

# **National Flood Insurance Program Handbook for Missouri Communities with Flood Insurance Studies**



**Missouri**

**Department of Natural Resources  
Division of Geology and Land Survey  
Water Resources Program  
Flood Plain Management Unit**

July 1989  
NFIP Handbook

The original version of this handbook, *National Flood Insurance Program Handbook for Regular Program Communities*, was prepared by Mr. Ross Richardson and published by the State of Missouri in March, 1980. It was republished by the Federal Emergency Management Agency in November, 1982. The current version was prepared by Mr. Richard Gaffney. It incorporates 1986 changes in minimum federal standards for flood-plain management in non-coastal areas. Publication was made possible by funding from the FEMA, in 1988.

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## I. INTRODUCTION

### The National Flood Insurance Program

The National Flood Insurance Program (NFIP) was conceived by President Harry S. Truman when he viewed the disastrous 1951 Kansas City flood. He was told that private insurance companies did not offer flood insurance, because the only people who would buy it would eventually file a claim, and the companies could not charge premiums that would be large enough to cover claims, and low enough to encourage people to purchase coverage.

"Then the government has to offer it," President Truman is reported to have said. It took passage of the National Flood Insurance Act of 1968 to realize the Missouri President's intention to make flood insurance available to those exposed to flood hazards.

### A Non-Structural Approach

Following a major flood of the Lower Mississippi River in 1927, Congress enacted the Rivers and Harbors Act of 1928, which charged the U.S. Army Corps of Engineers, to harness "Old Man River" and not let it flood like that again. The Corps built levees, dams, and relief channels to help prevent flooding of settlements. This structural approach has cost billions of dollars, but we still have disastrous floods. Although such structures have prevented or reduced flood damages in protected areas, unsafe flood-plain developments continue. Increasing flood disaster costs, despite so much money spent on structures, convinced Congress that another approach was needed. They believed a non-structural approach was warranted to help prevent flood disasters. "The other side of the coin" now is being used.

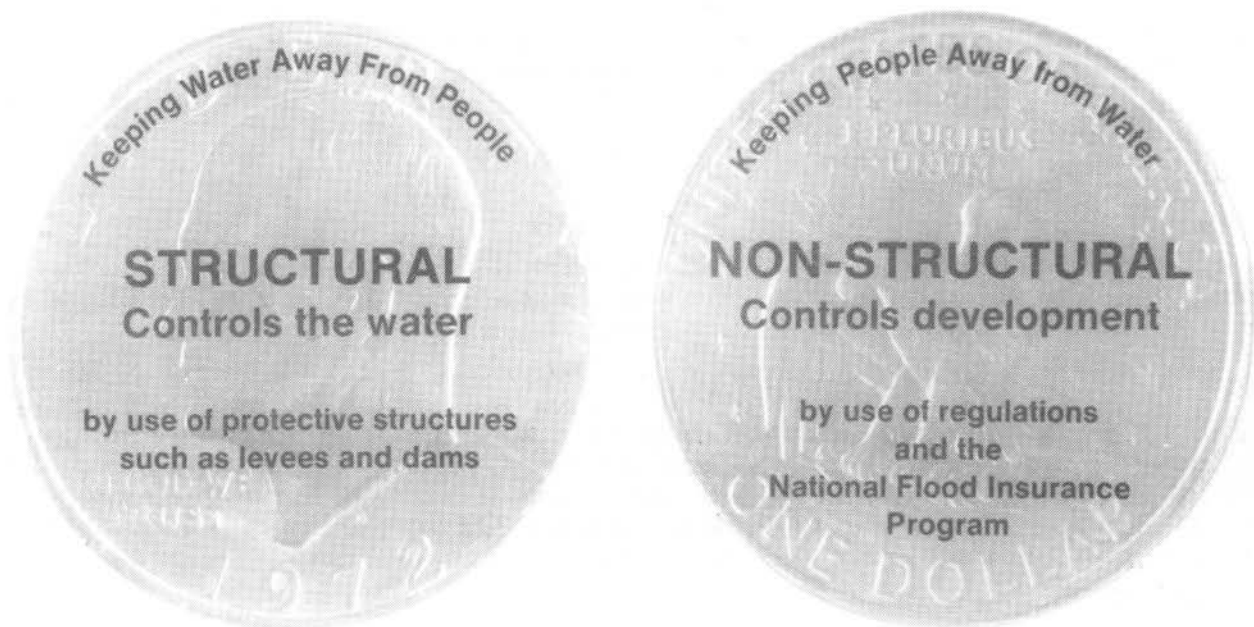
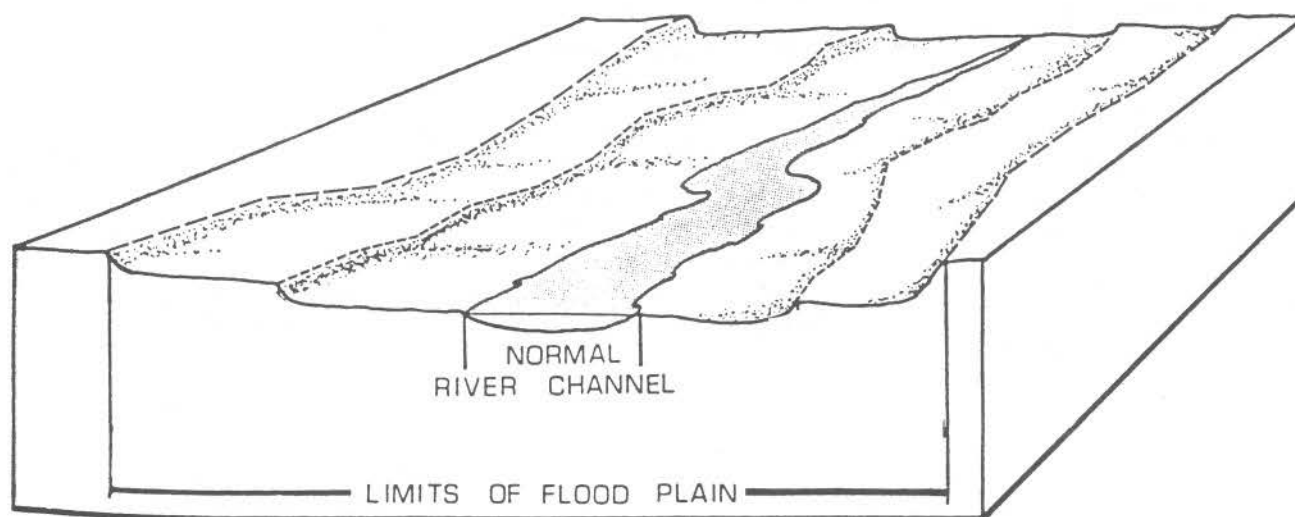


Figure 1. The two sides of the flood damage reduction coin

Like any coin, the two sides are inseparable. There are no suggestions to abandon structural methods but non-structural methods are receiving deserved attention as ways to reduce flood damages and flooding costs borne by citizens.

The NFIP was designed to accomplish two major objectives: It enables property owners and tenants to purchase federally subsidized insurance covering flood losses, but discourages future development subject to flood damage.

To accomplish these objectives, the NFIP makes availability of subsidized flood insurance contingent on local adoption of flood-plain management regulations designed to prevent future flood losses. Participating communities must adopt local regulations that meet federal requirements.



*Figure 2. The flood plain*

Those exposed to flood risks can buy flood insurance. Those not yet exposed are allowed to develop flood-plain (valley bottom) lands only if they do so safely. The purpose of the NFIP is to reduce the costs of flooding: lives, property damage, and recovery.

### **The Regular Program**

Community NFIP participation typically occurs in two phases. The first, called the Emergency Program, begins when community flood-hazard areas are identified and basic flood-plain management requirements are adopted. Later, a community converts to the second phase, the Regular Program, which is usually entered after a detailed Flood Insurance Study (FIS) and Flood Insurance Rate Map (FIRM) are completed. This information is not given to Special Conversion Communities.

### **Purpose of the Handbook**

This handbook, designed to help local administrators in Regular Program communities understand NFIP concepts, explains procedures to be followed in administering flood-plain management ordinances.

## **How to Use the Handbook**

Handbook text and illustrations follow the requirements of the Regular Program ordinance for all NFIP communities. Communities with FISs and FIRMs and which are Regular Program participants should use this handbook. (Special Conversion Communities without FISs have another handbook.)

## **Critical Concepts**

It is important to understand two concepts: Development and Substantial Improvement. Both require permits from a community's administrator if they are intended for a flood-hazard area (Zone A) on the Flood Insurance Rate Map (FIRM).

Development means activities beyond farmland cultivation. "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.

"Substantial improvement" applies to buildings and includes repairs, additions, or improvements costing fifty percent or more of the value of a building before work begins. The local administrator must review permit applications, decide to grant or deny permits, and be able to justify such decisions. Every application must be documented. Appeals can be made after permit denials, so even denied permit applications must be filed.

## **Other Basic Concepts**

### **Flood-Plain Management**

Flood-plain management and flood insurance are the principal components of the National Flood Insurance Program (NFIP). Flood-plain management comprises regulations and administrative procedures to minimize flood hazards. Flood insurance provides compensation for flood losses to real and personal property. Although this handbook mostly addresses NFIP flood-plain management aspects, general understanding of the NFIP is contingent on understanding the following basic concepts.

### **Flooding**

Flooding is defined for NFIP purposes as a temporary stream-flow rise or a sudden and unusual runoff accumulation that inundates adjacent lands. The presence of large water bodies such as the Mississippi or Missouri Rivers is not a prerequisite for flooding, which can also occur as ponding, dam failure, or flash flooding of creeks and ditches.

### **The Base Flood**

The "100-year flood," referred to herein as the base flood, is a standard measure of flooding in the United States. The base flood has a one-percent chance of occurrence in any given year. (See Figure 3, The base flood - a compromise.)

### **The Flood Plain**

Areas inundated by floodwaters are the flood plains of rivers, creeks, ditches, or other flooding sources. In this handbook, the flood plain is the area that would be inundated by a base flood; it is also called the "Special Flood Hazard Area." "Bottoms" is vernacular for the lowest, most frequently inundated portions of a Flood Plain. (See Figure 2, The flood plain.)

## Base Flood - A Compromise

### Base Flood Elevation (BFE)

The flooding level reached by a base flood is the Base Flood Elevation (BFE). Water-surface elevation is referenced to Mean Sea Level (MSL), e.g., a 928-ft Base Flood Elevation is a water-surface elevation of 928 feet above MSL. Elevations of undeveloped land, or of residential and commercial buildings are also referenced to MSL; therefore, if a survey of the lowest floor of a residence produces an elevation of 925 feet MSL and the Base Flood Elevation is 928 feet MSL, the residence is exposed to a flood hazard of three feet of water during an occurrence of the base flood.

Zone A on a FIRM does not show BFEs, but Zone AE on a FIRM shows wavy lines bearing numerals which indicate BFEs in feet above MSL. MSL may also be designated NGVD (the National Geodetic Vertical Datum of 1929).

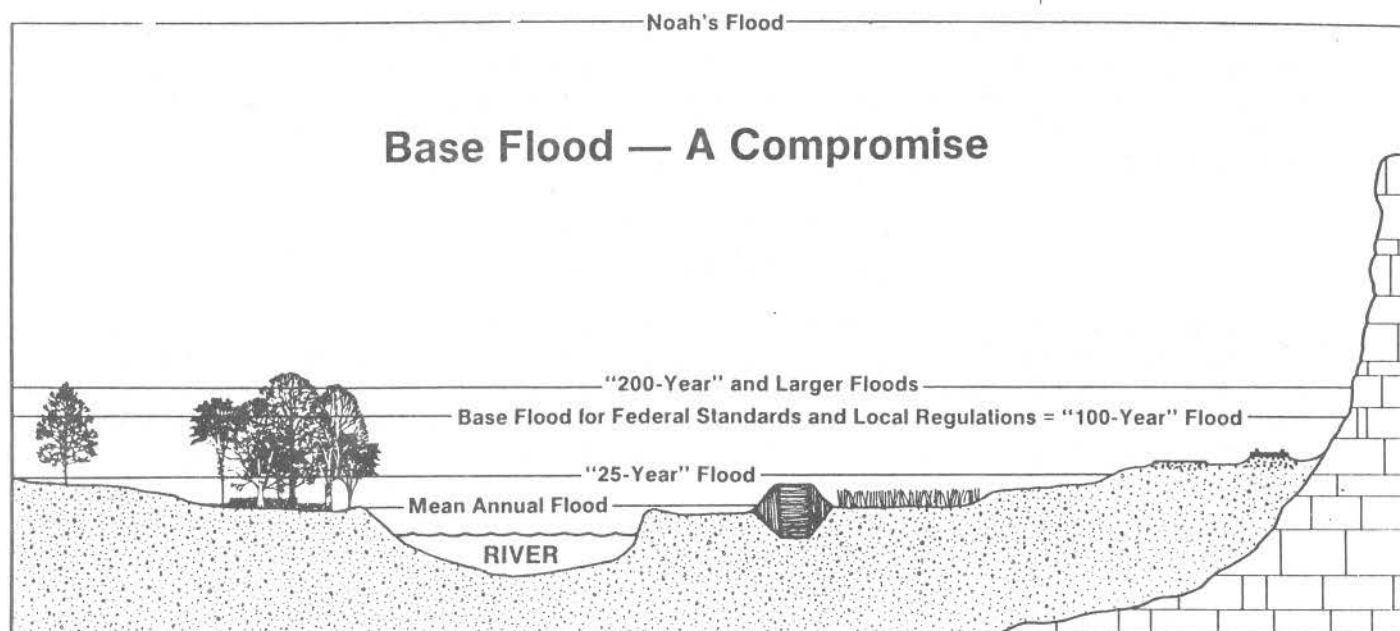


Figure 3. The base flood - a compromise.

## Encroachment

Flood-plain development, called "encroachment," restricts natural overflow areas of flooding streams. Each development, by encroaching on the natural overflow area of a stream or other source of flooding, increases the base flood elevation.

These basic NFIP concepts are referred to throughout the remainder of this handbook.

This handbook is intended to help local administrators do their jobs fairly and reasonably. For additional help, contact the Missouri Department of Natural Resources, (314) 751-2116, or the Federal Emergency Management Agency, (816) 283-7007.



## **II. THE FLOOD INSURANCE STUDY**

### **Purpose of the Study**

Arrangements to prepare a flood insurance study (FIS) are made while a community participates in the Emergency Program. The study requires approximately 18 months; during that time Federal Emergency Management Agency representatives and the study contractor meet with city officials and the public to discuss the study results.

An FIS is intended to investigate community flood hazards and their severity. During such an investigation, the study contractor identifies flood hazards, the severity of which is determined by detailed hydrologic and hydraulic analyses of the community's streams. Lending institutions; insurance agents; and local, state, and federal agencies use flood-hazard information in making mortgage loans, writing insurance, and reviewing development permits in community flood prone areas. This handbook explains use of such information in greater detail.

### **How to Use the Study**

FIS copies are sent to community officials before a community adopts the flood-plain management ordinance required for participation in the Regular Program. Such a study comprises a booklet and the FLOOD BOUNDARY AND FLOODWAY MAP. City officials use both in reviewing proposed developments in flood-prone community areas. A separate FLOOD INSURANCE RATE MAP is also sent to community officials, and is used by lending institutions and insurance agents when making mortgage loans or writing flood insurance for community property.

### **The New Format of Maps**

New entrants into the NFIP may receive a single map with their FIS, rather than a Floodway Map and a FIRM. The new single map format shows the regulatory floodway as a "hatched" area within the flood hazard area (Zone A). The hatchlines are diagonal straight lines across the portion of the flood plain shown in the FIS to be delineated as the floodway.

Newer maps also have dispensed with Zones B and C, calling them both Zone X, instead. The five hundred-year flood area formerly called Zone B is still shown, but for flood-insurance rating, it is not distinguished from higher ground formerly labeled Zone C. (Incidentally, roughly one-third of flood-insurance claims are paid in Zone X; about two-thirds are paid in Zone A and Zone V, a coastal zone).

Unnumbered A Zones, where there are no BFEs, were not studied in detail by the study contractor. These flood-hazard areas have general boundaries, no cross-sectional data, no floodways, and no BFEs. In them, local administrators must rely on "Best Available Information," which may be excellent data from another agency or recollections of long-term residents. (See "Guidance for Unnumbered A-zones.")

In some counties, newer maps are being produced that show incorporated municipalities and unincorporated areas on the same map panels, rather than separately. This also is part of the new FEMA map format.

## **III. THE FLOOD INSURANCE RATE MAP (FIRM)**

### **Purpose of the Map**

When the Federal Insurance Administration (FIA) began implementing terms of the National Flood Insurance Act of 1968, an initial decision was that all the nation's flood-hazard areas must be

identified (mapped) to inform landowners, developers, insurance agents, realtors, buyers, lenders, emergency preparedness planners, local officials, state officials, and federal officials.

Maps have been prepared for all regions of the country, including Puerto Rico, the Virgin Islands, Guam, and the Pacific Trust Territories. Identification (mapping) of flood-hazard areas is given a community by a letter and a map to the chief executive officer. The initial map is usually a Flood Hazard Boundary Map (FHBM), which, with conversion, is replaced by a Flood Insurance Rate Map (FIRM).

Flood-hazard areas are sections of a community that will be inundated by a base flood, a flood-measuring standard used by all United States communities. The base flood has a one percent chance of occurrence each year. There is a 26 percent possibility that the homeowner who purchases a 30-year mortgage in a flood-hazard area, will have his home damaged by a base flood before he repays the mortgage loan.

A principal FIS product is the Flood Insurance Rate Map (FIRM). As explained earlier, the purpose of the FIRM is to give flood-hazard information to lending institutions making mortgage loans in flood-prone areas, and to insurance agents writing flood-insurance policies in such areas. In addition, community officials also use a FIRM when reviewing development permit requests. Since this handbook is mostly for community officials, their uses of FIRMs will be emphasized in this section, although uses of FIRMs for lending and insuring will also be discussed briefly.

### **Contents of the Map**

A FIRM gives a community useful flood-hazard information. Although a FIRM is mainly intended to be used by mortgage lenders and insurance agents when making loans or writing flood insurance policies, it also provides a quick reference for community officials reviewing development proposals in flood-prone areas. A FIRM shows the following important flood hazard information: (1) boundaries of the 100-Year and 500-Year Flood Plains; (2) base flood elevations at selected points on streams, and (3) elevation reference marks for surveying. More detailed discussions of these items, and the information for reading a FIRM are on the following pages.

1. **Flood Boundaries.** On a FIRM, the entire community is divided into flood-insurance rate zones. Generally, all A Zones are within boundaries of the 100-Year Flood Plain; B Zones are within the boundaries of the 500-Year Flood Plain; and the remainder of the community is designated Zone C. (See also "The New Format of Maps" in Chapter II.) The 100-Year Flood Plain (Zone A) may be subdivided for insurance rating purposes; therefore, numerous Zone A variations may appear on a community's FIRM. The following is a summary of insurance rating zones:

Zone A - Areas of 100-Year Flood; base flood elevations and flood-hazard factors not determined.

Zone AE - Zones A1-30 in the New Format.

Zone AO - Areas of 100-Year Flood subject to shallow flooding. Flooding depths are between one and three feet; average depths are shown in most instances, and flood-hazard factors are not determined.

Zone AH - Areas of 100-Year Flood where flooding depths are between one and three feet; base flood elevations are shown; flood-hazard factors are not determined.

Zones A1-30 - Areas of 100-Year Flood; base flood elevations and flood-hazard factors are determined.

Zone B - Areas between limits of the 100-Year and 500-Year Flood, areas where the average flooding depth is less than one foot, areas where the contributing drainage is less than one square mile, or areas protected from the base flood by levees.

Zone C - Areas of minimal flooding (remainder of community).  
Zone X - Zones B and C in the New Format.

2. Base Flood Elevations. At selected intervals in flood plains designated Zones AE, AH, or A1-30, the BASE FLOOD ELEVATION (BFE) is indicated by wavy lines drawn across the flood plain and accompanied by an elevation referenced to Mean Sea Level (MSL). The BFE for a particular site can be approximated by using the FIRM, or more accurately, by using the flood profiles in the FIS.
3. Elevation Reference Marks. The initials "RM" on the FIRM indicate surveyed U. S. Geological Survey elevation reference points or those from other approved surveyors. These reference marks are numbered and are listed either on the FIRM or in the FIS.

The ELEVATION REFERENCE MARK is a starting elevation from which a survey can be made of a development site or existing building in the 100-Year Flood Plain.

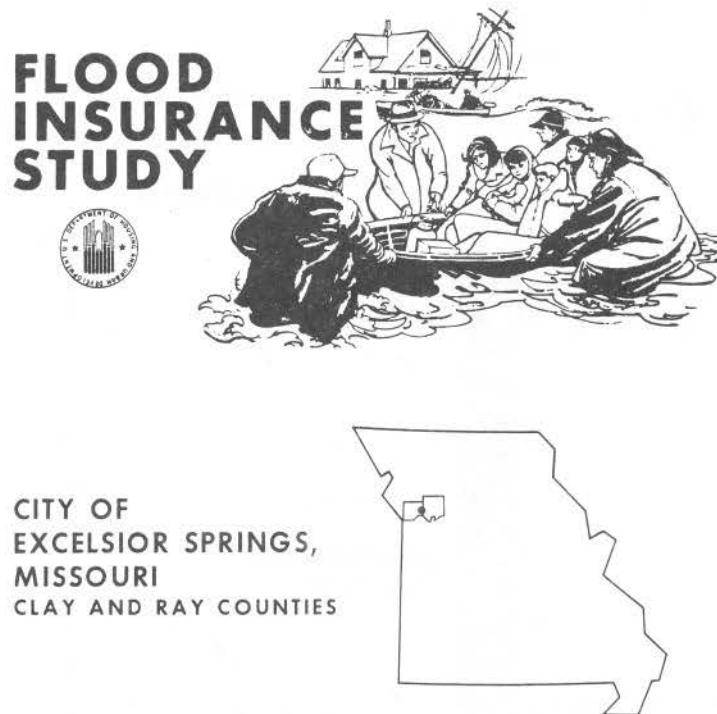


Figure 4. A recent FIRM -- index and identification panel.

## How to Use the Map

Figure 4, which gives examples of Flood Insurance Rate Maps, shows the outside cover of the FIRM for the cities of Excelsior Springs and Lebanon, Missouri. The maps, called "z-folds," are identified by community name, community number, effective date, and page (panel) number. Using a FIRM can be simplified by observing the following:

1. Use the correct map. Incorporated communities and counties are mapped separately. (Newest FEMA maps, produced in the new format, show municipalities and unincorporated areas on the same panels, rather than separately.) A community FIRM shows only those areas in the corporate limits. A county FIRM shows only the unincorporated portions of the county. Each mapped community and each mapped county has an assigned community number; e.g., the community number of Excelsior Springs is



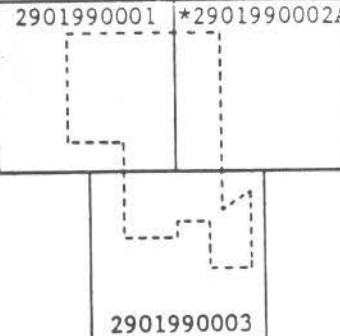
<b>NATIONAL FLOOD INSURANCE PROGRAM</b>	<b>FLOOD HAZARD BOUNDARY MAP H-01-02 FLOOD INSURANCE RATE MAP I-01-02</b>	
<p><b>FIRM</b> <b>FLOOD INSURANCE RATE MAP</b></p> <p><b>CITY OF LEBANON, MISSOURI LACLEDE COUNTY</b></p> <p><b>PANEL 2 OF 2</b></p> <p><b>COMMUNITY-PANEL NUMBER 290197 0002 B</b></p> <p><b>EFFECTIVE DATE: JUNE 1, 1982</b></p> <p> <b>Federal Emergency Management Agency</b></p>	<p><b>CITY OF EXCELSIOR SPRINGS, MISSOURI CLAY AND RAY COUNTIES</b></p> <p><b>PANEL H&amp;I-02</b></p> <p><b>EFFECTIVE DATE: MARCH 15, 1977</b></p> <p><b>COMMUNITY NUMBER: 2900908</b></p> <p> <b>U.S. DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT FEDERAL INSURANCE ADMINISTRATION</b></p>	<p>2901990001 *2901990002A</p> <p></p> <p>2901990003</p> <p><b>FIRM INDEX MAP</b> City of anywhere</p> <p><b>MAP INDEX</b></p> <p>*Panel not printed, area in Zone C</p>

Figure 5. A recent FIRM -- A-zone, scale in feet, north arrow, and date.

290090B and that of Lebanon is 290197B. A list of maps published by the Federal Emergency Management Agency is available from the Kansas City Regional Office, and can be obtained by contacting the office. (See appendix.)

2. Use the currently-effective map. The effective date of the map is on the map cover. The effective date establishes the date from which actuarial flood-insurance rates are charged for insured new property, and the date from which all new community construction is subject to the Regular Program flood-plain management ordinance, or tells the date of a major map revision. In the examples in Figure 5, the effective map dates are March 15, 1977, for Excelsior Springs, and June 1, 1982, for Lebanon. After these dates is "post-FIRM" and before these dates is "pre-FIRM" for insurance rating purposes. Maps published prior to the creation of the Federal Emergency Management Agency (FEMA), bear the old department name.
3. Use the correct panel. The FIRM is divided into map panels, the number of which depends on community or county size. Smaller communities, or those having limited flood-prone areas, may have only one panel; larger communities or those having numerous flood-prone areas will have more panels. An index page showing the map panel number and location accompanies the FIRM. The sample index page shown in Figure 5 shows a community divided into numbered map panels. If there are only one or two community map panels, there may be no map index page; the FIRM will note if only one panel or two panels are printed. As shown in Figure 5, the Excelsior Springs community number is 290090B and the panel number is 02. The "B" indicates the map has been revised twice. (The first revision would be indicated by an "A" suffix.) On the Lebanon map the community number is 290197B, and the panel number is 0002.

### **Flood Plain Determinations**

When the correct map is used, the next step in locating a specific piece of property ensues. Figure 6, showing a portion of the inside FIRM map panel, is referred to in explaining the use of the map to locate specific properties.

As Figure 6 shows, the map panel consists of a section of the community showing street names, streams, and other major physical features. Individual structures and property lines are not shown on the FIRM panel; therefore, the use of this map requires user interpretation. To determine a specific property location on the map, the user must use the map scale on the map panel. In the example, the map scale is 600'=1" (one inch on the map equals six hundred feet on the ground). Such a map scale obviously requires user interpretation and judgement. This map-reading procedure is only one of three flood-hazard information sources in the FIS. The other sources are (1) the FIS flood profile, and (2) a certified survey of ground elevations and lowest-level elevations of structures at a specific location. The use of flood profiles and certified elevations will be discussed in later sections of this handbook.

It should be evident that using the FIRM map scale can give an approximate location of a specific piece of property relative to the community flood-prone area.

Figure 6 shows the flood-prone area of this section of the community as a gray-shaded area extending from the central portion of the flooding stream. This dark-shaded area is the 100-Year Flood Plain or the Special Flood Hazard Area, and is the area to which the community's Regular Program flood-plain management ordinance applies. It is also the area to which the National Flood Insurance Program mortgage-lending and insurance-purchase requirements apply. Another flood-prone area, the 500-Year Flood Plain, extends beyond the boundary of the Special Flood Hazard Area; shown for informational purposes only, it is not subject to the community's flood-plain

#### ELEVATION REFERENCE MARKS

REFERENCE MARK	ELEVATION FEET (NGVD)	DESCRIPTION OF LOCATION
RM1	1178.14	Chiseled $\square$ in the southwest corner of the concrete headwall on County Road over Azure Hills Branch.
RM2	1215.65	Chiseled $\square$ in the southeast corner of the concrete headwall on New Buffalo Road over Radio Tower Branch.
RM3	1212.20	Chiseled $\square$ in the northeast corner of the concrete headwall on Millcreek Road over Dry Auglade Creek.



Figure 6. Part of a FIRM -- map reading exercise

management regulations, unless the community has adopted more stringent requirements than those of the National Flood Insurance Program. The remainder of the Community is shown outside the 100-Year and 500-Year Flood Plains. Areas designated on the FIRM as flood-hazard Zones A, B, and C, refer respectively, to the 100-Year Flood Plain, 500-Year Flood Plain, and the rest of the community.

An important FIS-determined factor, the BASE FLOOD ELEVATION (BFE) (also known as the 100-YEAR FLOOD ELEVATION), is shown on the FIRM inside the boundary of the 100-Year Flood Plain, and is depicted by wavy lines at intervals across the flood-plain width throughout the stream length. In Figure 6, the BFE is shown as 1228 on the upstream portion of the Special Flood Hazard Area as it enters the community, and indicates the BFE is 1228 feet above Mean Sea Level (MSL). Farther downstream, the BFE changes from 1226 feet MSL to 1224 feet MSL, and continues to decrease downstream. As mentioned earlier, the BFE can be determined by reading the FIRM, or by referring to flood profiles in the FIS, a matter to be discussed later.

Determination of the specific location of a piece of property can now be made by using the foregoing description of FIRM-panel information.

#### Map (FIRM) Reading Exercise

Using figure 6, which shows a small portion of a firm panel, locate the north arrow and the scale of feet. This is a critical first step. Many FIRMS are printed with the north arrow pointing in the other-than-the-usual-direction. To locate a specific property on a firm panel, the user must refer to the map scale.

For instance, in Figure 6, a property is known to be 100 feet square, and at the southeast corner of Cedar Street and Sophia Street. Clearly, the lot is in the Special Flood Hazard Area,



Zone A, on a stream called City Branch. Local flood-plain regulations would be in force for the development of the lot.

To determine the Zone A designation, the user looks upstream and downstream to find a label. In this case, the one-hundred year flood plain is designated A3, with a slender line tying the label to the dark gray area (between Chestnut and Poplar Streets, west of Case Street). Sometimes there are distinctions between areas of flood plain, shown by a narrow white line; the arc where City Branch flows north of Oak Street, and along Sycamore Street; is designated Zone A1

Areas zoned B and C also are shown on the map. Notice that Zone B is too narrow to have the label in it, and so a slender line ties the label to the zone. B zones are tinted paler than A zones. C zones are untinted. Study the map legend on each panel for help.

The Base Flood Elevation (BFE) can be determined by merely locating the closest BFE lines (wavy lines) on the map panel and interpolating to the nearest foot. In the example, the wavy BFE line crosses the property at 984 feet above sea level. This is the surface-water elevation at the crest of a base flood. It has nothing to do with ground level.

Note just east of this site on Millcreek Road an "X" marked RM3; a description of this Reference Mark (RM) will appear on the FIRM panel or in the back of the flood-insurance study text. RM's are noted throughout the community, so that an elevation survey can be directed from the nearest RM to the proper site or building. Exact survey (elevation) data are needed to determine specifically to what level a new structure must be elevated or floodproofed, and to verify the elevation of a building for insurance rating. The RM is not the elevation of the BFE but is simply a point of reference from which to direct an elevation survey. (You will note that RM's are listed in terms of NGVD (National Geodetic Vertical Datum). For ease of understanding, consider NGVD the same as MSL.

As mentioned earlier, scaling property location on the FIRM panel will tell us generally if a structure is in the flood hazard area. It is the actual site elevation of the structure that truly determines if the property is inside the Special Flood Hazard Area; this is particularly true of borderline property.

For example, if a 100-foot by 100-foot site is described as on the northwest side of Florence and Walnut Streets, it is obvious that portions of the property would be in Zones A1, B, and C. In such a case, an elevation survey would be necessary to determine if the site or structure, or any portion thereof, is within the flood hazard area. For better determining the BFE, use of the elevation-survey data and of flood-profile tables are discussed in the following sections.

## **GUIDANCE FOR UNNUMBERED A ZONES**

In dealing with Flood Hazard Boundary Maps and Flood Insurance Rate Maps (FIRMs), Zone A flood areas may be encountered. In Special Conversion communities that have received no Flood Insurance Study (FIS), it may be the only flood-zone designation. Zones A, not immediately followed by a letter E, or a number, such as A5, A2, etc., has no indicated Base Flood Elevations (BFEs). Lack of map elevations does not remove the requirement for elevating structures. Federal regulations and the local flood-plain ordinance require a community to obtain, review, and reasonably use any BFE data or floodway data available from a Federal, State, or other source. Communities are to use BFE data to require that new construction and substantial residential-structure improvements have their lowest floors and basements elevated to or above the BFE, and that nonresidential structures be elevated or floodproofed to or above that elevation.

Every effort should be made to identify the portion of the flood plain which should remain free of development in order to keep flood stages from rising. Encroachments next to the channel cause obstructions to flows that result in higher floods. FEMA Flood Insurance Studies refer to such areas

as "floodways", but in unnumbered A Zones, floodways are not delineated. Obviously, if new developments occur too near a channel, flood heights greater than the acceptable norm of one additional foot may occur. Floodway data are usually found in flood reports provided by a State or Federal agency. Check with the State flood-plain management office about such information. Without such reports, common sense or locally funded studies are the only way to manage future flooding.

Below are some ideas for developing BFE information and guidance for finding such flood information is given.

1. Preliminary, draft, or final Flood Insurance Studies for your community or adjacent communities.
2. The Flood Hazard Boundary Map or Flood Insurance Rate Map can be used to determine the closest point on the outer boundary of Zone A in relation to a site. Assuming the mapped flood-plain limit results from water reaching high ground, one might use that indicated limit, or the flood-plain outer boundary as the BFE limit. A surveyor can determine the elevation of this point or a topographic map can be used to determine the elevation; this can then serve as the BFE. (If you question the accuracy of the configuration of Zone A as shown on your map, this method should not be used.)
3. Research any local BFE-information sources such as the following: Public Works or Road and Bridge Department; sewer, watershed, or levee districts; historical data, such as high water marks; information from local engineering firms; past flood stories in the local newspaper; or recollections of big floods by long-time residents.
4. Check with the State Coordinating Office to determine if BFE information is available from the following sources: Soil Conservation Service, United States Geological Survey, Missouri Highway and Transportation Department, Federal Highway Administration, Bureau of Land Reclamation, U. S. Army Corps of Engineers (Flood Plain Management Services Office).

**NOTE:**

- A. *BFE and floodway data must be included with all subdivision proposals and other proposed new developments greater than 50 lots or 5 acres (whichever is smaller). In such cases, the developer is required to make an engineering study to determine BFEs and floodway information; this will be considered the best available information. The responsibility is the developer's.*
- B. *Remember that final, as-built elevation certificates are required for all new flood-plain buildings and substantial improvements.*

When a BFE cannot be determined by information sources listed above, a permit may be issued without citing a BFE. In such cases, the lowest floor must be above the highest natural grade adjacent to the proposed structure. The lowest floor (including basement) is recommended to be at least 2 feet above the highest natural adjacent grade to facilitate a reasonable insurance rate. In addition, the community is recommended to instruct the developer (in writing) to consult an insurance agent to determine the economical benefits of exceeding these minimum guidelines.

Be thorough and persevere in research. Most people will be courteous and helpful. Remember that not all "big" floods are base floods. For example, many people who experienced the great 1973 flood at St. Louis believed it was a base flood (a



"once-in-a-hundred years flood"). It was not; the volume of Mississippi River water passing the St. Louis gauge was on the order of a "thirty year flood" at the crest. (The duration of flooding that spring broke all records.)

Remember that the local ordinance adopts the FEMA-issued FIRM by reference; it is your source of information. Errors the community believes FEMA contractors made in mapping community flood-hazard areas should be explained as soon as possible to the FEMA Regional Office.

## **IV. THE FLOOD BOUNDARY AND FLOODWAY MAP**

### **Purpose of the Map**

The FIRM is mostly used for mortgage lending and insurance writing; the Flood Boundary and Floodway Map is mostly used for flood-plain management. The principal users of the Flood Boundary and Floodway Map are the community flood-plain management officer and, with him, developers and real estate interests. The map shows future flood-plain-development limits in the community and the conditions that allow portions of the flood plain to be developed.

The FLOODWAY concept, a community planning tool, helps reduce flood hazards and loss of life in the most hazardous portion of the 100-Year Flood Plain. The floodway is that portion of the flood plain that includes the stream channel and overbank areas that must remain undeveloped in order that the 100-Year Flood may pass without cumulatively increasing the Base Flood Elevation more than one foot. Floodway boundaries on a community map identify the limits of encroachment on the 100-Year Flood Plain; it thereby shows the extent of possible future flood-plain development before a one-foot rise in the Base Flood Elevation will occur. It is therefore essential that a community flood-plain management officer understand that future developments cannot be permitted on a floodway if such developments would increase the Base Flood Elevation. It is also essential that the flood-plain management officer know how to interpret and use the community Flood Boundary and Floodway Map.

### **Contents of the Map**

Flood Boundary and Floodway Maps are published only for those portions of a community that have delineated floodways. Communities with flood plains designated Zones AE or A1-30 are likely to have delineated floodways, whereas those with Zones AO, AH and unnumbered A Zones will not have them. They come with the Flood Insurance Study.

Examples of a Flood Insurance Study cover page, and a Flood Boundary and Floodway Map cover page is shown in figure 4. In the example shown, the map gives the same information concerning map names, panel number, community number, and effective date as that provided by the FIRM. The only difference between the FIRM cover and Flood Boundary and Floodway Map cover is the map title itself.

Although outward appearances of the Flood Boundary and Floodway Map and the FIRM are similar, the maps are quite different, and as mentioned earlier, they are used differently. An examination of the Flood Boundary and Floodway Map reveals the following differences:

1. **Flood Boundaries.** An example of a Flood Boundary and Floodway Map panel is shown in Figure 8., with a FIRM covering the same area. The primary difference between this map and the FIRM is readily obvious, since the 100-Year Flood Plain is now divided into two distinct sections. On the map the central portion of the flood plain, the FLOODWAY, is the stream and adjacent portions of the flood plain shown in white. The remainder of the 100-Year Flood Plain, the FLOODWAY FRINGE, is a gray or

blue-shaded area. Extending outward from the boundary of the floodway fringe is the 500-YEAR FLOOD PLAIN, shown for informational purposes only, as it was on the FIRM. As with the FIRM, the rest of the community is shown lying outside the boundaries of the 100-Year and 500-Year Flood Plains. Reference to these zones will be made in Section VI of this Handbook, where issuing and reviewing development permits is discussed.

2. Cross-sections. Note that CROSS SECTIONS are shown on the map. Examples of cross-sections are seen in Figure 7. These cross-sections on the Floodway Map, shown as lines across the width of the 100-Year Flood Plain and symbolized by the letters A, B, C, D, E, and F, (in hexagonal boxes) indicate that a detailed survey (cross-section) of the stream was taken at these points during the FIS. The study contractor therefore prepared detailed information about stream discharges, cross-sectional areas of the stream valley, and flood elevations at these particular cross-sections. Data derived by the study contractor are shown in tabular and profile forms in the FIS. (See Figures 9. and 10.)
3. Elevation Reference Marks. Another useful piece of information from the map, the ELEVATION REFERENCE MARK, is shown on the map as RM3. In the example RM3 refers to reference mark No. 3; other reference marks would be indicated by RM1, RM2, etc. The reference mark indicates that a surveyed elevation has been taken at this point, often by the U.S. Geological Survey. The reference mark can therefore be used as a starting point from which elevations of nearby locations can be determined. These are the same RMs as found on the corresponding FIRM.
4. Flood Profiles. As mentioned above, accurate measurements of structure location relative to the flood-hazard area, and of the BFE, can be derived by using the Flood Profile in the FIS in conjunction with the Floodway Map. A flood profile chart is illustrated by figure 9. As Figure 7 shows, the cross sections on the bottom of the

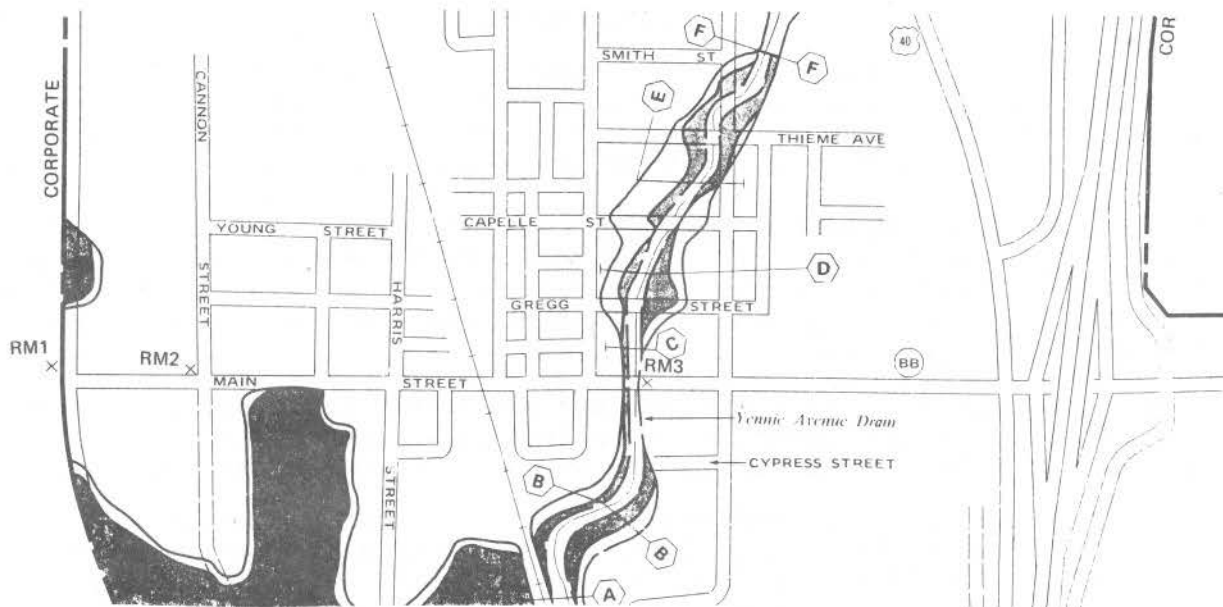
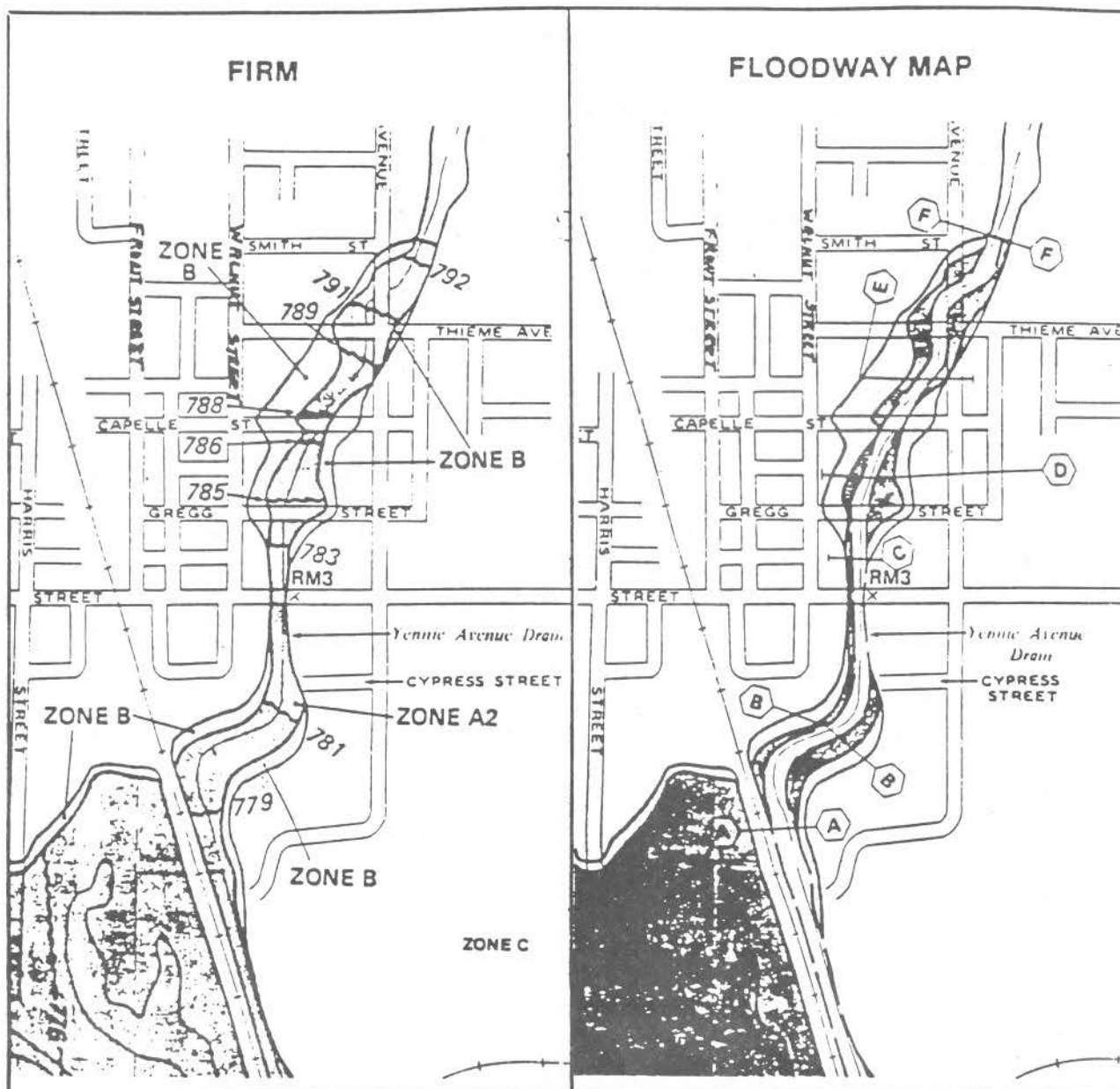


Figure 7. Example of cross section



#### ELEVATION REFERENCE MARKS

REFERENCE MARK	ELEVATION FEET (NGVD)	DESCRIPTION OF LOCATION
----------------	-----------------------	-------------------------

RM 1	790.80	Boat spike in southwest side of power pole at southwest corner of State Route AA and Main Street.
RM 2	779.41	Chiseled square on west headwall of culvert on Main Street, 50 feet south of Cannon Street
RM 3	785.90	Chiseled cross on north end of headwall sidewalk curb of Main Street over Yennie Avenue Drain, 13 feet west of pavement.
RM 4	794.80	Chiseled square on southwest wingwall of first bridge east of Barr Road on State Route AA



APPROXIMATE SCALE

600 0 600 FEET

Figure 8. Locating the site -- two maps

Flood Profile correspond to those shown on the Floodway Map (Figure 8). A quick reference to determine the BFE at a particular location can be made by locating the property site on the Flood Profile relative to cross-section locations or to the streets and bridges noted at the top of the Flood Profile. For example, if a property were located at cross-section C and the Yennie Avenue Drain, the BFE at that site would be 783 MSL as shown in the Flood Profile. This is consistent with the BFE shown in the FIRM. The BFE of locations upstream or downstream from cross-section C can be determined by moving to the right or left of cross-section C on the profile and reading up the profile to the intersection with the 100-Year flood elevation.

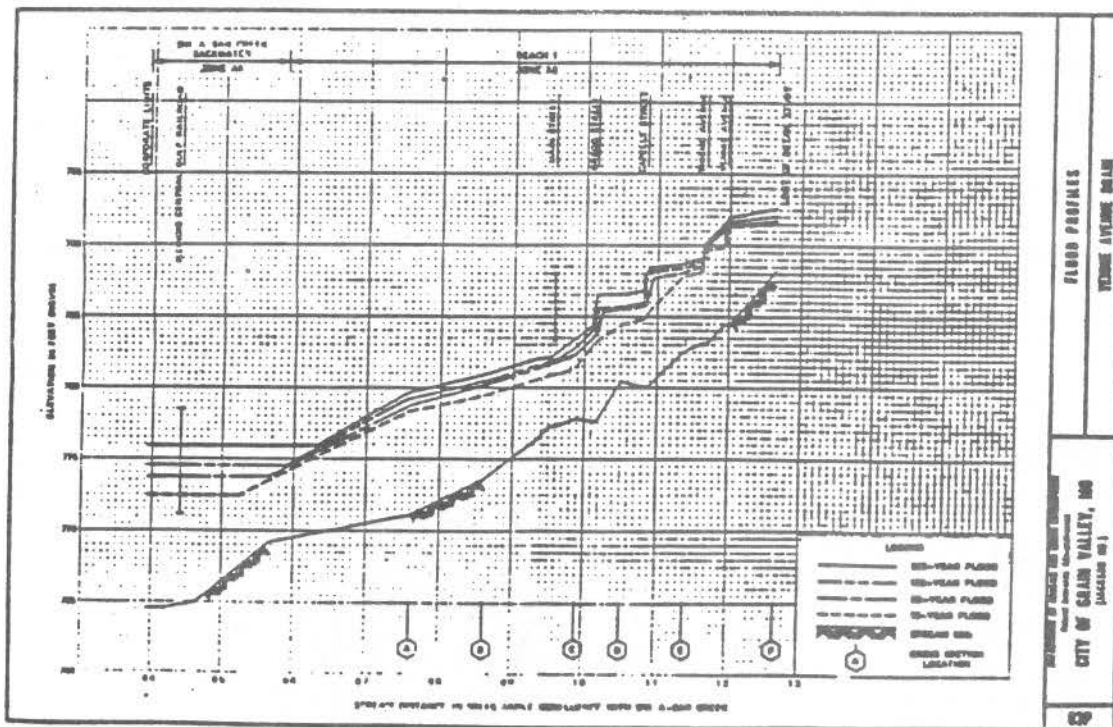


Figure 9. A flood profile

The FIRM or the Flood Profile can be used to determine the BFE for a piece of property or a structure. It is important to remember that the most accurate method to determine if the property is below the BFE (the only method that can be used for certification purposes) is a survey of the property or the structure.

5. Floodway Data Table. The FLOODWAY DATA TABLE gives supplementary information that can be used in conjunction with the map. The table, illustrated in Figure 10., gives critical information about the floodway at various stream cross-sections. As can be seen in the example, the width of the Floodway at cross-section B of the Yennie Avenue Drain extends 50 feet. In the example, from looking at the Floodway Map, it can be estimated that the floodway width comprises approximately two-thirds on the "south bank" of the stream and one-third on the "north bank." Floodway width would therefore be approximately 34 feet on the "south bank" and 17 feet on the "north bank" of the stream. Additional information in the table consists of (1) flood velocities, and (2) water surface elevation of the 100-Year Flood, with and without encroachments in the floodway fringe portion of the 100-Year Flood Plain.

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION		
CROSS SECTION	DISTANCE <sup>1</sup>	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/SEC.)	WITH FLOODWAY (NGVD)	WITHOUT FLOODWAY (NGVD)	DIFFERENCE
YENNIE AVENUE DRAIN							
A	0.76	50	240	2.6	780.0	779.2	0.8
B	0.86	50	170	3.6	781.1	780.4	0.7
C	0.99	30	100	6.2	783.1	782.8	0.3
D	1.05	20	110	5.6	786.0	785.7	0.3
E	1.14	80	180	3.3	788.8	788.4	0.4
F	1.26	20	70	8.8	792.5	792.1	0.4

Figure 10. A floodway data table

### How to Use the Map

As in the case of using the FIRM, several simple steps can be taken when using the Flood Boundary and Floodway Map:

1. Use the correct map. As in the case of the FIRM, the Flood Boundary and Floodway Map is published separately for incorporated communities and unincorporated portions of counties. Each mapped incorporated community and county has been assigned a community number that is printed on each map panel. The community number corresponds to that of the FIRM.
2. Use the currently effective map. The effective map date is printed on each map panel, but can also be learned from the Status of Communities list available from the Kansas City Regional Office of the Federal Emergency Management Agency. The effective map date usually is identical to that of the FIRM.

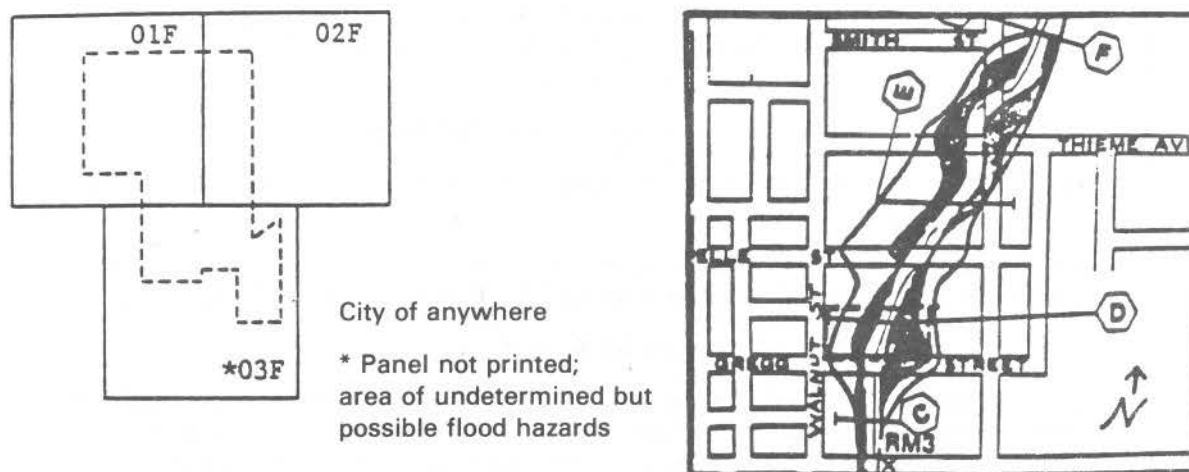


Figure 11. A flood boundary and floodway map index and portion of a panel

3. Use the correct map panel. Like the FIRM, the Flood Boundary and Floodway Map is divided into map panels and is accompanied by an index page showing the printed map panels and their numbers. An example of a Flood Boundary and Floodway Map index page is shown in



Figure 11. The index page shows the portions of the community that have identified floodways. Map panels having no floodways and which therefore have not been printed, are identified on the map index with the following wording: "Panel not printed -- area of undetermined but possible flood hazards," or "Panel not printed -- no floodways."

### **Flood Plain Determinations**

When the correct map is being used, locating a specific piece of property on the Flood Boundary and Floodway Map can proceed. Figure 11, depicting the inside of the map panel, is referred to in explaining map use to locate specific properties.

The example indicates that the map panel consists of a section of the community showing street names, streams, and other major physical features similar to the FIRM. Individual property lines and structures rarely are shown on the map. (Some FBFMs are printed on aerial photo or topographic base maps.) To determine a specific property location, the map reader must use the map scale on the map. In the example, the map scale is 600'=1", the same scale as the FIRM. As in making determinations with the FIRM, the map scale allows one only to estimate a property's location; therefore, the map reader must use judgement when making a determination. Applying the map scale, a piece of property 300 feet wide and 200 feet deep, fronting Gregg Street and at the northeast intersection of Gregg and Walnut Streets (as shown in Figure 11.) can be determined to be partially in the floodway fringe, but a structure situated on the southeast corner of the lot would be inside the floodway fringe area.

## **V. PROCEDURES FOR MAP CHANGES AND APPEALS**

### **Reasons for Appealing Maps**

Upon completion of a Flood Insurance Study, representatives of the study contractor and the Federal Emergency Management Agency meet with community representatives and public to discuss study results. A formal ninety-(90)-day period is allotted for appeals concerning Base (100-Year) Flood Elevations determined in the study. During the appeal period, individual property owners or the community may appeal Base Flood Elevations; however, appeals must be based on technical, scientific information that challenges elevations determined in the study. Appeals may be made for various reasons any time after study completion. Reasons for appeals include the following:

1. The 100-Year boundary contains property naturally above the BFE.
2. The 100-Year boundary contains property partially below the BFE, although buildings are above it.
3. Stream channel modifications or levees were built after the FIS was prepared, and flood-hazard conditions that existed before the FIS were thereby altered.

### **Types of Appeals**

The above description of appeal reasons shows that appeals can be made to amend FIRMs and revise Flood Boundary and Floodway Maps by letter or map revision. A letter revision is correspondence, comprising legal documents, that address small changes, in an official community map, that do not require map republication. A map revision is an official map republication that is required by significant changes in flood hazard boundaries or floodways.

The property owner must document his reasons for appealing for letter revision or map revision.

The following information must support appeals:

1. Legal description of the property, usually a copy of the recorded plat map bearing the seal of the circuit clerk (County Clerk or Recorder of Deeds), indicating official recordation and proper citation (deed or plat book volume and page numbers).
2. A topographical map showing ground-elevation contours, the total property area, location of the structure or structures on the property, and indication of the ownership near line which represents the border enclosing the area subject to inundation by a flood having a one-percent chance of occurrence in any given year. The curvilinear line must be based on information from authoritative sources, such as the U.S. Army, Corps of Engineers; USGS, SCS, or other Federal agencies; the State Department of Natural Resources; the County Water Control District; the County or City Engineer; a FEMA Flood Insurance Study; or technical data from a registered engineer. FEMA may coordinate information submitted by a property owner with any of the above listed sources.
3. Certification by a registered professional engineer or licensed land surveyor stating (1) the type of structure, (2) if it is elevated on posts, piers, or walls (3) if it is built on a barrier sand dune, (4) the elevation of lowest floor (including basement), and (5) the elevation of the lowest grade adjacent to the structure.

Application forms for Letter of Map Amendment or changes in the FIRM or Flood Boundary and Floodway Map are available from the Kansas City Regional Office of FEMA. (See appendix.)

## **VI. REGULAR PROGRAM ORDINANCE**

The most important aspect of community NFIP participation is use of the flood-plain development ordinance which specifies measures to reduce flood hazards. Generally, the ordinance requires new buildings and substantial improvements be above the BFE.

The FIRM and the Flood Boundary and Floodway Map are used to determine if property lies in a flood hazard area; any available flood information is used to help establish the elevation requirement.

To clarify ordinance requirements each section is explained in the following pages.

### **Development Permits**

Separate permits are required to erect, construct, improve, (over 50 percent of market value) or build a structure; place a manufactured home; or mine, dredge, fill, grade, pave, excavate, fence, or drill in the flood-hazard area.

Maintenance work such as roofing, painting, and basement sealing needs no permit. For improvement projects costing less than 50 percent of the building's value, a permit can be granted without requiring the project to comply with the ordinance, unless the structure is in a regulatory floodway, and its size, shape, or location is to be changed.

Development permits are issued by the community flood-plain management enforcement officer, and he must maintain permit records.

To obtain a permit, the developer must demonstrate that the development will be safe from flooding and will not increase flood hazards. Small-development plans, such as individual residences or business structures, must include property description, structure locations, lowest floor and basement elevations, and flood-hazard area locations. Large development plans must be accompanied by more detailed information, such as the structure locations, lowest floor and basement elevations of each building, drainage plan, utilities plan, grading plan, and location and

BFE. If the BFE is unavailable, the developer must provide one, as explained in the community flood-plain management ordinance.

Plans for stream channel modifications, filling, dredging, or excavation must include the 100-Year flood elevation before and after projects are built. A project must not increase the established 100-Year flood elevation.

A flood-plain development permit application form can be of any design the local government chooses, and may also be used as a building permit application form. Few model building permit application forms are satisfactory, however, because they do not indicate flood-plain location, or the need for an elevation certificate. For most local governments that issue building permits, a flood-plain development permit *also* will be needed.

### **Reviewing Development Permit Applications**

Development permit applications are reviewed by the community enforcement officer, planning and zoning committee, city council, or other person or committee that normally reviews building permit applications.

Review of permits involves the following steps:

1. Determine if the property is in a floodway or flood fringe. (See Section IV.) If a property is in the floodway, all floodway requirements must be satisfied before issuing a development permit. Floodway requirements are described in the following section. If the property is in the floodway fringe, the permit official should address the remaining applicable flood-plain development requirements.
2. Determine if the development site is safe from flooding. The development proposal must at least show property lines, structure locations, and proposed elevations of the lowest floor (including basement) of each structure. Subdivision proposals of five acres or fifty lots must contain detailed specifications outlined on page 30 of this manual. The reviewing agency should require any additional needed information to determine if the site is reasonably safe from flooding.
3. If applicable, require that any additional local, state or federal permits are obtained. Other than the flood-plain development permit, additional local, state and federal permits may be required to develop a particular site. These permits include the following:

Corps of Engineers - Section 404 Permit for discharging dredged or filled material into rivers and adjacent wetlands; Section 10 Permit for construction activities that may affect a Corps of Engineers flood-protection project.

State Permits - Certain state agencies may have permit authority for flood-plain development, and for water quality and other purposes. To determine if a state permit is required, contact the state coordinator's office for more information.

Levee and Drainage Districts - Contact levee and drainage districts before construction or alteration of levees, dikes, or drainage-works in their jurisdiction.

### **Special Standards for the Floodway**

As mentioned in Section IV, the floodway is a special portion of the 100-Year flood plain in which no developments can occur if they would increase the BFE. This means that certain performance standards must be met before proposed developments can be permitted in the community's designated floodways. Provisions for regulation of floodway uses are discussed in this section.



CITY OF IRONTON, MISSOURI  
APPLICATION  
FLOOD PLAIN DEVELOPMENT PERMIT  
(Ref. City Ordinance 359, July 28, 1984)

DATE \_\_\_\_\_ PERMIT NUMBER \_\_\_\_\_

NAME OF APPLICANT \_\_\_\_\_

MAILING ADDRESS \_\_\_\_\_

TELEPHONE NUMBER (home) \_\_\_\_\_ (work) \_\_\_\_\_

PERMIT IS FOR: (check one)

<input type="checkbox"/> New Construction.*	<input type="checkbox"/> Other Development:
<input type="checkbox"/> Substantial Improvement* (Greater than 50% of value)	<input type="checkbox"/> Filling
<input type="checkbox"/> Addition to Existing Building	<input type="checkbox"/> Excavating, Mining
<input type="checkbox"/> *Elevation Certificate Needed	<input type="checkbox"/> Grading
	<input type="checkbox"/> Paving
	<input type="checkbox"/> Building
	<input type="checkbox"/> Drilling
	<input type="checkbox"/> Subdivision

ADDRESS OF DEVELOPMENT \_\_\_\_\_  
(use lot, tract, or other \_\_\_\_\_  
appropriate description to \_\_\_\_\_  
allow accurate identification) \_\_\_\_\_

IS SITE IN AN IDENTIFIED FLOOD HAZARD AREA?

<input type="checkbox"/> Yes, Floodway	<input type="checkbox"/> Yes, Zone B
<input type="checkbox"/> Yes, Zone A	<input type="checkbox"/> No, Zone C

ELEVATION OF HUNDRED-YEAR FLOOD \_\_\_\_\_ FEET ABOVE SEA LEVEL.

ELEVATION OF DEVELOPMENT SITE \_\_\_\_\_ FEET ABOVE SEA LEVEL.

ELEVATION OR FLOOD PROOFING REQUIREMENT \_\_\_\_\_ FEET (difference).

IS PROPOSED USE RESIDENTIAL? ☐ Yes ☐ No

Other? ☐ Yes, Specify: \_\_\_\_\_

(Residences must have lowest floor two feet above 100-year flood elevation. Other buildings must be flood-proofed or elevated to that height.)

SUBDIVISION PROPOSALS MUST ATTACH ADDITIONAL INFORMATION:

- ☐ Original site contours, showing existing drainage and watercourses, buildings, and other development.
- ☐ Plan for grading, showing new contours, new drainage, altered watercourses, removal of buildings or other development, roads.
- ☐ Limits of flood plain as shown on Ironton Flood Insurance Rate Map (FIRM).
- ☐ Hundred-year flood elevations, as shown on Ironton FIRM.
- ☐ Locations and lowest floor elevations of proposed buildings.
- ☐ Other site data needed by city for evaluation: e.g., fire hydrants, sanitary sewerage.

OTHER PERMITS REQUIRED?

- ☐ CORPS OF ENGINEERS (e.g., Section 404, Clean Water Act, for dredging, filling, channel changes, in or beside rivers.)
- ☐ STATE OF MISSOURI (e.g., State Highway Curb Cut; DNR, for NPDES Permit or Section 401, CWA, Water Quality Certification.)
- ☐ LOCAL SPECIAL DISTRICT (e.g., Levee Crossing Permit.)
- ☐ OTHER: \_\_\_\_\_

ALL PROVISIONS OF THE IRONTON FLOODWAY REGULATION ORDINANCE (NO. 359) SHALL BE COMPLIED WITH.

\_\_\_\_\_  
(Signature of applicant or certified agent)

APPROVAL: \_\_\_\_\_

(Date) (Signature of authorizing official)

NAME \_\_\_\_\_

TITLE \_\_\_\_\_

Figure 12. A sample flood plain development permit form

**ELEVATION CERTIFICATE**  
**FEDERAL EMERGENCY MANAGEMENT AGENCY NATIONAL FLOOD INSURANCE PROGRAM**

OMB 3067-007  
EXPIRES: JUNE 30 1990

This form is to be used for: 1) Post-FIRM construction only when the base flood information is available for the building site; and 2) Pre-FIRM buildings rated using Post-FIRM rules. Instructions for completing this form can be found on the reverse side.

BUILDING OWNER'S NAME

POLICY NUMBER

STREET ADDRESS

Apt.-/Unit-U Suite-S/Bldg.-B

NO.

ROUTE

BOX NUMBER

OTHER DESCRIPTION (Block and lot numbers, etc.)

CITY

STATE

ZIP CODE

This form is to be completed by a land surveyor, engineer, or architect who is authorized by state law to certify elevation information when the elevation information for zones A1-A30, AE, AH, A(with BFE), V1-V30, VE, and V(with BFE) is required. In the case of zone AO, the building official, the property owner, or the owner's representative should complete the information in Section I and may also complete the certification. Community officials who are authorized by local law or ordinance to provide floodplain management information may also complete this form.

**SECTION I BUILDING ELEVATION INFORMATION**

1. Using the Flood Insurance Manual or the NFIP Flood Insurance Application—Part 2 Worksheet, indicate the proper diagram number \_\_\_\_
2. FIRM Zones A1-A30, AE, AH, and A (with BFE). The top of the reference level floor from the selected diagram is at an elevation of \_\_\_\_ feet NGVD. (or other datum—see #5)
3. FIRM Zones V1-V30, VE, and V (with BFE). The bottom of the lowest horizontal structural member of the reference level floor from the selected diagram is at an elevation of \_\_\_\_ feet NGVD (or other datum—see #5).
4. FIRM Zone AO. The floor used as the reference level from the selected diagram is \_\_\_\_ feet above highest natural grade next to the building (also enter in line 8). This value must be equal to or greater than the AO Zone flood depth number listed below. If no flood depth number is available, is the building's lowest floor (or reference level) elevated in accordance with the community's floodplain management ordinances? ☐ Yes ☐ No ☐ Unknown
5. Indicate the elevation datum system used in determining the above reference level elevations: ☐ NGVD ☐ Other (describe on back)
6. Indicate the elevation datum system used on the FIRM for base flood elevations: ☐ NGVD ☐ Other (describe on back)  
(ATTENTION: If the elevation datum used in measuring the elevations is different than that used on the FIRM, then the elevations provided must be converted to the datum system used on the FIRM.)
7. Is the reference level based on actual construction? ☐ Yes ☐ No\*  
\* A "No" answer is only valid if the building does not have the reference level floor in place. Fill in the elevation based on construction drawings and do not complete question #8. If "No" is checked, this certification will be valid only for buildings in the course of construction. After construction of the reference level floor is completed, a post-construction elevation certificate will be required for continued flood insurance coverage.
8. Provide the following measurements using the natural grade next to the building (round to the nearest foot).
  - a. The reference level is:  
☐ feet ☐ above ☐ below (check one) the highest grade.  
☐ feet ☐ above ☐ below (check one) the lowest grade.
  - b. The garage floor (if applicable) is:  
☐ feet ☐ above ☐ below (check one) the highest grade.  
☐ feet ☐ above ☐ below (check one) the lowest grade.

**SECTION II FLOOD INSURANCE RATE MAP INFORMATION**

Provide the following from the proper FIRM (see Instructions on back—Date of FIRM) and accompanying insurance application:

COMMUNITY NO.	PANEL NO.	SUFFIX	DATE OF FIRM	FIRM ZONE	BASE FLOOD ELEV. (In AO Zone, use depth)	COMMUNITY ESTIMATED BASE FLOOD ELEVATION ESTABLISHED FOR ZONE A OR ZONE V, IF AVAILABLE

Elevation reference mark used appears on FIRM ☐ Yes ☐ No (See reverse side for details)

**SECTION III CERTIFICATION**

This certification is to be signed by a land surveyor, engineer, or architect who is authorized by state law to certify elevation information when the elevation information for zones A1-A30, AE, AH, A(with BFE), V1-V30, VE, and V(with BFE) is required. In the case of zone AO, the building official, the property owner, or the owner's representative can sign the certification. Community officials who are authorized by local law or ordinance to provide floodplain management information, may also sign the certification. I certify that the information on this certificate represents my best efforts to interpret the data available. I understand that any false statement may be punishable by fine or imprisonment under 18 U.S. Code, Section 1001.

CERTIFIER'S NAME

LICENSE NUMBER (or Affix Seal)

TITLE

COMPANY NAME

ADDRESS

CITY

STATE

ZIP

SIGNATURE

DATE

PHONE

The insurance agent should attach the original copy of the completed form to the flood insurance policy application. The second copy should be supplied to the policyholder and the third copy retained by the agent. The fourth copy is for the local community permit office, if required.  
THIS FORM MAY BE REPRODUCED.

FOR OPTIONAL COMMUNITY USE: Is the reference level also the lowest floor under the community's floodplain management ordinances?

☐ YES ☐ NO If NO the elevation of the lowest floor is \_\_\_\_ feet NGVD.

Figure 13. A NFIP elevation certificate: obverse, and reverse

FEDERAL EMERGENCY MANAGEMENT AGENCY  
NATIONAL FLOOD INSURANCE PROGRAM  
**FLOODPROOFING CERTIFICATE**

This form is to be used for: 1) Post-FIRM construction only when the base flood information is available for the building site;  
and 2) Pre-FIRM buildings rated using Post-FIRM rules.

BUILDING OWNER'S NAME		POLICY NUMBER	
STREET ADDRESS			
Apt.-A/Unit-U Suite-S/Bldg.-B	NO.	ROUTE	BOX NUMBER
OTHER DESCRIPTION (Block and lot numbers., etc.)			
CITY		STATE	ZIP CODE

This form is to be completed by a land surveyor, engineer, or architect who is authorized to certify elevation information. Community officials who are authorized by local law or ordinance to provide floodplain management information may also complete this form.

**SECTION I FLOOD INSURANCE RATE MAP INFORMATION**

Provide the following from the proper FIRM and accompanying insurance application:

COMMUNITY NO.	PANEL NO.	SUFFIX	DATE OF FIRM	FIRM ZONE	BASE FLOOD ELEV. (In AO Zone, use depth)	COMMUNITY ESTIMATED BASE FLOOD ELEVATION ESTABLISHED FOR ZONE A OR ZONE V, IF AVAILABLE

Elevation reference mark used appears on FIRM ☐ Yes ☐ No

**SECTION II FLOODPROOFING CERTIFICATION**  
(Certification by a Registered Professional Engineer or Architect)

I certify to the best of my knowledge, information, and belief, that the building is designed so that the building is watertight, 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 that would be caused by the flood depths, pressures velocities, impact and uplift forces associated with the base flood.

In the event of flooding, will this degree of floodproofing be achieved with human intervention? ☐ Yes ☐ No

*(Human intervention means that water will enter the building when floods up to the base flood level occur unless measures are taken prior to the flood to prevent entry of water, e.g., bolting metal shields over doors and windows.)*

Will the building be occupied as a residence? ☐ Yes ☐ No

If the answer to both questions is Yes, the floodproofing cannot be credited for rating purposes and the actual reference level floor must be completed and certified instead. Complete both the elevation and floodproofing certificates.

FIRM ZONES A, AE, A1-A30, VE, V1-V30, AO and AH: Certified Floodproofed Elevation is \_\_\_\_\_ feet, (NGVD).

**SECTION III CERTIFICATION**

I certify that the information on this certificate represents my best efforts to interpret the data available. I understand that any false statement may be punishable by fine or imprisonment under 18 U.S. Code, Section 1001.

CERTIFIER'S NAME		LICENSE NUMBER (or Affix Seal)	
TITLE		COMPANY NAME	
ADDRESS	CITY	STATE	ZIP
SIGNATURE	DATE	PHONE	

The insurance agent should attach the original copy of the completed form to the flood insurance policy application. The second copy should be supplied to the policyholder and the third copy retained by the agent.

THIS FORM MAY BE REPRODUCED.

Figure 14. A NIFP floodproofing certificate

### **Permitted Uses**

Only uses that will not increase the BFE are permitted in the floodway. Generally these uses include the following:

1. Agricultural uses not involving structures.
2. Uses incidental to industrial-commercial structures, such as loading areas, parking areas, airport landing strips.
3. Private and public recreational uses, such as golf courses, driving ranges, picnic grounds, boat launching ramps, swimming areas, wildlife and nature preserves, fish hatcheries, shooting preserves, target ranges, hunting and fishing areas, and hiking and horseback-riding trails.
4. Uses incidental to residential structures, such as lawns, gardens, parking areas, and play areas.
5. Structures designed not to obstruct flood flows. This performance standard must be certified

### **Existing Structures and Expansion of Existing Structures**

Structures that were in the floodway on the date that the community FIRM became effective are "grandfathered-in" for flood-plain management purposes. These structures cannot be expanded, if such activity would increase the BFE. Proposals to expand structures in the floodway must be accompanied by a "no-rise" certification from a registered professional engineer or architect. Granting a development permit to expand a structure must be contingent on certification the BFE will not be increased thereby.

### **Reconstruction of Damaged Structures**

Floodway structures damaged by any means can be rebuilt only by complying with floodway requirements; that means reconstruction is permitted only if it will not increase the BFE. It is possible to replace the structure in kind (covering the same area and having the same dimensions as it did before damage); however, the structure must be elevated to or above the BFE. Reconstruction, like any other development in the 100-year flood-plain, requires a flood-plain development permit and certification.

### **Relocation of Structures**

Development by definition includes the building placements, foundation preparations, building construction, and use of fill, dredging, and other activities mentioned in the first section of this handbook. Relocation of a structure from its present location to the floodway is possible only if floodway regulations are followed. A development permit is required for such action, and the structure must be built so that the BFE is not increased. As with other types of development, certification that floodway requirements were followed must be provided.

### **Expansion of Manufactured Homes and Manufactured Home Parks**

Manufactured home parks cannot be expanded into the floodway, nor can existing manufactured home parks in the floodway be expanded. Manufactured homes not in parks cannot be placed in the floodway nor can they be expanded if such activity would increase the BFE. Some local ordinances state that manufactured homes cannot be replaced in the floodway. FEMA plans to publish a ruling on this issue in late 1989.

## **Construction of Bridges, Culverts, Levees, Marinas, and Other Water-Related Structures**

Some structures and developments such as bridges, culverts, levees, marinas, and other water-related structures and developments can be designed so they do not increase the BFE or increase flood velocities. It is advised that the Kansas City Regional Office be consulted for help in reviewing such developments.

### **Obtaining and Using Flood Elevation Data.**

Regular Program communities are generally given Base Flood Elevation data they can use to review development proposals in flood-prone areas. As previously mentioned, the FIRM and Flood Boundary and Floodway Map should be used to determine approximate locations and elevation requirements for development proposals. In addition, the FIS provides flood elevation information. When flood-elevation data are not given, such as in "Unnumbered A Zones," the party reviewing development proposals should follow "Guidance for Unnumbered A Zones" given above.

## **Requirements for Residential Structures**

### **General Requirements**

Generally, the Regular Program ordinance specifies that new residences (built after the date of the FIRM) must be elevated above the BFE. This means that the lowest floor, including the basement if there is one, must be above the BFE. To do this, the enforcement officer must determine what the lowest floor will be, and then determine the proper elevation requirement. The developer must then decide which method to use to elevate the residence.

### **Determining the Lowest Floor**

Flood insurance rates are partly based on the first-floor level of a structure. If the lowest floor level is equal to the 100-Year flood elevation, there is a one percent chance of annual flood loss to the lowest floor. For new construction it is therefore very important that the first floor level (including basement) be at least equal to the 100-Year flood elevation. Several examples of first floor levels of various types of residences are listed below; these examples are illustrated in Figure 15.

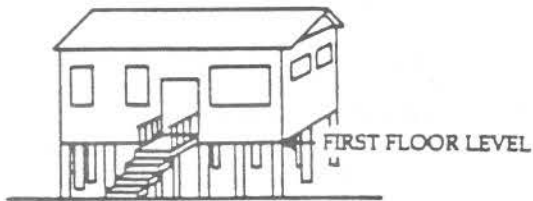
1. One-story without basement - the lowest floor level is the top of the finished floor. As an added precaution, the position of the bottom of the floor joists could be used as the lowest floor level.
2. Two-story building without a basement - the lowest floor level is determined as it is in a one-story building without a basement.
3. One-story with a basement - the lowest floor is the basement floor.
4. Split-level without a basement - the lowest floor level is the lowest floor of the structure.
5. Split-level with a basement - the lowest floor level is the basement floor.
6. Two or more stories with a basement - the lowest floor-level is the basement floor.

### **Establishing the Minimum Elevation Requirement**

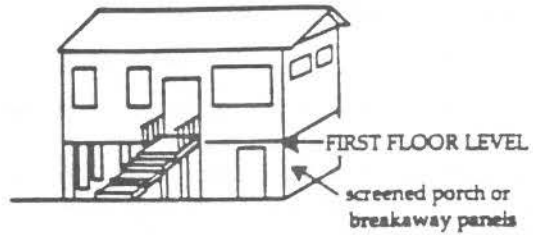
When the lowest floor has been determined, the enforcement officer can give the applicant the BFE, which should be indicated on the flood-plain development permit. The enforcement officer should use the BFE from the FEMA flood map, if available, or any other available flood elevation. NFIP regulations require the lowest floor of a residential structure be elevated at least to BFE.

## DETERMINING THE FIRST FLOOR LEVEL

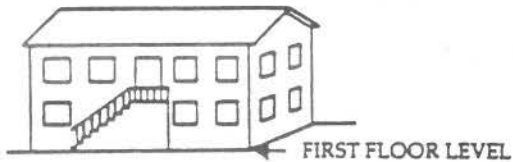
ONE STORY NO BASEMENT  
(elevated structure)



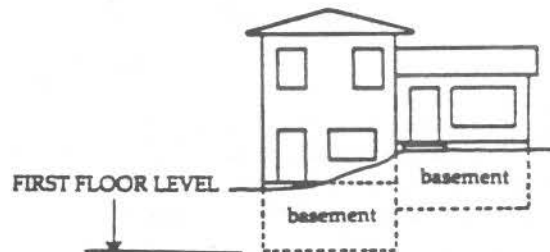
ONE STORY NO BASEMENT  
(elevated structure)



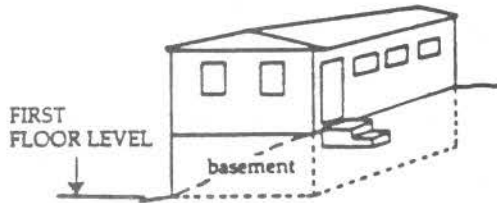
TWO OR MORE STORIES NO BASEMENT



SPLIT LEVEL W/BASEMENT



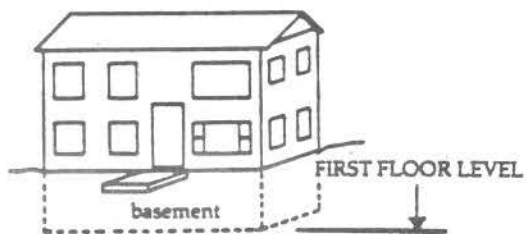
ONE STORY W/BASEMENT



SPLIT LEVEL NO BASEMENT

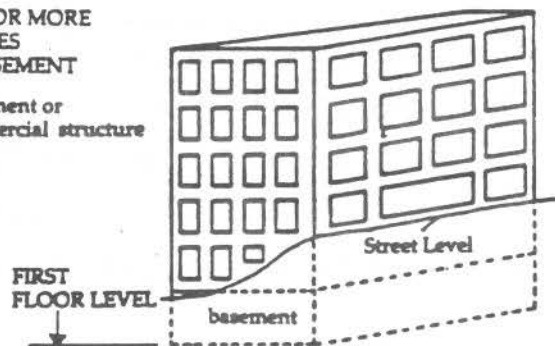


TWO OR MORE STORIES W/BASEMENT



TWO OR MORE  
STORIES  
W/BASEMENT

Apartment or  
Commercial structure



TWO OR MORE STORIES NO BASEMENT  
(elevated structure)

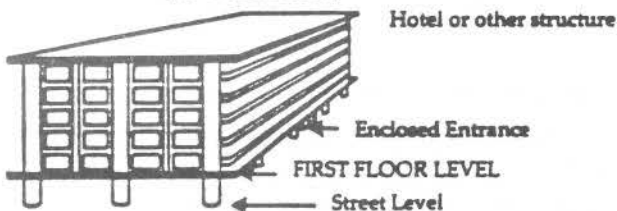


Figure 15. Determining the lowest floor.

Before a developer or builder knows how far to elevate a structure, the elevation of the flood-plain site must be known. The flood-plain permit therefore contains specific space on which to indicate the site elevation, the BFE, and the necessary elevation. For example, if the site elevation is certified to be 404 NGVD, and the BFE is 406 NGVD, a structure must be elevated two feet above existing grade.

Some states and many communities require "freeboard" in their elevation requirements, i.e., a structure may be required to be elevated higher than the BFE (one foot of freeboard is a typical requirement). In the above case, the structure must therefore be elevated three feet, not two feet. Freeboard is encouraged because it guarantees a safer structure and a lower flood-insurance rate.

### Methods of Elevating Residential Structures

Residences can be elevated by increasing foundation height, adding fill, or building residences on posts or piers. These methods, described in more detail below, are illustrated in Figure 16.

1. Increasing the height of the foundation - It is sometimes a practice in communities to construct residential foundations using 8x8x16-inch concrete blocks. Foundations may therefore be described as being "two-blocks-high," "three-blocks-high," etc. Using this as a gauge, a developer could use a three-block-high foundation to meet a two-foot elevation requirement. A five-block-high foundation could be used to meet a three-foot-elevation requirement. The technique could be used when pouring a concrete foundation and having a crawl space beneath a residence. As previously mentioned, the floor joists could also be used to meet the elevation requirement; therefore, a four-foot-elevation requirement could be met by using five blocks and a 10-inch floor joist. These techniques can be used to design a foundation that would protect the first-floor level from the base flood.
2. Using earth fill - Fill dirt may also be used to meet the residential elevation requirement. Fill, of course, may be used in combination with the foundation to meet the elevation requirement. Fill should extend 15 feet from all sides of the structure to increase fill stability during floods, and it should be properly compacted.
3. Using posts or piers - Posts or piers as structural supports may be used to gain the proper elevation. This method of elevating residential structures is common in areas adjacent to the Missouri and Mississippi Rivers and other major rivers where elevation requirements may exceed 10 feet.

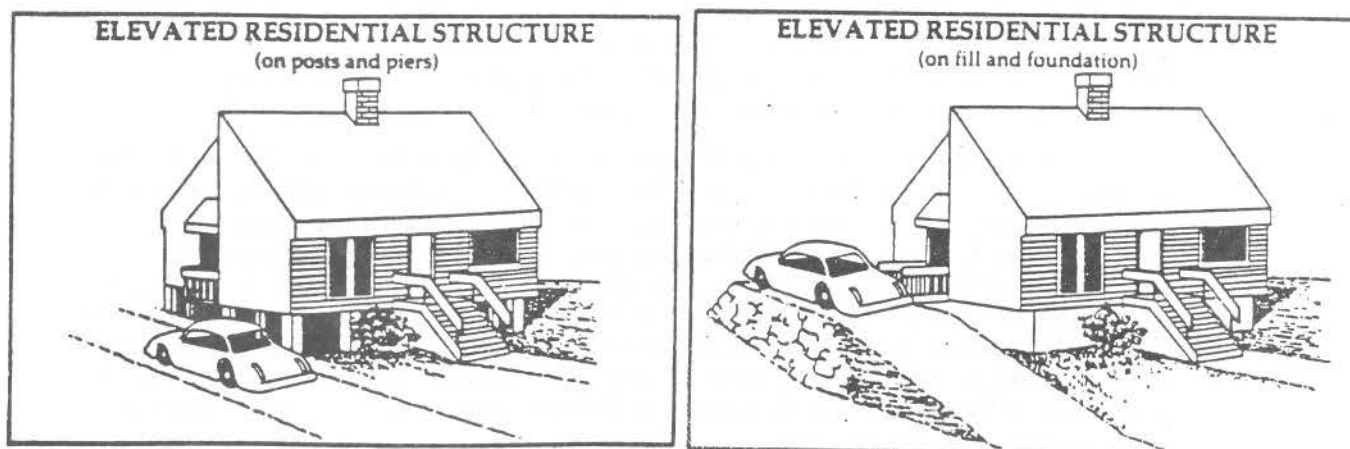


Figure 16. Elevating methods.



## **Certification Requirements**

A licensed surveyor or engineer must certify that the elevation requirement has been met. Certification requirements are explained in more detail later in this handbook. Sample certification forms are provided.

Additional information about elevating residential structures may be obtained by ordering the *Elevated Residential Structures* manual listed in the Appendix.

## **Requirements for Commercial Structures**

### **General Requirements**

The Regular Program ordinance regulations concerning commercial (non-residential) structures are generally not different from those for residential structures, i.e., the enforcement officer must determine the lowest floor and establish the BFE, and the developer must design the structure to meet elevation regulations.

Commercial structure regulations differ, however, because they permit flood-proofing to protect structures from flood hazards; therefore, commercial structures can be elevated on fill, posts, foundations, or they may be flood-proofed (or a combination of the two).

### **Methods of Elevating Commercial Structures**

The same techniques to elevate residential structures apply to commercial structures. For information regarding elevation techniques, refer to the preceding section on residential structures.

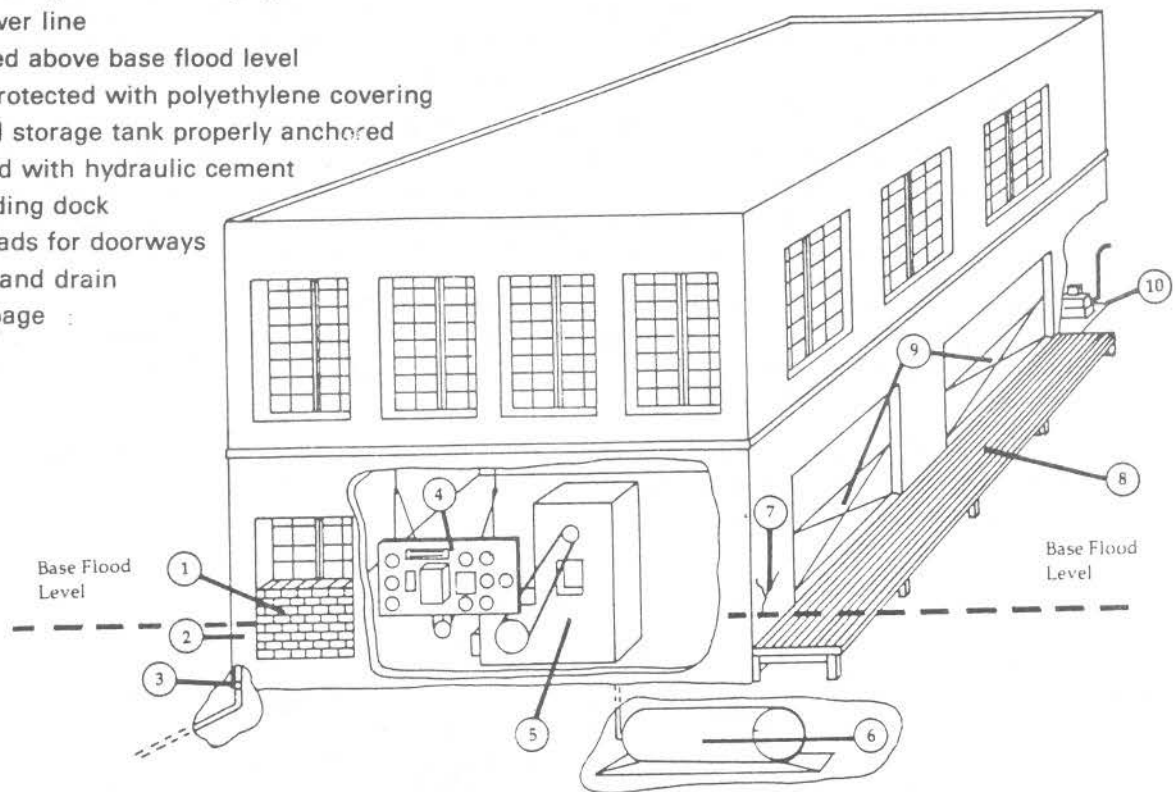
### **Methods of Flood-Proofing Commercial Structures**

Flood-proofing may be used to protect non-residential structures from the base flood. Flood-proofing is designing a structure so that all parts below the 100-Year flood elevation are water-tight and resistant to flood damage. Approved flood-proofing methods require dry flood-proofing and may involve human intervention. These methods are described in detail below and are illustrated in Figure 17.

1. **Dry Flood-proofing** - Dry flood-proofing is designing a structure to protect it from the base flood. The structure must be designed to prevent seepage, collapse or cracking of basement walls, buckling of basement floors, and back-up of water from sewer lines. Walls must withstand hydrostatic pressure and all openings must be one-foot above the BFE. Waterproof seals and paints should be used on exterior surfaces exposed to the base flood. These techniques are illustrated in Figure 17. Additional information concerning flood-proofing techniques may be obtained by ordering the *Introduction to Flood-proofing* manual listed in the Appendix to this handbook.
2. **Human Intervention** - Human intervention is using door and window shields as temporary protection from the base flood. Door and window shields may be made of wood, metal, or other materials, but they must be designed so they securely cover all openings exposed to the base flood. This method should be used only where adequate flood-warning time is possible or where flood-warning devices are present. Shields and other temporary flood-proofing devices should be stored near openings they are intended to cover, and employees should be familiar with their location and use. Flood-proofing measures and devices must be designed with great caution. Door and window shields are generally ineffective for flood depths greater than three (3) feet, and they may cause more damage to older structures than they prevent.



1. Permanent closure of opening with masonry
2. Thoroseal coating to reduce seepage
3. Valve on sewer line
4. Utilities raised above base flood level
5. Machinery protected with polyethylene covering
6. Underground storage tank properly anchored
7. Cracks sealed with hydraulic cement
8. Elevated loading dock
9. Steel bulkheads for doorways
10. Sump pump and drain to eject seepage



SOURCE: Missouri Department of Public Safety, Disaster Planning and Operations Office, *National Flood Insurance Program Handbook for Missouri Communities*, March 1980.

*Figure 17. Flood-proofing methods.*

### **Certification Requirements**

A registered engineer or architect must certify all flood-proofing techniques. A copy of the flood-proofing certificate must be filed; the insurance agent will use it to verify the level of flood protection and to determine the flood-insurance rate.

It is important to note that for flood insurance purposes, the flood-proofed building is rated one foot below the level of flood-proofing. Unless the developer exceeds the minimum standards, the premium can be very costly. When in doubt, ask.

## **Requirements for Construction Materials, Methods and Equipment**

### **General Requirements**

The Regular Program ordinance specifies that construction materials, equipment, and methods must minimize flooding. Specifically, the following objectives should be met:

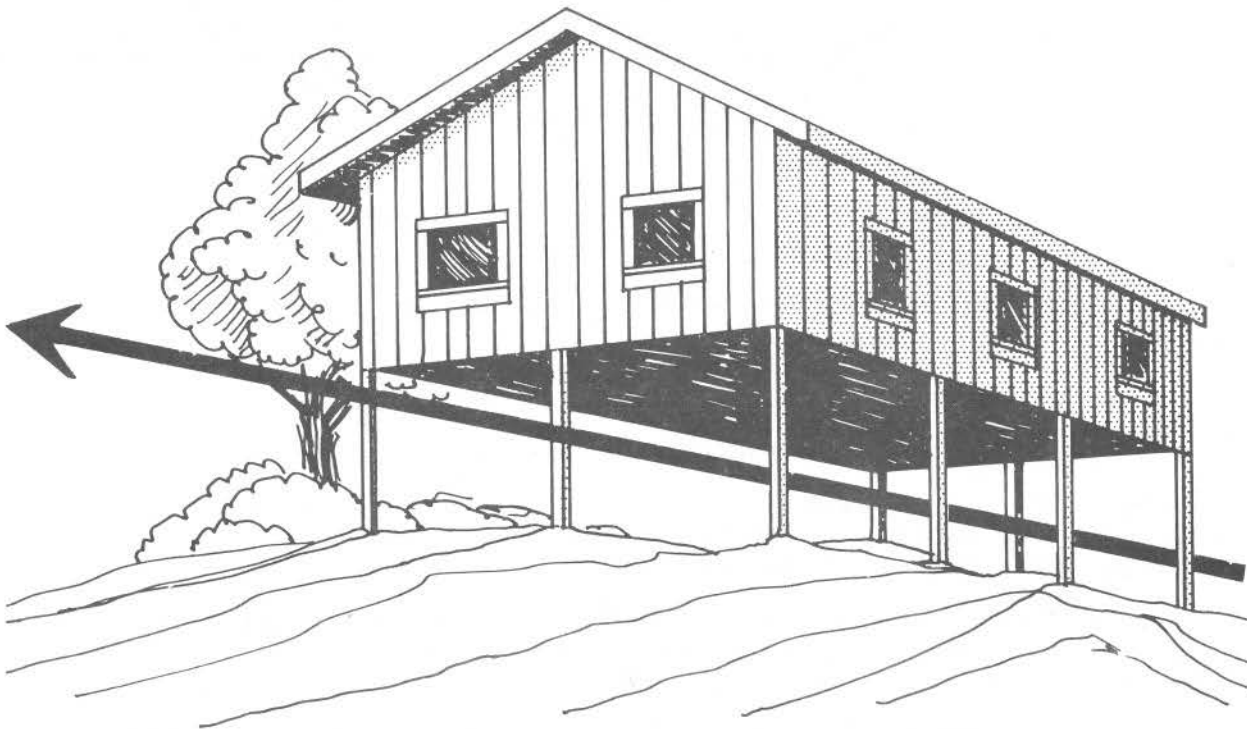
1. **Materials and Equipment** - Wood floorings shall be installed to accommodate lateral flooring expansion perpendicular to the flooring grain, without incurring structural damage to the building. All finished flooring shall be made of materials that are stable and resist water damage from submersion. All carpeting or carpet cushions employed as

finished flooring surface shall be made of materials that resist water damage from submersion. Plywood shall be made of an "exterior" or "marine" grade and be water-resistant and/or a waterproof variety.

2. Construction Methods - Construction methods can be adjusted to reduce flood damages. Generally all requirements of the Regular Program ordinance constitute construction methods designed to reduce flood damages. In addition, two specific construction techniques can reduce flood damages to new construction in the flood plain. These techniques are (1) building setback, and (2) building alignment.

**Building Setback**--Building setback is placing fill, posts, or pilings outside the floodway portion of the 100-Year Flood Plain. Where floodways have not been delineated, the developer must certify that the proposed development and anticipated equal encroachments will not raise the BFE more than one (1) foot.

**Building Alignment**--Building alignment is placing structures so they offer the least obstruction to flood flows, e.g., buildings aligned horizontally to flood flows or stream flows. Alignment techniques are shown in figure 18.



*Figure 18. Building alignment.*

### **Anchoring Requirements**

New structures in the flood-hazard area must be anchored to prevent their collapse, flotation, or lateral movement. It is, of course, a standard construction procedure to anchor a residential or commercial structure to its foundation. The need to anchor other structures such as sheds, detached garages, mobile homes, and liquid storage tanks may not be as obvious; however, it must be

addressed when such structures are in flood-prone areas. Details about anchoring are given below. Manufactured home anchoring requirements are discussed in detail in the manufactured home section of this handbook. (page 31)

Methods of anchoring larger buildings may also be applied to smaller ones. Sheds, detached garages, and accessory buildings may be bolted to their foundations to meet the anchoring requirement.

Liquid storage tanks can be anchored with steel straps or, if practical, they can be elevated above the BFE.

## Utility Requirements

Electrical and plumbing facilities must be designed and placed to minimize flood damage. This can be done by using the techniques described below and illustrated in Figure 19.

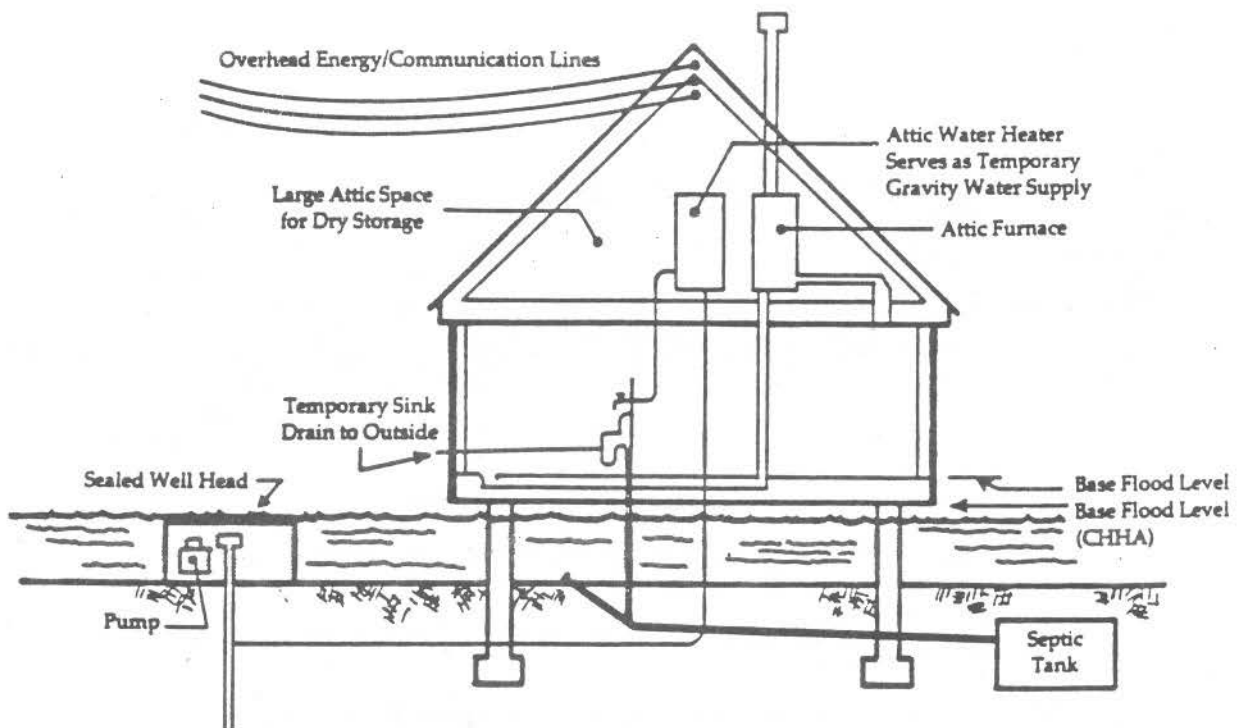


Figure 19. Electrical and plumbing techniques.

### Electrical Systems

All electrical water heaters, electric furnaces, and other critical electrical installations must be placed above the BFE.

### Plumbing

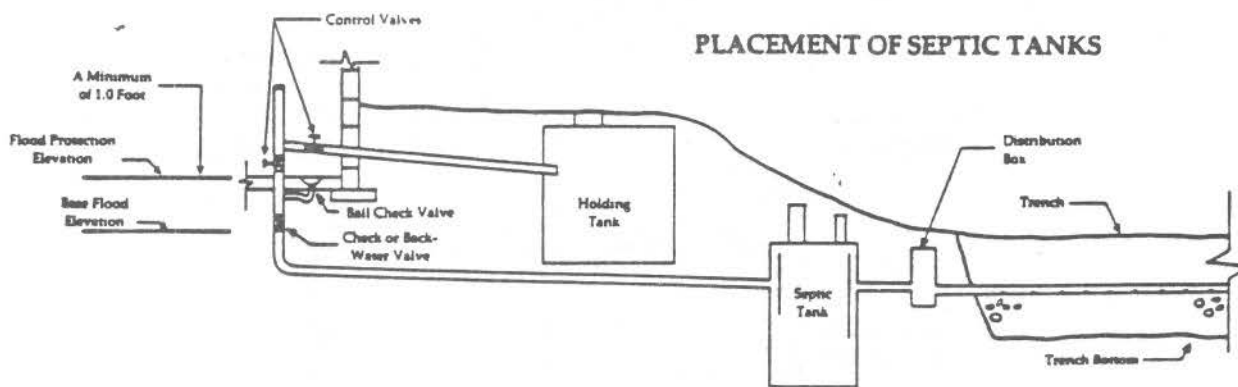
Water heaters, furnaces, and other critical mechanical installations shall be prohibited below the established BFE.

Water supply systems, wells, and sanitary sewage systems must be designed to prevent flood-water infiltration into the systems and discharges from the system into flood waters.

Manhole covers must be placed above the 100-Year flood elevation or otherwise designed to minimize flood damage. Waste-treatment facilities, including pumping stations, lagoons, and treatment plants must be flood-proofed or otherwise protected to the BFE. Ring levees may need to protect waste treatment facilities below the BFE.

All gas and oil supply systems must be designed to prevent flood-water infiltration into the systems and discharges from the systems into flood waters.

On-site waste disposal and treatment systems, such as septic tanks and sewage treatment plants must also be designed to minimize flood damage. Meeting this requirement may be particularly difficult, because on-site facilities may be substantially below the first-floor level of the structure they serve. Any septic-tank inlets and outlets and waste-disposal trenches should be above the base flood. A mound system of waste disposal may be necessary for adequate subsurface drainage during flooding. Basic design and layout of on-site systems are shown in Figure 20.



NOTES: Earth cover over the top of the distribution box shall be at least 6" but no more than 12".

Earth cover over the top of the septic tank cover or over the top of the access manhole or the inspection pipe shall be at least 6" but no more than 12".

The elevation of the inlet invert to the holding tank shall be at or above the regional flood elevation.

SOURCE: *On-Site Sewage Disposal in Flood Plain Areas*, Minnesota Department of Natural Resources Technical Report 5 (December, 1974).

Figure 20. Placement of septic tanks.

## Subdivision Requirements

Subdivision proposals of five or more acres or of fifty or more lots must meet certain requirements, which are listed below, before they can be approved for flood-plain management purposes

### **Provide Base-Flood Elevation Data**

A developer is responsible for listing the BFE and indicating the floodway and floodway-fringe boundaries on a subdivision proposal. A grading plan showing the proposed finished elevation of streets and building sites should be included in the proposal. Portions of the grading plan located below the BFE may be used for streets, recreation, and other uses which will not increase flooding. All structures must be above the BFE and outside the floodway boundary.

### **Provide Adequate Drainage**

Building sites should be at least two feet above their street elevations. Streets should be designed to drain building sites and prevent street ponding. Stream crossings should be designed to accommodate the base flood.

### **Locate Public Utilities and Facilities to Minimize Flood Damage**

Electrical, gas, water, and sewer facilities should be protected from flood damage. Electrical facilities should be above the base flood. Gas, water, and sewer systems should be designed to withstand leakage or rupture during flooding.

## **Manufactured Home Requirements**

Manufactured homes generally are more susceptible to flood damage than conventional homes and business structures, mostly because flooding will probably dislodge them from their foundations, cause collapse, or move them laterally during serious flooding. Inundation by flood waters can cause building components to fall apart. Flood-damage prevention requirements for manufactured homes are therefore given extensive consideration in the Regular Program ordinance.

In several ways, manufactured homes are treated differently from other structures when applying flood-plain regulations:

1. For manufactured homes outside a manufactured-home park, it is required that flood-plain management regulations (elevation and tie down requirements) be enforced whenever new pads are constructed or new manufactured homes are moved to existing pads. Pads are defined as concrete or gravel parking spaces with attendant utility hook-ups.
2. Manufactured home parks or subdivisions have been (in the past) "grandfathered-in" as a single unit. Expansions or reconstruction of manufactured home parks or subdivisions (which equals over fifty percent of the existing manufactured home park) made after the effective date of the FIRM are subject to Regular Program regulations. New FEMA standards related to manufactured homes in manufactured home parks were in preparation at the time this handbook was being published.
3. For a manufactured home to be insured under the NFIP, the manufactured home must be certified as properly anchored. The "Elevation Certificate" illustrated in Figure 13 includes space for manufactured-home anchoring certification.

Manufactured home regulations for Regular Program communities are as follows:

1. Manufactured homes must be anchored by using over-the-top ties or straps. The anchoring system must be able to carry a force of 4,800 pounds. An anchoring system designed to withstand a wind force of 90 miles per hour meets this requirement.

2. Over-the-top ties must be at each of the four corners of the manufactured home, with additional ties on each side if the manufactured home exceeds 50 feet in length. A manufactured home elevated on a foundation, posts, or piers must be anchored. If a manufactured home is elevated on fill above the BFE, anchoring is encouraged, but not required, for flood protection purposes. Methods of anchoring manufactured homes are shown in Figure 21. (The home must be anchored to be insured.)
3. Stands or lots must be elevated on compacted fill or on pilings so that the lowest floor of the manufactured home will be at or above the BFE. When pilings are used, lots must be large enough to permit steps. Pilings must be placed in stable soil no more than ten feet apart. Pilings more than six feet above ground level must be reinforced.

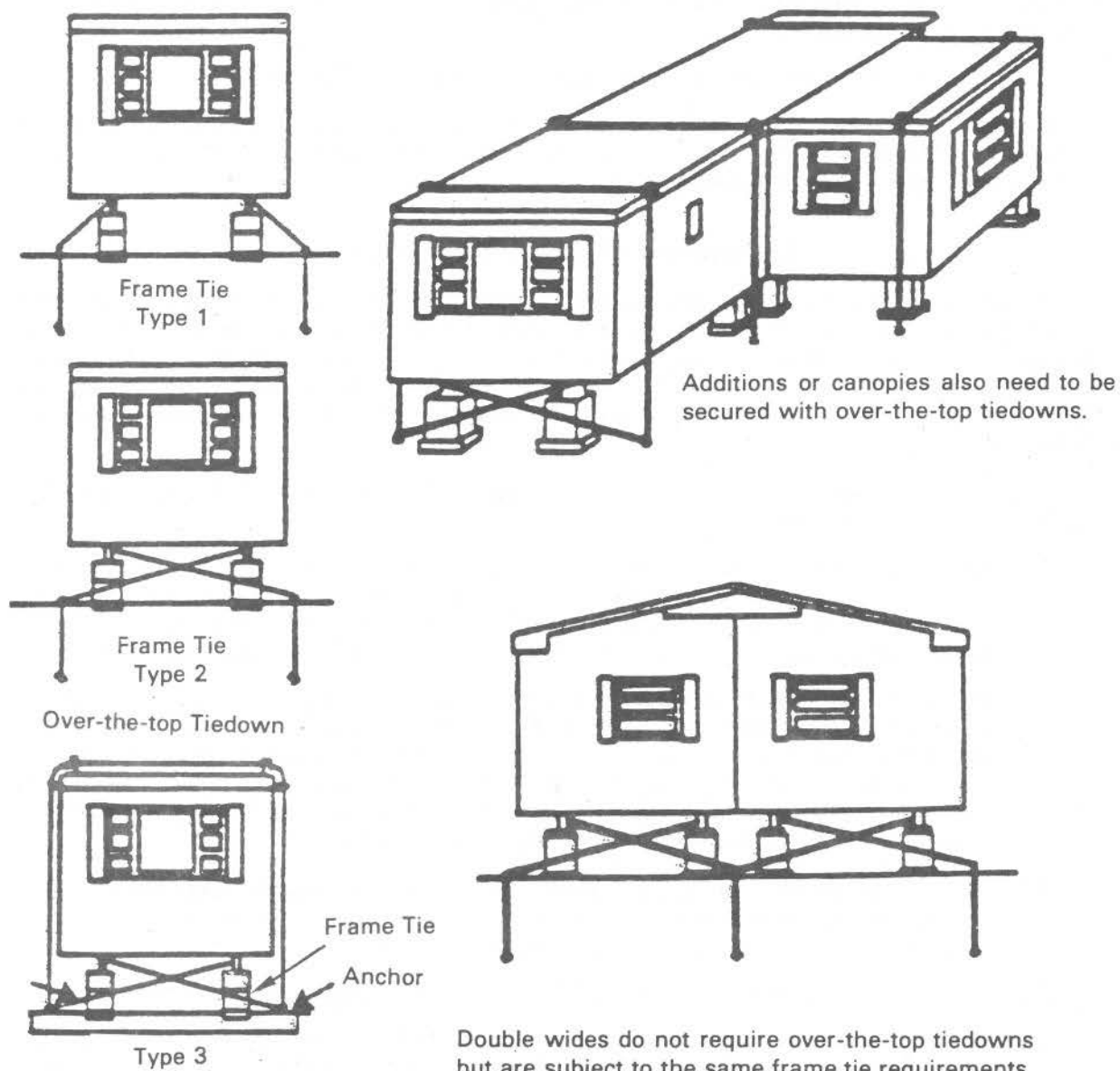


Figure 21. Anchoring systems



4. There must be adequate surface drainage and access for haulers.

Many communities require all manufactured homes to meet regular residential requirements. Some communities forbid placing of manufactured homes in Zone A.

### **Elevating Manufactured Homes**

Manufactured homes may be elevated to the 100-Year flood elevation, on dirt fill, posts, or pilings. In this respect, elevation techniques are similar to those for residential and commercial structures; therefore, elevation techniques will not be repeated here. Preceding sections of this handbook concerning elevation of residential and commercial structures should be reviewed.

### **Manufactured Home Evacuation Plans**

Regardless of precautions, manufactured homes may still be susceptible to severe flooding damage. Removing manufactured homes from imminent flooding may be practical in locations subject to gradual rises in flood waters; it is more important, however, to evacuate people and readily removable personal property from manufactured home parks. Flood insurance covers certain removal expenses in such cases. For these reasons, a manufactured-home-evacuation route is encouraged, although not required by federal minimum standards.

An example of a manufactured-home evacuation plan is shown in Figure 22.

The plan provides at least two escape routes, identifies the equipment and personnel needed for the evacuation, and identifies the staging area.

### **Accessory Structures**

Accessory structures (sheds, detached garages) are included under the general definition of structure and consequently, subject to all flood plain management regulations pertaining to structures. There is justification for treating accessory structures, which do not represent significant investments, differently in regard to the application of flood plain 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 minimal investment, elevation or dry flood-proofing standards need not be met; however, all other standards applicable to structures, such as obtaining a flood-plain development permit, anchoring and utility requirements, and floodway regulations, do apply.

As guidelines, the following standards apply to accessory structures:

1. Accessory structures shall not be used for human habitation.
2. Accessory structures shall be designed to have low flood-damage potential.
3. Accessory structures shall be constructed and placed on building sites so they offer 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 or flood-proofed.



# MANUFACTURED HOME EVACUATION PLAN RIVERVIEW TRAILER PARK EVACUATION PLAN

People to be relocated: 105  
Relocation Points: West Valley Shopping Center (1)  
East Valley Shopping Center (2)  
Contact Person: Jim Travis (Phone: 236-8799)  
Equipment Needed: 6 buses (Public Works/School District)-Police-Fire  
4 trucks  
Evacuation Routes: Northland Drive West  
Northland Drive East  
Comments: People living west of Central Ave. will evacuate to West Valley Shopping Center,  
those living east of Central Ave. will evacuate to East Valley Shopping Center

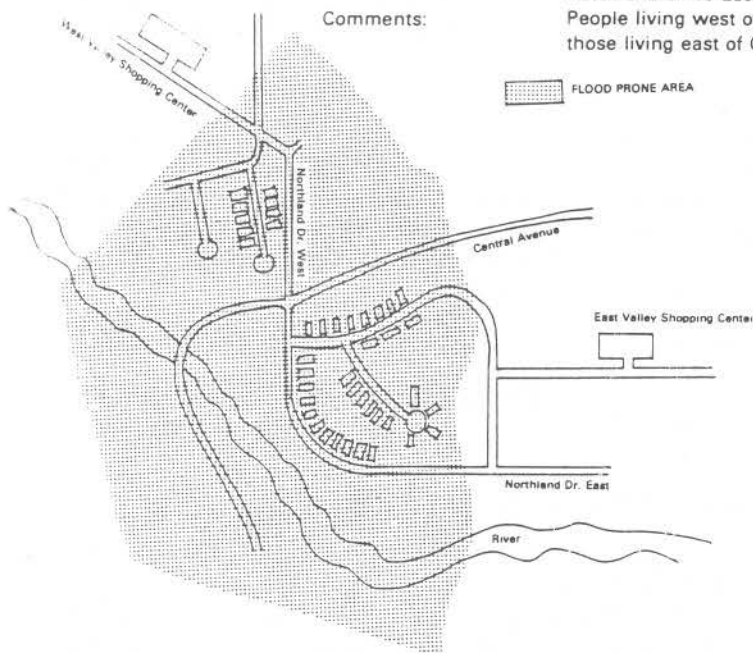


Figure 22. Evacuation plan.

If the above procedures are followed, and an accessory structure does not satisfy elevation and/or flood-proofing requirements of community ordinance, the applicant must request a variance. Such a variance is deemed a reasonable departure from the standards.

It is important to note that even an accessory structure (if insured separately from the principal structure) could have a high flood-insurance rate if it does not satisfy the flood-plain ordinance.

An accessory structure can often be insured with the principal structure. It is best to consult an insurance agent.

## Special Standards for Areas of Shallow Flooding

Shallow-flooding area means a designated AO or AH Zone with a one-percent or greater chance of flooding to an average depth of one to three feet. A clearly defined channel does not exist in Zones AO or AH, the flooding of which is characterized by ponding or sheet flow. Zones AO and AH are part of the 100-Year flood plain and are therefore subject to regulations in Section VI of this handbook; floodway requirements are an exception, since floodways are not delineated in these zones.

Aside from the lack of floodway requirements, shallow-flooding zones are most characterized by the methods in which the elevation requirements for residential and nonresidential developments are applied. These methods are described below.

#### **Requirements for Zone AO**

All new construction and substantial improvements of residential structures in Zone AO must have the lowest floor (including basement) elevated above the highest adjacent grade, to the depth number specified on the FIRM (at least two feet if no depth number is specified). The highest adjacent grade is the highest natural grade adjacent to the proposed walls of the structure before construction.

All nonresidential construction and substantial improvements must have the lowest floor (including basement) elevated above the highest grade, to the depth number specified on the FIRM (at least two feet if no depth number is specified), or, together with attendant utility and sanitary facilities, be flood-proofed to that level to satisfy the flood-proofing standard.

#### **Requirements for Zone AH**

All new construction and substantial improvements of residential structures in Zone AH must have the lowest floor (including basement) elevated to or above the BFE shown on the FIRM.

All new construction and substantial improvements of nonresidential structures in Zone AH must have the lowest floor (including basement) elevated to or above the BFE shown on the FIRM, or, together with attendant utility and sanitary facilities, be flood-proofed to that level to satisfy flood-proofing standards.

### **Variances**

Provisions for variances are made in the Regular Program flood-plain management ordinance. They include a description of procedures that should be used in reviewing requests for variances, and precautions that should be taken when issuing variances.

Variance procedures adopted by communities need not be those in sample ordinances from the Federal Emergency Management Agency; instead, communities may adopt state variance procedures or develop their own. Two important issues that should be addressed when developing variance regulations are (1) procedures used to review variances and (2) precautions observed when granting variances.

#### **Variance Procedures**

In some cases, variances may be given without regard to the variance procedures outlined in a community flood-plain management ordinance, namely, for the reconstruction, rehabilitation, or restoration of structures listed on the National Register of Historic Places or in the State Inventory of Historic Places.

In other cases, variances may not be given in any instance, namely, for the construction of buildings or other developments in a regulatory floodway without certification that the development will not increase the BFE.

In other cases, variances may be considered, provided that procedures for reviewing requests for variances are followed. Generally, when reviewing requests for variances, the appeal board or other party reviewing such requests must consider the hazards to which the nonconforming structure or development would be exposed and the hazards that would be created by allowing the development to be built. When granting a variance, a community should also provide written notification to the

party requesting the variance that actuarial flood-insurance rates may be higher for the proposed structure if a variance is granted.

### **Precautions to Observe When Granting Variances**

A variance represents a community action to set aside flood-plain management regulations adopted to reduce the loss of life and property due to flood hazards. The effect of individual variances on attempts to reduce losses of life and property may not be severe, however the cumulative effect of a pattern of variances or the impact of granting a single variance for a large development may be severe. The issuance of variances is therefore regarded as a serious matter by the Federal Emergency Management Agency. Granting variances that will severely affect the community's ability to reduce the loss of life and property as a result of floods can be cause for a community's suspension from participation in the National Flood Insurance Program. These precautions, taken to reduce future flood losses and to maintain eligibility for participation in the National Flood Insurance Program, should be observed by communities when considering variances.

The elevation (or floodproofing) certificate is important: It lets the local administrator know that the permittee has done what he said he would do. It "closes the loop", as it were.



*Figure 23. Closing the loop.*

The local administrator keeps a copy of the permit application, whether approved or denied and should note the reason for a denial on the application form. An applicant denied a permit can appeal or can request a variance.

An applicant issued a permit may have a time limit imposed, such as twelve months, in which to begin the permitted development; otherwise the permit expires, a provision that protects the community from later "surprise" developments permitted by a former administrator.

When a permit is issued, the local administrator fills out the portion of an elevation certificate that identifies the FIRM panel shows the site, and the BFE, if known. When the building is completed, the owner tells the project engineer or surveyor to complete the form certifying the elevation of the lowest floor.

The elevation certificate is important for the following reasons:

1. the owner's insurance agent needs it to write flood insurance coverage for the building;
2. the tenant's insurance agent needs it to write flood insurance coverage for building contents;
3. the owner needs it if he ever wants to sell the property;
4. the local administrator needs it because the certificate shows if the completed building complies with the ordinance. If not, the court will consider the certificate evidence.

The owner's lender may also find the certificate useful. See sample development permit, elevation certificate, and floodproofing certificate.

### **The Reluctant Applicant**

What does the local administrator do when the developer does not want to comply with the ordinance terms, and says he does not want to buy flood insurance?

As most municipalities have vehicle speed limits to ensure public safety, nearly five hundred Missouri communities have flood-plain management ordinances to ensure public safety. What would a sheriff, police chief, or city marshall do if a motorist said he did not want to observe the speed limits, and did not want to buy auto insurance?

A flood-plain management ordinance has a penalty provision. Regardless of the penalty, it is an ordinance enforceable in (a) municipal court, or (b) circuit court. If the community does not actively enforce its ordinance, it is subject to disciplinary action by the FEMA Regional Office.

### **Probation**

When a FEMA review of community performance determines lax enforcement, the FEMA Regional Office may impose probation, a formal step toward suspension from the NFIP. During the probation period, each purchased or renewed flood insurance policy has a \$25.00 premium surcharge imposed. FEMA officials work closely with a community on probation to improve performance.

### **Suspension**

If a community demonstrates recalcitrance or efforts to improve performance fail, the FEMA Regional Office will recommend that the community be suspended from NFIP participation. The FEMA central office, in Washington, D.C., suspends such a community.

Suspension means flood insurance (new or renewal) is unavailable, and federally related grants or loans are unavailable for buildings in flood-hazard areas; it also means no disaster assistance, no mortgage loans, no small business loans, and no grants for sewage-treatment plants.

Several Missouri communities have been suspended and subsequently reinstated. Suspended communities can return to the NFIP if they reapply and are recertified by the FEMA regional office. Usually, a community assistance visit is made. If there has been development during the period of suspension, it is examined by state or federal reconnaissance. If violations have occurred, the local community must somehow correct the problem. Both the FEMA Regional VII office and the State Coordinator's office can help a community desiring help.

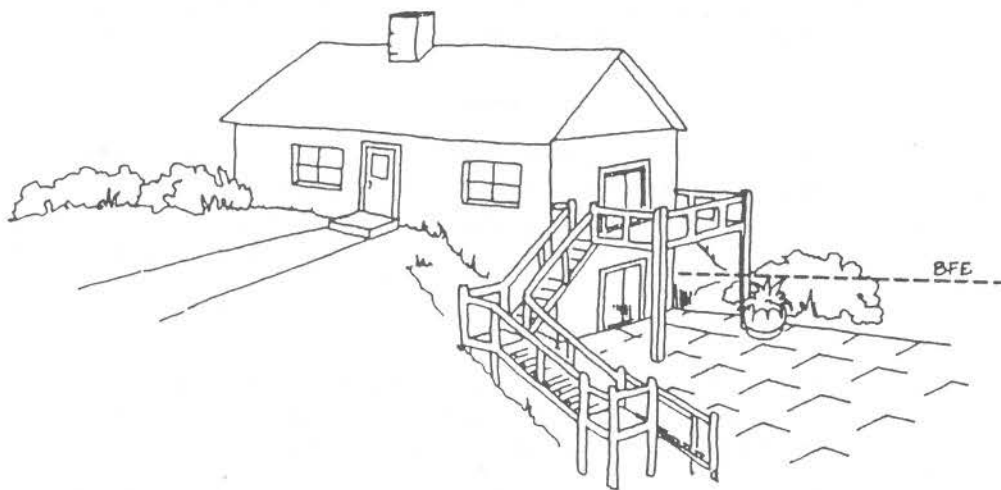
It can be seen that there are serious ramifications to ordinance enforcement. Community assistance is available, however, and local administrators should not be reluctant to contact FEMA or Missouri DNR officials with questions or requests for help.

## Enclosures below Elevated Buildings

All new construction and substantial improvements should be required to be fully enclosed areas below the lowest floor subject to flooding and should be designed to equalize automatically hydrostatic flood forces on exterior walls, by allowing for 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. All other requirements must be met - any utilities above BFE, not suitable for habitation, etc. Formerly forbidden, this provision was added in 1986.

## Flood Insurance Ramifications

A basement is defined as being below grade on all sides. In Missouri, because of common hilly terrain, it has been a common practice to design and build homes with "walk-out basements." Typically, a walk-out basement is not really a basement, because the walk-out side of the house is at or above adjacent grade. This makes a difference concerning flood insurance coverage of residential contents: Basement contents are excluded from coverage (with the exception of one washing machine, one clothes dryer, and one freezer). Contents of a walk-out basement are considered lowest "floor" contents and are covered.



*Figure 24. The "Walk-out Basement." --In a flood hazard area, this is a pre-FIRM building. It cannot be built in a post-FIRM condition.*

## Special Case

A building constructed before the effective date of a community's Flood Insurance Rate Map (FIRM) is a "pre-FIRM" building. In this special case, a pre-FIRM residence with basement, in the flood hazard area, is substantially fire damaged.

Substantial improvements *must* be made according to the code, and substantially improved buildings must meet the code. A basement is below grade, pre-FIRM, and cannot, as originally built, be made to meet the code.

The lowest floor must be above BFE. In a similar case in a Missouri River community, the owner broke up the concrete basement floor and placed several tons of gravel (cost: about one hundred dollars) in the former basement. He then had a "crawl-space," not a basement; the lowest floor was eight feet higher than before. The flood-insurance policy, now rated for a post-FIRM building was written at a substantial premium saving. The rebuilt house met the ordinance requirements.

There usually are ways to comply. Sometimes compliance costs are compensated by a few years of insurance premium reductions. When in doubt, ask questions; there are people who can help. FEMA has prepared several books to help. See the Appendix.

## ACTUARIAL RATES

### TWO EXAMPLES

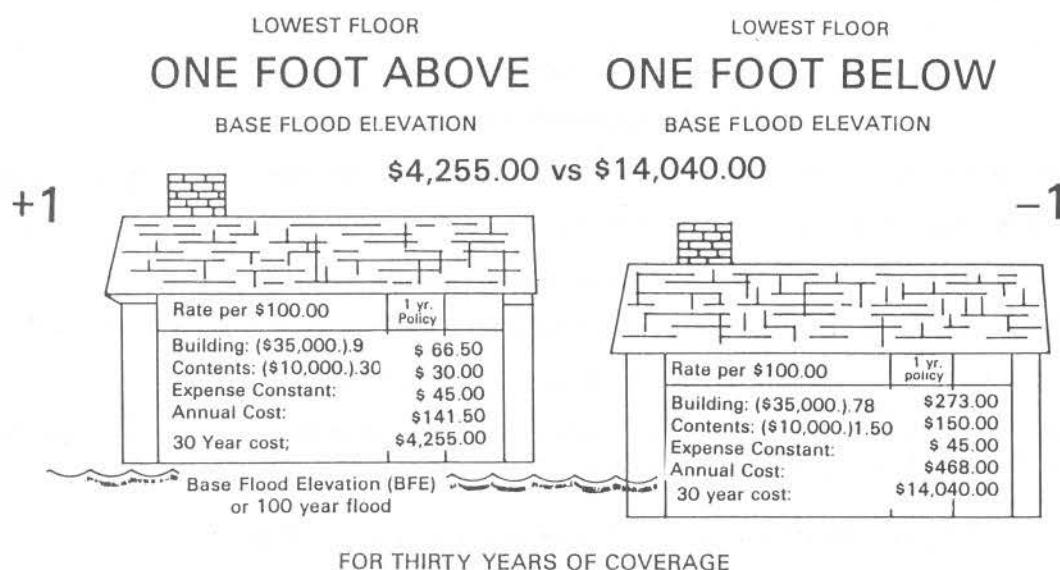


Figure 25. Comparison of rates.

### Administration

In some Missouri counties, a municipality contracts with the county government or with the city government of the county seat to do inspections and enforcement. Applicants pay a fee for the service. For example, many small municipal governments do this in St. Louis County. Elsewhere, a county government sometimes contracts with the county's major city to administer its ordinance.

In other cases, the Regional Planning Commission, the Council of Governments, or an engineering consulting firm may be the contract agent for local flood-plain development permits or inspections. It should not be necessary to organize a new government agency.



## **Record-keeping and Certification Requirements**

### **General Requirements**

The preceding explanation of ordinance requirements should indicate clearly that records must be maintained of ordinance-regulated activities. Such records include issuance of permits, certificates of compliance with the ordinance requirements, and maintenance of maps and other flood-hazard information.

### **Maintaining Records of Permits**

The enforcement officer must maintain records of development permits in flood-prone areas. Where applicable, records of permits required by local, state, and federal agencies also should be maintained.

### **Obtaining Certification of compliance**

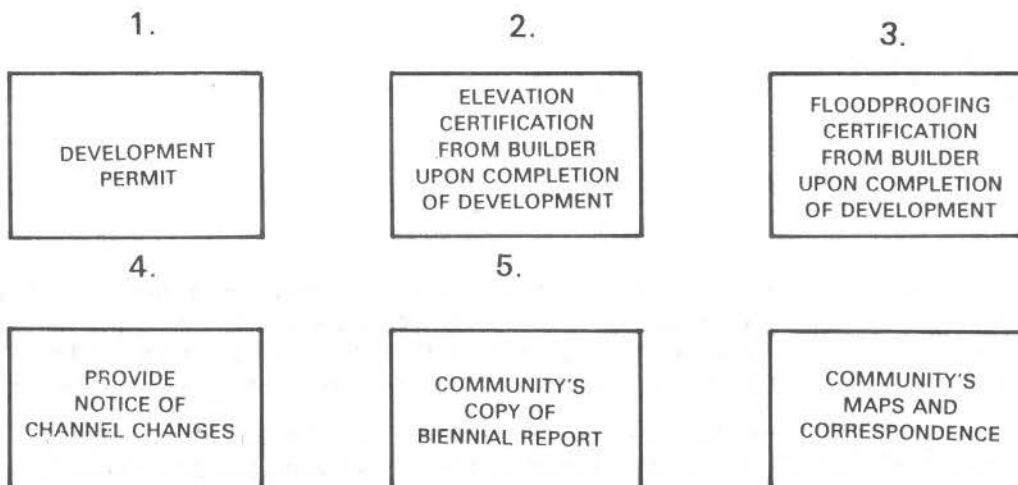
#### **With The Requirements Of The Ordinance**

Developers of structures built after the effective date of the ordinance must certify the following:

1. The elevation of the lowest floor level of structures.
2. The elevation to which commercial structures may be flood-proofed.
3. The elevations in the grading plan for subdivision proposals of 5 acres or 50 lots.
4. Specification that new stream crossings will accommodate the base flood flow.

Sample development permit and certification forms are illustrated in this handbook. Items included in record-keeping and certification are shown below.

### **RECORD-KEEPING AND CERTIFICATION PROCEDURES**





### **-Check List-**

#### **Records the Local Administrator Must File**

1. Approved and denied flood-plain development permits and related materials.
2. If permit denied, written reasons for denial.
3. If appeal is filed, appeal records.
4. If variance is granted, justification for same, and documentation record.
5. If variance is granted for a building below BFE, copy of the notification which must be given the appellant that flood insurance premiums will be higher.
6. *Elevation (or Flood-proofing) Certificate when a building is completed.*
7. *Notification to the Missouri Department of Natural Resources, adjacent communities, and FEMA of community watercourse alterations or stream channel changes.*
8. *A community's FIRM and FIS.*
9. *Correspondence with applicants, FEMA, and the Missouri Department of Natural Resources State Coordinator.*
10. *A community's copy of its biennial report.*
11. *A community's ordinance, resolution, and application to enter the NFIP.*
12. *Developer subdivision plans.*
13. *Records of enforcement action taken.*

## **VII. The Biennial Report**

NFIP participating communities must file a Biennial Report with the Federal Emergency Management Agency (FEMA). Report forms are sent to communities by March. Completed forms should be returned to the FEMA Regional Office within three months. A Biennial Report, (fig. 26) contains information about changes to a flood-hazard area and program administration. FEMA wants this information to obtain a general idea of changes in the flood-prone areas of the United States, and to determine if communities are having difficulty in using FEMA flood-hazard information. Information on answering questions in the Biennial Report is given in the following pages:

**Address Changes** - Note address changes at the top of the form.

**Boundary Changes** - If your community has annexed areas adjacent to streams, lakes, or other sources of flooding, indicate this on the form and attach a copy of the new community map.

**Natural Changes** - Only large-scale changes that will obviously affect flooding need to be reported.

**Man-made Changes** - Projects built that comply with the ordinance should not be listed. Replacement of culverts, bridges, or other structures that previously contributed to serious flooding should be reported. Construction of non-private dams and levees should be reported. Individual, localized projects such as parking lots, small retention basins, and minor storm-drainage

FEDERAL EMERGENCY MANAGEMENT AGENCY  
WASHINGTON, D.C. 20472

NATIONAL FLOOD INSURANCE PROGRAM

BIENNIAL REPORT for  
Calendar Year \_\_\_\_\_/R

RETURN TO  
Federal Emergency Management Agency  
P.O. Box 8181  
Washington, D.C. 20024

(Please make necessary corrections to the address above.)

INSTRUCTIONS

- i) This report should be completed by you or your locally designated Flood Plain Management Administrator (e.g., your City Engineer, City Planner, City Manager, Building Inspector, etc.).
- ii) Please answer every question.
- iii) Where additional information is needed, please attach separate sheets.
- iv) Please return the report within 30 days of its receipt.

SECTION ONE: Changes and Activities in the Flood Plain

(If you answer "yes" to any question in this section, please provide explanatory information, including when appropriate your own map or a copy of the Flood Insurance Rate Map showing the areas affected.)

- |  | YES                      | NO                       |
|--|--------------------------|--------------------------|
| A. Was there a change last year of your community's territorial or extraterritorial boundaries?  | <input type="checkbox"/> | <input type="checkbox"/> |
| B. Was there a significant natural change of topography — e.g., by land erosion or subsidence, sedimentation or seismic activity — in or near local flood hazard areas?                                    | <input type="checkbox"/> | <input type="checkbox"/> |
| C. Was there a significant man-made change, such as levees or bridges, extensive excavation or filling and paving, in or near local flood hazard areas?  | <input type="checkbox"/> | <input type="checkbox"/> |
| D. Is your community in need of assistance in improving local flood plain management techniques, such as planning in the flood plain, regulation interpretation, enforcement procedures, or floodproofing? | <input type="checkbox"/> | <input type="checkbox"/> |
| E. Does your community operate a program for the acquisition and relocation of structures in flood hazard areas?   | <input type="checkbox"/> | <input type="checkbox"/> |
| How many structures were affected by this in the last calendar year?   | <input type="text"/>     |                          |

SECTION TWO: Program Data

- A. Has there been a change to your flood-related codes or ordinances? (If yes, please send a certified copy of the new law.) ☐ YES ☐ NO
- B. Please tell us the number of building permits granted in the last calendar year for new construction, including substantial repairs or additions to existing structures, in flood hazard areas shown on your community's Flood Insurance Rate Map.
- C. Please tell us the number of variances granted from the base flood elevations established by FEMA in the last calendar year. (A variance is a grant of relief issued by local officials to an applicant seeking release from the requirements of a flood plain management ordinance. Base flood elevations are shown on your community's Flood Insurance Rate Map.)
- D. The numbers printed below were given to FEMA when your community last reported to the National Flood Insurance Program. (If the numbers are inaccurate, please correct them. Provide your best available figures. If precise information is unavailable, please give us your best estimates.)

	Permanent Year-round Population	1-4 Family Structures	All Other Structures
1) In your entire community, including flood hazard areas	<input type="text"/>	<input type="text"/>	<input type="text"/>
2) In your community's flood hazard areas only	<input type="text"/>	<input type="text"/>	<input type="text"/>

Name, Title and Signature	Telephone No. (Include Area Code) (    )	Date
---------------------------	--	------

(Keep the last copy. Return the other 4 copies to the address listed above.)

4 REGION

Figure 26. A biennial report form

improvements should be excluded. Large projects designed to decrease flooding should not be reported unless they are a hundred percent funded and fifty percent completed.

Recent Flooding - Flood damage to residences, business structures, and other structures should be reported. Non-structural damage and minor flooding should be omitted.

Amendments to existing laws - If the community flood-plain management ordinance has been changed, and the Federal Emergency Management Agency (FEMA) has not been notified, attach the record of the changes to the Biennial Report.

Coordination - Include only those problems that affect a community's flood hazards.

### **Statistics**

- a. Construction permits - indicate how many development permits were requested, and how many were granted.
- b. Variances - indicate how many were requested and how many were granted.
- c. Other variances.
- d. General data - Estimate the population and the number of 1-4 family structures, small business structures, and other structures (schools, churches, public buildings) in the flood-hazard area. On the second line of the form estimate the community population, and the number of 1-4 family structures, small business structures, and other structures in the community.

The Chief Executive Officer (Mayor, Chairman of the Board, County Executive, or Presiding Judge) should sign the Biennial Report. The last copy should be retained for the community file, and the remaining copies should be sent to the FEMA office, as directed on the report.

## **VIII. Other Considerations**

The information discussed above explains the minimum federal standards for regular NFIP participation. Because the community purpose in entering the NFIP is flood-damage reduction, the community may wish to take additional steps to protect future and existing developments from flood hazards. Communities may wish to be involved with disaster or emergency preparedness planning and technical assistance, which constitute "hazard mitigation."

### **Emergency Preparedness Planning**

Chapter 44 of the Revised Statutes of Missouri (RSMo) states that each government entity (municipality and county) shall have an emergency preparedness plan and an emergency preparedness director. The State Emergency Management Agency, in Jefferson City, will assist communities when requested. Plans made before a disaster help prepare community officials and citizens for a crisis that may occur "It never has rained as hard as it is going to rain."

### **Technical Assistance**

A number of books are available from the U.S. Army Corps of Engineers; Federal Insurance Administration, FEMA; National Weather Service, NOAA; Soil Conservation Service, USDA; U.S. Geological Survey; and other organizations, that concern flooding, flash flooding, retrofitting existing buildings, designing new elevated buildings, and designing new floodproof buildings. Community officials and citizens can ask the Flood Plain Management Unit of the Missouri Department of Natural Resources for technical assistance. Some book titles are listed in the appendix.

K. Kansas City District  
700 Federal Bldg.  
Kansas City, MO 64106  
(816) 426-3575

L. Little Rock District  
P.O. Box 867  
Little Rock, AR 72203  
(501) 378-5612

M. Memphis District  
688 Federal Bldg.  
Memphis, TN 38103  
(901) 521-3968

O. Omaha District  
217 N. 17th St.  
Omaha, NE 68102  
(402) 221-4893

R. Rock Island District  
Clock Tower Bldg.  
Rock Island, IL 61210  
(309) 788-6361

S. St. Louis District  
210 Tucker Blvd., N.  
St. Louis, MO 63101  
(314) 263-5505

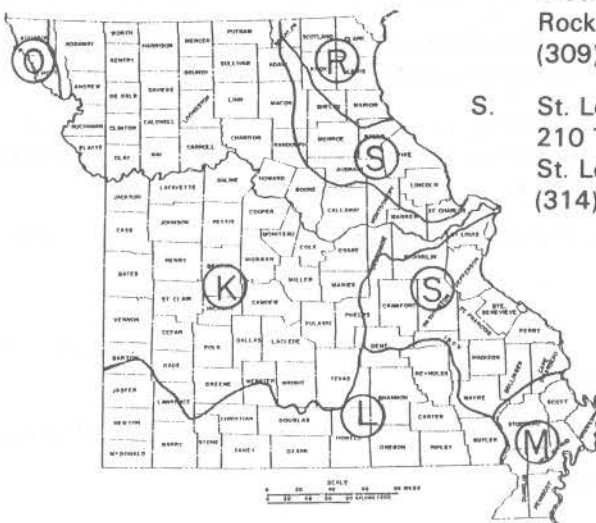


Figure 27. Districts of the Corps of Engineers

## Flood-Hazard Mitigation

Mitigation means relief, reduction, or alleviation.

Comprehensive flood-hazard mitigation uses flood early warning, evacuation planning, leveeing, development regulating, storm water runoff managing, and other measures designed to alleviate flood damages and costs.

The National Flood Insurance Program, the topic of this handbook, is the principal means by which communities can participate in flood hazard mitigation. The Program, created for communities with and without developments in their flood-prone areas, provides benefits of flood insurance for existing property, and the benefits of flood insurance and sound flood-plain management measures for future development in areas where there currently is no development. By adopting and enforcing flood-plain management measures, communities can therefore pursue active roles in flood-hazard mitigation.

Currently, FEMA is considering implementation of a Community rating System (CRS) that would rate local governments on their flood-hazard mitigation activities. Communities that exceed federal minimum standards could build up "points", which would reduce premium rates for flood insurance coverage.

## State and Federal Action

In recent years, the direction of the National Flood Insurance Program has been changed to emphasize the role of flood-hazard mitigation. It is recognized that the program regulations are minimum measures that communities should take to reduce the flood-damage risk. Additional measures designed to reduce or eliminate risks to existing property, other than the provision of flood insurance, are also needed. In response to this need, several procedures were added to the Program. These procedures are intended to encourage acquisition and relocation of flood-prone property, thereby reducing exposure risks. In addition, Executive Order 11988, issued on May 24, 1977, gives guidelines for federal agencies investing in flood hazard areas. These measures, requiring local, state and federal cooperation for successful implementation, are the following:

1. Section 1362. Section 1362 of the National Flood Insurance Act of 1968 contains guidelines for purchase of flood damaged property. The intent of this section is to encourage relocation of property that is repeatedly flood damaged. Factors considered in determining if properties qualify for Section 1362 funding include (1) significance of damage, and (2) repetitive nature of flood damage. The extent to which property is insured against flood loss may also be considered. Although Section 1362 was enacted in 1968, it was not authorized for funding until Fiscal Year 1980, and even then only on a limited basis.

Due to stringent guidelines for applying Section 1362, governments and individuals interested in these procedures must contact either the FEMA Regional Office or the Washington Office of the Federal Insurance Administration/FEMA for more details concerning their use.

2. Executive Order 11988. In his Executive Order 11988 of May 24, 1977, President Carter instructed all executive agencies of the federal government to avoid to the extent possible, long and short-term adverse effects associated with occupancy and modification of flood plains. Each agency was directed to provide leadership to reduce the risk of life and property damage from floods. The Order applies to federal actions including (1) acquiring, managing, and disposing of federal lands and buildings; (2) federally undertaken, financed, or assisted construction and improvements; and (3) federal activities and programs affecting land use, including water- and land-resources planning, and regulation and licensing.

The Order requires all agencies to recognize unique, natural flood-plain values. Additionally, the Order establishes the National Flood Insurance Program standards as the minimum standards where federal action is proposed for flood plains.

The Order delegates one authority to communities. In the case of HUD Community Development Block Grants, the local government assumes responsibility for meeting the requirements of the Order. Information concerning the Order can be obtained by contacting the Kansas City Regional Office of the Federal Insurance Administration/FEMA.



## **APPENDIX**

### **FLOOD MAPS**

For future reference, if you want additional copies of the FIRM, you may write the following

The National Flood Insurance Program  
P.O. Box 449  
Lanham, MD 20706

or telephone, toll-free, (800)333-1363. You must be able to provide your community number.

If you want additional copies of the FIS (which includes the Flood Boundary Floodway Map), you may write the following

The National Flood Insurance Program  
6930 (A/F) San Thomas Road  
Baltimore, MD 21227

or telephone, toll-free, (800)333-1363. Again, you must give the community number.

### **PUBLICATIONS AVAILABLE AT NO COST:**

*Design Guidelines for Flood Damage Reduction* FEMA-15

General information on flooding and how to properly design and build in floodprone areas.

*Elevated Residential Structures* FEMA-54

Proper design and construction of an elevated building.

*Coastal Construction Manual* FEMA-55

Details design and construction techniques for construction in coastal high hazard areas.

*Manufactured Home Installation in Flood Hazard Areas* FEMA-85

How to properly site a manufactured home in a floodprone area, with emphasis on proper design of elevated foundations.

*Floodproofing Non-Residential Structures* FEMA-102

Describes a variety of floodproofing strategies for commercial and industrial structures.

*Flood Emergency and Residential Repair Handbook* FIA-13

Outlines for the homeowner action to be taken before and after a flood to help reduce flood damage and speed repairs.

*Design Manual for Retrofitting Floodprone Residential Structures* FEMA-114

Presents floodproofing steps that can be used for existing residential construction.

*A Unified National Program for Floodplain Management* FEMA-100

Updates a 1979 report which sets forth a conceptual framework and identifies strategies fundamental to implementing a balanced approach to floodplain management.

To order publications write to the following address:

Federal Emergency Management Agency  
P.O. Box 70274  
Washington, D.C. 20024

ATTN: Publications



# **SOURCES OF INFORMATION FOR THE NATIONAL FLOOD INSURANCE PROGRAM REGION VII -- IOWA, KANSAS, MISSOURI, AND NEBRASKA**

<b>Information Desired</b>	<b>Source(s)</b>
Determination of community eligibility	1 - 3 - 4 - 6
Map appeals	1 - 5
Building requirements and permits	1 - 6
Copies of flood-insurance rate maps	3
Copies of flood-hazard boundary maps	3
Sale of flood insurance policy	7
Flood-plain information	1 - 2 - 6
Date of construction	6
First-floor elevation	6
Rates and coverage	3 - 4 - 7
Insurance manual, agency supplies	3 - 4
NFIP regulations	1 - 6
Insurance claims	7

## **SOURCES**

1. Region VII  
Federal Emergency Management Agency  
911 Walnut, Room 300  
Kansas City Missouri 64106  
(816) 283-7007
2. State coordinator for Missouri  
G. Tracy Mehan, III, Director  
Missouri Department of Natural Resources  
Attention: Richard M. Gaffney, AICP  
Flood Plain Management Unit  
Jefferson State Office Building  
201 N. Jefferson Street  
P.O. Box 176  
Jefferson City, Missouri 65102  
(314) 751-2116
3. National Flood Insurance Program  
P.O. Box 499  
LAnham, Maryland 20706  
(800) 636-6620 (Toll-free)
4. National Flood Insurance Program  
Regional Office  
800 Roosevelt Road,  
Building B, Suite 418,  
Glen Ellyn, IL 60137  
(312) 790-9680

## NFIP SUPPLIES ORDER FORM

### PROGRAM FORMS AND MATERIALS

Please send me the flood insurance forms, literature, and/or material indicated below which are available at no charge.  
(The maximum amount that can be ordered at one time is 200 units.)

Producers placing business with WYO companies should follow their company's instructions on ordering supplies.

FORM NUMBER	TITLE	QUANTITY	
		Circle One	Quantity Over 100
593-112	Notice of Loss Form	\$ 15 50 100	_____
593-114	Flood Insurance Application, Part 1 & Part 2	\$ 15 50 100	_____
593-115	Flood Insurance General Change Endorsement	\$ 15 50 100	_____
593-116	Flood Insurance Cancellation/Nullification Request Form	\$ 15 50 100	_____
593-117	Elevation Certificate	\$ 15 50 100	_____
593-180	Map Order Form	\$ 15 50 100	_____
593-213	Certificate of Redetermination of a Property's Location Relative to Special Flood Hazard Areas	\$ 15 50 100	_____
593-215A	Agent's Premium Calculation Pad	\$ 15 50 100	_____
593-224	How to Read a Flood Insurance Rate Map	\$ 15 50 100	_____
593-225	How to Read a Flood Hazard Boundary Map	\$ 15 50 100	_____
593-226	Suggested Lender's Notice	\$ 15 50 100	_____
593-9046	Flood Insurance Application-Part 2 Worksheet	\$ 15 50 100	_____
593-9049	Floodproofing Certificate	\$ 15 50 100	_____
700-9003	Flood Insurance Rate Table	\$ 15	_____
900-255C	Flood Insurance Manual Order Form	\$ 15 50 100	_____

### PUBLIC AWARENESS MATERIALS

593-190	NOTICE: This Policy Does Not Cover Flood Loss (Stuffer)	\$ 15 50 100	_____
593-192	NOTICE: This Policy Does Not Cover Flood Loss (Sticker)	\$ 15 50 100	_____
593-222	Questions and Answers on the NFIP (Booklet)	\$ 15 50 100	_____
593-235	Announcing Better Flood Protection (Stuffer)	\$ 15 50 100	_____
593-236	Flood . . . Are You Protected from the Next Disaster? (Brochure)	\$ 15 50 100	_____
593-237	In The Event of a Flood (Brochure)	\$ 15 50 100	_____
593-238B	Worst Guest List (Hurricane Stuffer)	\$ 15 50 100	_____
593-248	Season's Warnings (Winter Stuffer)	\$ 15 50 100	_____
593-501	If You Are Flooded Out (Mini-Poster)	\$ 15 50 100	_____
900-075	Camera-ready Newspaper Advertisements	\$ 15 50 100	_____
900-090	Is There a Leak in Your Protection? (Stuffer)	\$ 15 50 100	_____
900-113	Spring Floods. . . More Than Just a Threat (Mini-Poster)	\$ 15 50 100	_____
900-114	Spring Floods. . . More Than Just a Threat (Stuffer)	\$ 15 50 100	_____
900-148	Hurricanes & Summer Storms (Stuffer)	\$ 15 50 100	_____
900-149	In the Calm Before the Storm (Mini-Poster)	\$ 15 50 100	_____
900-153	Summer Storms, Summer Floods (Stuffer)	\$ 15 50 100	_____

Fill out your name, company, address, city, state, and zip code. If you are ordering for an agent/agency, you must include an agent identification number on your order. Please identify yourself by checking the appropriate box. Fold, seal, and return to the NFIP.

☐ AGENT    ☐ LENDER    ☐ COMMUNITY OFFICIAL    ☐ MEDIA    ☐ OTHER

NAME \_\_\_\_\_  
 COMPANY \_\_\_\_\_  
 ADDRESS \_\_\_\_\_  
 CITY \_\_\_\_\_  
 STATE \_\_\_\_\_ ZIP CODE \_\_\_\_\_

AGENT ID NUMBER

*Please allow 2 to 3 weeks for delivery.*

5. Federal Emergency Management Agency  
500 C Street, S.W.  
Washington, D.C. 20472
6. Local government
7. Local insurance agent

### **REVIEW CHECKLIST**

1. Is the Floodplain Development Permit Application Form properly filled in?
2. Determine if the property is located within a regulatory floodway. If yes, obtain engineer's certification of no rise in BFE. Make sure all floodway requirements are satisfied. if not floodway, proceed.
3. Determine if the site is safe from flooding. It is contrary to local ordinance and federal regulations to allow development at risk of flooding.
4. Determine if other local, state, federal, or other permits are needed. If drilling a well, water-well driller must be licensed by Missouri DNR, and water wells must be certified by Missouri DNR; oil and gas wells must be registered with Missouri DNR, Division of Geology and Land Survey, Rolla, Missouri. If building, other local permits may needed.
5. Determine BFE for site. It is developers responsibility to meet elevation requirements. Obtain elevation certificate.
6. If non-residential, not elevated enough, obtain floodproofing certificate.
7. Check construction materials and equipment for flood safety.
8. Check construction methods, setback, alignment, and anchoring.
9. Check utilities, access, drainage compaction of fill.
10. If manufactured home, check special requirements, especially anchoring.
11. If enclosed below elevated structure, check openings required.
12. If a watercourse is involved, will it be altered? If so, notifications.
13. If an improvement, addition, or repair after damage, compare fair market value of improvements, or repair against fair market value of building prior to improvements or damages. if cost of improvements is fifty percent of value of building (or more), it constitutes substantial improvement and must meet the code.

## CHECKLIST

### What to ask for, from the developer:

1. Any development in Zone A *must* have a local permit. What is the nature of the development?

\_\_\_\_\_ Excavating  
\_\_\_\_\_ Grading  
\_\_\_\_\_ Drilling<sup>9</sup>  
\_\_\_\_\_ Fencing  
\_\_\_\_\_ Filling  
\_\_\_\_\_ Paving  
\_\_\_\_\_ Mining  
\_\_\_\_\_ Building<sup>†</sup>

<sup>9</sup>Water well drillers are licensed by Mo. DNR. Water wells must be certified by Mo. DNR. Oil and gas wells must be registered with Mo. DNR.

Attn. Division of Geology and Land Survey, P.O. Box 250, Rolla, Mo 65401.

<sup>†</sup>New buildings, substantial improvements, and placement of manufactures homes must have an elevation certificate (or floodproofing certificate for non-residential buildings), and a permit, where applicable.

2. Subdivisions in Zone A must be accompanied by other information:

\_\_\_\_\_ Is site reasonably free from flood hazards?  
\_\_\_\_\_ What is base flood elevation? (Give source of BFE \_\_\_\_\_)  
\_\_\_\_\_ Is there adequate drainage?  
\_\_\_\_\_ Public utilities and facilities are so located as to minimize or eliminate flood damage?

3. Is a watercourse involved?

Watercourse alterations *must* be relayed to Mo. DNR and adjacent communities, and notify FEMA that state and communities were told.

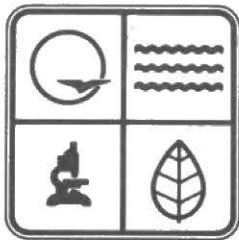
4. Permit application review process:

A. Property is in what zones(s)? \_\_\_\_\_  
B. What is base flood elevation (BFE)? \_\_\_\_\_  
How was BFE determined? \_\_\_\_\_  
C. Is a floodway involved? \_\_\_\_\_  
If yes, applicant's engineer certifies "no rise" in BFE? \_\_\_\_\_  
If no, any on BFE? \_\_\_\_\_  
Applicant's engineer certifies less than one foot rise in BFE? \_\_\_\_\_  
D. Any effect on neighboring land? \_\_\_\_\_  
Diversion of surface water drainage? \_\_\_\_\_

- E. If building (or manufactured home),  
...is anchoring adequate? \_\_\_\_\_  
...do building materials resist flood damage? \_\_\_\_\_  
...do building methods resist flood damage? \_\_\_\_\_  
...are on-site waste disposal systems designed to avoid impairment? \_\_\_\_\_  
...are new replacement water and sewer systems designed to minimize infiltration? \_\_\_\_\_  
...are gas and electric utilities placed to avoid flood hazards? \_\_\_\_\_  
is drainage adequate? \_\_\_\_\_
- F. If residential building,  
*must* have elevation certificate. \_\_\_\_\_
- G. If non-residential,  
*must* have either elevation or floodproofing certificate \_\_\_\_\_
- H. Other permits obtained?  
Federal? (Corps of Engineers) \_\_\_\_\_  
State? (Natural Resources) \_\_\_\_\_  
      (Highway Department) \_\_\_\_\_  
      (Public Service Commission) \_\_\_\_\_  
Local? (Levee District) \_\_\_\_\_  
      (Sewer District) \_\_\_\_\_  
      (Water District) \_\_\_\_\_  
      (Road District) \_\_\_\_\_  
Other? (Railroad Crossing) \_\_\_\_\_
- I. Will there be a fully enclosed space below an elevated structure? \_\_\_\_\_  
If yes, it needs openings to equilibrate hydrostatic pressure. \_\_\_\_\_
5. Was permit issued in keeping with ordinance?  
If not, did applicant request a variance? \_\_\_\_\_
6. Was variance requested or appeal made?  
If yes, document results, keep on file. \_\_\_\_\_
7. Was permit issued upon granting of variance?  
Conditions of variance? List, keep on file.  
Did applicant meet variance conditions? \_\_\_\_\_
8. Were enforcement actions taken at any point? \_\_\_\_\_



**Miscellaneous Publication 49**



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For Missouri Communities With Flood Insurance Studies  
Missouri Department of Natural Resources  
Division of Geology and Land Survey  
James H. Williams, Ph.D., Director and State Geologist**