

NFIP

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

FEMA

ASWCC

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TO: LOCAL COMMUNITY OFFICIAL

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 Soil and Water Conservation 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.

A handwritten signature in black ink, appearing to read "J. Randy Young", is written over a horizontal line.

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

FOREWARD

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 Soil and Water Conservation Commission. Floodplain Administrators should read through this guide to familiarize themselves with its contents. Particular attention should be given to the minimum criteria for floodplain management in Chapter 3.

Each Floodplain Administrator should compare the community Flood Damage Prevention Ordinance and flood hazard maps with the floodplain management criteria to determine which type of ordinance and criteria matches. The community should refer to the floodplain management criteria for its type of ordinance.

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, how the Floodplain Administrator conducts his 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.

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Chapter 1

INTRODUCTION

FLOOD PROBLEMS IN THE UNITED STATES AND ARKANSAS

Floods are a common occurrence in many parts of the United States. They are probably most associated with the Mississippi River and its tributaries. During this century alone, several great floods have occurred over vast areas of the Mississippi River Basin. Two of the most memorable of these are the Flood of 1927 and the Flood of 1973.



When Arkansans speak of the “Great Flood,” they are generally referring to the 1927 flood. And while no flood has had such statewide coverage, few regions or communities within the State have not been affected by significant floods since then. Over the past 20 years, floods have affected communities in some portion of the State virtually every year. Often these events were accompanied by Presidential Disaster Declarations, such as 1982, 1987, and 1990. **For occupants of the State’s floodplains, it is just a matter of time before they too are affected.**

MANAGING FLOODING

There are basically two ways to protect lives and property from flooding: 1.) build structures to ward off floodwaters (**structural floodplain management**), and 2.) avoid areas subject to flooding (**non-structural floodplain management**). Throughout history, man has employed both of these methods. And while building and living outside the floodplain may be easier and less expensive to accomplish, it also reduces the opportunity to utilize flood-prone property. In order to make use of these lands, systems of levees and dams have been constructed. And as more and more people have occupied floodplains, the demand for more and larger levees and dams has also increased.

Flood Control acts of 1917, 1928, 1936, and 1938 led to a massive federal program to build dams and levees, enlarge channels, and divert floodwaters. Most of this responsibility was placed with the U.S. Army Corps of Engineers. Other federal agencies such as the U.S. Department of Agriculture and Bureau of Reclamation began constructing flood control projects. The Tennessee Valley Authority (T.V.A.) also became a major participant in flood control activities. From 1960 to 1985, Corps flood control projects are estimated to have saved \$245 billion in flood damages. From its inception in 1933, T.V.A. projects have prevented over \$3 trillion in flood losses.

Despite tens of billions of dollars spent on flood control structures and the success in preventing flood damages, the cost of floods continues to escalate. Damage from the 1993 Midwest floods **alone** is estimated at \$15-20 billion.

NATIONAL FLOOD INSURANCE PROGRAM



In the 1950's, the federal government initiated a comprehensive disaster relief program (**Federal Disaster Act of 1950**). However, without a parallel program to mitigate or reduce the potential for flood damages, disaster relief costs were added to the taxpayers' bill for flooding throughout the nation.

In the late 1950's and 1960's, it became apparent that the only way to reduce flood losses (costs) at all levels of government was to either discourage development in floodplains or provide protection to property in floodplains

without large flood control projects. In 1968, the **National Flood Insurance Act** was passed by Congress to accomplish both of these objectives. The Act was broadened and modified with the passage of the **Flood Disaster Act of 1973** and the **National Flood Insurance Reform Act of 1994**. It is administered by the **Federal Insurance Administration (FIA)** and **Mitigation Directorate (MT)**, both components of the **Federal Emergency Management Agency (FEMA)**.

The **National Flood Insurance Program (NFIP)** makes flood insurance available in **communities** which agree to enact and enforce measures designed to reduce future risks to new development in floodplains. While communities have strong incentives to enter the **NFIP**, the program is voluntary. The **NFIP** is a partnership between the Federal Government, which provides flood insurance, and the local government or community, which manages its flood hazard areas to reduce future flood problems. The State also plays a role by relaying technical assistance to local communities and providing feedback to the Federal Government.

The World Wide Web site for a complete set of NFIP regulations is:

http://www.access.gpo.gov/nara/cfr/waisidx_99/44cfrv1_99.html

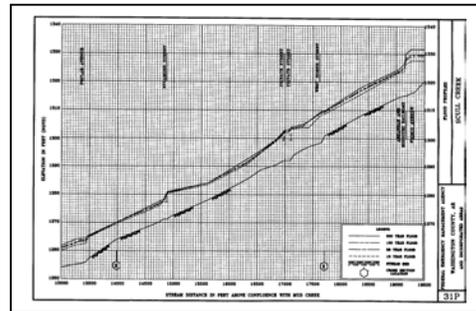
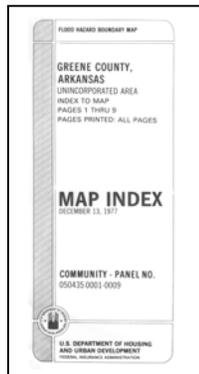
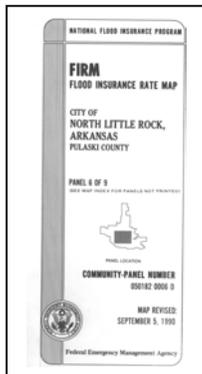
PARTICIPATION IN THE NFIP

The **NFIP** allows the **FIA** to make flood insurance available only in those areas where the appropriate public body has adopted adequate floodplain management regulations for its flood-prone areas. Individual citizens cannot regulate building or establish construction priorities for a community. Without community oversight of building activities in the floodplain, the best efforts of some to reduce future losses could be undermined or nullified by the careless building of others. Unless the community as a whole is practicing adequate flood hazard mitigation, the potential for loss will not be reduced sufficiently to affect disaster relief costs. Insurance rates also would reflect the probable higher losses that would result without local floodplain management enforcement activities.

NATIONAL FLOOD INSURANCE PROGRAM (NFIP) COMMUNITY RESPONSIBILITIES:

1. Require Development Permits in floodplain areas and regulate development in accordance with flood damage prevention regulations and ordinance approved by the **FEMA** Regional Office.
2. Obtain elevation certificates for all new construction and substantial improvement. Obtain "floodproofing" certificates, as applicable.
3. Maintain records of all floodplain development and index or file them so that information can be easily retrieved by address or other geographic identifier. A log of all floodplain permits is required.
4. When otherwise not provided, obtain detailed flood information (base flood elevations and base flood boundaries) for any development project five acres or more in size (or 50 or more lots) in the floodplain.
5. Notify **FEMA** of all new floodplain information, including the impacts of new development, within six months, or require a developer to submit this information via the Letter of Map Revision process.
6. Protect regulatory **floodways** from encroachment. Require "No-Rise" evaluations and certificates for any proposed development in a **floodway**.
7. Ensure all other necessary permits are obtained.
8. Notify affected agencies and neighboring communities of any changes proposed to a stream channel.
9. Ensure that the carrying capacity of a stream channel is maintained if it is to be altered.
10. Design water supply and sewage disposal systems to minimize or eliminate infiltration of flood waters into the systems.
11. Require on-site sewage disposal systems to be located and designed so as to minimize flood damage.

PHASES OF PARTICIPATION IN THE NFIP



There are two phases of participation in the **NFIP**. The initial phase is called the **Emergency Phase**. During this stage, availability of flood insurance is limited, flood hazard maps either have not been published or provide limited detail, and floodplain management requirements are more general. If a community has a flood hazard map, it is referred to as a **Flood Hazard Boundary Map (FHBM)**. Through a Special Conversion Program, all but 1% of the 19,000 participating communities, nationwide, have been converted to the **Regular Phase**.

In the **Regular Phase**, higher amounts of flood insurance are made available to the community. For many communities, flood hazard information is more detailed, including such data as flood elevations, survey reference marks, and **floodways**. Floodplain management requirements are also more comprehensive and specific. In the **Regular Phase**, the flood hazard map is referred to as a **Flood Insurance Rate Map (FIRM)**. If the community is converted to the **Regular Phase** by Special Conversion, the flood hazard map may still be labeled as a **Flood Hazard Boundary Map (FHBM)**. The conversion to the **Regular Phase** is indicated by a letter which accompanies the map. The **FIRM** is usually accompanied by a **Flood Insurance Study (FIS)** booklet, which contains data and narrative, and a **Flood Boundary and Floodway Map (FBFM)**, generally referred to as a “**Floodway Map**.”

WHAT HAPPENS IF A COMMUNITY DOES NOT PARTICIPATE IN THE NFIP?

First, flood insurance under the **NFIP** is not available within a non-participating community. Furthermore, most lending institutions require that flood insurance be purchased for the length of a loan which is secured by insurable property in a **Special Flood Hazard Area (SFHA)**. This makes it extremely difficult, for example, to borrow money to remodel or build a house in a **SFHA**. Equity loans are likewise affected.

Section 202 (b) of Public Law 93-234 also states that if a Presidentially-declared disaster occurs as a result of flooding in a non-participating community, no Federal financial assistance can be provided for the permanent repair or reconstruction of insurable buildings in the **SFHA**. This does not affect such programs as temporary housing.

EFFECTS OF NON-PARTICIPATION IN THE NATIONAL FLOOD INSURANCE PROGRAM

1. Flood insurance is not available. No resident is able to purchase a flood insurance policy.
2. No Federal grants or loans for buildings may be made in identified flood hazard areas. Includes all Federal agencies such as HUD, EPA, SBA, HHR, etc.
3. No Federal disaster assistance may be provided in identified flood hazard areas for permanent restorative construction and grants.
4. No Federal mortgage insurance may be provided in identified flood hazard areas. This includes FHA, VA, FmHA, etc.
5. For conventional loans in non-participating communities:

Restriction on conventional loans in non-participating communities requires that lenders:

- a. must notify buyer or lessee that property is in a flood hazard area; and
 - b. must notify buyer or lessee that property in the flood hazard area is not eligible for Federal disaster relief in a declared disaster.
6. The **Flood Insurance Rate Map (FIRM)** and appropriate actuarial rates go into effect regardless of whether or not a community participates in the program. Lacking a local ordinance, unsafe construction today may result in prohibitively expensive insurance rates tomorrow.
 7. Local governing body may be susceptible to liability by not participating because their action:
 - a. denies the ability of its citizens to purchase flood insurance and;
 - b. does not take positive steps to reduce the exposure of life and property in the face of authoritative scientific and technical data.

EXECUTIVE ORDER 11988

In 1979, President Jimmy Carter issued an executive order which essentially requires all Federal agencies to abide by the same criteria with respect to floodplain management. The effect of **Executive Order 11988** is to require that whenever there is Federal funding or security for projects to be located in a **SFHA**, the community must be a participant in the **NFIP** and flood insurance must be required to protect any insurable structures to be built.

Each Federal agency has adopted its own rules and regulations, but they are all based on the principal of not allowing any development in the floodplain which will either cause damage to other properties or which is, itself, not protected. For some Federally-funded projects, the community may also be required to demonstrate that it is in compliance with **NFIP** floodplain management criteria.

WHAT HAPPENS IF A COMMUNITY DOES NOT ENFORCE ITS FLOODPLAIN MANAGEMENT ORDINANCES?

If a community does not enforce its floodplain management ordinances, it can be: 1) placed on probation, and 2) suspended from the **NFIP**. This is done only after **FEMA** has attempted to provide assistance to the community and the community has not responded positively within a reasonable time frame.

PROBATION

A community can be placed on probation 90 days after **FEMA** provides a written notice of deficiencies to community officials. Probation may last for up to 1 year. During this time, a **\$50 surcharge** is added to the premium of all flood insurance policies in effect in the community. The **FEMA** Regional Director has the authority to place a community on probation.

SUSPENSION

If, after a period of time on probation, a community fails to satisfactorily address deficiencies in its floodplain management program, the community may be suspended from the **NFIP**. The community is given 30 days written notice of impending suspension in order to appeal. If suspended from the **NFIP**, no new flood insurance policies may be written or renewed.

A community may also be suspended for failure to adopt an adequate ordinance. This generally occurs when either phase or map-type changes (which requires modification to the floodplain management criteria) or when there is a nationwide ordinance revision to make ordinances up-to-date with changes in the **NFIP**.

STATE ROLE IN THE NFIP

The National Flood Insurance Act of 1968 established a **State Coordinator** to promote floodplain management on the state level as well as provide assistance to local governments and the public as a whole. **Act 629 of 1969**, enacted by the General Assembly of the State of Arkansas authorizes cities, towns and counties to enact and enforce land use measures which will prevent and alleviate flood hazards and losses in flood-prone areas of the State. In 1970, **the Arkansas Soil and Water Conservation Commission (ASWCC)** was appointed by Governor Winthrop Rockefeller to be the **State Coordinating Agency**.

The **ASWCC** assists communities in qualifying for the **NFIP** and in adopting and enforcing floodplain management regulations. Through the Community Assistance Program – State Support Services Element (CAP-SSSE), a grant program funded by **FEMA**, staff of the **ASWCC** conducts scheduled visits, and provides general and technical assistance, and training to participating communities. The **ASWCC** also works closely with insurance agents, lenders, surveyors and engineers, appraisers, and others who have some involvement with floodplain management and the **NFIP**.

COMMUNITY RATING SYSTEM

The **NFIP** currently makes flood insurance available in communities which adopt and enforce **minimum** national standards for development in flood hazard areas. If a building is constructed to a greater protection level, the owner may be rewarded with a lower flood insurance premium.

Beginning in 1990, the **NFIP** recognizes a community that manages floodplain development to higher (**than the minimum**) standards or undertakes additional flood damage reduction projects. Flood insurance rates can be reduced “community-wide” if a community adopts floodplain management measures which “go beyond” the minimum standards.

Communities which qualify for participation in the **CRS** can eventually save insured citizens up to 45% on flood insurance premiums. During the first year, policyholders in these communities (which both qualify and elect to participate in the **CRS**) will be entitled to a 5% reduction in flood insurance rates.

TABLE 1-1
Community Rating System
Flood Insurance Rate Reduction Classes

<u>Rate Class</u>	<u>Rate Reduction</u>	<u>Credit Points Required</u>
1	45%	4,500+
2	40%	4,001 - 4,500
3	35%	3,501 - 4,000
4	30%	3,001 - 3,500
5	25%	2,501 - 3,000
6	20%	2,001 - 2,500
7	15%	1,501 - 2,000
8	10%	1,001 - 1,500
9	5%	501 - 1,000
10	0%	0 - 500

The **CRS** is voluntary. It operates in a fashion similar to a Fire Rating classification. Flood insurance rates will be reduced as shown in the **Table 1-1** on the preceding page. The credited points refers to calculations of the value of credited activities in reducing flood damages in **Table 1-2**.

TABLE 1-2 ACTIVITIES CREDITED UNDER THE COMMUNITY RATING SYSTEM

ACTIVITY	MAXIMUM POSSIBLE POINTS ¹	AVERAGE POINTS EARNED ²	MAXIMUM POINTS EARNED ³	PERCENTAGE OF COMMUNITIES CREDITED ⁴
300 Public Information Activities				
310 Elevation Certificates	142	72	142	100%
320 Map Information	140	138	140	96%
330 Outreach Projects	290	81	260	62%
340 Hazard Disclosure	81	24	81	47%
350 Flood Protection Library	30	22	30	84%
360 Flood Protection Assistance	71	57	71	39%
400 Mapping & Regulatory Activities				
410 Additional Flood Data	1,230	148	538	20%
420 Open Space Preservation	900	206	743	75%
430 Higher Regulatory Standards	1,750	159	658	71%
440 Flood Data Maintenance	226	78	170	59%
450 Stormwater Management	670	132	430	75%
500 Flood Damage Reduction Activities				
510 Floodplain Management Plan	235	34	178	10%
520 Acquisition and Relocation	3,200	177	1,700	9%
530 Retrofitting	2,800	66	352	4%
540 Drainage System Maintenance	330	236	305	78%
600 Flood Preparedness Activities				
610 Flood Warning Program	200	99	200	27%
620 Levee Safety	900	153	520	1%
630 Dam Safety	120	66	98	82%

¹ The maximum possible points do not include credit for management of special hazards.

² The average points earned are based on conversions of the average scores for 1991—1997 to the 1999 *CRS Coordinator's Manual*. Not all elements can be converted directly to the 1999 system, so some figures are approximate. The average points earned include credit for growth rates, discussed in Section 710.

³ The maximum points earned are the highest scores attained by a community. In some cases many communities have attained the maximum points listed.

⁴ The percentage of communities credited is based on the number of *CRS* communities receiving the credits in 1997.

All communities begin as Class 10. During the first year of the **CRS**, a community may qualify for the initial 5% rate reduction (Class 9). In order to qualify, a community must be in good standing in the **National Flood Insurance Program (NFIP)** and be compliant with the minimum floodplain management requirements. Then, the community negotiates with a **CRS** specialist to undertake credited activities in **Table 1-2**. In the first year, the total credit must exceed 500 points and include Activity 310.

HOW THE CRS BENEFITS YOUR COMMUNITY FLOOD LOSS REDUCTION

Perhaps the greatest benefit of the **CRS** to communities is the reduction of damage or flood losses to both existing and future development. Public Information, and Mapping and Regulatory activities are designed to reduce flood damage from new development, while Flood Damage Reduction and Flood Preparedness activities are designed to reduce losses to existing development.

INSURANCE RATE REDUCTION

While many of the **CRS** activities should be seriously considered by communities to reduce flood losses, the primary purposes of the Community Rating System is to provide an opportunity for residents and property owners to receive a reduction in flood insurance rates in communities which exceed minimum standards of the **National Flood Insurance Program (NFIP)**. Many communities already do more than what is required. Many more communities can qualify for some rate reductions with minimal effort.

FEMA Webpage for Community Rating System

<http://www.fema.gov/nfip/crs.htm>

WE'RE ALL IN THIS TOGETHER

**NATIONAL FLOOD INSURANCE
PROGRAM
WORKSHOP FOR LENDERS,
APPRAISERS, INSURANCE AGENTS,
ENGINEERS, SURVEYORS, LOCAL
PERMIT OFFICIALS, AND OTHERS**



Mayors

Insurance Agents

Lenders

Surveyors

Building Inspectors

The **NFIP** involves the interaction of a large number of professions and agencies. It includes federal, state and local governments. At the local level, community administrators (mayor, county judges, city councils, and quorum courts), code enforcement officers, city inspectors, city engineers, and planners are commonly active in the Program. Other county officials often include emergency services coordinators, tax assessors, treasurers, county surveyors, and administrative assistants.

From the private sector, there are lenders, insurance agents, surveyors, appraisers, engineers, and developers.

Throughout this guide, you will see how these “role players” interact and how what one does or does not do affects others. It is important that community officials understand how other public and private agencies interrelate with their duties.

DEFINITIONS AND ACRONYMS

As you use the materials in this manual, you will encounter many terms and acronyms. Some of these may be new to you. Others, may have different meanings as they apply to the **NFIP**. The first time you read through this manual, you should familiarize yourself with this information. These and additional definitions may be found in the **Rules and Regulations of the NFIP** in **Appendix 1**.

Area of shallow flooding means a designated **AO, AH, AR/AO, AR/AH, or VO** zone on a community's **Flood Insurance Rate Map (FIRM)** with a one percent or greater annual chance of flooding to an average depth of one to three feet where a clearly defined channel does not exist, where the path of flooding is unpredictable, and where velocity flow may be evident. Such flooding is characterized by ponding or sheet flow.

Area of special flood hazard is the land in the flood plain within a community subject to a one percent or greater chance of flooding in any given year. The area may be designated as **Zone A** on the **FHBM**. After detailed rate making has been completed in preparation for publication of the **Flood Insurance Rate Map, Zone A** usually is refined into **Zones A, AO, AH, A1-30, AE, A99, AR, AR/A1-30, AR/AE, AR/AO, AR/AH, AR/A, VO, or V1-30, VE, or V**. For purposes of these regulations, the term "**Special Flood Hazard Area (SFHA)**" is synonymous in meaning with the phrase "area of special flood hazard".

ASWCC – Arkansas Soil & Water Conservation Commission; State Coordinating Agency for the **NFIP**.

Base flood means the flood having a one percent chance of being equalled or exceeded in any given year.

Basement means any area of the building having its floor subgrade (below ground level) on all sides.

BFE – base flood elevation; refer to the term “base flood” above.

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

Building (See structure)

Community means any State or area or political subdivision thereof, or any Indian tribe or authorized tribal organization, or Alaska Native village or authorized native organization, which has authority to adopt and enforce flood plain management regulations for the areas within its jurisdiction.

Criteria means the comprehensive criteria for land management and use for flood-prone areas developed for the purposes of the **NFIP**.

Critical feature means an integral and readily identifiable part of a flood protection system, without which the flood protection provided by the entire system would be compromised.

Developed area means an area of a community that is:

- (a) A primarily urbanized, built up area that is a minimum of 20 contiguous acres, has basic urban infrastructure, including roads, utilities, communications, and public facilities, to sustain industrial, residential, and commercial activities, and
 - 1) Within which 75 percent or more of the parcels, tracts, or lots contain commercial, industrial, or residential structures or uses; or
 - 2) Is a single parcel, tract, or lot in which 75 percent of the area contains existing commercial or industrial structures or uses; or
 - 3) Is subdivision developed at a density of at least two residential structures per acre within which 75 percent or more of the lots contain existing residential structures at the time the designation is adopted?
- (b) An undeveloped single parcel, tract, or lot of less than 20 acres that is contiguous on at least three sides to areas meeting the criteria of paragraph (a) at the time the designation is adopted.
- (c) A subdivision that is a minimum of 20 contiguous acres that has obtained all necessary government approvals, provided that the actual "start of construction" of structures has occurred on at least 10 percent of the lots or remaining lots of a subdivision or 10 percent of the maximum building coverage or remaining building coverage allowed for a single lot subdivision at the time the designation is adopted and construction of structures is underway. Residential subdivisions must meet the density criteria in paragraph (a)(3).

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

Eligible community or **participating community** means a community for which the Administrator has authorized the sale of flood insurance under the National Flood Insurance Program.

Elevated building means, for insurance purposes, a non basement building which has its lowest elevated floor raised above ground level by foundation walls, shear walls, posts, piers, pilings, or columns.

Emergency Flood Insurance Program or **emergency program** means the Program as implemented on an emergency basis in accordance with the **NFIP**. It is intended as a program to provide a first layer amount of insurance on all insurable structures before the effective date of the initial **FIRM**.

Exception means a waiver from the provisions of floodplain management criteria directed to a community which relieves it from the requirements of a rule, regulation, order or other determination made or issued pursuant to the **NFIP**.

Existing construction, means for the purposes of determining rates, structures for which the "start of construction" commenced before the effective date of the **FIRM** or before January 1, 1975, for **FIRMs** effective before that date. "Existing construction" may also be referred to as "existing structures."

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.

Existing structures (see *Existing construction*.)

Expansion to an existing manufactured home park or subdivision means the preparation of additional sites by the construction of facilities for servicing the lots on which the manufacturing 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).

FBFM – flood boundary and **floodway** map; referred to as the “**floodway**” map

Federal agency means any department, agency, corporation, or other entity or instrumentality of the executive branch of the Federal Government, and includes the Federal National Mortgage Association and the Federal Home Loan Mortgage Corporation.

Federal instrumentality responsible for the supervision, approval, regulation, or insuring of banks, savings and loan associations, or similar institutions means the Board of Governors of the Federal Reserve System, the Federal Deposit Insurance Corporation, the Comptroller of the Currency, the Federal Home Loan Bank Board, the Federal Savings and Loan Insurance Corporation, and the National Credit Union Administration.

FEMA – Federal Emergency Management Agency

FHBM – (See **Flood Hazard Boundary Map**.)

FIA – Federal Insurance Administration; agency within **FEMA** responsible for the **NFIP**

Financial assistance means any form of loan, grant, guaranty, insurance, payment, rebate, subsidy, disaster assistance loan or grant, or any other form of direct or indirect Federal assistance, other than general or special revenue sharing or formula grants made to States.

Financial assistance for acquisition or construction purposes means any form of financial assistance which is intended in whole or in part for the acquisition, construction, reconstruction, repair, or improvement of any publicly or privately owned building or mobile home, and for any machinery, equipment, fixtures, and furnishings contained or to be contained therein, and shall include the purchase or subsidization of mortgages or mortgage loans but shall exclude assistance pursuant to the Disaster Relief Act of 1974 other than assistance under such Act in connection with a flood. It includes only financial assistance insurable under the Standard Flood Insurance Policy.

FIRM – (See **Flood Insurance Rate Map**.)

FIS – **Flood Insurance Study** accompanying the production of the **FIRM**; study booklet accompanying a **Flood Insurance Study**

Flood or Flooding means:

- (a) A general and temporary condition of partial or complete inundation of normally dry land areas from:
 - 1) The overflow of inland or tidal waters.
 - 2) The unusual and rapid accumulation or runoff of surface waters from any source.
 - 3) Mudslides (i.e., mudflows) which are proximately caused by flooding as defined in paragraph (a)(2) of this definition and are akin to a river of liquid and flowing mud on the surfaces of normally dry land areas, as when earth is carried by a current of water and deposited along the path of the current.
- (b) The collapse or subsidence of land along the shore of a lake or other body of water as a result of erosion or under mining caused by waves or currents of water exceeding anticipated cyclical levels or suddenly caused by an unusually high water level in a natural body of water, accompanied by a severe storm, or by an unanticipated force of nature, such as flash flood or an abnormal tidal surge, or by some similarly unusual and unforeseeable event which results in flooding as defined in paragraph (a)(1) of this definition.

Flood elevation determination means a determination by the Administrator of the water surface elevations of the base flood, that is, the flood level that has a one percent or greater chance of occurrence in any given year.

Flood elevation study means an examination, evaluation and determination of flood hazards and, if appropriate, corresponding water surface elevations, or an examination, evaluation and determination of mudslide (i.e., mudflow) and/or flood related erosion hazards.

Flood Hazard Boundary Map (FHBM) means an official map of a community, issued by the Administrator, where the boundaries of the flood, mudslide (i.e., mudflow) related erosion areas having special hazards have been designated as Zones A, M, and/or E.

Flood Insurance Rate Map (FIRM) means an official map of a community, on which the Administrator has delineated both the special hazard areas and the risk premium zones applicable to the community.

Flood Insurance Study see *flood elevation study*.

Flood plain or flood-prone area means any land area susceptible to being inundated by water from any source (see definition of "flooding").

Flood plain 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 flood plain management regulations.

Flood plain management regulations means zoning ordinances, subdivision regulations, building codes, health regulations, special purpose ordinances (such as a flood plain ordinance, grading ordinance and erosion control ordinance) and other applications of police power. The term describes such state or local regulations, in any combination thereof, which provide standards for the purpose of flood damage prevention and reduction.

Flood protection system means those physical structural works for which funds have been authorized, appropriated, and expended and which have been constructed specifically to modify flooding in order to reduce the extent of the area within a community subject to a "special flood hazard" and the extent of the depths of associated flooding. Such a system typically includes hurricane tidal barriers, dams, reservoirs, levees or dikes. These specialized flood modifying works are those constructed in conformance with sound engineering standards.

Flood proofing 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.

Floodway see regulatory floodway.

Floodway encroachment lines mean the lines marking the limits of floodways on Federal, State and local flood plain maps.

Freeboard means a factor of safety usually expressed in feet above a flood level for purposes of flood plain management. "Freeboard" tends to compensate for the many unknown factors that could contribute to flood heights greater than the height calculated for a selected size flood and floodway conditions, such as wave action, bridge openings, and the hydrological effect of urbanization of the watershed.

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.

Highest adjacent grade means the highest natural elevation of the ground surface prior to construction next to the proposed walls of a structure.

Historic Structure means any structure that is:

- (a) Listed individually in the National Register of Historic Places (a listing maintained by the Department of Interior) or preliminarily determined by the Secretary of the Interior as meeting the requirements for individual listing on the National Register;
- (b) Certified or preliminarily determined by the Secretary of the Interior as contributing to the historical significance of a registered historic district or a district preliminarily determined by the Secretary to qualify as a registered historic district;
- (c) Individually listed on a state inventory of historic places in states with historic preservation programs which have been approved by the Secretary of the Interior; or
- (c) Individually listed on a local inventory of historic places in communities with historic preservation programs that have been certified either:
 - (1) By an approved state program as determined by the Secretary of the Interior or
 - (2) Directly by the Secretary of the Interior in states without approved programs.

Levee means a man made structure, usually an earthen embankment, designed and constructed in accordance with sound engineering practices to contain, control, or divert the flow of water so as to provide protection from temporary flooding.

Levee System means a flood protection system which consists of a levee, or levees, and associated structures, such as closure and drainage devices, which are constructed and operated in accordance with sound engineering practices.

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 floodplain management requirements.

Manufactured home means a structure, transportable in one or more sections, which is built on a permanent chassis and is designed for use with or without a permanent foundation when attached to the required utilities. The term "manufactured home" does not include a "recreational vehicle"

Manufactured home park or subdivision means a parcel (or contiguous parcels) of land divided into two or more manufactured home lots for rent or sale.

Map means the **Flood Hazard Boundary Map (FHBM)** or the **Flood Insurance Rate Map (FIRM)** for a community issued by the Agency.

Mean sea level means, for purposes of the National Flood Insurance Program, the National Geodetic Vertical Datum (NGVD) of 1929 or other datum, to which base flood elevations shown on a community's **Flood Insurance Rate Map** are referenced.

New construction means, for the purposes of determining insurance rates, structures for which the "start of construction" commenced on or after the effective date of an initial **FIRM** or after December 31, 1974, whichever is later, and includes any subsequent improvements to such structures. For floodplain management purposes, "new construction" means structures for which the "start of construction" commenced on or after the effective date of a floodplain management regulation adopted by a community and includes any subsequent improvements to such structures.

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.

NFIP – National Flood Insurance Program

100-year flood (See base flood.)

Participating community, also known as an "eligible community," means a community in which the Administrator has authorized the sale of flood insurance.

Principally above ground means that at least 51 percent of the actual cash value of the structure, less land value, is above ground.

Program means the National Flood Insurance Program.

Program deficiency means a defect in a community's flood plain management regulations or administrative procedures that impairs effective implementation of those flood plain management regulations or standards.

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.

Reference feature is the receding edge of a bluff or eroding frontal dune, or if such a feature is not present, the normal high water line or the seaward line of permanent vegetation if a high water line cannot be identified.

Regular Program means the Program authorized by the **NFIP** under which risk premium rates are required for the first half of available coverage (also known as "first layer" coverage) for all new construction and substantial improvements started on or after the effective date of the **FIRM**, or after December 31, 1974, for **FIRM**'s effective on or before that date. All buildings, the construction of which started before the effective date of the **FIRM**, or before January 1, 1975, for **FIRMs** effective before that date, are eligible for first layer coverage at either subsidized rates or risk premium rates, whichever are lower. Regardless of date of construction, risk premium rates are always required for the second layer coverage and such coverage is offered only after the **FIA** has completed a risk study for the community.

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.

Remedy a violation means to bring the structure or other development into compliance with State or local flood plain management regulations, or, if this is not possible, to reduce the impacts of its noncompliance. Ways that impacts may be reduced include protecting the structure or other affected development from flood damages, implementing the enforcement provisions of the ordinance or otherwise deterring future similar violations, or reducing Federal financial exposure with regard to the structure or other development.

Risk premium rates mean those rates established by the **FIA** pursuant to individual community studies and investigations which are undertaken to provide flood insurance in accordance with the **NFIP** and the accepted actuarial principles. "Risk premium rates" include provisions for operating costs and allowances.

Riverine means relating to, formed by, or resembling a river (including tributaries), stream, brook, etc.

Servicing company means a corporation, partnership, association, or any other organized entity which contracts with the Federal Insurance Administration to service insurance policies under the National Flood Insurance Program for a particular area.

SFHA – Special Flood Hazard Area; see below

Sheet flow area (See area of shallow flooding)

Special Flood Hazard Area (See "area of special flood hazard")

Start of Construction includes new construction and 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 a 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 means the agency of the state government, or other office designated by the Governor of the state or by state statute at the request of the FIA to assist in the implementation of the National Flood Insurance Program in that state.

Storm cellar means a space below grade used to accommodate occupants of the structure and emergency supplies as a means of temporary shelter against severe tornado or similar wind storm activity.

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. "Structure" for insurance coverage purposes, means a walled and roofed building, other than a gas or liquid storage tank, that is principally above ground and affixed to a permanent site, as well as a manufactured home on a permanent foundation. For the latter purpose, the term includes a building while in the course of construction, alteration or repair, but does not include building materials or supplies intended for use in such construction, alteration or repair, unless such materials or supplies are within an enclosed building on the premises.

Subsidized rates mean the rates established by the Administrator involving in the aggregate a subsidization by the Federal Government.

Substantial damage means damage of any origin sustained by a structure whereby the cost of restoring the structure to its before damaged condition would equal or exceed 50 percent of the market value of the structure before the damage occurred.

Substantial improvement means any reconstruction, rehabilitation, addition, or other improvement of a structure, the cost of which equals or exceeds 50 percent of the market value of the structure before the "start of construction" of the improvement. This term includes structures which have incurred "substantial damage", regardless of the actual repair work performed. The term does not, however, include either:

- (1) Any project for improvement of a structure to correct existing violations of state or local health, sanitary, or safety code specifications which have been identified by the local code enforcement official and which are the minimum necessary to assure safe living conditions or
- (2) Any alteration of a "historic structure", provided that the alteration will not preclude the structure's continued designation as a "historic structure".

Variance means a grant of relief by a community from the terms of a flood plain management regulation.

Violation means the failure of a structure or other development to be fully compliant with the community's flood plain management regulations. A structure or other development without the elevation certificate, other certifications, or other required evidence of compliance is presumed to be in violation until such time as that documentation is provided.

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 flood plains of coastal or riverine areas.

FEMA WEBSITE

Throughout this guidebook, World Wide Web addresses will be given, either as the direct source of information or as a supplement to the text. The primary website for information related to the NFIP and floodplain management is <http://www.fema.gov/>. This site should be “bookmarked” for quick access.

STATE WEBSITES

Two State (2) websites contain information related to the NFIP and floodplain management in Arkansas. They are: 1) the State Coordinating Agency for the NFIP – Arkansas Soil and Water Conservation Commission (ASWCC) – <http://www.accessarkansas.org/aswcc> and 2) the Arkansas Floodplain Management Association (AFMA) – <http://www.arkansasflood.org/>.

ASSOCIATION OF STATE FLOODPLAIN MANAGERS (ASFPM)

ASFPM is the leading national non-governmental association in the field of floodplain management. Its address is <http://www.floods.org/>.

There are other organizations containing valuable information related to the NFIP and floodplain management. Many of these are contained in LINKS on the above websites. Searching the World Wide Web will reveal more sites.

Chapter 2

FLOOD INFORMATION AND FLOOD HAZARD MAPS

THE BASE FLOOD OR 100-YEAR FLOOD

The flood used as a “base” for the **NFIP** is the so-called “**100-year flood**” or the “one percent (**1%**) chance flood.” This flood has a one percent chance of occurring in any year. And over a long period of time, it would average one time in **100-years**. There is no regular pattern to its occurrence. For example, it may occur 3 times in a year or not occur for 700 years. Given the limited amount of data collected for streams in this country, the addition of a decade of either unusually wet years or dry years can change the **100-year flood** or “**base flood**” substantially.

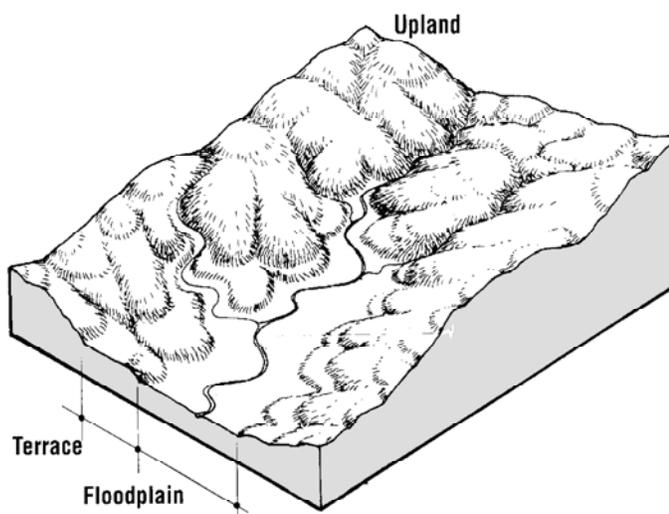
NOTE: For a homeowner within the **100-year floodplain**, the **100-year flood** has a 26% chance of occurring during the life of a 30-year mortgage. Near the center of the floodplain (for example, adjacent to a stream or lake), the odds are even greater.

FLOODPLAIN

The floodplain is a relatively flat to gently sloping land which is subject to being inundated by water. As used in the **NFIP**, this generally refers to the **base flood** or **100-year flood**.

The floodplain can be extremely flat and extend over several miles from the source of flooding, such as a stream. It can be shallow or deep, as in hilly or mountainous terrain where valley slopes confine the flooding.

Flooding can occur rapidly as with a flash flood or gradually as in the case of lower reaches of large river basins.



FLOOD HAZARD INFORMATION PROVIDED BY THE NFIP

The **NFIP** has provided flood information for the purpose of managing development in floodplains as well as writing flood insurance. This information is contained on flood hazard maps and accompanying data.

FLOOD HAZARD MAPS

The official maps of the **NFIP** are those published by the **FIA**, either as a part of the **Department Housing and Urban Development**, commonly referred to as "**HUD**", before 1979 or as part of the **FEDERAL EMERGENCY MANAGEMENT AGENCY (FEMA)** since 1979. The two basic maps used in the **NFIP** are the **Flood Hazard Boundary Map (FHBM)** and the **Flood Insurance Rate Map (FIRM)**. The **Flood Insurance Study (FIS)** and the **Flood Boundary and Floodway Map (FBFM)**, commonly referred to as simply the "**Floodway Map**", often accompany the **FIRM**. These latter two documents are very important in managing floodplains in the affected communities.

FLOOD HAZARD BOUNDARY MAP (FHBM)

The **FHBM** simply shows the area (**Zone A**) of a community which is located in a **Special Flood Hazard Area (SFHA)** and inundated by the **100-year** or "base" flood. No **base flood** elevations, floodways or other data are provided to describe the **SFHA**. Property is either in the **SFHA** or out of the **SFHA**. An example of a **FHBM** is shown in **Figure 2-1**. This map is used in the **Emergency Phase** of the **NFIP**.

FLOOD INSURANCE RATE MAP (FIRM)

The **FIRM** is used both as a basis for flood insurance and flood plain management. For flood insurance, the various flood hazard zones on the **FIRM** are used to establish variable insurance rates in the **Regular Phase** of the **NFIP**. The **FIRMs** are also used as a basis for regulating development by defining areas or zones and by providing flood elevations.

1. Flood insurance rate zones

To assist the insurance agent in determining actuarial flood insurance rates for specific properties, each map is divided into flood risk zones that are based on the flood boundaries previously determined. Areas within the **100-year** flood boundary are termed **Special Flood Hazard Areas**; areas between the 100- and 500-year flood boundaries are termed **Areas of Moderate Flood Hazard**; and remaining areas above the 500-year flooding are termed **Areas of Minimal Flood Hazard**. Below is a list and description of flood risk zones applicable in the State of Arkansas.

2. Types of FIRMs

The **FIRM** is the base map for the **Regular phase** of the **NFIP**. Unfortunately **FIRMs** vary considerably, from those which are essentially similar to the **FHBM** to those with flood elevations and floodways included on the maps. **Figure 2-2** shows a portion of a **FIRM** with **BFEs**; **Figure 2-4** shows a **FIRM** with both **BFEs** and **Floodway**.

FLOOD MAP ZONES

ZONE	DESCRIPTION
A	Special Flood Hazard Areas inundated by the 100-year , determined by approximate methods; no Base flood Elevations determined.
AO	Special Flood Hazard Areas inundated by types of 100-year shallow flooding where depths are between 1.0 and 3.0 feet; depths are shown.
AH	Special Flood Hazard Areas inundated by types of 100-year shallow flooding where depths are between 1.0 and 3.0 feet; Base flood Elevations are shown.
AI-A30 and AE	Special Flood Hazard Areas inundated by the 100-year flood; with Base Flood Elevations shown, and zones subdivided according the Flood Hazard Factors (FHF) in zones AI-A30 .
A99	Special Flood Hazard Areas inundated by the 100-year flood, which will be affected by a flood protection system where adequate progress has been made toward completion; no Base flood Elevations are shown.
B	Areas between the Special Flood Hazard Areas and the limits of the 500-year flood; areas that are protected by dike, levee, or other local water-control structure; areas subject to certain types of 100-year shallow flooding where depths are less than 1.0 foot; and areas subject to 100-year flooding from sources with drainage areas less than 1 square mile.
C	Areas of minimal flood hazard.
D	Areas of undetermined, but possible flood hazard.
X	Areas of minimal to moderate flood hazards; combines B and C.

Nearly all **Regular Program** communities fit into one of the following:

TYPES OF FIRMs	
CATEGORY	DESCRIPTION
1	Communities with complete FIS , which includes FIS booklet and FIRM (with elevations and “ FLOODWAY ” included on the map);
2	Communities with complete FIS , which includes FIS booklet, FIRM (with elevations) and separate “ FLOODWAY ” map;
3	Communities with both FIS booklet and FIRM (with elevations) but no “FLOODWAY” map;
4	Communities with FIRM (with elevations) but no FIS or “ FLOODWAY ” map;
5	Communities with FIRM (no flood elevations) and no FIS OR “ FLOODWAY ” map.

FLOOD INSURANCE STUDY (FIS)

The **Flood Insurance Study (FIS)** provides technical information used in evaluating the flood hazard in a community. Much of this information is used in combination with the **Flood Insurance Rate Map (FIRM)** and the **Flood Boundary and Floodway Map (FBFM)**.

“FLOODWAY” MAP (FBFM)

The “**FLOODWAY**” map subdivides the **100-year** flood plain into two parts: a **floodway** and a floodway fringe. The **floodway** is the zone adjacent to and including the stream channel. Except in rare or unavoidable circumstances (such as piers for a bridge), the community is required to prohibit any development which results in "any increase in the **Base flood Elevation.**" See **Figure 2-3** for an example of a **separate floodway map**.

**FIGURE 2-1 Flood Hazard Boundary Map (FHBM)
For Palestine, Arkansas
(northwest corner)**

KEY TO SYMBOLS

	ZONE C
	ZONE A
	ZONE C

ZONE DESIGNATIONS*

Elevation Reference Mark: RM7 x

River Mile: - M1.5

***EXPLANATION OF ZONE DESIGNATIONS**

Zone	Explanation
A	Areas of 100-year flood; base flood elevations and flood hazard factors not determined.
A0	Areas of 100-year shallow flooding; flood depth 1 to 3 feet; product of flood depth (feet) and velocity (feet/second) less than 15.
A1 - A30	Areas of 100-year flood; base flood elevations and flood hazard factors determined.
B	Area between limits of 100-year flood and 500-year flood; areas of 100-year shallow flooding where depths less than 1 foot.
C	Areas outside 500-year flood.
D	Areas of undetermined, but possible, flood hazards.
V	Areas of 100-year coastal flood with velocity (wave action); base flood elevations and flood hazard factors not determined.
V1 - V30	Areas of 100-year coastal flood with velocity (wave action); base flood elevations and flood hazard factors determined.

TO DETERMINE IF FLOOD INSURANCE IS AVAILABLE IN THIS COMMUNITY, CONTACT YOUR INSURANCE AGENT, OR CALL THE NATIONAL FLOOD INSURANCE PROGRAM AT (800) 628-6620.

INITIAL IDENTIFICATION
APRIL 25, 1975

FLOOD HAZARD BOUNDARY MAP REVISIONS:

FLOOD INSURANCE RATE MAP EFFECTIVE:
OCTOBER 12, 1992

FLOOD INSURANCE RATE MAP REVISIONS:

FEDERAL EMERGENCY MANAGEMENT AGENCY



**FLOOD HAZARD BOUNDARY MAP H - 01
FLOOD INSURANCE RATE MAP I - 01
MAP INDEX**

**CITY OF PALESTINE, AR
(ST. FRANCIS CO.)**

COMMUNITY NO. 050359 A

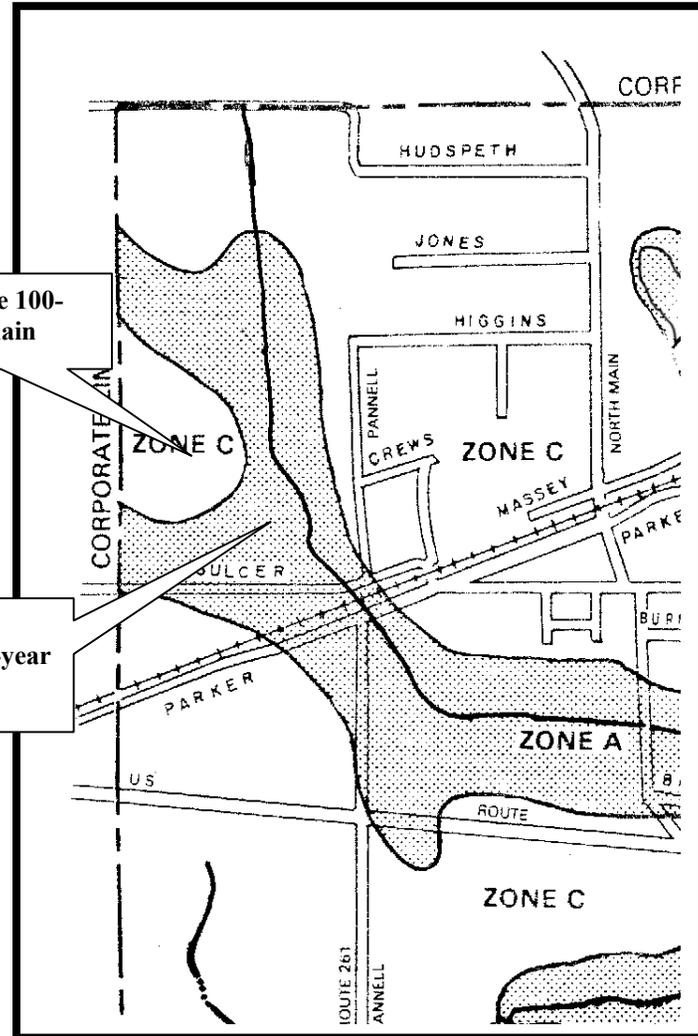
**Flood
Zone
Information**

Area outside 100-year floodplain

Area inside SHFH (100-year floodplain)

**Date of
Original Map
and Revisions**

**Community
Name,
Community
Number**



**FIGURE 2-2 Flood Insurance Rate Map (FIRM)
For Magnolia, Arkansas
(center of Panel 2)**

NATIONAL FLOOD INSURANCE PROGRAM

FIRM
FLOOD INSURANCE RATE MAP

CITY OF
MAGNOLIA, ARKANSAS
COLUMBIA COUNTY

PANEL 2 OF 2

COMMUNITY-PANEL NUMBER
050041 0002 B

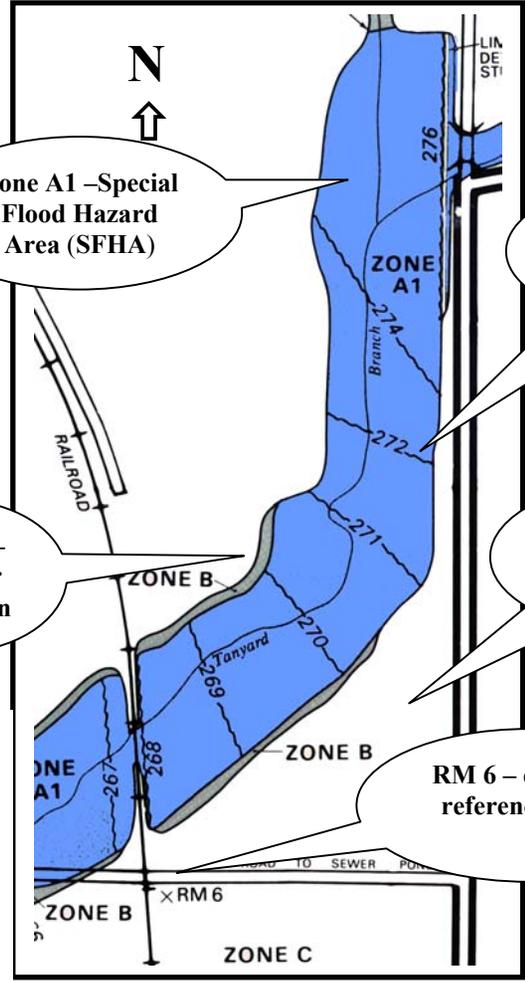
EFFECTIVE DATE:
JULY 5, 1982



Federal Emergency Management Agency

Map Panel Number

Community Number, Map Panel and Effective Date of Panel



Zone A1 - Special Flood Hazard Area (SFHA)

Zone B - 500 year floodplain

Base Flood Elevation - 272 feet above MSL

Zone C - outside 500 year floodplain

RM 6 - elevation reference mark

NATIONAL FLOOD INSURANCE PROGRAM

FLOODWAY
FLOOD BOUNDARY AND
FLOODWAY MAP

CITY OF
MAGNOLIA, ARKANSAS
COLUMBIA COUNTY

PANEL 2 OF 2

Companion
map to FIRM

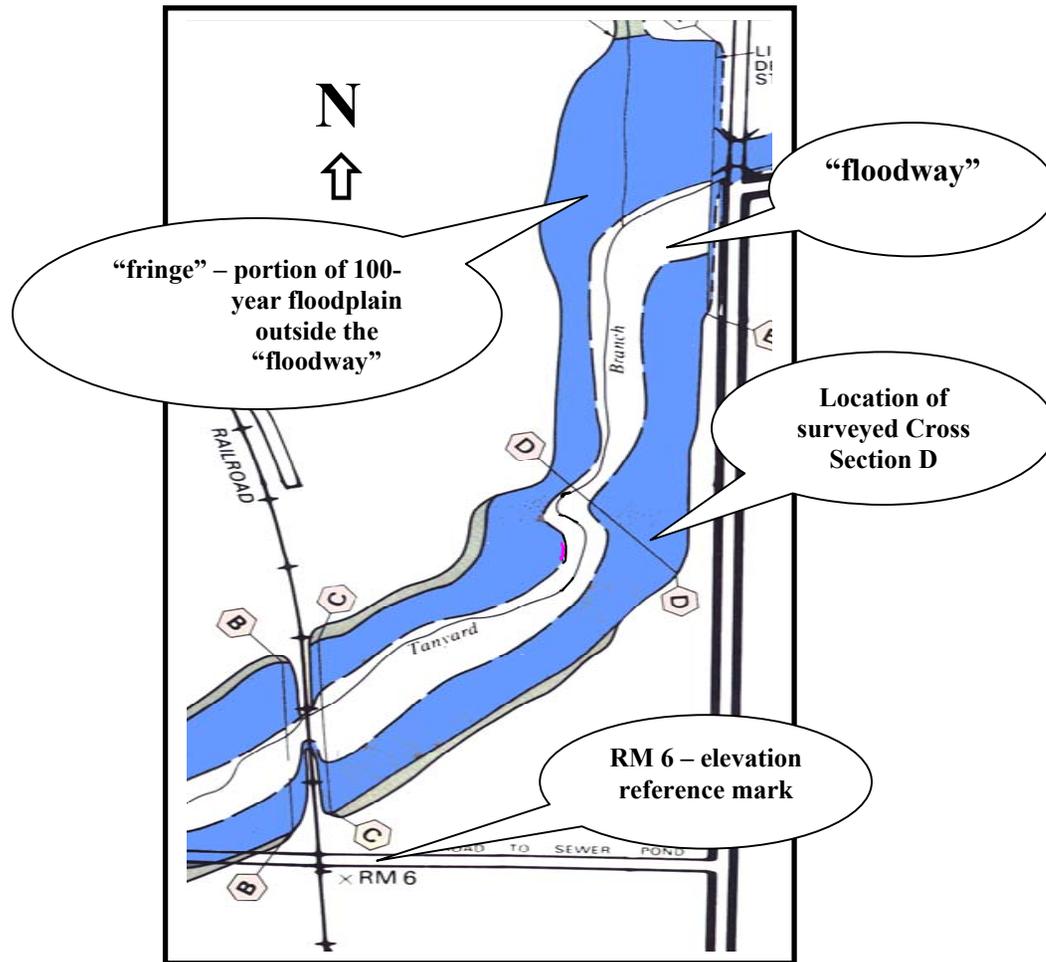
COMMUNITY-PANEL NUMBER
050041 0002

EFFECTIVE DATE:
JULY 5, 1982



Federal Emergency Management Agency

FIGURE 2-3 Flood Boundary and Floodway Map
(FBFM) For Magnolia, Arkansas
(center of Panel 2)



**FIGURE 2-4 Flood Insurance Rate Map (FIRM)
For North Little Rock, Arkansas
(from Panel 6)**

NATIONAL FLOOD INSURANCE PROGRAM

FIRM
FLOOD INSURANCE RATE MAP

CITY OF
NORTH LITTLE ROCK,
ARKANSAS
PULASKI COUNTY

PANEL 6 OF 9
(SEE MAP INDEX FOR PANELS)



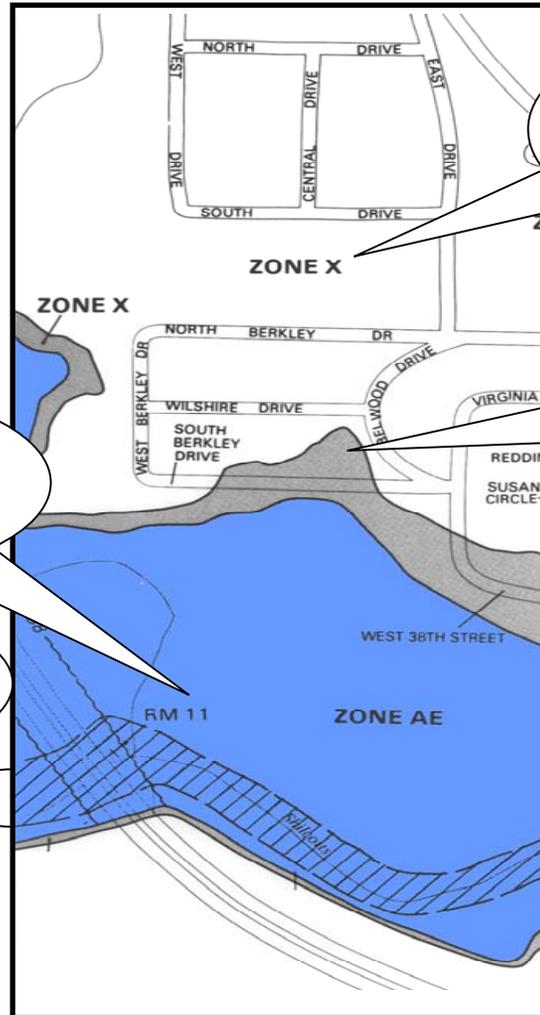
PANEL LOCATION

COMMUNITY-PANEL NUMBER
050182 0006 D

MAP REVISED:
SEPTEMBER 5, 1990



Federal Emergency Management Agency



Zone AE – Special Flood Hazard Area (SFHA)

“floodway”

Zone X - area outside the 500 year floodplain

Zone X - area inside the 500 year floodplain

FIGURE 2-5

Flood Insurance Study For Magnolia, Arkansas

FLOOD
INSURANCE
STUDY



**CITY OF MAGNOLIA,
ARKANSAS
COLUMBIA COUNTY**



JANUARY 5, 1982



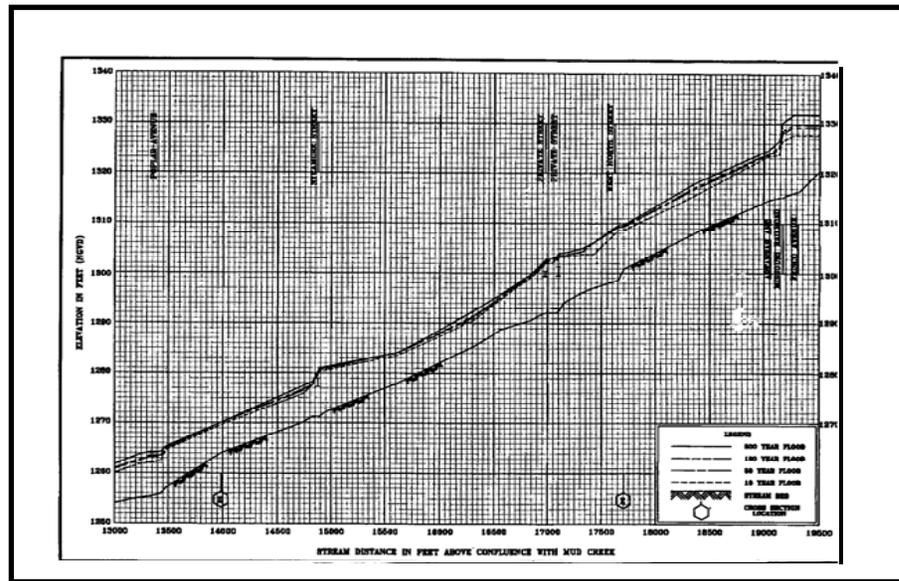
Federal Emergency Management Agency
COMMUNITY NUMBER - 050041

**FLOOD INSURANCE STUDY
CITY OF MAGNOLIA, ARKANSAS**

1.0 INTRODUCTION

1.1 Purpose of Study

This Flood Insurance Study investigates the existence and severity of flood hazards in the City of Magnolia, Columbia County, Arkansas, and aids in the administration of the National Flood Insurance Act of 1968 and the Flood Disaster Protection Act of 1973. This study will be used to convert the City of Magnolia to the regular program of flood insurance by the Federal Emergency Management Agency (FEMA). Local and regional planners will use this study in their efforts to promote sound flood plain management.



LOCATING PROPERTY IN THE FLOODPLAIN

Property is located in the floodplain by means of “scaling.” **Scaling** involves transferring distance and direction on the ground to the map using the “**approximate scale**” (bar scale) on the map.

For example, suppose a developer wishes to build a house in Brinkley, Arkansas (**Figure 2-6**) at the following location:

- A lot on the west side New Orleans Avenue
- 500 feet south from the intersection of New Orleans Avenue and Baxter

The scale of the map is 1 inch to 1430 feet. 500 feet on the ground would equal 0.35 inches on the map. 0.35 inches south of Baxter on New Orleans Avenue is located in **Zone A**. Floodplain management and development permit requirements for development in **Zone A** would apply.

DETERMINING THE BASE FLOOD ELEVATION (BFE) ON FIRMS

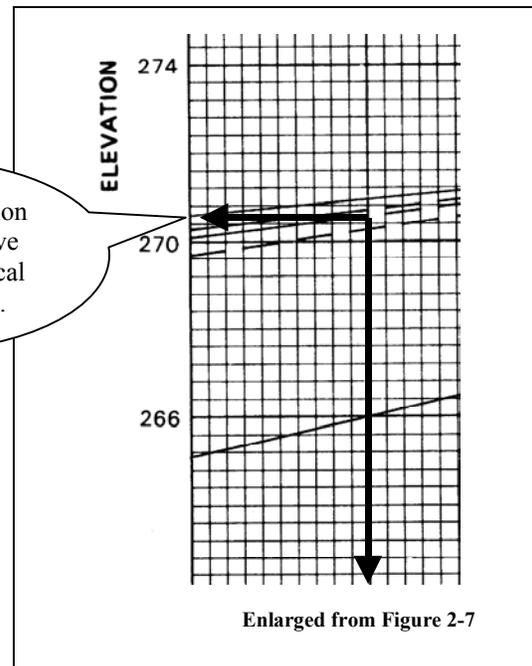
The following discussion concerns determining base flood elevations for those portions of the **FIRM** with elevations provided on the map and in the **Flood Insurance Study (FIS)** booklet.

Example:

Determine the **BFE** for a site located at **cross section D** on the floodway map for Magnolia (**Figure 2-3**).

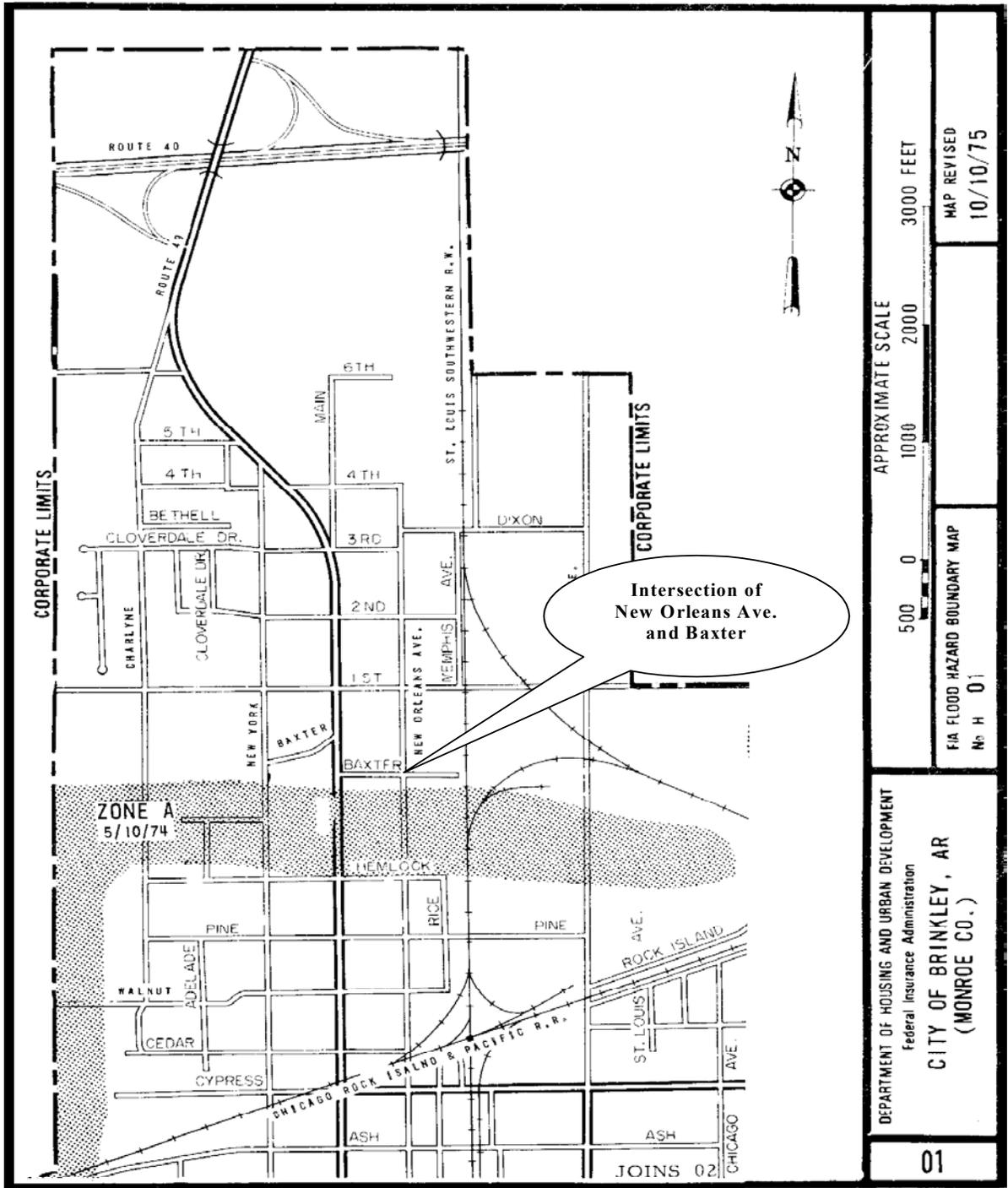
Then locate the position of cross section D on the **FIRM** for Magnolia (**Figure 2-2**). The **BFE** is a little more than 271 feet above MSL. To obtain a more accurate **BFE** for the site, use the **Stream Profile** in **Figure 2-7**. Note that the cross section is located 12,980 feet upstream from the mouth of Tanyard Branch and at an elevation of 270.8 feet above mean sea level (MSL).

Base flood elevation is 270.8 feet above MSL. Each vertical block is 0.4 feet.

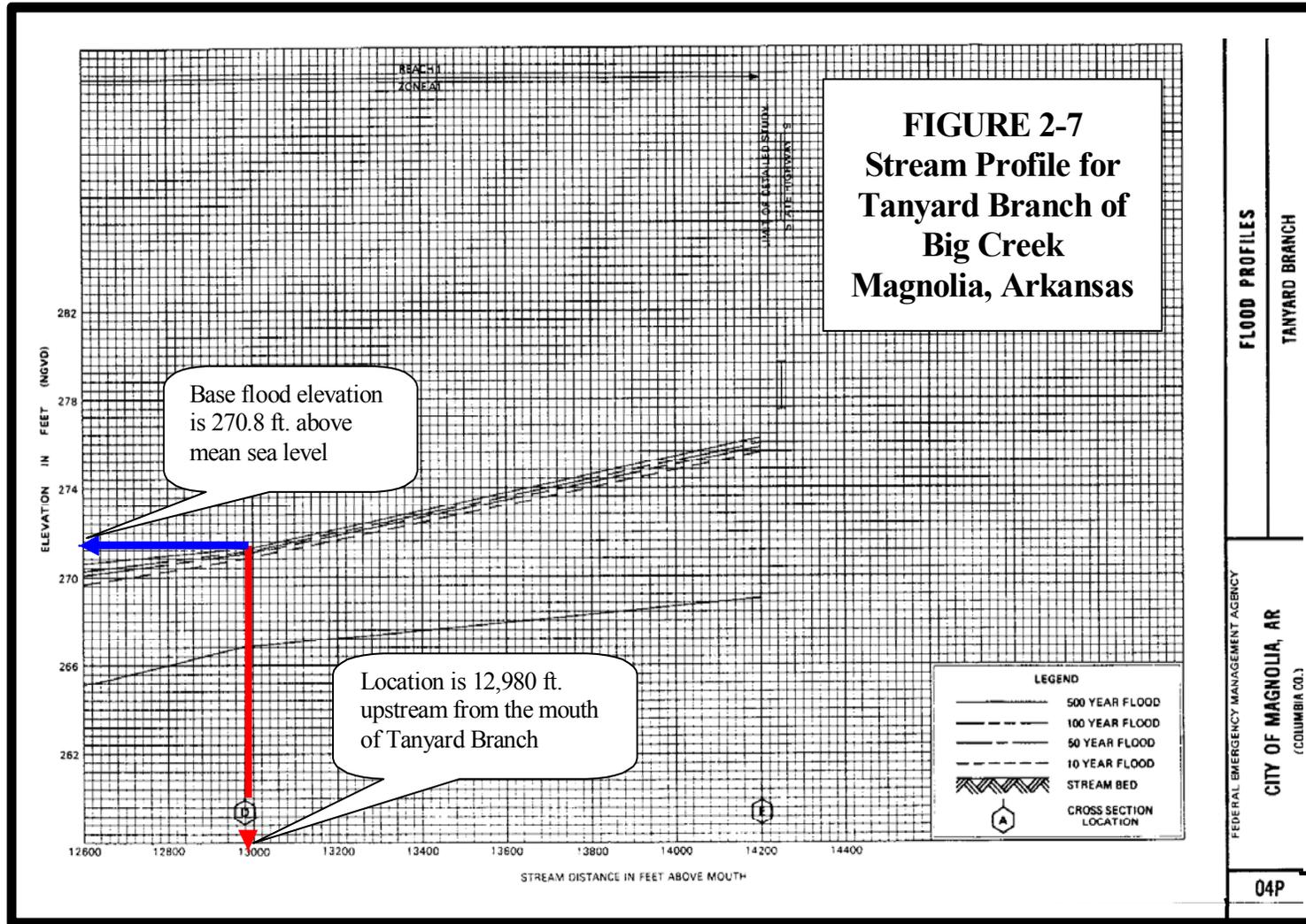


Always use the stream profile to determine the **BFE** even though comparable information is on the **FIRM**. If there is an abrupt change in the **BFE** between two elevation lines on the **FIRM**, the stream profile will show this, while the **FIRM** will not. In this example, there is a difference of a little more than 0.2 feet.

Another valuable source of information in an **FIS** is a **FLOODWAY DATA TABLE** (**Figure 2-8**). **Note:** - the right hand column. This represents the amount of increase in the base flood elevation that would occur if the flood fringe is fully developed. **This is one reason it is recommended that communities require that new and substantially increased developments be elevated “one foot above the BFE.”**



**FIGURE 2-6 FLOOD HAZARD BOUNDARY MAP (FHBM)
FOR BRINKLEY, ARKANSAS
(right portion of Panel 1)**



FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE ¹	WIDTH (FT.)	SECTION AREA (SQ. FT.)	MEAN VELOCITY (F.P.S.)	REGULATORY (NGVD)	WITHOUT FLOODWAY (NGVD)	WITH FLOODWAY (NGVD)	INCREASE (FEET)
Nations Creek								
A	31,400	586 ²	2,244	2.0	269.2	269.2	270.2	1.0
B	31,777	729 ²	3,775	1.2	271.0	271.0	271.6	0.6
C	37,450	440 ²	1,186	3.5	273.1	273.1	273.8	0.7
D	37,829	683 ²	4,302	1.0	277.6	277.6	278.2	0.6
E*	39,000	612	3,407	1.2	277.7	277.7	278.3	0.6
Tanyard Branch								
A*	10,250	133	727	2.4	264.5	264.5	265.5	1.0
B	11,650	182	598	2.9	267.1	267.1	267.9	0.8
C	11,759	263	1,174	1.5	268.4	268.4	269.2	0.8
D	12,980	70	200	8.7	271.1	271.1	271.5	0.4
E	14,200	250	704	1.4	276.0	276.0	277.0	1.0
Barlow Branch								
A*	7,664	869	2,217	1.4	258.9	258.9	259.9	1.0
B*	10,100	99	248	8.7	263.1	263.1	263.6	0.5
C*	10,244	391	1,798	1.2	266.4	266.4	266.8	0.4
D*	12,194	97	272	7.9	267.6	267.6	268.6	1.0

¹Feet above mouth

²This width extends beyond the corporate limits

*Located outside the corporate limits

TABLE 2

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF MAGNOLIA, AR
(COLUMBIA CO.)

FLOODWAY DATA

NATIONS CREEK-TANYARD BRANCH-BARLOW BRANCH

FIGURE 2-8 FLOODWAY DATA TABLE FOR MAGNOLIA, ARKANSAS
(first page of table)

DETERMINING THE BFE FOR UNNUMBERED “A ZONES”

Since no **BFEs** are included on flood hazard maps for areas labeled “**Zone A**”, the community must establish methods which are acceptable for providing the **BFE**. Below is a list of sources the community may wish to utilize:

- Data provided by a registered professional engineer
- Data provided by a federal, state, or local government agency (for example, the U.S. Army Corps of Engineers, the Natural Resources Conservation Service, the U.S. Geological Survey, the State Highway Department, etc.)
- High water marks obtained from major flood events

When data does not exist from agencies or published sources, the community may wish to approve methods to estimate the **BFE**. Two (2) widely used methods are:

- The contour method
- The “survey out” method

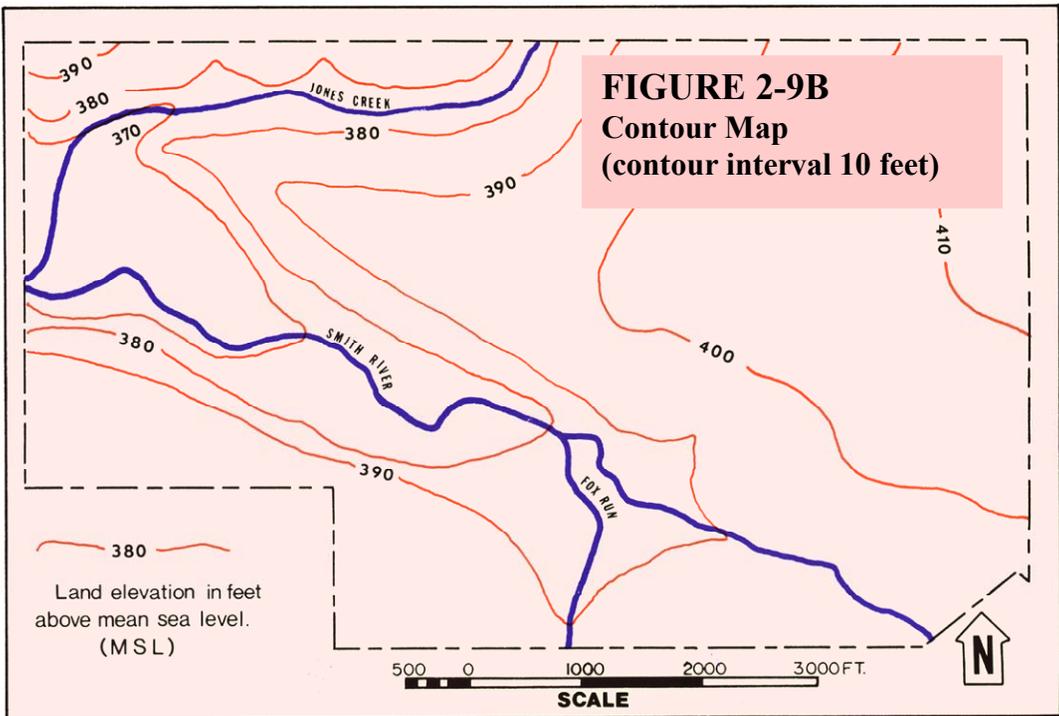
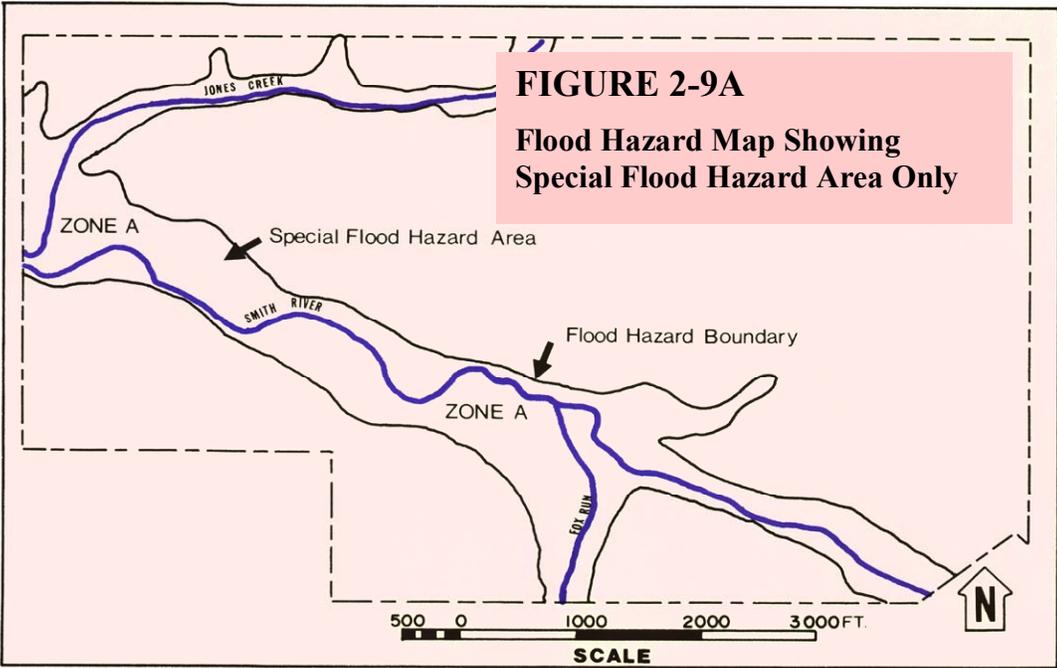
See **FEMA Publication 265** under **SOURCES OF INFORMATION** later in this chapter.

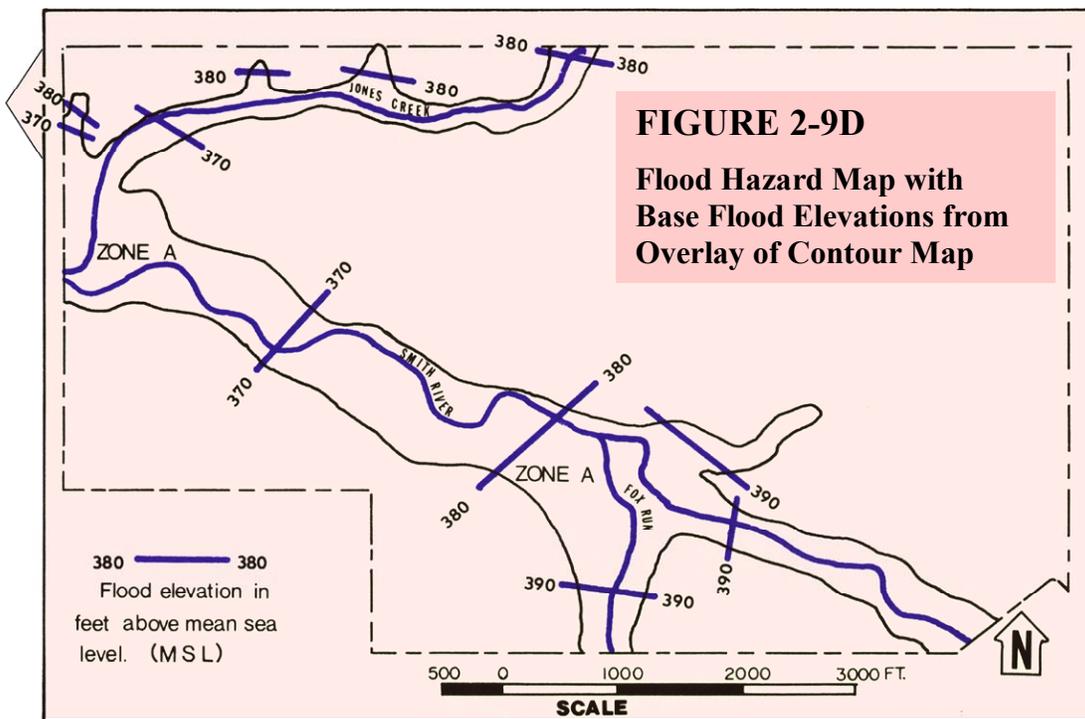
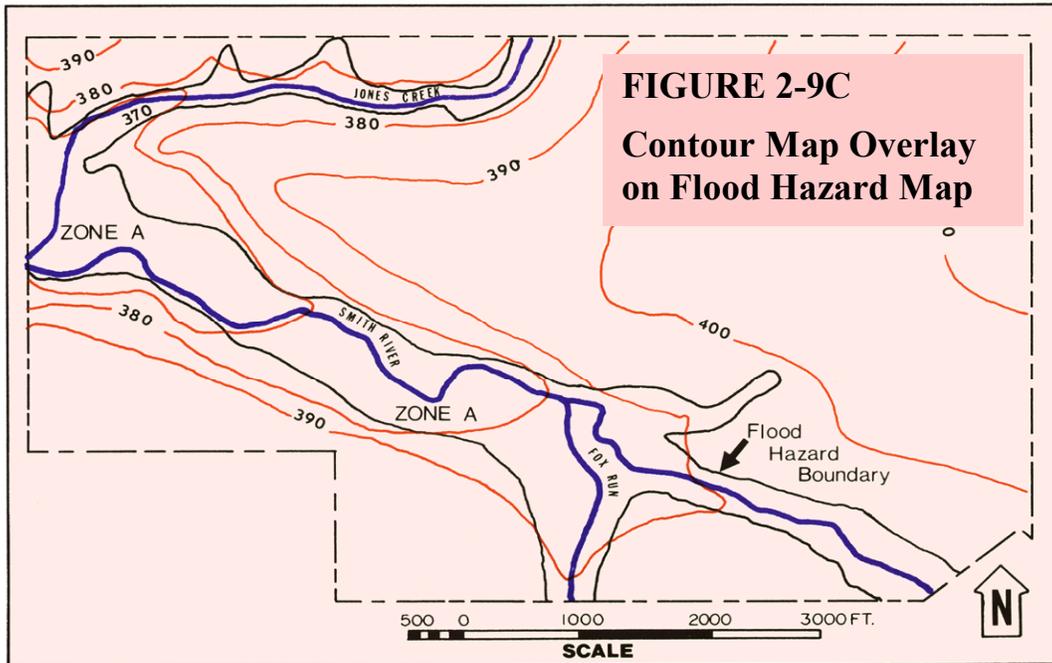
THE CONTOUR METHOD

Contour interpolation involves superimposing approximate Zone A boundaries onto a topographic map in order to estimate a BFE. BFEs obtained by this method can only be assumed to be as accurate as one-half of the contour interval of the topographic map that is used. Therefore, the smaller the contour interval of the topographic map, the higher the accuracy of the BFE determined from the map.

Contours maps show lines of equal elevation (**contours**) on a map. Contour maps are constructed by private and government agencies for a variety of purposes. The U.S. Geological Survey has produced topographic maps at a scale of 1:24,000 (1 inch represents 24,000 inches or 2,000 feet) for the entire United States. These maps for Arkansas are available from the Arkansas Geological Commission in Little Rock. A central feature of these maps is an overlay of contour lines.

Contour maps can be overlaid with the flood hazard map to interpolate the BFE. This can be done on a case by case basis or to establish BFEs on the entire flood map for all “**Zone A**”s. The series of maps in **Figures 2-9A through 2-9D** shows how to create a flood hazard map with **BFEs** using contour map overlays.





STEPS USED IN CONTOUR INTERPOLATION

1. Obtain a topographic map showing the site being analyzed.
2. Reduce or enlarge the FIRM or topographic map as necessary so that the two are at the same scale.
3. Superimpose the approximate Zone A (100-year) flood boundary from the FIRM onto the topographic map.
4. Determine if this method is within the acceptable accuracy limits.
The floodplain boundary must generally conform with the contour lines along the flooding source in question. The difference between the water-surface elevations determined on the right overbank and the left overbank must be within one-half of the map contour interval. Otherwise, this method is not acceptable. (For lake flooding sources, the difference between the highest and lowest determined water-surface elevations around the flooding source must be within one-half of the map contour interval.)
5. If the method is acceptable, then determine the BFE.

Determining BFEs for riverine flooding:

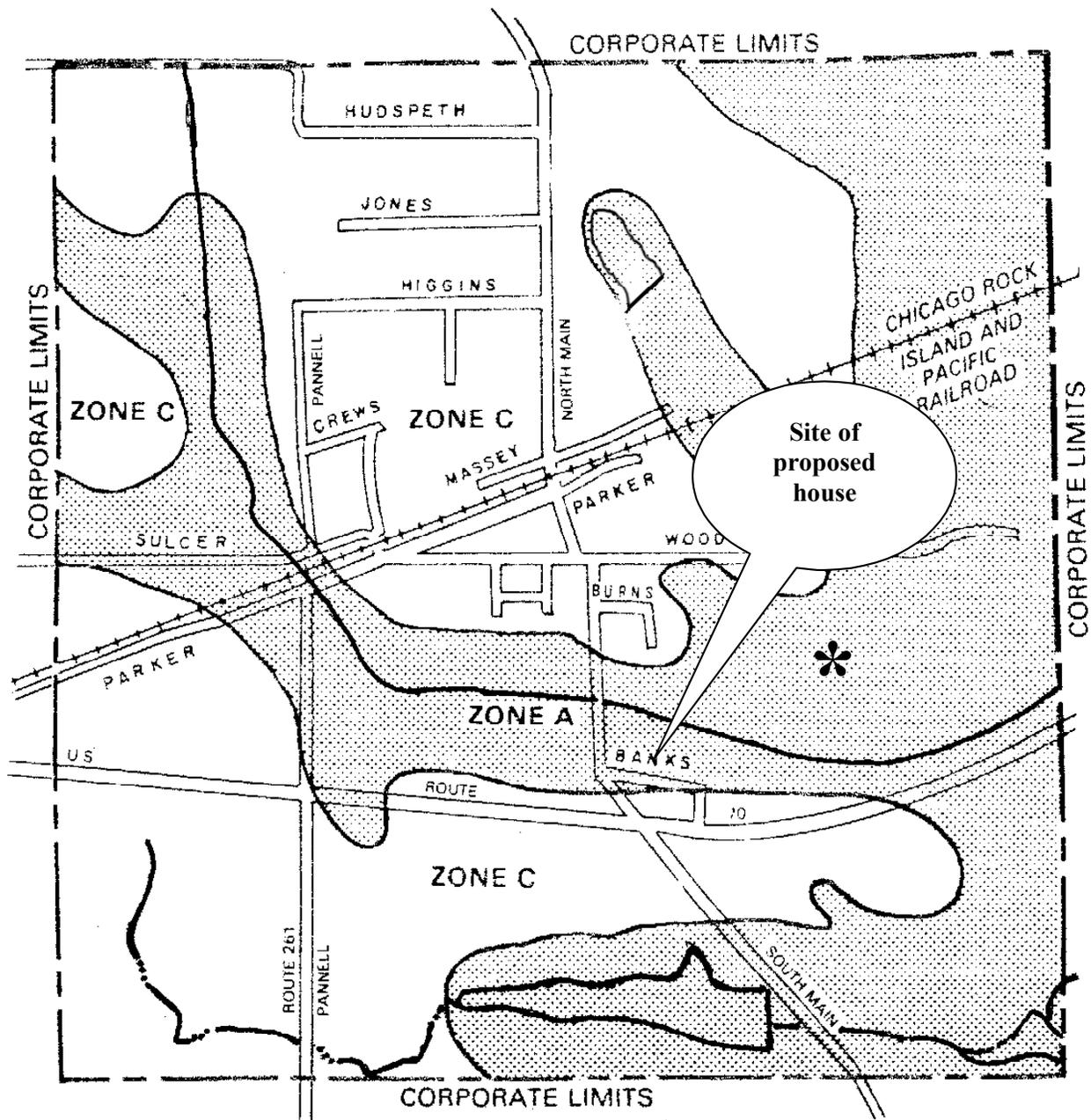
On each side of the stream in the vicinity of the site, determine the ground elevation at which the superimposed Zone A boundary lies by interpolating between two contour lines. Add one-half of the map contour interval to the lower of the two interpolated elevations. This is the approximate BFE for the site (be sure to perform this method at each structure location).

By adding one-half of the contour interval to the lowest interpolated elevation, two things are achieved:

- 1) The final BFE is within one-half of the contour interval of both interpolated water-surface elevation and, therefore, is still within the acceptable tolerance of the topographic map (generally regarded as \pm one-half of the map contour interval);
- 2) It is a conservative estimate of the BFE. If the BFE determined under this procedure seems too high, then a detailed analysis may be performed to justify lowering it.

Using a topographic map of the Palestine area (Figure 2-11) with a contour interval of 5 feet the approximate Zone A boundary (shown in Figure 2-10) crosses contour elevations on the left and right bank at 210 and 212 feet, respectively. The difference between these two water-surface elevations is 2 feet, which is less than one-half of the contour interval or 2.5 feet. Therefore, this method is acceptable for use on this portion of the stream. Add 210 feet (lowest interpolated water-surface elevation) plus 2.5 feet (one-half of the contour interval), which yields a BFE of 212.5 feet.

NOTE: The contour method, or any method that “estimates” BFEs, should be used with caution. This particular method should not be used if the **contour interval** (elevation difference between contours) is more than 10. Since “**Zone A**” areas are “approximate,” they should be evaluated for what is “reasonable.” If it is known that the area floods beyond the **A Zone** boundary, developers should be required to protect to an elevation that protects the structure or other development. It is also wise to add a foot or more above the estimated BFE to allow for a “margin of error.” This method is best employed by an engineer, surveyor or someone with experience in using contour maps.



**FIGURE 2-10 FLOOD HAZARD BOUNDARY MAP (FHBM)
FOR PALESTINE, ARKANSAS
(northeast corner)**

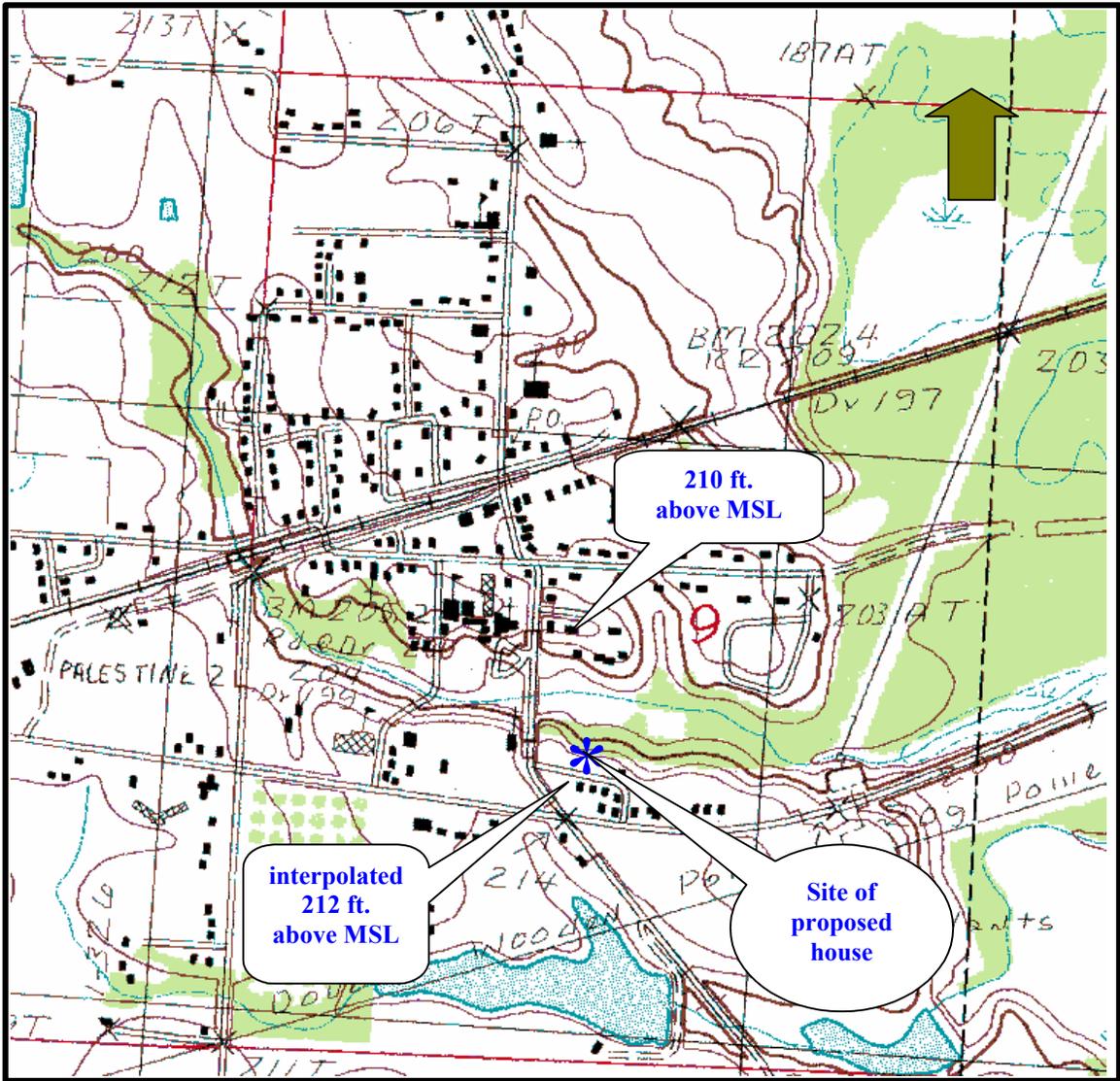


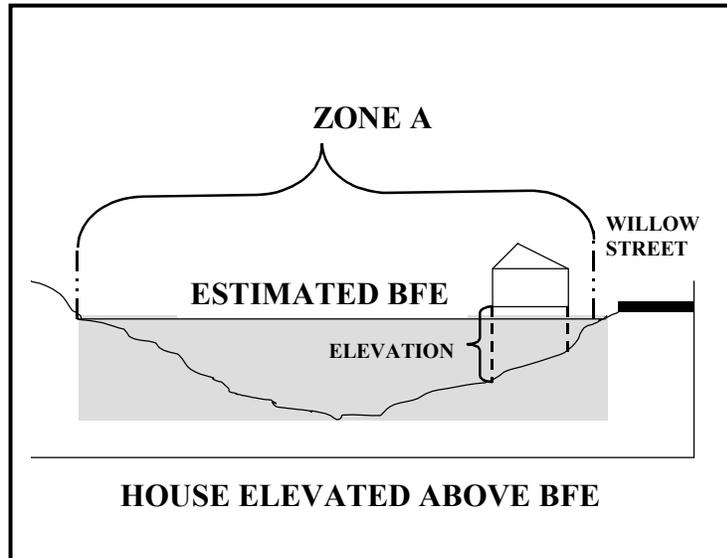
FIGURE 2-11 PORTION OF U.S. GEOLOGICAL SURVEY QUADRANGLE MAP FOR PALESTINE, ARKANSAS

APPROXIMATE SCALE 1:24,000

THE “SURVEY OUT” METHOD

If it is assumed that the elevation of land outside the **SFHA** is above the base flood level, a surveyor may use this elevation as a reference to estimate the **BFE**. The surveyor should survey the ground elevation immediately outside the **SFHA** on a line perpendicular to the stream or lake shore. The line should pass through the site of the development (for example, the location of a house).

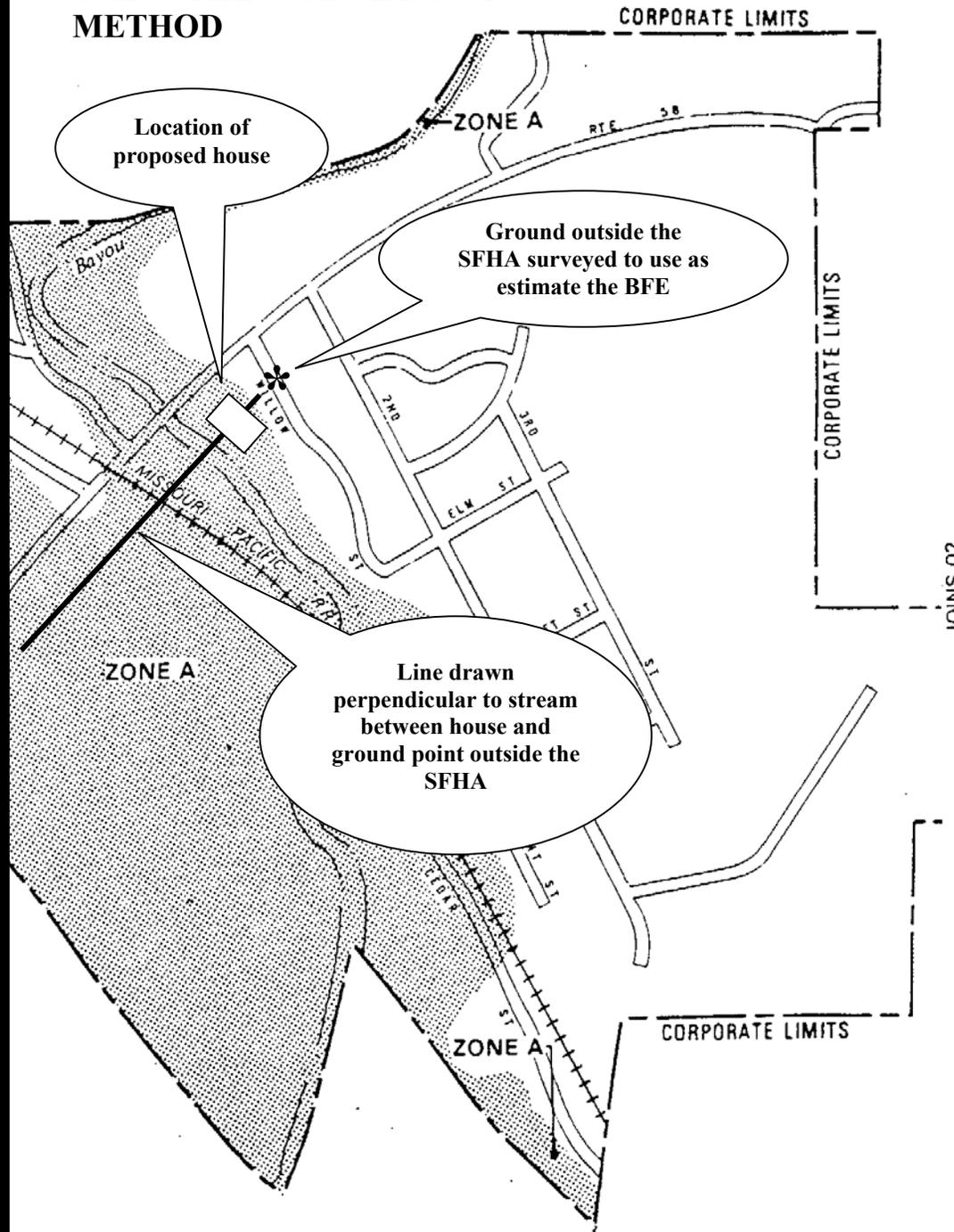
Figure 2-12 illustrates the “survey-out” method. In this case, a house is proposed to be constructed in “**Zone A**” on Willow Street. A surveyor establishes a reference mark on the ground outside **Zone A**. That elevation is surveyed into the floodplain to the site of the proposed house. The floor of the house must be elevated to or above this elevation. Again, it may be wise to add a foot or so for a “margin of safety.”



Additional knowledge may also prove useful. For example, if a major flood affected this area and the high water mark was known, that elevation could be used to survey into the site. In this case, floodwaters may have reached to near level with the crest Willow Street. Hence, the crest of Willow Street may serve as a reference for the **BFE**.

FIGURE 2-12

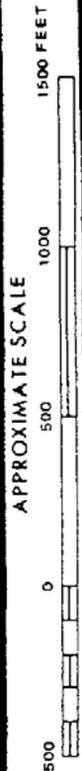
**DETERMINING THE BFE
USING THE "SURVEY-OUT"
METHOD**



Location of proposed house

Ground outside the SFHA surveyed to use as estimate the BFE

Line drawn perpendicular to stream between house and ground point outside the SFHA



MAP REVISED 3/18/77

FLOOD HAZARD BOUNDARY MAP

DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT
Federal Insurance Administration

TOWN OF GUION, AR
(IZARD CO.)

MAP APPEALS AND REVISIONS

Maps may be revised under a variety of circumstances. The entire flood hazard map may be revised, or the map may be revised by letter to affect only the site of a house. The entire community may be affected, or only one homeowner.

Earlier in this chapter, the flood hazard maps used in the **NFIP** were described. The first maps published were the **Flood Hazard Boundary Maps (FHBMs)**, which showed only the 100-year or **Special Flood Hazard Area (SFHA)** but no flood depths or other detailed hydrologic or hydraulic data. Later, as detailed engineering studies were conducted in towns, cities and counties, **Flood Insurance Rate Maps (FIRMs)** and **Flood Boundary and Floodway Maps (FBFMs)**, or simply “**Floodway Maps**, were published to replace the **FHBMs**. In the future, **FHBMs**, **FIRMs** and **FBFMs** will be revised on and as-needed basis.

FEMA MAPPING PROGRAM

Some communities in Arkansas still do not have a **FHBM**, **FIRM** or **FBFM** provided by **FEMA**. Others have inadequate maps which need revising. **FEMA** may eventually contact a community to schedule one of several mapping options:

1. Publish an initial **FIRM** map (Flood Insurance Study)
2. Revise the current **FIRM** (Restudy)
3. Conduct a limited detailed study of a small area (**Limited Map Maintenance Program**)

Each of these options may also involve “floodways.”

The process of conducting a major mapping program in a community can take more than two (2) years from the initial meeting of **FEMA** officials with community representatives and the technical consultants conducting the study. Besides the time involved in conducting the study, ample opportunity is provided for appeals and approval by the community.

In addition to mapping or remapping a large part of a community, the **NFIP** also provides for a **Limited Map Maintenance Program (LMMP)**. Under this program, small areas such as the reach of a small stream are studied and mapped. This is a more efficient way to utilize funds to map areas of special need such as an area where anticipated growth is expected to occur very soon.

EXISTING DATA STUDY

Federal, state, local, and private agencies are often the source of (**existing**) hydrologic and hydraulic data which can be used in the publication or revision of a **Flood Insurance Study (FIS)**. The **Natural Resources Conservation Service (NRCS)**, formerly the **Soil Conservation Service (SCS)**, for example, conducts watershed and floodplain management studies which can serve as a basis for revising a community’s flood hazard map. However, the community must collect and submit this information to **FEMA** in order for it to be used in revising the community’s map.

Communities may also wish to contract with a government agency or private company to conduct studies which would speed up FEMA's map revision schedule. Grants may be available for these studies or the studies may be conducted as part of another project in the community.

PHYSICAL MAP REVISION

A Physical Map Revision refers to a revision in which the flood hazard map is republished. The above Flood Insurance Study program, LMMP, and existing data study are all examples of a Physical Map Revision.

LETTERS OF MAP AMENDMENT AND REVISION

The NFIP has provided a mechanism for changing or correcting flood hazard maps without publishing new maps or map panels. "**Letters**" are issued for essentially small areas to revise the map. Some of these areas are too small to be mapped. Others, while small, will be included when the map is revised at a later date.

"**Conditional letters**" are issued to comment on a **proposed** project that would, upon construction, change the flood hazard map. Once the project is completed, a **final letter**, based on as-built conditions, is issued.

Letters from **FEMA** which remove a parcel of land or structure from the **SFHA** can be used by the property owner to eliminate the Federal requirement to purchase flood insurance to secure a real estate loan. Keep in mind, a lender can still require flood insurance if he feels it is necessary to secure his investment.

Letter of Map Amendment (LOMA)

A **LOMA** is a letter issued by **FEMA** which indicates that a particular property has been erroneously included in the **SFHA**. The **LOMA** effectively removes the property, land or structure, from the **SFHA**.

Flood hazard maps are not perfect. There are pockets of higher land on the borders or within the **SFHA** where land is sufficiently high to be above the base flood elevation (**BFE**). The **LOMA** addresses the need to correct the map through the issuance of letter removing the property from the **SFHA**.

Property owners may apply for a **LOMA** by submitting forms which contain documentation that the property is outside the floodplain.

Letter of Map Revision Based on Fill (LOMR-F)

A parcel of land or a structure may be removed from the **SFHA** by placement of fill. Since the natural ground was below the **BFE**, the placement of fill constitutes a change to the floodplain. **FEMA** will issue a **LOMR-F**, as with the **LOMA**, upon receipt of proper documentation.

A developer may wish to submit a plan for a proposed project to show that, after placement of fill, the property or structures will be elevated above the **BFE**. This is called a **Conditional Letter of Map Revision Involving Fill (CLOMR-F)**. Once the structures are built, final **LOMR-Fs** will be issued.

FEMA charges fees to process **CLOMR-Fs** and **LOMRs**. Contact **FEMA** for the current fee schedule.

Letter of Map Revision (LOMR)

LOMRs are generally based on the implementation of physical measures that affect the hydrologic or hydraulic characteristics of a flooding source and thus result in the modification of the existing regulatory floodway, the effective base flood elevations, or the **SFHA**. The **LOMR** officially revises the **FIRM**, or **FHBM**, and sometimes the **Flood Insurance Study (FIS)** report, and, when appropriate, includes description of the modifications. The **LOMR** is generally accompanied by a portion of the affected **FIRM**, **FHBM**, or **FIS** report.

Record Keeping

Map revisions require that a community official acknowledge that proposed developments do not violate local community regulations. The community also receives copies of letters of map amendment and revision from **FEMA**. The community should maintain a file of this information for future reference. In some cases, map revisions also include a “physical map” for a portion of the flood hazard map. Since this map conflicts with the published **FHBM** or **FIRM**, it can lead to mistakes in evaluating permits.

SECTION 65.12

REVISION OF FLOOD INSURANCE RATE MAPS TO REFLECT BASE FLOOD ELEVATIONS CAUSED BY PROPOSED ENCROACHMENTS.

(Source: Rules and Regulations of the NFIP)

- (a) When a community proposes to permit encroachments upon the flood plain when a regulatory floodway has not been adopted or to permit encroachments upon an adopted regulatory floodway which will cause base flood elevation increases in excess of those permitted under paragraphs (c)(10) or (d)(3) of §60.3 of this **subchapter (See Rules and Regulations of the NFIP in Appendix 1)**, the community shall apply to the Flood Insurance Administrator for conditional approval of such action prior to permitting the encroachments to occur and shall submit the following as part of its application:
 - (1) A request for conditional approval of map change and the appropriate initial fee as specified by §72.3 of this subchapter or a request for exemption from fees as specified by §72.5 of this subchapter, whichever is appropriate;
 - (2) An evaluation of alternatives which would not result in a base flood elevation increase above that permitted under paragraphs (c)(10) or (d)(3) of §60.3 of this subchapter demonstrating why these alternatives are not feasible;
 - (3) Documentation of individual legal notice to all impacted property owners within and outside of the community, explaining the impact of the proposed action on their property.
 - (4) Concurrence of the Chief Executive Officer of any other communities impacted by the proposed actions;
 - (5) Certification that no structures are located in areas which would be impacted by the increased base flood elevation;
 - (6) A request for revision of base flood elevation determination according to the provisions of §65.6 of this part'
 - (7) A request for floodway revision in accordance with the provisions of §65.7 of this part;
- (b) Upon receipt of the Administrator's conditional approval of map change and prior to approving the proposed encroachments, a community shall provide evidence to the Administrator of the adoption of flood plain management ordinances incorporating the increased base flood elevations and or revised floodway reflecting the post-project condition.
- (c) Upon completion of the proposed encroachments, a community shall provide as-built certifications in accordance with the provisions of §65.3 of this part. The Administrator will initiate a final map revision upon receipt of such certifications in accordance with part 67 of this chapter.

SOURCES OF INFORMATION

Information which can be of use to Floodplain Administrators as well as others involved in floodplain management, flood insurance and the National Flood Insurance Program (NFIP) is available from many sources. These include:

1. Agencies or organizations
2. Internet
3. Publications and Videos

Agencies or Organizations

**ARKANSAS SOIL AND WATER CONSERVATION COMMISSION
101 EAST CAPITOL, SUITE 350
LITTLE ROCK, ARKANSAS 72201**

PHONE: 501-682-1611

FAX: 501-682-3991

<http://www.accessarkansas.org/>

This agency is the State Coordinating Agency for the National Flood Insurance Program (NFIP). The ASWCC provides assistance and information to local communities. This should be the first point of contact by local officials and floodplain administrators.

**FEDERAL EMERGENCY MANAGEMENT AGENCY
REGION VI, FEDERAL CENTER
800 NORTH LOOP 288
DENTON, TEXAS 76201-3698**

PHONE: 940-898-5127

<http://www.fema.gov/>

The Federal Agency which administers the National Flood Insurance Program is the FEDERAL EMERGENCY MANAGEMENT AGENCY, (FEMA). The regional office in Denton, Texas is the best source of information from the Federal Government.

**ARKANSAS DEPARTMENT OF EMERGENCY MANAGEMENT
P.O. BOX 758
CONWAY, ARKANSAS 72033**

PHONE: 501-730-9750

FAX: 501-730-9754

<http://www.adem.state.ar.us/>

ADEM provides emergency services in the case of flooding and other disasters. It also administers State and Federal grant programs for mitigation. This includes funds to repair flood damage as well as relocate buildings outside the floodplain.

NATIONAL FLOOD INSURANCE PROGRAM

15835 Park Ten Place, Suite 108

Houston, TX 77084

(281) 829-6880

fax: (281) 829-6879

<http://www.fema.gov/nfip/reg.htm> - 6

For information regarding flood insurance (policies and insurance questions), this office is responsible for the region of the country which includes Arkansas.

FEMA MAP SERVICE CENTER

P.O. BOX 1038

JESSUP, MD 20794-1038

PHONE: 1-800-358-9616 (8 a.m. – 8 p.m. Eastern)

FAX: 1-800-358-9620

msc.fema.gov/MS/

Contact this office to order FIRM maps.

U.S. ARMY CORPS OF ENGINEERS

P.O. BOX 867

LITTLE ROCK, ARKANSAS 72203-0867

Phone: 501-324-5037

<http://www.usace.army.mil/where.html> - State

For a variety of flood information, the Corps of Engineers can be helpful. Also, for information on wetlands. **NOTE:** If your community is within a different Corps District, ask the Little Rock office for the particular person, address and phone number.

**NATURAL RESOURCES CONSERVATION SERVICE
FEDERAL BUILDING, ROOM 5404
700 WEST CAPITOL AVENUE
LITTLE ROCK, ARKANSAS 72201-3225**

Phone: 501-324-6335
<http://www.ar.nrcs.usda.gov/>

The NRCS, formerly SCS (Soil Conservation Service), is an excellent source of flood information. Local Conservation District Offices throughout the State can assist local residents and community officials. The NRCS may also be able to conduct floodplain management or drainage studies for local communities.

**WATER RESOURCES DIVISION
U.S. GEOLOGICAL SURVEY
401 HARDIN ROAD
LITTLE ROCK, ARKANSAS 72211**

Phone: 501-228-3600
ar.water.usgs.gov/

Also a source of flood data, the U.S.G.S. maintains a network of stream gages which record streamflow and flood heights.

**ARKANSAS GEOLOGICAL COMMISSION
3815 WEST ROOSEVELT ROAD
LITTLE ROCK, ARKANSAS 72204**

PHONE: 501-296-1877
www.accessarkansas.orghttp://www.state.ar.us/agc/agc.htm/agc

The Geological Commission maintains topographic maps for the State which can be purchased and used for property location and elevation information.

**HYDRAULICS BRANCH
ARKANSAS HIGHWAY AND TRANSPORTATION DEPARTMENT
10324 INTERSTATE 30
LITTLE ROCK, ARKANSAS 72203**

PHONE: 501-569-2000
<http://www.ahtd.state.ar.us/AHTD.htm>

The Arkansas Highway Department may have flood data used in designing roads and bridges.

**ASSOCIATION OF STATE FLOODPLAIN MANAGERS
4233 WEST BELTLINE HIGHWAY
MADISON, WISCONSIN 53711**

PHONE: 608-274-0123

FAX: 608-274-0696

<http://www.floods.org/>

This is the foremost floodplain management organization in the Nation. It grew out of the establishment of the NFIP in the early 1970s, and it is an excellent way for local communities to keep up with news of both local and national relevance. Of particular value to local Floodplain Administrators is the development of professional certification for floodplain administrators. The ASFPM is leading in this effort.

Add Your Own

Publications and Videos

To order Publications:

FEMA Publications

P.O. Box 2012

Jessup, MD 20794-2012 or 1-800480-2520

<http://www.fema.gov/nfip/publicat.htm>

<http://www.fema.gov/nfip/forms.htm>

<u>Item No.</u>	<u>Publication</u>	
3-0107	FEMA-15	Design Guidelines for Rood Damage Reduction. General information on flooding and how to properly design and build in floodprone areas.
8-0390	FEMA-54	Elevated Residential Structures. Proper design and construction methods for elevated buildings.
8-0497	FEMA-85	Manufactured Home Installation in Rood Hazard Areas. How to properly install a manufactured home in a flood hazard area with emphasis on design of elevated foundations.
3-0125	FEMA-100	Unified National Program for Floodplain Management. A conceptual framework to guide local, State, and Federal decisionmakers toward a balanced consideration of alternative goals, loss reduction strategies, and tools. (See FEMA-248 for an update to this publication)
3-0126	FEMA-102	Floodproofing Non-Residential Structures. Describes a variety of floodproofing strategies for commercial and industrial structures.
3-0127	FEMA-114	Design Manual for Retrofitting Flood-prone Residential Structures Presents floodproofing techniques that can be used for existing residential structures.
3-0164	FEMA-213	Answers to Questions about Substantially Damaged Buildings: Guidance on NFIP regulations governing substantially damaged Structures
3-0178	FEMA-234	Repairing Your Rooded Home. Repair manual for homeowners on how to repair your home after a flood.
	FEMA-248	A Unified National Program for Floodplain Management Updates the information in FEMA-100.

<u>Item No.</u>	<u>Publication</u>	
	FEMA-258	Guide to Flood Maps. A How-To booklet for reading Flood Insurance Rate Maps (FIRMS)
	FEMA-259	Engineering Principles and Practices for Retrofitting Floodprone Residential Buildings. A comprehensive technical manual with specific guidance on financial, engineering determination of methods, and design practices for many floodproof retrofitting techniques.
	FEMA-265	Managing Floodplain Development in Approximate A Areas: A Guide for Obtaining and Developing Base (100-Year) Flood Elevations. A variety of methods are described for estimating the BFE. These include use of contour maps and engineering methods (open channel hydraulics). Computer program Quick 2, Version 1.0 is included on diskette.
	FIA-2	Answers to Questions About the National Flood Insurance Program. Basic reference of general information and important addresses regarding the NFIP.
3-0183	FIA-TB-0	Technical Bulletins: User's Guide with Key Word and Subject Index Provides a list of available technical bulletins, a key word/subject reference index for all the bulletins, and information about how to obtain copies of the bulletins.
3-0184	FIA-TB- 1	Technical Bulletin 1: Openings in Foundation Walls. Guidance on the NFIP regulations concerning the requirement for openings in below-Base Flood Elevation foundation walls for buildings located in Zones A, AE, A1-A30, AR, AO, and AH.
3-0185	FIA-TB-2	Technical Bulletin 2: Flood-Resistant Materials Requirements Guidance on the NFIP regulations concerning the required use of flood damage-resistant construction materials for building components located below the Base Flood Elevation in Special Flood Hazard Areas (both A and V Zones).
3-0186	FIA-TB-3	Technical Bulletin 3: Non-Residential Floodproofing – Requirements and Certification. Guidance on the NFIP regulations concerning watertight construction and the required certification for floodproofed non-residential buildings in Zones A, AE, A1-A30, AR, AO, and AH whose lowest floors are below the Base Flood Elevation.

<u>Item No.</u>	<u>Publication</u>	
3-0187	FIA-TB4	Technical Bulletin 4: Elevator Installation. Guidance on the NFIP regulations concerning the installation of elevators below the Base Flood Elevation in Special Flood Hazard Areas (both A and V Zones).
3-0188	FIA-TB-5	Technical Bulletin 5: Free-Of-Obstruction Requirements. Guidance on the NFIP regulations concerning obstructions to floodwaters below elevated buildings and on building sites in coastal high Hazard Areas (Zones V, VE, and V1-V30).
3-0189	FIA-TB-6	Technical Bulletin 6: Below-Grade Parking Requirements. Guidance on the NFIP regulations concerning the design of below-grade parking garages beneath buildings located in Zones A, AE, AIA30, AR, AO, and AH).
3-0202	FIA-TB-7	Wet Floodproofing Requirements. Guidance on the NFIP regulation concerning the design of wet floodproofing which is not recognized for residential homes, only for non residential structures.
3-124		NFIP Regulations for Floodplain Management and Flood Hazard Identification. 44CFR Regulations that pertains only to the Floodplain Management Program.
3-0132	L-153	Retrofitting Flood-prone Residential Structures (Brochure). A companion brochure summarizing FEMA-1 14
3-0174	L-197	Unified National Program for Floodplain Management (Brochure) A companion brochure summarizing FEMA-100
3-0179	L-198	After a Flood: The First Steps (Brochure). A brochure that pulls pertinent first step information from FEMA-234.
3-0172	FF 81-78	Residential Basement Floodproofing Certificate (7192). A form provided to communities that have been granted a basement exception through FEMA Headquarters.
	FF 81-31	Elevation Certificate. A form provided to communities participating in the NFIP for proper recording of elevated buildings.
	FF 81-65	Floodproofing for Non-Residential Structures. A form provided to communities participating in the NFIP for proper recording of floodproofing non-residential buildings.

Item No.

Publication

Poster-15 Repairing Your Flooded Home (English/Spanish). Poster for use in public buildings with English on one side and Spanish on the other.

Videos

Best Build I Constructing a Sound Coastal Home

Best Build II Construction in a Riverine Floodplain

Best Build III Protecting a Flood-prone Home

Federal Emergency Management Agency
Hazard Mitigation Grant Program Publications

Publication #

L-169 Hazard Mitigation Grant Program. Describes Program requirements and availability of the Hazard Mitigation Grant Program for Presidential disaster declarations.

DAP-12 Post-Hazard Mitigation Planning Guide for State/Local Governments General guidance for State and local governments on developing an effective mitigation program and conducting mitigation planning.

Chapter 3

FLOODPLAIN MANAGEMENT

WHAT IS FLOODPLAIN MANAGEMENT?

Floodplain management is an overall community program of corrective and preventive measures for reducing future flood damage. These measures take a variety of forms and generally include zoning, subdivision or building requirements, and special-purpose floodplain ordinances.

TABLE 1 FLOODPLAIN MANAGEMENT TOOLS	
<p>Modify Susceptibility to Flood Damage and Disruption</p> <ol style="list-style-type: none"> 1. Floodplain Regulations <ol style="list-style-type: none"> a) State regulations for flood hazard areas b) Local regulations for flood hazard areas <ol style="list-style-type: none"> 1) Zoning 2) Subdivision regulations 3) Building codes 4) Housing codes 5) Sanitary and well codes 6) Other regulatory tools 2. Development and Redevelopment Policies <ol style="list-style-type: none"> a) Design and location of services and utilities b) Land rights, acquisition, and open space use c) Redevelopment d) Permanent evacuation 3. Disaster Preparedness 4. Disaster Assistance 5. Floodproofing 6. Flood Forecasting and Warning Systems and Emergency Plans <p>Modify Flooding</p> <ol style="list-style-type: none"> 1. Dams and Reservoirs 2. Dikes, Levees, and Floodwalls 3. Channel Alterations 4. High Flow Diversions 5. Land Treatment Measures 6. Other Detention Measures 	<p>Modify the Impact of Flooding on Individuals and the Community</p> <ol style="list-style-type: none"> 1. Information and Education 2. Flood Insurance 3. Tax Adjustments 4. Flood Emergency Measures 5. Postflood Recovery <p>Restore and Preserve the Natural and Cultural Resources of Floodplains</p> <ol style="list-style-type: none"> 1. Floodplain, Wetland, Coastal Barrier Resources Regulations <ol style="list-style-type: none"> a) Federal regulations b) State regulations c) Local regulations <ol style="list-style-type: none"> (1) Zoning (2) Subdivision regulations (3) Building codes (4) Housing codes (5) Sanitary and well codes (6) Other regulations 2. Development and Redevelopment Policies <ol style="list-style-type: none"> a) Design and location of services and utilities b) Land rights, acquisition, and open space c) Redevelopment d) Permanent evacuation 3. Information and Education 4. Tax Adjustments 5. Administrative Measures

NATURAL AND BENEFICIAL USES OF FLOODPLAINS

Increasing attention has been given to the environmental benefits and open space benefits of floodplains. Floodplains provide a buffering and filtering system to protect the environment from pollution. They also provide valuable open space for “lifting spirits” and recreation. When floodplains are inappropriate for building houses and other similar development, private citizens and communities should look to other beneficial uses. As open space resources become scarcer, they also become more valuable.

COMMUNITY FLOODPLAIN MANAGEMENT AND THE NFIP

While floodplain management includes a variety of structural and non-structural methods, the **NFIP** places emphasis on non-structural “tools” to mitigate the effects of flooding. Communities participating in the **NFIP** are required to adopt and enforce minimum floodplain management regulations. These regulations are described in the local **Flood Damage Prevention Ordinance**. All participating communities must utilize this ordinance to manage development in flood-prone areas. This ordinance is based on minimum floodplain management criteria published in **Federal Rules and Regulations for the NFIP** (See **Appendix 1**).

CATEGORIES OF PARTICIPATING COMMUNITIES

The community **Flood Damage Prevention Ordinance** has been tailored to match the particular type of map and minimum floodplain management criteria. Community ordinances are identified by **FEMA** as “**a**”, “**b**”, “**c**”, “**d**”, “**e**”, or “**f**”. The letters refer to subsections of **Section 60.3 of the Rules and Regulations for the NFIP**. Below is a brief description of the differences among these ordinances:

TYPES OF ORDINANCES
“ a ” ordinance - for communities which have no identified Special Flood Hazard Areas (SFHAs) ; in other words, no map has been published for this community.
“ b ” ordinance - for communities which show SFHAs as Zone A , but without flood elevations or FLOODWAYS . The maps are labeled either Flood Hazard Boundary Map (FHBM) or Flood Insurance Rate Map (FIRM) .
“ c ” ordinance - for communities which show SFHAs as Zone A, A1-A30, AE, AH, AO, or AR . Flood elevations are shown for at least a portion of the flood areas. No FLOODWAY map has been published. Some may also be accompanied by A Flood Insurance Study (FIS) booklet.
“ d ” ordinance - for communities which have been provided with map information in “ c ” communities, but with the addition of A “FLOODWAY.” The “ FLOODWAY ” may be shown on a separate Flood Boundary and Floodway Map (FBFM) or incorporated into the FIRM .
“ e ” ordinance - for communities with coastal high hazard areas. There are none in Arkansas
“ f ” ordinance - for areas behind levees being restored to 100-year protection; currently, only applies to California

MINIMUM CRITERIA FOR FLOODPLAIN MANAGEMENT

As stated earlier, the minimum floodplain management criteria depend upon the type of map and flood information provided to the community by FEMA; in other words, by type of ordinance. Therefore, the floodplain management regulations will be described in this guide by the type of ordinance listed above. **It is very important that community permit officials be familiar with the map information and ordinance currently in effect.**

HOW TO IDENTIFY FLOODPLAIN MANAGEMENT CRITERIA FOR YOUR COMMUNITY

- If no **Flood Hazard Boundary Map (FHBM)** or **Flood Insurance Rate Map (FIRM)**, which shows **Special Flood Hazard Areas (SFHAs)**, has been published for your community, use the criteria for “a” communities on pages marked **A**
- If the **FHBM** or **FIRM** for your community shows **SFHAs** only as “**Zone A**”, and the map contains no base flood elevation or **floodway** information, use the criteria for “b” communities on pages marked **B**
- If the **FIRM** for your community shows at least some of the **SFHA** as Zones **A1-30, AE, AH, or AO**; and if no “floodways” have been delineated either on the **FIRM** or on a separate **Flood Boundary and Floodway Map (FBFM)**, use the criteria for “c” communities on pages marked **C**
- If the **FHBM** or **FIRM** for your community shows at least some of the **SFHA** as Zones **A1-30, AE, AH, or AO**; and if “floodways” have been delineated either on the **FIRM** or on a separate **Flood Boundary and Floodway Map (FBFM)**, use the criteria for “d” communities on pages marked **D**

A

**FLOODPLAIN MANAGEMENT CRITERIA
FOR “a” COMMUNITIES**

***** **Community has no flood hazard map provided by FEMA** *****

**NO FLOOD HAZARD MAP
IDENTIFYING SPECIAL
FLOOD HAZARD AREAS
HAS BEEN PUBLISHED
OR MAP HAS BEEN
RESCINDED**

- (a) When the **Federal Insurance Administrator** has not defined the **Special Flood Hazard Areas** within a community, has not provided water surface elevation data, and has not provided sufficient data to identify the **floodway**, but the community has indicated the presence of such hazards by submitting an application to participate in the Program, the community shall:

PERMITS REQUIRED

- (1) 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 it is determined that the proposed development is reasonably safe from flooding and will cause no harm to adjacent property, an exemption may be issued instead of a permit;

REVIEW OTHER GOVERNMENT PERMITS

- (2) Review proposed development to assure that all necessary permits have been received from those governmental agencies from which approval is required by Federal or State law, including **Section 404 of the Federal Water Pollution Control Act Amendments of 1972**;

GENERAL SAFETY STANDARDS

- (3) Review all permit applications to determine whether proposed building sites will be reasonably safe from flooding. If a proposed building site is in a flood-prone area, all new construction and substantial improvements shall
 - (i) be designed (or modified) and adequately anchored to prevent flotation, collapse, or lateral movement of the structure resulting from hydrodynamic and hydrostatic loads, including the effects of buoyancy,
 - (ii) be constructed with materials resistant to flood damage,
 - (iii) be constructed by methods and practices that minimize flood damages,

and

- (iv) be constructed with electrical, heating, ventilation, plumbing, and air conditioning equipment and other service facilities that are designed and/or located so as to prevent water from entering or accumulating within the components during conditions of flooding;

SUBDIVISION AND MANUFACTURED HOME PARK REVIEW

- (4) 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;

WATER SUPPLY SYSTEMS

- (5) 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

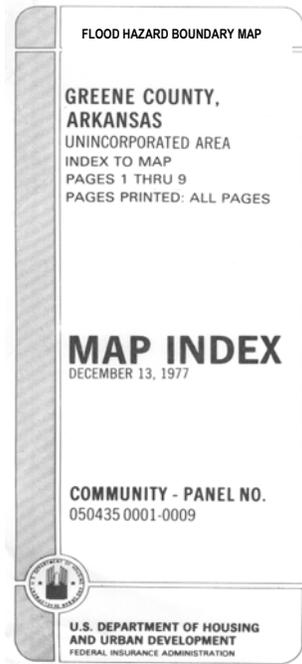
SANITARY SEWAGE SYSTEMS

- (6) 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.

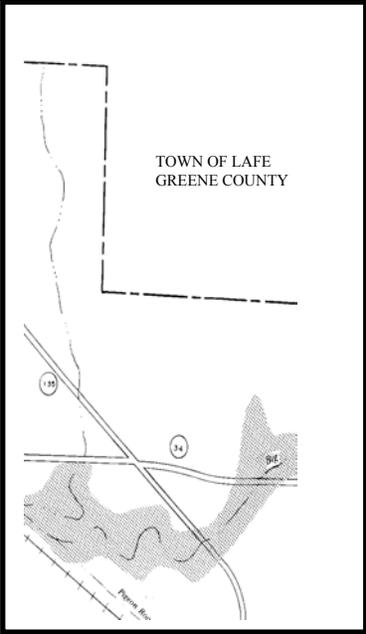
NOTE: The community will have to establish a method for determining flood-prone areas. This may include high water marks from previous floods, local knowledge, soil maps (indicating frequently flooded areas), or even an engineering study conducted by either a government or private agency.

**FLOODPLAIN MANAGEMENT CRITERIA
FOR “b” COMMUNITIES**

***** **Community has a Flood Hazard Boundary Map (FHBM) or a Flood Insurance Rate Map (FIRM), but maps do not have flood elevations provided; there is no accompanying Floodway Map (FBFM) or Flood Insurance Study (FIS)** *****



(b) When the Federal Insurance 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, the community shall:



PERMITS REQUIRED

- (1) Require permits for all proposed construction and other developments including the placement of manufactured homes, within **Zone A** on the community's **FHBM** or **FIRM**;

REVIEW OTHER GOVERNMENT PERMITS

- (2) Review proposed development to assure that all necessary permits have been received from those governmental agencies from which approval is required by Federal or State law, including **Section 404 of the Federal Water Pollution Control Act Amendments of 1972**;

GENERAL SAFETY STANDARDS

- (3) Review all permit applications to determine whether proposed building sites will be reasonably safe from flooding. If a proposed building site is in a flood-prone area, all new construction and substantial improvements shall
 - (i) be designed (or modified) and adequately anchored to prevent flotation, collapse, or lateral movement of the structure resulting from hydrodynamic and hydrostatic loads, including the effects of buoyancy,
 - (ii) be constructed with materials resistant to flood damage,
 - (iii) be constructed by methods and practices that minimize flood damages, and
 - (iv) be constructed with electrical, heating, ventilation, plumbing, and air conditioning equipment and other service facilities that are designed and/or located so as to prevent water from entering or accumulating within the components during conditions of flooding;

SUBDIVISION AND MANUFACTURED HOME PARK REVIEW

- (4) 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;
- (5) 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;

WATER SUPPLY SYSTEMS

- (6) 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;

B

SANITARY SEWAGE SYSTEMS

- (7) 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;

OBTAIN, REVIEW AND REASONABLY UTILIZE ANY BASE FLOOD ELEVATION AND FLOODWAY DATA

- (8) Obtain, review and reasonably utilize any base flood elevation and floodway data available from a Federal, State, or other source, **including Federal Emergency Management Agency (FEMA)** data developed pursuant to paragraph (b)(5) of this section, as criteria to (See information in following boxes):

The Following Requirements Apply When Base Flood Elevations and/or Floodway Data are Available, as in Section (8) Above, from an Authoritative Source Such as the U.S. Army Corps of Engineers

RESIDENTIAL STRUCTURES

- (i) Require that all new construction and substantial improvements of residential structures within **Zone A** on the community's **FIRM** have the lowest floor (including basement) elevated to or above the base flood level);

NONRESIDENTIAL STRUCTURES

- (ii) Require that all new construction and substantial improvements of nonresidential structures within **Zone A** on the community's **FHBM** or **FIRM**;
 - 1) have the lowest floor (including basement) elevated to or above the base flood level or,
 - 2) 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;

Section (8) Requirements Continued

PARKING AND STORAGE AREAS BELOW THE BASE FLOOD ELEVATION

- (iii) Require, for all new construction and substantial improvements, that fully enclosed areas below the lowest floor (that is, below the base flood elevation) 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.

MANUFACTURED HOMES

- (iv) Require that manufactured homes that are placed or substantially improved within **Zone A** on the community's **FHBM** or **FIRM** on sites
 - 1) Outside of a manufactured home park or subdivision,
 - 2) In a new manufactured home park or subdivision,
 - 3) In an expansion to an existing manufactured home park or subdivision, or
 - 4) In an existing manufactured home park or subdivision on which a manufactured home has incurred "substantial damage" as the result of a flood, be elevated on a permanent foundation such that the lowest floor of the manufactured home is elevated to or above the base flood elevation and be securely anchored to an adequately anchored foundation system to resist floatation collapse and lateral movement.

MANUFACTURED HOMES IN EXISTING PARK OR SUBDIVISION

- (v) Require that manufactured homes to be placed or substantially improved on sites in an existing manufactured home park or subdivision within **Zone A** on the community's **FHBM** or **FIRM** that are not subject to the provisions of paragraph (b)(8)(iv) above be elevated so that either
 - 1) The lowest floor of the manufactured home is at or above the base flood elevation, or
 - 2) 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.

Section (8) Requirements Continued**RECREATIONAL VEHICLES**

- (vi) Require that recreational vehicles placed on sites within **Zone A** on the community's **FHBM** or **FIRM** either
- 1) Be on the site for fewer than 180 consecutive days,
 - 2) Be fully licensed and ready for highway use, or
 - 3) Meet the permit requirements of paragraph (b)(1) above and the elevation and anchoring requirements for "manufactured homes" in paragraph (b)(8)(iv) above.

A recreational vehicle is ready for highway use if it is on its wheels or jacking system, is attached to the site only by quick disconnect type utilities and security devices, and has no permanently attached additions.

SELECT AND ADOPT A REGULATORY FLOODWAY

- (vii) Select and adopt a regulatory **floodway** based on the principle that the area chosen for the regulatory **floodway** must be designed to carry the waters of the base flood, without increasing the water surface elevation of that flood more than one foot at any point;

PROHIBIT DEVELOPMENT IN THE FLOODWAY

- (viii) 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.

NOTE: Floodway requirements apply only when floodway data are available for a particular stream.

OBTAIN AND RECORD LOWEST FLOOR ELEVATIONS

- (9) Where base flood elevation data are utilized, within **Zone A** on the community's **FHBM** or **FIRM**:
- (i) Obtain the elevation (in relation to mean sea level) of the lowest floor (including basement) of all new and substantially improved structures,
 - (ii) Obtain, if the structure has been floodproofed in accordance with paragraph (b)(8)(ii) 2) of this section, the elevation (in relation to mean sea level) to which the structure was floodproofed, and
 - (iii) Maintain a record of all such information with the official designated by the community;

NOTIFY AGENCIES PRIOR TO ALTERATION OR RELOCATION OF A WATERCOURSE

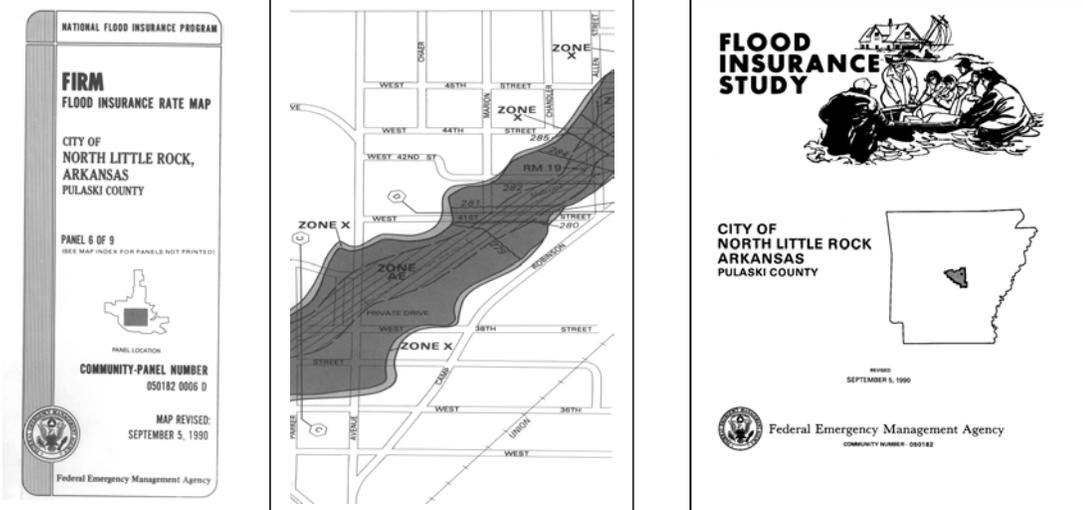
- (10) Notify, in riverine situations, adjacent communities and the State **NFIP** Coordinator at the **Arkansas Soil & Water Conservation Commission (ASWCC)** prior to any alteration or relocation of a watercourse, and submit copies of such notifications to the **Federal Insurance Administrator**; and

ASSURE MAINTENANCE OF FLOOD CARRYING CAPACITY

- (11) Assure that the flood carrying capacity within the altered or relocated portion of any watercourse is maintained.

**FLOODPLAIN MANAGEMENT CRITERIA
FOR “c” COMMUNITIES**

***** Community has a Flood Insurance Rate Map (FIRM) which *****
shows base flood elevations for part or all of the Special Flood Hazard Areas (SFHAs); there is no published Floodway Map (FBFW); there may be a Flood Insurance Study (FIS) booklet



- (c) When the **Federal Insurance Administrator** has provided a notice of final flood elevations for one or more **Special Flood Hazard Areas** on the community's **FIRM** and, If appropriate, has designated other **Special Flood Hazard Areas** without base flood elevations on the community's **FIRM**, but has not identified a regulatory **floodway** or coastal high hazard area, the community shall:

FOR PROPERTY LOCATED IN UNNUMBERED “ZONE A”

⇒ Use **Floodplain Management Criteria for “b” Communities** in previous section. **Otherwise, proceed.**

PERMITS REQUIRED

- (1) Require permits for all proposed construction and other developments including the placement of manufactured homes, within **Zone A1-30, AE, AH, AO or AR** on the community's **FIRM**;

REVIEW OTHER GOVERNMENT PERMITS

- (2) Review proposed development to assure that all necessary permits have been received from those governmental agencies from which approval is required by Federal or State law, including **Section 404 of the Federal Water Pollution Control Act Amendments of 1972**;

GENERAL SAFETY STANDARDS

- (3) Review all permit applications to determine whether proposed building sites will be reasonably safe from flooding. If a proposed building site is in a flood-prone area, all new construction and substantial improvements shall
 - (i) be designed (or modified) and adequately anchored to prevent flotation, collapse, or lateral movement of the structure resulting from hydrodynamic and hydrostatic loads, including the effects of buoyancy,
 - (ii) be constructed with materials resistant to flood damage,
 - (iii) be constructed by methods and practices that minimize flood damages, and
 - (iv) be constructed with electrical, heating, ventilation, plumbing, and air conditioning equipment and other service facilities that are designed and/or located so as to prevent water from entering or accumulating within the components during conditions of flooding;

SUBDIVISION AND MANUFACTURED HOME PARK REVIEW

- (4) 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;
- (5) 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;

C

WATER SUPPLY SYSTEMS

- (6) 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;

SANITARY SEWAGE SYSTEMS

- (7) 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;

RESIDENTIAL STRUCTURES

- (8) 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;
- (9) Require within any **AO** zone on the community's **FIRM** that all new construction and substantial improvements of residential structures have the lowest floor (including basement) elevated above the highest adjacent grade at least as high as the depth number specified in feet on the community's **FIRM** (at least two feet if no depth number is specified);

NONRESIDENTIAL STRUCTURES

- (10) Require that all new construction and substantial improvements of nonresidential structures within Zones **A1-30**, **AE** and **AH** zones on the community's **FIRM** have the
 - (i) 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;

- (11) Provide that where a nonresidential 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 the above paragraph, 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;

- (12) Require within any **AO** zone on the community's **FIRM** that all new construction and substantial improvements of nonresidential structures
 - (i) have the lowest floor (including basement) elevated above the highest adjacent grade at least as high as the depth number specified in feet on the community's **FIRM** (at least two feet if no depth number is specified), or
 - (ii) together with attendant utility and sanitary facilities be completely floodproofed to that level to meet the floodproofing standard specified in (c)(10)(ii) above;

PARKING AND STORAGE AREAS BELOW THE BASE FLOOD ELEVATION

- (13) 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;

MANUFACTURED HOMES

- (14) Require that manufactured homes that are placed or substantially improved within Zones **AI-30**, **AH**, and **AE** on the community's **FIRM** on sites
- (i) Outside of a manufactured home park or subdivision,
 - (ii) In a new manufactured home park or subdivision,
 - (iii) In an expansion to an existing manufactured home park or subdivision,
or
 - (iv) In an existing manufactured home park or subdivision on which a manufactured home has incurred "substantial damage" as the result of a flood, be elevated on a permanent foundation such that the lowest floor of the manufactured home is elevated to or above the base flood elevation and be securely anchored to an adequately anchored foundation system to resist floatation collapse and lateral movement.;

MANUFACTURED HOMES IN EXISTING PARK OR SUBDIVISION

- (15) Require that manufactured homes to be placed or substantially improved on sites in an existing manufactured home park or subdivision within Zones **AI-30**, **AH**, and **AE** on the community's **FIRM**, that are not subject to the provisions of the above paragraph, 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.
 - (iii)

RECREATIONAL VEHICLES

- (16) Require that recreational vehicles placed on sites within Zones **A1-30**, **AH**, and **AE** on the community's **FIRM** either
- (i) Be on the site for fewer than 180 consecutive days,
 - (ii) Be fully licensed and ready for highway use, or
 - (iv) Meet the permit requirements of for placement of manufactured homes and the elevation and anchoring requirements for "manufactured homes" in paragraph (c)(14) above.

A recreational vehicle is ready for highway use if it is on its wheels or jacking system, is attached to the site only by quick disconnect type utilities and security devices, and has no permanently attached additions;

FOR ZONE A99

- (17) Require within any **A99** zones on a community's **FIRM** the standards for Floodplain Management Criteria for “**b**” Communities;

SELECT AND ADOPT A REGULATORY FLOODWAY

- (18) Require until a regulatory **floodway** is designated, that no new construction, substantial improvements, or other development (including fill) shall be permitted within Zones **AI-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;

PROJECTS REQUIRING APPLICATION FOR A MAP REVISION

- (19) Notwithstanding any other provisions a community may approve certain development in Zones **AI-30**, **AE**, and **AH**, on the community's **FIRM** which increase the water surface elevation of the base flood by more than one foot, provided that the community first applies for a conditional **FIRM** revision, fulfills the requirements for such a revision as established under the provisions of **NFIP Regulations, Section 65.12**, and receives the approval of the **Flood Insurance Administrator**.

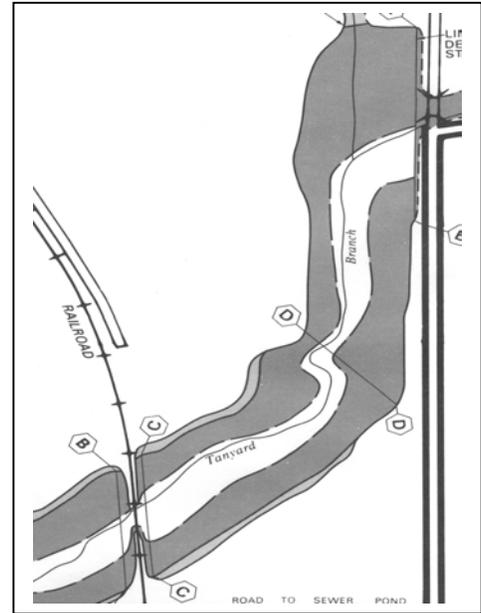
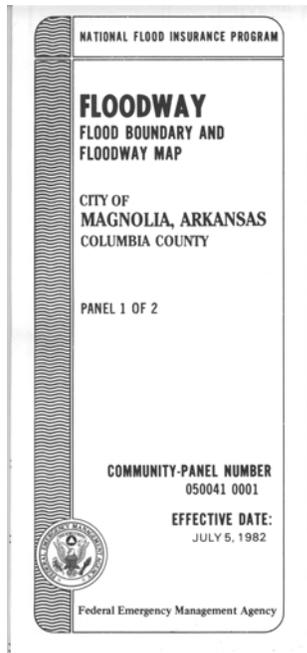
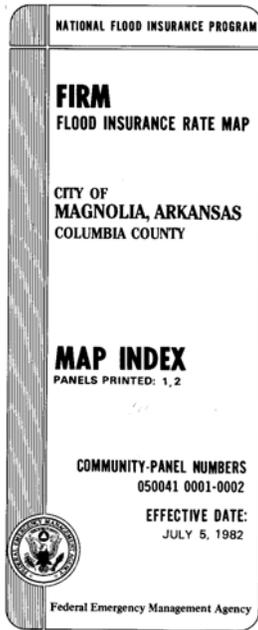
DRAINAGE REQUIREMENTS FOR ZONES AH AND AO

- (20) Require within Zones **AH** and **AO**, adequate drainage paths around structures on slopes, to guide floodwaters around and away from proposed structures.

D

**FLOODPLAIN MANAGEMENT CRITERIA
FOR “d” COMMUNITIES**

***** Community has a Flood Insurance Rate Map (FIRM) which *****
shows base flood elevations and floodways for part or all of the Special Flood
Hazard Areas (SFHAs); there is also a Flood Insurance Study (FIS) booklet



(d) When the Administrator has provided a notice of final base flood elevations within Zones **A1-30** and/or **AE** on the community's **FIRM** and, if appropriate, has designated **AO** zones, **AH** zones, **A99** zones, and **A** zones on the community's **FIRM**, and has provided data from which the community shall designate its regulatory **floodway**, the community shall:

FOR PROPERTY LOCATED IN UNNUMBERED “ZONE A”

⇒ Use **Floodplain Management Criteria for “b” Communities** beginning on page 3-6. **Otherwise, proceed.**

PERMITS REQUIRED

(1) Require permits for all proposed construction and other developments including the placement of manufactured homes, within **Zone A1-30, AE, AH, AO, or AR** on the community's **FIRM**;

REVIEW OTHER GOVERNMENT PERMITS

- (2) Review proposed development to assure that all necessary permits have been received from those governmental agencies from which approval is required by Federal or State law, including **Section 404 of the Federal Water Pollution Control Act Amendments of 1972**;

GENERAL SAFETY STANDARDS

- (3) Review all permit applications to determine whether proposed building sites will be reasonably safe from flooding. If a proposed building site is in a flood-prone area, all new construction and substantial improvements shall
- (i) be designed (or modified) and adequately anchored to prevent flotation, collapse, or lateral movement of the structure resulting from hydrodynamic and hydrostatic loads, including the effects of buoyancy,
 - (ii) be constructed with materials resistant to flood damage,
 - (iii) be constructed by methods and practices that minimize flood damages, and
 - (iv) be constructed with electrical, heating, ventilation, plumbing, and air conditioning equipment and other service facilities that are designed and/or located so as to prevent water from entering or accumulating within the components during conditions of flooding;

SUBDIVISION AND MANUFACTURED HOME PARK REVIEW

- (4) 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;
- (5) 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;

D

WATER SUPPLY SYSTEMS

- (6) 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

SANITARY SEWAGE SYSTEMS

- (7) 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;

RESIDENTIAL STRUCTURES

- (8) 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;
- (9) Require within any **AO** zone on the community's **FIRM** that all new construction and substantial improvements of residential structures have the lowest floor (including basement) elevated above the highest adjacent grade at least as high as the depth number specified in feet on the community's **FIRM** (at least two feet if no depth number is specified);

NONRESIDENTIAL STRUCTURES

- (10) Require that all new construction and substantial improvements of nonresidential structures within Zones **A1-30**, **AE** and **AH** zones on the community's **FIRM** have the
- (i) 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;

- (11) Provide that where a nonresidential 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 the above paragraph, 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;

- (12) Require within any **AO** zone on the community's **FIRM** that all new construction and substantial improvements of nonresidential structures
 - (i) have the lowest floor (including basement) elevated above the highest adjacent grade at least as high as the depth number specified in feet on the community's **FIRM** (at least two feet if no depth number is specified), or
 - (ii) together with attendant utility and sanitary facilities be completely floodproofed to that level to meet the floodproofing standard specified in (d)(10)(ii) above;

PARKING AND STORAGE AREAS BELOW THE BASE FLOOD ELEVATION

- (13) 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;

MANUFACTURED HOMES

- (14) Require that manufactured homes that are placed or substantially improved within Zones **AI-30**, **AH**, and **AE** on the community's **FIRM** on sites
 - (i) Outside of a manufactured home park or subdivision,
 - (ii) In a new manufactured home park or subdivision,

D

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

MANUFACTURED HOMES IN EXISTING PARK OR SUBDIVISION

- (15) Require that manufactured homes to be placed or substantially improved on sites in an existing manufactured home park or subdivision within Zones **A1-30**, **AH**, and **AE** on the community's **FIRM**, that are not subject to the provisions of the above paragraph, 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.

RECREATIONAL VEHICLES

- (16) Require that recreational vehicles placed on sites within Zones **A1-30**, **AH**, and **AE** on the community's **FIRM** either
- (i) Be on the site for fewer than 180 consecutive days,
 - (ii) Be fully licensed and ready for highway use, or
 - (v) Meet the permit requirements of for placement of manufactured homes and the elevation and anchoring requirements for "manufactured homes" in paragraph (d)(14) above.

A recreational vehicle is ready for highway use if it is on its wheels or jacking system, is attached to the site only by quick disconnect type utilities and security devices, and has no permanently attached additions;

FOR ZONE A99

- (17) Require within any A99 zones on a community's **FIRM** the standards for Floodplain Management Criteria for "b" Communities;

SELECT AND ADOPT A REGULATORY FLOODWAY

- (18) Select and adopt a regulatory **floodway** based on the principle that the area chosen for the regulatory **floodway** must be designed to carry the waters of the base flood, without increasing the water surface elevation of that flood more than one foot at any point;
- (19) 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;

PROJECTS REQUIRING APPLICATION FOR A MAP REVISION

- (20) Notwithstanding any other provisions, 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 **NFIP Regulations, Section 65.12**, and receives the approval of the **Flood Insurance Administrator**.

DRAINAGE REQUIREMENTS FOR ZONES AH AND AO

- (21) Require within Zones **AH** and **AO**, adequate drainage paths around structures on slopes, to guide floodwaters around and away from proposed structures.

Chapter 4

THE DEVELOPMENT PERMIT

FLOOD DAMAGE PREVENTION ORDINANCE

One of the most important aspects of a community's participation in the **National Flood Insurance Program (NFIP)** is the use of the flood hazard prevention ordinance. The ordinance specifies measures which must be taken to reduce flood hazards. The flood hazard prevention ordinance must satisfy the minimum requirements as set forth in the **NFIP Rules and Regulations**. The community may require more than the minimum standards. The ordinance also identifies the **Local Administrator** and other officials involved in the community's program.

60.3(b) Revised as of October 1, 1989

FLOOD DAMAGE PREVENTION ORDINANCE

ARTICLE I

STATUTORY AUTHORIZATION, FINDINGS OF FACT, PURPOSE AND METHODS

SECTION A. STATUTORY AUTHORIZATION

THE FLOODPLAIN ADMINISTRATOR

Each community is required by its ordinance to appoint a **Floodplain Administrator** or **Local Administrator** to manage development in the floodplains. This person should become familiar with the community ordinance and related regulations. Responsibilities of the **Floodplain Administrator** are listed on the following page.

DEVELOPMENT PERMIT

1. Development defined

"**Development**" is defined as 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.



DUTIES & RESPONSIBILITIES OF THE FLOODPLAIN ADMINISTRATOR

Duties and responsibilities of the Floodplain Administrator shall include, but not be limited to, the following:

- (1) Maintain and hold open for public inspection all records pertaining to the provisions of this ordinance.
- (2) Review permit application to determine whether proposed building site, including the placement of manufactured homes, will be reasonably safe from flooding.
- (3) Review, approve or deny all applications for development permits required by adoption of this ordinance.
- (4) Review permits for proposed development to assure that all necessary permits have been obtained from those Federal, State or local governmental agencies (including Section 404 of the Federal Water Pollution Control Act Amendments of 1972, 33 U.S.C. 1334) from which prior approval is required.
- (5) Where interpretation is needed as to the exact location of the boundaries of the areas of special flood hazards (for example, where there appears to be a conflict between a mapped boundary and actual field conditions) the Floodplain Administrator shall make the necessary interpretation.
- (6) Notify, in riverine situations, adjacent communities and the State Coordinating Agency which is Arkansas Soil & Water Conservation Commission, prior to any alteration or relocation of a watercourse, and submit evidence of such notification to the Federal Emergency Management Agency.
- (7) Assure that the flood carrying capacity within the altered or relocated portion of any watercourse is maintained.

2. Who needs a development permit?

- a. Separate development permits must be required when constructing or substantially improving a structure; placing a mobile home; or mining, dredging, filling, grading, paving, excavating, or drilling within the flood hazard area.
- b. A permit must be required for all structural activities. These consist of walled and roofed buildings of any type including mobile homes intended for residential, commercial, or industrial purposes, and gas or liquid storage tanks. There is some latitude for non-structural activities, such as dredging or filling.

- c. For either structural or non-structural activity, permits must be required if the activity might change the direction, height, or velocity of flood waters. This would apply, for example, to clearing or grading activities that remove vegetation or push soil into a stream and divert the flow of water from its normal channel or increase flood heights. Projects that will not have an impact may be excluded from the requirement. This will usually depend on the scale of the particular type of development.
- d. The **scale** of a proposal is an important factor in potential impact and should be considered in determining what activities must have a permit. Small scale activities such as planting a flower bed or a small picket fence will not effect flooding and, therefore, would not require a permit. On the other hand, irrigation channels may alter drainage patterns and should have a permit.
- e. The point at which the scale of particular type of project should activate the requirement to have a permit will often depend on the physical setting or location. The greatest distinction is between developed and undeveloped areas. For example, one hundred cubic yards of fill placed in a rural flood-prone area is not likely to have a measurable impact, while within a completely developed area any quantity of fill could have negative consequences.
- f. The specific scale and the setting of various types of activities that should require a permit therefore vary. Some communities may wish to require a permit for all activities regardless of scale. Others may wish to quantify scale of development that requires a permit within the ordinance itself; for example, a dollar (\$) figure could trigger the permit requirement for non-structural activities. The **FIA**, a professional hydrologist, **the Arkansas Soil and Water Conservation Commission (ASWCC)**, and various Federal agencies (e.g., **Corps of Engineers, NRCS, FHA**) should be consulted in order to properly quantify the scale at which particular types of development may increase flood damage potential.

In uncertain cases, the ordinance should be interpreted so that the requirement is set with a certain margin for error. Any development that could possibly increase or adversely alter the flood hazard must require a permit.

- g. **Important: If a proposed development is in a “FLOODWAY”, the developer must submit acceptable engineering data to prove that there will be no increase in the level of the Base Flood. Consult ASWCC or FEMA for assistance.**

3. Setting up a development permit

The development permit may be part of an existing building permit system or a completely separate permit. If a building permit system already exists, a development permit may be required as a condition of issuing a building permit in flood hazard areas.

In setting up a permit, the community should publicize the permit requirement so that all parties concerned will be aware. This will help insure compliance on behalf of developers and property owners.

The following pages include sample permit forms. Each community is free to establish its own permit forms. These forms should include the following information regarding the flood hazard:



- a. whether or not the proposed structure or non-structural activity is in the **“FLOODWAY”**;
- b. the **Base Flood Elevation** (100-year flood elevation),
- c. the elevation of the lowest floor, basement floor, or floodproofed level,
- d. whether or not the proposed structure or non-structural activity will cause increased flooding,
- e. other pertinent information (for example, mobile home tie-downs, subdivision regulations, etc.),
- f. signatures of builder or owner and surveyor, engineer, or architect where applicable, and
- g. verification of community official that the builder has complied with the permit application.

NOTE: While most references in this document are to structures such as houses and other buildings, the permit procedure must include provisions for non-structural activities such as placement of fill material and relocation of stream channels.

4. Procedure for evaluating a development permit application

Only developers in the flood hazard area need apply for a development permit. However, it may be necessary for a developer to contact the **Floodplain Administrator** to determine if a proposed development is in the flood hazard area. The following steps are suggested for evaluating a development permit application.

STEPS IN EVALUATING A DEVELOPMENT PERMIT

- STEP 1** Anytime a "development" takes place in the community's flood hazard area, **the developer must apply for a development permit.**
- STEP 2** The developer completes an application form set up by the community and submits the form to the permit official. It is the responsibility of a permit official to supply the **Base Flood Elevation (BFE)** or approve any method(s) used to determine the **BFE** . The developer supplies the rest of the information.
- STEP 3** The permit official approves or disapproves the permit to develop.
- STEP 4** If he is denied a permit, the developer may appeal the decision as set forth in the community's Flood Hazard Prevention Ordinance.
- STEP 5** If the developer is granted a permit, the permit official should inspect the development so as to verify elevation and flood damage potential. The signature of a professional surveyor, engineer or architect is required to certify the elevation, flood proofing or potential of the development to increased flooding.
- STEP 6** If an inspection of as-built conditions indicates the developer has satisfied the conditions of the permit application, the permit official verifies compliance.
- STEP 7** If the development is not compliant, the permit official refers the permit to the appropriate community official or governing body to remedy any inadequacies.
- STEP 8** The permit officer must maintain a record of all development permits.

A sample permit application and permit form is contained on the following pages.

FIGURE 4-1A
APPLICATION AND PERMIT FORM
TO DEVELOP IN A FLOOD HAZARD AREA

Application No.: _____ **Date:** _____

Address of development site: _____

Type of development:

Subdivision: _____ **Mobile home park or mobile home subdivision:** _____

Residential structure: _____ **Mobile home:** _____

Non-residential structure: _____

Alteration or relocation of watercourse: _____

Non-structural activity (filling, dredging, etc.): _____

Briefly describe the development. If additional space is needed, attach to form.

Is the proposed development site in a "FLOODWAY?"

YES _____ **NO** _____

If YES, attach a "Certification of No Increase in the Base Flood Elevation", before proceeding.

The Base Flood Elevation (BFE) at the development site is _____ feet above MSL (mean sea level).

The elevation of the first floor of the proposed structure is above _____ feet above MSL. NOTE: This number must be equal to or greater than the BFE. Attach Elevation Certificate.

Option for Nonresidential Structure: The elevation of floodproofing of the proposed structure is _____ feet above MSL. NOTE: This number must be equal to or greater than the BFE. Attach Floodproofing Certificate.

Permit Form - FRONT PAGE

FIGURE 4-1B

CHECKLIST FOR FLOODPLAIN ADMINISTRATOR:

ITEM	DATE OF APPROVAL OR CERTIFICATION	SIGNATURE OR INITIAL OF OFFICIAL
1. "Certification of No Increase in the Base Flood Elevation"	_____	_____
2. Subdivision standards	_____	_____
3. Mobile home park/ subdivision standards	_____	_____
4. Elevation Certificate`	_____	_____
5. Floodproofing Certificate	_____	_____
6. Mobile home tie-downs	_____	_____
7. Other Permits:		
Section 404	_____	_____
EPA Stormwater	_____	_____
8. Water supply system	_____	_____
9. Sanitary and onsite waste disposal system	_____	_____
10. Alteration or relocation of a watercourse		
a. Notification of adjacent communities, ASWCC,FEMA	_____	_____
b. Assurance of carrying capacity	_____	_____
11. Other	_____	_____

I, the undersigned, agree to comply with all provisions of community ordinances.

Signature of Developer: _____ Date: _____



Permit to Development: Issued Prior to Construction

Approved _____ Disapproved _____

Signature of Floodplain Administrator: _____ Date: _____



Verification of Compliance: Issued Following Inspection

Development: _____ complies _____ does not comply with permit.

Signature of Floodplain Administrator: _____ Date: _____

Permit Form - BACK PAGE

5. Certificates to accompany the development permit

In addition to a development permit, the following certificates may be required:

- a. **Certificate of No Increase in the Base Flood Elevation (for Floodways),**
- b. **Elevation Certificate, or**
- c. **Floodproofing Certificate.**

Examples of each certificate are contained on the following pages . **Appendix 2** also contains the **ELEVATION CERTIFICATE** required by insurance companies. Information contained on the community development permit (or certificates) may be transferred to this certificate.

It is very important that the **Floodplain Administrator** obtains the proper information during the process of granting a development permit, since some of this information will be necessary when a builder or owner purchases flood insurance or is required to furnish information for other purposes.

6. Monitoring and enforcement of the flood hazard area

The community permit official is also responsible for inspecting the community to insure that all developments in the flood hazard area have been permitted. If the developer either does not receive a permit or does not build or develop in compliance with the community's ordinance, appropriate penalties should be imposed. Developments in progress that are determined to be illegal should be halted until they satisfy the community's ordinance. The community's ordinance should provide for sufficient penalty to discourage violation by developers.

7. Section 1316: Denial of Flood Insurance Coverage

If a community exhausts all remedies to correct an illegal development that violates the community's Flood Damage Prevention Ordinance, any official or body authorized under State or local law to declare a structure in violation of a law, regulation or ordinance may petition to the **Flood Insurance Administrator** to invoke Section 1316 of **NFIP** Regulations. Section 1316 denies flood insurance for any property which has been declared by the appropriate local authority to violate floodplain regulations. FEMA has established procedures to implement Section 1316 as well as to restore flood insurance coverage once violations have been corrected.

Note: Since flood insurance rates will, in many cases, be based on the risk of the structure to flooding, it is wise to advise builders to set the first floor, basement or flood-proofed level at least one foot above the Base Flood Elevation. Community ordinances may be amended to require "one foot (or more) above" the Base Flood Elevation.

FIGURE 4-2

SAMPLE

**CERTIFICATE OF NO INCREASE
IN THE BASE FLOOD ELEVATION**

I certify that the proposed development (Development Permit Application No. _____) will cause no increase in the flood elevation during the base flood discharge.

Signature of Registered Professional Engineer:

Name: _____ Date: _____

Affix Seal:

Documentation is attached.

FIGURE 4-3

SAMPLE

ELEVATION CERTIFICATE

I certify that the lowest floor (including basement) of the structure (Development Permit Application No. _____) is _____ feet above mean sea level.

Signature of Licensed Surveyor, Registered Professional Engineer or Architect

Name: _____ Date: _____

Affix Seal:

**Use of FEMA Elevation
Certificate in Appendix 2
is preferred.**

FIGURE 4-4

SAMPLE

FLOODPROOFING CERTIFICATE

I certify that the proposed structure (Development Permit Application No. _____), together with the proposed utility and sanitary facilities, are designed so that the structure will be watertight to an elevation of _____ feet above mean sea level, with walls substantially impermeable to the passage of water and structural components having the capability of resisting hydrostatic and hydrodynamic loads and effects of buoyancy. (Attach Specifications.)

Signature of Registered Professional Engineer or Architect

Name: _____ Date: _____

Affix Seal:



I certify that the proposed structure has been built to the design standards specified in the application.

Signature of Registered Professional Engineer or Architect

Name: _____ Date: _____

Affix Seal:

**Use of FEMA form in
Appendix 2 is preferred**

VARIANCES AND EXCEPTION

a. Variances

The issuance of a variance is for flood plain management purposes only. Insurance rates are determined by statute according to actuarial risk and will not be modified by the granting of a variance. Therefore, while a variance initially offers relief to a developer, for example, through lower construction costs, higher insurance premiums may offset or exceed the reduced cost of construction. The community, after examining the applicant's hardships, shall approve or disapprove a variance request. While the granting of variances generally is limited to a lot size less than one-half acre, deviations from that limitation may occur. However, as the lot size increases beyond one-half acre, the technical justification required for issuing a variance increases. Variances may be issued by a community for the reconstruction, rehabilitation or restoration of structures listed on the **National Register of Historic Places** or a **State Inventory of Historic Places**, without regard to the procedures described in this section.

Procedures for the granting of variances by a community are as follows:

- 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 community flood plain management requirements;
- 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 hardship to the applicant, and
 - iii) a determination that the granting of a variance will not result in increased flood heights, additional threats to public safety, extraordinary public expense, create nuisances, cause fraud on or victimization of the public, or conflict with existing local laws or ordinances.
- 4). Variances shall only be issued upon a determination that the variance is the minimum 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 annual premium for \$100 of insurance coverage, and
 - ii) such construction increases the risk to life and property.
- 6) A community shall maintain a record of variances and report the number of variances to the **Federal Insurance Administrator** when requested.
- 7) Variances may be issued by a community for new construction and substantial improvements and for other development as necessary for the conduct of a functionally dependent use provided that:
 - i) the criteria of paragraphs a. through d. 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.

A sample variance form is contained on the following pages.

b. Exception

If any flood plain management provisions of the **NFIP** could cause severe hardship and gross inequity for a particular community, the community may appeal to the **Federal Insurance Administrator, FEMA**.

FIGURE 4-5

**APPLICATION FOR A VARIANCE
TO DEVELOP IN A FLOOD HAZARD AREA**

Date: _____

Application No. _____

Address of development site:

Reason for requesting variance:

I have read the attached "Information Regarding Variances" and understand the consequences regarding flood insurance and flood risks. I, hereby, request a variance from community floodplain management regulations.

Signature of Applicant: _____ **Date:** _____

NOTE: No variance is allowed in the "FLOODWAY".

Variance is: Approved: _____ Disapproved: _____

Signature of Authorized Official of Appeal Board:

Name: _____ **Date:** _____

If a variance is granted, applicant must provide documentation from a licensed surveyor, registered professional engineer, or architect certifying as-built elevations.

Information Regarding Variances

The issuance of a variance is for flood plain management purposes only. Insurance premium rates are determined by statute according to actuarial risk and will not be modified by the granting of a variance. Therefore, while a variance initially offers relief to a developer, for example, through lower construction costs, higher insurance premiums may offset or exceed the reduced cost of construction.

The continuity, after examining the applicant's hardships, shall approve or disapprove a variance request. While the granting of variances generally is limited to a lot size less than one-half acre, deviations from that limitation may occur. However, as the lot size increases beyond one-half acre, the technical justification required for issuing a variance increases. Variances may be issued by a community for the reconstruction, rehabilitation or restoration of structures listed on the National Register of Historic Places or a State's Inventory of Historic Places, without regard to the procedures described in this section.

Procedures for the granting of variances by a community are as follows:

- a. 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;
- b. 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 community flood plain management requirements;
- c. Variances shall only be issued by a community upon:
 - 1) a showing of good and sufficient cause,
 - 2) A determination that failure to grant the variance would result in exceptional hardship to the applicant, and
 - 3) a determination that the granting of a variance will not result in increased flood heights, additional threats to public safety, extraordinary public expense, create nuisances, cause fraud on or victimization of the public, or conflict with existing local laws or ordinances;

Figure 4-5 Page 2 of 3

- d. Variances shall only be issued upon a determination that the variance is the minimum necessary, considering the flood hazard, to afford relief;
- e. A community shall notify the applicant in writing over the signature of a community official that
 - 1) the issuance of a variance to construct a structure below the base flood level will result in increase premium rates for flood insurance up to amounts as high as \$25 for \$100 of insurance coverage, and
 - 2) such construction increases the risk to life and property;
- f. A community shall maintain a record of variances and report the number of variances to the Federal Insurance Administrator when requested; and
- g. Variances may be issued by a community for new construction and substantial improvements and for other development as necessary for the conduct of a functionally dependent use provided that
 - 1) the criteria of paragraphs a. through d. 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.

The above information constitutes notification to the applicant of the criteria for and consequences of the issuance of a variance.

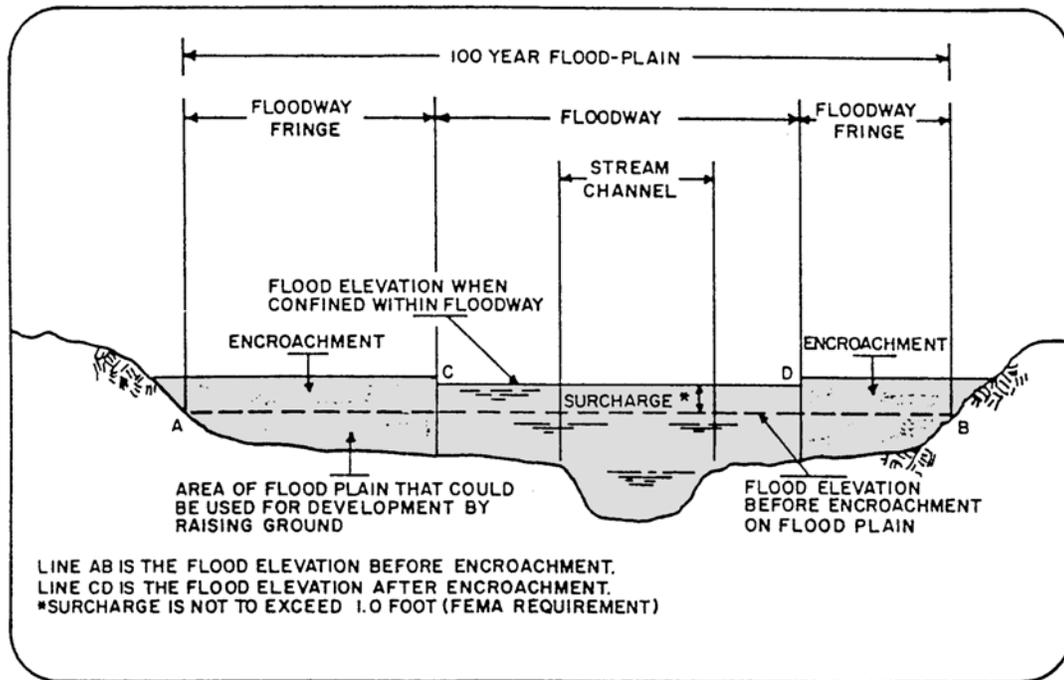
Figure 4-5 Page 3 of 3

Chapter 5

ADDITIONAL TOPICS

THE FLOODWAY

The “*floodway*” or as it is referred to in the NFIP, the *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 foot. Since development is allowed to fill the adjacent **flood fringe**, the displacement of floodwaters will result in potential increases of up to 1 foot above the base flood elevation.



THE CONCEPT OF THE FLOODWAY

The "Floodway" is an engineering concept which has been incorporated into the NFIP floodplain management criteria. Floodways are defined as the areas of land immediately adjacent to a stream or river channel which in times of flooding actually become the enlarged stream or river channel and carry the floodwaters with the highest velocity. Floodways are calculated by FEMA for the 100-year base flood for major rivers and streams as part of the Flood Insurance Study undertaken for a community. Floodways are shown on the community's Floodway and Flood Hazard Boundary Map prepared by FEMA, and data on their width, cross-sectional area and flood-water velocity are given in the Flood Insurance Study. When floodway delineations and data have been furnished by FEMA, the community is required to adopt a "regulatory floodway" and begin enforcing the "no-encroachment" requirement through its zoning ordinance.

No encroachments, including fill, new construction, substantial improvements, and other development is permitted 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. These restrictions are necessary to preserve the carrying capacity of the **floodway** and to prevent aggravation of flooding by increasing flood elevations in the floodplain.

Development, including structures, located in the **floodway** prior to either the community entry into the **NFIP** or the publication of the first **floodway** map are “grandfathered.” Certain uses are normally acceptable within floodways. For example, the following use may be ideal **floodway** uses, assuming they do not increase base flood elevations, and provided they can sustain flood damage without economically ruining the property of the owner:

1. Agricultural uses;
2. Uses incidental to industrial-commercial structures, such as loading areas, parking areas, airport landing strips (except in flash flood areas);
3. Private and public recreational areas, such as golf courses, driving ranges, archery ranges, picnic grounds, boat launching ramps, swimming areas, wildlife and nature preserves, fish hatcheries, shooting preserves, target ranges, hunting and fishing areas, hiking and horseback riding trails;
4. Uses incidental to residential structures, such as lawns, gardens, parking areas and play areas; and
5. Other uses that will not result in increases in flood heights as specified in the community ordinance.

An existing structure located within a **floodway** may be replaced by a structure of equal dimensions and displacement if it is removed, substantially damaged or destroyed. The replacement structure must, however, satisfy other floodplain management criteria specified in the community ordinance, including elevation or floodproofing requirements.

A detailed description of the **floodway** concept and the application of the **floodway** to the **NFIP** and floodplain management are contained in **Appendix 3**.

SUBSTANTIAL IMPROVEMENTS AND ROOM ADDITIONS

IMPROVEMENTS TO DEVELOPMENT IN THE FLOODPLAIN

Much confusion has been caused by the substantial improvement definition, and what the requirements are for additions, reconstruction and second story additions. Hopefully, the following information will help guide you through this confusion. Items necessary to make a determination on what is required of the structure include the following: date of original construction, dates of the **Flood Insurance Rate Maps (FIRM)** and/or **Flood Hazard Boundary Maps (FHBM)** for your community, cost of improvement and market value of the structure.



DEFINING PRE-FIRM AND POST-FIRM

Pre-FIRM refers to structures built before any floodplains were identified by the **Department of Housing and Urban Development (HUD)** or the **Federal Emergency Management Agency (FEMA)** with a **FIRM**.

Post-FIRM refers to structures built after the effective date of the **FIRM** produced which identifies **Special Flood Hazard Areas (SFHA)**. Some structures may be outside of the identified floodplain at the time of construction; however, they may later be identified as being located in the floodplain with later editions of the maps.

DETERMINING THE PERCENTAGE OF THE IMPROVEMENT

1. Find out the **market value** of the structure before the improvement is to be made. **Note:** For damaged homes, the market value should be that of the structure before the damage occurred.

Market value may be based upon the tax appraisal records of the community; however, there should be an appeals process similar to requesting changes on the actual appraisals. (Communities might want the owners to go through changing the values on the tax records before accepting the new market value for permitting purposes. Market value may also be based on a certified appraisal brought in by the owner. In either case, documentation should be kept in the permit file for the structure.

2. Determine the cost of the repairs or improvements.

A **contractor's estimate** or a cost worksheet may be used for determining the cost of the repairs. If your community only allows certain licensed contractors, the estimate should be from one of those contractors. This estimate should itemize individual items and should not include the costs to bring an older structure up to code (i.e. electrical, plumbing, fire, etc. The estimate for damaged structures should be the cost to put me structure back together in the same shape before the damage occurred.

3. Determining percentage of the improvement.

$$\frac{\text{Cost of Improvement}}{\text{Market Value}} = \underline{\quad ? \quad} \%$$

If this value exceeds 50%, then it is considered substantial improvement.

IMPROVEMENTS WHICH ARE LESS THAN 50%
OF THE STRUCTURE'S VALUE

If the total cost of the addition, reconstruction, rehabilitation, or any combination of these is less than 50% of the market value, then the improvement must meet the floodplain elevation requirements in effect at the time the original structure was built.

Example 1: Home built in 1968 flat on the ground. **Flood Insurance Rate Maps (FIRMs)** were issued in 1978, 1983 and 1992. According to the latest map, the home is in the floodplain 10 feet below the 100-year flood elevation. The structure is valued at \$75,000. The owner is planning to add another room on the back of the house. The cost of the improvement is \$25,000.

Solution:

$$\$25,000 \div \$75,000 = .333 = 33.3\%$$

Since the improvement is less than 50% and the house was built before any map was issued, the addition may be added at ground level.

Example 2: Home built in 1979 flat on the ground. The community joined the National Flood Insurance Program in 1982. **FIRMs** were issued in 1978, 1983, and 1992. According to the 1978 map, the home is located 3 feet below the 100-year flood level. The 1983 and 1992 map show the home to be 6 feet below the 100-year flood elevation. The structure is valued at \$80,000. The room addition will cost \$20,000 once it is completed.

Solution:

$$\$20,000 \div \$80,000 = .25 = 25\%$$

Since the improvement is less than 50% and the house was built in 1979, the room addition is required to be elevated to the 100-year floodplain indicated on the 1978 map. The house should have been built to the 1978 elevations even though the community did not join the program until 1982* .

*This is the scenario for communities which did not initially adopt floodplain management ordinances. These homes are **not pre-FIRM** since **FIRMs** were available. If homes built after the map was issued, but before the community entered the program, were considered **pre-FIRM**, then communities would wait until they were fully developed to adopt the floodplain management ordinances.

Example 3: Home built in 1994 seven feet above the ground. The community joined the **National Flood Insurance Program (NFIP)** in 1982 and established elevations at the 100-year flood level plus one foot. **FIRMs** were issued in 1978, 1983 and 1992. According to the 1992 map the home is located 2 feet above the 100-year flood level. The structure is valued at \$95,000. The room addition will cost \$34,000 once it is completed.

Solution:

$$\$34,000 \div \$95,000 = .36 = 36\%$$

Since the improvement is less than 50% and the house was built after 1992, the addition must meet the 1992 map elevations (also the current map) for the 100-year flood plus the one foot freeboard required by the community. In this case, the addition can be placed at a minimum of six feet above the ground.

Second Floor Additions

If the total cost of the second floor improvements are less than 50%, then the second floor must meet the floodplain elevations in place at the time the original structure was built. **Note:** It is important for the owner to have the structure checked to make sure the walls and the foundation can support a second floor.

**Improvements Which Are More Than 50%
of a Residential Structure's Value**

If the total cost of the addition, reconstruction, rehabilitation, or any combination exceeds 50% of market value, then the improvement must meet the current floodplain elevation requirements regardless of when the original structure was built. For residential, the home must be elevated. For nonresidential, the structure must be either elevated or floodproofed to the appropriate height.

Addition without Major Structural Alterations

For substantial improvements of a structure where there are no major alterations of the original structure, then only the addition must meet the current floodplain standards. A major alteration is defined as structural changes in walls or roof (i.e., removal of exterior wall for tie-in purposes or change in primary roofline).

Example 4: Home built in 1968 flat on the ground. Flood Insurance Rate Maps (FIRMs) were issued in 1978, 1983 and 1992. The community joined the NFIP in 1983. According to the latest map, the home is in the floodplain 10 feet below the floodplain elevations. The structure is valued at \$75,000. The owner is planning to add several rooms onto the back of the house by simply extending the roof. The cost of the improvement is \$40,000.

Solution:

$$\$40,000 \div \$75,000 = .533 = 53.3\%$$

Since the house was built before any map was issued and the improvement is greater than 50%, the addition must be elevated to 10 feet above the ground.

Example 5: Home built in 1979 flat on the ground. The community joined NFIP in 1982. **FIRMs** were issued in 1978, 1983 and 1992. According to the 1978 map the home is located 3 feet below the 100-year flood level. The 1983 and 1992 maps show the home to be 6 feet below the 100-year flood elevation. The structure is valued at \$80,000. The owner is planning to add a great room, remove the back portion of the house, create vaulted roof and modify the old roof to raise the ceiling in the master bedroom. The great room addition and modification will cost \$55,000 once it is completed. The roofline will be completely redone to achieve a greater slope than the one on the current structure.

Solution:

$$\$55,000 \div \$80,000 = .688 = 68.8\%$$

Therefore, the improvement is more than 50%. Since the house was built in 1979, the house should have been built to the 1978 elevations even though the community did not join the program until 1982. Since the roofline will be modified, this will be considered a major alteration: therefore, the entire structure and the great room addition are required to be elevated to the current floodplain standards of the community. (Six feet higher than where the structure currently is placed plus any freeboard required by the community)*

***This is the scenario for communities which did not initially adopt floodplain management ordinances. These homes are not pre-FIRM since Flood Insurance Rate Maps (FIRMs) were available. If homes built after the map was issued, but before the community entered the program, were considered pre-FIRM, then communities would wait until they were fully developed to adopt the floodplain management ordinances.**

Second Floor Additions

If the total cost of the second floor addition is more than 50% of the market value of the original structure, then the entire structure must be upgraded to meet the current floodplain standards.

Note: It is important for the owner to have the structure checked to make sure the walls and foundation can support a second floor.

Example 6: - Home built in 1994 seven feet above the ground. The community joined the NFIP in 1982 and established elevations at the 100-year flood level plus one foot. Maps were issued in 1978, 1983 and 1992. According to the 1992 map the home is located 2 feet above the 100-year flood level. The structure is valued at \$95,000. A second story is being added at a cost of \$50,000.

Solution:

$$\$50,000 \div \$95,000 = .526 = 52.6\%$$

In this case the improvement is more than 50%; therefore, the structure must meet the current map elevations for the 100-year flood elevation plus the one-foot freeboard required by the community. In this example, the structure could remain at its current elevation.

SUBSTANTIAL DAMAGE

REPAIRING DAMAGED STRUCTURES

If the total cost of reconstruction, rehabilitation, or any combination thereof is more than 50% of the market value of the original structure (**substantially damaged structure**), then the entire structure must be elevated to meet current floodplain standards.



Example 7: Home built in 1984 flat on the ground. The community joined NFIP in 1982. Maps were issued in 1978, 1983 and 1992. According to the 1983 map, the home is not located in the 100-year floodplain. The revised 1992 map shows the home to be 2 feet below the 100-year flood elevation. The structure was valued at \$90,000 before the tornado struck. The owner is planning to repair the structure back to its original condition and upgrade the electrical wiring system. The cost to restore the building with the electrical upgrades will cost \$55,000. The cost of bringing the electrical wiring up to code is approximately \$3,000.

Solution:

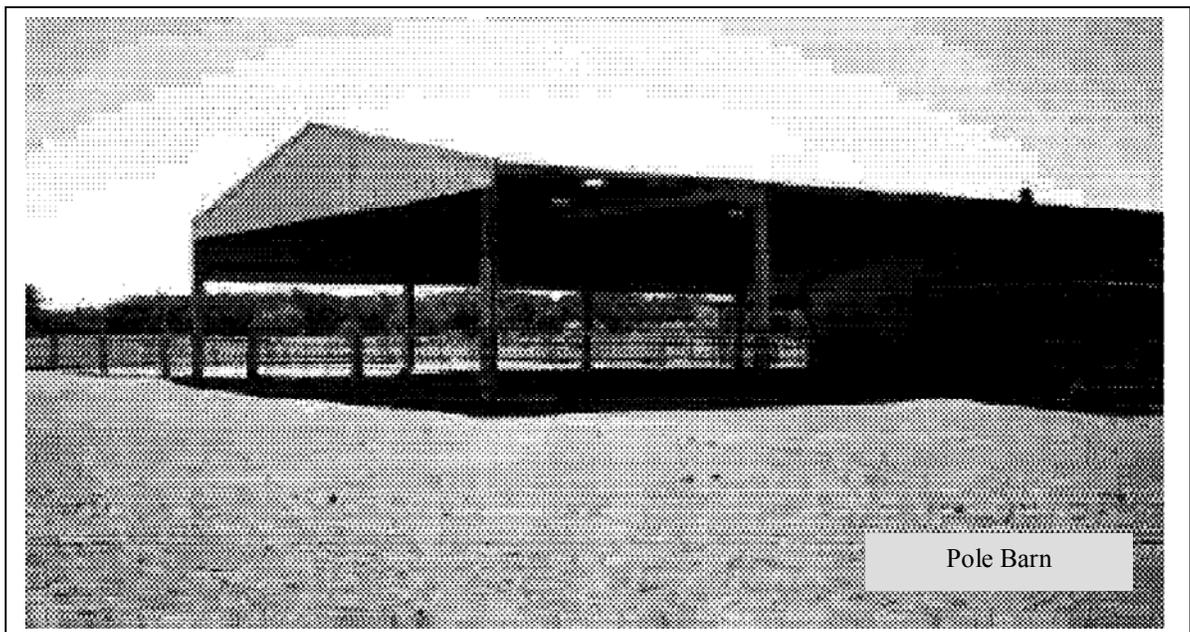
$$\text{Repair Cost} = \$55,000 - \$3,000 = \$52,000$$

$$\$52,000 \div \$90,000 = .578 = 57.8\%$$

Since the rehabilitation cost is more than 50%, the structure must be elevated two feet plus any freeboard requirements by the community to bring it in compliance with current standards.

ACCESSORY STRUCTURES: GARAGES, STORAGE SHEDS, POLE BARN, AND OTHER BUILDINGS

The definition of a "structure" for floodplain management purposes pursuant to the **National Flood Insurance Program (NFIP)** regulations means any walled and roofed building as well as a manufactured home. "**Accessory structures**" (or "**appurtenant structures**") are structures which are located on the same parcel of property as the principal structure and the use of which is incidental to the use of the principal structure. Garages, carports, and storage sheds are common urban accessory structures. Pole barns, hay sheds, and the like, qualify as accessory structures on farms, and may or may not be located on the same parcel as the farm dwelling or shop building.



NFIP regulations require that all new structures or substantial improvements to existing structures be elevated to or above the base flood elevation indicated on the **Flood Insurance Rate Map (FIRM)**. These regulations are enforced by local communities in return for the availability of flood insurance.

Accessory structures qualify under the general definition of structure and are, consequently, subject to all floodplain management regulations pertaining to structures. There is, however, justification for treating accessory structures which do not represent significant investments differently in regard to the application of floodplain management measures. The minor initial investment in such structures would be greatly increased by the necessity to either elevate or dry flood-proof the accessory structure. Such measures may provide an excessive degree of protection for these types of structures.

Consequently, when an accessory structure represents a minimal investment, the elevation or dry flood-proofing standards need not be met. However, all other requirements applicable to structures will apply. Of course, the **floodway** encroachment standards and the need for a development permit would continue to apply.

As a guideline, the adoption and implementation of the following standards would satisfy **NFIP** objectives for construction of accessory structures within **A-Zones** (**A**, **AE**, **A1-30**, **A0**, and **AH**), without elevating the floor level to **BF**E:

1. Accessory structures shall not be used for human habitation (including work, sleeping, living, cooking, or restroom areas).
2. Accessory structures shall be designed to have low flood damage potential.
3. Accessory Structures shall be constructed and placed on the building site so as to offer the minimum resistance to the flow of floodwaters.
4. Accessory structures shall be firmly anchored to prevent flotation which may result in damage to other structures.
5. Service facilities such as electrical and heating equipment shall be elevated above **BF**E or flood-proofed.
6. Openings to relieve hydrostatic pressure during a flood shall be provided below **BF**E. (See **Enclosures Below Base Flood Elevation (BF**E) below.}

The determination of what constitutes a minimal investment may be determined by the community, subject to review by **FIA** if the choice exceeds the bounds of reasonableness. The community must have some input in determining the cut-off amount since construction prices may vary in different parts of the country.

NOTE: Ten percent (10%) of the amount of the flood insurance coverage purchased for a dwelling may apply to one garage or carport that services the insured dwelling and which is used for garaging a vehicle and limited storage. To be covered by flood insurance, all other accessory structures must be rated separately. Therefore, other accessory structures which are not elevated above **BF**E, or otherwise built in accordance with the floodplain management standards, could be subject to extremely high flood insurance premiums.

Enclosures Below Base Flood Elevation (BFE)

Enclosed areas below the lowest habitable floor which is elevated to or above the **BFE** are subject to numerous restrictions:

A. Uses Allowed: only the following are allowed:

- parking
- limited incidental storage and building access

A bathroom, laundry, in-law suite, recreation room, office, etc. is not permissible. Such uses must not be added after the Certificate of Occupancy or equivalent is issued. In fact, it would be a good idea to record a notice to that effect in the deed records. Future owners would thereby learn about the restrictions through the title search.

B. Openings: openings must be provided to equalize the hydrostatic pressure of floodwaters on the exterior walls.

- minimum of 2 openings, no more than 1 foot above adjacent finished grade with a total net area of not less than one square inch for every square foot of enclosed area subject to flooding
- openings may be louvered, screened, etc., but must be self-actuating
- openings must be provided for any interior walls, so that the enclosed area floods evenly

C. Materials: flood resistant materials must be used below **BFE**.

D. Electrical service: the number of switches and outlets must be the minimum necessary for adequate safety and security. All electrical service below **BFE** must be provided on ground fault interrupt (GFI) circuit separate from other circuits used in the building.

E. Other:

- Heating and/or air conditioning of enclosed areas should not be permitted
- Any interior partitioning must be minimized to that necessary to accommodate life, fire, safety, and security standards, separating parking area from the rest of the

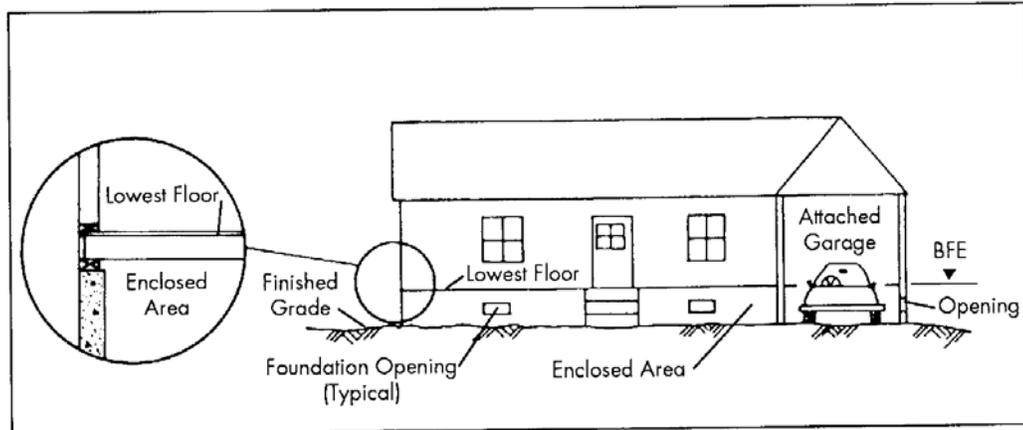


Figure 3. Compliant Residential Building Built on Solid Foundation Walls With Attached Garage

enclosed area.

NOTE: Attached garages are to be treated as enclosures below **BFE**.

GUIDELINES FOR THE 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.

DAMS AND LEVEES

While affording some protection against floods, dams and levees can and have failed causing catastrophic damage and loss of life. Community officials should be familiar with these structures. They should be concerned about the safety condition and maintenance of these structures, and the degree of protection they afford. What areas of the community would be affected if they failed? Is there an emergency plan to warn and evacuate downstream residents? In the eastern half of Arkansas, a strong earthquake may cause dams and levees to fail. This should be a consideration in earthquake planning.

WETLANDS

Section 404 of the Federal Clean Water Act authorizes the U.S. Army Corps of Engineers to regulate discharge of dredged or fill material into the “waters of the United States” including all adjacent wetlands. Community officials should contact the Corps of Engineers to determine what portions of their communities require a “404 Permit” from the Corps before development can proceed. The community can then continue with its permit procedure.

STATE LAW ON OBSTRUCTING NATURAL DRAINS

Chapter 72 of the Arkansas Code Annotated, entitled “Water and Watercourses” contains valuable information regarding State law involving obstruction of natural drains and damage to dams, levees and other water related structures. This legislation can be a useful tool in floodplain management.

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.

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.

FLOODPROOFING TECHNIQUES

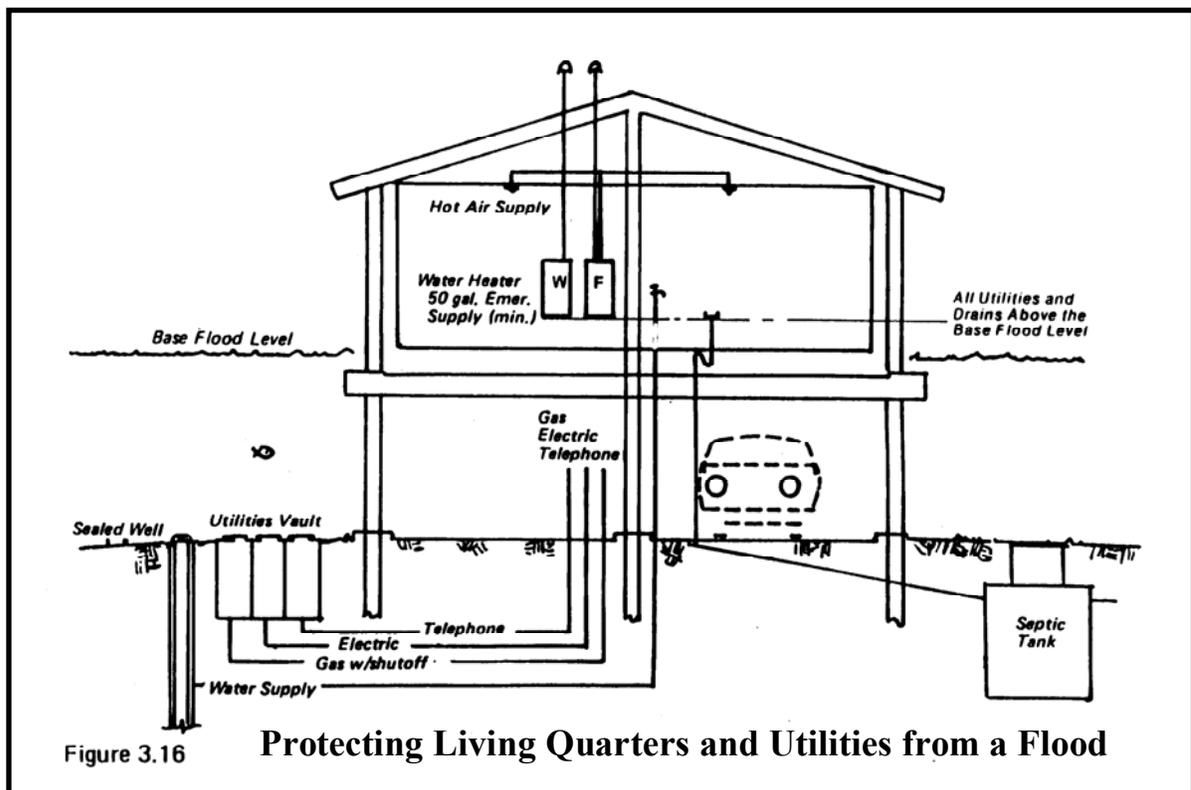
Floodproofing is a process for preventing or reducing flood damages to the structure and/or to the contents of buildings located in flood hazard areas. For the most part, it involves altering or changing existing properties. However, it can be incorporated into the design and construction of new buildings.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



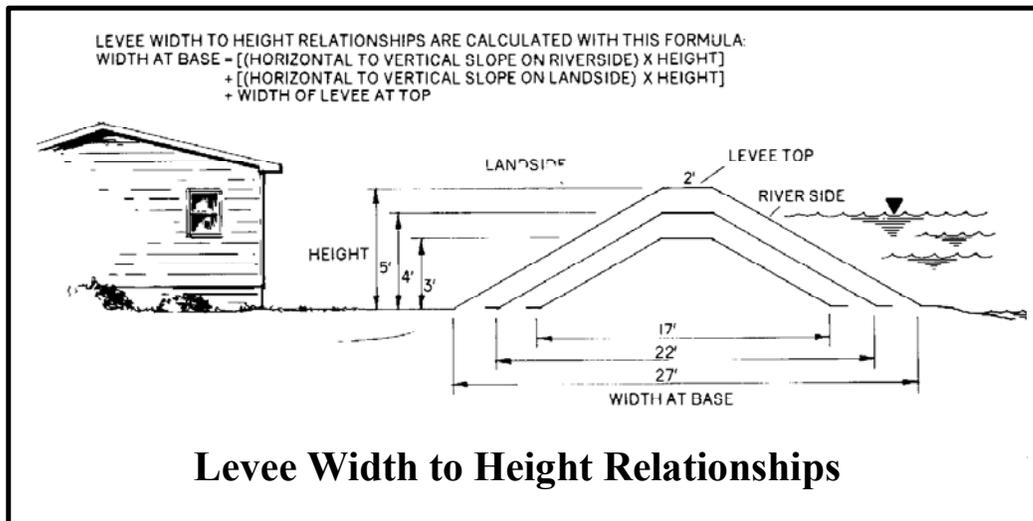
Cost is an important factor to consider in elevating structures. Lighter wood frame buildings are easier and cheaper to raise than masonry buildings. Masonry buildings not only are more expensive to raise, but are susceptible to cracks. If homeowners opt for elevation of the building, they must not then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

Relocation

A 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.

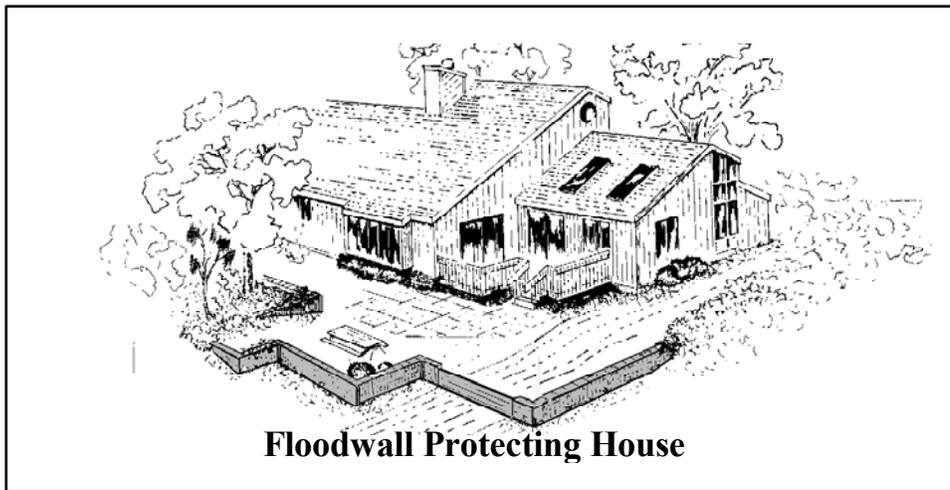
Berm or Levee

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.



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.



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 floodproofing 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.

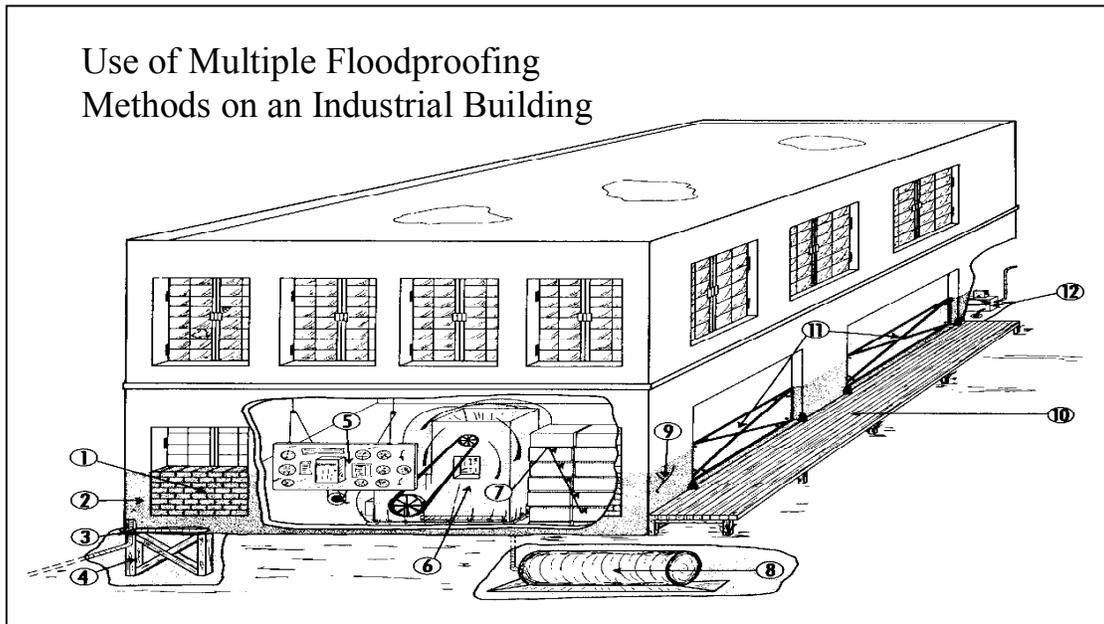
The first source of flooding in basements is failure or overload of the subdrainage system's sump pump. Installing alternate power sources, improving pump maintenance, and adding or increasing the size or number of pumps could eliminate this source of flooding.

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).



EXPLANATION

1. Permanent closure of opening with masonry
2. Thoroseal coating to reduce seepage
3. Valve on sewer line
4. Underpinning
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.

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 foot is recommended.**

Developers may wish to increase floor elevations for structures to save on flood insurance cost.

HOW FLOOR ELEVATION AFFECTS INSURANCE RATES

Flood insurance consists of separate policies for building and contents. During the Emergency Phase of the NFIP, coverage is limited to \$35,000 on single family dwellings and \$100,000 on non-residential buildings. In the Regular Program, coverage limits are increased, and the coverage is divided into basic limits and additional limits. Basic limits are rated significantly higher.

BUILDING COVERAGE	REGULAR PROGRAM			
	EMERGENCY PROGRAM	Basic Insurance Limits	Additional Insurance Limits	Total Insurance Limits
Single Family Dwelling	\$ 35,000 *	\$ 50,000	\$200,000	\$250,000
2-4 Family Dwelling	\$ 35,000 *	\$ 50,000	\$200,000	\$250,000
Other Residential	\$100,000**	\$135,000	\$115,000	\$250,000
Non-Residential	\$100,000**	\$135,000	\$365,000	\$500,000
CONTENTS COVERAGE				
Residential	\$ 10,000	\$ 15,000	\$ 85,000	\$100,000
Non-Residential	\$100,000	\$115,000	\$385,000	\$500,000
* In Alaska, Guam, Hawaii, and U.S. Virgin Islands, the amount available is \$50,000. ** In Alaska, Guam, Hawaii, and U.S. Virgin Islands, the amount available is \$150,000.				

REMERGENCY PROGRAM RATES

Elevation of structures does not affect flood insurance rates in the Emergency Program. As of May 1, 1998, the annual flood insurance rate on a residential building was \$0.68 per \$100 of coverage. However, once a community enters the Regular Program, a structure may be rerated at the option of the property owner. If the structure was elevated, it may qualify for a lower insurance rate using Post-FIRM rates discussed later.

ANNUAL RATES PER \$100 OF COVERAGE

EMERGENCY PROGRAM RATES

	Building	Contents
Residential	.68	.79
Non-Residential	.79	1.58

Effective May 1, 1998

REGULAR PROGRAM RATES

Pre-FIRM

Regular Program flood insurance rates are divided into Pre-FIRM and Post-FIRM categories. **Pre-FIRM** rates are essentially Emergency Program rates, but with additional coverage at a reduced rate. There is no rating based on elevation. The advantage of the Pre-FIRM rate is that it allows existing structures which are sited below the BFE to have reasonably low insurance rates.

REGULAR PROGRAM -- PRE-FIRM CONSTRUCTION RATES¹

FIRM ZONES A, AE, A1-A30, AO, AH, AR, AR DUAL ZONES, D²

OCCUPANCY		Single Family		2-4 Family		Other Residential		Non-Residential	
		Building	Contents	Building	Contents	Building	Contents	Building	Contents
BUILDING TYPE	No Basement/Enclosure	.68 / .20	.79 / .36	.68 / .20		.68 / .42		.79 / .36	
	With Basement	.73 / .36	.79 / .36	.73 / .36		.73 / .42		.84 / .42	
	With Enclosure	.73 / .28	.79 / .36	.73 / .28		.73 / .42		.84 / .39	
	Mobile Home	.68 / .20	.79 / .35					.79 / .36	
CONTENTS LOCATION	Basement & Above				.79 / .36		.79 / .36		1.58 / .14
	Enclosure & Above				.79 / .36		.79 / .36		1.58 / .72
	Lowest Floor Only - Above Ground Level				.79 / .36		.79 / .36		1.58 / .30
	Lowest Floor Above Ground Level and Higher Floors				.79 / .24		.79 / .24		1.58 / .30
	Above Ground Level - More than One Full Floor				.18 / .12		.18 / .12		.20 / .12
	Mobile Home								1.58 / .30

¹ Start of construction or substantial improvement on or before 12/31/74, or before the effective date of the initial Flood Insurance Rate Map (FIRM), whichever is later. If FIRM Zone is unknown, use rates for Zones A, AE, A1-A30, AO, AH, AR, AR Dual Zones, D.

² See RATE 16 for AR and AR Dual Zone information.

From Flood Insurance Manual

May 1, 1998

Post-FIRM

Once the FIRM is published, all new and substantially improved construction must be **Post-FIRM** rated. The owner of a Pre-FIRM structure may wish to have his property Post-FIRM-rated or elevation-rated if the property owner can obtain a lower flood insurance rate. It is a good idea for a property owner of a Pre-FIRM structure to consult his insurance agent regarding the potential benefits of Post-FIRM or elevation rating.

Post-FIRM rates are based on the elevation of the lowest floor or first floor of the structure. As the following tables indicate, Post-FIRM rates are determined by one of the following:

1. Elevation of the lowest floor above or below the BFE
2. Elevation of the lowest floor above or below an estimated BFE, and
3. Elevation of the lowest floor above or below the highest adjacent grade.

FLOOD INSURANCE RATE TABLES
ANNUAL RATES PER \$100 OF COVERAGE

REGULAR PROGRAM -- POST-FIRM CONSTRUCTION RATES
FIRM ZONES AE, A1-A30, AR, AR DUAL ZONES¹ -- BUILDING RATES

Elevation of Lowest Floor Above or Below BFE ²	One Floor, No Basement/Encl		More than One Floor, No Basement/Encl		More than One Floor, With Basement/Encl		Manufactured (Mobile) Home	
	1-4 Family	Other Residential & Non-Residential	1-4 Family	Other Residential & Non-Residential	1-4 Family	Other Residential & Non-Residential	Single Family	Non-Residential
+4	.16 / .08	.16 / .08	.16 / .08	.16 / .08	.16 / .08	.16 / .08	.16 / .08	.16 / .08
+3	.16 / .08	.16 / .08	.16 / .08	.16 / .08	.16 / .08	.16 / .08	.17 / .08	.18 / .08
+2	.20 / .08	.22 / .08	.16 / .08	.16 / .08	.16 / .08	.16 / .08	.20 / .08	.20 / .08
+1	.29 / .08	.32 / .10	.18 / .08	.22 / .08	.16 / .08	.16 / .08	.35 / .08	.49 / .08
0	.50 / .08	.65 / .20	.39 / .08	.40 / .18	.33 / .08	.37 / .16	.88 / .08	1.30 / .08
-1 ³	1.28 / .67	1.94 / .106	1.17 / .67	1.67 / .81	.68 / .45	.79 / .66	***	***
-2	***	***	***	***	***	***	***	***

FIRM ZONES A1-A30, AE, AR, AR DUAL ZONES¹ -- CONTENTS RATES

Elevation of Lowest Floor Above or Below BFE ²	Lowest Floor Only -- Above Ground Level (No Basement/Encl.)		Lowest Floor Only -- Above Ground Level & Higher Floors (No Basement/Encl.)		More than One Floor With Basement/Enclosure		Manufactured (Mobile) Home	
	Residential	Non-Residential	Residential	Non-Residential	Residential	Non-Residential	Single Family	Non-Residential
+4	.21 / .12	.18 / .12	.21 / .12	.18 / .12	.21 / .12	.18 / .12	.21 / .12	.18 / .12
+3	.21 / .12	.19 / .12	.21 / .12	.18 / .12	.21 / .12	.18 / .12	.21 / .12	.18 / .12
+2	.21 / .12	.25 / .12	.21 / .12	.20 / .12	.21 / .12	.18 / .12	.21 / .12	.27 / .14
+1	.40 / .12	.39 / .21	.24 / .12	.30 / .12	.21 / .12	.18 / .12	.29 / .12	.44 / .21
0	.88 / .12	.75 / .56	.50 / .12	.52 / .33	.21 / .12	.25 / .12	.80 / .12	.92 / .71
-1 ³	2.22 / 1.01	1.85 / 1.62	1.28 / .71	1.26 / 1.01	.26 / .12	1.02 / .12	***	***
-2	***	***	***	***	***	***	***	***

¹ See RATE 16 for AR and AR Dual Zone information.

² If Lowest Floor is -1 because of attached garage, submit application for special consideration. Rate may be lower.

³ Use Submit-for-Rate guidelines if the enclosure below the lowest elevated floor of an elevated building, which is used for rating, is 1 or more feet below BFE.

*** SUBMIT FOR RATING

From Flood Insurance Manual

May 1, 1998

FLOOD INSURANCE RATE TABLES
ANNUAL RATES PER \$100 OF COVERAGE

REGULAR PROGRAM -- POST-FIRM CONSTRUCTION RATES

⇨ **UNNUMBERED ZONE A -- WITHOUT BASEMENT/ENCLOSURE¹**

Elevation Difference to nearest foot	BUILDING RATES		CONTENTS RATES		TYPE OF ELEVATION CERTIFICATE
	Occupancy		Occupancy		
	1-4 Family	Other & Non-Residential	Residential ⁴	Non-Residential ⁴	
+5 or more	.28 / .10	.44 / .15	.45 / .12	.61 / .12	NO ESTIMATED BASE FLOOD ELEVATION ²
+2 to +4	.55 / .12	.65 / .20	.65 / .17	.89 / .25	
+1	.91 / .50	1.16 / .71	1.10 / .72	1.35 / .85	
0 or below	***	***	***	***	
+2 or more	.22 / .08	.33 / .10	.33 / .12	.50 / .12	WITH THE ESTIMATED BASE FLOOD ELEVATION ³
0 to +1	.42 / .10	.52 / .17	.50 / .15	.89 / .21	
-1	1.22 / .67	1.60 / .96	1.33 / .82	1.67 / 1.25	
-2 or below	***	***	***	***	
No Elevation Certificate	1.80 / 1.10	2.75 / 1.70	1.80 / 1.10	2.45 / 1.40	No Elevation Certificate

¹ Zone A Buildings With Basement/Enclosure -- Submit for Rating

² Elevation difference is the measured distance between the highest adjacent grade next to the building site and the lowest floor of the building.

³ Elevation difference is the measured distance between the estimated BFE provided by the community or registered professional engineer, surveyor, or architect and the lowest floor of the building.

⁴ For elevation rated risks other than Single Family, when contents are located one floor or more above lowest floor used for rating -- use .18 / .12.

*** SUBMIT FOR RATING

From Flood Insurance Manual

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COMPARISON OF FLOOD INSURANCE COSTS

It is important to remember that community officials, and the Local Floodplain Administrator in particular, can have a significant influence on the flood insurance cost for their citizens. Flood insurance costs can also make a difference in the ability to sell property and the price it returns.

The following examples are intended to both inform community officials regarding how flood insurance costs are determined. Floodplain Administrators may be able to make developers more conscious of the savings in flood insurance costs they can achieve by elevating structures to or beyond minimum floodplain management standards.

FLOOD INSURANCE EXAMPLES

Example 1

Determine the cost of flood insurance for a single family residence (no basement) under the **Emergency Program**. The house is valued at \$100,000, and contents at \$30,000.

Solution:

Flood insurance for a single family residence under the Emergency Program is capped at \$35,000 for dwelling and \$10,000 for contents. At \$0.68 per \$100 for building and \$0.79 per \$100 for contents, maximum coverage would cost \$317.00 per year. The house would be insured for \$35,000; contents would be insured for \$10,000.

Example 2

Suppose the community in which the above house was located was converted to the **Regular Program** by the adoption of a FIRM which replaced the FHBM. Since the house was present before the FIRM, it is Pre-FIRM.

This house has four options for determining flood insurance rates:

1. **Regular Program – Pre-FIRM Construction Rates** may be used without using the lowest floor elevation.

In this case, the flood insurance rates for the Emergency Program would be used for the basic limits (\$50,000 on building and \$15,000 on contents). For additional limits, building coverage would cost \$0.20 per \$100 and contents would cost \$0.36.

The calculations would be:

	Basic		Additional
Building	\$340.00 (0.68×500)		\$100.00 (0.20×500)
Contents	\$118.50 (0.79×150)		\$ 54.00 (0.36×150)
TOTAL PREMIUM	\$458.50	+	\$157.00 = \$612.00

Flood insurance rates may be lowered if the lowest floor is sufficiently elevated either above the BFE or above the highest adjacent grade to warrant a lower rate.

2. First, assume the house is located in a Zone AE or A1-30 on the new FIRM. Base flood elevations (BFEs) are shown on the FIRM and in the accompanying Flood Insurance Study (FIS) booklet. Assume a survey shows the lowest floor of the house is two (2) feet above the BFE.

Apply **Regular Program – Post-FIRM Constructions Rates**

The calculations are:

	Basic		Additional
Building	\$100.00 (\$0.20 X 500)		\$ 40.00 (\$0.08 X 500)
Contents	\$ 31.50 (\$0.21 X 150)		\$ 18.00 (\$0.12 X 150)
TOTAL PREMIUM	\$131.50	+	\$ 58.00 = \$189.50

If a property owner is fortunate to have his house elevated well above the BFE, significant savings in flood insurance can be realized.

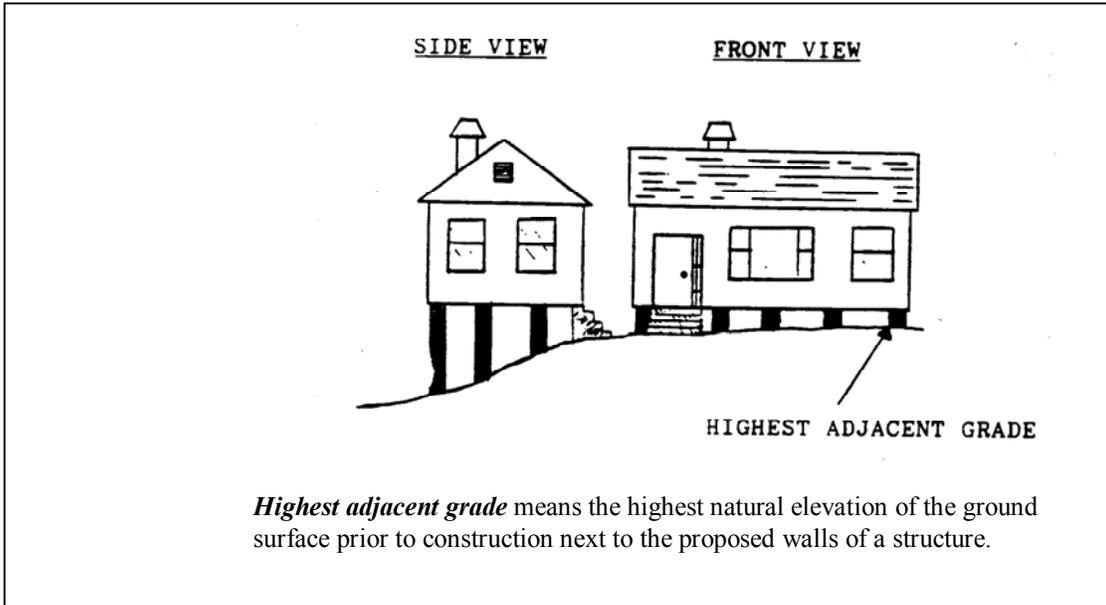
3. Now, consider the same house is located in the FIRM in “Zone A.” This is referred to as an “**Unnumbered A Zone.**” Suppose the property owner contacts a registered professional engineer, licensed surveyor or architect to **obtain an estimate of the BFE.** The Local **Floodplain Administer** may also furnish and estimate of the BFE.

Assume the lowest floor of the house is more than two (2) feet above the “estimated BFE.” The calculations for the flood insurance are as follows:

	Basic		Additional
Building	\$110.00 (\$0.22 X 500)		\$ 40.00 (\$0.08 X 500)
Contents	\$ 49.50 (\$0.33 X 150)		\$ 18.00 (\$0.12 X 150)
TOTAL PREMIUM	\$159.50	+	\$ 58.00 = \$217.50

The NFIP does not give as much credit for an “estimated BFE” as for a BFE which is the product of a fully engineered FIS. Nevertheless, the insurance savings are substantial.

4. Falling short of an estimated BFE, the structure may realize large savings in flood insurance costs by simply elevating the structure. Consider the same house which is elevated between 2 and 4 feet above the **highest adjacent grade**.



The flood insurance cost is as follows:

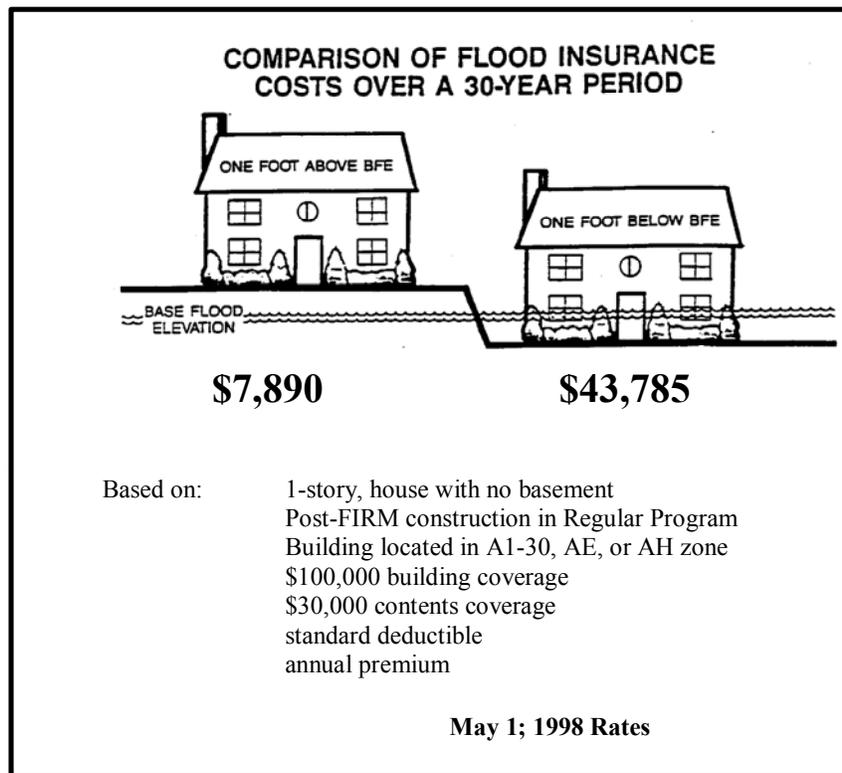
	Basic		Additional
Building	\$275.00 (\$0.55 X 500)		\$ 60.00 (\$0.12 X 500)
Contents	\$ 97.50 (\$0.65 X 150)		\$ 25.50 (\$0.17 X 150)
TOTAL PREMIUM	\$372.50	+	\$ 85.50 = \$457.50

By elevating the lowest floor 5 feet or more above the **highest adjacent grade**, the Total Premium can be reduced to **\$275.50**.

The above examples illustrate how the cost of flood insurance can vary depending upon the flood zone, elevation, the phase of the NFIP, the date of construction, and the method of calculation. In this example, the annual cost of flood insurance ranged from \$189.50 to \$615.00. The cost could be substantially higher.

For example, suppose a builder constructed a house with the lowest floor **only one (1) foot below the BFE**. If the community is in the Regular Program, the structure would be Post-FIRM. Flood insurance for the same house, with \$100,000 building coverage and \$30,000 contents coverage would be \$1459.50. If the lowest floor was more than one (1) foot below the BFE, the policy would have to be submitted for special – much higher – rating. **NOTE:** A house constructed with the lowest floor below the BFE in this situation would either be in violation of the community Flood Damage Prevention Ordinance or be constructed with a variance.

Multiply the flood insurance costs by 30 years and the differences are dramatic.



Additional expense constant and federal policy fees of \$80.00 are added to each policy.

APPENDIX 1

RULES AND REGULATIONS OF THE NATIONAL FLOOD INSURANCE PROGRAM (NFIP)

Go to the following webpage to view or download regulations.

Complete download of FEMA Rules and Regulations:

http://www.access.gpo.gov/nara/cfr/waisidx_99/44cfrv1_99.html

Download of particular sections relating to the NFIP and mitigation:

1. **Definitions, Eligibility requirements and Suspension of community eligibility:**
http://www.access.gpo.gov/nara/cfr/waisidx_99/44cfr59_99.html
2. **Criteria for land management and use; Variances and exceptions:**
http://www.access.gpo.gov/nara/cfr/waisidx_99/44cfr60_99.html
3. **Denial of flood insurance on a property (Section 1316):**
http://www.access.gpo.gov/nara/cfr/waisidx_99/44cfr73_99.html
4. **Flood mitigation assistance:**
http://www.access.gpo.gov/nara/cfr/waisidx_99/44cfr78_99.html

View/download other sections of interest on the webpages above.

APPENDIX 2

ELEVATION CERTIFICATE AND FLOODPROOFING CERTIFICATE

Go to the following FEMA webpage to view/download these forms.

<http://www.fema.gov/nfip/forms.htm>

APPENDIX 3

THE FLOODWAY: A GUIDE FOR COMMUNITY OFFICIALS

To view/download this document, click on the title below:

Large file: 8 mb

http://www.accessarkansas.org/aswcc/NFIP_Guide_Web/Floodway.pdf

APPENDIX 4

LETTER OF MAP AMENDMENT/REVISION FORMS

<http://www.fema.gov/nfip/forms.htm>

APPENDIX 5

Public Awareness Materials Order Form

<http://www.fema.gov/nfip/pamof.pdf>

Supplies Order Form

<http://www.fema.gov/nfip/sof.pdf>

Technical Bulletins

<http://www.fema.gov/mit/techbul.htm>

NFIP STATE AND LOCAL SOURCES

<http://www.fema.gov/nfip/infosl.htm>

APPENDIX 6

Federal Programs Offering Non-Structural Flood Recovery and Floodplain Management Alternatives

<http://www.fema.gov/library/ombflood.pdf>