 71.4 percent

Because total cost of the project is greater than 50 %the rehab is a substantial improvement

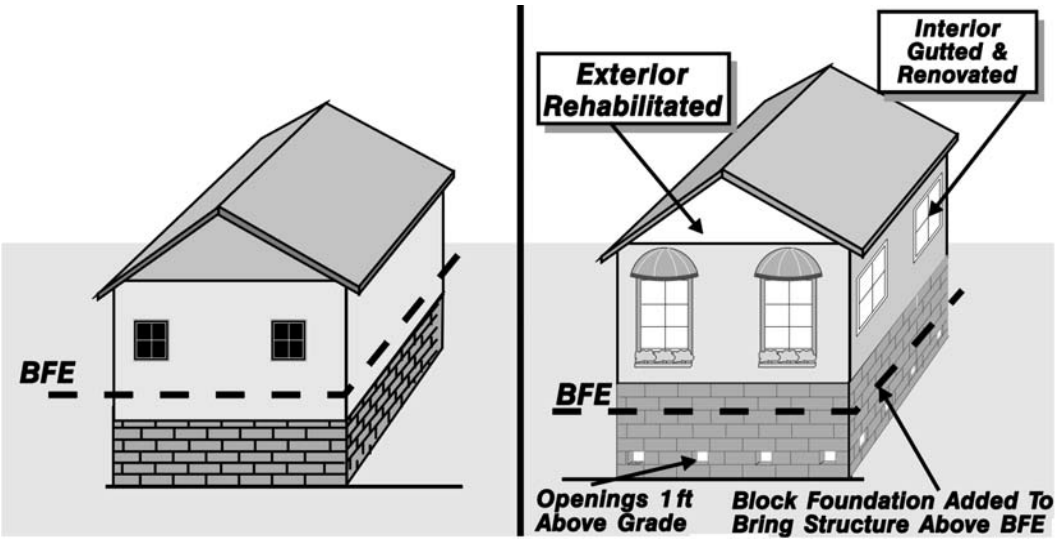


Figure 8-3. substantially rehabilitated building elevated above the BFE.

In A Zones, elevation may be on fill, crawlspace, columns, etc. The new structure would benefit from post-FIRM flood insurance rates.

Example 3. Lateral addition - residential

Additions are improvements that increase the square footage of a structure. Commonly, this includes the structural attachment of a bedroom, den, recreational room garage or other type of addition to an existing structure. Note that if one building is attached to another through a covered breezeway or similar connection, it is a separate building and not an addition.

When an addition is a substantial improvement, the addition must be elevated or floodproofed, providing that improvements to the *existing* structure are minimal. **Figures 8-4** and **8-5** illustrate lateral additions that are compliant.

Depending on the flood zone and details of the project, the existing building may not have to be elevated. The determining factors are the common wall and what improvements are made to the existing structure. If the common wall is demolished as part of the project, then the entire structure must be elevated. If only a doorway is knocked through it and only minimal finishing is done, then only the addition has to be elevated.

In A Zones only, if significant improvements are made to the existing structure (such as a kitchen makeover), both it and the addition must be elevated and otherwise brought into compliance. Some states and many communities require that both the existing structure and lateral additions be elevated in all cases.

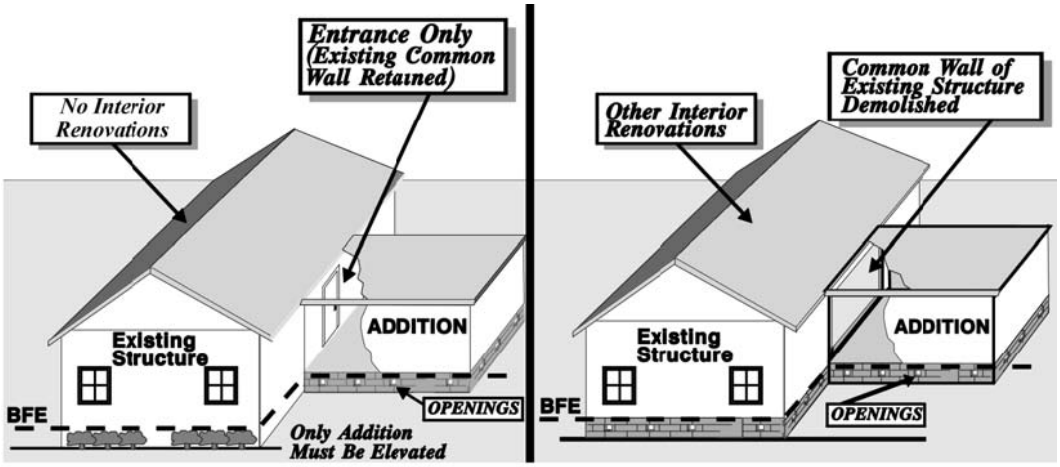


Figure 8-4. Lateral additions to a residential building in an A Zone.

Example 4. Lateral addition - nonresidential

A substantial improvement addition to a nonresidential building may be either elevated or floodproofed. Otherwise, all the criteria for residential buildings reviewed in Example 3 must be met.

If floodproofing is used, the builder must ensure that the wall between the addition and the original building is floodproofed. Floodproofing is not allowed as a construction measure in V Zones.

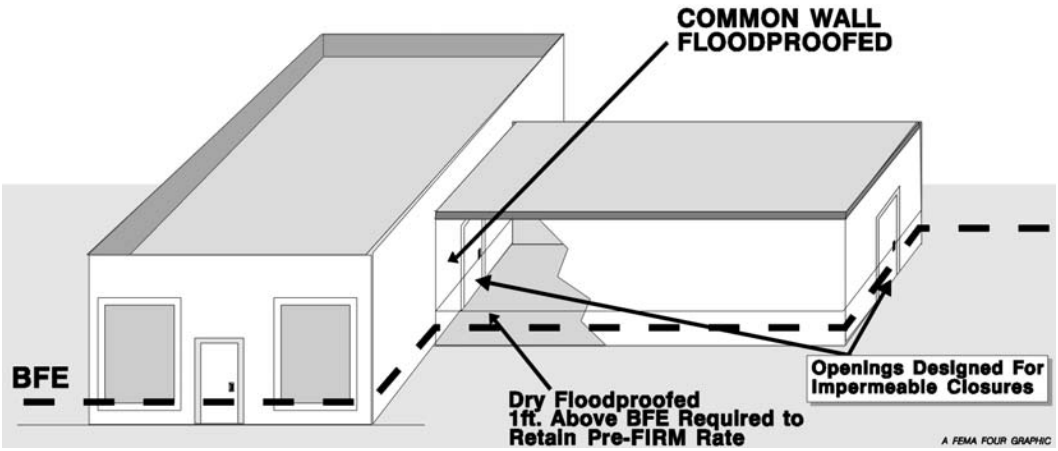


Figure 8-5. Lateral addition to a nonresidential building in an A Zone.

Example 5. Vertical addition - residential

When the proposed substantial improvement is a full or partial second floor, the entire structure must be elevated (**Figure 8-6**). In this instance, the existing building provides the foundation for the addition. Failure of the existing building would result in failure of the addition, too.

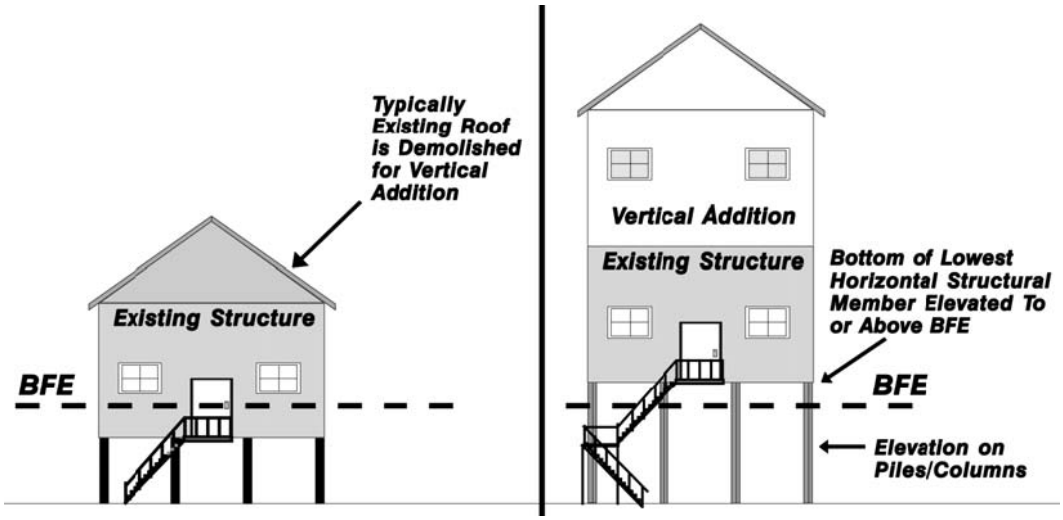


Figure 8-6. Vertical addition to a residential building in a floodplain.

The new structure would benefit from post-FIRM flood insurance rates.

Example 6. Vertical addition - nonresidential

When the proposed substantial improvement is a full or partial second floor, the entire structure must be elevated or floodproofed (**Figure 8-7**).

The owner could obtain post-FIRM rates on the building if it is floodproofed to one foot above the BFE and he has a floodproofing certificate signed by a registered engineer. An optional approach is to elevate the entire building and obtain an elevation certificate.

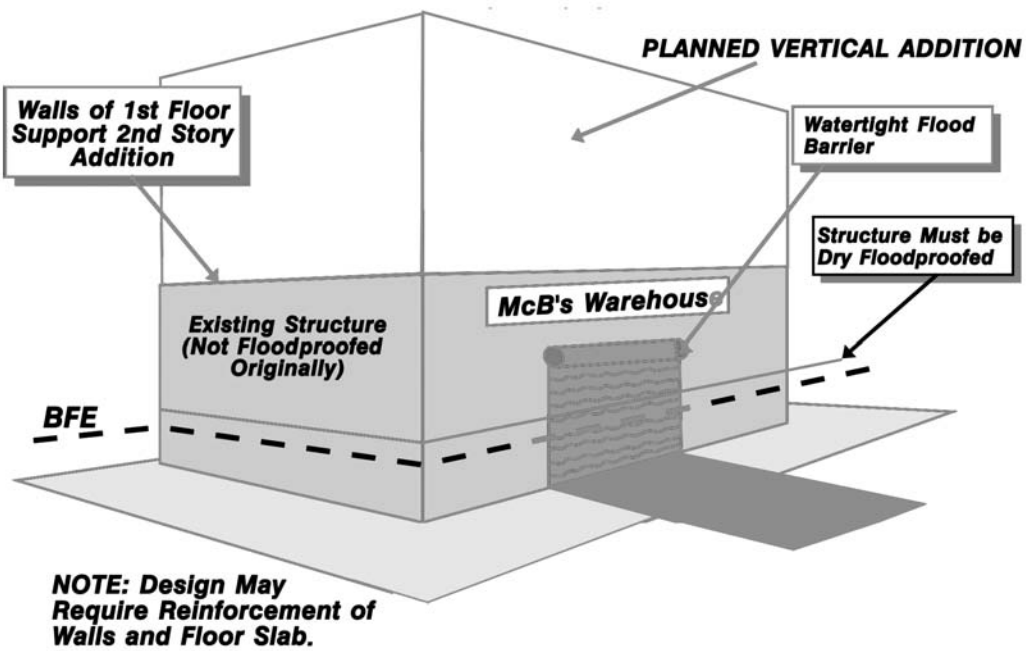


Figure 8-7. Vertical addition to a nonresidential building in an A Zone.

The new floodproofed structure would benefit from post-FIRM flood insurance rates.

Example 7. Post-FIRM building—minor addition

All additions to post-FIRM buildings are defined as new construction and must meet the requirements of your floodplain management ordinance regardless of the size or cost of the addition (**Figure 8-8**). A small addition to a residential structure that is not a substantial improvement must be elevated at least as high as the BFE in effect when the building was built. Minor additions to nonresidential structures can be floodproofed to the BFE.

If a map revision has taken place and the BFE has increased, only additions that are substantial improvements have to be elevated to the new BFE or flood-proofed (nonresidential buildings only).

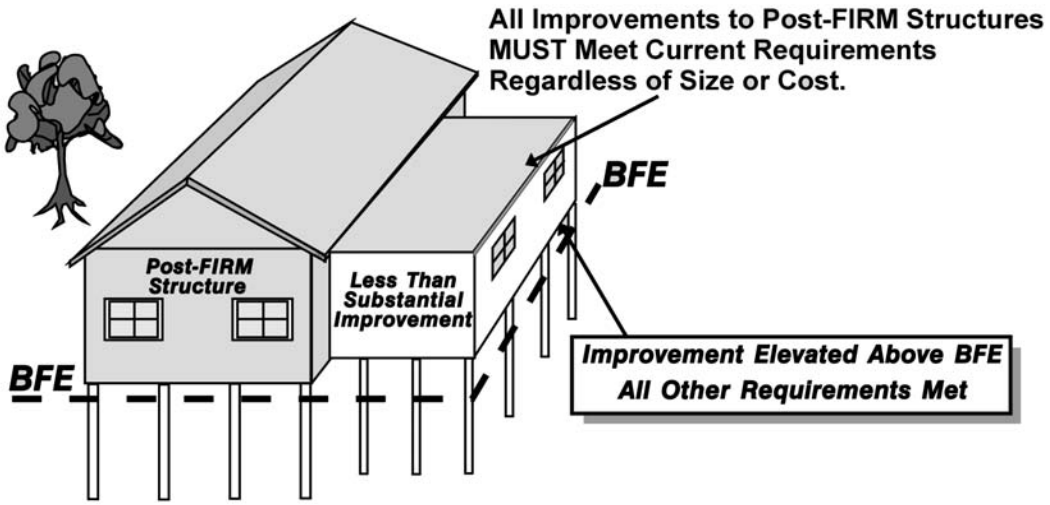


Figure 8-8. Small additions to post-FIRM buildings must be elevated.

Example 8. Post-FIRM building—substantial improvement

Substantial improvements made to a post-FIRM structure must meet the requirements of the current ordinance. **Figure 8-9** shows a lateral addition made after a map revision took place and the BFE was increased.

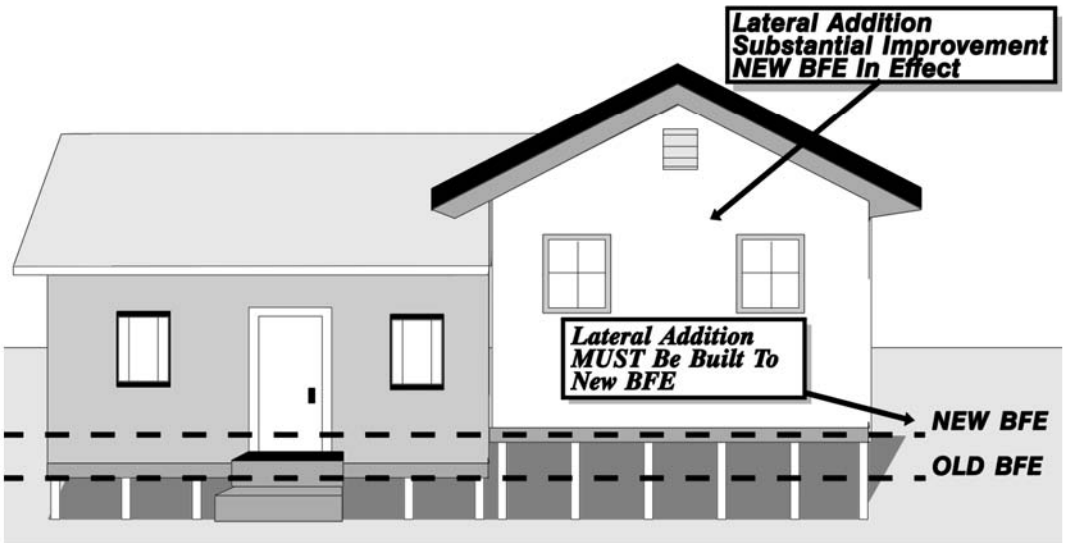


Figure 8-9. Substantial improvements to post-FIRM buildings must be elevated above the new BFE. Nonresidential buildings may be floodproofed

B. SUBSTANTIAL DAMAGE

44 CFR 59.1. Definitions: "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.

Two key points:

- The damage can be from any cause - flood, fire, earthquake, wind, rain, or other natural or human-induced hazard.
- The substantial damage rule applies to all buildings in a flood hazard area, regardless of whether the building was covered by flood insurance.

The formula is essentially the same as for substantial improvements:

$$\frac{\text{Cost to repair}}{\text{Market value of the building}} \geq 50 \text{ percent}$$

Market value is calculated in the same way as for substantial improvements. Use the pre-damage market value.

COST TO REPAIR

Notice that the formula uses “cost *to* repair,” not “cost *of* repairs.” The cost to repair the structure must be calculated for full repair to the building’s before-damage condition, even if the owner elects to do less. It must also include the cost of any improvements that the owner has opted to include during the repair project.

The total cost to repair includes the same items listed in **Figure 8-1**. As shown in Example 2 below, properly repairing a flooded building can be more expensive than people realize. The owner may opt not to pay for all of the items needed. The owner may:

- Do some of the work, such as removing and discarding wallboard.
- Obtain some of the materials free.
- Have a volunteer organization, such as the Mennonites, do some of the work.
- Decide not to do some repairs, such as choosing to nail down warped flooring rather than replace it.

Basic rule: Substantial damage is determined regardless of the actual cost to the owner. You must figure the true cost of bringing the building back to its pre-damage condition using qualified labor and materials obtained at market prices.

The permit office and the owner may have serious disagreements over the total list of needed repairs and their cost, as the owner has a great incentive to show less damage than actually occurred in order to avoid the cost of bringing the building into compliance. Here are four things that can help you:

- Get the cost to repair from an objective third-party or undebatable source, such as:
    - A licensed general contractor.
    - A professional construction estimator.
    - Insurance adjustment papers (exclude damage to contents).
    - Damage assessment field surveys conducted by building inspection, emergency management or tax assessment agencies after a disaster.
    - Your office.

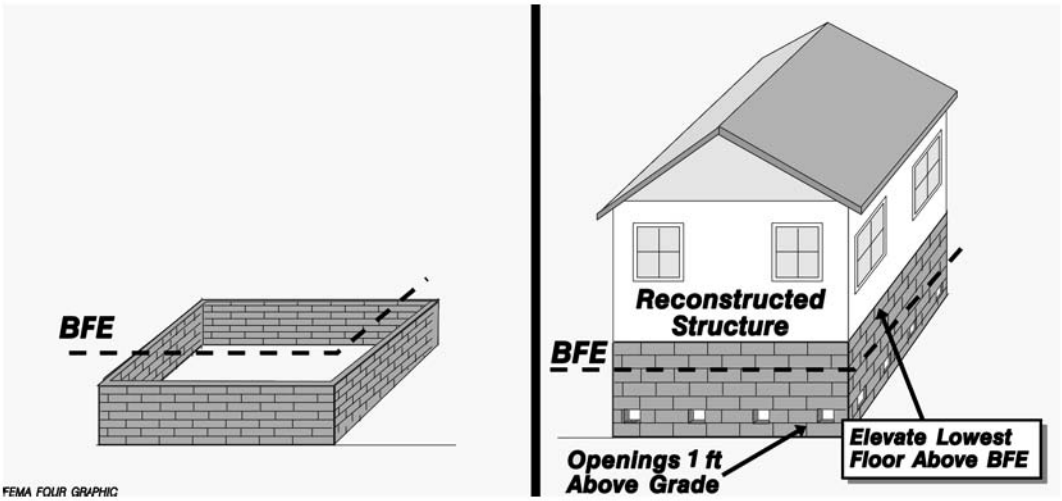
    Even if your office does not prepare the cost estimate, it needs to review the estimate submitted by the permit applicant. You can use your professional judgment and knowledge of local and regional construction costs. Or, you can use building code valuation tables published by the major building code groups.
- Use an objective system that does not rely on varying estimates of market value or different opinions of what needs to be repaired. The **Substantial Damage Estimator Program** discussed later in this section will do this.
- Publicize the need for the regulations and the benefits of protecting buildings from future flooding. A well-educated public won't argue as much as one that sees no need for the requirement.
- Help the owner find financial assistance to meet the extra cost of complying with the code. If there was a disaster declaration, there may be sources of financial assistance as discussed in the next chapter. If the owner had flood insurance and the building was substantially damaged by a flood, the new Increased Cost of Compliance coverage will help (see next section).

SUBSTANTIAL DAMAGE EXAMPLES

Example 1. Reconstruction of a destroyed building

Reconstructions are cases where an entire structure is destroyed, damaged, purposefully demolished or razed, and a new structure is built on the old foundation or slab. The term also applies when an existing structure is moved to a new site.

Reconstructions are, quite simply, “new construction.” They must be treated as new buildings.



Razed or “totaled” building with remaining foundation — Reconstruction on existing foundation

Figure 8-10. A reconstructed house is new construction.

This example is for A Zones only.

Example 2. Substantially damaged structure

To determine if a damaged structure meets the threshold for substantial damage, the cost of repairing the structure to its before-damaged condition is compared to the market value of the structure prior to the damage. The estimated cost of the repairs must include all costs necessary to fully repair the structure to its before-damaged condition.

If equal to or greater than 50 percent of that structure's market value before damage, then the structure must be elevated (or floodproofed if it is nonresidential) to or above the level of the base flood, and meet other applicable local ordinance requirements. This is the basic requirement for substantial damage.

Figure **8-11** graphically illustrates the amount of damage that can occur to a building flooded only four feet deep. Even though the structure appears sound and there are no cracks or breaks in the foundation, the total cost of repair can be significant.

The cost of repair after a flood that simply soaked the building will typically include the following structural items:

— Remove all wallboard and insulation.
— Install new wallboard and insulation.
— Tape and paint.
— Remove carpeting and vinyl flooring.
— Dry floor, replace warped flooring.
— Replace cabinets in the kitchen and bathroom.
— Replace built-in appliances.
— Replace hollow-core interior doors.
— Replace furnace and water heater.
— Clean and disinfect duct work.
— Repair porch flooring and front steps.
— Clean and test plumbing (licensed plumber may be required).
— Replace outlets and switches, clean and test wiring (licensed electrician may be required).

Note: See also **Figures 7-7** through **7-12** for what happens to flood insurance premiums if a substantially damaged building is granted a variance and is not brought up to post-FIRM standards.

Figure 8-11. Even slow moving floodwater can cause substantial damage.

SUBSTANTIAL DAMAGE SOFTWARE

FEMA has developed a software program to help local officials make substantial damage determinations. The software is based on Microsoft Access, but is self-contained and does not require any software in addition to a Windows operating system.

The software comes with a manual, ***Guide on Estimating Substantial Damage Using the NFIP Residential Substantial Damage Estimator*, FEMA 311**. This includes a user's manual and worksheets that allow the calculations to be done manually.

Contact your FEMA Regional Office for a copy of the software package and help in using it. Following a major disaster declaration, training sessions and technical assistance may be available.

INCREASED COST OF COMPLIANCE

On June 1, 1997, the NFIP began offering additional coverage to all holders of structural flood insurance policies. This coverage is called Increased Cost of Compliance or ICC.

The name refers to cases where the local floodplain management ordinance requires elevation or retrofitting of a substantially damaged building. Under ICC, the flood insurance policy will not only pay for repairs to the flooded building, it will pay up to $30,000 to help cover the additional cost of complying with the ordinance. This is available for any flood insurance claim and, therefore, is not dependent on the community receiving a disaster declaration.

There are some limitations to ICC:

- It's only available if there was a flood insurance policy on the building before the flood.
- It covers only damage caused by a flood.
- Claims are limited to $30,000 per structure.
- Claims must be accompanied by a substantial damage determination by the floodplain ordinance administrator.

It should also be mentioned that a portion of the rest of the claim payment may help meet the cost of bringing the building up to code. For example, if there was foundation damage, the regular claim will pay for the cost of repairing or replacing the foundation. The ICC funds would only be needed for the extra costs of raising the foundation higher than it was before.

An ICC claim cannot be paid unless the community has determined the building to be substantially damaged and requires that the building comply with local ordinance requirements. For further information on how ICC coverage works and how you can help policyholders in your community qualify for the coverage, refer to ***National Flood Insurance Program's Increased Cost of Compliance Coverage: Guidance for State and Local Officials, FEMA 301.***

In certain cases, an ICC claim can be filed if the building is repetitively flooded, and has had two or more claims averaging 25% or more of building value within a ten-year period, provided the community has language in the flood damage ordinance that implements the substantial damage rule in these cases.

Figure 8-12 has example ordinance language. This language exceeds the minimum NFIP requirements, but would be needed if you wanted to trigger the ICC provision for repetitively damaged buildings.

The Community Rating System credits keeping track of improvements to enforce a cumulative substantial improvement requirement. The 1999 *CRS Coordinator's Manual* credits the ordinance language in Figure 8-12. These credits are found under Activity 430, Section 431.c in the *CRS Coordinator's Manual* and the *CRS Application.*

Option 1

A. Adopt the Following Definition:

"**Repetitive Loss**" means flood-related damage sustained by a structure on two separate occasions during a 10-year period for which the cost of repairs at the time of each such flood event, on the average, equals or exceeds 25 percent of the market value of the structure before the damage occurred.

B. And modify the "substantial improvement" definition as follows:

"**Substantial Improvement**" means any reconstruction, rehabilitation, addition, or other improvement of a structure, the cost of which equals or exceeds 50 percent of the market value of the structure before the "start of construction" of the improvement. This term includes structures which have incurred "repetitive loss" or "substantial damage", regardless of the actual repair work performed.

Option 2

Modify the substantial damage definition as follows:

"**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 dam-age occurred. Substantial damage also means flood-related damage sustained by a structure on two separate occasions during a 10-year period for which the cost of repairs at the time of each such flood event, on the average, equals or exceeds 25 percent of the market value of the structure before the damage occurred.

NOTE 1: Communities need to make sure that these definitions are tied to the floodplain management requirements for new construction and substantial improvements and to any other requirements of the ordinance, such as the permit requirements, in order to enforce this provision.

NOTE 2: An ICC Claim Payment is ONLY made for flood-related damage. The substantial damage part of the definition must still include "damage of any origin" to be compliant with the minimum NFIP Floodplain Management Regulations.

Figure 8-12. Sample ordinance language for ICC repetitive loss definitions

Source: -- ***Increased Cost of Compliance Coverage: Guidance for State and Local Officials*, FEMA-301, September 2003**. This language is only needed to trigger an ICC payment for a repetitive loss. No ordinance changes are needed for the ICC coverage for substantial damage.

C. SPECIAL SITUATIONS

As explained in previous sections, the substantial improvement and substantial damage requirements affect all buildings regardless of the reason for the improvement or the cause of the damage. There are three special situations you should be aware of: exempt costs, historic buildings and corrections of code violations.

EXEMPT COSTS

Certain costs related to making improvements or repairing damaged buildings do not have to be counted toward the cost of the improvement or repairs. These include:

- Plans and specifications.
- Surveying costs.
- Permit fees.
- Demolition or emergency repairs made for health or safety reasons or to prevent further damage to the building.
- Improvements or repairs to items outside the building, such as the driveway, fencing, landscaping and detached structures.

HISTORIC STRUCTURES

Historic structures are exempted from the substantial improvement requirements subject to the criteria listed below. The exemption can be granted administratively if the current NFIP definitions of substantial improvement and historic structure are included in your ordinance, or they can be granted through a variance procedure.

In either case, they are usually granted subject to conditions.

If the improvements to a historic structure meet the following three criteria and are approved by the community, the building will not have to be elevated or floodproofed. It can also retain its pre-FIRM flood insurance rating status.

1. The building must be a bona fide "historic structure." Figure 7-13 has the definition that must be followed.

2. The project must maintain the historic status of the structure. If the proposed improvements to the structure will result in it being removed from or ineligible for the National Register or federally-certified state or local inventory, then the proposal cannot be granted an exemption from the substantial improvement rule.

The best way to make such determinations is to seek written review and approval of proposed plans by the local historic preservation board, if it is federally-certified, or by the state historic preservation office. If the plans are approved, you can grant the exemption. If not, no exemption can be permitted.

3. Take all possible flood damage reduction measures. Even though the exemption to the substantial improvement rule means the building does not have to be elevated to or above BFE, or be renovated with flood-resistant materials that are not historically sensitive, many things can and should be done to reduce the flood damage potential. Examples include:

- Locating mechanical and electrical equipment above the BFE or flood-proofing it.
- Elevating the lowest floor of an addition to or above the BFE with the change in floor elevation disguised externally.

CORRECTIONS OF CODE VIOLATIONS

The NFIP definition of substantial improvement includes another exemption:

> **44 CFR 59.1** Definitions: "Substantial improvement" means …. The term does not, however, include … 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.

Note the key words in this exemption: *correct* existing violations, *identified* by the local official, and *minimum* necessary to assure safe conditions. This language was included in order to avoid penalizing property owners *who had no choice* but to make improvements to their buildings or face condemnation or revocation of a business license.

This exemption was intended for *involuntary* improvements or violations that existed before the improvement permit was applied for or before the damage occurred - for example, a restaurant owner who must upgrade the wiring in his kitchen in order to meet current local and state health and safety codes.

You can only exempt the items specifically required by code. For example, if a single stair tread was defective and had to be replaced, do not exempt the cost of rebuilding the entire stairway. Similarly, count only replacement in like kind and what is minimally necessary. If the owner chooses to upgrade the quality of a code-required item, the extra cost is not exempt from the formula - it’s added to the true cost of the improvement or repairs.

Unfortunately, many property owners and builders pressure local building official to exclude “code violation corrections” from their voluntary improvement proposals. There are “code violations” in all structures built before the current code was enacted. In many cases, those elements must be brought up to code as part of an improvement project.

This is very different from a code violation citation that forces a property owner to correct those violations and make improvements that were otherwise not planned. The building official must know about and document the violations before or at the time the permit is issued.

Example

A small business in a 40-year old building was damaged by a fire. The building’s pre-fire market value was $100,000. The insurance adjuster and the permit office concluded that the total cost to repair would be $45,000.

However, the community’s building code states that whenever an applicant applies for a permit to modify or improve a building, the building must be brought up to code. This building would need the following additional work:

- Replace unsafe electrical wiring.
- Install missing fire exit signs, smoke detectors and emergency lighting.
- Widen the front door and install a ramp to make the business accessible to handicapped and mobility-impaired people.

The total cost of these code requirements would be $8,000. However, since these were required by the code before the fire occurred, they would not have to be counted toward the cost to repair. Based on the basic formula:

$$\frac{\$45{,}000}{\$100{,}000} = 0.45 \text{ or } 45\%$$

The building is not declared substantially damaged

In this example, the building can be repaired without elevating or floodproofing. However, the permit office should strongly recommend incorporating flood protection measures and flood resistant materials in the repair project (as in the example in **Figure 8-2**).

ARKANSAS INSERT 3

OUTREACH: GETTING THE WORD OUT

The primary purpose of outreach is to make sure that developers or property owners comply with local, state and federal regulations. Outreach can also help these citizens to maximize their development by providing the best flood protection at the lowest cost, including flood insurance.

Outreach for Compliance Purposes

How does the community floodplain administrator insure that developers comply with local laws? There are both direct and indirect methods to "get the word out." Indirect methods consist of informing all those involved in a potential development, including the general population. Letters, faxes or emails could be sent to developers, lenders, insurance agents, appraisers, surveyors, engineers, and other groups informing them of the need for a development permit for floodplains. News releases in local newspapers or newsletters can further spread the word. The more the public knows about permit requirements, the less likely non-compliant development can occur due to accident or ignorance of laws.

Sometimes the number of targeted individuals is too large to send information to each one. Often there are associations or groups which can use meetings and/or newsletters to circulate floodplain management information to the members.

Another important community is local government employees. Appraisers, road crews, building officials, and other employees routinely travel throughout the community. They can be trained to be aware of the floodplain areas and report questionable activity to the floodplain administrator. Certain employees might also keep a set of flood maps in the glove compartment of their assigned vehicles.

Direct methods consist of placing conditions on development in an effort to eliminate both accidental and intentional avoidance of local laws. These consist of such measures, for example, as requiring a development permit before utilities can be provided or before a 911 address can be assigned. Developers could be especially targeted so that there is no excuse if they ignore floodplain management regulations. A key population is manufactured home installers or those who regularly move manufactured homes within the community. Manufactured homes can appear all of a sudden and sometimes cannot be recognized as a newly placed structure. Tracking manufactured homes is a special problem.

Multiple outreach activities are especially important for counties, where it is virtually impossible of a one-man staff to monitor development. Not only is it important to make sure that development in the floodplain areas of counties is compliant, it is also important that appraisers are aware of new construction so that property taxes are fairly assessed.

Sample Letters and News Release

The following pages contains sample letters and news releases for an outreach program.

Sample Letter

February 1, 2008

Mr. John Doe
ZZZ Realty Company
100 Washington Avenue
Anytown, Md 10000

RE: Floodplain Management Regulations

Dear Mr. Doe:

The City of Anytown has participated in the National Flood Insurance Program (NFIP) since 1976. In return for making federally-backed flood insurance available to the property owners of Anytown, the City adopted floodplain management regulations through an ordinance and/or code.

All developments within the designated Special Flood Hazard Areas (SFHAs) of the City require application for a development permit, which must be approved prior to proceeding. SFHAs are indicated on Flood Insurance Rate Maps (FIRMs) which may be viewed at the Office of the _____. A copy of the ordinance and/or code is available in the Office of the _____. Development permits may be obtained from the Office of the _____.

Development means any man made change to improved or unimproved real estate, including but not limited to buildings or other structures, mining, dredging, filling, grading, paving, excavation or drilling operations or storage of equipment or materials.

Please note that failure to comply with the City's floodplain management regulations can result in fines of up to $500 per day or other penalties.

Sincerely,

Name
Anytown Floodplain Administrator

Sample News Release

Development Permits Required in Floodplains

The City of Anytown has participated in the National Flood Insurance Program (NFIP) since 1976. In return for making federally-backed flood insurance available to the property owners of Anytown, the City adopted floodplain management regulations through an ordinance and/or code.

All developments within the designated Special Flood Hazard Areas (SFHAs) of the City require application for a development permit, which must be approved prior to proceeding. SFHAs are indicated on Flood Insurance Rate Maps (FIRMs) which may be viewed at the Office of the _____. A copy of the ordinance and/or code is available in the Office of the _____. Development permits may be obtained from the Office of the _____.

Development means any man made change to improved or unimproved real estate, including but not limited to buildings or other structures, mining, dredging, filling, grading, paving, excavation or drilling operations or storage of equipment or materials.

Please note that failure to comply with the City's floodplain management regulations can result in fines of up to $500 per day or other penalties.

ARKANSAS INSERT 4

DEVELOPMENT PERMIT SYSTEM FOR ARKANSAS COMMUNITIES

****

Floodplain Development Permit Application
for «City_of» «Community»

This is an application packet for a Floodplain Development Permit. Certain sections are to be completed by the Applicant, and certain sections are to be completed by the local Floodplain Administrator (FPA).

The National Flood Insurance Program (NFIP) provides flood insurance to individuals at much lower premiums than could otherwise be purchased through private insurers, and makes certain federal monies available to local communities. In order for citizens to be eligible for the national flood insurance rates, or for communities to receive certain kinds of federal monies, the community must agree to meet minimum floodplain standards. This application packet is a tool to ensure that the minimum standards are met.

In a participating NFIP community, flood insurance policies can be purchased from any local insurance agent at the national rate. Even though the policy may be issued as if it were coming from the insurance company you deal with, it is actually a Federal NFIP policy printed on the insurance agency's letterhead. The rates are determined by the flood risk zone in which you live and by the elevation of the lowest floor of your home, not by the insurance company, and should be the same regardless of which agent or agency sells you the insurance.

You may buy flood insurance for your own peace of mind, you may be required to buy it before a lending institution will make or refinance a loan, or you may not be buying flood insurance at all. Whatever the case, if the property which you propose to develop is located within a "Special Flood Hazard Area" on a flood map issued by the Federal Emergency Management Agency (FEMA), you **MUST** obtain a Floodplain Development Permit prior to beginning the project. This is a requirement of the local Flood Damage Prevention Ordinance of your community, and there are penalties for failing to do so.

Floodplain Development Permits are ONLY required for developments in areas designated as "Special Flood Hazard Areas" of FEMA-issued flood maps. Flood maps can be reviewed at the office of your local FPA, or online at the FEMA website (www.FEMA.gov).

If you are proposing a development of any kind (constructing a new building, adding on to an existing building, clearing land, placing fill, grading land, mining, dredging, drilling, etc…) in a floodplain, you **MUST** submit Section I of this application for a Floodplain Development Permit to your local FPA. Depending upon the type of development you are proposing, additional forms ***may*** be required. For example, all new buildings in a Special Flood Hazard Area require an Elevation Certificate to document that the lowest floor of the building is elevated to a certain height relative to the anticipated flood crest of the "base flood" event. The Elevation Certificate and other forms are provided in Section III of this application packet, ***but should only be completed if they are required by the FPA for the proposed development***.

Typically, the Applicant completes Section I of this packet and submits the information to the local FPA. The FPA reviews the submission and determines whether or not additional information is needed. If it is, the FPA will request the additional information from the Applicant. Once all required materials have been submitted, the FPA will make a permitting decision and either issue or deny the requested Floodplain Development Permit. (Denied permits may be appealed per the provisions of the local Flood Damage Prevention Ordinance.)

The Applicant should understand that a Floodplain development Permit is only a permit to complete the proposed development. It is a permit to, for example, build a house, construct a baseball field, install a drainage ditch or septic system or grade a parcel of land. Before the house can actually be occupied, or the developed land used, a Compliance Certificate must be issued by the local FPA. The FPA will perform an inspection after the project is completed, or perhaps several inspections throughout the progress of the project, to make sure that the development is compliant with the requirements of the local Flood Damage Prevention Ordinance. Once the Compliance Certificate has been issued, the process has been completed.

INSTRUCTIONS FOR COMPLETION

SECTION I

General Information
Self-explanatory. Note the last two items under this heading.

Owner Information
List the contact information for the owner(s) of the property where development is proposed. All owners of the property must sign the application.

Applicant Information
If you are applying for this development permit, but are not the owner of the property, list your contact information here. If you are the property owner, leave this section blank.

Project Information
Check the box(es) beside the type of development that is being proposed. Note that some types of activity require the estimated cost of the proposed project to be disclosed so the Floodplain Administrator (FPA) can determine whether or not the improvement is a "substantial improvement."

Signature
Print your name, sign your name, and date the application.

SECTION II

Floodplain Information
The FPA will determine – for the sole purpose of administering the local Flood Damage Prevention Ordinance – the position of the proposed development relative to community floodplains and floodways. This determination is not binding at any lending institution or with any insurance agency, but is used to determine whether or not a Floodplain Development Permit and/or any other forms are required prior to commencing the proposed project.

Section II requires a map and panel number(s), a listing of the flood source for the proposed development, and contains a checklist of additional documents required for the FPA to make an informed permitting decision.

If any of the additional documentation is required, the FPA is to notify the applicant, allow a reasonable length of time for submission of the documents, and then review all submissions to determine whether or not the permit will be issued.

SECTION III

Forms
Templates for forms that may be required are provided in this Section.

SECTION IV

Permit Determination
The FPA will indicate whether or not the proposed development is conformant with the requirements of the local Flood Damage prevention ordinance, and whether or not the requested permit is issued. If the decision is to NOT issue the permit, the FPA will provide an explanation of the perceived deficiencies to the Applicant.

SECTION V

Certificate of Compliance
The FPA will indicate the "As-Built" lowest floor elevation for structural developments, list any inspections that have been performed, and issue the Certificate of Compliance to the Applicant if appropriate.

OFFICE USE ONLY
Date Received: _____
File Number: _____

FLOODPLAIN DEVELOPMENT PERMIT APPLICATION FORM FOR «Community»

SECTION I: Applicant and Project Information

GENERAL INFORMATION

1. No work of any kind may begin in a floodplain area designated as A, A1-30, AE, AO, AH, or B until a floodplain development permit is issued.
2. The permit may be revoked if any false statements are made in this application.
3. If revoked, all work must cease until a permit is re-issued.
4. The development may not be used or occupied until a **Certificate of Compliance** is issued.
5. The permit will expire if no work is commenced within 6 months of the date of issue.
6. The permit will not be issued until any other necessary local, state or federal permits have been obtained.
7. By signing and submitting this application, the Applicant gives consent to the local Floodplain Administrator or his/her representative to make reasonable inspections prior to the issuance of a **Certificate of Compliance**.
8. By signing and submitting this application, the Applicant certifies that all statements contained in SECTION I of the application, and in any additional attachments submitted by the Applicant, are true and accurate.

OWNER INFORMATION

Property owner(s): _____

Mailing address: _____

Telephone number: _____

Fax number: _____

e-mail address: _____

Signature(s) of property owner(s) listed above[1]

_____

_____

[1]Attached forms if there are additional property owners. This permit application will not be accepted without the signature of all property owners. The signature is an acknowledgement and consent to this floodplain development permit application.

APPLICANT INFORMATION

Applicant: _____

Telephone number: _____

Fax number: _____

Notes:

Signature of applicant listed above

_____

Section I continued on back

File Number: _____

PROJECT INFORMATION

Project _____	Lot _____ Block _____
Address _____	Subdivision _____
_____	Legal Description (*Attach to this document*)_____

A. Structural development (*Please check all that apply.*)

Type of Structure

- ❑ Residential (1 to 4 families)
- ❑ Residential (More than 4 families)
- ❑ Non-Residential
  - ❑ Elevated
  - ❑ Floodproofed
- ❑ Combined Use (Residential and Non-Residential
- ❑ Manufactured (mobile) Home
  - ❑ Located within a Manufactured Home Park
  - ❑ Located outside a Manufactured Home Park

Type of Structural Activity

- ❑ New Structure
- ❑ Addition to Existing Structure[2]
- ❑ Alteration of Existing Structure[2]
- ❑ Relocation of Existing Structure[2]
- ❑ Demolition of Existing Structure
- ❑ Replacement of Existing Structure

[2]Estimate Cost of Project _____

B. Other Development Activities

- ❑ Excavation (not related to a Structural Development listed in Part A.)
- ❑ Clearing
- ❑ Placement of fill material
- ❑ Grading
- ❑ Mining
- ❑ Drilling
- ❑ Dredging
- ❑ Watercourse alteration
- ❑ Drainage improvement (including culvert work)
- ❑ Individual water or sewer system
- ❑ Roadway or bridge construction
- ❑ Other development not listed above (specify) _____

[2]If the value of an addition or alteration to a Structure equals or exceeds 50% of the value of the structure before the addition or alteration, the entire structure must be treated as a substantially improved structure. A relocated structure must be treated as new construction.

SIGNATURE

I certify that to the best of my knowledge the information contained in this application is true and accurate.

_____	_____	_____
(PRINTED name)	(SIGNED name)	(Date)

File Number: _____

SECTION II: (To be completed by Floodplain Administrator)

FLOOD INFORMATION

1. The proposed development is located on FIRM map panel: _____ (number and suffix)
2. The date on the FIRM is _____
3. The proposed development is located in Zone: _____ (A, A1-30, AE, AO, AH, B, C, D, or X)
4. Is the proposed development located in either of the following zones? A, A1-30, AE, AO, AH, B, or shaded X

   ❑ YES ❑ NO ***If NO, no permit floodplain development is required.***

5. If the proposed development is located in Zone B or shaded Zone X, a floodplain development permit is only required if the Development is a "critical facility" as defined in the Flood Damage Prevention Ordinance. ***Otherwise, no floodplain development permit is required in Zone B or shaded Zone X.***

6. If the proposed development is located within either Zone A1-30 or Zone AE, is it also located within a "regulatory floodway"? ❑ YES ❑ NO
7. If YES, a **No Rise Certificate** is necessary before proceeding.
8. If NO, continue.

If the proposed development is located within Zones A, A1-30, AE, AO, AH, B or shaded X (critical facilities only), apply the criteria of the Flood Damage Prevention Ordinance to minimize flood damages to the proposed Development and to adjacent properties as well.

For structures, the provisions of the ordinance specify that the lowest floor, including utilities, be elevated _____ above the base flood elevation. Therefore, it is necessary that the following information be provided:

1. Base flood elevation at the site: _____ feet above mean sea level (MSL)
2. Vertical datum used in the Flood Insurance Study, on flood maps and in surveys is _____
3. Source of the base flood elevation (BFE) ❑ FIRM (flood map)

   ❑ Flood Insurance Study Profile # _____

   ❑ Other sources of the BFE (specify): _____

   _____

4. Proposed lowest floor elevation (including utilities): _____ feet above MSL
   (This elevation must be greater than the BFE. For non-residential structures, floodproofing may be used for protection. See ordinance for details.)

The following documents may be required. ***Check applicable.***

- ❑ Maps and plans of the development
- ❑ An **Elevation Certificate**[3] – required for all structures
- ❑ A **Floodproofing Certificate**[3] – required if floodproofing a non-residential structure
- ❑ A **No-Rise Certificate**[3] – if the proposed development is in a "regulatory floodway"
- ❑ An elevation study showing BFEs on developments exceeding 50 lots or 5 acres in Zone A
- ❑ A copy of **Wetlands Permit** from the U.S. Army Corps of Engineers if required; and other local, state, federal permits. Other permits: _____

[3] **Certificates require completion by a Professional Land Surveyor or Registered Professional Engineer, as indicated.**

File Number : _____

SECTION III : (Forms which may be required by the Floodplain Administrator)

ELEVATION CERTIFICATE

Attached. *Submit only if required to do so by the Floodplain Administrator.*

FLOODPROOFING CERTIFICATE

Attached. *Submit only if required to do so by the Floodplain Administrator.*

NO-RISE CERTIFICATE

Attached. *Submit only if required to do so by the Floodplain Administrator.*

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

ELEVATION CERTIFICATE

OMB No. 1660-0008
Expires February 28, 2009

Important: Read the separate instructions.

SECTION A - PROPERTY INFORMATION

For Insurance Company Use:

A1. Building Owner's Name

Policy Number

A2. Building Street Address (including Apt., Unit, Suite, and/or Bldg. No.) or P.O. Route and Box No.

Company NAIC Number

City State ZIP Code

A3. Property Description (Lot and Block Numbers, Tax Parcel Number, Legal Description, etc.)

A4. Building Use (e.g., Residential, Non-Residential, Addition, Accessory, etc.) _____

A5. Latitude/Longitude: Lat. _____ Long. _____ Horizontal Datum: ☐ NAD 1927 ☐ NAD 1983

A6. Attach at least 2 photographs of the building if the Certificate is being used to obtain flood insurance.

A7. Building Diagram Number _____

A8. For a building with a crawl space or enclosure(s), provide
- a) Square footage of crawl space or enclosure(s) _____ sq ft
- b) No. of permanent flood openings in the crawl space or enclosure(s) walls within 1.0 foot above adjacent grade _____
- c) Total net area of flood openings in A8.b _____ sq in

A9. For a building with an attached garage, provide:
- a) Square footage of attached garage _____ sq ft
- b) No. of permanent flood openings in the attached garage walls within 1.0 foot above adjacent grade _____
- c) Total net area of flood openings in A9.b _____ sq in

SECTION B - FLOOD INSURANCE RATE MAP (FIRM) INFORMATION

B1. NFIP Community Name & Community Number	B2. County Name	B3. State

B4. Map/Panel Number	B5. Suffix	B6. FIRM Index Date	B7. FIRM Panel Effective/Revised Date	B8. Flood Zone(s)	B9. Base Flood Elevation(s) (Zone AO, use base flood depth)

B10. Indicate the source of the Base Flood Elevation (BFE) data or base flood depth entered in Item B9.
☐ FIS Profile ☐ FIRM ☐ Community Determined ☐ Other (Describe) _____

B11. Indicate elevation datum used for BFE in Item B9: ☐ NGVD 1929 ☐ NAVD 1988 ☐ Other (Describe) _____

B12. Is the building located in a Coastal Barrier Resources System (CBRS) area or Otherwise Protected Area (OPA)? ☐Yes ☐No
Designation Date _____ ☐ CBRS ☐ OPA

SECTION C - BUILDING ELEVATION INFORMATION (SURVEY REQUIRED)

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

C2. Elevations – Zones A1-A30, AE, AH, A (with BFE), VE, V1-V30, V (with BFE), AR, AR/A, AR/AE, AR/A1-A30, AR/AH, AR/AO. Complete Items C2.a-g below according to the building diagram specified in Item A7.

Benchmark Utilized _____ Vertical Datum _____

Conversion/Comments _____

Check the measurement used.

a) Top of bottom floor (including basement, crawl space, or enclosure floor)	_____._____	☐ feet	☐ meters (Puerto Rico only)
b) Top of the next higher floor	_____._____	☐ feet	☐ meters (Puerto Rico only)
c) Bottom of the lowest horizontal structural member (V Zones only)	_____._____	☐ feet	☐ meters (Puerto Rico only)
d) Attached garage (top of slab)	_____._____	☐ feet	☐ meters (Puerto Rico only)
e) Lowest elevation of machinery or equipment servicing the building (Describe type of equipment in Comments)	_____._____	☐ feet	☐ meters (Puerto Rico only)
f) Lowest adjacent (finished) grade (LAG)	_____._____	☐ feet	☐ meters (Puerto Rico only)
g) Highest adjacent (finished) grade (HAG)	_____._____	☐ feet	☐ meters (Puerto Rico only)

SECTION D - SURVEYOR, ENGINEER, OR ARCHITECT CERTIFICATION

This certification is to be signed and sealed by a land surveyor, engineer, or architect authorized by law to certify elevation information. *I certify that the information on this Certificate represents my best efforts to interpret the data available. I understand that any false statement may be punishable by fine or imprisonment under 18 U.S. Code, Section 1001.*

☐ Check here if comments are provided on back of form.

Certifier's Name License Number

Title Company Name

Address City State ZIP Code

Signature Date Telephone

PLACE SEAL HERE

IMPORTANT: In these spaces, copy the corresponding information from Section A.	For Insurance Company Use:
Building Street Address (including Apt., Unit, Suite, and/or Bldg. No.) or P.O. Route and Box No.	Policy Number
City State ZIP Code	Company NAIC Number

SECTION D - SURVEYOR, ENGINEER, OR ARCHITECT CERTIFICATION (CONTINUED)

Copy both sides of this Elevation Certificate for (1) community official, (2) insurance agent/company, and (3) building owner.

Comments

Signature Date

☐ Check here if attachments

SECTION E - BUILDING ELEVATION INFORMATION (SURVEY NOT REQUIRED) FOR ZONE AO AND ZONE A (WITHOUT BFE)

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

E1. Provide elevation information for the following and check the appropriate boxes to show whether the elevation is above or below the highest adjacent grade (HAG) and the lowest adjacent grade (LAG).

a) Top of bottom floor (including basement, crawl space, or enclosure) is _____._____ ☐ feet ☐ meters ☐ above or ☐ below the HAG.

b) Top of bottom floor (including basement, crawl space, or enclosure) is _____._____ ☐ feet ☐ meters ☐ above or ☐ below the LAG.

E2. For Building Diagrams 6-8 with permanent flood openings provided in Section A Items 8 and/or 9 (see page 8 of Instructions), the next higher floor (elevation C2.b in the diagrams) of the building is _____._____ ☐ feet ☐ meters ☐ above or ☐ below the HAG.

E3. Attached garage (top of slab) is _____._____ ☐ feet ☐ meters ☐ above or ☐ below the HAG.

E4. Top of platform of machinery and/or equipment servicing the building is _____._____ ☐ feet ☐ meters ☐ above or ☐ below the HAG.

E5. Zone AO only: If no flood depth number is available, is the top of the bottom floor elevated in accordance with the community's floodplain management ordinance?

☐ Yes ☐ No ☐ Unknown. The local official must certify this information in Section G.

SECTION F - PROPERTY OWNER (OR OWNER'S REPRESENTATIVE) CERTIFICATION

The property owner or owner's authorized representative who completes Sections A, B, and E for Zone A (without a FEMA-issued or community-issued BFE) or Zone AO must sign here. *The statements in Sections A, B, and E are correct to the best of my knowledge.*

Property Owner's or Owner's Authorized Representative's Name

Address City State ZIP Code

Signature Date Telephone

Comments

☐ Check here if attachments

SECTION G - COMMUNITY INFORMATION (OPTIONAL)

The local official who is authorized by law or ordinance to administer the community's floodplain management ordinance can complete Sections A, B, C (or E), and G of this Elevation Certificate. Complete the applicable item(s) and sign below. Check the measurement used in Items G8. and G9.

G1. ☐ The information in Section C was taken from other documentation that has been signed and sealed by a licensed surveyor, engineer, or architect who is authorized by law to certify elevation information. (Indicate the source and date of the elevation data in the Comments area below.)

G2. ☐ A community official completed Section E for a building located in Zone A (without a FEMA-issued or community-issued BFE) or Zone AO.

G3. ☐ The following information (Items G4.-G9.) is provided for community floodplain management purposes.

G4. Permit Number	G5. Date Permit Issued	G6. Date Certificate Of Compliance/Occupancy Issued

G7. This permit has been issued for: ☐ New Construction ☐ Substantial Improvement

G8. Elevation of as-built lowest floor (including basement) of the building: _____._____ ☐ feet ☐ meters (PR) Datum _____

G9. BFE or (in Zone AO) depth of flooding at the building site: _____._____ ☐ feet ☐ meters (PR) Datum _____

Local Official's Name Title

Community Name Telephone

Signature Date

Comments

☐ Check here if attachments

Building Photographs

See Instructions for Item A6.

	For Insurance Company Use:
Building Street Address (including Apt., Unit, Suite, and/or Bldg. No.) or P.O. Route and Box No.	Policy Number
City State ZIP Code	Company NAIC Number

If using the Elevation Certificate to obtain NFIP flood insurance, affix at least two building photographs below according to the instructions for Item A6. Identify all photographs with: date taken; “Front View” and “Rear View”; and, if required, “Right Side View” and “Left Side View.” If submitting more photographs than will fit on this page, use the Continuation Page, following.

Building Photographs

Continuation Page

	For Insurance Company Use:
Building Street Address (including Apt., Unit, Suite, and/or Bldg. No.) or P.O. Route and Box No.	Policy Number
City State ZIP Code	Company NAIC Number

If submitting more photographs than will fit on the preceding page, affix the additional photographs below. Identify all photographs with: date taken; “Front View” and “Rear View”; and, if required, “Right Side View” and “Left Side View.”

O.M.B. NO. 3067-0077
Expires:

FEDERAL EMERGENCY MANAGEMENT AGENCY
NATIONAL FLOOD INSURANCE PROGRAM

FLOODPROOFING CERTIFICATE

FOR NON-RESIDENTIAL STRUCTURES

The floodproofing of non-residential buildings may be permitted as an alternative to elevating to or above the Base Flood Elevation; however, a floodproofing design certification is required. This form is to be used for that certification. Floodproofing of a residential building does not alter a community's floodplain management elevation requirements or affect the insurance rating unless the community has been issued an exception by FEMA to allow floodproofed residential basements. The permitting of a floodproofed residential basement requires a separate certification specifying that the design complies with the local floodplain management ordinance.

BUILDING OWNER'S NAME

STREET ADDRESS (Including Apt., Unit, Suite and/or Bldg number) OR P.O. ROUTE AND BOX NUMBER

OTHER DESCRIPTION (lot and Block Numbers, etc)

FOR INSURANCE COMPANY USE
POLICY NUMBER
COMPANY NAIC NUMBER

CITY STATE ZIP CODE

SECTION I – FLOOD INSURANCE RATE MAP (FIRM) INFORMATION

Provide the following from the proper FIRM:

COMMUNITY NUMBER	PANEL NUMBER	SUFFIX	DATE OF FIRM INDEX	FIRM ZONE	BASE FLOOD ELEVATION (In AO Zones, Use Depth)

SECTION II – FLOODPROOFING INFORMATION (By a Registered Professional Engineer or Architect)

Floodproofing Design Elevation Information:

Building is floodproofed to an elevation of _____ Feet NGVD. (Elevation datum used must be the same as that on the FIRM)

Height of floodproofing on the building above the lowest adjacent grade is _____ feet.

(NOTE: for insurance rating purposes, the building's floodproofed design elevation must be at least one foot above the Base Flood Elevation to receive rating credit. If the building is floodproofed only to the Base Flood Elevation, then the building's insurance rating will result in a higher premium.)

SECTION III – CERTIFICATION (By a Registered Professional Engineer or Architect)

Non-Residential Floodproofed Construction Certification:

I certify that, based upon development and/or review of structural design, specifications, and plans for construction, the design and methods of construction are in accordance with accepted standards of practive for meeting the following provisions:

The structure, together with attendant utilities and sanitary facilities, is watertight to the floodproofed design elevation indicated above, with walls that are substantially impermeable to the passage of water.

All structural components are capable of resisting hydrostatic and hydrodynamic flood forces, including the effects of buoyancy, and anticipated debris impact forces.

I certify that the information on this certificate represents my best efforts to interpret the data available. I understand that any false statement may be punishable by fine or imprisonment under 18 U.S. Code, Section 1001.

CERTIFYER'S NAME LICENSE NUMBER (or Affix Seal)

TITLE COMPANY NAME

ADDRESS CITY STATE ZIP CODE

SIGNATURE DATE PHONE

Copies should be made of this Certificate for : 1) community official, 2) Insurance agent/company, and 3) building owner.

NATIONAL FLOOD INSURANCE PROGRAM

ENGINEERING "NO-RISE" CERTIFICATE

FOR ARKANSAS COMMUNITIES

SITE INFORMATION

Community _____ County _____

Applicant _____ Date _____

Address _____

Telephone _____

Engineer _____

Address _____

Telephone _____

Project Address _____

Lot _____ Block _____

Subdivision _____

Legal Description _____

PROJECT INFORMATION

Description of Development: _____

Principal Use of Premises: _____

FLOOD INSURANCE RATE MAP (FIRM) INFORMATION

NFIP map(s) and panel(s) affected: _____

Effective date of map: _____

Base Flood Elevation on FIRM: _____

Name of flooding source: _____

CERTIFICATION

This is to certify that I am a duly qualified Professional Engineer licensed to practice in the State of Arkansas. I further certify that the attached engineering data supports the fact the proposed development would not result in any increase in flood levels within the community during the occurrence of a base flood event.

CERTIFIER'S NAME _____ LICENSE NUMBER _____

COMPANY NAME _____

(embossed seal)

SIGNATURE _____ DATE _____

TITLE _____

ARKANSAS FLOODPLAIN DEVELOPMENT PERMIT

OFFICE USE ONLY	
Date Issued:	_____
File Number :	_____

SECTION IV : (To be completed by the Floodplain Administrator)

PERMIT DETERMINATION

I have determined that the proposed development

- ❑ IS
- ❑ IS NOT *(non-conformances to be described in a separate document)*

in conformance with local Flood Damage Prevention Ordinance Number _____ , dated _____ .

The Floodplain Development Permit

- ❑ IS
- ❑ IS NOT *(reasons for denial to be described in a separate document)*

issued, subject to any conditions attached to and made part of this permit.

_____ _____

SIGNATURE DATE

The applicant is reminded that this document is a development permit only. An inspection must be performed and a Compliance Certificate must be issued before the development can be occupied or used.

CERTIFICATE OF COMPLIANCE

OFFICE USE ONLY	
Date Issued:	_____
File Number :	_____

SECTION V : CERTIFICATE OF COMPLIANCE

"AS-BUILT" ELEVATION (to be completed by the applicant after construction)

The following information must be provided for structures that are part of this application. This section must be completed by a Professional Land Surveyor or a Professional Engineer (or attach a certification to this application).

(1) The Actual ("As-Built") elevation of the top of the lowest floor, including the basement, is _____ Feet above MSL (vertical datum: _____).

(2) The Actual ("As-Built") elevation of floodproofing protection is _____ Feet above MSL (vertical datum: _____).

COMPLIANCE ACTION (to be completed by the Local Floodplain Administrator)

The Floodplain Administrator will complete this section as applicable based on inspection of the development to ensure compliance with the community's local flood damage prevention ordinance.

Inspections:	Date: _____	By: _____	Deficiencies?	❑ Yes	❑ No
	Date: _____	By: _____	Deficiencies?	❑ Yes	❑ No
	Date: _____	By: _____	Deficiencies?	❑ Yes	❑ No
	Date: _____	By: _____	Deficiencies?	❑ Yes	❑ No
	Date: _____	By: _____	Deficiencies?	❑ Yes	❑ No

CERTIFICATE OF COMPLIANCE (to be completed by the Local Floodplain Administrator)

Certificate of Compliance issued.

_____ _____

SIGNATURE DATE

This Certificate of Compliance indicates that structures may now be occupied and non-structural developments may be utilized.

ARKANSAS INSERT 5

MODEL FLOODPLAIN MANAGEMENT ORDINANCE FOR ARKANSAS COMMUNITIES

****

ORDINANCE #_____

BE IT ENACTED BY THE {__**governing body**_____}OF {__**community name**_____} ARKANSAS, AN ORDINANCE TO BE ENTITLED: "**AN ORDINANCE PROVIDING FOR THE ESTABLISHMENT OF A FLOOD DAMAGE PREVENTION PROGRAM FOR {__community name__} AND FOR OTHER PURPOSES**."

SECTION 1. STATUTORY AUTHORITY

The Legislature of the State of Arkansas has in Ark. Code Ann. § 14-268-101 et seq., delegated the responsibility of local governmental units to adopt regulations to minimize flood losses. Therefore, the {__**governing body**____} of {____**community name**_____}, Arkansas, does hereby ordain as follows:

SECTION 2. FINDINGS OF FACT

A. The Federal Emergency Management Agency (FEMA) has identified Special Flood Hazard Areas of {__**community name**__} in the current scientific and engineering report entitled "The Flood Insurance Study (FIS) for {____**from the FIS Title**_____ _____}," dated {_**date of latest FIS**__}, with an effective Flood Insurance Rate Map (FIRM) dated {__**date of latest FIRM**__}.

B. These Special Flood Hazard Areas are subject to periodic flooding events that result in loss of life and property, pose health and safety hazards, disrupt commerce and governmental services, and cause extraordinary public expenditures for flood protection and relief, all of which adversely affect the public health, safety and general welfare.

C. These periodic flooding events are exacerbated by the cumulative effect of floodplain developments which cause an increase in flood heights and velocities, and by the placement of inadequately elevated, inadequately floodproofed or otherwise unprotected structures or uses vulnerable to floods into Special Flood Hazard Areas. Such structures or uses are inherently hazardous to other lands because of their adverse impact on flooding events.

SECTION 3. STATEMENT OF PURPOSE

The purpose of this ordinance is to promote the public health, safety and general welfare, to prevent adverse impacts from any floodplain development activities, and to minimize public and private losses due to flooding events in identified Special Flood Hazard Areas. This ordinance advances the stated purpose through provisions designed to:

A. Protect human life and health;

B. Protect natural floodplains against unwise development;

C. Eliminate adverse impacts of necessary floodplain development;

D. Minimize expenditure of public monies on flood control projects;

E. Minimize the need for rescue and relief efforts associated with flooding and generally undertaken at the expense of the general public;

F. Minimize prolonged business interruptions due to flooding events;

G. Minimize damage to public facilities and utilities such as water and gas mains, electric, telephone and sewer lines, streets and bridges located in Special Flood Hazard Areas;

H. Minimize future flood blight areas to help maintain a stable tax base; and

I. Provide for notice to potential buyers when property is in a Special Flood Hazard Area.

SECTION 4. LANDS TO WHICH THIS ORDINANCE APPLIES

The ordinance shall apply to all Special Flood Hazard Areas within the jurisdiction of {**community name**}

SECTION 5. METHODS OF REDUCING FLOOD LOSSES

This ordinance uses the following methods to accomplish the stated purpose:

A. This ordinance restricts or prohibits structures or uses in Special Flood Hazard Areas that adversely impact health, safety or property during flooding events;

B. This ordinance requires protection against flood damage for structures or uses vulnerable to floods at the time of initial construction, or after substantial improvement of the structure, or after substantial damage has occurred;

C. This ordinance controls the alteration of natural floodplains, stream channels and natural protective barriers which are involved in the accommodation and transport of flood waters;

D. This ordinance controls floodplain development (structural development, placement of manufactured structures, clearing, grading, mining, drilling, dredging, placement of fill, excavating, watercourse alteration, drainage improvements, roadway or bridge construction, individual water or sewer installations and other activities) which may increase flood damage by increasing flood elevations, flood water velocities, or flood discharge patterns;

E. This ordinance regulates the construction of flood barriers which unnaturally divert floodwaters or which may adversely impact other lands.

SECTION 6. FLOOD DAMAGE PREVENTION CODE ADOPTED BY REFERENCE.

There is hereby adopted by reference a "**Flood Damage Prevention Code for {_community name_}, Arkansas,**" **dated {___date_____}** The code shall include:

ARTICLE 1 DEFINITIONS
ARTICLE 2 ADMINISTRATION
ARTICLE 3 PROVISIONS FOR FLOOD HAZARD REDUCTION

A copy of the referenced code shall be filed in the office of the {__title of community official_} and shall be available for inspection and copying by any person during normal office hours.

SECTION 7. ABROGATION AND GREATER RESTRICTIONS

This ordinance does not repeal, abrogate, or impair any existing easements, covenants, or deed restrictions. Whenever there is a conflict or overlap between this ordinance and another ordinance, easement, covenant, or deed restriction, the instrument with the more stringent restrictions applies.

SECTION 8. INTERPRETATION

In the interpretation and application of this ordinance, all provisions must:

A. Be considered as minimum requirements;

B. Be liberally construed in favor of the governing body; and

C. Be deemed to neither limit nor repeal any other powers granted under State statutes.

SECTION 9. WARNING AND DISCLAIMER OF LIABILITY

The degree of flood protection required by this ordinance is considered reasonable for regulatory purposes. Documented scientific and engineering data form the basis for these requirements. On rare occasions, flooding events greater than those considered for this ordinance will occur. In addition, flood heights may increase over time due to man-made or natural causes. This ordinance does not imply that land outside Special Flood Hazard Areas will be free from flooding, nor that strict adherence to this ordinance protects uses permitted within Special Flood Hazard Areas from all flood damages. This ordinance specifically does not create liability on the part of the community, nor any official or employee of the community, for any flood damages that result while strictly following this ordinance, or from any lawful administrative decision made under the provisions of this ordinance.

SECTION 10. COMPLIANCE

Constructing, locating, substantially altering or changing the use of any structure or land after the effective date of this ordinance requires full compliance with the provisions of this ordinance and all other applicable regulations.

SECTION 11. PENALTY FOR NON-COMPLIANCE

Flood hazards are reduced by compliance with the provisions of this code. Accordingly, enforcement of this ordinance discourages non-compliance and is a recognized mechanism for flood hazard reduction.

A. The Floodplain Administrator must enforce the provisions of this ordinance and is authorized to

B. Issue cease and desist orders on non-compliant floodplain development projects;

C. Issue citations for non-compliance;

D. Request that FEMA file a 1316 Action (Denial of Flood Insurance) against non-compliant properties; and

E. Take any other lawful action necessary to prevent or remedy any instance of non-compliance with the provisions of this ordinance.

(1) It is a misdemeanor to violate or fail to comply with any provision of this ordinance.

(2) Any person found, in a court of competent jurisdiction, guilty of violating this ordinance is subject to fines of not more than $500 per day for each violation; in addition the defendant is subject to payment of all associated court costs and costs involved in the case.

SECTION 12. SEVERABILITY

If any court of competent jurisdiction finds that any section, clause, sentence, or phrase of this ordinance is invalid or unconstitutional, that finding in no way affects the validity of the remaining portions of this ordinance.

SECTION 13. EMERGENCY CLAUSE

It is hereby found and declared by {**community name**} that severe flooding has occurred in the past within its jurisdiction and will certainly occur within the future; that flooding is likely to result in infliction of serious personal injury or death, and is likely to result in substantial injury or destruction of property within its jurisdiction; in order to effectively comply with minimum standards for coverage under the National Flood Insurance Program; and in order to effectively remedy the situation described herein, it is necessary that this ordinance become effective immediately.

Therefore, an emergency is hereby declared to exist, and this ordinance, being necessary for the immediate preservation of the public peace, health and safety, shall be in full force and effect from and after its passage and approval.

APPROVED: _____
(Local Official)

PASSED: _____
(Date)

ATTEST: _____
(City of County Clerk)

CERTIFICATION

I, the undersigned, _____, do hereby certify that the above is a

true and correct copy of an ordinance duly adopted by the _____ of
(governing body)
_____, at a regular meeting duly convened on _____.
(community name) (date)

_____
(City or County Clerk)

ARKANSAS INSERT 6

MODEL FLOODPLAIN MANAGEMENT CODE

(*TO ACCOMPANY MODEL ORDINANCE*)

****

FLOOD DAMAGE PREVENTION CODE
FOR { community name }, {date}

ARTICLE 1 DEFINITIONS

Unless specifically defined below, words or phrases used in this Code have their common usage meaning to give the most reasonable application to this Code.

Additional definitions for floodplain management terms can be found at Part §59.1 of 44 CFR.

44 CFR (Emergency Management and Assistance – National Flood Insurance Program Regulations) Parts 59-75 contain Federal regulations upon which local floodplain managements are based

44 CFR § 65.12 – contains the section of the Federal regulations which involves revision of flood insurance rate maps to reflect base flood elevations caused by proposed encroachments.

"100-year flood" is any flood with a 1% chance of occurring in any given year. The term is misleading, because of its statistical derivation. A "100-year flood" may occur many times in any given 100-year period, or it may not occur at all in 100 years.

"500-year flood" is any flood with a 0.2% chance of occurring in any given year. As with the 100-year flood, this term is also misleading, because of its statistical derivation. A "500-year flood" may occur many times in any given 500-year period, or it may not occur at all in 500 years.

"Accessory Structures" are structures which are on the same parcel of property as the principle structure and the use of which is incidental to the use of the principle structure (such as garages and storage sheds).

"Adverse impact" means any negative or harmful effect.

"AE or A1-30 Risk Zones" are special flood hazard areas where detailed studies have determined base flood elevations. AE has replaced A1-30 in newer flood maps.

"AH Risk Zones" are special flood hazard areas characterized by shallow flooding with ponding effects (where floodwaters accumulate in depressions and linger until absorbed or evaporated).

"AO Risk Zones" are special flood hazard areas characterized by shallow flooding with sheet flow (where floodwaters flow in a broad, shallow sheet rather than through a narrow channel).

"A Risk Zones" are special flood hazard areas without detailed studies, where base flood elevations have not been determined.

"Appeal Board" means a person or persons specifically designated to render decisions on variance applications and floodplain management complaints.

"Automatic" entry and exit of floodwaters means that the water must be able to enter and exit with no intervening action from a person.

"Base flood" is the flood profile used as the basis for the NFIP regulations. The Federal government has selected the "100-year flood" as the base flood.

"Base Flood" is the flood profile used as the basis for the NFIP regulations. The Federal government has selected the 1% chance flood as the base flood.

"Basement" is any enclosed area that is below grade on all sides.

"BFE" is the acronym for Base Flood Elevation.

"Buoyancy" is the upward force exerted by water. Buoyancy can cause underground tanks to float free and can lift structures off foundations.

"Certificates of Compliance" are formal documents issued by floodplain administrators certifying that completed projects comply with the requirements of the local Code.

"CFR" is the acronym for the Code of Federal Regulations. The Code of Federal Regulations is the codification of the general and permanent rules published in the Federal Register by the executive departments and agencies of the Federal Government. It is divided into 50 titles that represent broad areas subject to Federal regulation. The Federal regulations pertaining to the national Flood Insurance Program are found in title 44, Emergency Management and Assistance.

"Clearing" is the act of cutting timber or shrubs from an area

"Commercial business park" is typically an area of offices or light industrial usage, although retail, service, or industrial usage is sometimes included in supporting roles. For example, a commercial business park of office complexes may also include restaurants which service these offices.

"Concrete deadman anchors" are heavy steel rods embedded in buried sections of concrete, used to secure items in place under tension.

"Covenant" is a clause in a contract that requires one party to do, or refrain from doing, certain things. A covenant frequently appears as a restriction that a lender imposes on a borrower.

"Crawlspace" is a type of structural foundation where the space beneath the lowest floor is typically not deep enough to allow a person to stand and not all four walls are below grade.

"Critical Facilities" include: Governmental facilities that are considered essential for the delivery of critical services and crisis management (such as data and communication centers and key governmental complexes); facilities that are essential for the health and welfare of the whole population (such as hospitals, prisons, police and fire stations, emergency operations centers, evacuation shelters and schools); mass transportation facilities (such as airports, bus terminals, train terminals); lifeline utility systems (including potable water, wastewater, oil, natural gas, electric power and communications systems); high potential loss facilities (such as nuclear power plants or military installations); hazardous material facilities (such as industrial facilities housing or manufacturing or disposing of corrosives, explosives, flammable materials, radioactive materials and toxins.

"D Zones" areas in which the flood hazard has not been determined, but may be possible

"Deed restriction" refers to a clause in a deed that limits the future uses of the property in some respect. Deed restrictions may impose a vast variety of limitations and conditions, for example, they may limit the density of buildings, dictate the types of structures that can be erected, prevent buildings from being used for specific purposes or even from being used at all.

"Development" means any man-made change to improved or unimproved real estate. It includes, but not limited to, construction, reconstruction, or placement of a building, or any addition or substantial improvements to a building. "Development" also includes the installation of a manufactured home on a site, preparing a site for a manufactured home, or installing/parking a travel trailer. The installation of utilities, construction of roads, bridges, culverts or similar projects are also "developments." Construction or erection of levees, dams, walls, or fences; drilling, mining, filling, dredging, grading, excavating, paving, or other alterations of the ground surface are "developments." Storage of materials including the placement of gas and liquid storage tanks are "developments," as are channel modifications or any other activity that might change the direction, height, or velocity of flood or surface waters. "Development" will normally not include maintenance of existing drainage ditches, gardening, plowing, planting, harvesting of crops, or similar practices that do not involve filling, grading, or construction of levees.

"Development Permit" refers to the permit required for placing a "development" in the floodplain.

"Easements" are rights or permissions held by one person to make specific, limited use of land owned by another person.

"Elevation Certificate" refers to FEMA form 81-31, which for the purposes of this Code must be properly completed by a Professional Engineer, Surveyor or Architect licensed to practice in the State of Arkansas.

"Erosion" is the process of soil removal by moving water.

"Existing Structure" means, for floodplain management purposes, a structure which is in place before any reconstruction, rehabilitation, addition, or other improvement takes place.

"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 a 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 the floodplain management regulations adopted by a community.

"Expansion to an Existing Manufactured Home Park or Subdivsion" **-** 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).

"Federal Emergency Management Agency", or FEMA, is the Federal agency responsible for administering the National Flood Insurance Program.

"FEMA" is the acronym for the Federal Emergency Management Agency.

"Fill" refers to the placement of natural sand, dirt, soil, rock, concrete, cement, brick or similar material at a specified location to bring the ground surface up to a desired elevation.

"FIRM" is the acronym for Flood Insurance Rate Map.

"Flood Fringe" refers to the portion of the 100-year floodplain which is outside the floodway (See definition of floodway below.)

"Flood Insurance Rate Map" **(or "FIRM")** refers to the official flood map of a community on which FEMA has categorized Special Flood Hazard Areas into risk premium zones.
flood maps

"Flood Insurance Study" **(or "FIS")** is the official report provided by FEMA. It contains flood profiles, floodway tables, engineering methods, and other descriptive and technical data.

"Floodplain Management" means the operation of an overall program of corrective and preventive measures for reducing flood damage, including but not limited to emergency preparedness plans, flood control works and floodplain management regulations.

"Flooding events" are general or temporary conditions of partial or complete inundation of normally dry land areas from the overflow of inland or tidal waters, or from the unusual and rapid accumulation or runoff of surface waters from any source.

"Floodplain" refers to any land area susceptible to inundation by floodwaters from any source. For the purposes of this Code, floodplain refers to the land area susceptible to being inundated by the base flood.

"Floodplain Administrator" refers to the community official designated in the local Flood Damage Prevention Code as responsible for the Code's administration.

"Floodplain Development Permit" is a permit issued by the local Floodplain Administrator and is required before beginning any development in an area designated as a Special Flood Hazard Area on the community's FIRM.

"Floodproofing" is a combination of structural and nonstructural additions, changes, or adjustments to structures that reduce or eliminate the risk of flood damage.

"Floodproofing Certificate" refers to FEMA form 81-65, which for the purposes of this Code must be properly completed by a Professional Engineer or Architect licensed to practice in the State of Arkansas.

"Floodway"* or *"Regulatory Floodway" refers to a stream channel and the land to either side of the stream channel that must remain undeveloped and open in order to allow floodwaters to pass without increasing the base flood elevation more than a designated height. For the purposes of this Code, the height is one foot (1 ft.). Severe restrictions or prohibitions are imposed on development within the floodway.

"Flow-through openings" are openings specifically designed to allow floodwaters to flow into and out of enclosed spaces, minimizing the danger of foundation or wall collapse from lateral hydrostatic pressure.

"Functionally dependent use" means a use which cannot perform its intended purpose unless it is located or carried out in close proximity to water. The term includes only docking facilities, port facilities that are necessary for the loading and unloading of cargo or passengers, and ship building and ship repair facilities, but does not include long-term storage or related manufacturing facilities.

"Grade" means the surface of the ground.

"Grading" means to smooth the surface of the ground, typically with heavy construction equipment.

"Highest Adjacent Grade" (HAG) means the highest natural elevation of the ground surface prior to construction next to the proposed walls of a structure.

"Historical Structure" means any structure that is:

1. 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;

2. 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;

3. 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

4. Individually listed on a local inventory or historic places in communities with historic preservation programs that have been certified either:

   a. By an approved state program as determined by the Secretary of the Interior or;
   b. Directly by the Secretary of the Interior in states without approved programs.

"Hydrodynamic forces" are the forces and stresses associated with moving water, including impacts from objects carried in the water.

"Hydrostatic flood forces" are the forces and stresses associated with standing floodwaters.

"Lacustrine Flooding" is flooding associated with a lake.

"Lateral forces" are the horizontal hydrostatic forces associated with standing water. Water exerts an equal force in all directions, and as little as three feet of standing water can generate sufficient lateral force to collapse a foundation or wall.

“Lowest floor” refers to the lowest floor of the lowest enclosed area (including Basement). For a typical slab-on-grade construction, the lowest floor is the top of the first floor of the structure. For a typical basement foundation construction, the elevation of the lowest floor is the top of the basement floor. For a typical crawlspace foundation construction, the elevation of the lowest floor is the top of the first floor of the structure. For a typical split-level construction, the elevation of the lowest floor is the top of the first living area floor. For a manufactured home installation, the elevation of the lowest floor will be the bottom of the lowest I-Beam. The garage floor and crawlspaces are not the lowest floor as long as there are no living areas in the garage and it is used solely for storage, parking vehicle and entry to the structure, 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 of the National Flood Insurance regulations.

“Manufacture Homes” or Structures 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 subdivided into two or more manufactured home lots for rent or sale.

“Mean Sea Level” (MSL) means, for the purposes of the NFIP, the National Geodetic Vertical Datum (NGVD) of 1929 or other datum, to which base flood elevations shown on a community’s FIRM are referenced.

“Mixed Use Structures” are structures with both a business and a residential component, but where the area used for business is less than 50% of the total floor area of the structure.

“New Construction” means, for floodplain management purposes, structures for which the “start of construction” commenced on or after the date of a floodplain management regulation adopted by a community and includes any subsequent improvements to such structures.

“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 a 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.

“No Adverse Impact principle” is a principle of restricting or prohibiting land development that does harm or “adversely affects” someone else’s property or land.

“Nonresidential Structures” are structures used only for commercial or public purposes, such as businesses, schools, churches, etc...

"No-Rise Certificates" are formal certifications signed and stamped by a Professional Engineer licensed to practice in the State of Arkansas, demonstrating through hydrologic and hydraulic analyses performed in accordance with standard engineering practice that a proposed development will not result in any increase in flood levels within the community during the occurrence of a base flood event.

"Piers" are columns of masonry or other structural material (commonly cement blocks stacked up to support a manufactured home), usually rectangular, used to support other structural members. For the purpose of this ordinance, piers must be permanent in nature.

"Pilings" are steel tubes driven to rock or a suitable soil bearing layer and connected to the foundation of a structure.

"Ponding" is a flooding effect where floodwaters accumulate in shallow depressions and linger until absorbed or evaporated.

"Recreational vehicles" means a vehicle which is:

(i) built on a single chassis;
(ii) 400 square feet or less when measured at the largest horizontal projections;
(iii) designed to be self-propelled or permanently towable by a light duty truck; and
(iv) designed primarily not for use as a permanent dwelling but as temporary living quarters for recreational, camping, travel, or seasonal use.

"Risk Zones" categorize special flood hazard areas into groupings by the specific risk of flooding. Zones A, AE or A1-30, AO, and AH are Special Flood Hazard Areas. See "X Risk Zones" in this section.

"Riverine flooding" is flooding associated with a river or stream channel.

"RV" is the acronym for recreational vehicle.

"Screw augers" are any type of anchor that twists into the soil, typically to a depth of 4 feet or more. They are not suitable for securing manufactured homes against floodwaters because saturated grounds often soften and fail to hold the anchor in place.

"Section 404 Wetlands Permit" is a permit required under Section 404 of the Clean Water Act for the discharge of dredged and fill material into any surface water of the United States. The US Army Corps of Engineers issues Section 404 permits.

"SFHA" is the acronym for Special Flood Hazard Area.

"Shallow flooding" means a depth of less than 3 feet.

"Slab anchors" are anchors where the hook of the anchor is wrapped around a horizontal rebar in the slab before the concrete is poured.

"Special flood hazard areas" are geographical areas identified on FEMA flood maps as being at-risk for flooding. The maps further categorize these areas into various flood risk zones A, AE or A1-30, AH, and AO.

"Start of Construction" includes substantial improvement and means the date the building permit was issued, provided the actual start of construction, repair, reconstruction, rehabilitation, addition placement, or other improvement was within 180 days of the permit date. The actual start means either the first placement of permanent construction of a structure on a site, such as the pouring of slab or footings, the installation of piles, the construction of columns, or any work beyond the stage of excavation; or the placement of a manufactured home on a foundation. Permanent construction does not include land preparation, such as clearing, grading and filling; nor does it include the installation of streets and/or walkways; nor does it include excavation for basement, footings, piers or foundations or the erection of temporary forms; nor does it include the installation on the property of accessory buildings, such as garages or sheds not occupied as dwelling units or not part of the main structure. For a substantial improvement, the actual start of construction means the first alteration of any wall, ceiling, floor, or other structural part of a building, whether or not that alteration affects the external dimensions of the building.

"State Coordinating Agency" is the agency that acts as a liaison between FEMA and a community for the purposes of floodplain management. The Arkansas Natural Resources Commission is the State Coordinating Agency for Arkansas.

"Stream channels" are depressed natural pathways through which water of any quantity routinely flows.

"Structural development" is a development that includes the placement or construction of a structure.

"Structure" means for floodplain management purposes, a walled and roofed building, including a gas or liquid storage tank that is principally above ground, as well as a manufactured home.

"Substantial damage" is damage of any origin where the cost to restore a structure to its original undamaged state would equal or exceed 50% of the market value of the structure before any damage occurred. In determining whether substantial damage has occurred, estimators must use standard contractor and materials costs. There are no exceptions for homeowners who make their own repairs or for discounted or free raw materials.

"Substantial improvement" is any reconstruction, remodeling, addition or improvement to a structure with a cost equaling or exceeding 50% of the market value of the structure before any

improvement. Improvements to correct identified violations of local health, sanitary or safety Codes are not substantial improvements, regardless of the cost, as long as they are the minimum improvement necessary to bring the structure up to Code. Alterations to historical structures are also exempted, as long as the improvement does not affect the structure's official status of "historical structure."

"Uses vulnerable to floods" are simply any land or structural uses that may be negatively affected by a flood.

"Variance" is a formal, written permission from the Appeals Board to construct or develop in a way that is inconsistent with the requirements of this Code. The variance only deals with this Code – the Appeals Board has no authority to waive any other governmental requirement, and has no say in the cost of flood insurance.

"Violation" **-** means the failure of a structure or other development to be fully compliant with the community's floodplain management regulations. A structure or other development without the elevation certificate, other certifications, or other evidence of compliance required in this Code is presumed to be in violation until such time as that documentation is provided.

"Watercourse alteration" refers to any change that occurs within the banks of a watercourse.

"Water Surface Elevation" - means the height, in relation to the National Geodetic Vertical Datum (NGVD) of 1929 (or other datum, where specified), of floods of various magnitudes and frequencies in the floodplains of coastal or riverine areas.

"X Risk Zones" are a special group of insurance risk zones. One type, shown as non-shaded areas on FEMA issued flood maps, indicates a zone where flooding is not expected to occur. The second type, shown as shaded areas of FEMA flood maps, indicates a flood hazard area that is expected to be affected by the 500-year flood, but not by the 100-year base flood.

ARTICLE 2 ADMINISTRATION

SECTION A. DESIGNATION OF THE FLOODPLAIN ADMINISTRATOR

The **{ County Judge if the local community is a County / Mayor if the local community is a City or Town }** of **{ community name }**, or his designee, is hereby appointed the Floodplain Administrator.

SECTION B. DUTIES & RESPONSIBILITIES OF THE FLOODPLAIN ADMINISTRATOR

It is the duty and responsibility of the Floodplain Administrator or his designee to:

(1) **Obtain accreditation each year** as required by A.C.A. §14-268-106 through the State Coordinating Agency, which is the **Arkansas Natural Resources Commission**.

(2) **Administer and implement the provisions of this Code** and other appropriate sections of 44 CFR (Emergency Management and Assistance - National Flood Insurance Program Regulations) as they pertain to floodplain management

(3) **Review applications for Floodplain Development Permits** to:

a) Evaluate proposed projects for reasonable safety from flooding;

b) Evaluate proposed projects for conformance with No Adverse Impact principles;

c) Ensure that all other permits necessary (including Section 404 Wetlands Permits as required by the Federal Water Pollution Control Act Amendments of 1972, 33 U.S.C. 1334) for proposed projects are obtained from the appropriate government agency prior to issuing a Floodplain Development Permit; and

d) Ensure that proposed projects conform to the applicable provisions of this Code.

(4) **Approve or deny applications for Floodplain Development Permits** on the basis of:

a) The proposed development's compliance or non-compliance with the provisions of this Code;

b) The expected flood elevation, flood water velocity, flood duration, rate of rise and sediment transport of the floodwaters expected at the proposed development site;

c) The proposed development's potential to adversely impact life and property by changing flooding patterns, changing erosion rates, or being swept onto other lands by flood waters;

d) The proposed development's susceptibility to flood damage;

e) The proposed development's compatibility with existing and planned community development;

f) The proposed development's accessibility by ordinary and emergency vehicles during flooding events;

g) The anticipated costs of providing governmental services to the proposed development during and after flooding events, including maintenance and repair of streets, bridges, facilities and public utilities such as sewer, gas, electrical and water systems;

h) The proposed development's functionally dependent use;

i) The availability of alternative locations, not subject to flooding or erosion damage, for the proposed development; and

j) The relationship of the proposed use to the comprehensive plan for that area.

(5) **Interpret the exact location of the boundaries of Special Flood Hazard Areas** whenever a mapped boundary appears to be different from actual field conditions. (The sole purpose of this interpretation is to determinate the applicability of the provisions of this Code to the proposed project.)

(6) **Notify adjacent communities** and the State Coordinating Agency, which is the Arkansas Natural Resources Commission, a minimum of 60 days **prior to any alteration or relocation of a watercourse,** and submit evidence of all such notifications to FEMA.

(7) **Ensure that the flood carrying capacity** within an altered or relocated portion of a watercourse is not diminished, and that the alteration or relocation does not adversely impact any other lands.

(8) **Obtain, review and reasonably utilize**, whenever the current Flood Insurance Study or current Flood Insurance Rate Map does not provide **base flood elevation data, any base flood elevation data and floodway data** available from any Federal, State or other source. The Floodplain Administrator may obtain such data by requiring the applicant to submit it in conjunction with a Floodplain Development Permit application. (The sole use of this data is the administration of the provisions of this Code.)

(9) **Inspect floodplain developments as necessary** to ensure construction is in accordance with the application data that formed the basis for the decision to issue the Floodplain Development Permit.

(10) **Issue Certificates of Compliance**.

(11) **Maintain all records and documents pertaining to this Code for public inspection**.

SECTION C. ESTABLISHMENT OF DEVELOPMENT PERMIT

A **Floodplain Development Permit is required** for all structural development, placement of manufactured structures, clearing, grading, mining, drilling, dredging, placement of fill, excavating, watercourse alteration, drainage improvements, roadway or bridge construction, individual water or sewer installations or any other development **in a Special Flood Hazard Area to ensure conformance with the provisions of this Code**.

SECTION D. PERMIT PROCEDURES

(1) **Application** for a Floodplain Development Permit shall be presented to the Floodplain Administrator on forms furnished by him/her and may include, but not be limited to, plans in duplicate drawn to scale showing the location, dimensions, and elevation of proposed landscape alterations, existing and proposed structures, including the placement of manufactured homes, and the location of the foregoing in relation to areas of special flood hazard.

(2) The **documentation** required with each Application for a Floodplain Development Permit, and the specific provisions of this Code applicable to the proposed development, are dependant upon the type of development proposed and the Risk Zone of the proposed development site. Article 3, Section A contains standards for all developments in all Risk Zones. Article 3, Section B contains standards for specific development types in specific Risk Zones.

(3) The decision of the Floodplain Administrator to **approve or deny** issuance of a Floodplain Development Permit is **subject to appeal** to the designated Appeal Board. Within **{community name}**, Arkansas the designated Appeal Board is the **{identify the Appeal Board}**.

SECTION E. <u>PROCEDURES FOR VARIANCE FROM THE REQUIRMENTS OF THIS CODE</u>

(1) Applicants must submit petitions for variances directly to the Appeal Board (Section E).

(2) Variances may only be issued:

a) if showing a good and sufficient cause;

b) granting of the variance will not result in any adverse impact upon other lands;

c) if granting of the variance will not result in any additional threats to public safety;

d) if granting of the variance will not result in extraordinary public expense;

e) if granting of the variance does not create a nuisance, cause fraud on or victimization of the public, or conflict with existing laws or ordinances;

f) if granting of the variance will not result in increased flood heights or an increase in expected flood velocities;

g) if the requested variance is the minimum necessary, considering the flood hazards, to afford the necessary relief; and

h) upon determination that the requested variance is necessary to avoid an extraordinary hardship to the applicant.

(3) Variances may not be issued for developments inside a regulatory floodway unless

a) all requirements of 44 CFR §65.12 are first met; or

b) the following requirements are met:

1. a No-Rise Certificate signed and sealed by a Professional Engineer licensed to practice in the State of Arkansas is submitted to document that no increase in the base flood elevation would result from granting a variance for the proposed development;
2. protective measures are employed to minimize damages during flooding events; and
3. the variance does not result in any adverse impact to other lands.

(4) Examples of developments for which variance petitions may be appropriate include but are not limited to

a) the new construction of, or substantial improvement to, a structure on a lot of 1/2 acre or less in size that is surrounded by contiguous lots with existing structures constructed below the base flood elevation;

b) for the reconstruction, rehabilitation or restoration of an historical structure, provided that:

   1. the proposed repair or rehabilitation will not preclude the structure's continued designation as a historic structure; and
   2. the variance is the minimum necessary to preserve the historic character and design of the structure.

c) the new construction of, substantial improvement to, or other development necessary to conduct a functionally dependent use, provided that:

   1. the criteria outlined in Article 2, Section E, (3) and (4) and Article 2, Section F are met, and
   2. the structure or other development is protected by methods that minimize flood damages during the base flood and create no additional threats to public safety.

SECTION F. APPEAL BOARD

(1) Within **{ community name }**, Arkansas the **{ identify the Appeal Board }** is the designated Appeal Board.

(2) The Appeal Board will consider an appeal only with allegations of an error in any requirement, decision, or determination made by the Floodplain Administrator in the enforcement or administration of this Code.

(3) Upon consideration of the factors noted in Article 2, Sections E and F, and the intent of this ordinance, the Appeal Board may attach such conditions to the granting of variances as it deems necessary to further the purpose and objectives of this ordinance.

(4) Appeal Board decisions are binding only upon the requirements of this Code, and have no bearing on the decision of any lending institution to require the purchase of flood insurance or on the rate determination of such insurance.

(5) Any time the Appeal Board issues a variance, it must provide the applicant with a formal written warning of an increased risk of flood damage due to removal of restrictions designed to lessen such risks. The notice must also warn of a corresponding increase in the cost of flood insurance, since the cost of such insurance will be commensurate with the increased risk.

(6) Aggrieved parties may appeal any decision of the Appeal Board to a court of competent jurisdiction.

ARTICLE 3 PROVISIONS FOR FLOOD HAZARD REDUCTION

SECTION A. GENERAL STANDARDS

The following standards apply to all developments in Special Flood Hazard Areas, regardless of the type of proposed development or the Risk Zone of the proposed site.

1. **All new construction or substantial improvements** shall be **designed (or modified) and adequately anchored** to prevent flotation, collapse or lateral movement of the structure resulting form hydrodynamic and hydrostatic loads, including the effects of buoyancy;

2. **All new construction or substantial improvements** shall be constructed by methods and practices that **minimize flood damage**;

3. **All new construction or substantial improvements** shall be constructed **with materials resistant to flood damage**;

4. All **critical facilities** constructed or substantially improved in Special Flood Hazard Areas (SFHA) must be constructed or modified to **exceed 500-year flood protection** standards **or located outside the SFHA**.

5. **The placement or construction of all new structures must be in full compliance with the provisions of this Code**

6. For the purposes of this Code, all **mixed-use structures** are **subject to the more stringent requirements of residential structures**.

7. **A substantial improvement or substantial damage** to an existing structure **triggers a requirement to bring the entire structure into full compliance** with the provisions of this Code. The existing structure, as well as any reconstruction, rehabilitation, addition, or other improvement, must meet the standards of new construction in this Code.

8. **Any improvement to an existing structure that is less than a substantial improvement requires the improvement, but not the existing structure, to be in full compliance with the provisions of this Code**.

9. **All manufactured homes** to be placed within a Special Flood Hazard Area on a community's FIRM shall be **installed using methods and practices which minimize flood damage**. For the purposes of this requirement, manufactured homes must be elevated and anchored to resist flotation, collapse, or lateral movement. Methods of anchoring may include, but are not limited to, use of over-the-top or frame ties to ground anchors. This requirement is in addition to applicable State and local anchoring requirements for resisting wind forces. Screw augers or expanding anchors will not satisfy the requirement of this provision.

10. The design or location of **electrical, heating, ventilation, plumbing, and air conditioning equipment for new structures**, or for any improvements to an existing structure, must prevent water from entering or accumulating within the components during base flood events.

11. The design of **all new and replacement water supply systems** must minimize or eliminate infiltration of floodwaters into the system during base flood events.

12. The design of **all new and replacement sanitary sewage** systems must minimize or eliminate infiltration of floodwaters into the system during flooding events, and must prevent sewage discharge from the systems into floodwaters.

13. The placement of **on-site waste disposal systems** must avoid impairment to, or contamination from, the disposal system during base flood events.

14. **Construction of basement foundations in any Special Flood Hazard Area is prohibited**.

15. New construction and substantial improvements, with **fully enclosed areas (such as garages and crawlspaces)** 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 below the base flood elevation 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) A minimum of two openings on separate walls having a total net area of not less than 1 square inch for every square foot of enclosed area subject to flooding shall be provided.

    (b) The bottom of all openings shall be no higher than 1 foot above grade.

    (c) Openings may be equipped with screens, louvers, valves, or other coverings or devices provided that they permit the automatic entry and exit of floodwaters.

16. The placement of **recreational vehicles (RV)** in Special Flood Hazard Areas must either

    (a) be temporary, as demonstrated by the RV being fully licensed, being on wheels or a jacking system, attached to the site only by quick disconnect type utilities and security devices, having no permanently attached additions, and being immobile for no more than 180 consecutive days; or else

    (b) meet all provisions of this Code applicable to manufactured home structures.

17. All proposals for the development of a **residential subdivision, commercial business park or manufactured home park/subdivision** must have **public utilities and facilities such as sewer, gas, electrical and water systems** located and constructed to minimize or eliminate flood damage.

18. All proposals for the development of a **residential subdivision, commercial business park or a manufactured home park/subdivision** must include an adequate **drainage plan** to reduce exposure to flood hazards.

19. All proposals for the development of a **commercial business park or a manufactured home park/subdivision** must include an adequate **evacuation plan** for the escape of citizens from affected nonresidential structures during flooding events.

SECTION B. RISK ZONE SPECIFIC STANDARDS

In addition to the General Standards, the following standards apply to specific development types in specific Risk Zones. Risk Zones listed in this Code that do not appear on the current FIRM are not applicable.

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(1) In AE or A1-30 Risk Zones: Special Flood Hazard Areas with base floods determined

a) **For Residential Structures in Zone AE or A1-30**:

1. For all new residential structures, the top surface of the lowest floor must have an elevation {**2 feet or more**} above the published BFE. This elevation must be documented on an Elevation Certificate properly completed by a Professional Engineer, Surveyor or Architect licensed to practice in the State of Arkansas.

2. For all substantial improvements or substantial damage to existing residential structures, the entire structure becomes subject to the requirements of a new residential structure.

3. For any reconstruction, rehabilitation, addition, or other improvement to an existing residential structure that is less than a substantial improvement, only the improved area, but not the entire structure, becomes subject to the requirements of a new residential structure.

b) **For Nonresidential Structures in Zone AE or A1-30**:

1. All new commercial, industrial or other nonresidential structures must either:

   a. have the lowest floor (including basement) elevated {**2 feet or more**} above the base flood level or
   b. be floodproofed such that, together with attendant utility and sanitary facilities, be designed so that below {**an elevation of 3 feet above**} }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.
   c. A registered professional engineer or architect shall develop and/or review structural design, specifications, and plans for the construction, and shall certify on a Floodproofing Certificate that the design and methods of construction are in accordance with accepted standards of practice as outlined in this subsection. A record of such certification which includes the specific elevation (in relation to mean sea level) to which such structures are floodproofed shall be maintained by the Floodplain Administrator.

2. For all substantial improvements or substantial damage to existing commercial, industrial or other nonresidential structures the entire structure becomes subject to the requirements of a new nonresidential structure.

3. For any reconstruction, rehabilitation, addition, or other improvement to an existing nonresidential structure that is less than a substantial improvement, only the improved area, but not the entire structure, becomes subject to the requirements of a new nonresidential structure.

c) **For Manufactured Homes in Zone AE or A1-30**:

1. All manufactured homes that are placed or substantially improved on sites:

   a. outside of a manufactured home park or subdivision,
   b. in a new manufactured home park or subdivision,
   c. in an expansion to an existing manufactured home park or subdivision, or
   d. in an existing manufactured home park or subdivision on which a manufactured home has incurred "substantial damage" as a result of a flood, be elevated on a permanent foundation such that the lowest floor of the manufactured home is elevated {**2 feet or more**} above the base flood elevation and be securely anchored to an adequately anchored foundation system to resist flotation, collapse, and lateral movement.

2. Require that manufactured homes be placed or substantially improved on sites in an existing manufactured home park or subdivision on the community's FIRM that are not subject to the provisions of paragraph (1.) of this section be elevated so that either:

   a. the lowest floor of the manufactured home is {**2 feet or more**} above the base flood elevation, or
   b. 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 flotation, collapse, and lateral movement.

3. For all substantial improvements or substantial damage to existing manufactured home, the entire structure becomes subject to the requirements of a new manufactured home.

4. For any reconstruction, rehabilitation, addition, or other improvement to an existing manufactured home that is less than a substantial improvement, only the improved area, but not the entire structure, becomes subject to the requirements of a new manufactured home.

d) When a regulatory floodway has not been designated, the Floodplain Administrator must require 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.

(2) Floodways
High risk areas of stream channel and adjacent floodplain

a) **Developments** in regulatory floodways are **prohibited**, **unless**

1. **A No-Rise Certificate**, signed and stamped by a Professional Engineer licensed to practice in the State of Arkansas, **is submitted** to demonstrate through hydrologic and hydraulic analyses performed in accordance with standard engineering practice that the proposed development would not result in any increase in flood levels within the community during the occurrence of a base flood event; **or**

2. **All requirements of 44 CFR §65.12 are first met**.

b) **No Manufactured Home may be placed in a regulatory floodway**, regardless of elevation height, anchoring methods, or No-Rise Certification.

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(3) In AH or AO Risk Zones:
Special Flood Hazard Areas of shallow flooding

a) **For Residential Structures in Zones AH or AO**:

1. All new residential structures must be constructed with the top surface of the lowest floor elevated {__**2 feet or more**_} above the published BFE, or {__**2 feet or more**__} above the highest adjacent grade in addition to the depth number specified (at least 2 feet if no depth number is specified) on the community's FIRM. This elevation must be documented on an Elevation Certificate properly completed by a Professional Engineer, Surveyor or Architect licensed to practice in the State of Arkansas.

2. For all substantial improvements or substantial damage to existing residential structures the entire structure becomes subject to the requirements of a new residential structure.

3. For any reconstruction, rehabilitation, addition, or other improvement to an existing residential structure that is less than a substantial improvement, only the improved area, but not the entire structure, becomes subject to the requirements of a new residential structure

b) **For Nonresidential Structures in Zones AH or AO**:

1. All new commercial, industrial or other nonresidential structure must either:

   a. have the top surface of the lowest floor elevated {__**2 feet or more**__} above the published BFE, or {__**2 feet or more**__} above the highest adjacent grade in addition to the depth number specified (at least 2 feet if no depth number is specified) on the community's FIRM, with documentation on an Elevation Certificate properly completed by a Professional Engineer, Surveyor or Architect licensed to practice in the State of Arkansas; or
   b. be floodproofed such that the structure, together with attendant utility and sanitary facilities be designed so that below {__**3 feet or more**__} above the published BFE in Zone AH, or {__**3 feet or more**__} above the base specified flood depth in an AO Zone, 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 of effects of buoyancy.

2. For all substantial improvements or substantial damage to existing commercial, industrial or other nonresidential structures the entire structure becomes subject to the requirements of a new nonresidential structure.

3. For any reconstruction, rehabilitation, addition, or other improvement to an existing nonresidential structure that is less than a substantial improvement, only the improved area, but not the entire structure, becomes subject to the requirements of a new nonresidential structure.

c) **For Manufactured Homes in Zones AH or AO**:

1. All manufactured homes that are placed or substantially improved on sites:

   a. outside of a manufactured home park or subdivision,
   b. in a new manufactured home park or subdivision,
   c. in an expansion to an existing manufactured home park or subdivision, or
   d. in an existing manufactured home park or subdivision on which a manufactured home has incurred "substantial damage" as a result of a flood, be elevated on a permanent foundation such that the lowest floor of the manufactured home is elevated {**2 feet or more**} above the published BFE, or {**2 feet or more**} above the highest adjacent grade in addition to the depth number specified (at least 2 feet if no depth number is specified) on the community's FIRM, and be securely anchored to an adequately anchored foundation system to resist flotation, collapse, and lateral movement.

2. Require that manufactured homes be placed or substantially improved on sites in an existing manufactured home park or subdivision on the community's FIRM that are not subject to the provisions of paragraph 1. of this section be elevated so that either:

   a. the lowest floor of the manufactured home meets the elevation standard of paragraph 1., or
   b. 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 flotation, collapse, and lateral movement.

3. For all substantial improvements or substantial damage to existing manufactured home, the entire structure becomes subject to the requirements of a new manufactured home.

4. For any reconstruction, rehabilitation, addition, or other improvement to an existing manufactured home that is less than a substantial improvement, only the improved area, but not the entire structure, becomes subject to the requirements of a new manufactured home.

d) **Where FEMA has not established a regulatory floodway in Zone in Zones AH or AO**, no Floodplain Development Permit may be issued unless a detailed engineering analysis is submitted along with the application that demonstrates the increase in base floodwater elevation due to the proposed development and all cumulative developments since the publication of the current FIRM will be less than 1 foot.

e) **Require adequate drainage paths** around structures on slopes, to guide flood waters around and away from proposed structures.

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(4) In "A" Risk Zones: Special Flood Hazard Areas with no base flood elevations determined

a) **In Zone A, The applicant or the applicant's agent must determine a base flood elevation prior to construction. The BFE will be based on a source or method approved by the local Floodplain Administrator**.

b) **For Residential Structures in Zone A**:

1. For all new residential structures, the top surface of the lowest floor must have an elevation {**2 feet or more**} above the BFE. This elevation must be documented on an Elevation Certificate properly completed by a Professional Engineer, Surveyor or Architect licensed to practice in the State of Arkansas.

2. For all substantial improvements or substantial damage to existing residential structures, the entire structure becomes subject to the requirements of a new residential structure.

3. For any reconstruction, rehabilitation, addition, or other improvement to an existing residential structure that is less than a substantial improvement, only the improved area, but not the entire structure, becomes subject to the requirements of a new residential structure.

c) **For Nonresidential Structures in Zone A**:

1. All new commercial, industrial or other nonresidential structures must either:

   a. have the lowest floor (including basement) elevated {**2 feet or more**} above the base flood level or

b. be floodproofed such that, together with attendant utility and sanitary facilities, be designed so that below {**an elevation of 3 feet above**} }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.

c. A registered professional engineer or architect shall develop and/or review structural design, specifications, and plans for the construction, and shall certify on a Floodproofing Certificate that the design and methods of construction are in accordance with accepted standards of practice as outlined in this subsection. A record of such certification which includes the specific elevation (in relation to mean sea level) to which such structures are floodproofed shall be maintained by the Floodplain Administrator.

2. For all substantial improvements or substantial damage to existing commercial, industrial or other nonresidential structures the entire structure becomes subject to the requirements of a new nonresidential structure.

3. For any reconstruction, rehabilitation, addition, or other improvement to an existing nonresidential structure that is less than a substantial improvement, only the improved area, but not the entire structure, becomes subject to the requirements of a new nonresidential structure.

d) For Manufactured Homes in Zone A:

1. All manufactured homes that are placed or substantially improved on sites:

   a. outside of a manufactured home park or subdivision,
   b. in a new manufactured home park or subdivision,
   c. in an expansion to an existing manufactured home park or subdivision, or
   d. in an existing manufactured home park or subdivision on which a manufactured home has incurred "substantial damage" as a result of a flood, be elevated on a permanent foundation such that the lowest floor of the manufactured home is elevated {**2 feet or more**} above the base flood elevation and be securely anchored to an adequately anchored foundation system to resist flotation, collapse, and lateral movement.

2. Require that manufactured homes be placed or substantially improved on sites in an existing manufactured home park or subdivision on the community's FIRM that are not subject to the provisions of paragraph (1.) of this section be elevated so that either:

   a. the lowest floor of the manufactured home is {__**2 feet or more**__} above the base flood elevation, or
   b. 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 flotation, collapse, and lateral movement.

3. For all substantial improvements or substantial damage to existing manufactured home, the entire structure becomes subject to the requirements of a new manufactured home.

4. For any reconstruction, rehabilitation, addition, or other improvement to an existing manufactured home that is less than a substantial improvement, only the improved area, but not the entire structure, becomes subject to the requirements of a new manufactured home.

e) **Base flood elevation data and a regulatory floodway**, utilizing accepted engineering practices, shall be generated for subdivision proposals and other proposed development including the placement of **manufactured home parks and subdivisions which is greater than 50 lots or 5 acres, whichever is lesser**, if not otherwise provided.