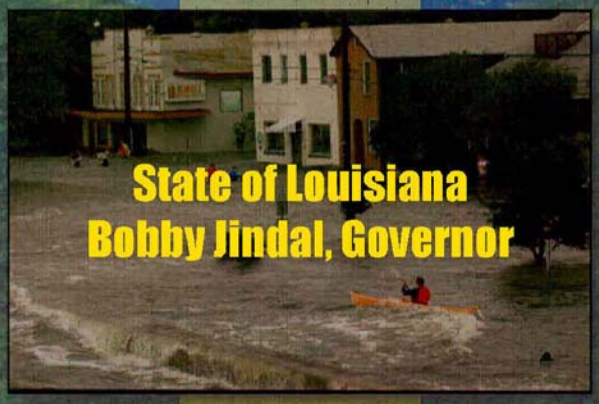
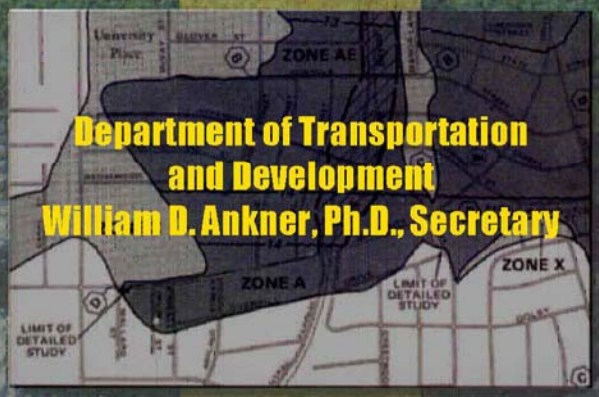
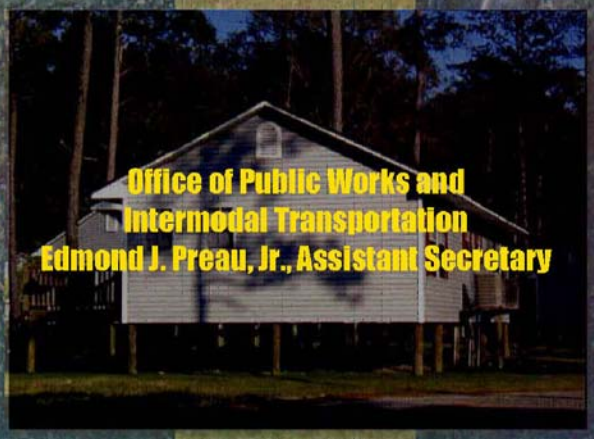
September
2008



State of Louisiana
Bobby Jindal, Governor



Department of Transportation
and Development
William D. Ankner, Ph.D., Secretary



Office of Public Works and
Intermodal Transportation
Edmond J. Preau, Jr., Assistant Secretary

Louisiana Floodplain Management

DESK REFERENCE

prepared for

FEMA

and

Louisiana Department of
Transportation and Development

The Desk Reference at a Glance

Notes to the User

This reference book provides detailed information on administering a flood damage prevention ordinance at the community level.

Sections **1** – **4** provide **background** information on flooding and the National Flood Insurance Program, the two basic reasons for enacting and administering flood damage prevention ordinances.

Sections **5** – **10** review the **mapping** and data that provide the flood information used in the community's floodplain management program.

Sections **11** – **17** discuss the **regulatory standards** that should be in the ordinance.

Sections **18** – **24** cover the **administration** procedures and practices that should be followed to make the flood damage prevention ordinance effective.

Sections **25** – **28** review **other aspects** of floodplain management, including insurance, disaster operations, and hazard mitigation.

Sections **29 – 31** include **additional materials** – references, a glossary, names and addresses of key state and federal contacts, and the Index.

Common acronyms: The following acronyms are used most often in this reference. Others are listed in the Glossary in Section 30:

NFIP	The National Flood Insurance Program (explained in Section 3)
LADOTD	Louisiana Department of Transportation and Development, the State Coordinating Agency for the National Flood Insurance Program (Section 3.3.2)
DHS/FEMA	The Department of Homeland Security's FEMA, the agency responsible for the National Flood Insurance Program (Section 3.3.3)
FIRM	Flood Insurance Rate Map (Section 8)
SFHA	Special Flood Hazard Area, the 100-year floodplain shown on the FIRM and regulated according to the community's ordinance (Section 5.5.3)
BFE	Base flood elevation (Section 5.3.2)

Referenced publications can be found in Section 29 and agency contact information is in Section 31. If you don't find what you're looking for, check the cross referenced sections and the Index.

Acknowledgements

The organization and preparation of this Desk Reference were accomplished with the support and assistance of an advisory committee from the Louisiana Department of Transportation and Development and DHS/FEMA. We wish to thank the following people for the time they spent to help ensure that this product is useful for Louisiana local floodplain managers.

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The 2008 edition was edited and updated by LA Bond Associates.

Illustrations

Except as noted, all illustrations are from DHS/FEMA, URS, or French & Associates.

Significant Changes Since 2004

Since this manual was initially published and distributed in 2004, there have been changes in the National Flood Insurance Program and changes in Louisiana. This 2008 revision reflects those changes.

Many of the changes in this version are minor, and are not noted. The significant revisions are listed below. The important changes are denoted by a vertical bar in the right margin of the page like the one to the right of this paragraph.

Section 2 was revised by adding a discussion of land subsidence and sea level rise as Section 2.4

Section 5 was revised by updating the discussions on map modernization (5.1.3), Cooperating Technical Partners (5.1.4), datum (5.3.4) and elevation reference marks (5.3.5), and adding discussions of GPS survey methods (5.3.6) and changing datums (5.3.7).

Section 6 was revised by expanding the discussion on mapping levees (6.5)and adding a section on Provisionally Accredited Levees (PALs) (6.6.2).

Section 8 was revised by expanding the discussions on parish-wide FIRMs (8.4.1) and digital FIRMs (8.4.2), and by adding a discussion on communities with no FIRMs (8.4.5).

Section 9 was revised by adding discussions of advisory base flood elevations (ABFEs) (9.2.4) and properties located in two zones (9.5.3).

Section 17 was revised by creating new Section 17.6, Regulation of Development Outside of the Floodplain. The earlier discussion on stormwater management is now 17.6.1, and a new discussion on dealing with local drainage problems is 17.6.2.

Section 24 was revised by replacing the earlier version of the FEMA Elevation Certificate with the February 2006 version.

Section 25 was revised by adding a discussion on how the community floodplain manager can deal with insurance issues in his community (25.4.4).

Section 29 was revised by including updated references and additional references.

Section 1. Flooding Processes

Contents

1.1. Riverine Flooding Processes

1.1.1. The hydrologic cycle

Floods are part of the Earth's natural hydrologic cycle. The cycle circulates water throughout the environment (Figure 1-1). This process maintains an overall balance between water in the air, on the surface, and in the ground.

A discussion of the hydrologic cycle can start anywhere. Atmospheric water is in the form of vapor, small droplets, and ice crystals. Under the right conditions, these fall as precipitation. Precipitation may be rain, snow, hail, or sleet. Even as the precipitation falls, some of the water evaporates.

The hydrologic cycle sometimes gets out of balance, sending more water to an area than it can normally handle. The result is a flood.

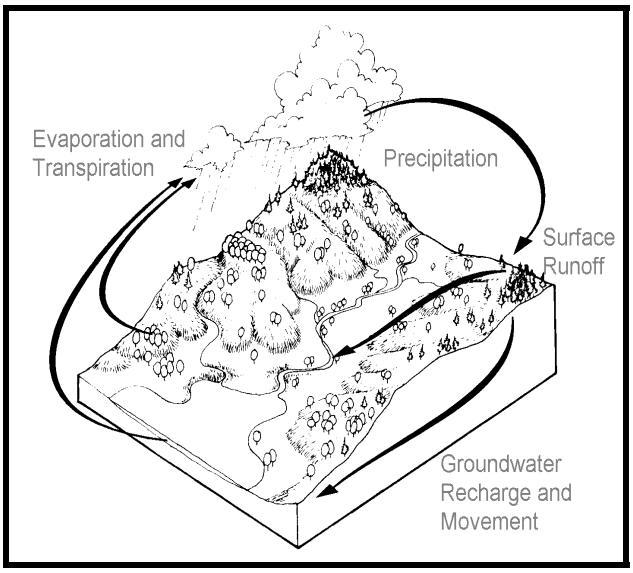

Figure 1-1. The hydrologic cycle.

1.1.2. Watersheds

A watershed is an area that drains into a lake, stream, or other body of water. Other names for it are "basin" or "catchment area." Watersheds vary in size, and larger ones can be divided into sub-watersheds.

Figure 1-2 shows a watershed and some key terms. The boundary of a watershed is a ridge or a divide. Water from rain and snowmelt are collected by the smaller channels (tributaries), which send the water to larger ones and eventually to the lowest body of water in the watershed (main channel).

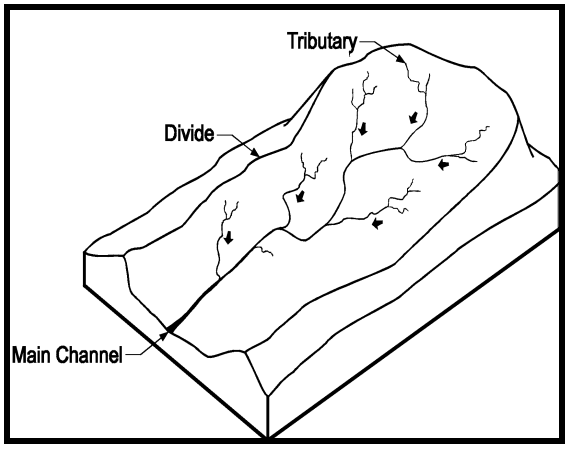

Figure 1-2. Watershed terms.

Channels are defined features on the ground that carry water through and out of a watershed. In Louisiana, these channels may be called bayous, rivers, creeks, coulees, or canals. The major watercourses flow all year due to the abundance of precipitation. However, the smaller, upland channels may have intermittent flow.

When excessive precipitation occurs, surface water reaches the streams and rivers and adds to the water already flowing there. If there is too much surface water, it flows out of the channel and floods the floodplain.

Rainfall is abundant throughout Louisiana. The major source of moisture is the Gulf of Mexico. In the winter, sustained precipitation results from polar fronts stalling over the State or retreating northward after reaching the Gulf of Mexico. Summer thunderstorms occur almost daily and release heavy rains; they are most frequent in the southern part of the State. Tropical storms and hurricanes may cause flooding as the accompanying rains overwhelm the drainage systems.

In general, precipitation increases from northwest to southeast. The Shreveport region averages about 48 inches of rain annually. Maximum precipitation occurs across the Florida parishes, with locations measuring over 70 inches of rain per year. Southern parishes from Texas to Mississippi record annual precipitation of 56 inches to 64 inches.

Rains of up to 10 inches in a 2-day period are not rare in Louisiana. Over the past century, there has been an apparent increase in large rainstorms and resultant flooding associated with frontal activity, particularly in the late winter and spring.

If the floodplain is undeveloped, it has two major effects on a flood: it stores water temporarily while the channel is overflowing and it allows excess water to filter into the ground during the flood. Both of these effects reduce the amount of water moving downstream. Infiltration also temporarily raises the water table. This water reenters the stream soon after the flood has passed.

Water in the streams and rivers eventually reaches the Gulf of Mexico. Throughout these processes, water is evaporating and restarting the hydrologic cycle.

What happens in a watershed affects events and conditions downstream. Terrain helps determine the dynamics of inland flooding. In relatively flat areas, shallow, slow-moving floodwater may cover large areas of land for days or even weeks. In hilly areas and along bluffs, after a heavy rain a flood may come and go in minutes.

1.1.3. Riverine flooding

The most common type of inland flooding in Louisiana is called “riverine” flooding. Riverine flooding occurs when a downstream channel receives more rain from its watershed than it can handle. Excess water overloads the channel and flows over the channel’s banks, and out onto the floodplain. Riverine flooding is also called “overbank flooding.”

Riverine flooding varies with the watershed’s size and terrain. Hilly areas have narrow floodplains with faster moving water, so velocity can pose a serious hazard. In flat areas, the floodplain can be very wide and floodwaters may move slowly, making velocity less of a hazard (Figure 1-3).

In addition to riverine flooding, Louisiana's smaller subbasins experience headwater flooding in the upper reaches of watersheds. Headwater flooding occurs when precipitation and runoff exceed the capacity of the watercourse and the runoff overflows onto the adjacent floodplain.

At the lower end of the watershed, where a tributary flows into a larger river, there may be backwater flooding. Backwater flooding occurs when flooding on the larger river or tide driven water makes the receiving channel so high that runoff from the small channel is blocked. Basically, water in the larger channel acts as a dam. Excessive flow then backs upstream in the smaller tributaries and floods adjacent lowlands.

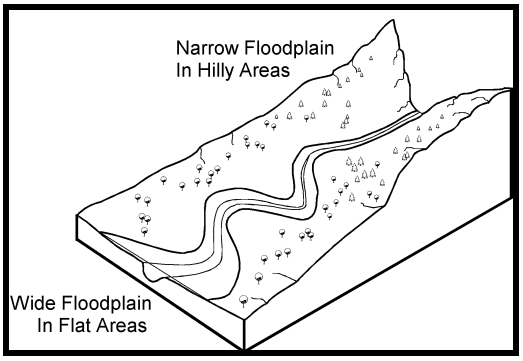

Figure 1-3. Riverine floodplain.

Flood warning time can be affected by the terrain. There may be hours or even days of advance notice for rivers that drain a large watershed. On the other hand, there may be no warning when a flood is about to strike on smaller streams in hilly or urbanized areas.

Flood depths vary, as do flood durations. Generally, the larger the river, the deeper the flood and the longer it will last. Depending on the size of the river and the terrain of its floodplain, flooding can last for days and cover wide areas.

1.1.4. Flash flooding

Flash floods strike quickly and end swiftly. A severe storm that drops a lot of rain in a short time can generate a flash flood. Generally, flash floods occur in hilly or mountainous areas.

In Louisiana, flash floods occur when there is a rapid accumulation of rain that overloads the drainage system. Here, flash floods occur on smaller streams and in urbanized areas. Smaller streams react faster to rain and urbanized areas speed runoff through storm sewers and drainageways to those streams.

Unlike in mountainous areas, Louisiana's flash floods do not have high velocity flows. However, the water does rise and fall quickly and there is little or no warning time. Flash floods also can be caused by dam failure, collapse of debris dams, or failure of a levee.

1.1.5. Riverine erosion

River channels change as water moves downstream, acting on the channel banks and the channel bottom. This force becomes more potent during a flood, when the river's velocity increases.

Several features along a river are affected by this flow of water in different ways. A meander is a curve in a channel. On the outside of a meander, the banks are subject to erosion as the water scours against them (Figure 1-4).

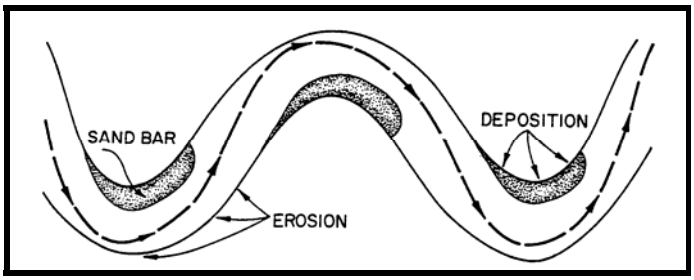

Figure 1-4. Erosion changes the shape of channels.

On the other hand, areas on the inside of meanders receive deposits of sand and sediment transferred from the eroded sites.

Meanders do not stay in the same place; they migrate slowly downstream and across the floodplain, reworking the shape of the channel within the floodplain. Properties on the outside of curves face a double threat of inundation and undercutting from riverine erosion during floods.

1.2. Coastal Flooding Processes

1.2.1. Coastal storms

Hurricanes and tropical storms cause most coastal flooding. Persistent high wind and changes in air pressure push water toward the shore, causing a storm surge that can raise the level of a large body of water by several feet (Figures 1-5 and 1-6). When a storm makes landfall at high tide, the water level and wind-driven waves are even higher.

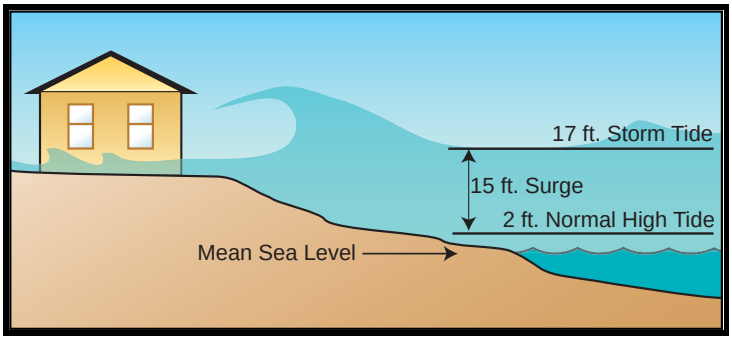

Figure 1-5. Storm surge.

During Hurricanes Katrina and Rita in 2005, this combination brought flooding up to 27 feet above normal sea level. This storm surge covered large areas up to 20 miles inland along the Louisiana coast. On open coasts, the magnitude of a flood varies with the tides. An increase in the level of the ocean during high tide will flood larger areas than a storm that strikes during low tide.

Figure 1-6. Storm surge flooding at Mandeville, Tropical Storm Isidore, 2002.

Photo by Alex Brandon© 2003.

Seventy percent of Louisiana's citizens live in the 11.5 million-acre coastal zone, seriously threatened by hurricanes and Mississippi River floods. The coastal zone is a landscape of low elevation in which more than 95% of the 11.5 million acres are less than 3 feet above sea level. Highest elevations are found along the Mississippi River levee between Baton Rouge and New Orleans.

Natural levees, the highest and driest topographic features suitable for development, decrease in elevation and width from Baton Rouge to the Gulf of Mexico. In the Chenier Plain (the coastal zone west of the Atchafalaya), the cheniers (places of oaks) are abandoned beach ridges now isolated from the Gulf of Mexico by marsh and mudflats. Elevations along the ridges are just over 10 feet above sea level.

For the most part, Louisiana's coastal zone population lives within leveed and pumped areas, such as New Orleans and the coastal parishes. Although surrounded by hurri-

cane protection levees and drained by the world's most expensive and extensive canal and pump system, these areas are still at risk.

Recent coastal floods are summarized in Figure 1-7. Most of the damage and loss of life have been directly attributable to storm surge and the failure of individuals to evacuate in a timely fashion. No part of coastal Louisiana is immune from the effects of tropical storms and hurricanes.

Gulf surges can occur any time of the year, directly affecting the low wetlands and threatening the more populated natural levees of the Mississippi River and its abandoned distributaries. Along the entire coast, persistent onshore winds contribute to flooding. South and southeast winds in the spring and summer build water elevations in the estuaries.

At Lakes Maurepas and Pontchartrain, upland runoff is prevented from entering the lakes, a particularly regular problem in the lower Amite River Basin to the west of Lake Maurepas. In spring 1991, the low-lying coastal areas south of Houma flooded, as did the Barataria Basin and the area around Lake Palourde. Strong and unrelenting south winds caused backwater flooding by preventing runoff from heavy precipitation or pushed Gulf waters into the bays and estuaries, flooding roads, yards, and fields.

Louisiana's coastal zone communities are also subject to flooding due to heavy precipitation and runoff either in the State or in the watersheds that directly affect the coastal zone. These flood processes are discussed in Section 1.1.

Recent Coastal Floods

Several storms have become milestones when discussing the impacts of hurricanes on Louisiana.

1915: Water levels rose to 13 feet at Fernier Beach and 12 feet at Pointe a la Hache. Over 25,000 homes or structures were damaged or destroyed in New Orleans when the City flooded to a depth of 1 foot to 8 feet.

1947: The storm flooded almost all of southeast Louisiana. Many parts of Jefferson Parish were under 6 feet of water and Louis Armstrong Airport had 6 inches of water on the runway and could not operate.

1957: Hurricane Audrey's storm surge was 13 feet as it crossed the Cameron coast, placing 12.4 feet of water in the town of Cameron, and 8.5 feet of water in Morgan City over 100 miles to the east. Many people could not escape the rising water and 556 people died.

1964: Hurricane Hilda caused a 14.6-foot flood elevation in St. Mary Parish.

1965: Water from Hurricane Betsy covered 2.5 million acres; fatalities numbered 81; and damages exceeded $2 billion.

1969: Although Hurricane Camille expended most of its fury on the Mississippi coast, Louisiana east of the Mississippi River was heavily damaged by a storm surge of up to 15.9 feet (23 feet in Biloxi, Mississippi).

1992: Hurricane Andrew was devastating to south Florida and caused damage to coastal Louisiana. But Andrew was not as bad as it could have been had it followed a path just west of New Orleans.

2005: Hurricanes Katrina (August 29) and Rita (September 24) combined to cause the largest damage totals in Louisiana history. More than 1,300 Louisianans died during Katrina.

Figure 1-7. Recent coastal floods.

1.2.2. Coastal erosion

Erosion refers to the wearing or washing away of lands near water. Erosion should be considered part of the larger process of shoreline change. When more sediment leaves a shoreline segment than moves into it, *erosion* results; when more sediment moves into a shoreline segment than leaves it, *accretion* results. When the amounts of sediment moving into and leaving a shoreline segment balance, the shoreline is said to be *stable*.

A shoreline classified as "stable" or "accretional" may be subject to periods of erosion. Actual shoreline behavior can change over time. Therefore, shoreline changes are classified as "short-term" changes or "long-term" changes. Short-term changes occur over periods ranging from a few days to a few years and can be highly variable in direction and magnitude. Long-term changes occur over a period of decades, over which short-term changes tend to average out to the underlying erosion or accretion trend.

Shoreline erosion rates are usually computed and cited as long-term, average annual rates. However, erosion rates are not uniform in time or space. Erosion rates can vary substantially from one location along the shoreline to another, even when the two locations are only a short distance apart.

Erosion can be due to a variety of natural or man-made causes, including:

- Storms and coastal flood events, usually rapid and dramatic (also called storm-induced erosion)
- Natural changes associated with tidal inlets, river outlets, and entrances to bays (e.g., interruption of flows by jetties, groins, and channels; migration or fluctuation of channels and shoals; formation of new inlets; or saltwater intrusion)
- Man-made structures and human activities (e.g., certain shore protection structures, damming of rivers, dredging, mining sand from beaches and dunes, digging canals through marshes, boat wakes, and alteration of vegetation)
- Cumulative effects over the long term, such as changes in sea level and sediment supply
- Local scour around structures, piles, and foundations

Erosion during storms can be dramatic and damaging. Although storm-induced erosion is usually short-lived (usually occurring over a few hours in the case of tropical storms), the resulting erosion can be equivalent to decades of long-term erosion. During severe storms or coastal flood events, it is not uncommon for large dunes to be eroded 25 feet to 75 feet or more and for small dunes to be completely destroyed.

Coastal degradation during storms sometimes occurs despite the presence of erosion control devices. Storm waves frequently overtop, damage, or destroy poorly designed, constructed, or maintained structures such as seawalls, revetments, and toe protection. Lands and buildings situated behind these structures are not necessarily safe from coastal flood forces and storm-induced erosion.

1.2.3. Sea-level rise

The coastal flood effects described on the previous page typically occur over a period of hours or days. However, longer-term water level changes also occur. Sea level tends to rise or fall over centuries or thousands of years, in response to long-term global climate changes. A warming trend expands water molecules and melts ice caps, raising the level of the oceans.

Not only is the level of the water rising; in some areas, the level of the land is sinking or subsiding. Subsidence is a hazard that typically affects areas where:

- Withdrawal of groundwater or hydrocarbons has occurred on a large scale
- Organic soils are drained
- Younger sediments are deposited over older sediments, compacting the underlying beds (e.g., river delta areas)
- Surface materials collapse into underground voids, such as salt mines

All of these conditions exist in Louisiana. In coastal Louisiana, the Mississippi River deposits large amounts of sediment in a relatively short period of time, causing the crust to compensate for the extra weight of the sediment. Human acceleration of natural processes through building levees along rivers, draining wetlands, dredging channels, and cutting canals through marshes has made the subsidence problem worse.

Because it is difficult to separate the effects of subsidence and sea-level rise, a new approach to categorizing the hazard has been developed. A coastal vulnerability index (CVI) is determined based on rate of sea-level rise, coastal erosion, wave height, tidal characteristics, regional coastal slope, and coastal geomorphology. The CVI for the Louisiana coast is high to very high. Some portions rank very high for every factor with the exception of wave height. The main factors responsible for the high ranking, however, are geomorphology, coastal slope, and rate of relative sea-level rise.

The average subsidence/submergence rates in Louisiana's coastal zone are approximately 0.39 inches per year or 3.3 feet per 100 years. Louisiana's subsidence rates are approximately six times the world average rate of 0.065 inches per year. Subsidence rates along the Louisiana coast have ranged from a low of 0.048 inches per year (0.4 feet per 100 years) to a high of 0.75 inch per year (6.3 feet per 100 years). Local subsidence rates can be as high as 4.7 inches per year (39 feet per 100 years) or 12 times the average coastal subsidence rates.

Subsidence rates decrease away from the delta in a northeast, northwest, and western direction. Those areas most affected are shown in Figure 1-8. There is little to suggest that these processes will cease to occur in the future; in fact, rates may increase due to naturally occurring sediment deposition.

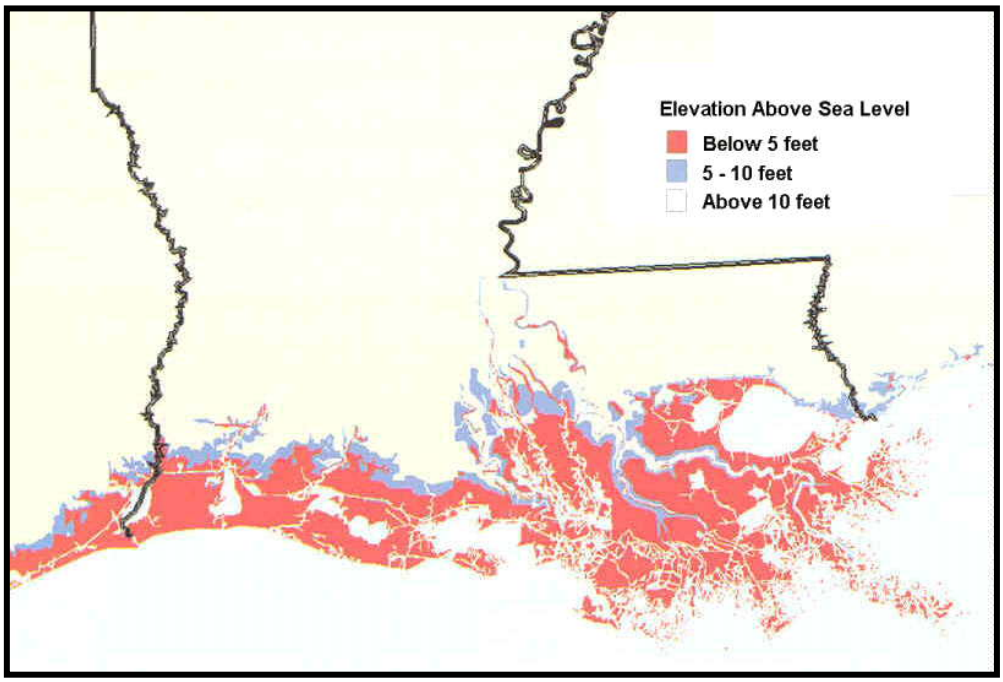

Figure 1-8. Areas potentially affected by sea-level rise.

Increased rates of subsidence and sea-level rise can have an effect on structures, infrastructure, and the coastal ecology, namely:

- Foundation failures for residential and commercial buildings, roads, bridges, and sidewalks
- Structural failures of underground utilities, levees, railroad embankments, etc.
- Saltwater intrusion or submergence destroying wetland vegetation, which promotes erosion
- Hurricane and storm protection structures being impacted directly over the long term by increased loading from building higher structures
- Relocation of infrastructure—roads, utility lines, etc.
- Increased susceptibility of the coast to storm surge

Perhaps the most significant secondary hazard associated with subsidence and sea-level rise is the increased intensity of storm surge. The risk of flooding for cities like New Orleans which are near or below sea level is greatly increased, even after minor storms. This, in combination with the ongoing disappearance of delta marshes, leaves the New Orleans area with an increasing probability of more severe flood impacts.

1.3. Other Types of Flooding

1.3.1. Sheet flow

In areas where there are inadequate or no defined channels, floodwater spreads out over a large area at a somewhat uniform depth in what is called sheet flow. Sheet flows occur after an intense or prolonged rainfall during which the rain cannot soak into the ground. During sheet flow, floodwaters move downhill and cover a wide area.

1.3.2. Ponding

In some areas, runoff collects in depressions or in areas where man-made features, such as roads and railroad embankments, block outlets. Since these sumps cannot drain, ponds result. Floodwaters remain in these temporary ponds and depressions until they infiltrate, evaporate, or are pumped out.

To drain these areas, channels have been built and pumps installed to mechanically move the water. Often, these man-made systems do not have the capacity to handle heavy rains or intense storms.

1.3.3. Urban drainage

An urban drainage system is comprised of the natural channels and man-made ditches, storm sewers, retention ponds, and other facilities constructed to store runoff or carry it to a receiving stream or lake. Other features in such a system include yards and swales that collect runoff and direct it to the streams, sewers, and ditches.

When most of the man-made systems were built, they were typically designed to handle the amount of water expected during a 10-year or smaller storm. Larger storms overload them and the resulting backed-up sewers and overloaded ditches produce shallow flooding.

1.3.4. Levee and dam failures

Levees and dams are designed to hold back large amounts of water. If they fail or are overtopped, they can produce a dangerous flood situation because of the high velocities and large volumes of water released. During Hurricane Katrina in 2005, 80% of New Orleans was flooded as a result of levee failures. Near the locations of the failures, the sudden rise in flood levels and the high velocity of flood water were especially dangerous and damaging. Flooding is caused by overtopping, failure, or seepage through or under the structure. Since it occurs during a flood on the river, people are usually alerted to a potential problem.

The river is connected to the water table, so, over time, the water table on the landward side of the levee rises. Although the levee keeps surface water out of an area, it may

not prevent rising ground water from damaging septic tanks and underground storage tanks on the landward side when there are prolonged high flows in the river.

A break in a dam, on the other hand, can occur with little or no warning on clear days when people are not expecting rain, much less a flood. Breaching often occurs within hours of the first visible signs of dam failure, leaving little or no time for evacuation. (Three of the four top killer floods in the 1970s were related to the failure of a dam or dam-like structure).

Dam breaks occur for one of three reasons:

- Foundation failure due to seepage, settling, or earthquake
- Deficient design, construction, materials, operation, or maintenance
- Flow exceeding the capacity of the dam's spillway

Proper design can prevent dam breaks. While state and federal dam safety programs help ensure that new dams are properly designed, there are still many private or locally built dams that were poorly designed and maintained. Louisiana's dam safety program is discussed in Section 20.3.4.

1.3.5. Debris dams

Debris, such as logs, can collect at shallow parts of a stream, sharp bends, bridges, and other "choke points." If the channel is not kept clear, the debris will build up and form a dam. If the debris dam breaks during high flows (or anytime), the result can be a flood.

Usually, debris dam floods are not as severe as floods from man-made dams because they do not hold as much water. However, they can also occur on sunny days and be completely unexpected.

1.4. Natural and Beneficial Floodplain Functions

Floodplain lands and adjacent waters combine to form a complex, dynamic physical and biological system found nowhere else. When portions of floodplains are preserved in (or restored to) their natural state, they provide many benefits to both human and natural systems.

These benefits range from providing aesthetic pleasure to reducing the number and severity of floods, helping handle stormwater runoff and minimizing nonpoint water pollution. For example, by allowing floodwater to slow down, sediments settle out, thus maintaining water quality. The natural vegetation filters out impurities and uses excess nutrients. Such natural processes cost far less than it would take to build facilities to correct flood, stormwater, water quality, and other problems.

Natural resources of floodplains fall into three categories: water resources, living resources, and societal resources. The following sections describe each category's natural and beneficial functions. For more information on natural and beneficial floodplain functions, see *Protecting Floodplain Resources - A Guidebook for Communities.*

1.4.1. Natural flood and erosion control

Over the centuries, floodplains develop their own ways to handle flooding and erosion with natural features that provide floodwater storage and conveyance, reduce flood velocities and flood peaks, and curb sedimentation.

Natural controls on flooding and erosion help to maintain water quality by filtering nutrients and impurities from runoff, processing organic wastes, and moderating temperature fluctuations.

These natural controls also contribute to recharging groundwater by promoting infiltration and refreshing aquifers and by reducing the frequency and duration of low surface flows (Figure 1-9).

Figure 1-9. Louisiana's wetlands store and filter floodwater and help recharge aquifers (Bogue Chitto National Wildlife Refuge).

1.4.2. Biologic resources and functions

Floodplains enhance biological productivity by supporting a high rate of plant growth. This helps to maintain biodiversity and the integrity of ecosystems. Floodplains provide excellent habitats for fish and wildlife by serving as breeding and feeding grounds. They also create and enhance waterfowl habitats and help to protect habitats for rare and endangered species.

1.4.3. Societal resources and functions

People benefit from floodplains through the food they provide, the recreational opportunities they afford, and the scientific knowledge gained in studying them. Wild and cultivated products are harvested in floodplains, where the agricultural land has been enriched by sediment deposits. Floodplains provide open space, which may be used to restore and enhance forest lands, provide recreational opportunities, or simple enjoyment of their aesthetic beauty.

Floodplains provide areas for scientific study and outdoor education. They contain cultural resources, such as historic or archaeological sites, and thus provide opportunities for environmental and other kinds of studies.

Floodplains can increase a community's overall quality of life, a role that often has been undervalued. By transforming floodplains from problem areas into value-added assets, a community can improve its quality of life. Parks, bike paths, open spaces, wildlife conservation areas, and aesthetic features are important to citizens (Figure 1-10). Assets such as these make the community more appealing to potential employers, investors, residents, property owners, and tourists.

Figure 1-10. Louisiana's floodplains provide many recreational benefits (Bogue Chitto National Wildlife Refuge)

Section 2. Flooding and People

Contents

2.1. Safety and Health Hazards

Over 8 million families in the United States live in the floodplain. Millions more work in floodplains or drive through them every day. In an average year, floods kill 150 people and cause more than $3 billion in property damage. Nationally, average annual flood losses continue to increase. Knowing the impact of a potential hazard—and guarding against it—is an important part of administering a floodplain management program.

2.1.1. Safety hazards

Studies have shown that it does not take much depth or velocity to knock over a person. No areas with moving floodwater can be considered safe for walking (Figures 2-1 and 2-2).

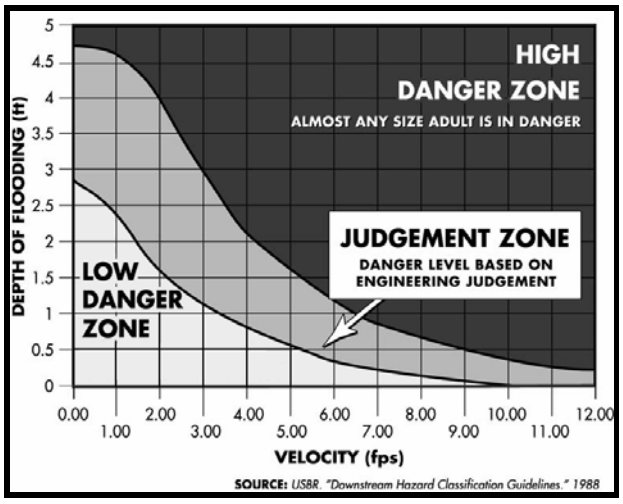

Figure 2-1. Depth and velocity hazard chart.

Figure 2-2. Even slow moving flooding is life threatening.

Photo by Chuck Cook© 2003.
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Drowning in vehicles is the number one cause of flood deaths. The hazards of driving in flooded waters are explained in Figure 2-4. A car will float in only 2 feet of moving water, which is one reason why floods kill more people trapped in vehicles than anywhere else. Victims often put themselves in perilous situations by ignoring warnings about travel or mistakenly thinking that a washed-out bridge is still open.

Electrocution is the number two cause of flood deaths, claiming lives in a flooded area that is carrying a live current created when electrical components short. People die of heart attacks, especially from exertion during a flood fight. Floods also can damage gas lines, floors and stairs, creating secondary hazards such as gas leaks and unsafe structures. Propane tanks can float, causing gas leaks and sending explosive "torpedoes" downstream (Figure 2-3).

Fire can be a result of too much water: floods can break gas lines, extinguish pilot lights, and short circuit electrical wiring—causing conditions ripe for a fire. Fire equipment may not be able to reach a burning building during high water.

Figure 2-3. A propane tank floated into this building,exploded, and destroyed it.

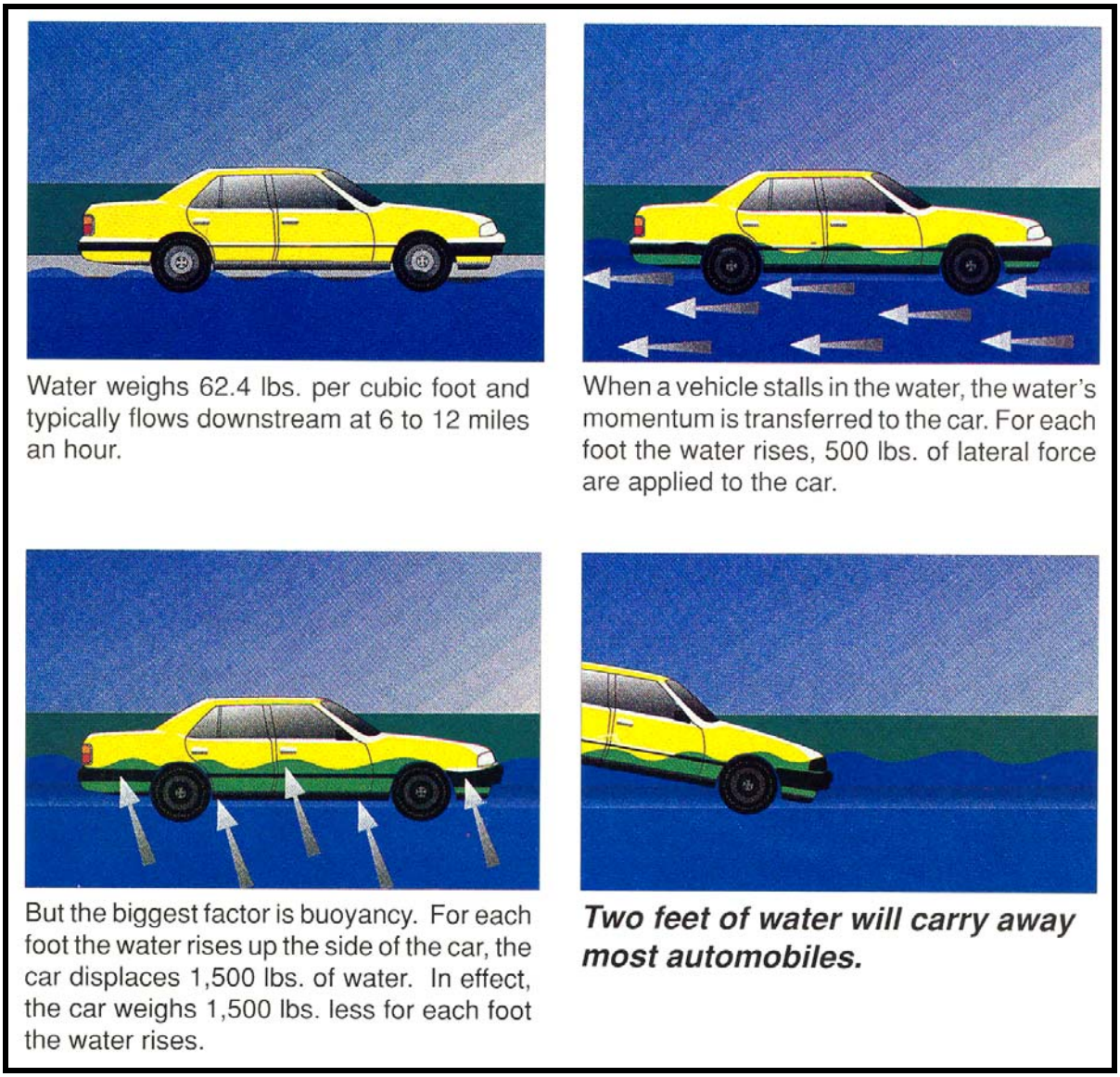


Figure 2-4. Effects of shallow water on cars.

Source: *Flash Floods and Floods. The Awesome Power*, National Weather Service, 1992.

Figure 2-5 provides safety tips that can help people avoid these life-threatening hazards brought on by floods. DHS/FEMA's *Protecting Building Utilities from Flood Damage* provides guidance on protecting electrical and gas systems from creating safety hazards.

Flood Safety Outdoors

Do not walk through flowing water. Drowning is the number one cause of flood deaths. Currents can be deceptive; 6 inches of moving water can knock someone off their feet. Use a pole or stick to determine if the ground is still there before walking through water.

Do not drive through a flooded area. More people drown in their cars than anywhere else. Do not drive around road barriers; the road or bridge may be washed out. A car can float in as little as 2 feet of water.

Stay away from power lines and electrical wires. The number two flood killer after drowning is electrocution. Electrical current can travel through water. Report downed power lines to the power company.

Flood Safety Indoors

Turn off all electricity if the building is flooded. If you do not know how, call an electrician. Some appliances, such as television sets, can shock you even after they have been unplugged. Do not use appliances or motors that have gotten wet unless they have been taken apart, cleaned, dried, and inspected by a professional.

Watch for animals. Small animals such as rats and snakes that have been flooded out of their homes may seek shelter in yours. Use a pole or stick to poke and turn items over and scare away small animals.

Look before you step. After a flood, the ground and floors are covered with debris, including broken bottles and nails. Floors and stairs covered with mud can be very slippery.

Be alert for gas leaks. Use a flashlight to inspect for damage. Do not smoke or use candles, lanterns, or open flames unless you know the gas has been turned off and the area has been thoroughly aired out. If you have questions about gas, call the gas company.

Carbon monoxide exhaust kills. Use a generator or other gasoline-powered machine outdoors. The same goes for camping stoves. Fumes from charcoal are especially deadly—cook with charcoal outdoors.

Clean everything that got wet. Floodwaters pick up sewage and chemicals from roads, farms, factories, and storage buildings. Spoiled food and flooded cosmetics and medicines are health hazards. When in doubt, throw them out.

Take good care of yourself. Wear gloves and boots. Wash your hands frequently during clean up. Recovering from a flood is a big job. It is tough on both the body and spirit and the effects a disaster has on you and your family may last a long time. Keep your eyes open for signs of anxiety, stress, and fatigue in you and your family.

Figure 2-5. Flood safety tips.

Taken from *Repairing Your Flooded Home* (FEMA 234).

2.1.2. Health hazards

Two general types of health hazards accompany floods. The first comes from the water itself. Floodwaters carry whatever was on the ground that the upstream runoff picked up, including dirt, oil, animal waste, and lawn, farm, and industrial chemicals. Pastures and areas where cattle and hogs are kept can contribute polluted waters to the receiving streams. Decomposing bodies of animals may add to these problems.

Rain and floodwaters saturate the ground, which leads to infiltration into sanitary sewer lines. When wastewater treatment plants are flooded, there is nowhere for the sewage to flow. Infiltration and lack of treatment lead to overloaded sewer lines that back up into low-lying areas and some homes. Even though it is diluted by floodwaters, raw sewage can be a breeding ground for bacteria and other disease-causing agents.

If the drinking water system loses pressure, an order to boil water before it is used may be issued to protect people and animals from contaminated water. Private wells may also be contaminated by flood waters. Septic systems are put out of operation when under water, adding to the health hazard of a flood.

The second type of health problem comes after the water is gone. Stagnant pools become breeding grounds for mosquitoes and wet areas of a building that have not been cleaned breed mold and mildew (Figure 2-6). A building that is not thoroughly and properly cleaned becomes a health hazard, especially for small children and the elderly.

Another health hazard occurs when heating ducts in a forced-air system are not properly cleaned after inundation. When the air conditioner is turned on, the sediments left in the ducts are circulated throughout the building and breathed in by the occupants.

Figure 2-6. Post-flood silt, mold, and mildew.

After Hurricane Katrina, the Federal Emergency Management Agency (FEMA), the Center for Disease Control (CDC) and other agencies issued guidelines on inoculations, equipment, apparel and other topics to protect the property owners and disaster recovery staff who were entering flooded areas.

After a flood, walls and floors that were soaked for more than a few hours may have absorbed large amounts of water. These areas must be cleaned, dried, and disinfected. Mold has been found growing in wet insulation several months after a flood. The insulation and the wooden studs may be wet for two or more feet above the flood's high-water level because of absorption by the materials and wicking to other areas.

Many people are allergic to molds. Mold allergies affect all age groups, but older folks are more likely to suffer the most from worsening of asthma and other lung diseases when exposed to mold spores. The respiratory symptoms of mold exposure include a runny or congested nose, sinus pain, a sore throat, cough, wheezing, chest tightness, and shortness of breath. You can also get headaches, a fever, a skin rash, eye irritation, and a generally ill feeling (like you have the flu) from large mold exposures. Exposure to high levels of indoor mold growth can eventually cause health problems for anyone.

2.1.3. Mental health

Flooding, especially repetitive flooding, takes a toll on people's mental health. Stress comes from facing the loss of time, money, property, and personal possessions such as heirlooms. This is aggravated by fatigue during cleanup and anxiety over lost income, health risks, and damage to irreplaceable items. Children and the elderly are especially vulnerable to stress from the disruption of their daily routines.

Here are some warning signs of stress. Advise people with these signs to get help through the local health department or disaster assistance counselors:

- Short tempers, frequent arguments
- Greater consumption of alcohol
- Smoking more than usual
- Getting upset over minor irritations
- Difficulty sleeping, bad dreams
- Aches, pains, stomach problems
- Apathy, loss of concentration
- Depression

> Van Sandt strode through her home Friday, focused on cleaning and rebuilding just hours after the water receded. Then she stopped to pick up her mother's old Bible, now sopping and blurred, from the bedroom floor.
>
> "The water pressure opened our cabinet doors and just pushed everything out," Van Sandt said, her voice starting to shake as she tried to thumb the pages. "Oh God, the videotapes of the grandchildren doing their Easter egg hunts and at Christmas. They're all gone, too."
>
> *The Times-Picayune*, 9/28/02

2.2. Damage to Structures

Floodwaters damage structures in three general ways:

- Moving water can affect a structure's stability
- Standing water can place pressures against a structure
- Water interacts with and damages a variety of materials

2.2.1. Moving water

Moving water creates a **hydrodynamic force** which can damage a building's walls in three ways (Figure 2-7):

- Frontal impact, as water strikes the structure
- Drag effect, as water runs along the sides of a structure
- Eddies or negative pressures created as water passes the downstream side

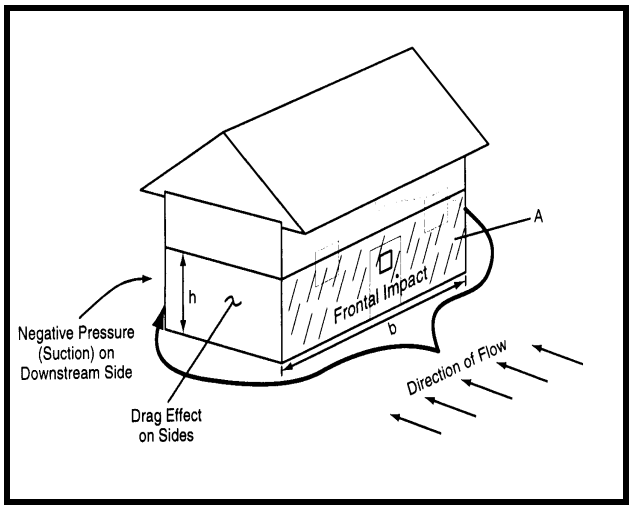


Figure 2-7. Hydrodynamic forces on a building.

The speed of moving water is called velocity, a movement that is measured in feet per second. The faster water moves, the more pressure it puts on a structure and the more it will erode stream banks and scour the earth around a building's foundation.

Floodwaters moving faster than 5 feet per second comprise a high-velocity flood, requiring special design considerations for buildings, roads, bridges, and other man-made structures in its path. While velocity is one factor in determining the potential harm of a flood, the total impact of moving water is related to the depth of the flooding. Studies have shown that deep water and low velocities can cause as much damage as shallow water and high velocities.

In coastal areas, **waves** are hydrodynamic forces that can affect coastal buildings in a number of ways. The most severe damage is caused by breaking waves. The force created by waves breaking against a vertical surface is often 10 or more times higher than the force created by high winds during a storm event.

Wave runup occurs as waves break and run up beaches, sloping surfaces, and vertical surfaces. Wave runup can drive large volumes of water against or around coastal buildings, inducing fluid impact forces, current drag forces, and localized erosion and scour. Wave runup against a vertical wall generally extends to a higher elevation than runup on a sloping surface and can destroy overhanging decks and porches.

Debris increases the hazard posed by waves and moving water. Floodwaters can and will pick up anything that floats—logs, lumber, ice, even propane and farm chemical tanks and vehicles. Moving water can also drag or roll objects that do not float. All of this debris acts as battering rams that can knock holes in walls (Figure 2-8).

Figure 2-8. House damaged by high-velocity flows and debris loads.

Another impact from moving water is **scour**. Scour occurs when water flows at high velocities past an object embedded in or resting on erodible soil. The scour is not caused by the flood or storm event, per se, but by the distortion of the flow field by the object. Flow moving past a fixed object must accelerate, often forming eddies and scouring loose sediment from the immediate vicinity of the object.

Localized scour around piles and similar objects is generally limited to small, cone-shaped depressions (less than 2 feet deep and several feet in diameter). Localized scour is capable of undermining slabs and grade-supported structures (Figure 2-9).

Figure 2-9. Localized scour undermined this slab-on-grade house on the coast.

2.2.2. Standing water

The weight of standing water puts **hydrostatic pressure** on a structure. The deeper the water, the more it weighs and the greater the hydrostatic pressure. Because water is fluid, it exerts the same amount of pressure sideways (lateral pressure) as it does downward. As water gets deeper, it exerts more lateral pressure than shallow water (Figure 2-10).

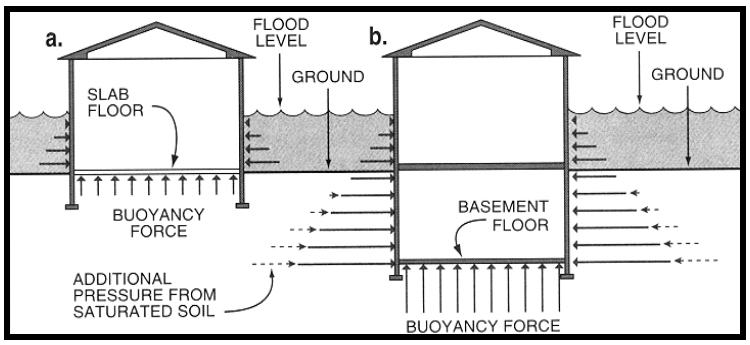


Figure 2-10. Hydrostatic pressure increases with deeper water.

Most walls are not built to withstand lateral pressure. Studies and tests have shown that the lateral force presented by 3 feet of standing water can be enough to collapse the walls of a typical frame house.

2.2.3. Contact with water

Few floods have clear floodwater and so they leave a mess of natural and man-made debris in the form of **sediment and contaminants**. Stormwater and river water pick up whatever was on the ground, such as soil, road oil, and farm and lawn chemicals (see the floor in Figure 2-6). If a wastewater treatment plant or livestock feedlots were inundated, the floodwaters probably will include untreated sewage.

Many materials, including wood and fiberglass or cellulose insulation, absorb floodwater and its sediment. Even if allowed to dry out, these materials will still hold the sediment and contaminants brought by the flood. Simply letting a flooded house dry out will not make it clean—and it certainly will not be as healthy a place as it was before the flood.

When soaked, many materials change their composition or shape. Wet wood swells and if it is dried too fast it will crack, split, or warp. Plywood can come apart. Gypsum wallboard falls apart if it is bumped before it dries out. The longer these materials are wet, the more moisture they will absorb.

Soaking can cause extensive damage to household goods. Wooden furniture and cabinets may become so badly warped that they cannot be used. Other furnishings, such as upholstery, carpeting, mattresses, and books, are very difficult to dry out and restore. Electrical appliances and gasoline engines will not work safely until they are properly dried and cleaned.

Figure 2-11. Prolonged exposure to water and "wicking" can destroy wood and gypsum walls.

Walls present a special problem: a **wicking** effect pulls water up through wood, insulation, and wallboard. This can soak materials several feet above the actual high water line (Figure 2-11).

On the coast, **salt spray and moisture** lead to corrosion and decay of certain building materials. Metal connectors, straps, and clips used to improve a building's resistance to high winds often show signs of corrosion (Figure 2-12). Corrosion is affected by many factors, but the primary difference between coastal and inland areas is the presence of salt spray. Salt spray accumulates on metal surfaces (such as appliances and electrical services) and accelerates the electrochemical processes that cause rusting and other forms of corrosion. Salt also damages concrete, concrete block, and lawns.

Figure 2-12. Hurricane straps rusted through by salt spray.

2.3. Impact of Development

Because floodplains attract people and industry, a substantial portion of this country's development is now subject to flooding. Floodplains account for only 7% of the nation's total land area. However, they contain a tremendous amount of property value. It is estimated that 8 to 12 million homes are located in our nation's floodplains.

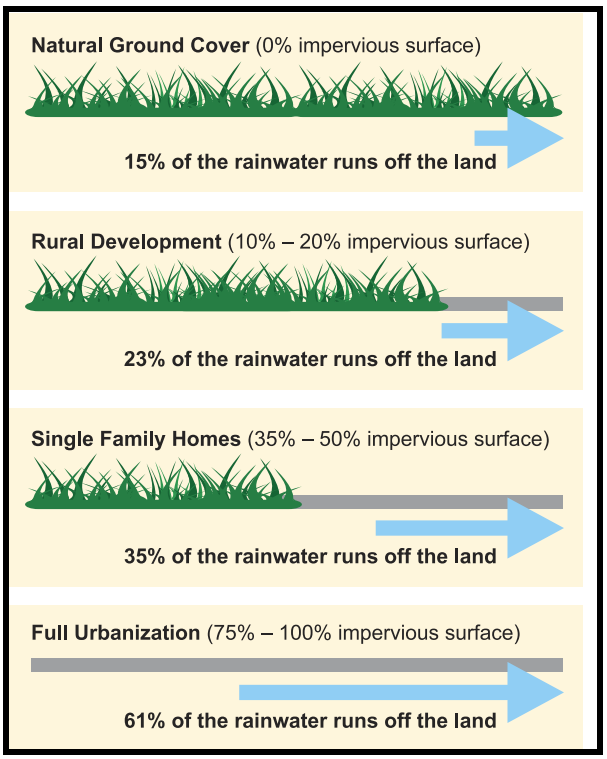
Several problems result from floodplain development:

- Development alters the floodplain and the dynamics of flooding
- Buildings and infrastructure are damaged by periodic flooding
- Water-dependent habitat is destroyed

Development can have an adverse impact on the watershed (where the water comes from), riverine floodplains (where it goes), and coastal shorelines.

2.3.1. Watersheds

Development in riverine watersheds affects the runoff of stormwater. Farming, parks, buildings, and parking lots replace the natural vegetation that is used to absorb water. When rain falls in a natural setting, as much as 85% of it will infiltrate into the ground, evaporate, or be absorbed by plants. In an urbanized area, as much as 60% of it will run off (Figure 2-13).



Note: These are typical conditions. Actual runoff varies with the length of the storm, soil type, and degree of ground saturation before the storm.

Figure 2-13. Stormwater runoff increases as areas are urbanized

Urban features alter flood dynamics as well. Storm sewers and more efficient ditches that come with urban drainage systems speed flood flows. The result of urbanization is that there is more runoff in the watershed and it moves faster, increasing flooding downstream. Thus, a 10-year storm may produce the runoff equivalent of a 25-year storm, overloading the drainage system.

Urbanization also changes the timing of flows along the tributaries. If one subwatershed develops faster than another, the flood will leave sooner than it used to, possibly arriving at the main channel at the same time as the peak arrives from another tributary, causing increased flooding downstream.

2.3.2. Floodplains

The most obvious impact of development on riverine flooding comes with moving or altering channels or constructing bridges and culverts with small openings. Construction and regrading of the floodplain can obstruct or divert water to other areas. Levees and dikes are the best known examples of this, but even small construction projects have an impact (Figure 2-14).

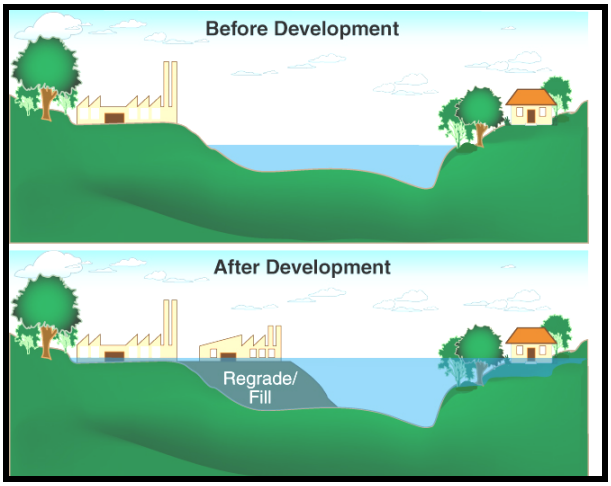


Figure 2-14 Floodplain development can increase flood problems

Filling obstructs flood flows, backing up floodwaters onto upstream and adjacent properties. It reduces the floodplain's ability to store excess water, sending more water downstream and causing floods to rise to higher levels and flow at higher velocities. Filling also reduces the area available for infiltration and recharging of ground water levels.

2.3.3. Coastal shorelines

Development close to the shore can make flooding worse. Removing the sand from beaches and dunes removes the natural barrier built up by flood forces over the years and exposes inland areas to increased risk of flooding.

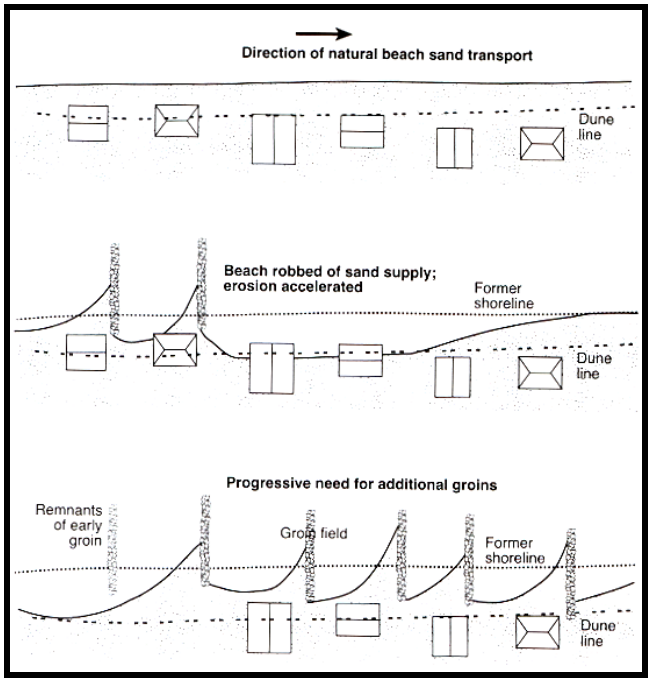


Figure 2-15. Adverse impact of groins.

Source: *Living on the Edge of the Gulf – The West Florida and Alabama Coast*, Bush, et al, 2001

Coastal erosion is affected by construction of navigation channels, breakwaters, jetties, and mining of sand. Often construction of barriers, groins, seawalls, or even sandbag walls to protect buildings from flooding or erosion has an adverse affect on properties at the end of the walls where erosion is accelerated. The natural forces that transport sand and replenish beaches are disrupted, often increasing shoreline erosion on adjacent properties (Figure 2-15). Therefore, structural barriers, such as groins and seawalls, are not encouraged and even prohibited in many areas.

2.4. Land Subsidence and Sea Level Rise

The combination of land subsidence and sea level rise are constantly increasing flood risks in much of Louisiana. Coastal Louisiana has lost an average of 34 square miles of land, primarily marsh, per year for the last 50 years. From 1932 to 2000, coastal Louisiana has lost 1,900 square miles of land, roughly an area the size of the State of Delaware. Louisiana accounted for an estimated 90 percent of the coastal marsh loss in the lower 48 states during the 1990s.

In addition to these coastal areas, much of southern Louisiana has experienced land subsidence, which increases flood hazards and damages roads, levees and other infrastructure, as well as building foundations and other developments.

2.4.1. Land subsidence

There are several probable causes of land subsidence in Louisiana, and they are probably working together in most areas. These include:

- Compaction of soil due to decomposition of organic components;
- Slippage along faultlines in deep sediments; and
- Compaction of soils due to the extraction of oil, gas and water

A rapid increase in the rate of land subsidence during the Twentieth Century indicates that human activities probably have an effect on the rates. For example, drainage of land for development exposes organic components in the soil to oxygen, increasing the rate of decomposition. Also, extraction of liquids and gasses from the ground promotes compaction of soils.

Processes which have occurred over geologic time have caused land subsidence of 1 mm (0.039 inches) to 5 mm (0.197 inches) per year. Since about 1970, subsidence rates of 12 mm (0.472 inches) to 23 mm (0.906 inches) per year have been observed.

The land subsidence processes which have occurred over geologic time have been offset, to some extent by the ongoing deposition of new sediment by floods. Since the construction of levees along the Mississippi River and other streams in the Mississippi Delta area during the early 20th Century, most of this sediment has been carried to the Gulf of Mexico.

2.4.2. Sea level rise

Global MSL rise is estimated by numerous studies to be between 1.0 and 2.4 mm/yr. From 1947 through 1999, the trend of sea level rise at Grand Isle, Jefferson Parish, LA was 9.85 mm (0.388 inches) per year. At Eugene Island, Terrebonne Parish, LA, the trend from 1939 through 1999 was 9.74 mm (0.383 inches) per year. These figures include absolute sea level rise and land subsidence. At Grand Isle, this indicates a

relative sea level rise of 19.4 inches in 50 years; at Eugene Island, the relative rise is 19.2 inches in 50 years.

2.4.3. Implications for floodplain management

Subsidence and sea level rise have several implications for Louisiana floodplain managers.

- Land subsidence means that special attention must be paid to surveying techniques and results (see Sections 5.3.5 through 5.3.7 for a discussion of datums and surveying);
- Coastal areas that are buildable today may be submerged in the relatively near future;
- Communities in areas subject to land subsidence may have special reasons to consider adopting such higher standards as freeboard and foundation protection (see Section 17); and
- In riverine floodplains where it is likely that flood elevations (in absolute terms) may be affected by land subsidence, it may be desirable to remap floodplains every few years using updated topographic data. It is possible that calculated flood elevations may subside at more or less the same rate as the land in some areas.

Section 3. National Flood Insurance Program

Contents

3.1. History

3.1.1. Prelude to the National Flood Insurance Program (NFIP)

Historically, people at risk from flooding could only hope for help from their neighbors and charitable organizations in the event of a flood. Government assistance varied from community to community and flood insurance was scarce.

During the 1920s, the insurance industry concluded that flood insurance would not be a profitable venture because the only people who would want flood coverage would be those who lived in floodplains. Since they were sure to be flooded, the rates would be too high to attract customers.

It wasn't until the great Mississippi River flood of 1927 that the federal government became a major player in flooding. As defined by the Flood Control Acts of 1928 and 1936, the role of government agencies was to build massive flood control structures to control the great rivers, protect coastal areas, and prevent flash flooding. The 1936 Act authorized construction of approximately 250 projects for both flood control and relief work.

Until the 1960s, such structural flood control projects were seen as the primary way to reduce flood losses. Public policy emphasized that flood losses could be curbed by controlling floodwater with structures such as dams, levees, and floodwalls.

During the 1960s, there was a growing questioning of the effectiveness of this single solution. Disaster relief expenses were on the rise and all taxpayers were paying more to provide relief to those with property in floodplains. Studies during the 1960s concluded that flood losses were increasing, in spite of the number of flood control structures that had been built.

One of the main reasons structural flood control projects failed to reduce flood losses was that people continued to build in floodplains. In response, federal, state, and local agencies began to develop policies and programs with a "non-structural" emphasis, ones that did not prescribe projects to control or redirect the path of floods. Since the 1960s, flood protection programs evolved from heavy reliance on flood control, or structural measures, to one using a combination of many tools.

In recognition of increasing flood losses and disaster relief costs, major steps were taken in the 1960s to redefine federal policy and approaches to flood control. In 1965, Congress passed the Southeast Hurricane Disaster Relief Act to help pay for rebuilding after Hurricane Betsy, which had hit Louisiana particularly hard. The Act provided financial relief for the flooding victims and authorized a feasibility study of a national flood insurance program.

The resulting report formed the basis for House Document 465, *A Unified National Program for Managing Flood Losses*. These reports voiced concern with problems

related to the traditional methods of dealing with floods and flood damage—construction of structural projects and federal disaster assistance. Both were proving to be quite expensive, with no end in sight.

It was concluded that:

- Although federal flood programs were funded by all taxpayers, they primarily helped only residents of floodplains
- Flood protection structures were expensive and could not protect everyone
- People continued to build and live in floodplains, thus still risking disaster
- Disaster relief was both inadequate and expensive
- The private insurance industry could not sell affordable flood insurance because only those at high risk would buy it

3.1.2. Creation of the NFIP

In 1968, Congress passed the National Flood Insurance Act to correct some of the shortcomings of traditional flood control and flood relief programs. The act created the National Flood Insurance Program (NFIP) to:

- Transfer the costs of private property flood losses from the taxpayers to floodplain property owners through flood insurance premiums
- Provide floodplain residents and property owners with financial aid after floods, especially smaller floods that do not warrant federal disaster aid
- Guide development away from flood hazard areas
- Require that new, substantially improved, and substantially damaged buildings be constructed in ways that would minimize or prevent damage in a flood

Congress charged the Federal Insurance Administration (FIA) in the Department of Housing and Urban Development with responsibility for the program.

Participation in the NFIP grew slowly. In 1972, Hurricane Agnes devastated a wide area of the eastern United States. Disaster assistance costs were the highest ever, leading Congress to examine why the NFIP was used so little. Investigators found that few communities had joined the NFIP—there were fewer than 100,000 flood insurance policies in force nationwide.

To remedy this, the Flood Disaster Protection Act was passed in 1973, requiring that buildings located in identified flood hazard areas have flood insurance coverage as a condition of federal aid or loans from federally insured banks and savings and loans and as a condition for receiving federal disaster assistance. The “sanctions” for non-participation (Section 3.5.5) made it difficult for any community that wanted federal assistance for properties in floodplains to avoid joining the NFIP.

3.1.3. Growth of the NFIP

The 1973 Act spurred participation in the program dramatically. By the end of the decade, more than 15,000 communities (Figure 3-1) had signed on and about 2 million flood insurance policies were in effect.

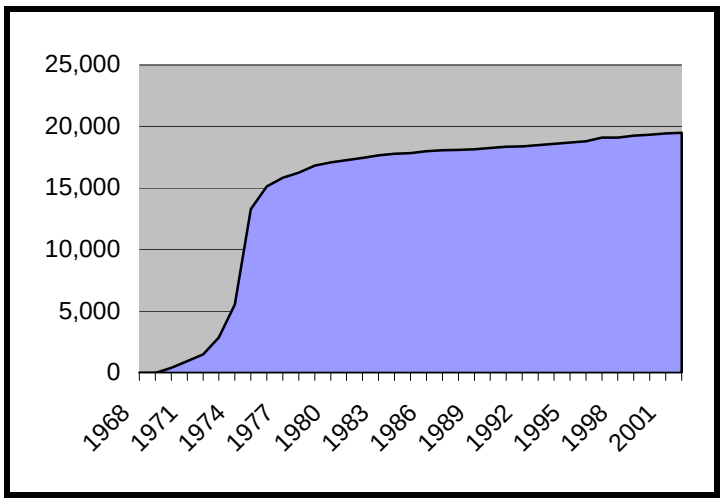


Figure 3-1 NFIP community participation

In 1979, the FIA and the NFIP were transferred to the newly created Federal Emergency Management Agency (FEMA). During the early 1980s, FEMA worked to reduce the program's dependence on its authority to borrow from the Federal Treasury.

Through a series of rate increases and other adjustments, the program has been self-supporting since 1986. The NFIP is funded primarily through premium income, which pays all the costs of administration, mapping, and claims.

Since 1973, the program has been amended several times. The most important changes came under the National Flood Insurance Reform Act of 1994, which fine-tuned various aspects of the program, such as authorizing the Community Rating System (CRS), increasing the maximum amount of flood insurance coverage, and establishing a grant program for mitigation plans and projects.

The Reform Act strengthened the provisions that mandate the purchase of flood insurance that were created in the 1973 Flood Disaster Protection Act. The Act and the initiation of an advertising campaign boosted sales of flood insurance policies. By 2008, there were more than 5.5 million flood insurance policies in force in the country.

Louisiana ranks third in the nation (after Florida and Texas) with 503,000 flood insurance policies. Since 1978, the NFIP has paid more than 300,000 claims to Louisiana policy holders for a total of over $15.4 billion.

The number of participating communities exceeds 20,300 out of 22,000 with identified floodplains. In Louisiana, 298 parishes and municipalities have identified flood hazards and 276 of them have joined the NFIP. There are also more than 20 additional communities in the NFIP that do not have flood hazard areas identified.

In 2003, FEMA and the NFIP were transferred to the newly created Department of Homeland Security (DHS) and the agency's name became "DHS/FEMA."

3.2. How the NFIP Works

The NFIP is based on a mutual agreement between the federal government and the community. Federally guaranteed flood insurance is made available in those communities that agree to regulate development in their mapped floodplains. If communities do their part in making sure future floodplain development meets certain criteria, DHS/FEMA will provide flood insurance for properties in that community.

There are three basic parts to the NFIP—mapping, insurance, and regulations. These three parts are interconnected and mutually supportive.

3.2.1. Mapping

DHS/FEMA has prepared a floodplain map and developed flood hazard data for most communities in the country. The maps and data are used for several purposes:

- Communities, states, and Federal agencies use them as the basis for regulating new floodprone construction
- Insurance agents use them when rating flood insurance policies
- Lenders and federal agencies use them to determine when flood insurance must be purchased as a condition of a loan or financial assistance

DHS/FEMA has issued two kinds of maps:

- The first map received for most communities was the Flood Hazard Boundary Map (FHBM). This map just shows the boundaries of the floodplain using approximate methods. It is discussed more in Section 5.2.
- FHBMs were replaced by a Flood Insurance Rate Map, or FIRM, that shows flood elevations and other hazard information necessary to better protect new construction from flood damage. FIRMs are discussed in Sections 8 through 10.

The flood insurance rates for post-FIRM buildings are based on how protected they are from the mapped hazard. Therefore, NFIP regulations and insurance coverage both depend on the accuracy and utility of the maps.

NFIP maps and flood studies are covered in depth in Sections 5 through 10.

Buildings that pre-date the FIRM are treated differently than buildings built after the flood hazard was made public on the FIRM. These existing structures are called “pre-FIRM” buildings, while new construction is called “post-FIRM.”

3.2.2. Insurance

Flood insurance can be purchased to cover any building located in a participating community—even buildings not located in a mapped floodplain. Coverage is for damage by a "flood." A flood is defined by the NFIP as a "general and temporary condition of partial or complete inundation of normally dry land areas from:

- "The overflow of inland or tidal waters or
- "The unusual and rapid accumulation or runoff of surface waters from any source"

Flood insurance premiums for post-FIRM buildings are based on how well they are protected from flood damage. Therefore, it is very important for communities to ensure that new buildings in the floodplain are constructed properly.

Flood insurance premium rates for pre-FIRM buildings are subsidized by NFIP. Owners of these policies do not pay "actuarial" rates, i.e., rates based on the true risk to which the building is exposed.

Whether pre- or post-FIRM, another advantage of flood insurance is that owners get claims paid when needed; they do not have to wait for a disaster declaration for assistance for financial recovery. Since its creation in 1968, the NFIP has paid out more than $33 billion in flood insurance claim payments nationally for big and small floods. Insurance provides relief for all floods, including those not severe enough to warrant federal disaster aid.

Flood insurance and its relation to construction regulations are discussed in more detail in Section 25.

3.2.3. Regulations

The NFIP underwrites flood insurance coverage only in those communities that adopt and enforce floodplain regulations that meet or exceed NFIP criteria. Buildings built in accordance with these regulations have a lower risk of flooding and can be insured at lower rates.

The community's floodplain regulations are designed to ensure that new buildings will be protected from the flood levels shown on the FIRM and that development will not make the flood hazard worse. Over time, exposure to flood damage should be reduced, as the stock of the floodplain's older pre-FIRM buildings is replaced. Eventually, a community should have only post-FIRM buildings subject to little or no flood damage.

The NFIP construction regulations focus on protecting insurable buildings, but they also provide a degree of protection to other types of development. These criteria are detailed in Sections 11 through 16.

It should be noted that NFIP regulations are *minimum standards*. States and communities are encouraged to adopt and enforce additional or more restrictive rules that would better protect property from local flooding conditions. Suggested additional standards are discussed in Section 17.

Floodplain regulations are often controversial and difficult to enforce. Many people want the freedom to build what they want without government controls. In some areas, they may not even be aware that they need a local permit to build.

As a result of public opposition, a community may not be inclined to fully enforce all of the provisions of its ordinance, which puts its participation in the NFIP at risk. If the community does not fulfill its NFIP obligations to the federal government and allows construction in violation of its regulations, three things can happen:

1. New buildings will be subject to damage by the base flood
2. Insurance on an improperly constructed building may be very expensive
3. DHS/FEMA can impose sanctions on the community to encourage it to correct its floodplain management program, up to and including suspending the community from the NFIP. These sanctions are discussed in Section 3.5.5.

3.3. NFIP Roles and Responsibilities

The NFIP is founded on a mutual agreement between the federal government and each participating community. Local, state, and federal agencies and private insurance companies must share roles and responsibilities to meet the goals and objectives of the NFIP.

The community's role is of paramount importance. Residents and property owners can obtain flood insurance only if the community carries out its responsibilities.

3.3.1. The community role

The community enacts and implements the floodplain regulations required for participation in the NFIP. These requirements are covered in Sections 11 through 16.

> In the NFIP, a "community" is a governmental body with the statutory authority to enact and enforce development regulations. In Louisiana, the NFIP definition of "community" means cities, towns, villages, and parishes. Parishes qualify only for their unincorporated areas.

A participating community commits itself to:

- Designating an individual to be responsible for implementing the community's commitments
- Issuing or denying floodplain development/building permits
- Inspecting all development to assure compliance with the local ordinance
- Maintaining records of floodplain development
- Having flood maps and elevation and floodproofing certificates available for public inspection
- Assisting in the preparation and revision of floodplain maps
- Helping residents obtain information on flood hazards, floodplain map data, flood insurance, and proper construction measures
- Cooperating with neighboring communities' floodplain management activities

3.3.2. The State role

In 1971, the Louisiana State Legislature passed RS 38:84, designating the Department of Public Works as the NFIP State Coordinating Agency for the State. The law charged the Department to cooperate with the federal government "in the planning and carrying out of state participation in the National Flood Insurance Program." The Department "shall aid, advise and cooperate with parishes and municipalities endeavoring to qualify for participation in said program."

The Department of Transportation and Development (LADOTD) is the successor agency to the Department of Public Works. As the State coordinating agency for the NFIP, LADOTD is responsible for:

- Ensuring that communities have the legal authorities necessary to adopt and enforce floodplain management regulations
- Coordinating the activities of various state agencies that affect the NFIP
- Assessing community compliance with the minimum NFIP criteria
- Advising local officials responsible for administering the ordinance
- Answering questions from the public
- Helping review and adopt new maps and data
- Providing information and training on flood insurance and the flood insurance purchase requirement

Other agencies are also active. For example, the Louisiana Office of Homeland Security and Emergency Preparedness coordinates flood warning and response activities and several flood hazard mitigation programs.

Current information on State and FEMA offices can be found in Section 31.

3.3.3. The Federal role

In the Department of Homeland Security, FEMA administers the NFIP through its Regional Offices. There are 10 Regional Offices, each with a Mitigation Division that coordinates the NFIP with states and communities. Region VI covers the States of Louisiana, Texas, Arkansas, Oklahoma and New Mexico.

The Regional Office is responsible for assisting the state NFIP coordinating agencies. Regional staff can also provide assistance to local officials with questions on NFIP maps, their regulatory obligations, flood insurance, disaster assistance, and hazard mitigation.

DHS/FEMA's Washington, DC, office sets national policy for floodplain regulations, researches floodplain construction practices and administers the flood hazard mapping program. DHS/FEMA has mapped more than 100 million acres of flood hazard areas nationwide and designated some six million acres of floodways along 40,000 river miles.

DHS/FEMA also administers the insurance portion of the program. It sets flood insurance rates, establishes coverage, monitors applications and claims, and markets flood insurance. DHS/FEMA has established the NFIP as a self-supporting program. Historically, NFIP expenses, including mapping and administrative costs, have been paid through insurance premiums and fees from map revision requests.

Most insurance applications and claims are processed by private insurance companies through an arrangement with DHS/FEMA called the Write-Your-Own Program. DHS/FEMA also contracts for agent training and other assistance through regional insurance offices (Section 31 has contact information).

3.4. Joining the NFIP

3.4.1. Initial actions

Community participation in the NFIP is voluntary. There is no federal or Louisiana State law that requires a community to join. However, as discussed in Section 3.5.5, a non-participating community faces sanctions, such as loss of federal aid for insurable buildings in the floodplain. The sanctions make participation a very important decision for many communities.

To join, a community submits an application form, a resolution of participation, and its flood damage prevention ordinance.

LADOTD and DHS/FEMA Region VI have a model resolution and ordinance. The resolution states the community's intent to participate and cooperate with DHS/FEMA. The community agrees to "maintain in force … adequate land use and control measures consistent with the [NFIP] criteria" and to:

- Assist DHS/FEMA in the delineation of the floodplain
- Provide information concerning present uses and occupancy of the floodplain
- Maintain for public inspection, and furnish upon request, elevation and flood-proofing records for all new construction in the floodplain
- Cooperate with agencies and firms that undertake to study, survey, map, and identify floodplain areas and cooperate with neighboring communities on the management of adjoining floodplain areas to prevent aggravation of existing hazards
- Notify the floodplain administrator whenever the boundaries of the community have been modified by annexation, or the community has otherwise assumed authority to adopt and enforce floodplain management regulations for a particular area

The community must also adopt and submit a flood damage prevention ordinance that meets or exceeds the minimum NFIP criteria. These criteria are explained in Sections 11 through 16.

As shown in Figure 3-1, most communities joined the NFIP in the 1970s. At that time, they were given a Flood Hazard Boundary Map that showed only the approximate boundaries of the floodplain. Generally, these communities entered the "Emergency Phase" whereby their regulatory responsibilities were limited because of the limited flood hazard data provided on the map.

3.4.2. Flood data and maps

Participating communities receive a Flood Insurance Rate Map (FIRM). In Louisiana, over 70 communities have had their Flood Hazard Boundary Map "specially converted" to a FIRM. A new map was not printed, but the Flood Hazard Boundary Map became the FIRM. These special conversion FIRMs do not have flood elevations or detailed flood data.

The other Louisiana communities in the NFIP have received a Flood Insurance Study (FIS) and a new FIRM with more detailed flood hazard data. The FIRM and flood data are discussed in Sections 5 through 10. After receiving a period of time to review and appeal the draft map and study, the community is given 6 months to adopt the new data in a more comprehensive ordinance.

3.4.3. The regular phase

Whether the community receives an FIS or has had its map specially converted, it is converted to the "Regular Phase" on the effective date of the new FIRM. In a few cases, communities have been converted with no map or study.

If the ordinance is not adopted in time, the community is suspended from the NFIP. The FIRM still goes into effect on the same date and is used by lenders and federal agencies to determine where loans can be issued and Federal assistance can be provided. Suspension and lending repercussions are discussed in Section 3.5.

As of May 10, 2008, 99% of the nation's NFIP communities were in the Regular Phase. Here are the statistics for Louisiana:

In the Regular Phase with FIS	188
In the Regular Phase, specially converted, with FHBM	73
In the Regular Phase, specially converted, with no floodplain	24
Total in the Regular Phase	285
In the Emergency Phase	10
Suspended from the NFIP	2
Mapped, but not in the NFIP	20

Special conversion is discussed in Section 5.2.2.

The last category, "Mapped, but not in the NFIP," is comprised of small villages and towns that have little development in the floodplain. There is not much incentive for them to initiate a regulatory program that would only affect a few properties. There are also two communities that have been suspended from the NFIP for failure to adopt the required floodplain regulations (Section 3.5.4).

3.5. Compliance

3.5.1. Community Assistance Contacts and Community Assistance Visits

A community's floodplain management program and permit records are reviewed periodically by the DHS/FEMA Regional Office and the LADOTD. Staff may inspect records as part of a Community Assistance Visit (CAV) or Community Assistance Contact (CAC).

A CAC is used to establish contact with a community to determine if any problems or issues exist and to offer the community assistance if necessary. CACs can be conducted through telephone calls or brief visits.

A CAV is a site visit that includes a review of permit records and visits to recent construction sites. It is an opportunity to discuss problems that local officials are having and to identify any deficiencies in the community's floodplain management program. It also serves to verify the community's compliance with its obligations to the NFIP.

Most deficiencies in a community's program or violations of local ordinances are generally due to a lack of understanding of the NFIP requirements, lack of technical skills, failure to understand the rationales behind the NFIP requirements, or lack of an appreciation of the insurance implications and other consequences of a decision. Most problems that are identified can be solved through community assistance efforts.

When this does not happen, DHS/FEMA has procedures in place to conduct an enforcement action in order to obtain compliance by the community. If a community does not uphold its part of the agreement and fails to adequately enforce its floodplain management regulations, DHS/FEMA has recourse through three approaches:

- Reclassification under the CRS
- Probation
- Suspension from the program

Most communities comply with NFIP requirements before DHS/FEMA ever takes a formal compliance action. Communities often recognize that it is in everyone's best interest to bring the community into compliance before probation or suspension occurs. One of the primary reasons communities comply is to avoid disruptions in the real estate market that would result with the potential loss of flood insurance.

3.5.2. Community Rating System reclassification

The Community Rating System (CRS) provides a discount in flood insurance premiums for properties in communities that participate in the CRS. The CRS is explained in Section 26. CRS communities that are deemed to no longer be in full compliance with the NFIP requirements can be reclassified to Class 10. Should that happen, residents would lose their CRS flood insurance premium discounts.

3.5.3. Probation

Probation represents formal notification to the community that DHS/FEMA considers the community's floodplain management program to be noncompliant with NFIP criteria.

Prior to imposing probation, DHS/FEMA provides the community with a 90-day written notice and lists specific deficiencies and violations. It also notifies all policy holders of the impending probation, telling them that an additional $50 premium will be charged on policies sold or renewed during the probation period. The objective of this surcharge is to bring the policy holders' attention to the fact that their community is not compliant and failure to correct the problems may lead to suspension.

The community has 90 days to avoid this sanction by correcting deficiencies and remedying identified violations. Probation may be continued for up to one year after the community corrects all program deficiencies. This ensures that the community has truly changed its ways and has become compliant and that all policy holders are advised of the situation when their policies are renewed.

3.5.4. Suspension

If, after a period of probation, a community fails to remedy its program deficiencies, it will be suspended from the NFIP. Suspension means the community is no longer in the NFIP. It is subject to the sanctions for non-participation that are explained in the next section.

DHS/FEMA grants a community 30 days to show why it should not be suspended and then gives it a 30-day suspension letter. DHS/FEMA may also conduct a written or oral hearing before the suspension takes effect.

A community can automatically be suspended if, following due notice, it failed to adopt revisions to its floodplain ordinance in response to flood map revisions or amended minimum NFIP criteria. It can also be suspended within 30 days for knowingly making its ordinance noncompliant.

A community suspended under the NFIP may apply to the DHS/FEMA Regional Office for reinstatement by submitting the following:

- A local legislative or executive measure reaffirming the community's intent to comply with the NFIP criteria
- Evidence that all program deficiencies have been corrected
- Evidence that any violations have been remedied to the maximum extent possible

DHS/FEMA may reinstate the community to full program status, bring it to a probationary status, or withhold reinstatement for up to one year after a satisfactory submission from the community.

3.5.5. Sanctions for non-participation

A community that does not join the NFIP, has withdrawn from it, or is suspended faces the following sanctions:

- Flood insurance will not be available. No resident will be able to purchase a flood insurance policy.
- If the community withdraws or is suspended, existing flood insurance policies will not be renewed.
- No direct federal grants or loans for development may be made in identified flood hazard areas under programs administered by federal agencies such as the U.S. Department of Housing and Urban Development, the Environmental Protection Agency, and the Small Business Administration. State agencies may also deny financial assistance for floodplain properties.
- Federal disaster assistance will not be provided to repair insurable buildings located in identified flood hazard areas for damage caused by a flood.
- No federal mortgage insurance or loan guarantees may be provided in identified flood hazard areas. This includes policies written by the Federal Housing Administration, Veterans Administration, and others.
- Federally insured or regulated lending institutions, such as banks and credit unions, must notify applicants seeking loans for insurable buildings in flood hazard areas that there is a flood hazard and the property is not eligible for federal disaster relief.

These sanctions can be severe on any community with a substantial number of buildings in the floodplain. Most communities with a flood problem have joined the NFIP and are in full compliance with their regulatory obligations.

3.5.6. Benefits of participation

A community should not be in the business of administering a flood damage prevention ordinance because it is worried about the sanctions for non-participation. Most communities have joined the NFIP because it offers some valuable benefits, including:

- Flood insurance is made available to all residents of the community. Without the NFIP, most residents and businesses would not have access to flood insurance. Only if a flood is large enough to warrant a federal disaster declaration would they be eligible for financial assistance, and then it is mostly in the form of a loan that must be paid back with interest.
- The NFIP provides floodplain maps and data to help local officials guide future development and make other land use decisions with better knowledge about the true flood hazard. The community will be better protected from future disasters.
- Participation provides the opportunity for assistance from DHS/FEMA. Staff can provide technical assistance and programs can provide financial assistance for flood loss reduction efforts, hazard mapping and hazard mitigation.

Section 4. NFIP Regulations

Contents

4.1. The NFIP Regulations

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

The NFIP standards work—as witnessed during floods in areas where buildings and other developments have been built in compliance. Nationwide each year, NFIP-based floodplain management regulations help prevent more than $1 billion in structural damage.

It is important to emphasize that the NFIP criteria are minimums. Communities are encouraged to enact their own higher regulatory standards, as discussed in Section 17.

4.1.1. 44 Code of Federal Regulations

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

Most of the requirements relative to a community's ordinance are in Parts 59 and 60, which are included in Section 4.2. Figure 4-1 shows how the regulations are organized. The sections are referred to in shorthand, such as 44 CFR 60.1 – Chapter 44, *Code of Federal Regulations*, Part 60, Section 1. In this reference, excerpts are shown in boxes:

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

As noted in Section 3.4, when a community joined the NFIP, it agreed to abide by these regulations. When the community's Federal Insurance Rate Map (FIRM) was published, it had to submit its ordinance to DHS/FEMA to ensure that it met these requirements.

Note: Periodically, the NFIP regulations are revised to incorporate new requirements or clarify old ones. These changes are published in the *Federal Register*. Some revisions require local ordinance amendments. A community may or may not have made the amendments necessary to stay updated. Local staff should check periodically with the Louisiana Department of Transportation and Development (LADOTD) or the DHS/Federal Emergency Management Agency (DHS/FEMA) Regional Office to verify that the ordinance is currently in full compliance with the latest NFIP requirements.

Part 59—General Provisions

Subpart A – General

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Subpart B – Requirements for State Flood Plain Management Regulations

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

Figure 4-1 44 CFR Parts 59 and 60

Note: The full text of these two Parts can be found in Section 4.2

4.1.2. Flood damage prevention ordinance

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

- 60.3(a) DHS/FEMA has not provided any maps or data
- 60.3(b) DHS/FEMA has provided a map with approximate A Zones
- 60.3(c) DHS/FEMA has provided a FIRM with base flood elevations
- 60.3(d) DHS/FEMA has provided a FIRM with a base flood elevation (BFE) and a map that shows a floodway
- 60.3(e) DHS/FEMA has provided a FIRM that shows coastal high hazard areas

DHS/FEMA has developed a series of model flood damage prevention ordinances for communities that relate to the five types of communities listed above. For example, a community with a floodway map would use the 60.3(d) model ordinance. Copies of the models are available from DHS/FEMA and LADOTD.

Two important notes:

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

Communities are encouraged to enact regulatory standards that exceed the NFIP minimums and are more appropriate for local conditions. The Community Rating System (CRS) is a part of the NFIP that rewards communities that implement programs that exceed the minimums. This is explained in more detail in Section 26.

These requirements are cumulative. A 60.3(c) community must comply with all appropriate requirements of Sections 60.3(a) and (b). For example, 60.3(a) includes basic requirements for subdivisions and utilities that are not repeated in the later sections. All communities in the NFIP must comply with these subdivision and utility requirements. For example, a 60.3(c) community must use the BFE provided on the FIRM. If that community also has an approximate A Zone without a BFE, it must comply with the requirements of 60.3(b) for that area.

The details of the requirements of 44 CFR 60.3 are explained in Sections 11 through 16. This Desk Reference is organized by subject matter, so the section numbers do not correspond with 44 CFR. Where appropriate, the specific *Code of Federal Regulations* section numbers are referenced.

4.2. 44 CFR

Note: This section only includes 44 CFR Parts 59 and 60, the sections of the Federal Regulations that directly relate to local floodplain management requirements. Other parts address mapping criteria and other issues. They can be found on DHS/FEMA's website, www.FEMA.gov.

4.2.1. PART 59 – General Provisions

Subpart A – General

Sec.

Subpart B – Eligibility Requirements

Authority: 42 U.S.C. 4001 et seq.; Reorganization Plan No. 3 of 1978, 43 FR 41943, 3 CFR, 1978 Comp., p. 329; E.O. 12127 of Mar. 31, 1979, 44 FR 19367, 3 CFR, 1979 Comp., p. 376.

Source: 41 FR 46968, Oct. 26, 1976; 44 FR 31177, May 31, 1979; 50 FR 36022, Sept. 4, 1985; 51 FR 30306, Aug. 25, 1986; 57 FR 19540, May 7, 1992; 58 FR 62424, Nov. 26, 1993; 59 FR 53597, Oct. 25, 1994; 62 FR 55715, Oct. 27, 1997, unless otherwise noted.

Subpart A – General

§ 59.1 Definitions.

As used in this subchapter.

"Act" means the statutes authorizing the National Flood Insurance Program that are incorporated in 42 U.S.C. 4001-4128.

"Actuarial rates": see "risk premium rates."

"Administrator" means the Federal Insurance Administrator.

"Agency" means the Federal Emergency Management Agency, Washington DC.

"Alluvial fan flooding" means flooding occurring on the surface of an alluvial fan or similar landform which originates at the apex and is characterized by high-velocity flows; active processes of erosion, sediment transport, and deposition; and, unpredictable flow paths.

"Apex" means a point on an alluvial fan or similar landform below which the flow path of the major stream that formed the fan becomes unpredictable and alluvial fan flooding can occur.

"Applicant" means a community which indicates a desire to participate in the Program.

"Appurtenant Structure" means a structure which is on the same parcel of property as the principal structure to be insured and the use of which is incidental to the use of the principal structure.

"Area of shallow flooding" means a designated AO, AH, AR/AO, AR/AH, or VO zone on a community's Flood Insurance Rate Map (FIRM) with a 1 percent or greater annual chance of flooding to an average depth of 1 to 3 feet where a clearly defined channel does not exist, where the path of flooding is unpredictable, and where velocity flow may be evident. Such flooding is characterized by ponding or sheet flow.

"Area of special flood-related erosion hazard" is the land within a community which is most likely to be subject to severe flood-related erosion losses. The area may be designated as Zone E on the Flood Hazard Boundary Map (FHBM). After the detailed evaluation of the special flood-related erosion hazard area in preparation for publication of the FIRM, Zone E may be further refined.

"Area of special flood hazard" is the land in the flood plain within a community subject to a 1 percent or greater chance of flooding in any given year. The area may be designated as Zone A on the FHBM. After detailed ratemaking has been completed in preparation for publication of the flood insurance rate map, Zone A usually is refined into Zones A, AO, AH, A1-30, AE, A99, AR, AR/A1-30, AR/AE, AR/AO, AR/AH, AR/A, VO, or V1-30, VE, or V. For purposes of these regulations, the term "special flood hazard area" is synonymous in meaning with the phrase "area of special flood hazard."

"Area of special mudslide (i.e., mudflow) hazard" is the land within a community most likely to be subject to severe mudslides (i.e., mudflows). The area may be designated as Zone M on the FHBM. After the detailed evaluation of the special mudslide (i.e., mudflow) hazard area in preparation for publication of the FIRM, Zone M may be further refined.

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

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

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

"Building": see "structure."

"Chargeable rates" mean the rates established by the Administrator pursuant to section 1308 of the Act for first layer limits of flood insurance on existing structures.

"Chief Executive Officer" of the community ("CEO") means the official of the community who is charged with the authority to implement and administer laws, ordinances and regulations for that community.

"Coastal high hazard area" means an area of special flood hazard extending from offshore to the inland limit of a primary frontal dune along an open coast and any other area subject to high velocity wave action from storms or seismic sources.

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

"Contents coverage" is the insurance on personal property within an enclosed structure, including the cost of debris removal, and the reasonable cost of removal of contents to minimize damage. Personal property may be household goods usual or incidental to residential occupancy, or merchandise, furniture, fixtures, machinery, equipment and supplies usual to other than residential occupancies.

"Criteria" means the comprehensive criteria for land management and use for flood-prone areas developed under 42 U.S.C. 4102 for the purposes set forth in Part 60 of this subchapter.

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

"Curvilinear Line" means the border on either a FHBM or FIRM that delineates the special flood, mudslide (i.e., mudflow) and/or flood-related erosion hazard areas and consists of a curved or contour line that follows the topography.

"Deductible" means the fixed amount or percentage of any loss covered by insurance which is borne by the insured prior to the insurer's liability.

"Developed area" means an area of a community that is:

(a) A primarily urbanized, built-up area that is a minimum of 20 contiguous acres, has basic urban infrastructure, including roads, utilities, communications, and public facilities, to sustain industrial, residential, and commercial activities, and

(1) Within which 75 percent or more of the parcels, tracts, or lots contain commercial, industrial, or residential structures or uses; or

(2) Is a single parcel, tract, or lot in which 75 percent of the area contains existing commercial or industrial structures or uses; or

(3) Is a subdivision developed at a density of at least two residential structures per acre within which 75 percent or more of the lots contain existing residential structures at the time the designation is adopted.

(b) Undeveloped parcels, tracts, or lots, the combination of which is less than 20 acres and contiguous on at least 3 sides to areas meeting the criteria of paragraph (a) at the time the designation is adopted.

(c) A subdivision that is a minimum of 20 contiguous acres that has obtained all necessary government approvals, provided that the actual "start of construction" of structures has occurred on at least 10 percent of the lots or remaining lots of a subdivision or 10 percent of the maximum building coverage or remaining building coverage allowed for a single lot subdivision at the time the designation is adopted and construction of structures is underway. Residential subdivisions must meet the density criteria in paragraph (a)(3).

"Development" means any man-made change to improved or unimproved real estate, including but not limited to buildings or other structures, mining, dredging, filling, grading, paving, excavation or drilling operations or storage of equipment or materials.

"Director" means the Director of the Federal Emergency Management Agency.

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

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

"Emergency Flood Insurance Program" or "emergency program" means the Program as implemented on an emergency basis in accordance with section 1336 of the Act. It is intended as a program to provide a first layer amount of insurance on all insurable structures before the effective date of the initial FIRM.

"Erosion" means the process of the gradual wearing away of land masses. This peril is not per se covered under the Program.

"Exception" means a waiver from the provisions of Part 60 of this subchapter directed to a community which relieves it from the requirements of a rule, regulation, order or other determination made or issued pursuant to the Act.

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

"Existing manufactured home park or subdivision" means a manufactured home park or subdivision for which the construction of facilities for servicing the lots on which the manufactured homes are to be affixed (including, at a minimum, the installation of utilities, the

construction of streets, and either final site grading or the pouring of concrete pads) is completed before the effective date of the floodplain management regulations adopted by a community.

"Existing structures" see "existing construction."

"Expansion to an existing manufactured home park or subdivision" means the preparation of additional sites by the construction of facilities for servicing the lots on which the manufacturing homes are to be affixed (including the installation of utilities, the construction of streets, and either final site grading or the pouring of concrete pads).

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

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

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

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

"First-layer coverage" is the maximum amount of structural and contents insurance coverage available under the Emergency Program.

"Flood" or "Flooding" means:

(a) A general and temporary condition of partial or complete inundation of normally dry land areas from:

(1) The overflow of inland or tidal waters.

(2) The unusual and rapid accumulation or runoff of surface waters from any source.

(3) Mudslides (i.e., mudflows) which are proximately caused by flooding as defined in paragraph (a)(2) of this definition and are akin to a river of liquid and flowing mud on the surfaces of normally dry land areas, as when earth is carried by a current of water and deposited along the path of the current.

(b) The collapse or subsidence of land along the shore of a lake or other body of water as a result of erosion or undermining caused by waves or currents of water exceeding anticipated cyclical levels or suddenly caused by an unusually high water level in a natural body of water, accompanied by a severe storm, or by an unanticipated force of nature, such as flash flood or an abnormal tidal surge, or by some similarly unusual and unforeseeable event which results in flooding as defined in paragraph (a)(1) of this definition.

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

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

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

“Flood insurance” means the insurance coverage provided under the Program.

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

“Flood Insurance Study” see “flood elevation study.”

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

Flood plain management means the operation of an overall program of corrective and preventive measures for reducing flood damage, including but not limited to emergency preparedness plans, flood control works and flood plain management regulations.

"Flood plain management regulations" means zoning ordinances, subdivision regulations, building codes, health regulations, special purpose ordinances (such as a flood plain ordinance, grading ordinance and erosion control ordinance) and other applications of police power. The term describes such state or local

regulations, in any combination thereof, which provide standards for the purpose of flood damage prevention and reduction.

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

"Flood proofing" means any combination of structural and non-structural additions, changes, or adjustments to structures which reduce or eliminate flood damage to real estate or improved real property, water and sanitary facilities, structures and their contents.

"Flood-related erosion" means the collapse or subsidence of land along the shore of a lake or other body of water as a result of undermining caused by waves or currents of water exceeding anticipated cyclical levels or suddenly caused by an unusually high water level in a natural body of water, accompanied by a severe storm, or by an unanticipated force of nature, such as a flash flood or an abnormal tidal surge, or by some similarly unusual and unforeseeable event which results in flooding.

"Flood-related erosion area" or "flood-related erosion prone area" means a land area adjoining the shore of a lake or other body of water, which due to the composition of the shoreline or bank and high water levels or wind-driven currents, is likely to suffer flood-related erosion damage.

"Flood-related erosion area management" means the operation of an overall program of corrective and preventive measures for reducing flood-related erosion damage, including but not limited to emergency preparedness plans, flood-related erosion control works, and flood plain management regulations.

"Floodway": see "regulatory floodway."

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

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

"Functionally dependent use" means a use which cannot perform its intended purpose unless it is located or carried out in close proximity to water. The term includes only docking facilities, port facilities that are necessary for the loading and unloading of cargo or passengers, and ship building and ship repair facilities, but does not include long-term storage or related manufacturing facilities.

"General Counsel" means the General Counsel of the Federal Emergency Management Agency.

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

"Historic Structure" means any structure that is:

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

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

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

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

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

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

"Independent scientific body" means a non-federal technical or scientific organization involved in the study of land use planning, flood plain management, hydrology, geology, geography, or any other related field of study concerned with flooding.

"Insurance adjustment organization" means any organization or person engaged in the business of adjusting loss claims arising under the Standard Flood Insurance Policy.

"Insurance company" or "insurer" means any person or organization authorized to engage in the insurance business under the laws of any State.

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

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

"Lowest Floor" means the lowest floor of the lowest enclosed area (including basement). An unfinished or flood resistant enclosure, usable solely for parking of vehicles, building access or storage in an area other than a basement area is not considered a building's lowest floor; provided, that such enclosure is not built so as to render the structure in violation of the applicable non-elevation design requirements of section 60.3.

"Mangrove stand" means an assemblage of mangrove trees which are mostly low trees noted for a copious development of interlacing adventitious roots above the ground and which contain one or more of the following species: Black mangrove (Avicennia Nitida); red mangrove (Rhizophora Mangle); white mangrove (Languncularia Racemosa); and buttonwood (Conocarpus Erecta).

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

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

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

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

"Mudslide" (i.e., mudflow) describes a condition where there is a river, flow or inundation of liquid mud down a hillside usually as a result of a dual condition of loss of brush cover, and the subsequent accumulation of water on the ground preceded by a period of unusually heavy or sustained rain. A mudslide (i.e., mudflow) may occur as a distinct phenomenon while a landslide is in progress, and will be recognized as such by the Administrator only if the mudflow, and not the landslide, is the proximate cause of damage that occurs.

"Mudslide (i.e., mudflow) area management" means the operation of an overall program of corrective and preventive measures for reducing mudslide (i.e., mudflow) damage, including but not limited to emergency preparedness plans, mudslide control works, and flood plain management regulations.

"Mudslide (i.e., mudflow) prone area" means an area with land surfaces and slopes of unconsolidated material where the history, geology and climate indicate a potential for mudflow.

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

"New manufactured home park or subdivision" means a manufactured home park or subdivision for which the construction of facilities for servicing the lots on which the manufactured homes are to be affixed (including at a minimum, the installation of utilities, the construction of streets, and either final site grading or the pouring of concrete pads) is completed on or after the effective date of floodplain management regulations adopted by a community.

"100-year flood" see "base flood."

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

"Person" includes any individual or group of individuals, corporation, partnership, association, or any other entity, including State and local governments and agencies.

"Policy" means the Standard Flood Insurance Policy.

"Premium" means the total premium payable by the insured for the coverage or coverages provided under the policy. The calculation of the premium may be based upon either chargeable rates or risk premium rates, or a combination of both.

"Primary frontal dune" means a continuous or nearly continuous mound or ridge of sand with relatively steep seaward and landward slopes immediately landward and adjacent to the beach and subject to erosion and overtopping from high tides and waves during major coastal storms. The inland limit of the primary frontal dune occurs at the point where there is a distinct change from a relatively steep slope to a relatively mild slope.

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

"Program" means the National Flood Insurance Program authorized by 42 U.S.C. 4001-4128.

"Program deficiency" means a defect in a community's flood plain management regulations or administrative procedures that impairs effective implementation of those flood plain management regulations or of the standards in §§ 60.3, 60.4, 60.5, or 60.6.

"Project cost" means the total financial cost of a flood protection system (including design, land acquisition, construction, fees, overhead, and profits), unless the Federal Insurance Administrator determines a given "cost" not to be a part of such project cost.

"Recreational vehicle" means a vehicle which is:

(a) built on a single chassis;

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

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

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

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

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

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

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

"Risk premium rates" mean those rates established by the Administrator pursuant to individual community studies and investigations which are undertaken to provide flood insurance in accordance with Section 1307 of the Act and the accepted actuarial principles. "Risk premium rates" include provisions for operating costs and allowances.

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

"Sand dunes" mean naturally occurring accumulations of sand in ridges or mounds landward of the beach.

"Scientifically incorrect" means the methodology(ies) and/or assumptions which have been utilized are inappropriate for the physical processes being evaluated or are otherwise erroneous.

"Second layer coverage" means an additional limit of coverage equal to the amounts made available under the Emergency Program, and made available under the Regular Program.

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

"Sheet flow area": see "area of shallow flooding."

"60-year setback" means a distance equal to 60 times the average annual long-term recession rate at a site, measured from the reference feature.

Special flood hazard area: see "area of special flood hazard."

"Special hazard area" means an area having special flood, mudslide (i.e., mudflow), or flood-related erosion hazards, and shown on an FHBM or FIRM as Zone A, AO, A1-30, AE, AR, AR/A1-30, AR/AE, AR/AO, AR/AH, AR/A, A99, AH, VO, V1-30, VE, V, M, or E.

"Standard Flood Insurance Policy" means the flood insurance policy issued by the Federal Insurance Administrator, or an insurer pursuant to an arrangement with the Administrator pursuant to Federal statutes and regulations.

"Start of Construction" (for other than new construction or substantial improvements under the Coastal Barrier Resources Act (Pub.L. 97-348)), includes substantial improvement, and means the date the building permit was issued, provided the actual start of construction, repair, reconstruction, rehabilitation, addition, placement, or other improvement was within 180 days of the permit date. The actual start means either the first placement of permanent construction of a structure on a site, such as the pouring of slab or footings, the installation of piles, the construction of columns, or any

work beyond the stage of excavation; or the placement of a manufactured home on a foundation. Permanent construction does not include land preparation, such as clearing, grading and filling; nor does it include the installation of streets and/or walkways; nor does it include excavation for a basement, footings, piers, or foundations or the erection of temporary forms; nor does it include the installation on the property of accessory buildings, such as garages or sheds not occupied as dwelling units or not part of the main structure. For a substantial improvement, the actual start of construction means the first alteration of any wall, ceiling, floor, or other structural part of a building, whether or not that alteration affects the external dimensions of the building.

"State" means any State, the District of Columbia, the territories and possessions of the United States, the Commonwealth of Puerto Rico, and the Trust Territory of the Pacific Islands.

"State coordinating agency" means the agency of the state government, or other office designated by the Governor of the state or by state statute at the request of the Administrator to assist in the implementation of the National Flood Insurance Program in that state.

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

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

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

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

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

(1) Any project for improvement of a structure to correct existing violations of state or local health, sanitary, or safety code specifications which have been identified by the local code enforcement official and which are the minimum necessary to assure safe living conditions or

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

"30-year setback" means a distance equal to 30 times the average annual long-term recession rate at a site, measured from the reference feature.

"Technically incorrect" means the methodology(ies) utilized has been erroneously applied due to mathematical or measurement error, changed physical conditions, or insufficient quantity or quality of input data.

"V Zone": see "coastal high hazard area."

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

"Violation" means the failure of a structure or other development to be fully compliant with the community's flood plain management regulations. A structure or other development without the elevation certificate, other certifications, or other evidence of compliance required in § 60.3(b)(5), (c)(4), (c)(10), (d)(3), (e)(2), (e)(4), or (e)(5) is presumed to be in violation until such time as that documentation is provided.

"Water surface elevation" means the height, in relation to the National Geodetic Vertical Datum (NGVD) of 1929, (or other datum, where specified) of floods of various magnitudes and frequencies in the flood plains of coastal or riverine areas.

"Zone of imminent collapse" means an area subject to erosion adjacent to the shoreline of an ocean, bay, or lake and within a distance equal to 10 feet plus 5 times the average annual long-term erosion rate for the site, measured from the reference feature.

[41 FR 46968, Oct. 26, 1976, as amended at 43 FR 7140, Feb. 17, 1978. Redesignated at 44 FR 31177, May 31, 1979, and amended at 46 FR 1274, Jan. 6, 1981; 47 FR 43061, Sept. 30, 1982; 48 FR 31644, July 11, 1983; 48 FR 39068, Aug. 29, 1983; 48 FR 44543 and 44552, Sept. 29, 1983; 49 FR 4751, Feb. 8, 1984; 49 FR 33655, 33656, Aug. 24, 1984; 49 FR 38119, Sept. 27, 1984; 50 FR 36023, Sept. 4, 1985; 50 FR 40007, Oct. 1, 1985; 50 FR 43706, Oct. 29, 1985; 51 FR 30306, Aug. 25, 1986; 52 FR 24372, June 30, 1987; 53 FR 16276, May 6,

1988; 53 FR 25332, July 6, 1988; 53 FR 36975, Sept. 23, 1988; 54 FR 33549, Aug. 15, 1989; 54 FR 40005, 40282, Sept. 29, 1989; 57 FR 19540, May 7, 1992; 58 FR 62424, Nov. 26, 1993; 59 FR 53597, Oct. 25, 1994; 62 FR 55715, Oct. 27, 1997]

§ 59.2 Description of program.

(a) The National Flood Insurance Act of 1968 was enacted by Title XIII of the Housing and Urban Development Act of 1968 (Pub.L. 90-448, August 1, 1968) to provide previously unavailable flood insurance protection to property owners in flood-prone areas. Mudslide (as defined in § 59.1) protection was added to the Program by the Housing and Urban Development Act of 1969 (Pub.L. 91-152, December 24, 1969). Flood-related erosion (as defined in § 59.1) protection was added to the Program by the Flood Disaster Protection Act of 1973 (Pub.L. 93-234, December 31, 1973). The Flood Disaster Protection Act of 1973 requires the purchase of flood insurance on and after March 2, 1974, as a condition of receiving any form of Federal or federally-related financial assistance for acquisition or construction purposes with respect to insurable buildings and mobile homes within an identified special flood, mudslide (i.e., mudflow), or flood-related erosion hazard area that is located within any community participating in the Program. The Act also requires that on and after July 1, 1975, or one year after a community has been formally notified by the Administrator of its identification as community containing one or more special flood, mudslide (i.e., mudflow), or flood-related erosion hazard areas, no such Federal financial assistance, shall be provided within such an area unless the community in which the area is located is then participating in the Program, subject to certain exceptions. See FIA published Guidelines at § 59.4(c).

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

(c) Minimum requirements for adequate flood plain management regulations are set forth in § 60.3 for flood-prone areas, in § 60.4 for mudslide (i.e., mudflow) areas and in § 60.5 for flood-related erosion areas. Those applicable requirements and standards are based on the amount of technical information available to the community.

[41 FR 46968, Oct. 26, 1976, as amended at 43 FR 7140, Feb. 17, 1978. Redesignated at 44 FR 31177, May 31, 1979; 48 FR 44552, Sept. 29, 1983; 49 FR 4751, Feb. 8, 1984]

§ 59.3 Emergency program.

The 1968 Act required a risk study to be undertaken for each community before it could become eligible for the sale of flood insurance. Since this requirement resulted in a delay in providing insurance, the Congress, in section 408 of the Housing and Urban Development Act of 1969 (Pub.L. 91-152, December 24, 1969), established an Emergency Flood Insurance Program as a new Section 1336 of the National Flood Insurance Act (42 U.S.C. 4056) to permit the early sale of insurance in flood-prone communities. The emergency program does not affect the requirement that a community must adopt adequate flood plain management regulations pursuant to Part 60 of this subchapter but permits insurance to be sold before a study is conducted to determine risk premium rates for the community. The program still requires upon the effective date of a FIRM the charging of risk premium rates for all new construction and substantial improvements and for higher limits of coverage for existing structures.

[43 FR 7140, Feb. 17, 1978. Redesignated at 44 FR 31177, May 31, 1979; 48 FR 44543, Sept. 29, 1983]

§ 59.4 References.

(a) The following are statutory references for the National Flood Insurance Program, under which these regulations are issued:

(1) National Flood Insurance Act of 1968 (Title XIII of the Housing and Urban Development Act of 1968), Pub.L. 90-448, approved August 1, 1968, 42 U.S.C. 4001 et seq.

(2) Housing and Urban Development Act of 1969 (Pub.L. 91-152, approved December 24, 1969).

(3) Flood Disaster Protection Act of 1973 (87 Stat. 980), Pub.L. 93-234, approved December 31, 1973.

(4) Section 816 of the Housing and Community Development Act of 1974 (87 Stat. 975), Pub.L. 93-383, approved August 22, 1974.

(5) Pub.L. 5-128 (effective October 12, 1977).

(6) The above statutes are included in 42 U.S.C. 4001 et seq.

(b) The following are references relevant to the National Flood Insurance Program:

(1) Executive Order 11988 (Floodplain Management, dated May 24, 1977 (42 FR 26951, May 25, 1977)).

(2) The Flood Control Act of 1960 (Pub.L. 86-645).

(3) Title II, section 314 of Title III and section 406 of Title IV of the Disaster Relief Act of 1974 (Pub.L. 93-288).

(4) Coastal Zone Management Act (Pub.L. 92-583), as amended Pub.L. 94-370.

(5) Water Resources Planning Act (Pub.L. 89-90), as amended Pub L. 94-112 (October 16, 1975).

(6) Title I, National Environmental Policy Act (Pub.L. 91-190).

(7) Land and Water Conservation Fund Act (Pub.L. 89-578), and subsequent amendments thereto.

(8) Water Resources Council, Principals and Standards for Planning, Water and Related Land Resources (38 FR 24778-24869, September 10, 1973).

(9) Executive Order 11593 (Protection and Enhancement of the Cultural Environment), dated May 13, 1971 (36 FR 8921, May 15, 1971).

(10) 89th Cong., 2nd Session, H.D. 465.

(11) Required land use element for comprehensive planning assistance under section 701 of the Housing Act of 1954, as amended by the Housing and Community Development Act of 1974 (24 CFR § 600.72).

(12) Executive Order 11990 (Protection of Wetlands, dated May 24, 1977 (42 FR 26951, May 25, 1977)).

(13) Water Resources Council (Guidance for Floodplain Management) (42 FR 52590, September 30, 1977).

(14) Unified National Program for Floodplain Management of the United States Water Resources Council, July 1976.

(c) The following reference guidelines represent the views of the Federal Insurance Administration with respect to the mandatory purchase of flood insurance under section 102 of the Flood Disaster Protection Act of 1973: Mandatory Purchase of Flood Insurance Guidelines (54 FR 29666-29695, July 13, 1989).

[41 FR 46968, Oct. 26, 1976, as amended at 43 FR 7140, Feb. 17, 1978. Redesignated at 44 FR 31177, May 31, 1979; 57 FR 19540, May 7, 1992]

Subpart B – Eligibility Requirements

§ 59.21 Purpose of subpart.

This subpart lists actions that must be taken by a community to become eligible and to remain eligible for the Program.

§ 59.22 Prerequisites for the sale of flood insurance.

(a) To qualify for flood insurance availability a community shall apply for the entire area within its jurisdiction, and shall submit:

(1) Copies of legislative and executive actions indicating a local need for flood insurance and an explicit desire to participate in the National Flood Insurance Program;

(2) Citations to State and local statutes and ordinances authorizing actions regulating land use and copies of the local laws and regulations cited;

(3) A copy of the flood plain management regulations the community has adopted to meet the requirements of §§ 60.3, 60.4 and/or § 60.5 of this subchapter. This submission shall include copies of any zoning, building, and subdivision regulations, health codes, special purpose ordinances (such as a flood plain ordinance, grading ordinance, or flood-related erosion control ordinance), and any other corrective and preventive measures enacted to reduce or prevent flood, mudslide (i.e., mudflow) or flood-related erosion damage;

(4) A list of the incorporated communities within the applicant's boundaries;

(5) Estimates relating to the community as a whole and to the flood, mudslide (i.e., mudflow) and flood-related erosion prone areas concerning:

(i) Population;

(ii) Number of one to four family residences;

(iii) Number of small businesses; and

(iv) Number of all other structures.

(6) Address of a local repository, such as a municipal building, where the Flood Hazard Boundary Maps (FHBMs) and Flood Insurance Rate Maps (FIRMs) will be made available for public inspection;

(7) A summary of any State or Federal activities with respect to flood plain, mudslide (i.e., mudflow) or flood-related erosion area management within the community, such as federally-funded flood control projects and State-administered flood plain management regulations;

(8) A commitment to recognize and duly evaluate flood, mudslide (i.e., mudflow) and/or flood-related erosion hazards in all official actions in the areas having special flood, mudslide (i.e., mudflow) and/or flood-related erosion hazards and to take such other official action reasonably necessary to carry out the objectives of the program; and

(9) A commitment to:

(i) Assist the Administrator at his/her request, in his/her delineation of the limits of the areas having special flood, mudslide (i.e., mudflow) or flood-related erosion hazards;

(ii) Provide such information concerning present uses and occupancy of the flood plain, mudslide (i.e., mudflow) or flood-related erosion areas as the Administrator may request;

(iii) Maintain for public inspection and furnish upon request, for the determination of applicable flood insurance risk premium rates within all areas having special flood hazards identified on a FHBM or FIRM, any certificates of floodproofing, and information on the elevation (in relation to mean sea level) of the level of the lowest floor (including basement) of all new or substantially improved structures, and include whether or not such structures contain a basement, and if the structure has been floodproofed, the elevation (in relation to mean sea level) to which the structure was floodproofed;

(iv) Cooperate with Federal, State, and local agencies and private firms which undertake to study, survey, map, and identify flood plain, mudslide (i.e., mudflow) or flood-related erosion areas, and cooperate with neighboring communities with respect to the management of adjoining flood plain, mudslide (i.e., mudflow) and/or flood-related erosion areas in order to prevent aggravation of existing hazards;

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

(b) An applicant shall legislatively:

(1) Appoint or designate the agency or official with the responsibility, authority, and means to implement the commitments made in paragraph (a) of this section, and

(2) Designate the official responsible to submit a report to the Administrator concerning the community participation in the Program, including, but not limited to the development and implementation of flood plain management regulations. This report shall be submitted annually or biennially as determined by the Administrator.

(c) The documents required by paragraph (a) of this section and evidence of the actions required by paragraph (b) of this section shall be submitted to the Federal Emergency Management Agency, Washington DC 20472.

[41 FR 46968, Oct. 26, 1976. Redesignated at 44 FR 31177, May 31, 1979 and amended at 48 FR 29318, June 24, 1983; 48 FR 44543 and 44552, Sept. 29, 1983; 49 FR 4751, Feb. 8, 1984; 49 FR 33656, Aug. 24, 1984; 50 FR 36023, Sept. 4, 1985]

§ 59.23 Priorities for the sale of flood insurance under the regular program.

Flood-prone, mudslide (i.e., mudflow) and flood-related erosion prone communities are placed on a register of areas eligible for ratemaking studies and then selected from this register for ratemaking studies on the basis of the following considerations.

(a) Recommendations of State officials;

(b) Location of community and urgency of need for flood insurance;

(c) Population of community and intensity of existing or proposed development of the flood plain, the mudslide (i.e., mudflow) and the flood-related erosion area;

(d) Availability of information on the community with respect to its flood, mudslide (i.e., mudflow) and flood-related erosion characteristics and previous losses;

(e) Extent of State and local progress in flood plain, mudslide (i.e., mudflow) area and flood-related erosion area management, including adoption of flood plain management regulations consistent with related ongoing programs in the area.

§ 59.24 Suspension of community eligibility.

(a) A community eligible for the sale of flood insurance shall be subject to suspension from the Program for failing to submit copies of adequate flood plain management regulations meeting the minimum requirements of paragraphs (b), (c), (d), (e) or (f) of § 60.3 or paragraph (b) of § 60.4 or § 60.5, within six months from the date the Administrator provides the data upon which the flood plain regulations for the applicable paragraph shall be based. Where there has not been any submission by the community, the Administrator shall notify the community that 90 days remain in the six-month period in order to submit adequate flood plain management regulations. Where there has been an inadequate submission, the Administrator shall notify the community of the specific deficiencies in its submitted flood plain management regulations and inform the community of the amount of time remaining within the six-month period. If, subsequently, copies of adequate flood plain management regulations are not received by the Administrator, no later than 30 days before the expiration of the original six month period the Administrator shall provide written notice to the community and to the state and assure publication in the Federal Register under part 64 of this subchapter of the community's loss of eligibility for the sale of flood insurance, such suspension to become effective upon the expiration of the six month period. Should the community remedy the defect and the Administrator receive copies of adequate flood plain management regulations within the notice period, the suspension

notice shall be rescinded by the Administrator. If the Administrator receives notice from the State that it has enacted adequate flood plain management regulations for the community within the notice period, the suspension notice shall be rescinded by the Administrator. The community's eligibility shall remain terminated after suspension until copies of adequate flood plain management regulations have been received and approved by the Administrator.

(b) A community eligible for the sale of flood insurance which fails to adequately enforce flood plain management regulations meeting the minimum requirements set forth in §§ 60.3, 60.4 and/or 60.5 shall be subject to probation. Probation shall represent formal notification to the community that the Administrator regards the community's flood plain management program as not compliant with NFIP criteria. Prior to imposing probation, the Administrator (1) shall inform the community upon 90 days prior written notice of the impending probation and of the specific program deficiencies and violations relative to the failure to enforce, (2) shall, at least 60 days before probation is to begin, issue a press release to local media explaining the reasons for and the effects of probation, and (3) shall, at least 90 days before probation is to begin, advise all policyholders in the community of the impending probation and the additional premium that will be charged, as provided in this paragraph, on policies sold or renewed during the period of probation. During this 90-day period the community shall have the opportunity to avoid probation by demonstrating compliance with Program requirements, or by correcting Program deficiencies and remedying all violations to the maximum extent possible. If, at the end of the 90-day period, the Administrator determines that the community has failed to do so, the probation shall go into effect. Probation may be continued for up to one year after the community corrects all Program deficiencies and remedies all violations to the maximum extent possible. Flood insurance may be sold or renewed in the community while it is on probation. Where a policy covers property located in a community placed on probation on or after October 1, 1986, but prior to October 1, 1992, an additional premium of $25.00 shall be charged on each such policy newly issued or renewed during the one-year period beginning on the date the community is placed on probation and during any successive one-year periods that begin prior to October 1, 1992. Where a community's probation begins on or after October 1, 1992, the additional premium described in the preceding sentence shall be $50.00, which shall also be charged during any successive one-year periods during which the community remains on probation for any part thereof. This $50.00 additional premium shall further be charged during any successive one-year periods that begin on or after October 1, 1992, where the preceding one-year probation period began prior to October 1, 1992.

(c) A community eligible for the sale of flood insurance which fails to adequately enforce its flood plain management regulations meeting the minimum requirements set forth in §§ 60.3, 60.4 and/or 60.5 and does not correct its Program deficiencies and remedy all violations to the maximum extent possible in accordance with compliance deadlines established during a period of probation shall be subject to suspension of its Program eligibility. Under such circumstances, the Administrator shall grant the community 30 days in which to show cause why it should not be suspended. The Administrator may conduct a hearing, written or oral, before commencing suspensive action. If a community is to be suspended, the Administrator shall inform it upon 30 days prior written notice and upon publication in the Federal Register under Part 64 of this subchapter of its loss of eligibility for the sale of flood insurance. In the event of impending suspension, the Administrator shall issue a press release to the local media explaining the reasons and effects of the suspension. The community's eligibility shall only be reinstated by the Administrator upon his receipt of a local legislative or executive measure reaffirming the community's formal intent to adequately enforce the flood plain management requirements of this subpart, together with evidence of action taken by the community to correct Program deficiencies and remedy to the maximum extent possible those violations which caused the suspension. In certain cases, the Administrator, in order to evaluate the community's performance under the terms of its submission, may withhold reinstatement for a period not to exceed one year from the date of his receipt of the satisfactory submission or place the community on probation as provided for in paragraph (b) of this section.

(d) A community eligible for the sale of flood insurance which repeals its flood plain management regulations, allows its regulations to lapse, or amends its regulations so that they no longer meet the minimum requirements set forth in §§ 60.3, 60.4 and/or 60.5 shall be suspended from the Program. If a community is to be suspended, the Administrator shall inform it upon 30 days prior written notice and upon publication in the Federal Register under Part 64 of this subchapter of its loss of eligibility for the sale of flood insurance. The community eligibility shall remain terminated after suspension until copies of adequate flood plain management regulations have been received and approved by the Administrator.

(e) A community eligible for the sale of flood insurance may withdraw from the Program by submitting to the Administrator a copy of a legislative action that

explicitly states its desire to withdraw from the National Flood Insurance Program. Upon receipt of a certified copy of a final legislative action, the Administrator shall withdraw the community from the Program and publish in the Federal Register under Part 64 of this subchapter its loss of eligibility for the sale of flood insurance. A community that has withdrawn from the Program may be reinstated if it submits the application materials specified in § 59.22(a).

(f) If during a period of ineligibility under paragraphs (a), (d), or (e) of this section, a community has permitted actions to take place that have aggravated existing flood plain, mudslide (i.e., mudflow) and/or flood related erosion hazards, the Administrator may withhold reinstatement until the community submits evidence that it has taken action to remedy to the maximum extent possible the increased hazards. The Administrator may also place the reinstated community on probation as provided for in paragraph (b) of this section.

(g) The Administrator shall promptly notify the servicing company and any insurers issuing flood insurance pursuant to an arrangement with the Administrator of those communities whose eligibility has been suspended or which have withdrawn from the program. Flood insurance shall not be sold or renewed in those communities. Policies sold or renewed within a community during a period of ineligibility are deemed to be voidable by the Administrator whether or not the parties to sale or renewal had actual notice of the ineligibility.

[41 FR 46968, Oct. 26, 1976. Redesignated at 44 FR 31177, May 31, 1979, and amended at 48 FR 44543 and 44552, Sept. 29, 1983; 49 FR 4751, Feb. 8, 1984; 50 FR 36023, Sept. 4, 1985; 57 FR 19540, May 7, 1992; 59 FR 2755, Jan. 19, 1994; 59 FR 53598, Oct. 25, 1994; 62 FR 55715, Oct. 27, 1997]

4.2.2. PART 60 – Criteria for Land Management and Use

Subpart A – Requirements for Flood Plain Management Regulations

Subpart B – Requirements for State Flood Plain Management Regulations

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

Subpart A – Requirements for Flood Plain Management Regulations

Authority: 42 U.S.C. 4001 et seq.; Reorganization Plan No. 3 of 1978, 43 FR 41943, 3 CFR, 1978 Comp., p. 329; E.O. 12127 of March 31, 1979, 44 FR 19367, 3 CFR, 1979 Comp., p. 376.

Source: 41 FR 46975, Oct. 26, 1976. Redesignated at 44 FR 31177, May 31, 1979; 50 FR 36024, Sept. 4, 1985; 59 FR 53598, Oct. 25, 1994; 62 FR 55716, Oct. 27, 1997, unless otherwise noted.

§ 60.1 Purpose of subpart.

(a) The Act provides that flood insurance shall not be sold or renewed under the program within a community, unless the community has adopted adequate flood plain management regulations consistent with Federal criteria. Responsibility for establishing such criteria is delegated to the Administrator.

(b) This subpart sets forth the criteria developed in accordance with the Act by which the Administrator will determine the adequacy of a community's flood plain management regulations. These regulations must be legally enforceable, applied uniformly throughout the community to all privately and publicly owned land within flood-prone, mudslide (i.e., mudflow) or flood-related erosion areas, and the community must provide that the regulations take precedence over any less restrictive conflicting local laws, ordinances or codes. Except as otherwise provided in § 60.6, the adequacy of such regulations shall be determined on the basis of the standards set forth in § 60.3 for flood-prone areas, § 60.4 for mudslide areas and § 60.5 for flood-related erosion areas.

(c) Nothing in this subpart shall be construed as modifying or replacing the general requirement that all eligible communities must take into account flood, mudslide (i.e., mudflow) and flood-related erosion hazards, to the extent that they are known, in all official actions relating to land management and use.

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

(Reorganization Plan No. 3 of 1978, Executive Order 12127)

[41 FR 46975, Oct. 26, 1976. Redesignated at 44 FR 31177, May 31, 1979, and amended at 48 FR 44552, Sept. 29, 1983; 49 FR 4751, Feb. 8, 1984]

§ 60.2 Minimum compliance with flood plain management criteria.

(a) A flood-prone community applying for flood insurance eligibility shall meet the standards of §

60.3(a) in order to become eligible if a FHBM has not been issued for the community at the time of application. Thereafter, the community will be given a period of six months from the date the Administrator provides the data set forth in § 60.3(b), (c), (d), (e) or (f), in which to meet the requirements of the applicable paragraph. If a community has received a FHBM, but has not yet applied for Program eligibility, the community shall apply for eligibility directly under the standards set forth in § 60.3(b). Thereafter, the community will be given a period of six months from the date the Administrator provides the data set forth in § 60.3(c), (d), (e) or (f) in which to meet the requirements of the applicable paragraph.

(b) A mudslide (i.e., mudflow)-prone community applying for flood insurance eligibility shall meet the standards of § 60.4(a) to become eligible. Thereafter, the community will be given a period of six months from the date the mudslide (i.e., mudflow) areas having special mudslide hazards are delineated in which to meet the requirements of § 60.4(b).

(c) A flood-related erosion-prone community applying for flood insurance eligibility shall meet the standards of § 60.5(a) to become eligible. Thereafter, the community will be given a period of six months from the date the flood-related erosion areas having special erosion hazards are delineated in which to meet the requirements of § 60.5(b).

(d) Communities identified in Part 65 of this subchapter as containing more than one type of hazard (e.g., any combination of special flood, mudslide [i.e., mudflow], and flood-related erosion hazard areas) shall adopt flood plain management regulations for each type of hazard consistent with the requirements of §§ 60.3, 60.4 and 60.5.

(e) Local flood plain management regulations may be submitted to the State Coordinating Agency designated pursuant to § 60.25 for its advice and concurrence. The submission to the State shall clearly describe proposed enforcement procedures.

(f) The community official responsible for submitting annual or biennial reports to the Administrator pursuant to § 59.22(b)(2) of this subchapter shall also submit copies of each annual or biennial report to any State Coordinating Agency.

(g) A community shall assure that its comprehensive plan is consistent with the flood plain management objectives of this part.

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

(Authority: Reorganization Plan No. 3 of 1978, Executive Order 12127)

[41 FR 46975, Oct. 26, 1976. Redesignated at 44 FR 31177, May 31, 1979, and amended at 48 FR 29318, June 24, 1983; 48 FR 44552, Sept. 29, 1983; 49 FR 4751, Feb. 8, 1984; 50 FR 36024, Sept. 4, 1985; 59 FR 53598, Oct. 25, 1994; 62 FR 55716, Oct. 27, 1997]

§ 60.3 Flood plain management criteria for flood-prone areas.

The Administrator will provide the data upon which flood plain management regulations shall be based. If the Administrator has not provided sufficient data to furnish a basis for these regulations in a particular community, the community shall obtain, review and reasonably utilize data available from other Federal, State or other sources pending receipt of data from the Administrator. However, when special flood hazard area designations and water surface elevations have been furnished by the Administrator, they shall apply. The symbols defining such special flood hazard designations are set forth in § 64.3 of this subchapter. In all cases the minimum requirements governing the adequacy of the flood plain management regulations for flood-prone areas adopted by a particular community depend on the amount of technical data formally provided to the community by the Administrator. Minimum standards for communities are as follows:

(a) When the Administrator has not defined the special flood hazard areas within a community, has not provided water surface elevation data, and has not provided sufficient data to identify the floodway or coastal high hazard area, but the community has indicated the presence of such hazards by submitting an application to participate in the Program, the community shall:

(1) Require permits for all proposed construction or other development in the community, including the placement of manufactured homes, so that it may determine whether such construction or other development is proposed within flood-prone areas;

(2) Review proposed development to assure that all necessary permits have been received from those governmental agencies from which approval is required by Federal or State law, including section 404 of the Federal Water Pollution Control Act Amendments of 1972, 33 U.S.C. 1334;

(3) Review all permit applications to determine whether proposed building sites will be reasonably safe from flooding. If a proposed building site is in a flood-prone area, all new construction and substantial improvements shall (i) be designed (or modified) and adequately

anchored to prevent flotation, collapse, or lateral movement of the structure resulting from hydrodynamic and hydrostatic loads, including the effects of buoyancy, (ii) be constructed with materials resistant to flood damage, (iii) be constructed by methods and practices that minimize flood damages, and (iv) be constructed with electrical, heating, ventilation, plumbing, and air conditioning equipment and other service facilities that are designed and/or located so as to prevent water from entering or accumulating within the components during conditions of flooding.

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

(5) Require within flood-prone areas new and replacement water supply systems to be designed to minimize or eliminate infiltration of flood waters into the systems; and

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

(b) When the Administrator has designated areas of special flood hazards (A zones) by the publication of a community's FHBM or FIRM, but has neither produced water surface elevation data nor identified a floodway or coastal high hazard area, the community shall:

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

(2) Require the application of the standards in paragraphs (a)(2), (3), (4), (5) and (6) of this section to development within Zone A on the community's FHBM or FIRM;

(3) Require that all new subdivision proposals and other proposed developments (including proposals for manufactured home parks and subdivisions) greater than 50 lots or 5 acres, whichever is the lesser, include within such proposals base flood elevation data;

(4) Obtain, review and reasonably utilize any base flood elevation and floodway data available from a Federal, State, or other source, including data developed pursuant to paragraph (b)(3) of this section, as criteria for requiring that new construction, substantial improvements, or other development in Zone A on the community's FHBM or FIRM meet the standards in paragraphs (c)(2), (c)(3), (c)(5), (c)(6), (c)(12), (c)(14), (d)(2) and (d)(3) of this section;

(5) Where base flood elevation data are utilized, within Zone A on the community's FHBM or FIRM:

(i) Obtain the elevation (in relation to mean sea level) of the lowest floor (including basement) of all new and substantially improved structures, and

(ii) Obtain, if the structure has been floodproofed in accordance with paragraph (c)(3)(ii), the elevation (in relation to mean sea level) to which the structure was floodproofed, and

(iii) Maintain a record of all such information with the official designated by the community under § 59.22 (a)(9)(iii);

(6) Notify, in riverine situations, adjacent communities and the State Coordinating Office prior to any alteration or relocation of a watercourse, and submit copies of such notifications to the Administrator;

(7) Assure that the flood carrying capacity within the altered or relocated portion of any watercourse is maintained;

(8) Require that all manufactured homes to be placed within Zone A on a community's FHBM or FIRM shall be installed using methods and practices which minimize flood damage. For the purposes of this requirement, manufactured homes must be elevated and anchored to resist flotation, collapse, or lateral movement. Methods of anchoring may include, but are not to be limited to, use of over-the-top or frame ties to ground anchors. This requirement is in addition to applicable State and local anchoring requirements for resisting wind forces.

(c) When the Administrator has provided a notice of final flood elevations for one or more special flood hazard areas on the community's FIRM and, if appropriate, has designated other special flood hazard areas without base flood elevations on the community's FIRM, but has not identified a regulatory floodway or coastal high hazard area, the community shall:

(1) Require the standards of paragraph (b) of this section within all A1-30 zones, AE zones, A zones, AH zones, and AO zones, on the community's FIRM;

(2) Require that all new construction and substantial improvements of residential structures within Zones A1-30, AE and AH zones on the community's FIRM have the lowest floor (including basement) elevated to or

above the base flood level, unless the community is granted an exception by the Administrator for the allowance of basements in accordance with § 60.6(b) or (c);

(3) Require that all new construction and substantial improvements of non-residential structures within Zones A1-30, AE and AH zones on the community's firm (i) have the lowest floor (including basement) elevated to or above the base flood level or, (ii) together with attendant utility and sanitary facilities, be designed so that below the base flood level the structure is watertight with walls substantially impermeable to the passage of water and with structural components having the capability of resisting hydrostatic and hydrodynamic loads and effects of buoyancy;

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

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

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

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

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

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

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

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

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

(9) Require within any A99 zones on a community's FIRM the standards of paragraphs (a)(1) through (a)(4)(i) and (b)(5) through (b)(9) of this section;

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

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

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

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

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

(13) Notwithstanding any other provisions of § 60.3, a community may approve certain development in Zones Al-30, AE, and AH, on the community's FIRM which increase the water surface elevation of the base flood by more than one foot, provided that the community first applies for a conditional FIRM revision, fulfills the requirements for such a revision as established under the provisions of § 65.12, and receives the approval of the Administrator.

(14) Require that recreational vehicles placed on sites within Zones A1-30, AH, and AE on the community's FIRM either

(i) Be on the site for fewer than 180 consecutive days,

(ii) Be fully licensed and ready for highway use, or

(iii) Meet the permit requirements of paragraph (b)(1) of this section and the elevation and anchoring requirements for "manufactured homes" in paragraph (c)(6) of this section.

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

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

(1) Meet the requirements of paragraphs (c)(1) through (c)(14) of this section;

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

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

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

(e) When the Administrator has provided a notice of final base flood elevations within Zones A1-30 and/or AE on the community's FIRM and, if appropriate, has designated AH zones, AO zones, A99 zones, and A zones on the community's FIRM, and has identified on the community's FIRM coastal high hazard areas by designating Zones V1-30, VE, and/or V, the community shall:

(1) Meet the requirements of paragraphs (c)(1) through (c)(14) of this section;

(2) Within Zones V1-30, VE, and V on a community's FIRM, (i) obtain the elevation (in relation to mean sea level) of the bottom of the lowest structural member of the lowest floor (excluding pilings and columns) of all new and substantially improved structures, and whether or not such structures contain a basement, and (ii) maintain a record of all such information with the official designated by the community under § 59.22(a)(9)(iii);

(3) Provide that all new construction within Zones V1-30, VE, and V on the community's FIRM is located landward of the reach of mean high tide;

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

(5) Provide that all new construction and substantial improvements within Zones V1-30, VE, and V on the community's FIRM have the space below the lowest floor either free of obstruction or constructed with non-supporting breakaway walls, open wood lattice-work, or insect screening intended to collapse under wind and water loads without causing collapse, displacement, or other structural damage to the elevated portion of the building or supporting foundation system. For the purposes of this section, a breakaway wall shall have a design safe loading resistance of not less than 10 and no more than 20 pounds per square foot. Use of breakaway

walls which exceed a design safe loading resistance of 20 pounds per square foot (either by design or when so required by local or State codes) may be permitted only if a registered professional engineer or architect certifies that the designs proposed meet the following conditions:

(i) Breakaway wall collapse shall result from a water load less than that which would occur during the base flood; and,

(ii) The elevated portion of the building and supporting foundation system shall not be subject to collapse, displacement, or other structural damage due to the effects of wind and water loads acting simultaneously on all building components (structural and non-structural). Water loading values used shall be those associated with the base flood. Wind loading values used shall be those required by applicable State or local building standards.

Such enclosed space shall be useable solely for parking of vehicles, building access, or storage.

(6) Prohibit the use of fill for structural support of buildings within Zones V1-30, VE, and V on the community's FIRM;

(7) Prohibit man-made alteration of sand dunes and mangrove stands within Zones V1-30, VE, and V on the community's FIRM which would increase potential flood damage.

(8) Require that manufactured homes placed or substantially improved within Zones V1-30, V, and VE on the community's FIRM on sites

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

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

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

(iv) In an existing manufactured home park or subdivision on which a manufactured home has incurred "substantial damage" as the result of a flood, meet the standards of paragraphs (e)(2) through (7) of this section and that manufactured homes placed or substantially improved on other sites in an existing manufactured home park or subdivision within Zones VI-30, V, and VE on the community's FIRM meet the requirements of paragraph (c)(12) of this section.

(9) Require that recreational vehicles placed on sites within Zones V1-30, V, and VE on the community's FIRM either

(i) Be on the site for fewer than 180 consecutive days,

(ii) Be fully licensed and ready for highway use, or

(iii) Meet the requirements in paragraphs (b)(1) and (e)(2) through (7) of this section.

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

(f) When the Administrator has provided a notice of final base flood elevations within Zones A1-30 or AE on the community's FIRM, and, if appropriate, has designated AH zones, AO zones, A99 zones, and A zones on the community's FIRM, and has identified flood protection restoration areas by designating Zones AR, AR/A1-30, AR/AE, AR/AH, AR/AO, or AR/A, the community shall:

(1) Meet the requirements of paragraphs (c)(1) through (14) and (d)(1) through (4) of this section.

(2) Adopt the official map or legal description of those areas within Zones AR, AR/A1-30, AR/AE, AR/AH, AR/A, or AR/AO that are designated developed areas as defined in § 59.1 in accordance with the eligibility procedures under § 65.14.

(3) For all new construction of structures in areas within Zone AR that are designated as developed areas and in other areas within Zone AR where the AR flood depth is 5 feet or less:

(i) Determine the lower of either the AR base flood elevation or the elevation that is 3 feet above highest adjacent grade; and

(ii) Using this elevation, require the standards of paragraphs (c)(1) through (14) of this section.

(4) For all new construction of structures in those areas within Zone AR that are not designated as developed areas where the AR flood depth is greater than 5 feet:

(i) Determine the AR base flood elevation; and

(ii) Using that elevation require the standards of paragraphs (c)(1) through (14) of this section.

(5) For all new construction of structures in areas within Zone AR/A1-30, AR/AE, AR/AH, AR/AO, and AR/A:

(i) Determine the applicable elevation for Zone AR from paragraphs (a)(3) and (4) of this section;

(ii) Determine the base flood elevation or flood depth for the underlying A1-30, AE, AH, AO and A Zone; and

(iii) Using the higher elevation from paragraphs (a)(5)(i) and (ii) of this section require the standards of paragraphs (c)(1) through (14) of this section.

(6) For all substantial improvements to existing construction within Zones AR/A1-30, AR/AE, AR/AH, AR/AO, and AR/A:

(i) Determine the A1-30 or AE, AH, AO, or A Zone base flood elevation; and

(ii) Using this elevation apply the requirements of paragraphs (c)(1) through (14) of this section.

(7) Notify the permit applicant that the area has been designated as an AR, AR/A1-30, AR/AE, AR/AH,

AR/AO, or AR/A Zone and whether the structure will be elevated or protected to or above the AR base flood elevation.

[41 FR 46975, Oct. 26, 1976. Redesignated at 44 FR 31177, May 31, 1979, and amended at 46 FR 1274, Jan. 6, 1981; 48 FR 44552, Sept. 29, 1983; 49 FR 4751, Feb. 8, 1984; 49 FR 33656, Aug. 24, 1984; 50 FR 36024, Sept. 4, 1985; 51 FR 30307, Aug. 25, 1986; 52 FR 24372, June 30, 1987; 52 FR 33411, Sept. 3, 1987; 53 FR 16276, May 6, 1988; 53 FR 25332, July 6, 1988; 54 FR 33550, Aug. 15, 1989; 54 FR 40005, 40283, Sept. 29, 1989; 54 FR 42144, Oct. 13, 1989; 59 FR 53598, Oct. 25, 1994; 62 FR 55716, Oct. 27, 1997]

§ 60.4 Flood plain management criteria for mudslide (i.e., mudflow)-prone areas.

[Not included in this reference]

§ 60.5 Flood plain management criteria for flood-related erosion-prone areas.

The Administrator will provide the data upon which flood plain management regulations for flood-related erosion-prone areas shall be based. If the Administrator has not provided sufficient data to furnish a basis for these regulations in a particular community, the community shall obtain, review, and reasonably utilize data available from other Federal, State or other sources, pending receipt of data from the Administrator. However, when special flood-related erosion hazard area designations have been furnished by the Administrator they shall apply. The symbols defining such special flood-related erosion hazard designations are set forth in § 64.3 of this subchapter. In all cases the minimum requirements governing the adequacy of the flood plain management regulations for flood-related erosion-prone areas adopted by a particular community depend on the amount of technical data provided to the community by the Administrator. Minimum standards for communities are as follows:

(a) When the Administrator has not yet identified any area within the community as having special flood-related erosion hazards, but the community has indicated the presence of such hazards by submitting an application to participate in the Program, the community shall

(1) Require the issuance of a permit for all proposed construction, or other development in the area of flood-related erosion hazard, as it is known to the community;

(2) Require review of each permit application to determine whether the proposed site alterations and improvements will be reasonably safe from flood-related erosion and will not cause flood-related erosion hazards or otherwise aggravate the existing flood-related erosion hazard; and

(3) If a proposed improvement is found to be in the path of flood-related erosion or to increase the erosion hazard, require the improvement to be relocated or adequate protective measures to be taken which will not aggravate the existing erosion hazard.

(b) When the Administrator has delineated Zone E on the community's FIRM, the community shall

(1) Meet the requirements of paragraph (a) of this section; and

(2) Require a setback for all new development from the ocean, lake, bay, riverfront or other body of water, to create a safety buffer consisting of a natural vegetative or contour strip. This buffer will be designated by the Administrator according to the flood-related erosion hazard and erosion rate, in conjunction with the anticipated "useful life" of structures, and depending upon the geologic, hydrologic, topographic and climatic characteristics of the community's land. The buffer may be used for suitable open space purposes, such as for agricultural, forestry, outdoor recreation and wildlife habitat areas, and for other activities using temporary and portable structures only.

(Reorganization Plan No. 3 of 1978, Executive Order 12127.)

[41 FR 46975, Oct. 26, 1976. Redesignated at 44 FR 31177, May 31, 1979, and amended at 48 FR 44552, Sept. 29, 1983; 49 FR 4751, Feb. 8, 1984]

§ 60.6 Variances and exceptions.

(a) The Administrator does not set forth absolute criteria for granting variances from the criteria set forth in §§ 60.3, 60.4 and 60.5. The issuance of a variance is for flood plain management purposes only. Insurance premium rates are determined by statute according to actuarial risk and will not be modified by the granting of a variance. The community, after examining the applicant's hardships, shall approve or disapprove a request. While the granting of variances generally is limited to a lot size less than one-half acre (as set forth in paragraph (a)(2) of this section), deviations from that limitation may occur. However, as the lot size increases beyond one-half acre, the technical justification required for issuing a variance increases. The Administrator may review a community's findings justifying the granting of variances, and if that review indicates a pattern inconsistent with the objectives of sound flood plain management, the Administrator may take appropriate action under § 59.24(b) of this subchapter. Variances may be issued for the repair or rehabilitation of historic structures upon a determination that the proposed repair or rehabilitation will not preclude the structure's continued designation as a historic structure and the

variance is the minimum necessary to preserve the historic character and design of the structure. Procedures for the granting of variances by a community are as follows:

(1) Variances shall not be issued by a community within any designated regulatory floodway if any increase in flood levels during the base flood discharge would result;

(2) Variances may be issued by a community for new construction and substantial improvements to be erected on a lot of one-half acre or less in size contiguous to and surrounded by lots with existing structures constructed below the base flood level, in conformance with the procedures of paragraphs (a)(3), (4), (5) and (6) of this section;

(3) Variances shall only be issued by a community upon (i) a showing of good and sufficient cause, (ii) a determination that failure to grant the variance would result in exceptional hardship to the applicant, and (iii) a determination that the granting of a variance will not result in increased flood heights, additional threats to public safety, extraordinary public expense, create nuisances, cause fraud on or victimization of the public, or conflict with existing local laws or ordinances;

(4) Variances shall only be issued upon a determination that the variance is the minimum necessary, considering the flood hazard, to afford relief;

(5) A community shall notify the applicant in writing over the signature of a community official that (i) the issuance of a variance to construct a structure below the base flood level will result in increased premium rates for flood insurance up to amounts as high as $25 for $100 of insurance coverage and (ii) such construction below the base flood level increases risks to life and property. Such notification shall be maintained with a record of all variance actions as required in paragraph (a)(6) of this section; and

(6) A community shall (i) maintain a record of all variance actions, including justification for their issuance, and (ii) report such variances issued in its annual or biennial report submitted to the Administrator.

(7) Variances may be issued by a community for new construction and substantial improvements and for other development necessary for the conduct of a functionally dependent use provided that (i) the criteria of (a)(1) through (a)(4) of this section are met, and (ii) the structure or other development is protected by methods that minimize flood damages during the base flood and create no additional threats to public safety.

(b)(1) The requirement that each flood-prone, mudslide (i.e., mudflow)-prone, and flood-related erosion prone community must adopt and submit adequate flood plain management regulations as a condition of initial and continued flood insurance eligibility is statutory and cannot be waived, and such regulations shall be adopted by a community within the time periods specified in §§ 60.3, 60.4 or § 60.5. However, certain exceptions from the standards contained in this subpart may be permitted where the Administrator recognizes that, because of extraordinary circumstances, local conditions may render the application of certain standards the cause for severe hardship and gross inequity for a particular community. Consequently, a community proposing the adoption of flood plain management regulations which vary from the standards set forth in §§ 60.3, 60.4, or § 60.5, shall explain in writing to the Administrator the nature and extent of and the reasons for the exception request and shall include sufficient supporting economic, environmental, topographic, hydrologic, and other scientific and technical data, and data with respect to the impact on public safety and the environment.

(2) The Administrator shall prepare a Special Environmental Clearance to determine whether the proposal for an exception under paragraph (b)(1) of this section will have significant impact on the human environment. The decision whether an Environmental Impact Statement or other environmental document will be prepared, will be made in accordance with the procedures set out in 44 CFR Part 10. Ninety or more days may be required for an environmental quality clearance if the proposed exception will have significant impact on the human environment thereby requiring an EIS.

(c) A community may propose flood plain management measures which adopt standards for floodproofed residential basements below the base flood level in zones A1-30, AH, AO, and AE which are not subject to tidal flooding. Notwithstanding the requirements of paragraph (b) of this section the Administrator may approve the proposal provided that:

(1) The community has demonstrated that areas of special flood hazard in which basements will be permitted are subject to shallow and low velocity flooding and that there is adequate flood warning time to ensure that all residents are notified of impending floods. For the purposes of this paragraph flood characteristics must include:

(i) Flood depths that are five feet or less for developable lots that are contiguous to land above the base flood level and three feet or less for other lots;

(ii) Flood velocities that are five feet per second or less; and

(iii) Flood warning times that are 12 hours or greater. Flood warning times of two hours or greater may be approved if the community demonstrates that it has a flood warning system and emergency plan in operation that is adequate to ensure safe evacuation of flood plain residents.

(2) The community has adopted flood plain management measures that require that new construction and substantial improvements of residential structures with basements in zones A1-30, AH, AO, and AE shall:

(i) Be designed and built so that any basement area, together with attendant utilities and sanitary facilities below the floodproofed design level, is watertight with walls that are impermeable to the passage of water without human intervention. Basement walls shall be built with the capacity to resist hydrostatic and hydrodynamic loads and the effects of buoyancy resulting from flooding to the floodproofed design level, and shall be designed so that minimal damage will occur from floods that exceed that level. The floodproofed design level shall be an elevation one foot above the level of the base flood where the difference between the base flood and the 500-year flood is three feet or less and two feet above the level of the base flood where the difference is greater than three feet.

(ii) Have the top of the floor of any basement area no lower than five feet below the elevation of the base flood;

(iii) Have the area surrounding the structure on all sides filled to or above the elevation of the base flood. Fill must be compacted with slopes protected by vegetative cover;

(iv) Have a registered professional engineer or architect develop or review the building's structural design, specifications, and plans, including consideration of the depth, velocity, and duration of flooding and type and permeability of soils at the building site, and certify that the basement design and methods of construction proposed are in accordance with accepted standards of practice for meeting the provisions of this paragraph;

(v) Be inspected by the building inspector or other authorized representative of the community to verify that the structure is built according to its design and those provisions of this section which are verifiable.

(Reorganization Plan No. 3 of 1978, Executive Order 12127)

[41 FR 46975, Oct. 26, 1976. Redesignated at 44 FR 31177, May 31, 1979, and amended at 48 FR 44543 and 44552, Sept. 29, 1983; 49 FR 4751, Feb. 8, 1984; 50 FR 36025, Sept. 4, 1985; 51 FR 30308, Aug. 25, 1986; 54 FR 33550, Aug. 15, 1989]

§ 60.7 Revisions of criteria for flood plain management regulations.

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

Section 5. Flood Insurance Studies

Contents

5.1. DHS/FEMA's Mapping Effort

5.1.1. Map accuracy

National Flood Insurance Program (NFIP) flood maps were prepared for the purpose of insurance ratings and land use regulations. DHS/Federal Emergency Management Agency (DHS/FEMA) has a limited budget for mapping, so NFIP maps do not show every flood problem that has been reported or that could exist. In some cases, they may not provide flood elevations.

A community or a developer could conduct a new study that might be more accurate or have more information. Therefore, it is important to know how the maps are prepared and how they are updated and revised. How maps are prepared is the subject matter of this section. Updating and revising DHS/FEMA maps is covered in Section 10.

5.1.2. DHS/FEMA's mapping program

The National Flood Insurance Act of 1968 directed DHS/FEMA to:

1. Identify all floodprone areas within the U.S.

2. Establish flood zones within floodprone areas

To implement this directive, DHS/FEMA has prepared flood studies and produced various forms of maps. The flood studies analyze the terrain and the factors that affect flooding. This information is used to draw the maps that outline the boundaries of the 100-year floodplain.

Initial flood study and mapping efforts of the NFIP were focused on identifying all flood-prone areas within the United States. The result was a series of Flood Hazard Boundary Maps (FHBMs) for most of the country. These maps are discussed in the next section.

As money was appropriated by Congress, DHS/FEMA performed more detailed studies for many communities, resulting in the publication of Flood Insurance Study (FIS) reports and Flood Insurance Rate Maps (FIRMs). These studies provide communities with data needed to adopt and implement more comprehensive floodplain management measures and to enter the Regular Phase of the NFIP.

The FISs were prepared for developed communities and for those areas experiencing rapid growth. They are used to guide future development within flood hazard areas and to provide the information needed for new construction allowed in already developed areas.

Today, almost every community in the NFIP has a FIRM, which may be mapped in detail with specified base flood elevations (BFEs), based on an approximate study, or some combination of the two. The areas mapped with an approximate study are where there was little or no development and/or little expectation of development when the mapping was done. Over 200 Louisiana communities have an FIS and base their regulations on the detailed data they provide.

Additional studies have been conducted by other agencies, but a community must use DHS/FEMA's studies and maps as a minimum for managing floodplain development.

5.1.3. Map modernization

Flood Map Modernization (Map Mod) is a multiyear Presidential initiative supported by Congress that is directed at improving and updating the Nation's flood hazard identification maps. These flood maps have been produced and used for 35 years under the National Flood Insurance Program (NFIP), originally for the identification and depiction of flood hazard areas in communities and for setting flood insurance rates. However, they have come to be much more widely used for many purposes, including local planning, emergency preparedness and response, and natural resource management.

At the end of the Map Mod initiative, it is estimated that:

- Digital flood map products will be available for 92% of the Nation's population.
- 30% of the mapped stream miles will be based on new, updated or validated engineering analyses, affecting 40% of the Nation's population.
- Digital map products will be available for 65% of the land area of the continental United States.

In order to leverage the successes of Map Modernization and further enhance the usability and value of flood hazard mapping, FEMA has developed the Risk MAP Strategy. Risk MAP combines flood hazard mapping, risk assessment tools and Mitigation Planning into one seamless program. The intent of this integrated program is to encourage beneficial partnerships and innovative uses of flood hazard and risk assessment data in order to maximize flood loss reduction.

5.1.4. Risk Map Strategy

Building upon the Draft Concept Paper "FEMA's Flood Map Modernization - Preparing for FY09 and Beyond: Integrated Flood Data Update, Risk Assessment, and Mitigation Planning" released in June 2007, FEMA has put together a Draft Risk MAP Strategy "FEMA's Risk MAP Strategy - Integrating Mapping, Risk Assessment, and Mitigation Planning", dated February 20, 2008. This Risk MAP Strategy provides a bridge between previously described concepts and future implementation.

The Strategy supports FEMA's mission and lays out the roadmap to the future by describing cross-cutting themes and goals for Risk MAP. The Risk MAP vision is:

- Continue to focus on improving and maintaining flood hazard data and maps - the foundation of both flood risk assessment and flood mitigation planning;
- Deliver quality products and services to the right audience, using the right methods, at the right time;
- Reduce losses of life and property through continuous improvement of mitigation plans; and
- Increase local mitigation action.

5.1.5. Cooperating Technical Partners

The CTP Program was developed in 1999 to increase involvement in the National Flood Insurance Program (NFIP) through strong, formalized partnerships with federal, state, regional, and local agencies. Many agencies have become technologically sophisticated and invest significant resources in flood hazard identification. The CTP Program facilitates and capitalizes on these efforts and coordinates them with FEMA's flood mapping efforts

The Program objectives are to:

- Maintain consistent national standards while interjecting a tailored, local focus;
- Provide training and technical assistance;
- Use data from local permitting and planning to facilitate floodplain management;
- Extend limited public funds;
- Utilize local experience and knowledge;
- Facilitate mentoring of partners that are willing to develop ability to maintain flood hazard information; and
- Build and maintain partner capabilities

Activities that are currently eligible for FEMA funding include:

- Base map acquisition;
- Refinement or creation of approximate Zone A boundaries;
- Hydrologic and hydraulic analyses and floodplain mapping;
- Coastal Flood Hazard Analyses and Floodplain Mapping;
- Digital Flood Insurance Rate Map preparation;

- Redelineation of detailed flood hazard information using updated topographic data;
- Digital topographic data development;
- Independent QA/QC Review of Hydrologic; and
- Hydraulic Analyses and Floodplain Mapping

You may send CTP related questions to CTP@Mapmodteam.com.

As of October 1, 2007, Louisiana had seven CTPs: Amite River Basin Commission, Jefferson Parish, Lake Charles, Mandeville, Rapides Parish, St. Bernard Parish and the Louisiana Office of Emergency Preparedness.

The Amite River Basin Commission's CTP agreement calls for redelineation of detailed flood zones and refinement of approximate A Zone boundaries using updated topographic data. Jefferson Parish is using digital topographic maps and will undertake full hydrologic and hydraulic analyses and floodplain mapping. It will also be keeping its digital FIRM updated.

5.2. Flood Hazard Boundary Maps

5.2.1. Flood Hazard Boundary Maps

Flood Hazard Boundary Maps (FHBMs) were initially prepared to provide flood maps to many communities in a short period of time. They were prepared in the 1970s and early 1980s without benefit of detailed studies or hydraulic analyses. The FHBMs were based on flood data and floodplain information from many sources, including soils mapping, actual high water profiles, aerial photographs of previous floods, and topographic maps. The approximate outline of the 100-year floodplain was overlaid on available community maps, usually U.S. Geological Survey (USGS) topographic quadrangle maps.

Most communities used an FHBM when they first joined the NFIP. The FHBMs were intended for interim use in most communities until more detailed studies could be prepared, but they are still used in areas where detailed FIS have not been prepared or cannot be justified. FHBMs are to be used for floodplain management, in conjunction with other local studies and other available data.

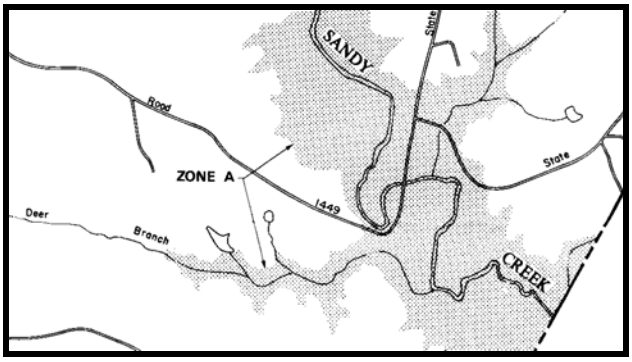


Figure 5-1. Flood Hazard Boundary Map.

On the FHBM, the Special Flood Hazard Area (SFHA) is designated as a shaded area labeled "Zone A," and no base flood elevations are given (Figure 5-1).

5.2.2. Special conversions

In some cases, DHS/FEMA simply converted the FHBM to a FIRM by issuing a letter to the community stating that the FHBM will be the FIRM without printing a new map. This process is called a "special conversion"—converting the community from the Emergency Phase to the Regular Phase of the NFIP. (The phases of the NFIP are discussed in Section 3.4).

There are more than 70 special conversion communities in Louisiana. Figure 5-2 is a special conversion letter for the Town of Merryville. This letter tells the community that DHS/FEMA is not reprinting its map but asks the local administrator to permanently mark the "FHBM as a FIRM with the new effective date and suffix." In these situations, the Zone A is treated the same as an unnumbered A Zone on the FIRM.

As of January 1, 2004, 24 of the specially converted communities had no map at all. These are designated as "No Special Flood Hazard Area (NSFHA)" in DHS/FEMA's reports. These communities do not have any floodplain management requirements other than to advise DHS/FEMA if they annex a floodplain or their flooding situation changes.

Federal Emergency Management Agency

Washington, D.C. 20472

IA-RA-TO:198

THIS IS A SPECIAL NOTICE REGARDING THE CONVERSION FROM THE EMERGENCY PHASE TO THE REGULAR PHASE, WHICH SHOULD BE ATTACHED TO THE MAP FOR THE COMMUNITY CITED BELOW.

Community Number	Community Name	County Name	State
220028	Merryville, Twn	Beauregard	LA

Flood Hazard Boundary Map Date	Old Suffix	Regular Program Entry & Initial	New Suffix
December 26, 1975	A	February 1, 1987	B

This community will be converted to the Regular Phase of the National Flood Insurance Program (NFIP), effective on the date indicated above. This action has the effect of converting the Flood Hazard Boundary Map (FHBM), which is referenced above, to a Flood Insurance Rate Map (FIRM). The Federal Emergency Management Agency does not intend to republish the FHBM as a FIRM at this time. Therefore, for insurance application and rating purposes, please note that the map suffix has been advanced from that shown on the FHBM to the next letter, shown above. Also note that the Special Flood Hazard Areas, which are shaded areas on the map, are designated Zone A; and all other areas are Zone X (unshaded). The conversion of a community to the Regular Phase of the NFIP affords additional limits of insurance coverage.

If the above is unclear, please call us at our toll-free number, (800) 638-6620, for more details.

YOU ARE ONLY BEING SENT ONE COPY OF THE NOTICE TO SAVE PRINTING, DISTRIBUTION AND POSTAGE. YOU MAY REPRODUCE THE NOTICE AS NEEDED.

FOR YOUR CONVENIENCE, PLEASE PERMANENTLY MARK YOUR COPY OR COPIES OF THE APPLICABLE FHBM AS A FIRM WITH THE NEW EFFECTIVE DATE AND SUFFIX

Figure 5-2. Special conversion letter.

5.3. Flood Study Terminology

5.3.1. The base flood

Floods occur in varying degrees of magnitude and frequency. Rivers and lakes are expected to flood because all bodies of water have floodplains. But each river and lake is also different; each has its own probability of flooding. Probability is a statistical term having to do with the size of a flood and the odds of that size flood occurring in any year (Figure 5-3).

For each river, engineers assign statistical probabilities to different size floods. This is done to understand what might be a common or ordinary flood for a particular river versus a less likely or a severe flood for that same river.

In order to have common standards, the NFIP adopted a baseline flooding probability. The NFIP calls this standard the “base” flood. The base flood has been called the 100-year flood.

The term 100-year flood is often misunderstood. People commonly interpret the 100-year flood definition to mean “once every 100 years.” This is incorrect. A community could have a 100-year flood two times in the same year, two years in a row, or four times over the course of 100 years. A community could also not have a 100-year flood over the course of 200 years.

The term "100-year flood" has caused a lot of confusion for people who are not familiar with statistics. Another way of looking at it is to think of the odds that a base or 100-year flood will happen sometime during the life of a 30-year mortgage (26% chance).

Chance of flooding over a period of time

Time period	Flood size			
	10-year	25-year	50-year	100-year
1 year	10%	4%	2%	1%
10 years	65%	34%	18%	10%
20 years	88%	56%	33%	18%
30 years	96%	71%	45%	26%
50 years	99%	87%	64%	39%

Even these numbers do not convey the true flood risk because they focus on the larger, less frequent, floods. If a house is low enough, it may be subject to the 10-or 25-year flood. During the proverbial 30-year mortgage, it may have a 26% chance of being hit by the 100-year flood, but the odds are 96% (nearly guaranteed) that it will be hit by a 10-year flood. Compare those odds to the only 5% chance that the house will catch fire during the same 30-year mortgage.

Figure 5-3. What are the odds of a 100-year flood?

The base flood is also called, and maybe more appropriately, the “1% chance flood.” The 1% chance flood is the flood that has a 1% (1 out of 100) chance of occurring or being exceeded in any given year.

The base flood was chosen as a compromise between excessive exposure to flood risk from using a lower standard (such as a 10-year flood, which is a more frequent flood) and applying such a high standard (e.g., a 1,000-year flood, which is a less frequent flood) that it would be considered excessive and unreasonable for the intended purposes of regulating new development and requiring the purchase of flood insurance.

To restate, the base flood refers to a flood that has a 1% chance of occurring or being exceeded in any given year. The terms base flood, 100-year flood, and 1% annual chance flood are used interchangeably throughout the NFIP.

Another term used is the "500-year flood." This has a 0.2% chance of occurring in any given year. While the odds are remote, it is the standard used for protecting critical facilities such as hospitals and power plants.

5.3.2. Base flood elevation

The computed elevation to which floodwater is anticipated to rise during the base flood is the 100-year flood elevation, or in NFIP terms, the base flood elevation (BFE).

5.3.3. Special Flood Hazard Area

The land area covered by the floodwaters of the base flood is the 100-year floodplain. On NFIP maps, this floodplain is called the Special Flood Hazard Area (SFHA). The SFHA is the area where NFIP floodplain management regulations must be enforced by the community and where the mandatory flood insurance purchase requirement applies.

Technical terms

Base flood = 100-year flood = 1% chance flood

Base flood elevation (BFE) = 100-year flood level

Base floodplain = 100-year floodplain = Special Flood Hazard Area = SFHA

5.3.4. Datum

If a site or a base flood is at an elevation of "22 feet," above what starting point does the 22 feet refer? Generally, "above sea level" is what is meant. However, the sea is actually not the same level everywhere. Furthermore, some inland communities' elevation records may be in relation to some other starting point. The use of a common starting point or "datum" ensures uniformity and avoids confusion.

During the 1920s, the U.S. government created a network of 21 tidal gauges in the United States and 5 in Canada to provide a fixed continental datum that would bring a consistent relationship to all vertical determinations in the United States. This new datum was known as the National Geodetic Vertical Datum of 1929 (NGVD 29) and is the base elevation to which all relief features and elevation data are referenced in the contiguous United States. NGVD 29 is also the datum of reference for most Flood Insurance Studies (FISs) produced before 2000.

It was recognized that there were errors in the methods used for the NGVD 29 datum. Gravitational variations over the surface of the earth, tectonic activity and subsidence required adjustments in the benchmarks over space and time. Using "sea level" as a standard was a misnomer as sea level changed over time. As global positioning system (GPS) technology became available, it was apparent that a better datum could be developed using a theoretical "surface" to approximate the shape of the earth and account for gravitational differences. This surface would also be independent of local surface movements due to subsidence and tectonic activity.

In 1993, the Federal Geodetic Control Subcommittee affirmed the North American Vertical Datum of 1988 (NAVD 88) as the official civilian vertical datum for surveying and mapping activities in the United States performed or financed by the federal government. In 2000, FEMA began using NAVD 88 for all new Flood Insurance Rate Maps (FIRMs) and for all restudies.

It is essential that all calculations and documentation for floodplain management use the correct datum for all floodplain management activities. This will be discussed in detail in Chapter 9.

If it is necessary to use two datums, a conversion must be made. The conversion from NGVD 29 to NAVD 88 is not an easy or automatic procedure, although there is computer software for it. Appendix B to DHS/FEMA's *Guidelines and Specifications for Flood Hazard Mapping Partners* provides the detailed guidance on how the conversions can be made. It is available on DHS/FEMA's website, www.fema.gov.

More information on datums and datum conversion can be obtained from Denis Riordan, NGS State Geodetic Advisor, (225) 578-5260 or denis.riordan@noaa.gov. Mr. Riordan is located at the Louisiana Spatial Reference Center at Louisiana State University.

5.3.5. Elevation reference mark

Elevation reference marks are marked locations on the ground that indicate the elevation of that location. The most dependable reference marks are government-installed benchmarks. These permanent brass markers are set in concrete. Most permanent elevation reference marks (or benchmarks) are referenced to the NGVD (see example in Figure 5-4).

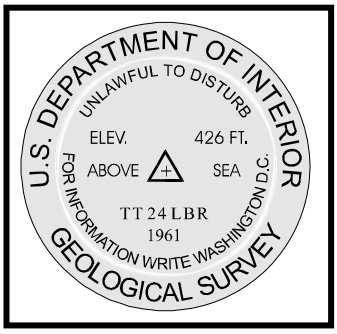


Figure 5-4. Typical USGS benchmark.

Each FIRM with base flood elevations provides one or more elevation reference marks. They are listed in the FIS text or on the FIRM. Figures 8-5 and 8-6 are examples of how they are shown on a FIRM.

While there are some benchmarks set by federal agencies, most are established by private surveyors and local agencies. Local reference marks should relate to a national datum, but some may not. *It is important to double check that the datum for elevation reference marks is the same as the one used for flood elevations.*

Reference marks are not always permanent monuments. They can be squares chiseled into a sidewalk, bolts on a fire hydrant, or other designated markers left by surveyors. Over time, these may disappear or be moved (in which case they are undependable). The city or parish surveyor or engineer's office should have a list of benchmarks in the community. If a surveyor suspects that an elevation reference mark is not dependable, e.g., it is in an area subject to subsidence and has not been checked for a while, it should not be used.

If a surveyor finds a suspect reference mark, it should be reported to the community's surveyor or engineer and to other surveyors. If it is one listed on the FIRM, the DHS/FEMA Regional Office should be advised, so the next FIRM revision will not include it. The report to DHS/FEMA should include the FIRM panel number, FIRM reference mark number and, if available, data on one or more dependable reference marks in the area.

Surveyors may use the reference marks shown on the FIRM, regular benchmarks, or other elevation reference marks as the basis for foundation elevations and Elevation Certificates, ***provided*** they use the same datum as the flood elevations on the FIRM.

Southern Louisiana is subject to land subsidence. Over time, organic materials in the deep alluvial deposits of the delta decompose and the land surface subsides. This creates an obvious problem for standard benchmarks. In fact, reference marks of the type described above must periodically be resurveyed and the elevations must be corrected. Because of this, the NGS has "stopped supporting" benchmarks established in areas of suspected subsidence.

5.3.6. GPS Survey Methods

The Global Positioning System (GPS) uses a constellation of at least 24 satellites that transmit microwave signals. The system enables a GPS receiver on the ground to determine its location with great accuracy. The satellites are managed by the United States Department of Defense. A sophisticated GPS receiver calculates its latitude, longitude and elevation using the signals from four or more GPS satellites. Each GPS satellite continually transmits messages containing the current time and parameters to calculate the location of the satellite. The receiver uses the arrival time to compute the distance to each satellite, from which it determines the position of the receiver using geometry and trigonometry.

Continuously operating reference stations (CORS) make it possible for GPS users to determine horizontal and vertical elevations at a point on the ground much more quickly. CORS stations are located at points whose positions are known to a very accurate degree. GPS receivers at these CORS stations continuously receive location data from GPS satellites. Portable GPS receivers utilize CORS station data to obtain accurate

location data quickly. A number of CORS stations have been installed across Louisiana to facilitate the use of GPS techniques for both horizontal and vertical surveys.

5.3.7. Changing Datums

The National Geodetic Survey (NGS), in the National Oceanographic and Atmospheric Administration (NOAA) defines and manages a national coordinate system. This network, the National Spatial Reference System (NSRS), provides the foundation for transportation and communication; mapping and charting; and a multitude of scientific and engineering applications. The NGS established and maintained the National Geodetic Vertical Datum of 1929 (NGVD 29) until 1993, when it officially changed to the North American Vertical Datum of 1988 (NAVD 88).

Virtually all Flood Insurance Rate Maps (FIRMs) and Flood Insurance Studies (FISs) use either NGVD 29 (if they were published before about 2000) or NAVD 88 (if they were published after about 2000). A community with a FIRM and FIS based on NGVD 29 has a particular problem, since that datum is no longer supported by the NGS in Louisiana.

If a community's FIRM uses NGVD 29 (see Section 8.1.7 to find the datum used), there are two ways to ensure that the elevations used for floodplain management are on that datum:

1. Make sure that all physical benchmarks used by the community and its surveyors and engineers are resurveyed periodically (perhaps once every year) and corrected for subsidence; or

2. Do all surveying using NAVD 88 and convert the elevations to NGVD 29.

If a community is in an area subject to land subsidence, it cannot rely on conventional benchmarks unless they are periodically corrected for the local amount of subsidence!

Method to correct physical benchmarks: A surveyor must determine the NAVD 88 elevation of one of the benchmarks used within the community (probably using GPS techniques). Calculate the difference between NAVD 88 and NGVD 29 at that benchmark using VERTCON. That will be the conversion factor for that benchmark.

Then, survey the elevation of all other benchmarks to be used by the community. Survey the elevation for each additional benchmark based on the NGVD 29 elevation at the first converted benchmark.

Repeat this procedure once every year.

The National Geodetic Survey (NGS) role in managing and defining the National Spatial Reference System (NSRS) includes the responsibility to develop tools allowing users to transform data between different systems. To support users needing to transform data between NGVD 29 and NAVD 88, NGS has developed the VERTCON program.

VERTCON, currently version 2.0, is available as an element of the NGS Geodetic Toolkit and is available for download from the NGS website:

http://www.ngs.noaa.gov/TOOLS/Vertcon/vertcon.html.

There is a web-based conversion tool for a single point on this website. The web-based version of VERTCON does not allow users to upload a file of points. The version available for download includes this feature.

For example, if the NAVD 88 elevation at the selected benchmark is 28.75, and the VERTCON conversion factor is -1.35, the NGVD 29 elevation for that benchmark is 28.75 – 1.35, or 27.40. Use this elevation to survey the NGVD 29 elevations of other nearby benchmarks.

Method for obtaining NAVD 88 elevations and converting them to NGVD 29: A surveyor with a portable survey grade GPS receiver can quickly and accurately determine an NAVD 88 elevation at a point of interest. Using VERTCON, this elevation can be converted to NGVD 29.

If this method is used for floodplain management purposes, it should be documented each time it is used. For example, if this method is used to complete a FEMA Elevation Certificate (EC), the person completing the EC should place a comment in the "Comments" part of the EC.

NOTE: All floodplain management records maintained by an NFIP community must be based on the datum used for its FIS and FIRM. Also, all FEMA Elevation Certificates must use the correct datum for all elevations on the EC.

5.4. Flood Insurance Study

5.4.1. The FIS

How a flood study is prepared is covered in Section 6, Riverine Flood Studies, and Section 7, Coastal Mapping.

When a flood study is completed for the NFIP, the information and maps are assembled into a Flood Insurance Study (FIS). An FIS is a compilation and presentation of flood risk data for specific watercourses, lakes, coastal zones, and ponding flood hazard areas within a community. If a community has more than one identified hazard, the study results of each hazard analysis are combined and included in the FIS.

The FIS report and associated maps delineate the SFHA and sometimes the 500-year floodplain; they also designate flood zones and establish base flood elevations. These maps serve as the basis for rating flood insurance, regulating floodplain development, and carrying out other floodplain management measures.

Most studies have three components:

- The Flood Insurance Study text (Figures 5-5 and 5-6)
- The Flood Insurance Rate Map
- The Flood Boundary and Floodway Map (included in studies prepared before 1985; since 1985, floodways have been shown on some FIRMs)

Additional copies of a community's FIS report, FIRM, or Floodway Map can be ordered by calling DHS/ FEMA's Map Service Center at 1-800-358-9616 or visiting the Center on DHS/FEMA's website:

www.fema.gov.

Maps are provided at no charge to local government officials. The FIS report and Floodway Maps must be specifically requested, or only the FIRMs will be sent. Be prepared to provide the Community Identification Number.

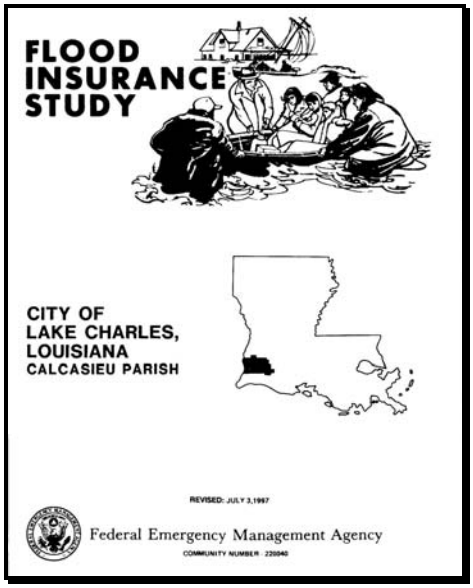


Figure 5-5. Cover to Lake Charles' Flood Insurance Study.

5.4.2. FIS report

The FIS report includes:

- An appraisal of the community's flood problems in a narrative that describes the purpose of the study, historic floods, the area and streams studied, and the engineering methods employed
- A vicinity map of the community and often photographs of historic floods
- Tables summarizing various study data
- Computed flood profiles for various recurrence probabilities, usually the 10-, 50-, 100-, and 500-year floods

The majority of FIS reports use the same outline and numbering system. Note that the location of the parish and community are pinpointed on the outline map on the cover. The date of the FIS and the community identification number are also indicated on the cover.

- Section 1 of all FIS reports states the purpose of the FIS, authority of and acknowledgments by its authors, and coordination steps taken during the preparation of the study.
- Section 2 provides background information on the community, its flood problems, which areas were studied, and which flood protection measures are in effect.
- Section 3 discusses the engineering methods used.
- Section 3.1 covers the hydrologic analysis – how much water will flow through the floodplain during peak floods. Section 3.2 describes the hydraulic analysis – how high the water will get. Note that the tables in Section 3 specify the datum for all elevations.
- Section 4 discusses how the flood map was prepared from flood data for floodplain management applications. Section 4.1 covers mapping the floodplain boundaries – where the water will go. If the study included a floodway determination, Section 4.2 describes the floodway study and mapping. Section 4 also includes the floodway data table.
- Section 5 covers data related to flood insurance, some of which a local official will not need to use. This section can be a useful reference because it describes the zones identified on the map.
- Completing the FIS report are three self-explanatory sections: Section 6, Other Studies; Section 7, Location of Data; and Section 8, Bibliography and References. Newer FIS reports have a section on the FIRM.
- Most riverine FIS reports include flood profiles as an exhibit at the end of the document.

Figure 5-6. FIS Report Contents.

5.4.3. Determining base flood elevations

There are three ways to find the BFE:

- Using the Floodway Data Table in the FIS
- Reading the flood profile in the FIS
- Using the FIRM

The first is the most accurate and is described in the next section. Using the profile is the next most accurate approach and is described in the following section. Using the FIRM is the least accurate and is discussed in Section 9.1.3.

5.4.4. Floodway data table

The floodway data table in Section 4 of the FIS report presents data from the hydraulic analysis. An excerpt from the table in the Lake Charles FIS is reproduced in Figure 5-7.

To interpret the floodway data table, follow these steps:

All numbers in the table are calculated at each floodplain cross section. The first two columns under "Flooding Source" identify the cross sections used in the FIS and their distance from some reference point, usually the mouth of a river or the point where a stream reaches a river or other stream. The footnotes at the bottom of the floodway data table identify this reference point.

For the South Branch Bayou Contraband example in Figure 5-7, the starting point is the confluence of the South Branch with the main stem of Bayou Contraband.

Cross section A can be found on the FIRM in Figure 8-13. It is the line with the "A" in the hexagon at both ends. Cross section A represents survey data that was shot along the north side of McNeese Street.

Cross section A is 1,584 feet above the confluence of the South Branch with the main stem of Bayou Contraband. Cross section B is 2,217 feet upstream of the confluence and (2,217 –1,584 = 633) 633 feet upstream of cross section A.

Remember, a floodway's width is not usually symmetrical; it varies with the topography at each cross section. The next three columns ("Floodway") provide data at each cross section.

At cross section A in the example in Figure 5-7, the floodway is 100 feet wide. That means from the floodway boundary on one side of the stream at this cross section to the floodway boundary on the other side of the stream is 100 feet. This is useful for double-checking the width of the floodway portrayed on the FIRM or Floodway Map.

The area of the floodway at cross section A is 300 square feet. This is the cross sectional area of the floodway below the elevation of the base flood at this location. The average or mean velocity of the base flood in the floodway is 7.1 feet per second.

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY (FEET NGVD)	WITH FLOODWAY	INCREASE
South Branch Bayou Contraband								
A	1,584[1]	100	300	7.1	11.9	11.9	12.5	0.6
B	2,217[1]	300	1,060	2.0	13.1	13.1	14.1	1.0
C	3,062[1]	450	1,190	1.5	13.6	13.6	14.6	1.0
D	3,960[1]	300	750	1.9	13.9	13.9	14.9	1.0
Pithon Coulee								
A	158[2]	120	1,450	2.0	9.1	8.1[3]	9.1	1.0
B	1,108[2]	50	440	6.7	9.1	8.1[3]	9.1	1.0
C	2,851[2]	500	2,670	0.9	10.0	10.0	11.0	1.0
Little Bayou								
A	1,056[1]	200	2,040	1.5	9.4	7.9[3]	8.9	1.0
B	2,798[1]	150	970	3.2	9.4	8.1[3]	9.1	1.0
C	2,904[1]	400	1,930	1.6	9.4	8.5[3]	9.5	1.0
D	4,382[1]	400	1,030	3.0	9.4	8.8[3]	9.8	1.0

[1]Feet above confluence with Bayou Contraband
[2]Feet above confluence with Calcasieu River (Lake Charles)
[3]Elevation computed without consideration of backwater effects from Calcasieu River (Lake Charles)

TABLE 3

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF LAKE CHARLES, LA
(CALCASIEU PARISH)

FLOODWAY DATA

SOUTH BRANCH BAYOU CONTRABAND, PITHON COULEE AND LITTLE BAYOU

Figure 5-7. Excerpt from the Lake Charles FIS floodway data table.

Similar data are provided at each of the other cross sections.

Looking down the mean velocity column it is evident that the velocity for the South Branch Bayou Contraband is highest at cross section A and lowest at cross section C. Note that the floodway is narrowest at cross section A and widest at cross section C. See also the width of the SFHA in Figure 8-13. As illustrated in Figure 1-3, a wide floodplain generally has slower moving floodwaters.

Of the last three columns under "Base Flood Water Surface Elevation," a permit program is usually concerned only with the second one, "Without floodway." This states the regulatory flood elevation, which is calculated before the fringe is filled ("with floodway"). The other columns tell engineers what happened to the water surface elevation when the floodway study was run through the computer model. Notice that at no cross section is the increase more than 1 foot (i.e., if the fringe was completely filled in).

In some newer FISs, there are four columns under "Base Flood Water Surface Elevation." The first one is entitled "Regulatory." Communities with these Floodway Data Tables use the numbers in the "Regulatory" column for their regulatory flood elevations.

5.4.5. Example BFE determination

If the site is at or very close to a cross section, the most accurate source of a BFE is the information in the "Without Floodway" column of the Floodway Data Table.

Site A is on the northeast corner of Ashland Street and Jefferson Drive. Cross section C was shot on the downstream (north) side of Jefferson Drive.

The Floodway Data Table for Lake Charles is in Figure 5-7. The "Without Floodway" elevation for cross section C is 13.6 feet NGVD. That is the regulatory base flood elevation for the site.

5.5. Flood Profile

Most FIS reports of floodplains with rivers, streams, bayous, or other channels include one or more flood profiles at the back of the report. A flood profile is a graph of computed flood elevations. How a profile is prepared is discussed in Section 6.2.

A profile can be used to determine elevations of floods of various frequencies at any location along the studied stream. It also contains other useful information, including location data for bridges, stream beds, stream crossings, and cross sections.

5.5.1. Profile features

Up to four flood levels are shown on the flood profile fold-out sheets at the back of the FIS report: the 10-, 50-, 100-, and 500-year floods (i.e., the 10%, 2%, 1% [base] and 0.2% floods). Some profiles have all four, while others may only have the 100-year flood.

Only the 100-year or base flood is used for compliance with NFIP standards. The 500-year is often used as the protection level for critical facilities. The others are useful for other floodplain management applications, such as bridge and culvert design and urban stormwater management.

In addition to the flood elevation lines, FIS profile sheets contain:

- A plot of the stream bed
- Locations of the cross sections used in the FIS and shown on the Floodway Map (a letter within a hexagon—refer to Section 6.1.3 for more information on cross sections)
- Location of dams
- Location of bridges, roads, and other stream crossings (usually designated by a symbol resembling the capital letter "**I,**" where the bottom of the letter marks the elevation of the top of the bridge or culvert opening [an example is in Figure 6-4])

The data are plotted on a grid to facilitate their interpretation. With few exceptions, the large grid squares are 1 inch on each side and are divided into 10 squares in both directions to aid in making measurements.

The X-axis, or bottom legend on the profile, measures horizontal distance, up and downstream. To be consistent with other data in the FIS report, distance is usually measured in feet upstream of the mouth of the river or its confluence with another river. In some profiles, the distances are measured in miles and tenths of a mile.

Figure 5-8 shows a portion of the profile for South Branch Bayou Contraband from the Lake Charles FIS.

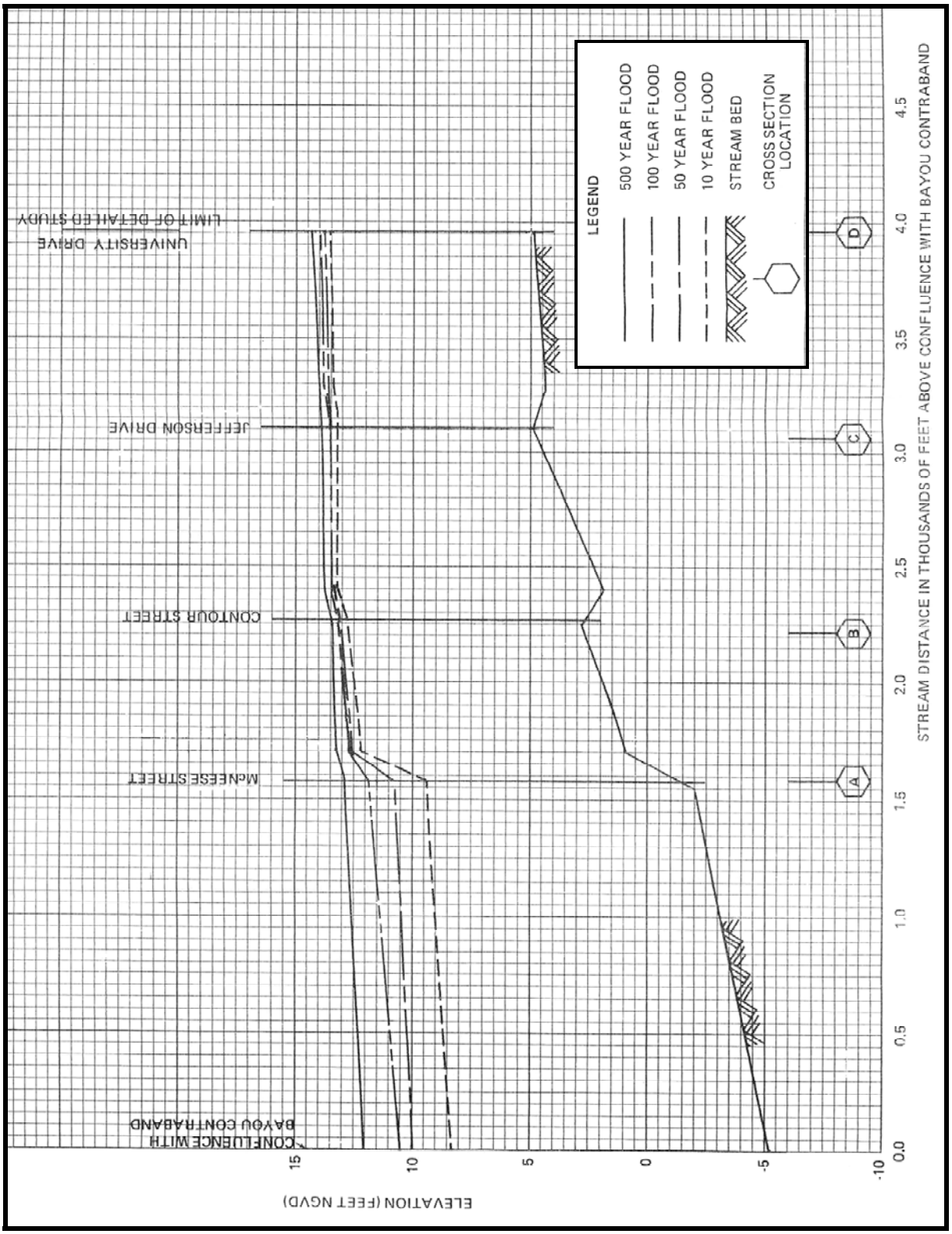


Figure 5-8. The Lake Charles FIS profile for South Branch Bayou Contraband.

For the example profile in Figure 5-8, the starting point is the confluence of the South Branch Bayou Contraband with the main stem of Bayou Contraband. Each large square is 500 feet and each little square is 50 feet.

The left side, or Y-axis, shows elevation in feet NGVD. In flat areas, each little square can be as small as one-half foot. The profile in each FIS may have a different scale.

For the example South Branch profile, each large square represents 5 feet and each small square is one-half foot. Note that the Y-axis includes elevations below sea level, a frequent occurrence in the southern portion of the State.

5.5.2. Reading a profile

Here are the steps to determine the BFE for a site using the flood profiles in the FIS report:

1. Using the Floodway Map (or new FIRM), locate features near the site that appear on the profile, such as a bridge or cross section.

   Site B is on the north side of Contour Street.

2. Determine the site's distance from a feature that appears on the profile.

   The site is 350 feet north (downstream) from Contour Street.

3. Find the feature(s) on the flood profile for that stream.

   Contour Street shows on the profile in Figure 5-8, 2,250 feet upstream from the confluence with Bayou Contraband.

4. Check the scale used for the profile and using an engineer's scale, measure the distance from the feature(s) to the site.

   Site B is 350 feet north of Contour Street, i.e., 350 feet downstream from the bridge. On the profile, each square is 50 feet horizontal, so the site is seven squares downstream (to the left) of Contour Street.

5. Find the site's location on the appropriate flood profile line and read the elevation on the Y-axis. Draw a straight line to the left or right edge of the graph, count squares, or use an engineer's scale. Remember to use a different scale when the scale on the Y-axis is different from the scale for the X-axis.

The enlarged profile in Figure 5-9 is from the profile in Figure 5-8. Go downstream (to the left) seven squares from the vertical line representing Contour Street. From this point, go up or down on the profile until the 100-year flood line is intersected. The 100-year line is denoted by the long dash, two short dashes, and a long dash. This point (the intersect) is noted by a circle in Figure 5-9.

From the intersect with the 100-year flood line, move horizontally to the left until the vertical axis is reached. The 100-year flood elevation is read from that vertical axis. Each square on the vertical axis represents one-half foot. In this example, the vertical ("Y") axis is intersected between five and six squares up from 10 feet. This point is noted by an arrow in Figure 5-9.

Since each vertical square is one-half foot, the point is between 12.5 and 13.0 feet. Since the point is about 4/5 of the way up the square, the 100-year (base) flood elevation at the site is 12.9 feet above sea level (NGVD).

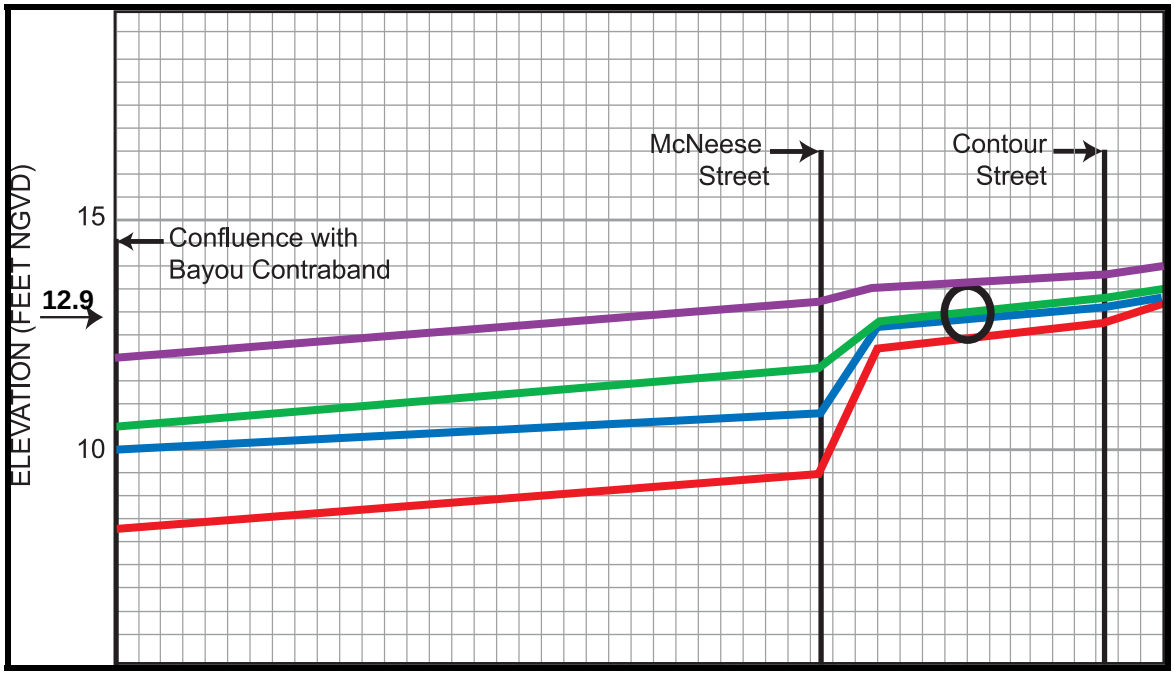


Figure 5-9. Using the profile to determine the 100-year (base) flood elevation.

6. A surveyor can establish the flood elevation at the site so the owner or builder knows how high the BFE is predicted to be.

   A surveyor can either shoot 12.9 feet at the site or shoot any elevation and tell the owner how high the base flood is in relation to the mark.

5.5.3. Relating FIS data to maps and profiles

The data contained in the FIS report are consistent with those found on the accompanying profiles and FIRM. For example, the base flood water surface elevations at each identified cross section can be found in the floodway data table, the flood profiles, and the FIRM.

Due to the limited detail and large scale of the base maps used for most FIRMs, the study contractor must interpolate between contour lines when mapping the floodplain boundaries. Discrepancies may be found when actual ground elevations are surveyed. The maps are just the best available graphic representations of the base flood elevations. They are not as accurate a source of flood elevation data as the FIS' floodway data table and profile.

Here is the order of precedence for identifying the BFE at a particular location:

- The most accurate 100-year flood elevations are found in the Floodway Data Table (for a riverine floodplain) and the Summary of Stillwater Elevations table (for coastal and lake floodplains). These 100-year flood elevations are listed to 0.1 foot. However, the Floodway Data Table is only good for sites at a cross section. One should not try to interpolate elevations between cross sections using the Floodway Data Table. That is what the profile is used for.
- The most accurate source of data for sites not close to a cross section is the profile.
- Of the three sources of BFE data in a standard FIS, the least accurate source of elevation data for a riverine floodplain is the FIRM. One reason for this is that in most communities, base flood elevations on the FIRM are rounded to the nearest whole foot while a profile can be used to determine an elevation to the nearest tenth of a foot. However, the FIRM is the only source of base flood elevations for VE and V1-30 Zones, and usually the only source for AO and AH Zones.

In the example in the previous section, if the wavy lines on the FIRM were used to determine the BFE for Site B, one would conclude that it is between 13 feet and 14 feet. However, using the more accurate profile showed that the BFE is really 12.9 feet.

5.5.4. When maps and data disagree

Base flood elevations take precedence if there is a dispute between the 100-year flood elevation and the boundaries of the SFHA shown on the maps:

- If a property is shown to be *in the SFHA* on the map and more accurate elevation information shows it above the BFE, the property owner may want to request a Letter of Map Amendment (LOMA) for DHS/FEMA to formally declare the property to be outside the SFHA. This is described in Section 10.3.

- If a property is shown to be *out of the SFHA* on the map and more accurate elevation information shows the ground to be below the BFE, the community should do two things:
  1. If a large lower area is found to be inadvertently mapped as outside the SFHA, the community should submit the more accurate elevation data for a Letter of Map Revision (LOMR) (Section 10.4). It is the community's obligation to advise DHS/FEMA when the map is found to be in error (Section 10.6.1).
  2. The community should advise the property owner that he or she is susceptible to flooding. While the community may opt to not mandate that new construction or substantial improvements be protected from the base flood, the community has an obligation to its residents to advise them of the known hazard. The community may also want to provide the information to avoid liability later, should the property flood.

> It must be noted that banks (and others who must read the FIRM to determine if flood insurance is required) must go by SFHA boundaries shown on the map. They cannot make on-site interpretations based on data other than the FIRM. However, they may recommend that the property owner submit a letter of map revision or map amendment so the map can be officially changed to reflect the more accurate data (Section 10).

Only DHS/FEMA can amend or correct the maps. Discrepancies should be brought to DHS/FEMA's attention through a request for a map change. This is discussed in Section 10.

If obvious mistakes or discrepancies between the tables, profiles, and FIRM are found, contact LADOTD or the DHS/FEMA Regional Office.

Section 6. Riverine Flood Studies

Contents

Note: This section reviews how base flood elevations and floodways are developed for riverine and other non-coastal floodplains. Section 7 covers flood studies for coastal areas.

6.1. Hydrology and Hydraulics

6.1.1. Hydrology

Watersheds are discussed in Section 1.1. The study of a watershed's behavior during and after a rainstorm is called hydrology. A hydrologic analysis determines the amount of rainfall that will stay within a watershed—absorbed by the soil, trapped in puddles, etc.—and the rate at which the remaining amount of rainfall will reach the stream. The rainfall that reaches the stream is called runoff and the rate at which it flows downstream is the flood discharge.

River gages with many years of flood records are generally the best source of data to estimate infrequent floods such as the 100-year flood. River gage records are used where they are available, but they are expensive to install and maintain. To use the record from a river gage, the hydrologist must make sure that conditions above the gage have not changed too much. Upstream dams, levees, and development may cause the record to be unusable.

Where river gage records are not available, or are unusable, other hydrologic methods must be used. Models have been developed for various regions of the country and for various types of watersheds. The models are developed from analysis of discharge data from a large number of watersheds having different topographic characteristics.

The hydrologist uses these models to determine runoff amounts and discharge rates. These will vary depending on soil type, vegetation, ground slope, land use, and the presence of storm sewers. In general, more runoff occurs on paved and built-on urban land and steeper slopes.

6.1.2. Discharges

Discharges are estimated by using rainfall data, historical stream records, or regional equations that represent such data. Computer models, such as the U.S. Army Corps of Engineers' Hydrologic Engineering Center's HEC-1 or HEC-HMS, allow engineers to incorporate many watershed characteristics into hydrologic analyses. Discharge rates also generally increase as the size of a watershed increases.

> Discharges are measured in cubic feet per second or "cfs." For perspective, a cubic foot of water is about 7.5 gallons and 1 cubic foot per second is about 450 gallons per minute.

Upon completion of the hydrologic analysis, engineers have flood discharges for various size rainstorms that are measured at different points along a stream, such as at the confluence with another stream and at the mouth of a tributary stream.

Most DHS/FEMA Flood Insurance Studies (FISs) have a "Table 1 – Summary of Discharges." This table lists the discharges used for the study at one or more locations for that stream.

6.1.3. Cross sections

All detailed flood studies examine the areas through which floodwater flows. This requires a determination of ground elevations and obstructions (such as buildings, bridges, and other developments) for these areas. Accurate data on the shape of the stream and changes in the floodplain are obtained from ground surveys, aerial photographs, or topographic maps.

A cross section is a graphical depiction of the stream and the floodplain at a particular point along the stream. It is generally taken at right angles to the flow of the stream. At each cross section, the engineer has accurate information on the size of the channel, the shape of the floodplain, and the changes in the elevation of the ground. A typical surveyed cross section is shown in Figure 6-1.

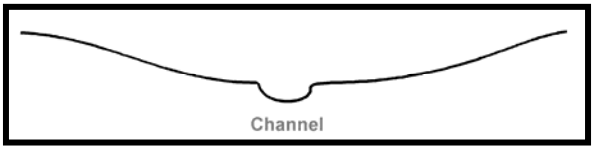


Figure 6-1. Surveyed cross section.

Cross sections of the floodplain are taken at locations along the stream that are representative of local conditions. They are taken at each bridge or other major obstruction and at other locations, depending on how much the stream or adjacent floodplain conditions change. Generally, the more changes there are in topography (e.g., steep river banks changing to large flat overbank area), the more cross sections are necessary to define the floodplain accurately.

Cross sections are shown on Floodway Maps with a line and a letter in a hexagon at each end (Figure 6-2). In the Lake Charles Flood Insurance Rate Map (FIRM) in Figure 8-13, cross sections A–D are shown. Cross section information is also provided in the FIS Floodway Data Table (Section 5.4.4).

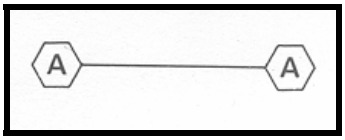


Figure 6-2. Cross section symbol.

6.1.4. Roughness

Surveyors and engineers also estimate the roughness factor along the floodplain to determine how fast floodwater will flow through the area. Roughness factors are related to ground surface conditions and they reflect changes in floodwater velocity due to ground friction. For example, water flows faster over mowed grass and pavement than it does over an area covered with bushes and trees, or planted in tall crops. In developed areas, fences substantially increase roughness values, since storm debris can clog the openings.

6.1.5. Hydraulics

For the purposes of floodplain analysis, hydraulics is the study of floodwaters moving through the stream and the floodplain. Hydraulic analysis combines:

- Flood hydrology (i.e., the discharges)
- The cross section data on how much area there is to carry the flood
- Stream and floodplain characteristics: "roughness," slope, and size of structures

Water flows faster in areas where the slope is steeper and the floodplain is "smooth" (e.g., where there are no trees and buildings to cause turbulence). Redeveloping an area can change the hydraulics of a flood.

Data are usually processed using a computer model, most commonly HEC-2 or HEC-RAS, which were developed by the U.S. Army Corps of Engineers' Hydrologic Engineering Center.

The hydraulic study produces flood elevations, velocities, and floodplain widths at each cross section for a range of flood flow frequencies (Figure 6-3). These elevations are the primary source of data used by engineers to map the floodplain.

An FIS usually produces elevations for the 10-, 50-, 100-, and 500-year floods, although many may just show the 100-year. Elevations for the other frequency floods are typically used for other floodplain management purposes. For example, the 50-year flood data may be used for placing bridges and culverts and the 500-year for siting critical facilities.

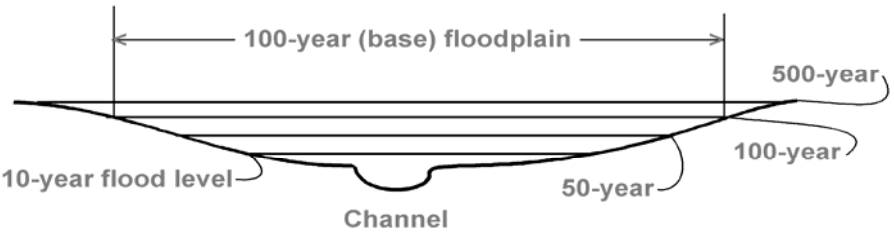


Figure 6-3. Cross section with flood elevations.

6.2. Flood Profiles and Maps

6.2.1. Flood profiles

The hydraulic computer program provides elevations at each cross section, but flood elevations at locations between the cross sections must be determined as well. This is done by plotting the elevations at the cross sections on a graph and connecting the plotted points. Such a graph is called a flood profile (Figure 6-4).

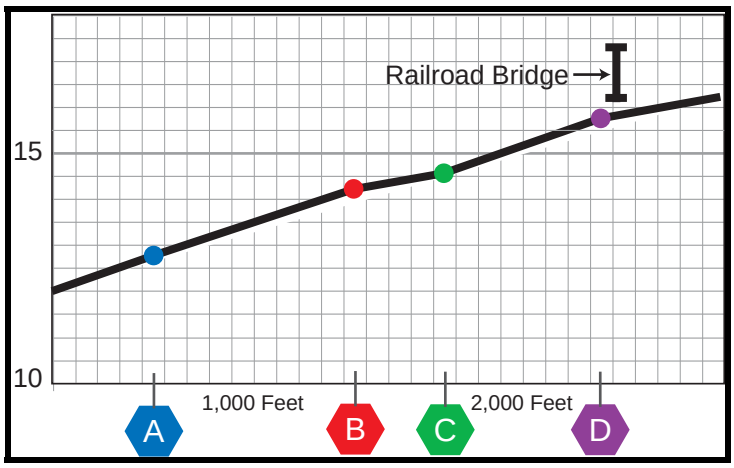


Figure 6-4. In this profile, the flood elevations for cross sections A – D are plotted on the graph.

The bottom of the graph (the horizontal axis or X-axis) shows the distance along the stream, which is commonly called stationing. For stationing, start at the mouth of a stream (its point of discharge into a larger body of water) and look upstream. When profiles are plotted, the slope of the stream bed will rise as the graph is read from left to right.

River distances are measured in either feet or stream miles. For most profiles, the distance is measured above the mouth of the stream or above its confluence (where it meets with another stream).

The left and right sides of the graph (the vertical axis or Y-axis) show elevation in feet (generally in NGVD). Bridges are usually indicated with an "**I**" shaped symbol, which represents the distance from the bridge's lowest beam to the top of the roadway.

Additional information is provided on the profiles, including corporate limits and confluences with smaller streams.

Profiles provide a picture of stream characteristics, such as steep sections of the stream bed and where restrictive bridge openings cause floodwaters to back up.

How to read a FIS profile is covered in Section 5.5.

6.2.2. Floodplain mapping

The next step in the mapping process is to transfer the flood elevation data from the profile onto a map showing ground elevation data (Figure 6-5). This is called a topographic or contour map because points with the same elevation are connected by a contour line. The topographic or contour map is often referred to as the base map or work map.

The most common topographic maps used are produced by the U.S. Geologic Survey (USGS). Some communities have prepared their own topographic maps and provided them to DHS/FEMA to improve the accuracy of their floodplain maps.

The BFEs from the cross sections and profiles are plotted on the topographic map. Floodplain boundary lines are drawn connecting these plotted points using the contour lines as a guide.

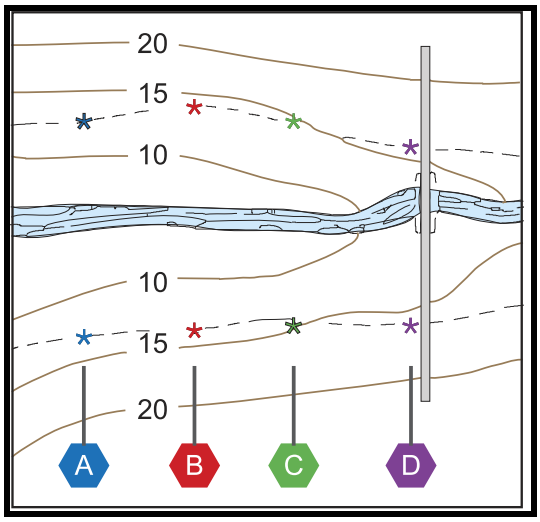


Figure 6-5. Flood elevations from the profile in Figure 6-4 are transferred to the contour map to delineate the floodplain boundary.

The floodplain boundaries, BFEs and flood zones are transferred to a base map which portrays the physical characteristics of the community, such as streets. The augmented base map (without any contours) is then published as the FIRM. The completed FIRM officially describes the 100-year floodplain (the Special Flood Hazard Area, or the SFHA).

It is important to remember that floodplain map boundaries are only as accurate as the topographic map on which they are drawn. Since the USGS topographic quadrangle maps have so large a scale, the SFHA boundaries cannot be precisely mapped. This is important to remember when determining if a building is in or out of the floodplain.

Correlating map features with ground features requires care, because maps do not always represent exact conditions on the ground. Use the map to determine whether a property is in or out of the floodplain for regulatory purposes. If the ground elevations show a mapped floodplain to be above the base flood elevation (BFE), the property owner should be advised to request a Letter of Map Amendment (LOMA) that will officially amend the map to reflect the new data. This process is explained in Section 10.3.

How to read a Flood Insurance Rate Map is covered in Section 9.1.

Banks (and others who must read the FIRM to determine if flood insurance is required) must go by the SFHA boundaries shown on the map. They cannot make on-site interpretations based on data other than the FIRM. However, they may recommend that the property owner submit a request for a map revision or map amendment so the map can be officially changed to reflect the more accurate data (Section 10).

DHS/FEMA does not map all the floodplains in a community. The agency generally does not map streams with less than 1 square mile of drainage area in urban areas. Some very shallow floodplains may not be mapped as Special Flood Hazard Areas, but as B or shaded X Zones.

Therefore, the flood hazard areas shown on a FIRM are probably not all of the flood-prone areas in the community. Consider them to be the minimum areas that must be regulated by a community that participates in the National Flood Insurance Program (NFIP). If the community is aware of additional flood hazard areas that meet DHS/FEMA's mapping thresholds, it has an obligation to inform DHS/FEMA (Section 10.6.1).

6.2.3. Mapping future conditions

Historically, flood hazard information presented on NFIP flood maps has been based on existing conditions of the floodplain and watershed. The primary reason why it is done this way is that future land-use development, such as urban growth, is uncertain and difficult to predict and has not, therefore, been considered.

A number of communities experiencing urban growth expressed interest in using hydrology based on future conditions to regulate floodplain development. DHS/FEMA conducted an extensive evaluation to determine whether future conditions flood hazard information could and should be placed on FIRMs and in the accompanying FIS. In 2001, DHS/FEMA issued a final rule that allows for floodplains that reflect future conditions hydrology to be shown on the FIRM at the request of the community.

The future conditions flood hazard information is provided for informational purposes only and it is up to the community to decide whether to use the information to regulate floodplain development. When future conditions floodplains are included on the FIRM, both the existing conditions floodplain and the future conditions floodplain are shown. The existing conditions data are used to establish flood insurance rates and to determine if flood insurance is required. This procedure allows DHS/FEMA to maintain national standards while also providing additional information for the community to use.

6.3. Mapping Floodways

The final step in preparing most riverine flood studies is to produce the floodway analysis, which identifies where encroachment by development can and cannot be allowed.

6.3.1. The floodway

The floodway is the stream channel and that portion of the adjacent floodplain that must remain open to permit passage of the 100-year flood. Floodwaters generally are deepest and swiftest in the floodway and anything in this area is in the greatest danger during a flood.

The remainder of the floodplain is called the fringe, an area in which water may be shallower and slower. NFIP minimum standards state that other areas outside the boundaries of the floodway can be developed. Consequently, most communities permit development in the fringe if the development is elevated or otherwise protected to the BFE (or any higher state or local standards).

6.3.2. Floodway analysis

A floodway analysis establishes the boundaries of the floodway or "encroachment limits" using these floodplain management concepts:

- Properties on both sides of a river or stream should be treated equitably. The degree of obstruction permitted now for one side of the river should be permitted in the future on the other side.
- If all areas up to the floodway encroachment limits were filled, the increase in the BFE will not exceed 1 foot.
- The floodway is analyzed using "equal conveyance" on both sides of the channel. To treat properties differently can only be done at the request of the community.

A floodway analysis is done with a computer program that can make the necessary calculations of the effects of further development. Beginning at both edges of the floodplain, the computer model starts "filling" the floodplain. This proportionally "squeezes" the floodwater toward the channel and causes the flood level to rise. At the point where this process reaches a 1-foot rise, the floodway boundaries are drawn. This process is shown in Figure 6-6.

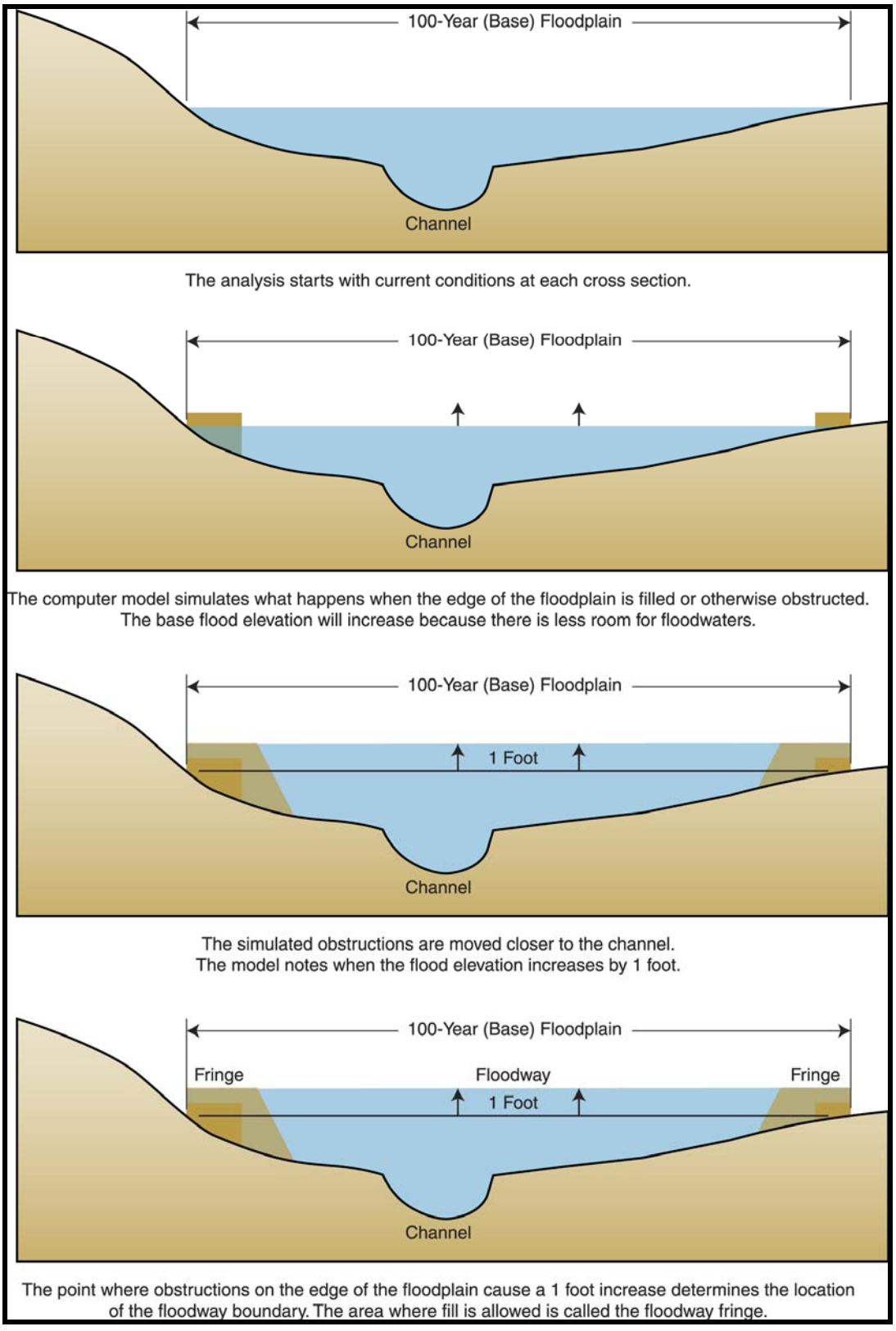


Figure 6-6. Computer floodway analysis.

The floodway boundaries at each cross section are transferred to the topographic or contour map (Figure 6-7). The plotted points are connected to show the floodway and fringe on the floodplain map.

Not every cross section will show exactly a 1-foot rise. Topographic conditions and the need to "smooth out" the floodway line will result in some cross sections with surcharges of less than 1 foot (see the discussion of the Floodway Data Table in Section 5.4.4).

How to read a Floodway Map is covered in Section 9.1.4.

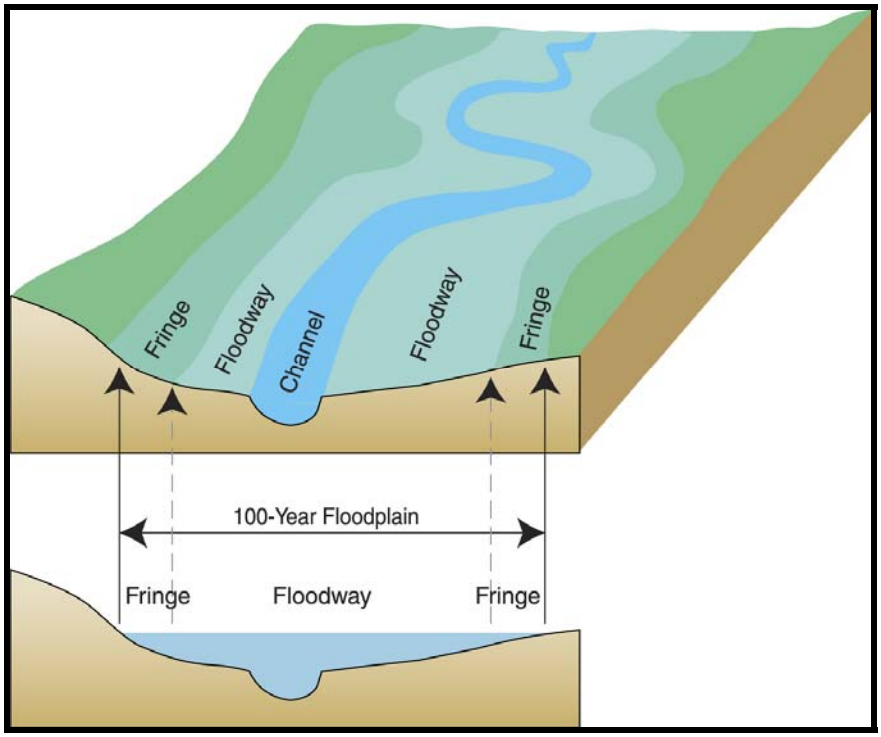


Figure 6-7. Floodplain cross section and floodway map.

6.4. Other Flood Studies

6.4.1. Shallow flooding studies

For the NFIP, shallow flooding is defined as flooding with an average depth of 1 foot to 3 feet in areas where a clearly defined channel does not exist. Shallow flooding can exist in any of the following situations:

- **Ponding:** In flat areas, water collects or "ponds" in depressions
- **Sheet flow:** In steeper areas where there are no defined channels or on flat plains, water will spread out over the land surface
- **Urban drainage:** Local drainage problems can be caused where runoff collects in yards or swales or when storm sewers back up

For the purposes of the NFIP, shallow flooding is distinguishable from riverine flooding because it occurs in areas where there is no channel or identifiable flow path. Shallow flooding is mapped based on historic flood experiences and a study of the topography. In some areas, the techniques used for riverine studies are used. The result will either be a BFE (i.e., in NGVD) or a 100-year flood depth (i.e., in feet above the ground). A shallow flooding study usually produces data for the base flood, but not for other floods.

These areas are usually designated on a FIRM as an "AO" or "AH" Zone (Figure 8-16). Note that DHS/FEMA generally does not map shallow flooding areas less than 1-foot deep. Therefore, a FIRM probably does not show all floodprone areas in a community.

6.4.2. Approximate studies

Detailed studies are expensive—a riverine study typically costs $5,000 to $10,000 per mile of stream to be mapped—so it is not cost effective to perform a detailed study in watersheds, such as in rural areas, where there is little or no development and none is anticipated.

Many NFIP maps show floodplains that were mapped using approximate study methods. Using flood data and floodplain information from a variety of sources—including soils mapping, actual high water profiles, aerial photographs of previous floods, topographic maps—the approximate outline of the 100-year floodplain for specific stream reaches is overlaid on available community maps, usually USGS topographic quadrangle maps.

An approximate study shows the estimated boundary of the SFHA. It does not establish a BFE. The boundaries are drawn on the best available topographic map using knowledge of past floods and the judgment of experienced engineers. Many flooding sources have been studied by other federal, state, or local agencies. Such studies that do not meet the NFIP standards for an FIS often contain valuable flood hazard information that may be incorporated into NFIP maps as approximate studies.

6.5. Mapping Levees

6.5.1. FEMA's levee policies

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

FEMA is responsible for identifying flood risks in areas behind levees through flood analysis and flood hazard mapping projects, including updating the Nation's flood hazard maps. In addition, FEMA has criteria for recognizing levees as providing protection against the one-percent annual-chance flood. However, FEMA does not actually examine or analyze structures to determine their performance in a given flood event. The levee owner must provide documentation to show that a levee meets current design, operations, and maintenance criteria. If the levee cannot be shown to meet FEMA criteria, the levee will not be mapped as providing adequate protection on the Flood Insurance Rate Map (FIRM) currently in effect. Because the risks associated with levees are real, FEMA strongly encourages flood insurance protection and adherence to evacuation procedures in all areas behind levees.

A levee is certified if evidence - typically a statement by a licensed professional engineer or federal agency responsible for levee design - has been presented showing that the structure meets current design, construction, maintenance, and operation standards to provide protection from the one-percent annual-chance flood. The levee owner is responsible for ensuring that the levee is being maintained and operated properly and for providing evidence of certification. If it can be shown that a levee provides the appropriate level of protection, then FEMA will "accredit," or recognize, the levee as providing adequate protection on flood hazard maps and the area behind it will be shown as a moderate risk zone (shaded X zone on flood hazard maps). FEMA accredits levees that meet the criteria and maps areas behind them as having a certain risk level, but does not perform the actual certifications.

Once a levee is accredited, DHS/FEMA will remove the property behind the levee or floodwall from the SFHA and show it as a B or shaded X Zone, as shown in Figure 6-8.

DHS/FEMA's review of a levee or floodwall system is for the sole purpose of establishing appropriate flood zone determinations for NFIP maps and does not constitute a determination or warranty by DHS/FEMA as to how a structure or system will perform in a flood event. Because of the potentially devastating effects to life and property if a levee or floodwall should fail or be overtopped, DHS/FEMA takes special care when considering the impacts of such structures on flood hazards.

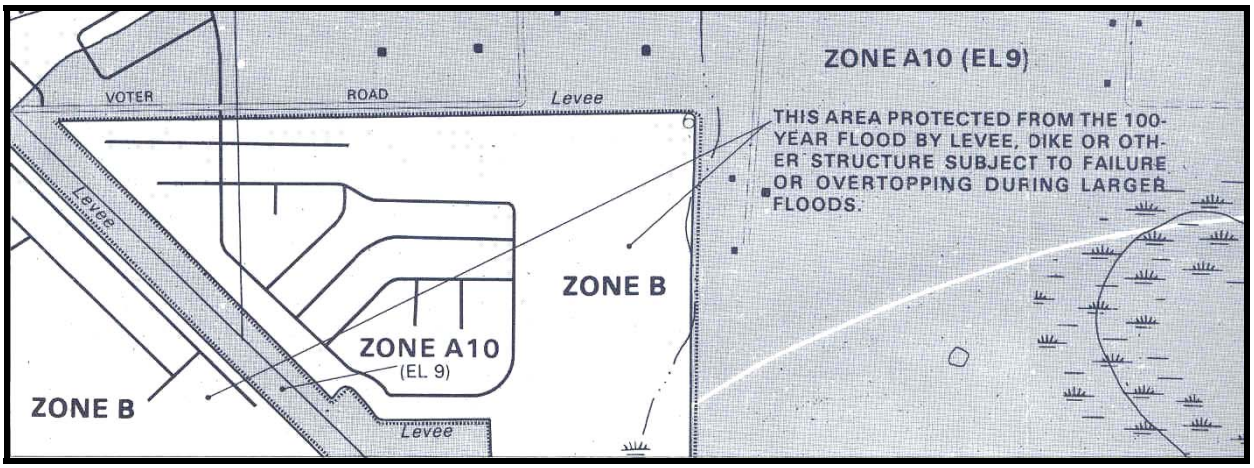


Figure 6-8. Flood Insurance Rate Map showing an area protected by a 100-year flood levee.

DHS/FEMA recognizes only a levee system or floodwall system that is certified to meet, and will continue to meet, minimum design standards that provide protection from the base flood. Specifically, the criteria established in 44 CFR §65.10 must be satisfied before a levee may be credited. The criteria include:

- **Design criteria,** which address minimum freeboard above flood height, closure devices for any openings, embankment protection, embankment and foundation stability, settlement, and interior drainage. All data submitted to demonstrate compliance with these structural requirements must be certified by a registered professional engineer. In lieu of submitting these data, a federal agency with responsibility for levee design may certify that the levee and/or levee system provides adequate protection against the base flood.
- **Operations plan and criteria**, which address operation of closures and interior drainage systems during a flood event. Operations for a levee system must be under the jurisdiction of a federal or state agency, an agency created by federal or state law, or an agency established by a community participating in the NFIP.
- **Maintenance plans and criteria** require an officially adopted maintenance plan. At a minimum, the plan must specify the maintenance activities to be performed, the frequency of their performance, and the person responsible for their performance. All maintenance activities must be performed under the jurisdiction of a federal or state agency, an agency created by a federal or state law, or an agency of a community participating in the NFIP.

6.5.2. Provisionally accredited levees (PALs)

FEMA has issued two Procedure Memorandums to clarify the evaluation and mapping requirements for areas protected by levees. PM 34-Interim “Guidance for Studies Including Levees,” issued on August 22, 2005, helps clarify the responsibility of community officials seeking recognition of a levee during a study/mapping project. PM

43 “Guideline for Identifying Provisionally Accredited Levees (PALs),” revised on March 16, 2007, explains how to determine if previously accredited levee (a levee that has been shown on a published FIRM) is or is not qualified to be a PAL. The PAL designation allows communities or levee owners additional time to provide the data and documentation to get the levee reaccredited. These Procedure Memoranda and other information is available at http://www.fema.gov/plan/prevent/fhm/lv_intro.shtm.

FIRMs with Provisionally Accredited Levees (PALs) show the areas behind those levees as a gray shaded area. See figures Figures 6-9 and 6-10.

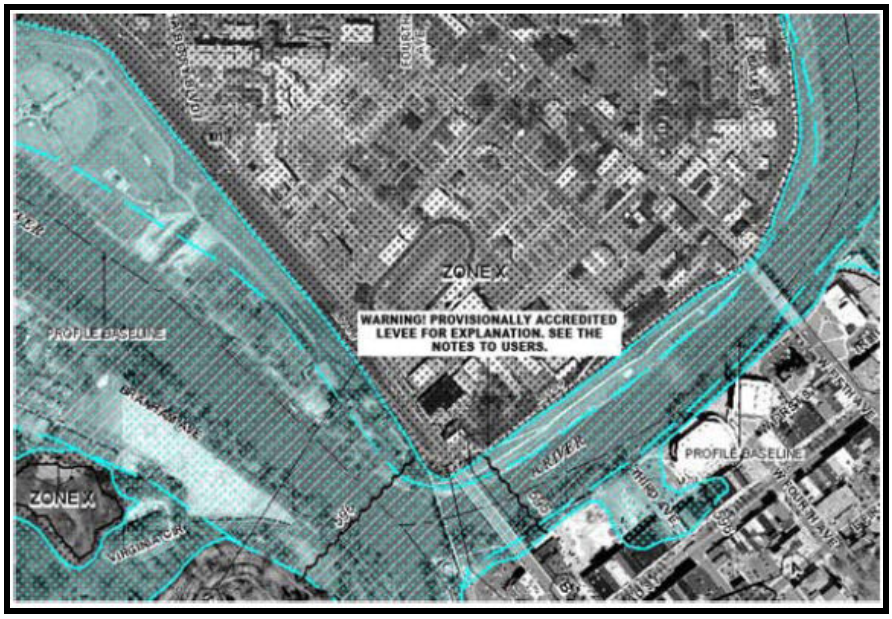


Figure 6-9. Digital FIRM (DFIRM) showing a PAL.

Figure 6-10. DFIRM showing a levee that is not accredited.

Section 7. Coastal Mapping

Contents

7.1. Coastal Flood Studies

7.1.1. Hydrology

Most coastal floods result from storm surge and wave action caused by coastal storms. The storms bring very strong winds that push water up against the shore. Air pressure changes add to this change in water level, which is called a storm surge. The result is that the ocean is higher in some areas than in others. This holds true for other large bodies of water, such as the Gulf of Mexico and Lake Pontchartrain.

A computer simulation of a coastal storm is developed based on data from past storms and past flood heights. The computer model uses data on wind speeds, wind direction, and air pressure from historical hurricanes. The results are correlated with the probability of high or low tide during the storm.

The coastal hydrology computer program produces stillwater elevation (i.e., the elevation of various coastal floods, not counting waves). The computer model is checked or “calibrated” by reproducing the historical stillwater elevations. The program calculates the base flood stillwater elevation from the historical data.

7.1.2. Waves

In addition to storm surge, wave action is an important part of coastal storms. The high winds cause waves that increase the water surface elevations and cause a phenomenon called wave set-up. Wave set-up is a "pile-up" of the waves, which further increases the water surface elevation. The coastal flood study determines the height of the wave crest elevation above the stillwater elevation.

When the waves hit the shoreline, the water moves with such force that it keeps moving inland. This is called wave runup (i.e., when areas on land above the stillwater elevation are flooded). Wave runup elevations are typically one to two times the height of the wave.

7.1.3. Hydraulic analysis

As with riverine studies, a coastal hydraulic analysis also determines where moving water goes. Instead of surveying a channel cross section, the coastal engineer’s profile data is called a “transect.”

A transect shows the elevation of the ground, both onshore and offshore. The computer program uses the ground elevation data to determine what happens to the stillwater and wave crest (wave runup) elevations. A typical transect schematic is shown in Figure 7-1. Underwater topography, called “bathymetry,” and the shape and location of coastal islands, headlands, estuaries, and harbors, are also considered in the modeling.

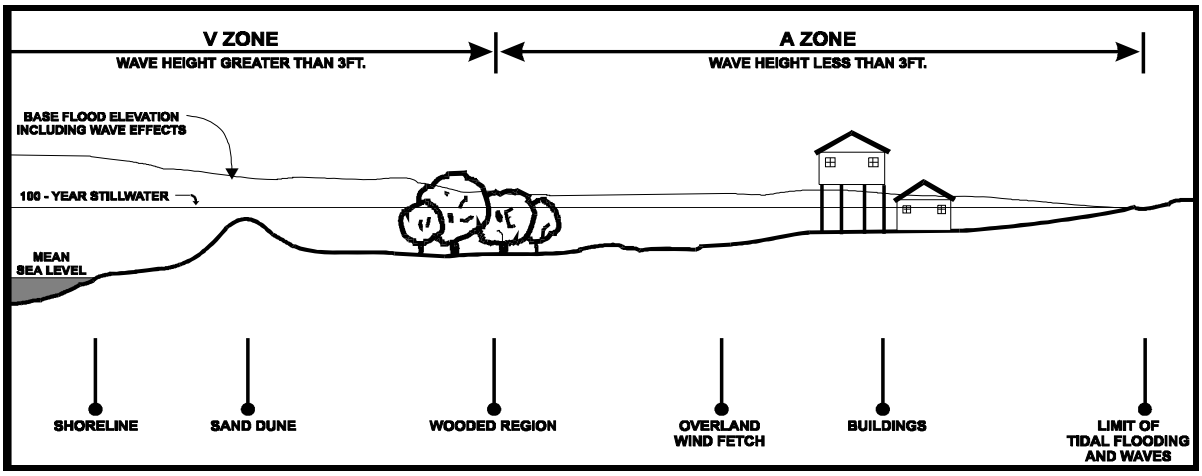


Figure 7-1. A typical transect schematic.

7.1.4. Wave heights and wave crest elevations

DHS/FEMA uses wave height as the primary criteria for distinguishing between the base flood elevation (BFE) for coastal V Zones and the BFE for coastal A Zones and X Zones. Simply stated, the wave height is the vertical distance between the crest and trough of a wave as it moves inland.

The maximum height of a breaking wave above the stillwater elevation is equal to 0.55 of the depth of the water at a location. The depth of the water is the stillwater elevation minus the ground elevation. One cautionary note: the ground elevation is not the existing ground elevation present today. It is the ground elevation after the erosion that results from a 100-year storm or the 1% annual chance event.

Example:

- The stillwater elevation is 10 feet National Geodetic Vertical Datum (NGVD)
- The post-storm ground elevation is 4 feet NGVD
- The depth of the water is the difference between the stillwater and the ground elevations (10 – 4 = 6 feet)
- By multiplying the depth by 0.55 (6 feet X 0.55), the maximum height of a breaking wave above the stillwater elevation, 3.3 feet, is obtained
- The wave crest elevation is therefore 3.3 feet + 10 feet = 13.3 feet

7.1.5. Wave runup

The rush of water up the surface of the natural beach, including dunes and bluffs, or the surface of a man-made structure, such as a revetment or vertical wall, can result in flood elevations that are higher than the crests of wind-driven waves.

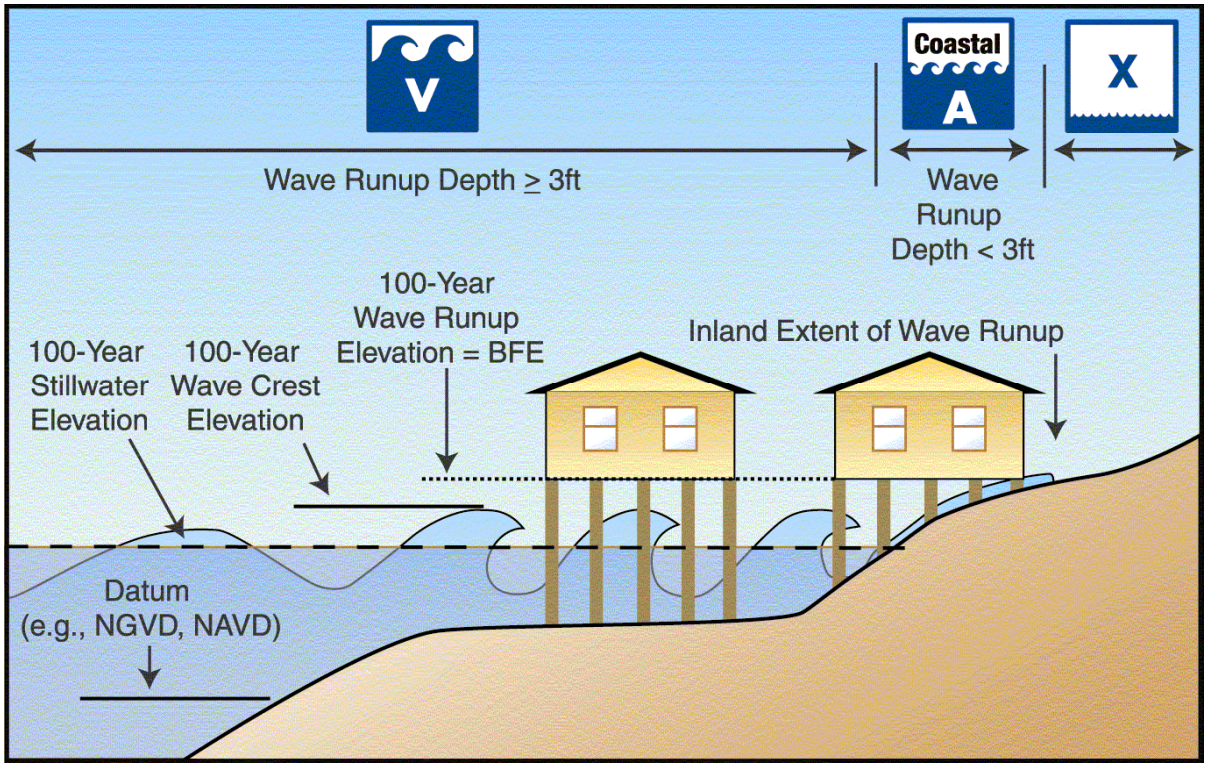


Figure 7-2 Wave runup determines the BFE if it is higher than the wave crest elevation

For a coastal flood hazard area where this situation occurs, the BFE shown on the Flood Insurance Rate Map (FIRM) is equal to the highest elevation that the water reaches (Figure 7-2).

The coastal methodology adopted by DHS/FEMA also includes computation of wave runup elevations. For details on DHS/FEMA's coastal methodology, refer to DHS/FEMA's Coastal Flood Hazard Technical Resources website:

www.fema.gov/fhm/en_cfhtr.shtm.

7.1.6. Coastal high hazard area

Waves have a great deal of energy and force. They are much more destructive than standing or slow-moving water and that power increases exponentially with their height. For the purposes of the National Flood Insurance Program (NFIP), the flood study identifies the “coastal high hazard area” as that part of the coastal floodplain where the wave heights during the base flood will be 3 feet or more.

These areas are designated as “V Zones,” in which the “V” stands for “velocity wave action.” Due to the increased degree of risk, V Zones are subject to more stringent regulatory requirements and a different flood insurance rate structure.

The 3-feet wave height threshold was selected because it was found to be the smallest wave with enough power to break a wall panel away from a floor to which it has been nailed. Coastal flood areas with wave heights of less than 3 feet are mapped as AE or A1–A30 Zones with the BFE indicated in parentheses.

7.1.7. DHS/FEMA models

In addition to storm surge models (or other means of determining stillwater elevations), DHS/FEMA currently uses three distinct flood hazard components in its Flood Insurance Studies (FISs): an erosion assessment, a wave runup analysis model, and a wave height analysis model (WHAFIS). The erosion assessment used by DHS/FEMA accounts for storm-induced erosion and does *not* take long-term erosion into account.

Figure 7-3 shows which techniques DHS/FEMA applies to different shoreline types. DHS/FEMA's application of the techniques follows the procedure summarized below:

	Model/Procedure To Be Applied		
Type of Shoreline	Erosion	Runup	WHAFIS
Rocky bluffs		▲	▲
Sandy bluffs, little beach	▲	▲	▲
Sandy beach, small dunes	▲		▲
Sandy beach, large dunes	▲	▲	▲
Open wetlands			▲
Protected by rigid structure		▲	▲

Figure 7-3. DHS/FEMA coastal study models.

1. Draw analysis transect(s) perpendicular to the shoreline at the site or region of interest (see Section 7.4.3).

2. Determine type of shoreline (e.g., rocky bluff, sandy beach, rigid structure – Figure 7-3) at each transect.

3. Determine profile bathymetry (ground elevations below the waterline) and topography (ground elevations above the waterline) along each transect.

4. Determine the flood stillwater elevation and incident wave conditions during the base flood event.

5. If a shore protection structure is present on a transect, determine whether it has the structural capacity to survive the 100-year flood event and whether the top of the structure is higher than the flood level. If not, neglect the structure in further analyses. If so, apply the runup and WHAFIS models.

6. If no shore protection structure exists on the transect, or if the structure fails the tests described in step 5, determine whether the shoreline type is erodible. If it is not erodible, apply the runup and WHAFIS models. If erodible, apply the erosion assessment procedure and then apply the runup and WHAFIS models on the eroded profile.

7. Determine base flood elevations along the transect(s) using the higher of the flood elevations calculated by the runup and WHAFIS models. Merge the results between transects to define flood zones over the area of interest. The Coastal Hazard Analysis Modeling Program, version 1.1 (CHAMP) model that DHS/FEMA recently developed incorporates the WHAFIS model, erosion assessment, and the wave runup model in a more user-friendly platform.

7.2. Coastal Floodplain Map

Section 7.1 reviews how stillwater elevation and wave height data are developed at the transects. The next job is to transfer the elevation data to the best available topographic map. Flood elevations between transects are interpolated, taking into consideration local topography.

7.2.1. FIRMs

An example of a coastal floodplain map is shown in Figure 7-4. The applicable BFE is shown on the map in parentheses below the zone designation. Two coastal flood zones are shown: V Zones and A Zones.

The V Zone (also known as the velocity zone or the coastal high hazard area) is more hazardous because structures located there are exposed to the most severe flood and wind forces, including wave action, high-velocity flow, and erosion. Zones V1–V30 were used on FIRMs until 1986. FIRMs published since then show VE Zones.

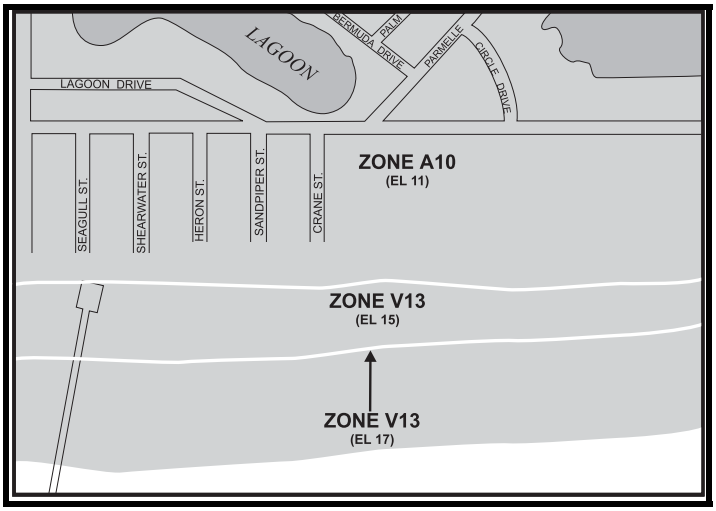


Figure 7-4. Coastal floodplain on a FIRM.

Insurance is the most expensive in V Zones because of the severity of the hazard. However, V Zones are often not very wide and most coastal buildings are usually located inland of this area.

Zones A1–A30 were used on FIRMs until 1986. FIRMs published since then show AE Zones. DHS/FEMA does not currently map or regulate coastal A Zones any differently than inland A Zones; however, post-disaster damage inspections consistently show the need for such a distinction. Flood hazards in coastal A Zones, like those in V Zones, can include the effects of waves, velocity flow, and erosion (although the magnitude of these effects will be less in coastal A Zones than in V Zones).

7.2.2. Erosion considerations

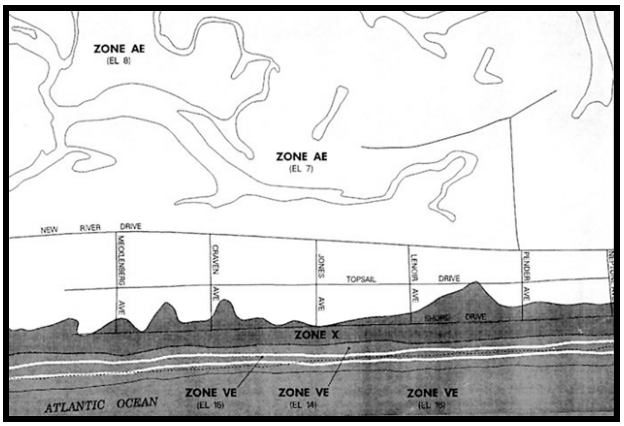
Current DHS/FEMA coastal flood study procedures account for the potential loss of protective dunes during the 100-year flood. However, this factor was not considered in the preparation of many older coastal FIRMs, which delineated V Zones without consideration for storm-induced erosion. V Zone boundaries were often drawn at the

crest of the dune solely based on the elevation of the ground and without regard for the erosion that would occur during a storm.

Flood zones shown on FIRMs do not necessarily reflect current flood hazards accurately. For example, flood hazard restudies completed after hurricane Opal (Florida Panhandle, 1995) and Fran (Topsail Island, North Carolina, 1996) resulted in FIRMs that are dramatically different from the FIRMs in effect prior to the storms.

Figure 7-5 compares pre-and post-storm FIRMs for Surf City, North Carolina. The map changes are attributable to two factors: (1) pre-storm FIRMs did not show the effects of erosion that had occurred since the FIRMs were published and did not meet technical standards currently in place and (2) Hurricane Fran caused significant changes to the topography of the barrier island. Not all coastal FIRMs would be expected to undergo such drastic revisions after a flood restudy; however, many FIRMs may need to be updated.

Pre-Hurricane FIRM



Post-Hurricane FIRM

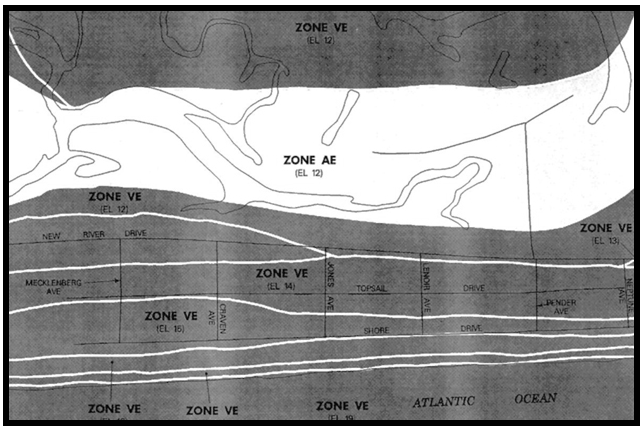


Figure 7-5. Portions of pre- and post-hurricane FIRMs for Surf City, North Carolina.

7.3. Coastal Barriers

7.3.1. Coastal Barrier Resources Act

The Coastal Barrier Resources Act (CBRA) of 1982 (16 U.S.C. 3501 – 3510) was enacted to protect vulnerable coastal barriers (Figure 7-6) from development; minimize loss of life; reduce expenditures of federal revenues; and protect fish, wildlife, and other natural resources. This law established the Coastal Barrier Resources System (CBRS), which is managed by the U.S. Department of the Interior's Fish and Wildlife Service.

Figure 7-6. East Island, of the Isle Dernier barrier island group.

Photo by Dr. Shea Pennland in *Water Marks*, February 2003 (New Orleans District, U.S. Army Corps of Engineers).

The law restricts federal expenditures and financial assistance that encourages development of coastal barriers. The CBRA does not prohibit privately financed development; however, it does prohibit most new federal financial assistance, including federally offered flood insurance, in areas within the CBRS (also referred to as CBRA areas).

Flood insurance may not be sold for buildings in the CBRS that were constructed or substantially improved after October 1, 1983. The financial risk of building in these areas is transferred from federal taxpayers directly to those who choose to live in or invest in these areas.

Banks can only make conventional loans in the CBRS, but are hesitant to do so because the property that secures their money is not insured. They are also wary because conventional loans are often sold to the secondary loan market and that transfer will require flood insurance. Although some private flood insurance may be

available, it is generally far more expensive than NFIP coverage. While lenders cannot require NFIP flood insurance on newer buildings in CBRS or "otherwise protected areas" since none is available, they are required to notify borrowers of the flood hazard and the lack of disaster assistance.

7.3.2. Coastal Barrier Improvement Act

The Coastal Barrier Improvement Act (CBIA), passed in 1991, tripled the size of the CBRS to more than 1.1 million acres. The CBIA also designated "otherwise protected areas" that include lands under some form of public ownership.

The CBIA prohibits the issuance of flood insurance on buildings constructed or substantially improved after November 16, 1991, for the areas added to the CBRS, including these "otherwise protected areas." An exception is made to allow insurance for buildings located in "otherwise protected areas" that are used in a manner consistent with the purpose for which the area is protected. Examples include research buildings and buildings that support the operation of a wildlife refuge.

7.3.3. Coastal barrier maps

The official CBRS boundaries are shown on a series of maps produced by the Department of the Interior. However, DHS/FEMA has transferred CBRS boundaries to FIRMs so that insurance agents and underwriters can determine eligibility for flood insurance coverage. In situations where the FIRM does not allow for a definitive determination, a determination can be requested from the U.S. Fish and Wildlife Service, based on its maps.

FIRMs show areas designated as within the Coastal Barrier Resources System or "otherwise protected areas." Figure 7-7 provides an example of these designations.

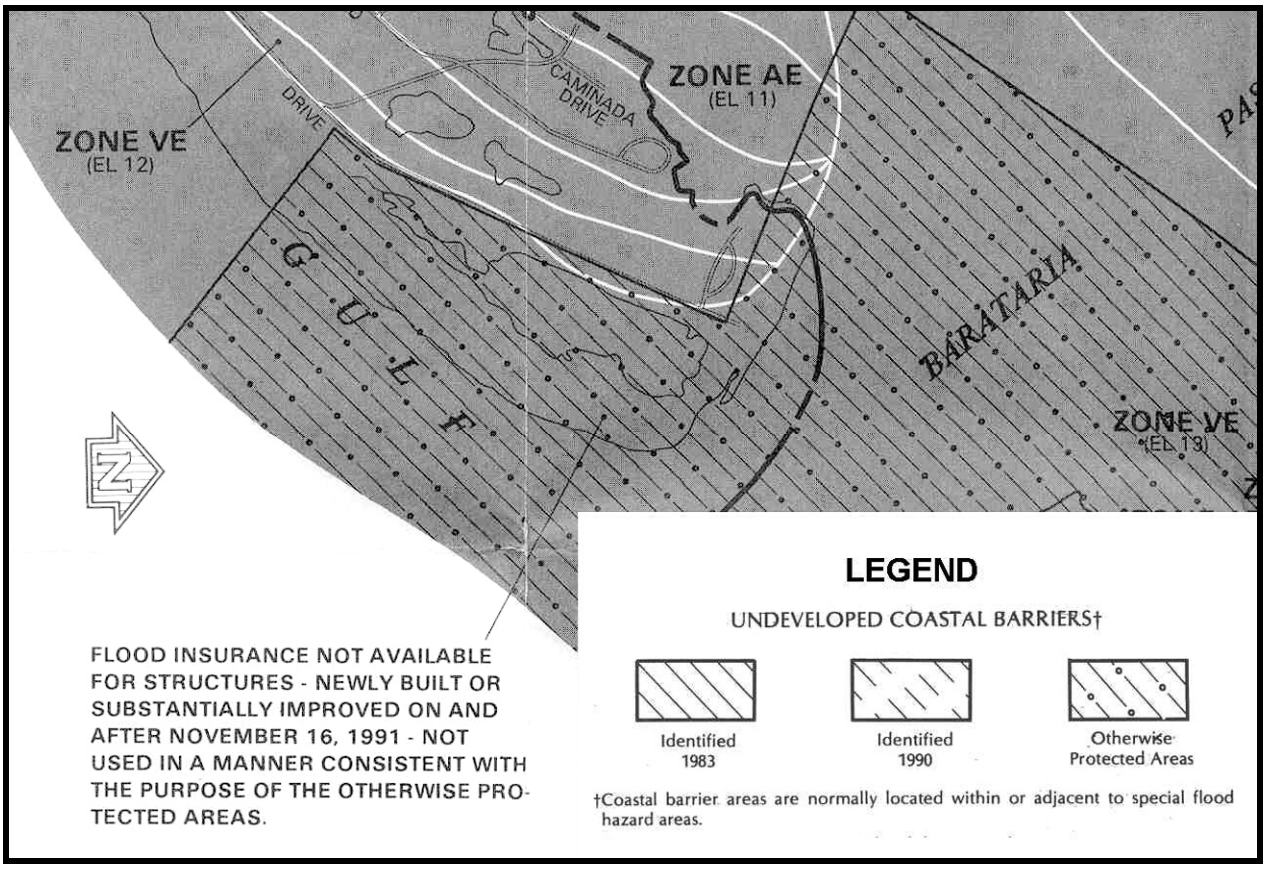


Figure 7-7. How Coastal Barrier Resource System areas are shown on a FIRM.

7.4. Using Coastal Maps and Data

7.4.1. Using the FIRM

Figure 7-8 shows a portion of a FIRM with a coastal floodplain. The FIRM shows that the BFE decreases with increasing distance from the shoreline.

To determine the flood zone for a site, scale on the FIRM from one or more identifiable features (streets, roads, etc.) to the zone boundary. Measure the scaled distances from these features on the ground to establish the boundary location. If any part of the proposed building construction is located in a V Zone, the entire building must meet the V Zone requirements.

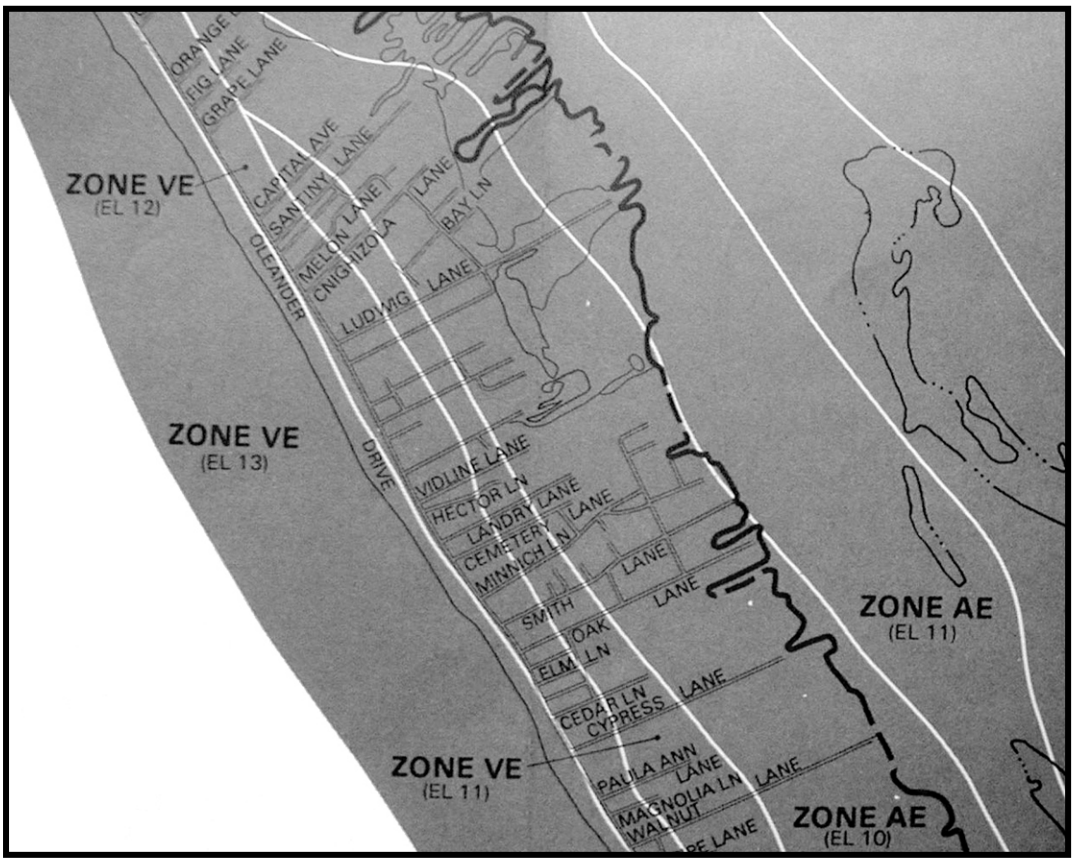


Figure 7-8. Excerpt from the coastal FIRM for Grand Isle.

7.4.2. Coastal flood elevations

Older coastal flood insurance studies used coastal profiles to show base flood elevations instead of transects. For the recent studies that contain transects, base flood elevations for coastal areas are obtained directly from the FIRM. The number in parentheses after or below the zone designation is the BFE.

In the example in Figure 7-8, sites along the south shore (to the left of Oleander Drive) are in the VE Zone. The BFE for these sites is 13 feet above sea level.

7.4.3. Transect data

As explained in Section 7.1.3, instead of using surveyed channel cross sections, coastal studies use survey data called transects. The coastal FIS text includes a map of transect locations and a table with stillwater and base flood elevations along each transect. As an example, Figure 7-9 shows where profiles were modeled for the St. Tammany Parish Flood Insurance Study and FIRM.

Transect data for each transect are shown in the FIS in a "Summary of Stillwater Elevations" table. The example from the FIS for St. Tammany Parish is in Figure 7-10. This table shows the storm-surge stillwater elevations for the 10-, 50-, 100-, and 500-year flood events for each transect.

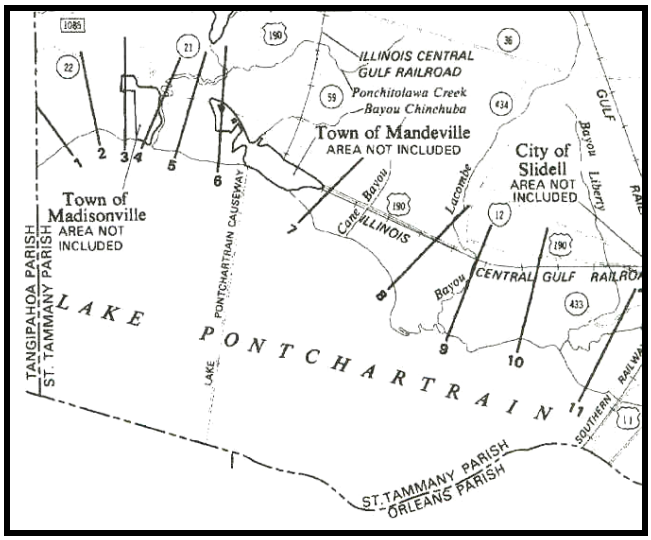


Figure 7–9. Transect location map from St. Tammany Parish's FIS.

TABLE 5 - TRANSECT DATA

Flooding Source	Stillwater Elevation 10-Year	50-Year	100-Year	500-Year	FHFs	Zone	Base Flood Elevation (Feet NGVD)[1]
GULF OF MEXICO/ LAKE PONTCHARTAIN							
Transects 1-2	6.9	10.6	11.6	13.2	075	V15	14-17
	*	*	11.4	*	050	A10	11-13
Transect 3	6.9	10.6	11.6	13.2	075	V15	14-18
	*	*	11.4	*	050	A10	11-13
	5.9	*	10.6	*	050	A10	11-12
	*	*	10.4	*	050	A10	10
Transect 4	6.9	10.6	11.6	13.2	075	V15	14-18
	5.9	*	10.6	*	050	A10	11-13
	*	*	10.4	*	050	A10	10
Transects 5-7	6.9	10.6	11.6	13.2	075	V15	14-18
	*	*	11.4	*	050	A10	11-13
	4.9	*	9.4	*	050	A7	9-11
Transect 8	6.9	10.6	11.6	13.2	075	V15	14-18
	*	*	11.4	*	050	A10	11-13

Figure 7-10. Excerpt from the St. Tammany Parish FIS summary of stillwater elevations.

Section 8. Flood Insurance Rate Maps

Contents

8.1. What's on a FIRM

8.1.1. FIRMs and Floodway Maps

When FEMA began publishing floodplain maps in the 1970s, two separate maps were prepared for each community:

- The Flood Insurance Rate Map (FIRM), which is published in an old format in studies prepared before 1985 and a new format for some studies prepared after 1985.
- The Flood Boundary and Floodway Map (the FBFM or Floodway Map), which was included in studies prepared before 1985. Since 1985, DHS/FEMA has generally not published separate floodway maps for new studies.

Originally, FIRMs were designed primarily for use by insurance agents and lenders. The Floodway Maps were directed toward the floodplain management aspects of the National Flood Insurance Program (NFIP) and intended for use by local administrators and floodplain managers.

Today, all floodway and floodplain boundary information is presented on the FIRM. The examples used in this reference use the new formatting.

DHS/FEMA floodplain maps are either flat or Z-fold. Flat maps are on 11- by -17-inch "ledger" size paper. Z-fold maps are on larger pages and are named for the way they are folded.

Additional copies of a community's Flood Insurance Study (FIS) report, FIRM, and Floodway Map can be ordered by calling DHS/FEMA's Map Service Center (MSC) 1-800-358-9616.

Maps are provided at no charge to local government officials. The FIS report and Floodway Map must be specifically requested, or only the FIRM will be sent. Be prepared to give your Community Identification Number.

All flood maps are prepared with general features or elements that include:

- An index
- Community name and NFIP identification number
- A title box
- A legend (or key to map)
- Panel or map number information
- An arrow pointing north on the map
- A scale to relate distance on the ground to distance on the map
- Effective date or revision date information

Note: as explained in Section 5.2.2, some communities have been "specially converted" to the NFIP's Regular Phase. Their Flood Hazard Boundary Maps were converted to Flood Insurance Rate Maps by letter. These maps should be considered FIRMs with approximate A Zones and used as described in Section 9.3.

8.1.2. Map Index

Smaller communities with relatively compact floodplains can have everything shown on one panel. The phrase "Only Panel Printed" on the title box of the FIRM (or earlier Floodway Map) shows that everything is included on the one panel.

Many communities, especially parishes, are geographically too large to fit on one map or panel at a usable scale. Therefore, maps for these communities are divided into two or more panels with unique panel numbers. Whenever a community requires more than one panel, a Map Index for both the FIRMs and Floodway Maps is prepared.

The Map Index shows the community's boundaries, highlighting prominent features such as major highways, railroads, and streams. The Map Index shows how the community is displayed on the panels. Panels with no identified flood hazard areas (or no floodways on a Floodway Map) are not printed, as indicated by an asterisk "*."

Figures 8-1 and 8-2 are from the Map Index for Lake Charles. With the older system of separate FIRMs and Floodway Maps, there is an index for each. In cases where floodways were not mapped for a particular area, the Floodway Map panel may not be printed. It is not uncommon for a given community to have more FIRM panels printed than Floodway Maps.

The number of panels that were printed appears in the title box ("Panels Printed: 10, 15, 20, 25, 30…"). Sometimes the entire panel is in one flood zone and is not printed. The flood zone for that panel is noted directly on the Map Index.

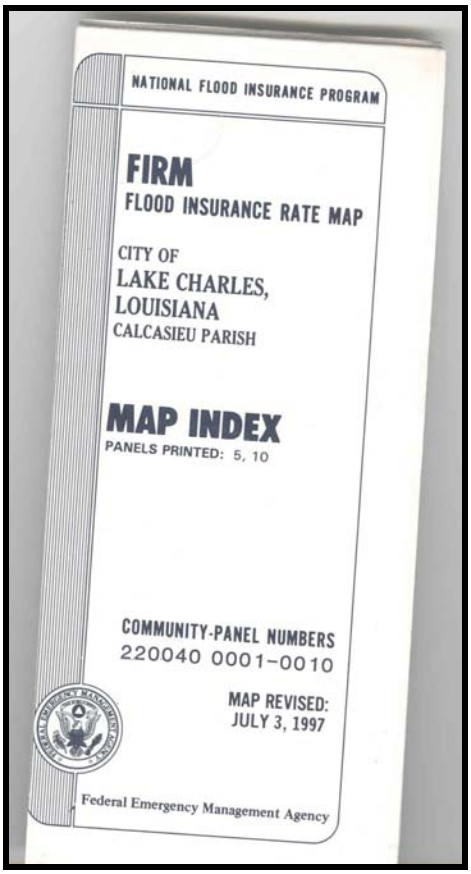


Figure 8-1. Lake Charles' FIRM Index.

8.1.3. Community NFIP number

DHS/FEMA gives every community that participates in the NFIP a six-digit identification number. In Louisiana, all community numbers start with "22" because Louisiana is the 22nd state alphabetically.

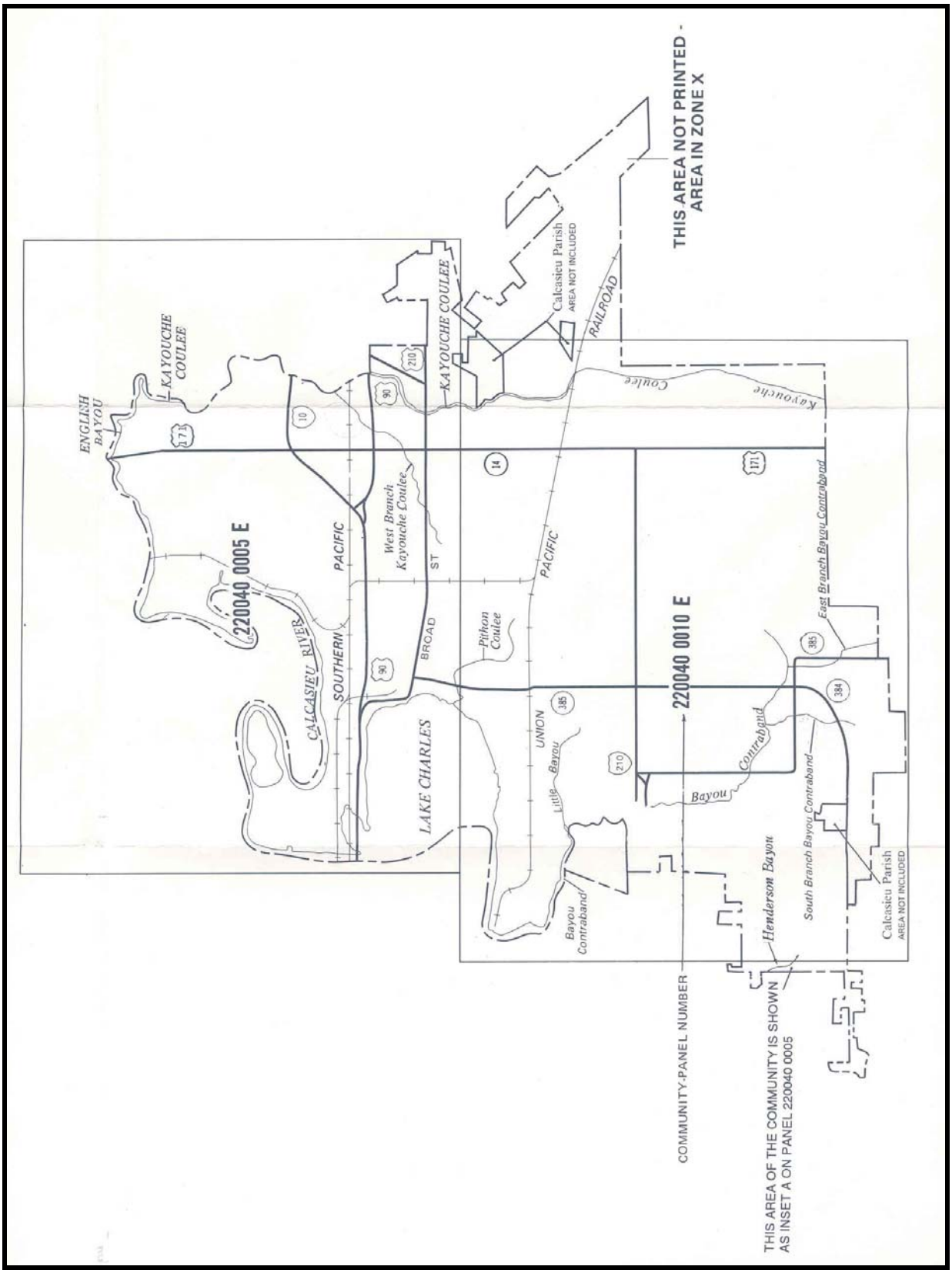


Figure 8-2. Lake Charles' FIRM Index Map.

8.1.4. Title box

When the FIRM Map Index or panels are opened, the title box can be found in the lower right corner. Figure 8-3 shows the type of information found in the title box for the Map Index and each map panel.

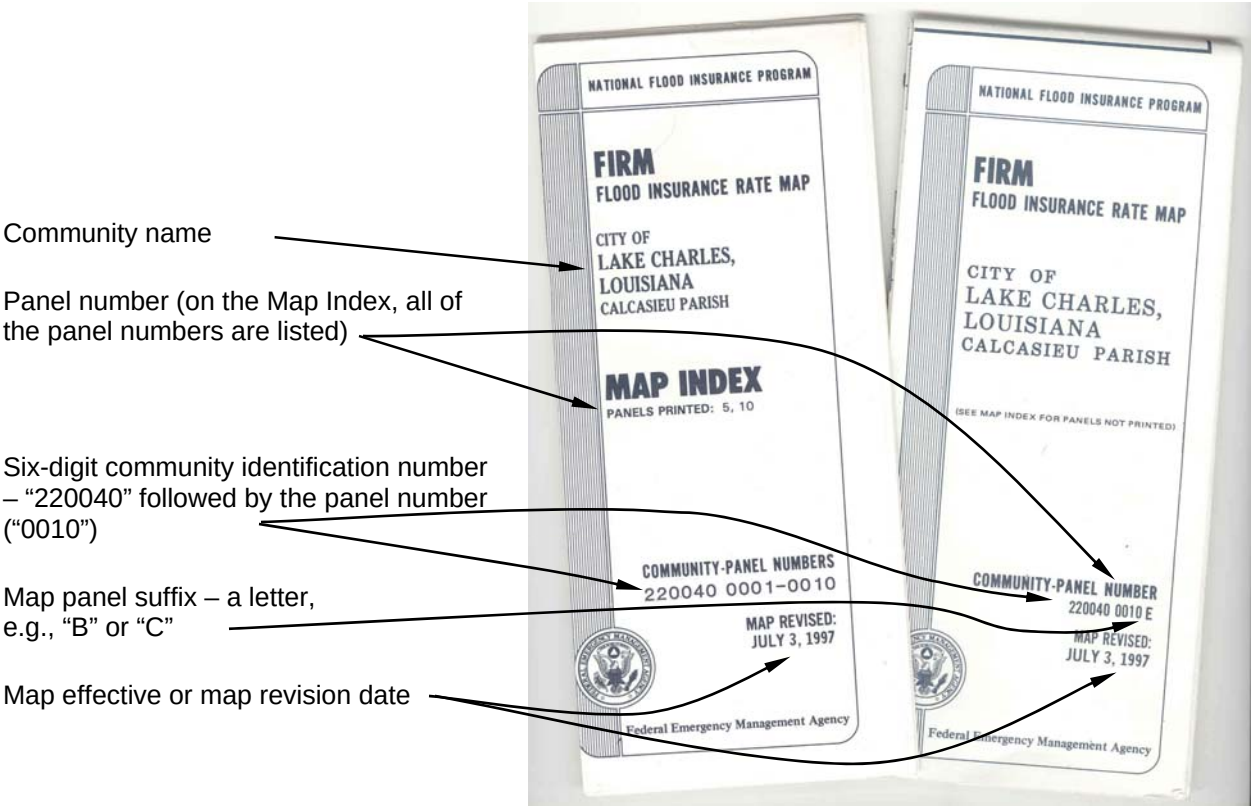


Figure 8-3. Title boxes to Lake Charles' FIRM Index and Panel 10.

8.1.5. Map revision date

The date in the title box shows the map's most recent revision. As changes within a community occur, and which result in a change in flood elevations or floodplain delineation, DHS/FEMA generally only republishes the Map Index and changed map panels.

Any revised panels are given a new map effective date and a new suffix letter. Some FIRMs have map panels with different effective dates.

The Map Index shows the current effective map date for all of the FIRM panels, or that of the most recently revised panel. A new panel suffix accompanies each revision. Check the "Community Status Book" on DHS/FEMA's website if you are not sure of the current version of a NFIP map.

8.1.6. Map scales and north direction

Different map scales are used on FIRMs and Floodway Maps, depending on the size of the mapped area for a community and the base map that is used. The map scale for the Lake Charles FIRM is 1 inch equals 1,000 feet (Figure 8-4). Be aware that different scales may be used for a single community with more than one map panel.

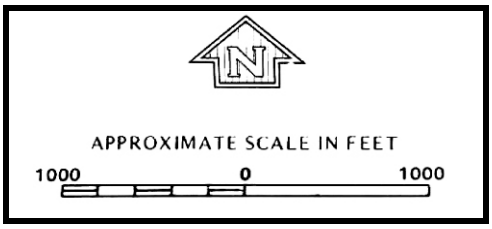


Figure 8-4. Map scale and north arrow.

An arrow pointing north is shown on all maps, including the Map Index. For FIRMs and Floodway Maps, the north direction arrow is located near the map scale. Generally, maps have north at the top of the map. However, sometimes the north direction on the map is "turned" to the left to maximize the mapped area that can be shown on a panel and to minimize the number of panels. *Be sure to check the north arrow on any map used.*

8.1.7. Elevation reference marks

Elevation reference marks are shown on FIRMs and Floodway Maps. Locations are identified with a small "x" and the designation "ERM" or "RM" followed by a number. Descriptions of the marks, including their elevations, appear on the FIRM panel, the FIRM Index, or in the Flood Insurance Study (FIS) text.

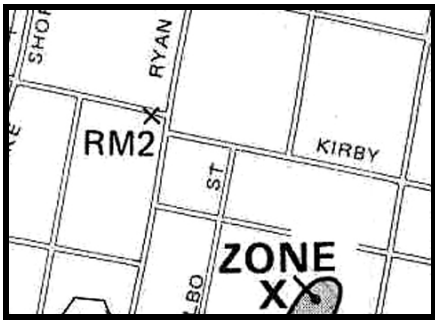


Figure 8-5. Lake Charles' Reference Mark No. 2.

Each FIRM that has base flood elevations or a Floodway Map provides one or more elevation reference marks (ERMs). They are listed in the FIS text or on the FIRM. Figures 8-5 and 8-6 show how they are listed on a FIRM.

ERMs and RMs are important sites. They provide a ground elevation reference for surveyors to start from when they shoot the elevation of a building.

More information on reference marks can be found in Section 5.3.5. Please refer to Section 5.3.5 to see why a surveyor may not be able to use reference marks from the FIRM to obtain accurate elevations.

ELEVATION REFERENCE MARKS

REFERENCE MARK	ELEVATION (FT. NGVD)	DESCRIPTION OF LOCATION
RM 1	6.0	USC&GS disk set in 5-inch cast iron pipe approximately 63 feet northwest of northwest corner of Ramada Inn Motel; located approximately 1 foot northwest of witness post and approximately 0.95 mile west along Southern Pacific Railroad from station in Lake Charles.
RM 2	19.1	USC&GS disk, set in north brick wall of courthouse at southwest corner of intersection of Kirby and Ryan Streets; located approximately 147 feet west of west curb of Ryan Street and approximately 79.5 feet south of south curb of Kirby Street.

Figure 8-6. Legend for Elevation Reference Marks 1 and 2 on the Lake Charles FIRM.

8.1.8. Flood zones

Flood Insurance Rate Maps show different floodplains with different zone designations. These are primarily for insurance rating purposes, but the zone differentiation can be very helpful for other floodplain management purposes. The more common zones are listed in Figure 8-7.

Zone A	The 100-year or base floodplain. There are six types of A Zones: **A** The base flood mapped by approximate methods, i.e., base flood elevations are not provided. This is often called an unnumbered A Zone or an approximate A Zone. **A1-A30** These are known as numbered A Zones (e.g., A7 or A14). This is the base floodplain where the FIRM shows a base flood elevation (old format). **AE** The base floodplain where base flood elevations are provided. AE Zone delineations are now used on new format FIRMs instead of A1-A30 Zones. **AO** The 100-year floodplain with sheet flow, or shallow flooding; 100-year flood depths (feet above ground) are provided. **AH** Shallow flooding base floodplain, such as ponding; base flood elevations are provided. **AR** The 100-year floodplain that results from the decertification of a previously accredited flood protection system that is in the process of being restored to provide a 100-year or greater level of flood protection. **A99** An area of special flood hazard where enough progress has been made on a protective system, such as dikes, dams, and levees, to consider it complete for insurance purposes.
Zone V	The base floodplain subject to coastal high-hazard flooding. There are three types of V Zones: V, V1-30, and VE that correspond to similar A Zone designations.
Zone B and Zone X (shaded)	Area of moderate flood hazard, usually the area between the limits of the 100-year and 500-year floods. It can also be an area of the 100-year flood (1) with average depths of less than 1 foot, (2) with a drainage area less than 1 sq. mile, or (3) protected by levees from the base flood.
Zone C and Zone X (unshaded)	Area of minimal flood hazard, usually depicted on FIRMs as above the 500-year flood level. B and C Zones may have ponding and local drainage problems that do not warrant a detailed study or designation as base floodplain.
Zone D	Area of undetermined but possible flood hazard.

Figure 8-7. Flood zones.

8.2. Map Formats

8.2.1. FIRM: old format

This section discusses the format used for FIRMs issued before 1985. The FIRM is used to determine:

- Whether a property is in the floodplain
- The flood zone that applies to the property
- The approximate base flood elevations at the site

Dates: Several dates may be listed in the FIRM legend, including:

- Initial Identification: Date of the first Flood Hazard Boundary Map.
- FIRM Effective: Date of the initial FIRM. This is the date that determines whether a building is "pre-FIRM" or "post-FIRM." The legend for Lake Charles is in Figure 8-8. The FIRM effective date for Lake Charles is October 16, 1979.
- FIRM Revisions: Dates of subsequent revisions to the FIRM.


MAP REPOSITORY

City Hall
326 Pujo Street
Lake Charles, Louisiana 70602
(Maps available for reference only, not for distribution.)

INITIAL IDENTIFICATION:
NOVEMBER 1, 1974

FLOOD HAZARD BOUNDARY MAP REVISION:
FEBRUARY 18, 1977

FLOOD INSURANCE RATE MAP EFFECTIVE:
OCTOBER 16, 1979

FLOOD INSURANCE RATE MAP REVISIONS:
JULY 5, 1984
SEPTEMBER 5, 1990

Map revised July 3, 1997 to update corporate limits, to add special flood hazard areas, to change special flood hazard areas, to change zone designations, to update map format, to add roads and road names, and to reflect updated topographic information.

To determine if flood insurance is available in this community, contact your insurance agent or call the National Flood Insurance Program at (800) 638-6620.

APPROXIMATE SCALE IN FEET

Figure 8-8. The FIRM panel shows the history of revisions for Lake Charles' FIRM.

100-year floodplain or Special Flood Hazard Area (SFHA): Designated by the dark-shaded areas (Zones A, A1-A30, AE, AO, AH, V, and V1-V30).

500-Year floodplain: Designated by the lighter-shaded areas (Zone B).

Base Flood Elevation (BFE): The water surface elevation of the 100-year or base flood at that point of the stream is denoted on wavy lines running across the floodplain.

Note that in riverine floodplains, the number on the FIRM is the approximate elevation normally rounded to the nearest foot. Flood elevations in the profile are more accurate and can usually be determined to 0.1 foot.

AH Zones and some lake AE Zones have the BFE noted in parentheses beneath the zone designations.

Zone break line: The thin white line that separates zones within the SFHA.

Approximate floodplain areas: The 100-year floodplain areas are delineated using approximate methods. No flood elevations are shown in approximate floodplain areas; these areas are classified as (unnumbered) A Zones.

An example of a FIRM with SFHAs using both approximate and detailed study methods is illustrated in Figure 8-9. Note the white line that separates the approximate SFHA (the Zone A) to the west from the detailed studied area (the Zone A4) to the east. Note also the approximate Zone A to the west has no wavy lines showing the BFE or B Zones subject to the 500-year flood.

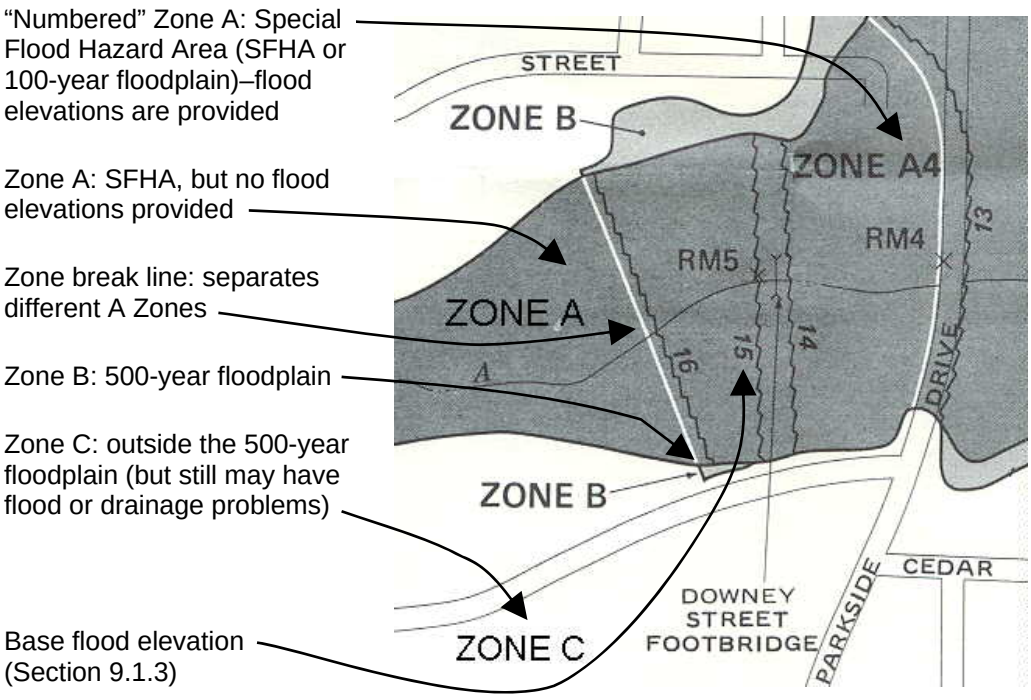


Figure 8-9. Example of the old FIRM format.

Note: This is the companion map for the Floodway Map in Figure 8-11.

8.2.2. Flood Boundary and Floodway Map

The Flood Boundary and Floodway Map (FBFM) is also known as the Floodway Map. This format was used with Flood Insurance Studies published before 1985. After that date, the new format FIRM was used for most communities.

The Floodway Map shows how the floodplain is divided into the floodway and the fringe where streams are studied in detail. It also shows general floodplain areas where floodplains have been studied by approximate methods.

Title box: Includes the community name, parish name, panel number, community number, and map date. Panel numbers and effective dates may differ from the FIRM panel numbers.

Map scale: The Floodway Map may have a different scale than the FIRM for the same community.

Cross section line: These lines represent the location of some of the surveyed cross sections used in the computer model of the stream for calculating base flood elevations. These cross sections can be used to relate a specific point on the Floodway Map to the floodway data table and flood profile (see also Sections 5.4.4 and 5.5).

Floodway: The SFHA has been divided into two areas, the floodway and the fringe. The white area adjacent to and including the channel is the floodway. The shaded area is the fringe (Figures 8-10 and 8-11).

A problem with this method of delineating floodways is that sometimes people confuse the white floodway with the white area representing land that is in the C Zone.

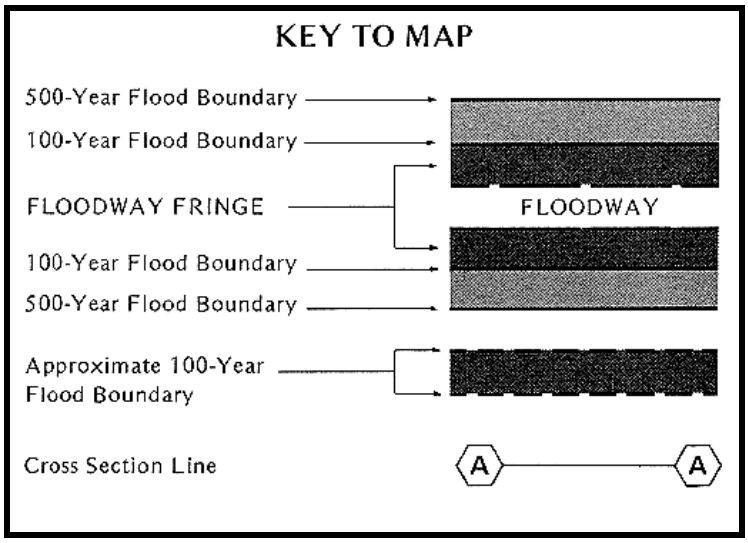


Figure 8-10. Floodway map legend.

Also, since the floodway was mapped separately, property owners, lenders, real estate agents, and others often do not have easy access to the Floodway Maps and are unaware of the severe flood hazard associated with the floodway.

Many newer FIS reports have corrected this problem—they do not have separate FIRM and Floodway Maps. Floodways are delineated on the newer FIRMs as a diagonally hatched area (Figures 8-12 and 8-13).

Note that the Floodway Map does not show base flood elevations or flood zone names.

If a map panel area does not include any detailed study of streams or floodways, a Floodway Map will not be printed; only a FIRM panel will be printed.

Fringe: The fringe is shown as a shaded area outside of the floodway but still within the SFHA.

500-year floodplain: Lighter shaded areas adjacent to but outside of the 100-year floodplain delineate the 500-year floodplain for streams studied in detail.

Approximate floodplain areas: SFHAs that are determined using approximate methods. Limits of the approximate floodplain on the Floodway Map are shown as dashed lines.

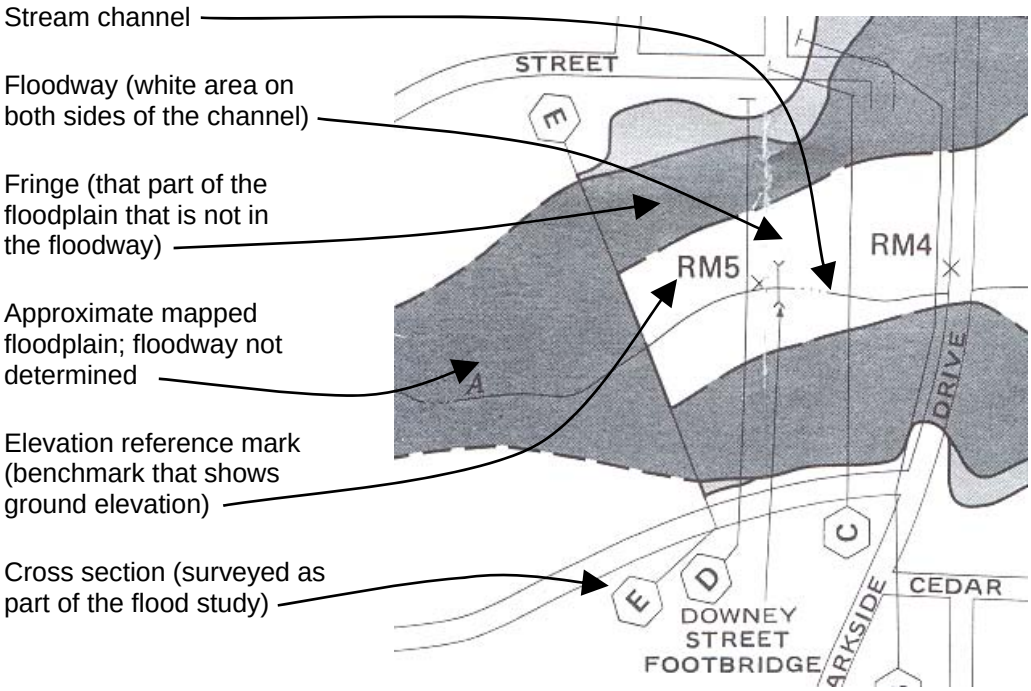


Figure 8-11. Example of the Floodway Map format.

Note: This is the companion map for the FIRM in Figure 8-9.

8.2.3. FIRM: new format

Flood maps have been redesigned over the years to make them easier to use since the first FIS reports were prepared in the late 1960s. A new format for FIRMs was introduced in 1985 that includes:

- Floodways and other floodplain management information (such as cross section locations) that were previously provided on separate Flood Boundary and Floodway Maps (Floodway Maps). (Except in a few instances, Floodway Maps are no longer being prepared).
- Simplified flood zone designations. Zones A1–A30 were replaced by the designations AE; Zones B and C were replaced by Zone X. The 500-year floodplain is still shown as lightly "shaded" portions of Zone X.

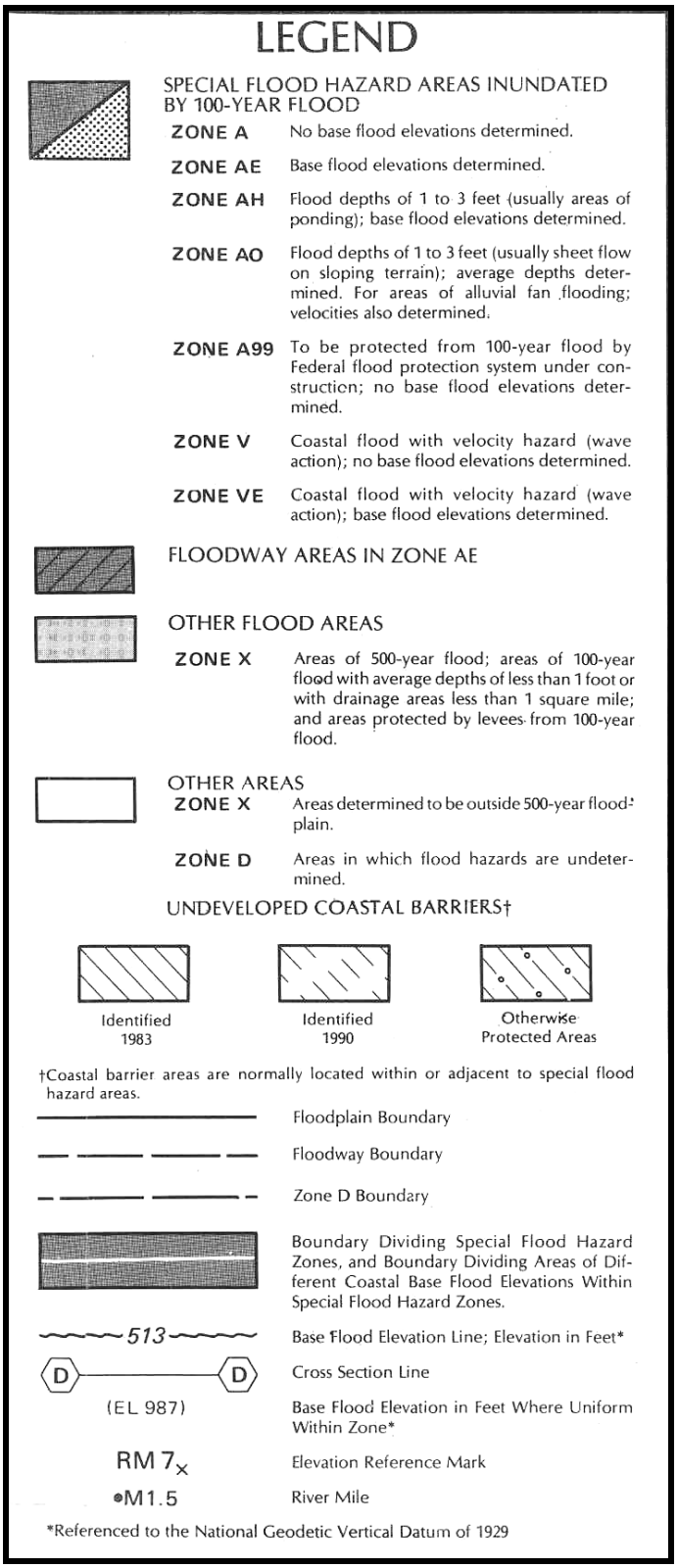


Figure 8-12. New FIRM format legend.

With these changes, community officials can use the FIRMs more easily for floodplain management; lenders can determine the need for flood insurance; insurance agents can rate policy applications; and land surveyors, engineers, property owners, and others can determine flood hazards in a given location.

Figure 8-13 is an example of a new format FIRM with a floodway and Figure 8-12 is the legend for the new format.

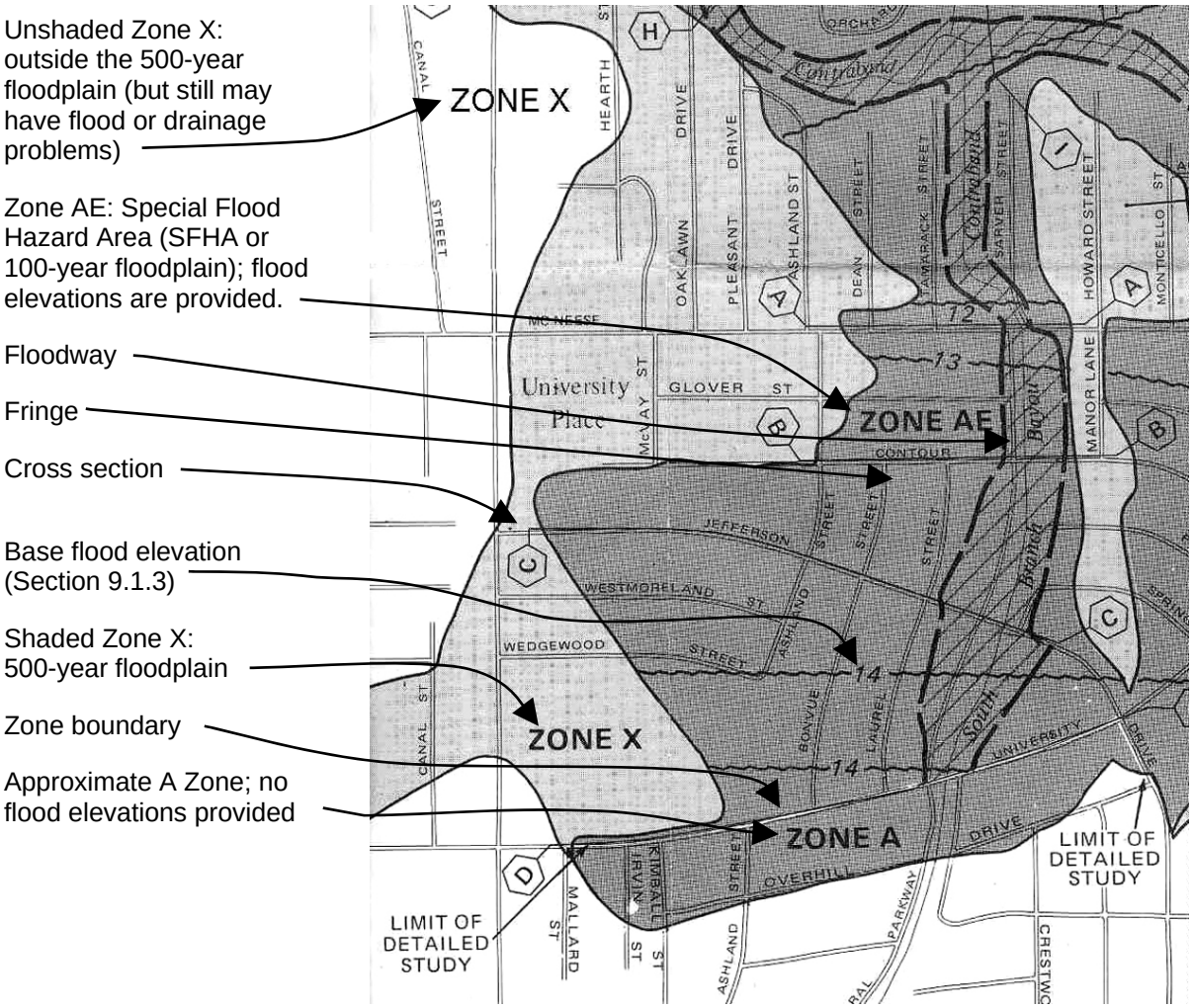


Figure 8-13. New FIRM format (Lake Charles).

8.3. Special FIRM Formats

Note: How FIRMs depict coastal floodplains is covered in Section 7.2.

8.3.1. Lakes

Most lakes have a whole number BFE shown in parentheses below the flood zone (Figure 8-14). The actual BFE is obtained from the FIS. However, many long lakes, especially reservoirs, have a higher BFE at the upstream end than at the outlet. These types of lakes and reservoirs have base flood elevations shown with wavy lines, the same as riverine base flood elevation. They also appear on the stream profiles in the flood insurance study.

When studies have been carried out for lakes and reservoirs, information on base flood elevations is contained in Section 3 of the FIS. A "Summary of Elevations" is provided as a table in the FIS (Figure 8-15). Note that base flood elevations are rounded to one-tenth of a foot in the table, but are shown in parentheses in whole numbers on the FIRM. For the most accurate flood elevation, use the "100-year flood elevation" from the table, not the FIRM.

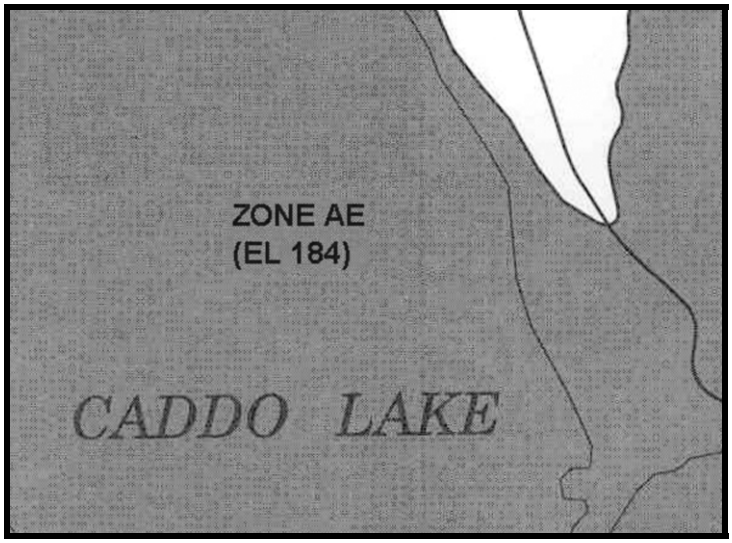


Figure 8-14. Caddo Parish FIRM with Caddo Lake floodplain.

Flooding Source and Location	Elevation Above NGVD			
	10-year	50-year	100-year	500-year
Caddo Lake				
At Town of Mooringsport	178.50	183.30	183.80	184.60

Figure 8-15. Summary of elevations for Caddo Lake
(from the Caddo Parish Flood Insurance Study).

8.3.2. Shallow flooding

Under the NFIP, ponding or sheet flow constitutes shallow flooding, which is mapped based on historic flood experiences and study of the topography.

Two methods can be used to display shallow flooding. An AO Zone may or may not show the 100-year flood depth. “AO 1,” “AO 2,” and “AO 3” Zones designate that the base flood is 1, 2 or 3 feet deep. We do not know how high the base flood is in relation to sea level, but we do know that the base flood should be no deeper than the listed number.

An AO Zone with no number means the base flood depth was not calculated.

Figure 8-16 provides an example of the other way DHS/FEMA maps a ponding area: using an AH Zone with a BFE. This map shows both the river floodplain outside the levee (Zone A20) and the drainage problem areas that are inside the levee (Zone AH).

Note how the BFE on the river is 26 (feet above sea level) while in the AH Zones’ ponding areas it is 2, 4, and 5 feet. While there are still SFHAs inside the levee, the flood levels are much lower because the levee protects the area from the 100-year flood of the river.

The rules for managing new development in AO and AH Zones are covered in Section 12.2.3.

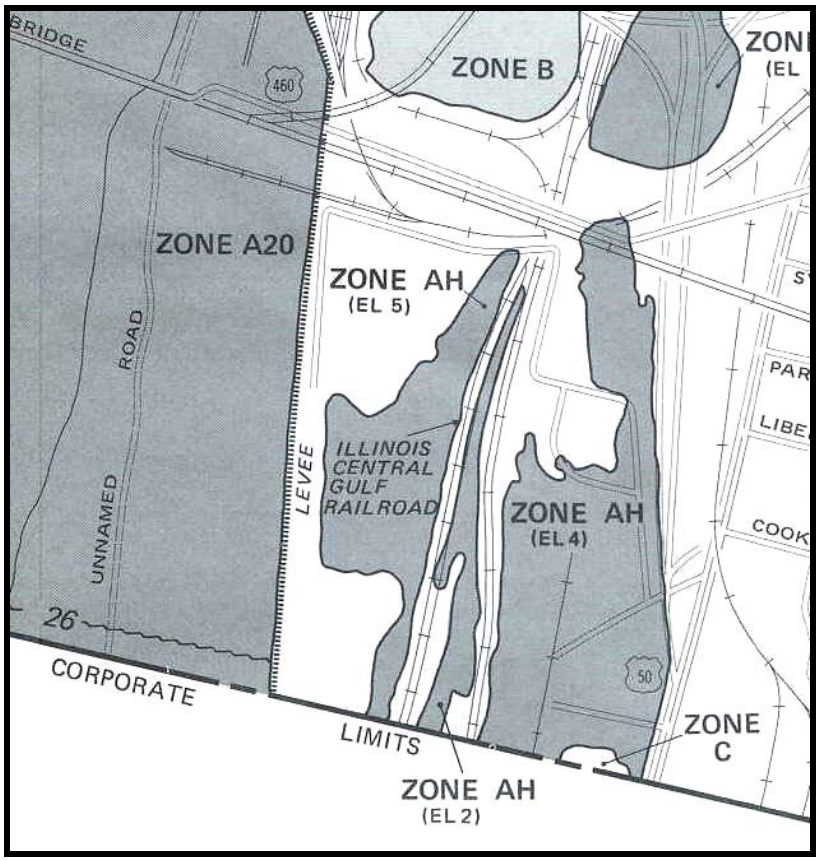


Figure 8-16. Shallow flooding areas shown as AH Zones.

8.4. Other Types of FIRMs

8.4.1. Parish-wide FIRMs

Recent and future FIRMs will be in the parish-wide FIRM format, unlike current maps which have been prepared for each jurisdiction. Parish FIRMs, for example, only show the flood hazards identified in the unincorporated areas of the parish and do not include any flood information inside the corporate limits of a municipality.

A Parish-wide FIRM displays an entire parish and any incorporated areas. Parish-wide FIRMs may include more than one community. As with all indexes the community boundaries are shown along with the numbers and position of the individual panels. All panels may not be printed so "Panels Printed" are listed in the title block. Some indexes may contain a generalized depiction of the SFHA shown on each panel for reference purposes only. On selected index maps, a flood-prone streets index may be included that lists flood-prone streets on the Flood Map. Occasionally, there are exceptions where a community that falls within the area of a parish-wide FIRM may continue to be shown on a separate FIRM.

The parish-wide FIRM format has a number of advantages; one in particular is that FIRMs will not have to be updated when municipal boundaries change.

One element that is only found on a Parish-wide FIRM Index is the list of Floodprone Communities:

- Floodprone communities covered by the FIRM. (Note: All communities are listed; the non-floodprone communities are footnoted to indicate they are non-floodprone.)
- The community identification number for each community
- The panel on which each community is shown
- The initial flood identification date (the date that flood hazards were first identified)
- Post FIRM date for each community (the date of the first FEMA FIRM for the community)

8.4.2. Digital FIRMs

DHS/FEMA is modernizing the map creation process by digitizing FIRMs. The conversion of FIRMs to a digital format has many benefits. For example, they can be revised and updated easily and can be incorporated into the community's mapping system and tied in with other geographic-based data, such as lot and parcel maps and aerial photographs that show building footprints.

All DFIRMs will contain certain standard features:

- A base map that is distributed with the digital files;
- The features normally shown on a printed FIRM; e.g., flood boundaries, Base Flood Elevations (BFEs), cross sections, benchmarks, etc.; and
- Electronic FIS report and profiles.

However, the simple conversion of FIRMs to a digital format does not inherently improve the engineering quality of the product. Many of the same difficulties with interpretation of flood risk data—and the requirement that users apply sound judgment in methods selected for decision making and map interpretation—remain unchanged.

DHS/FEMA charges a fee for all digital FIRM data products. Any questions regarding these products may be directed to DHS/FEMA (Section 31).

8.4.3. Q3 Flood Data

In the Q3 Flood Data Product, DHS/FEMA has developed a graphical representation of certain features of the FIRM. The Q3 Flood Data are in three formats that are usable with desktop mapping and GIS software packages (Digital Line Graph, ARC/INFO, and MapInfo).

Q3 Flood Data are created by digitally capturing certain key features from the current paper FIRMs. They show whatever was scanned in at the time the paper FIRM was made. These features are converted into area features in one parish-wide data layer. The following data features are included:

- SFHA and 500-year floodplain
- Flood zone designations
- Floodway boundaries (if available)
- Coastal Barrier Resources System (CBRS) areas
- Political boundaries
- Community/map panel identification numbers
- Boundaries between FIRM panels
- U.S. Geological Survey (USGS) 7.5 minute (1:24,000 scale) quadrangle neat-lines

Several features are not included, such as:

- Hydrographic features
- Base flood elevations
- Cross section lines

- Roads, road names, or address ranges
- Elevation reference mark locations and elevations

Q3s were developed to provide guidance and a general proximity of the location of SFHAs. Unlike digital FIRMs, Q3s do ***not*** replace paper FIRMs as the legal document.

Note: Q3 data are ***not*** suitable for applications such as detailed site design and development plans or flood risk determinations. They cannot be used to determine absolute delineations of flood boundaries, but instead should be viewed as portraying zones of uncertainty and possible risks associated with flooding.

All Q3 Flood Data for the State are available on a single CD-ROM from the DHS/FEMA Map Service Center (Section 31).

8.4.4. FIRMettes

A FIRMette is a relatively new product available through DHS/FEMA's Map Service Center (MSC) website. It allows on-screen display of scanned FIRMs. A community can be selected, panned, and zoomed within its FIRM, and an area of interest can be selected and printed. This is known as a "FIRMette." The FIRMette includes the map title block, north arrow, and scale bar, and can be printed on paper sizes of 8½"x11", 8½"x14", and 11"x17".

Because a FIRMette is a same-scale "clip" of an official NFIP flood map image, it can be used in all aspects of the NFIP, including floodplain management, flood insurance, and enforcement of mandatory flood insurance purchase requirements. While the original and complete FIRM should be used, FIRMettes are an easy way to not only print selected areas of the FIRM for others, but also to check floodplain boundaries in other communities.

This new technology allows users to view, print, email, and save the FIRMette free of charge. Help screens assist users to navigate the entire inventory of scanned flood map images.

To obtain a FIRMette, follow these steps:

1. Go to www.msc.fema.gov.
2. Select FEMA Flood Map Store.
3. Select Catalog from the menu at the top. A user ID or password will not be necessary.
4. Select FEMA Issued Flood Maps.
5. Under #1 - Select State, select Louisiana.
6. #2 - Select the parish.

7. #3 - Select the community.
8. #4 - Select Find FEMA-issued flood maps.
9. Select the Index panel or panel you want. Index panels are shown with “IND” under Item ID. For smaller communities, there may be only one panel listed.
10. Select View to the right of the listed panel.
11. Use the Zoom tools to see the details better.
12. When ready to print, use Max Zoom Out.
13. Select the Make a FIRMette button.
14. #1 - Select the paper size.
15. #2 - Select the three areas that will be printed. When selected, each will be a brown box with a green border. Move the boxes to the areas you want to reproduce. Note that the panel title and scale boxes are often not centered just right.
16. #3 - Select the format desired—Adobe or TIFF.
17. Select Save your FIRMette. You must save the file to the computer or a diskette and then print from the file to get the proper map size and page distribution.
18. Print the file.

The result will look like the FIRMette in Figure 8-17 for an area in Lake Charles. Compare this to the FIRM excerpt for the same area in Figure 8-13.

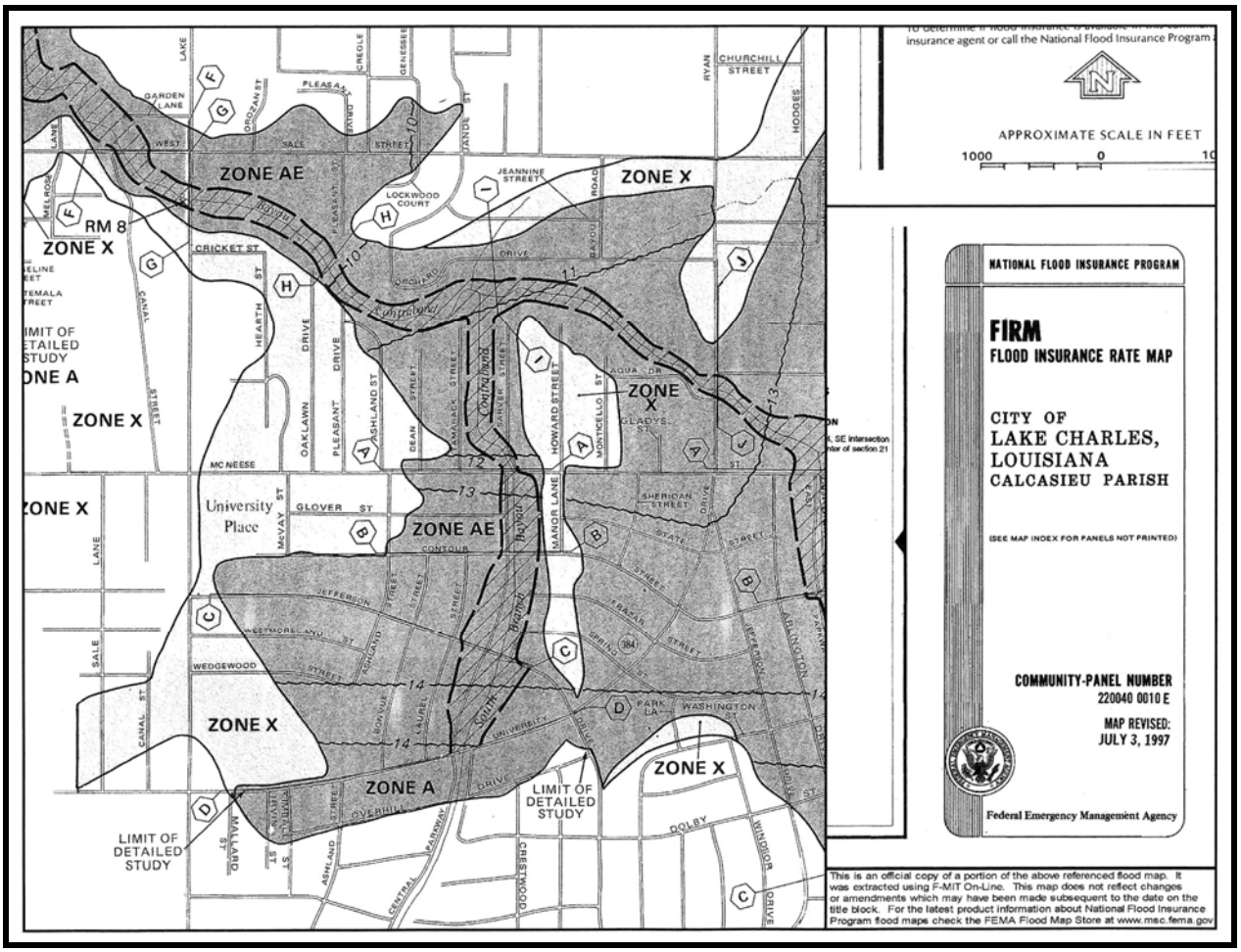


Figure 8-17 FIRMette for the same area as in Figure 8-13

8.4.5. Communities Without a Map

There are communities without formally identified SFHAs that chose to have flood insurance coverage available even though the local flooding problems are not mapped. For any such community in the Regular Program, all areas within that community are treated as Zone C or X.

Section 9. Using FIRMs

Contents

9.1. How to Read a FIRM

9.1.1. Locating a site

How easily a site can be located on a National Flood Insurance Program (NFIP) map depends on the level of familiarity with properties in the community and the scale of the flood maps.

To locate a site, follow these steps. Remember to check the map's north arrow. The top of the map is not always north.

1. If the community has more than one map panel, use the Map Index to determine which panel to use. Use map landmarks—highways, streets, or streams—to find the site on the index.

2. Find the map panel for the area containing the site. Be sure the map panel is the most recent one—compare its suffix letter with the suffix letter for that panel on the current Map Index. Remember, in many communities, panels will have different effective dates due to revisions that do not affect the entire community (see the discussion in Section 8.1.5).

   If there is an asterisk on the panel number on the Map Index, either no flood hazard has been identified in that area or it is entirely one flood zone and the panel was not printed.

3. Locate the site as accurately as possible. Use a detailed street or road map as well as the tax assessor's plat map to identify the property boundaries, if necessary.

In Figure 9-1, Site 1 is on the southeast corner of Contour and Ashland Streets. Looking at the FIRM, all properties southeast of this corner are in the AE Zone; therefore, Site 1 is in the AE Zone.

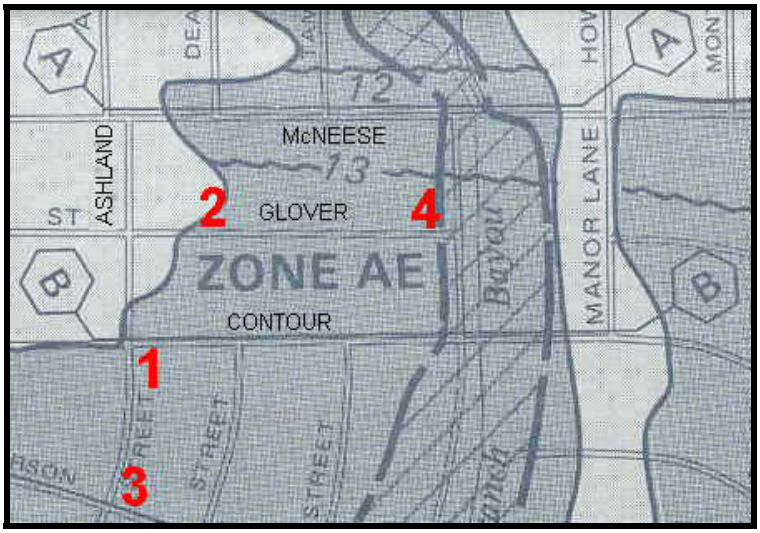


Figure 9-1. Location of example sites on the Lake Charles FIRM.

4. For sites near the floodplain boundary, determine the distance on the ground between the site and one or more identifiable points, such as the centerline of a road or street, a bridge, or some other feature on the map. Locate these points on the flood map.

   Site 2 is on the north side of Glover Street, the fifth home east of Ashland Street. Each lot is 60 feet wide. The site of interest is the fifth lot in, so it is located between 240 feet and 300 feet from east of Ashland Street.

5. Check the map scale used for the panel. The scale is in the map legend or key (Section 8.1.6).

   The map scale for the Lake Charles FIRM is 1 inch = 1,000 feet (Figure 8-4). This means the "10" scale on an engineer's scale should be used (Figure 9-2).

6. Once the site and the identifiable point (in this case, Ashland Street) have been located, convert the distances to the map scale and plot the site on the map.

   The Lake Charles FIRM has a scale of 1 inch = 1,000 feet. Measure 240 feet along Glover Street east from the Ashland Street right- of-way. In this example, Site 2 is in the AE Zone.

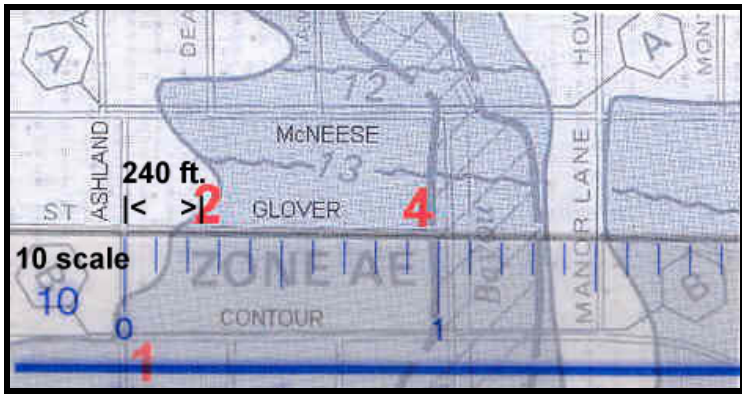


Figure 9-2. Using the map scale to locate a site on the FIRM shown in Figure 9-1 (not to scale).

> ***Note:*** The map reading procedures reviewed here are to help the community manage floodplain development. Different procedures may be followed by lenders and others who must determine whether a flood insurance policy is required as a condition of a loan or financial assistance (Section 9.5).

9.1.2. Stationing

To identify the base flood elevation (BFE) at a development site, the location of the site along the stream—or stationing—must be determined. The stationing of a site enables us to read the flood profiles to determine the BFE.

1. Locate the site on the Floodway Map or the newer version of the FIRM that shows cross sections. Identify which labeled cross sections are nearest to the site, upstream or downstream.

   Site 3 is on the corner of Ashland and Jefferson Streets. On the Lake Charles FIRM in Figure 9-1, the site is south of Contour Street and cross section B.

2. Check the map scale used for the panel. The scale is in the map legend or key.

   The map scale for the Lake Charles FIRM is 1 inch = 1,000 feet (Section 8.1.6 and Figure 8-4). The "10" scale on an engineer's scale should be used (Figure 9-3)

3. Use an engineer's scale to measure the distance from the site to the nearest cross section. If the stream curves, follow the stream centerline on the FIRM, including all bends and curves. Stationing readings should be taken perpendicular to the stream centerline.

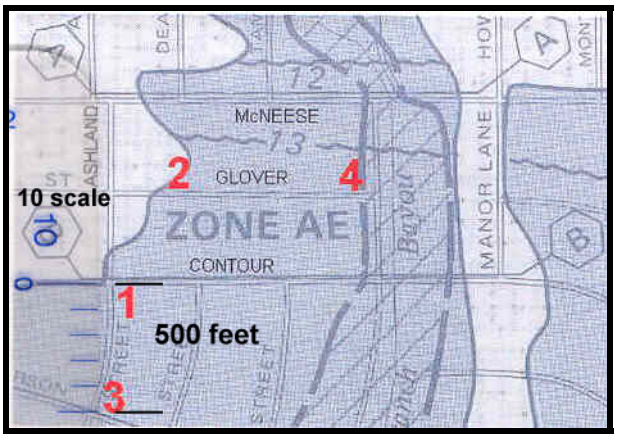


Figure 9-3. Measuring the distance from Site 3 to Contour Street and cross section B.

   Using the "10" scale, Site 3, the corner of Ashland and Jefferson Streets, is 500 feet south of Contour Street and cross section B (Figure 9-3).

4. Instructions on how to use stationing information to read a flood profile are found in Section 5.5.2. If the X-axis on the flood profile is in miles, convert these distances to miles by dividing by 5,280. When converting to miles, some accuracy is lost.

   Figure 9-4 is an enlargement of the Lake Charles flood profile (which is shown in its entirety in Figure 5-8). Each horizontal square is 50 feet, so 500 feet equals 10 squares. This information identifies where Site 3 falls on the profile. Note that while Site 3 is on Jefferson Street, Jefferson Street curves to the south before it crosses the Bayou. Therefore, using the Jefferson Street Bridge would not be an accurate way to determine the BFE at this site.

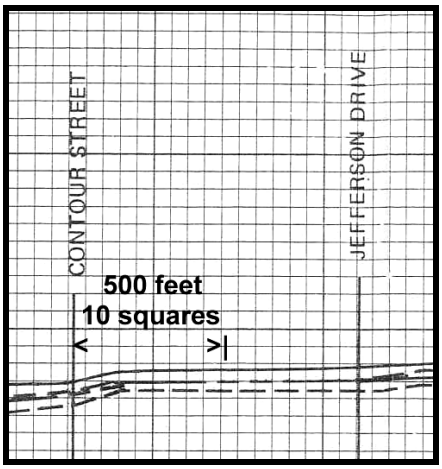


Figure 9-4. Transferring stationing information to the flood profile.

9.1.3. Getting a base flood elevation

Base flood elevations are shown on the FIRMs. For VE, V1-30 Zones on the coast, and AE and A1-30 Zones for lake floodplains, use the BFE printed in parentheses below the flood zone designation. No interpolation is necessary. The same holds true for VE and AH Zones with base flood elevations (Figures 7-4 and 8-16).

For other numbered A Zones and AE Zones, read the BFE from the nearest wavy "BFE line." Refer to the map legend or key if unsure of the line markings.

For Sites 2 and 4 in Figure 9-1, the BFE from the FIRM is approximately 13 feet.

Note: For riverine floodplains where a flood profile is available, it is always more accurate to use the BFE from the profile (Section 5.5).

For Site 3 in Figure 9-1, using stationing data and the flood profile shows that the BFE at the site is actually 13.5 feet.

There are no base flood elevations in AO Zones with base flood depths. Instead, the equivalent flood protection level is the number of feet shown in parentheses after the "Zone AO." This is not an elevation above sea level; it is the depth of flooding measured above ground level.

9.1.4. Locating the floodway boundary

If the site is located at a surveyed cross section, floodway width data from the FIS Floodway Data Table may be used as a more accurate measure than field and map measurements. This is discussed in Section 5.4.4. Remember, the width listed in the table is the distance from the floodway boundary on one side of the stream to the floodway boundary on the other side of the stream.

If the floodway width measured on the map at the site is at a cross section, the map should be used because it is the floodway officially adopted by the community. If there is a significant difference between the map width at the site and the closest cross section width in the Floodway Data Table, contact the DHS/FEMA Regional Office for an interpretation.

Most sites will not fall conveniently on a cross section, so here are the steps to using the map:

1. Locate the site on the map and select the correct engineer's scale for the map scale.

   See Figures 9-1 and 9-5. Site 4 is on the north side of Glover Street, one lot west of the end of the block.

2. Using an engineer's scale, measure the distance from the floodway boundary to a nearby feature on the ground. For streets, use either the right-of-way or the center of the street; just use the same approach on the map and the ground.

   See Figure 9-5. The map scale for the Lake Charles FIRM is 1 inch = 1,000 feet. Using the "10" scale, the floodway boundary is approximately 50 feet west of the street right-of-way. Site 4 is one lot farther west, so it is 60 feet west of the street. Therefore, Site 4 is not in the floodway.

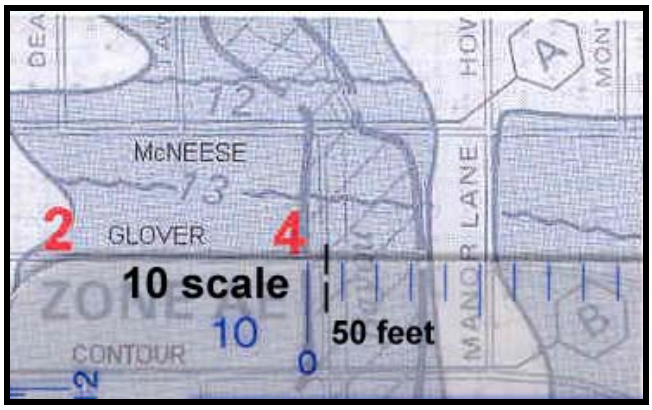


Figure 9-5. Using the map scale to locate the boundary of the floodway in Figure 9-3 (not to scale).

3. Run the same measurement on the ground to locate the floodway boundary at the site.

4. If any portion of the site is determined to be within the floodway, the floodway provisions of the ordinance apply.

9.2. Community Responsibilities

9.2.1. Requirement to use the FIRM

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

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

This requirement does not prevent a community from adopting and enforcing regulations based on data more restrictive than what DHS/FEMA provides. For example, a community may want to regulate to a historical flood that was higher than the base flood elevations shown on the FIRM.

This requirement also does not prevent a community from using other technical data to identify and regulate floodprone areas not shown on DHS/FEMA maps. For example, many cities and urban parishes map and regulate areas on small tributary streams that are not shown on the FIRM. Such data should be adopted in the community's flood damage prevention ordinance so that all floodplains are treated consistently.

The community always has a voice in what the latest maps and data should be. DHS/FEMA sends the community its proposed revisions to the official FIRM and there is time to review them and submit comments to DHS/FEMA before they are published. If the community disagrees with the DHS/FEMA data, it can submit a request for a map revision as discussed in Section 10.

9.2.2. Unmapped areas

There are communities interested in floodplain management and flood insurance where DHS/FEMA has not done any mapping. In fact, 24 Louisiana communities in the NFIP Regular Phase have no FIRM. DHS/FEMA has determined that their flood or drainage problems are relatively minor and do not warrant an expensive FIS.

These communities still have an obligation to the NFIP. They must comply with the requirements of 44 CFR 60.3(a) (Section 4). Section 60.3(a)(1) of the Federal Regulations states that the community shall "Require permits for all proposed construction or other development in the community, including the placement of manufactured homes, so that it may determine whether such construction or other development is proposed within floodprone areas."

The rest of 60.3(a) lists specific requirements to ensure that new buildings, factory-built homes, subdivisions, and utilities are "reasonably safe from flooding." The easiest way to do this is to map the flood problem area and adopt the map in one of the model ordinances. If it is likely that new buildings will be built in the mapped floodplain, the community should determine base flood elevations.

In other words, even though DHS/FEMA did not give it a map, the best way for a community to meet its obligation to the NFIP is to prepare its own map. This approach will eliminate confusion and claims of arbitrary treatment when the permit official has to decide if a building is "reasonably safe from flooding."

9.2.3. Unincorporated areas

If a municipality owns land in the unincorporated areas of the parish, plans to annex land, or otherwise has authority over lands outside its corporate limits, it has an obligation under the NFIP to ensure that development is properly regulated. To do this, it must use the parish's FIRM.

If a municipality annexes property in the mapped floodplain in the parish (Figure 9-6), a revision request should be submitted to the DHS/FEMA Regional Office (Section 31). The submittal needs to include a copy of the ordinance of annexation.

Because it is expensive to reprint and redistribute flood maps, corporate boundary changes are usually made only when maps are revised for other reasons, such as new or better flood data. The municipality does not need a new map after it has annexed an area that is shown on the parish's FIRM. It uses the parish's FIRM and the flood data in the parish's Flood Insurance Study (FIS).

It is recommended that a municipality formally adopt its parish's FIRM in its ordinance to strengthen the basis for regulating areas not currently shown on the municipality's FIRM.

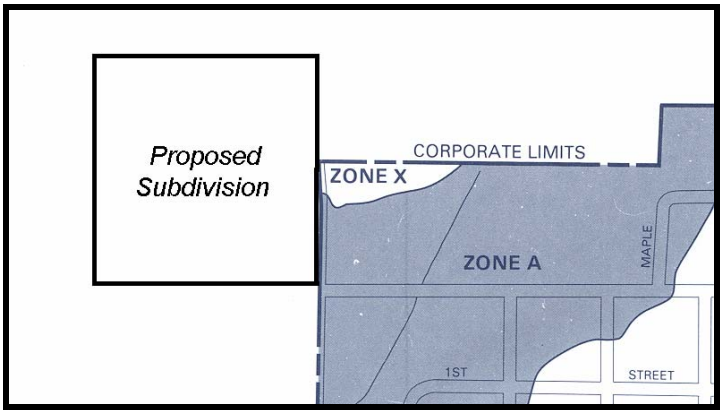


Figure 9-6. Communities are obligated to regulate new floodprone subdivisions that want to be annexed.

9.2.4. Advisory Base Flood Elevations (ABFEs)

Following Hurricanes Katrina and Rita, FEMA updated its flood frequency analyses to include more recent storm surge data (including storm surge stillwater levels measured after Katrina and Rita). The results of the analysis show that the updated one percent annual chance stillwater levels (also known as the 100-year stillwater levels) are 3 to 8 feet above the stillwater levels used to produce FIRMs before Hurricanes Katrina and Rita.

For post-Katrina recovery purposes, FEMA devised a method to approximate one percent annual chance wave crest elevations. The results of this effort are known as Advisory Base Flood Elevations (ABFEs, sometimes referred to as Advisory Flood Elevations [AFEs]).

The ABFEs are updated estimates of the one percent annual chance flood elevations, and are generally higher than the base flood elevations (BFEs) shown on the pre-Katrina FIRMs. ABFEs also extend farther inland than the Special Flood Hazard Areas (SFHAs) shown on the pre-Katrina FIRMs.

The ABFE Maps also show the approximate inland extent of storm surge inundation experienced during Hurricane Katrina. Since Katrina exceeded the BFE in most locations (based on the updated flood frequency analysis), the inland extent of Katrina storm surge penetration generally lies inland of the ABFE limit. However, where the Katrina impact was less extreme (very near the eye where the hurricane winds are small, to the left of the eye where the peak winds blow offshore rather than onshore, and far to the right of the eye where the winds weaken), the Katrina surge penetration properly lies seaward of the ABFE limit (see Figure 9-7).

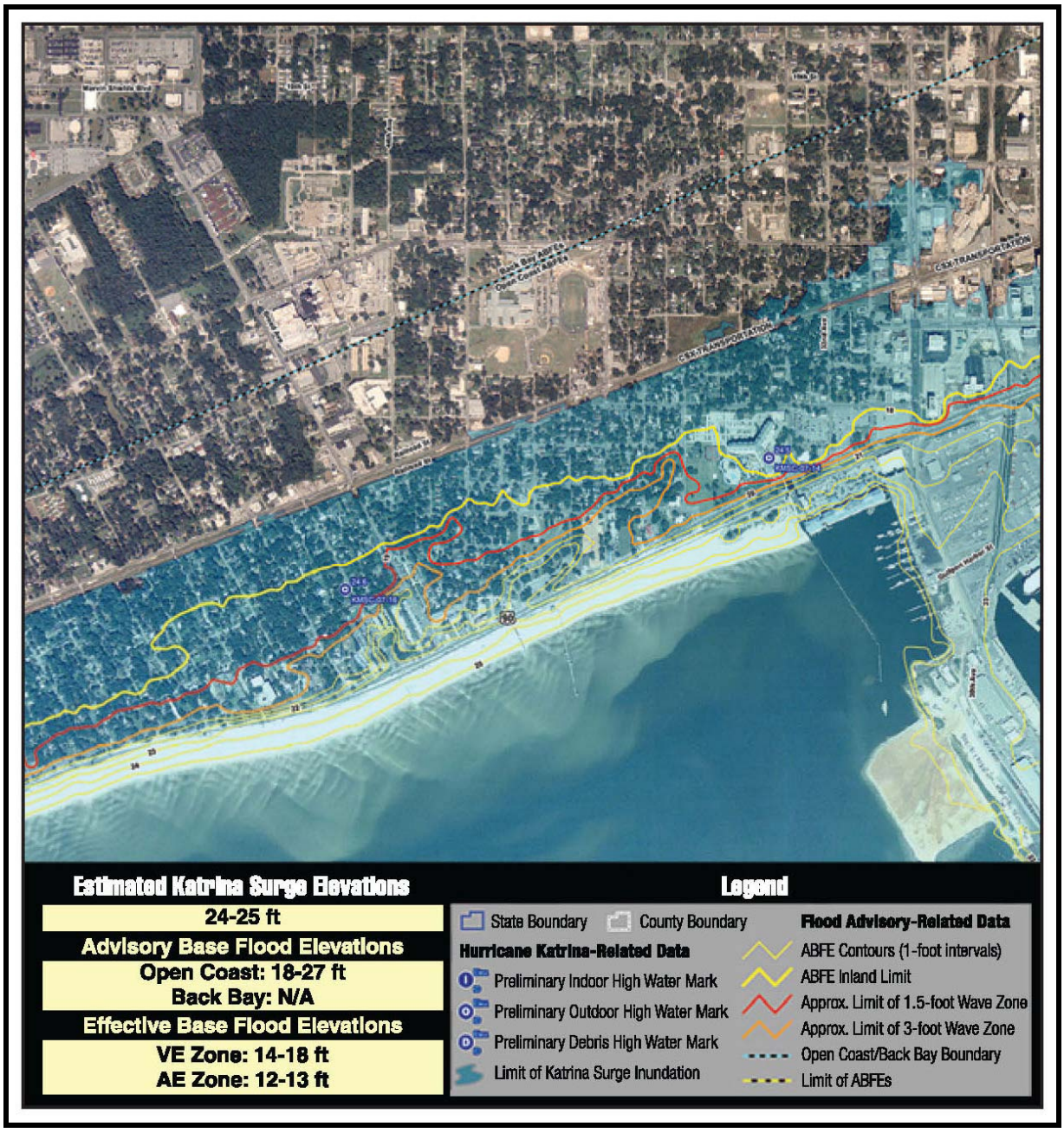


Figure 9-7. Sample Hurricane Katrina Surge Inundation and Advisory Base Flood Elevations. The shaded region in blue indicates the approximate inland extent of storm surge inundation experienced during Katrina; the ABFE contours are shown in yellow and the predicted inland limit of damaging wave effects during the advisory base flood is shown by the red line. Blue points indicate surveyed Katrina high water mark elevations.

The NFIP regulations identify V or VE Zones as areas subject to flooding with high velocity wave action, usually mapped wherever the wave height component of flooding is 3 feet or greater. (Note that other factors are also used to identify VE zones, including wave run-up, wave overtopping, and Primary Frontal Dunes.) However, laboratory tests and field observations of building performance following numerous hurricanes (including Opal in 1995, Georges in 1998, Ivan in 2004, and Dennis in 2005) have shown that waves as small as 1.5 feet in height can cause structural damage to buildings with slab-on-grade or solid, perimeter-wall foundations.

FEMA's Coastal Construction Manual (FEMA 55) and other guidance documents advise property owners, design professionals, and local officials to consider mitigating against moderate but damaging waves and scour in these "coastal A Zones," where waves are 1.5 to 3 feet in height. The NFIP regulations and the official flood maps do not currently identify these zones as anything other than normal AE Zones or require any special design or construction considerations. As a result, FEMA chose to show the estimated 1.5-foot wave zone on the ABFE Maps to aid map users in identifying where damaging waves may be possible based on the depth of the surge flooding.

Like the 3-foot-breaking wave zone, this 1.5-foot wave zone does not take into account dense vegetation, buildings, or other features that may serve as obstructions to wave growth. Therefore, there may be areas where the 1.5-foot wave limit has been overestimated; engineering judgment should be used to evaluate potential obstructions to wave growth and to adapt the wave zone delineation locally. The limitations of the wave-zone mapping method are, in part, why FEMA has not attached any regulatory requirement to this zone and chose to show the data for advisory purposes only.

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

For more information on this issue, see *Use of Flood Insurance Study (FIS) Data As Available Data*, FEMA Floodplain Management Bulletin 1-98. Sometimes FEMA issues advisory data after a major flood where it was found that the FIRM and/or flood insurance study underestimated the hazard. This information is provided so communities can ensure that reconstructed buildings are protected from the true hazard, not the one shown on the FIRM.

There are no insurance ramifications or NFIP eligibility issues that will result from non-adoption of the wave zones depicted on the ABFE Maps. Adopting the wave zones may help to reduce flood insurance premiums because the advisory risk is higher than the legislated (adopted) risk (including wave heights). Flood Insurance rating tables are based on the following: the higher above the BFE a building is protected, the lower the risk and the lower the rate.

Communities that participate in the Community Rating System (CRS) program may receive credit for adopting higher regulatory standards by adopting the wave zones. There also can be significant credit available for adoption of V Zone standards in areas subject to velocity wave action flooding that are beyond the limits of the adopted V or VE Zones and/or A Zones (see Section 26).

9.3. Using FIRMs in Approximate A Zones

Approximate A Zones are those areas not studied by the detailed hydrologic and hydraulic methods discussed in Section 6. These areas are shown as "unnumbered" A Zones on the FIRM and "approximate 100-year flood" zones on the old format Floodway Maps. They are also the Special Flood Hazard Areas designated on Flood Hazard Boundary Maps that have been specially converted to FIRMs (Section 5.2.2).

Approximate A Zones are Special Flood Hazard Areas where DHS/FEMA has not provided base flood elevations. They must be regulated, but more information is needed for effective floodplain management.

9.3.1. NFIP requirement

44 CFR Section 60.3(b)(4) requires a community to make every effort to use any flood data available to achieve a reasonable measure of flood protection.

44 CFR 60.3(b) When the Administrator has designated areas of special flood hazards (A zones) by the publication of a community's FHBM or FIRM, but has neither produced water surface elevation data nor identified a floodway or coastal high hazard area, the community shall:…

(3) Require that all new subdivision proposals and other proposed developments (including proposals for manufactured home parks and subdivisions) greater than 50 lots or 5 acres, whichever is the lesser, include within such proposals base flood elevation data;

(4) Obtain, review and reasonably utilize any base flood elevation and floodway data available from a federal, state, or other source, including data developed pursuant to paragraph (b)(3) of this section, as criteria for requiring that new construction, substantial improvements, or other development in Zone A on the community's FHBM or FIRM meet the standards …

9.3.2. Existing data

Where can flood data be found when DHS/FEMA has not provided it on the FIRM? The best place to start is to find out whether the data have already been prepared by a state or federal agency or from another project. Possible sources of existing floodplain data include:

- Louisiana Department of Transportation and Development (LADOTD), either from existing flood studies or highway and bridge design projects
- Parish engineer

The New Orleans District of the U.S. Army Corps of Engineers can often help provide or develop flood elevations in approximate A Zones to support local floodplain management programs. See Section 31 for contact information.

- U.S. Army Corps of Engineers studies or projects
- Natural Resource Conservation Service
- U.S. Geological Survey
- Advisory flood maps provided by FEMA (see Section 9.2.4).

Data obtained from one of these other sources should be used, provided the data reasonably reflect flooding conditions expected during the base flood, are known to be technically correct, and represent the best data available.

9.3.3. New flood studies

A new study should be conducted if no data are available. Developers usually pick up the cost of the study since they are the ones who want to build in the floodplain.

Guidance can be found in the DHS/FEMA publication *Managing Floodplain Development in Approximate Zone A Areas: A Guide for Obtaining and Developing Base (100-Year) Flood Elevations* (see Section 29). This publication provides information on a number of methodologies for developing base flood elevations in approximate A Zones. These methodologies range from detailed methods that produce base flood elevations and perform floodway analyses similar to those developed for a FIS, to simplified methods that can be used in isolated areas where more costly studies cannot be justified.

If the community has approximate A Zones that are likely to be developed, it should obtain a copy of this document and have its engineer review it. (The guide includes the Quick-2 software for computing flood elevations.) In some cases, the developer will not have to finance an expensive detailed study. These cases are discussed in the next two sections on large and small developments. Whatever method is used, be sure to record the source of the flood elevation on the permit records. This will help encourage consistency with future development in the same area.

9.3.4. Large developments

A large development is a subdivision that will consist of at least 5 acres or 50 lots. Base flood elevations are required if a large development will be built in the SFHA. The developer conducts the necessary study, but the community or other agency may provide assistance. The study must provide base flood elevations. The community may also want to require a floodway delineation to facilitate its review of the proposed development.

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

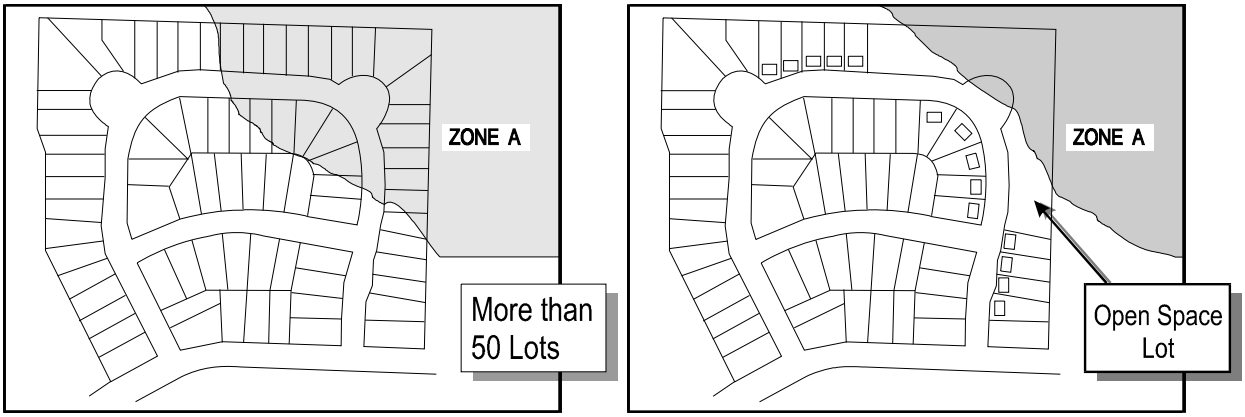


Figure 9-8. A detailed flood study is required for the affected lots in the subdivision on the left because it is has more than 50 lots or is greater than 5 acres. A study would not be needed for the subdivision on the right if the entire approximate A Zone area is to be left as open space.

In the subdivision on the right in Figure 9-7, the entire approximate Zone A area will be left as open space. If the planned subdivision shows that the floodplain is contained entirely within an open space lot, it may not be necessary to conduct a detailed engineering analysis to develop the BFE data.

Permit officials should review the flood hazard as early as possible in discussions with subdividers and developers of large areas. If a subdivision or planned unit development will be partially located in the floodplain, there may be ways to avoid building in the flood hazard area, which could save the developer the cost of preparing a flood study. The resulting vacant area makes more sense from a floodplain management perspective than constructing buildings.

9.3.5. Small developments

If the project is an isolated building (e.g., a cabin) or other development smaller than 50 lots or 5 acres, the community still must ensure that the building is protected from flood damage. Section 44 CFR 60.3(a)(3) of the NFIP regulations requires the floodplain administrator to determine if the site is reasonably safe from flooding and, if it is not, that the building be constructed with methods and practices that minimize flood damage and meet other construction requirements.

In nearly all cases, the only way to do this is to require that the building be elevated or otherwise protected to or above a flood elevation. For these small projects, a less expensive alternative to a detailed hydrologic and hydraulic study could be used to obtain a flood elevation sufficient for this requirement. They are listed in priority order.

- Check with other agencies for an available study that has a base flood elevation.

- Identify a site that is outside the mapped A Zone and require the building to be protected to a level 1-foot higher than that site.
- Use historical records or the flood of record (the highest known flood level for the area) prepared by a government agency. It may be that a recent flood was close to the base flood. If records of the recent flood can be used, base the regulatory flood elevations on them (or add a foot or two to the historical flood levels to provide a margin of protection). Before doing this, get a second opinion from DHS/FEMA.
- Require protection to at least 5 feet above grade. This will result in lower flood insurance rates than if the building had no protection, but the rates may not be as favorable as they would be if a base flood elevation were calculated. This approach should only be used if the floodplain administrator agrees that 5 feet of elevation will provide adequate flood protection to a building at that site.

9.3.6. Submittal to DHS/FEMA

When a detailed flood study provides new data in an approximate A Zone, it must be submitted to DHS/FEMA within 6 months. The community can pass that cost on to the developer by requiring that he or she submit a request for a Letter of Map Revision (LOMR) as a condition of approving the development. LOMRs are discussed in Section 10.4. If the developer does not do it, many individual property owners will have to do it later.

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

9.3.7. Community Rating System credit

Community Rating System (CRS) credit is provided if base flood elevations, floodways, and related regulatory data are provided in areas not mapped by the NFIP. It does not matter who prepares the study—it can be the developer, the community, or a state or federal agency (other than DHS/FEMA). The size of the watershed or the flood zone designation does not matter either.

This credit can be found in Activity 410, Section 411, of the *CRS Coordinator's Manual* or the *CRS Application*. For more on the CRS, see Section 26.

9.4. Conflicts with FIRM Data

In some cases, the Flood Insurance Rate Map may not be accurate or reflect more recent flood data. This section reviews three occasions when a community may vary from the data that DHS/FEMA has provided on the FIRM.

Note: These situations only apply to the use of flood data for floodplain management purposes. Insurance agents and lenders must use the current FIRM when determining insurance rates and whether flood insurance is required. If a person wants to vary from the current FIRM to obtain different premium rates, or to avoid the mandatory flood insurance purchase requirement, the FIRM must be officially revised or amended.

9.4.1. Better ground data

The base flood elevations published in the FIS set the level for flood protection purposes. The maps are a graphic portrayal of that information.

As explained in Section 6.2 on floodplain mapping, since a flood study contractor usually does not have detailed topographic mapping to use in preparing flood maps, the flood boundaries are interpolated between cross sections using whatever topographical information is available. This can result in inaccuracies in drawing the boundaries on the map.

Ground *higher* than the flood level: When ground surveys show that a development site is above the BFE based on natural high ground (i.e., no fill is involved), the data should be recorded and the permit may be issued. Then, if the developer or owner wants the property removed from the SFHA designation (e.g., in order to remove the federal mandate to purchase flood insurance), he or she can request a Letter of Map Amendment (LOMA).

The applicant should be advised of the benefits of a LOMA before the permit is issued. Many local officials require the LOMA first and many developers prefer the clear-cut exemption from the floodplain rules that a LOMA provides. However, a LOMA is not mandatory before a permit is issued.

It is up to the developer or property owner, and not community officials, to apply for a map change. This procedure is discussed in Section 10.

Ground *lower* than the flood level: Conversely, if site surveys show that an area considered outside the SFHA on the FIRM is in fact below the BFE, the applicant should be advised of the hazard and encouraged to protect new buildings to the BFE.

Even though a site may be technically outside the mapped SFHA, a community is not helping future occupants if it ignores the known flood hazard. However, NFIP regulations do not require the permit official to apply the floodplain management regulations on a property clearly outside of the SFHA.

The community's ordinance may be changed to define the regulated floodplain as "the area designated on a FIRM and adjacent areas that are below the base flood elevation." Then it will have clear authority to regulate those areas even though it is not otherwise required by NFIP regulations.

9.4.2. Draft revised NFIP data

The second situation in which a community may vary from the official DHS/FEMA data is when DHS/FEMA sends preliminary data to the community for review. Communities are required to "reasonably utilize" data from a draft or preliminary FIRM or FIS.

Four scenarios are possible:

1. The original FIRM shows a SFHA with *no* base flood elevations and the draft FIRM has flood elevations: Use the draft information. In the absence of other elevation or floodway data, the draft information is presumed to be the best available.

2. The original FIRM shows an AE, VE, or AH Zone *with* a base flood elevation (or an AO Zone with a flood depth) or floodway and the revision *increases* the base flood elevation or *widens* the floodway: The draft revised data should be used. However, if the community disagrees with the data and intends to appeal, the existing data can be presumed to be valid and may be used until the appeal is resolved.

3. The original FIRM shows an AE or AH Zone *with* a base flood elevation (or an AO Zone with a flood depth) or floodway and the revision *decreases* the base flood elevation or *shrinks* the floodway: The *existing* data should be used. Because appeals may change the draft data, the final BFE may be higher than the draft. If the community were to allow new construction at the lower level as shown in the draft, the owners would have to pay higher flood insurance premiums.

4. The original FIRM shows a B, C, or X Zone and the draft FIRM shows a SFHA: NFIP regulations do not require the draft revised data to be used. However, communities are encouraged to use the draft data to regulate development, since these areas are subject to a flood hazard.

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

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

CLOMRs: The above four scenarios are also relevant for a Conditional Letter of Map Revision (CLOMR). Note the *conditional* part of a CLOMR. A CLOMR provides that *if* a project is constructed as designed, the base flood elevations or boundaries can be revised or modified (or the property in question can be removed from the SFHA) after the as-built specifications are submitted and the final LOMR is issued. A permit cannot be issued based on a lower BFE or different floodway delineation proposed by a

CLOMR until the final LOMR is issued. This presents a quandary: How does the developer construct the changes needed for the LOMR if he cannot get a permit? A permit can be issued for that part of the work not dependent on the changes that will result from the LOMR. The full permit can be conditioned upon receipt of the final LOMR (e.g., construction in the fringe could be permitted while waiting for a LOMR that revises the floodway boundary). See also the discussion in Section 10.1.3.Advisory flood hazard data

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

When such advisory information is received, the community should “reasonably utilize” it. If the community agrees with the information, the ordinance should be revised to adopt it. If it disagrees with the data, the permit official should be ready to explain why the community is not requiring construction and reconstruction to be protected. The community is not helping its residents if it allows them to rebuild without protection from a known hazard.

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

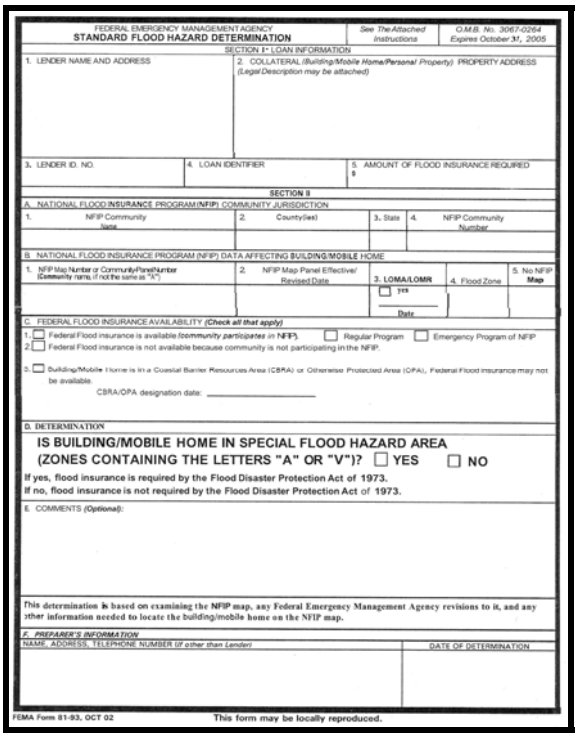
9.5. Flood Hazard Determinations

9.5.1. Hazard determination form

The Flood Disaster Protection Act requires banks and other lenders to determine if a loan or other financial assistance is for a property located in a Special Flood Hazard Area (SFHA). This requirement is discussed in Section 25.4.

A bank or lender may ask local officials to determine if a property is in or out of the SFHA. Communities should be aware that lenders are legally responsible for determining if a flood insurance policy is required for a loan. This is called a "flood hazard determination."

Under the 1994 National Flood Insurance Reform Act, if someone other than a lender provides a flood hazard determination to decide if a flood insurance policy is required for a loan, that information must be guaranteed. This information is usually provided on DHS/FEMA's Standard Flood Hazard Determination Form, which can be downloaded from DHS/FEMA's website, www.FEMA.gov. A copy is provided as Figure 9-8.



FEDERAL EMERGENCY MANAGEMENT AGENCY
STANDARD FLOOD HAZARD DETERMINATION
See The Attached Instructions
O.M.B. No. 3067-0264 Expires October 31, 2005

SECTION I* LOAN INFORMATION

1. LENDER NAME AND ADDRESS
2. COLLATERAL (Building/Mobile Home/Personal Property) PROPERTY ADDRESS (Legal Description may be attached)
3. LENDER ID. NO.
4. LOAN IDENTIFIER
5. AMOUNT OF FLOOD INSURANCE REQUIRED $

SECTION II

A. NATIONAL FLOOD INSURANCE PROGRAM (NFIP) COMMUNITY JURISDICTION

1. NFIP Community Name
2. County(ies)
3. State
4. NFIP Community Number

B. NATIONAL FLOOD INSURANCE PROGRAM (NFIP) DATA AFFECTING BUILDING/MOBILE HOME

1. NFIP Map Number or Community Panel Number (Community name, if not the same as "A")
2. NFIP Map Panel Effective/ Revised Date
3. LOMA/LOMR ☐ yes Date
4. Flood Zone
5. No NFIP Map

C. FEDERAL FLOOD INSURANCE AVAILABILITY (Check all that apply)

1. ☐ Federal Flood insurance is available (community participates in NFIP). ☐ Regular Program ☐ Emergency Program of NFIP
2. ☐ Federal Flood insurance is not available because community is not participating in the NFIP.
3. ☐ Building/Mobile Home is in a Coastal Barrier Resources Area (CBRA) or Otherwise Protected Area (OPA), Federal Flood insurance may not be available.
CBRA/OPA designation date: _____

D. DETERMINATION

IS BUILDING/MOBILE HOME IN SPECIAL FLOOD HAZARD AREA (ZONES CONTAINING THE LETTERS "A" OR "V")? ☐ YES ☐ NO

If yes, flood insurance is required by the Flood Disaster Protection Act of 1973.
If no, flood insurance is not required by the Flood Disaster Protection Act of 1973.

E. COMMENTS (Optional):

This determination is based on examining the NFIP map, any Federal Emergency Management Agency revisions to it, and any other information needed to locate the building/mobile home on the NFIP map.

F. PREPARER'S INFORMATION

NAME, ADDRESS, TELEPHONE NUMBER (If other than Lender)
DATE OF DETERMINATION

FEMA Form 81-93, OCT 02 This form may be locally reproduced.

Figure 9-9. Standard Flood Hazard Determination form.

If asked to sign such a form, the local official is guaranteeing the accuracy of the determination and may assume some liability for the action. Most local officials do not use the form. Banks and map determination companies use it under contract with lending institutions.

9.5.2. Flood hazard determination review

Sometimes a property is incorrectly placed in the SFHA by the lender or its map determination company. The property owner may come to the community asking for help or advice. The local official is welcome to double check the determination. The inquirer should be informed that the determination is the lender's responsibility and the local government has no authority over it.

If it appears that the property is outside the SFHA, but the map determination says that it is inside, the owner can ask DHS/FEMA for a determination review. A Flood Hazard

Determination Review is requested jointly by the owner and the lender. Requests must be postmarked not later than 45 days following the date the lender notified the borrower that the property is in a SFHA. The following must be submitted to DHS/FEMA:

- A copy of the completed Standard Flood Hazard Determination form (FEMA Form 81-93)
- A copy of the dated notification to the borrower from the lender that the property is in the SFHA
- A copy of the effective NFIP map panel for the community in which the structure or manufactured home is located, annotated to show the location of the structure or manufactured home
- A copy of *all* material used by the lender or any third party it has employed to make the flood hazard determination (DHS/FEMA must confirm the location of the structure on the NFIP map by examining the data source used to make the determination)
- A letter to DHS/FEMA requesting a review of the lender's determination, signed by the borrower and the lender
- $80 payment by check or money order, in U.S. funds, made payable to "National Flood Insurance Program"
- The materials are sent to the office identified on the form. The applicant should download the latest version of the form from the DHS/FEMA website (www.fema.gov) to ensure that the correct office and address are used.

If the submittal is complete and on time, DHS/FEMA will issue a Letter of Determination Review (LODR). This review does not result in an amendment or revision to the effective NFIP map. It is only a finding about the location of a building or manufactured home relative to a designated SFHA.

A LODR only affects the federal requirement for purchase of flood insurance. However, the mortgage lender always has the option to require flood insurance as a condition of providing financing, regardless of the location of the structure.

The property owner can submit a request for a LOMA (Section 10.3) if the map needs to be changed.

9.5.3. Property located in two zones

The building footprint, not the land, located in more than one zone must be rated using the more hazardous zone. If a building is determined to be located where a break occurs between zones on the FIRM, the community should use the building requirements for the more restrictive zone.

For example, if part of the building footprint is in a zone with BFE = 7 and part is in a zone with BFE = 6, the community should use BFE = 7 for regulatory purposes. Similarly, if a building footprint is partially in an A zone and partially in a V zone, the V zone standards should be applied.

It is the location of the building footprint that determines whether a building should be regulated under the community's floodplain management ordinance, and how the building should be rated for insurance purposes. For example, if part of a parcel is in an A zone and part is in an X zone, but the building footprint is entirely in the X zone, there is no regulatory requirement, and the building should be rated as an X zone property for NFIP insurance purposes.

Section 10. Revising FIRMS

Contents

10.1. FIRM Revision Procedures

No map is perfect and no flood situation is static. DHS/FEMA maps are based on the best information available at the time the study was completed. The floodplain maps should be updated as better information becomes available or as changes are proposed in the floodplain.

From time to time, DHS/FEMA, communities, or individuals may find it necessary for a Flood Insurance Rate Map (FIRM) or Floodway Map to be updated, corrected, or changed.

Uniform procedures have been established for requesting and administering map changes. DHS/FEMA uses two methods to make flood map changes—physical map revisions and letters of map change.

10.1.1. Physical map revisions

Under this procedure, DHS/FEMA changes the map and publishes new copies. Here the effective date of a map or panel is changed. This approach is expensive and is done only if the change affects a large area.

10.1.2. Letters of map change

It is more common for DHS/FEMA to issue a letter that describes the map change. This is called a letter of map change. There are three types of letters of map change:

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

Figure 10-1 summarizes the more common reasons why a map may require changes and where those changes are covered in Section 10.

Reason for Change	Type of Change	Section
New study with new flood elevations	Map Revision or Letter of Map Revision (LOMR)	10.2/10.4
New study with new floodway	Map Revision or Letter of Map Revision (LOMR)	10.2/10.4
New flood control project	Map Revision or Letter of Map Revision (LOMR)	10.2/10.4
Annexation changes corporate limits	Map Revision or Letter of Map Revision (LOMR)	10.2/10.4
Building on natural ground above BFE	Letter of Map Amendment (LOMA)	10.3
Vacant lot above BFE	Conditional Letter of Map Amendment (CLOMA)	10.3.2
Site filled above BFE	Letter of Map Revision Based on Fill (LOMR-F)	10.5
Site proposed for filling to above BFE	Conditional LOMR-F (CLOMR-F)	10.5.1

Figure 10-1. Types of FIRM changes (BFE = base flood elevation).

10.1.3. Conditional letters (CLOMAs and CLOMRs)

DHS/FEMA issues three types of conditional letters:

- Conditional Letter of Map Amendment (CLOMA)
- Conditional Letter of Map Revision (CLOMR) or
- Conditional Letter of Map Revision Based on Fill (CLOMR-F)

These are used when an applicant submits data to support ***proposed*** construction, modifications or conditions that are expected to exist in the future. Under this process, engineering data may be submitted for a proposed project or future condition with a request that DHS/FEMA review the data and issue a conditional letter describing the FIRM revision(s) that may be made upon completion of the proposed work.

Generally, conditional letters are requested so the developer can show that the project will be removed from the floodplain or floodway after it is built. Getting the conditional letter can be an important step for obtaining financing for the project.

Note the ***conditional*** part of a conditional letter**.** A conditional letter states that *if* a project is constructed as designed, the map can be revised or modified (or the property in question can be removed from the Special Flood Hazard Area [SFHA]) ***after*** the as-built specifications are submitted and the final LOMR or LOMR-F is issued. This presents a quandary: How does the developer construct the changes needed for the LOMR if he cannot get a permit?

It is important for local officials to understand that a permit cannot be issued based on a lower base flood elevation or different floodway delineation proposed by a *conditional* letter until the final letter is issued. However, a permit can be issued for that part of the work not dependent on the changes that will result from the letter.

Conditional and Final Letters

A conditional letter has no regulatory authority because it tells what will happen in the future if certain things are done. The floodplain administrator can only base permit actions on final LOMAs, LOMRs, and LOMR-Fs.

For example, the developer can conduct the project in two phases. The first phase would be the filling and regrading needed to alter the ground. After the ground is changed, the developer's engineer submits as-built plans and certifications necessary for DHS/FEMA to issue the final LOMR. Once the LOMR is issued, the floodplain administrator can issue a building permit based on the new data.

10.1.4. Requesting map changes

DHS/FEMA has forms used for requesting map changes. They are listed in Figure 10-2. Copies of them and a list of the necessary supporting information can be downloaded from DHS/FEMA's website at www.FEMA.gov.

With the exception of the MT-EZ, requests for map changes should be completed by a licensed engineer. *The most common reason a map change request is denied is that the applicant did not submit adequate technical data to validate the change.*

A processing fee is charged for LOMRs, CLOMRs, and CLOMAs. There is no fee for requesting a LOMA.

Form	Type of Change	Section
MT-EZ	Letter of Map Amendment (LOMA) for a single lot	10.3
MT-1	Letter of Map Amendment (LOMA) for multiple lots	10.3
	Conditional Letter of Map Amendment (CLOMA)	10.3
	Letter of Map Revision (Based on Fill) (LOMR-F)	10.5
	Conditional Letter of Map Revision (Based on Fill) (CLOMR-F)	10.5.1
MT-2	Letter of Map Revision (LOMR)	10.4
	Conditional Letter of Map Revision (CLOMR)	10.4.1
	Physical Map Revision	10.2

Figure 10-2. DHS/FEMA map change forms.

Assistance in completing a LOMA or LOMR-F application is available from a Map Specialist at the Map Assistance Center (Section 31).

10.1.5. Map revisions and the flood insurance purchase requirement

The issuance of a LOMA or LOMR-F eliminates the NFIP insurance purchase requirement as a condition of federal or federally backed financing for the site identified in the letter. LOMRs and map revisions may also remove some properties from the SFHA.

However, the mortgage lender always has the option to require flood insurance as a condition of providing financing, regardless of the location of the structure.

10.2. Physical Map Revisions

If a submittal covers an area too large to be described in a letter of map change, DHS/FEMA may prepare a full map revision. The most common reason for a map to be physically reprinted is when a study is conducted along the full reach of a stream or the map for large areas of the community is revised.

When there is a physical map revision, the FIRM or one or more FIRM panels are reprinted. The FIRM index is also reprinted to reflect the latest date of its panels. A list of all past panel revisions is included with the legend for each panel. An example is in Figure 10-3.


MAP REPOSITORY

City Hall
326 Pujo Street
Lake Charles, Louisiana 70602
(Maps available for reference only, not for distribution.)

INITIAL IDENTIFICATION:
NOVEMBER 1, 1974

FLOOD HAZARD BOUNDARY MAP REVISION:
FEBRUARY 18, 1977

FLOOD INSURANCE RATE MAP EFFECTIVE:
OCTOBER 16, 1979

FLOOD INSURANCE RATE MAP REVISIONS:
JULY 5, 1984
SEPTEMBER 5, 1990

Map revised July 3, 1997 to update corporate limits, to add special flood hazard areas, to change special flood hazard areas, to change zone designations, to update map format, to add roads and road names, and to reflect updated topographic information.

To determine if flood insurance is available in this community, contact your insurance agent or call the National Flood Insurance Program at (800) 638-6620.

APPROXIMATE SCALE IN FEET

Figure 10-3. The FIRM panel shows the history of revisions for Lake Charles' FIRM.

10.2.1. Reasons for map revisions

Map revisions are usually requested under the following circumstances:

- When a flood study is prepared for an unnumbered A Zone, the data can be submitted to DHS/FEMA for later incorporation into the Flood Insurance Study (FIS) or revised FIRM.
- When a new study is based on better information than the existing study, the new information should be submitted to DHS/FEMA. The study would reflect new information, such as a new, larger bridge opening.
- If a new levee, reservoir, or channel modification reduces the flow of the base flood or the boundaries of the SFHA, the community should request that the map be revised to reflect the new conditions or new (lower) base flood elevations.
- A community *must* request a map revision if a project will *increase* the BFE or when the community wants to revise the boundaries of its adopted floodway.

It is important to note that many small projects, such as channel clearing, low-level dams, private levees, land treatment, or retention basins in new subdivisions do not have a measurable effect on the base flood, and, therefore, do not warrant a map change. The request for a change must be carefully prepared by a licensed engineer who is familiar with DHS/FEMA flood study guidelines.

10.2.2. Procedures

Requests for map revisions that involve changes in flood study data, floodways, and flood elevations are submitted using DHS/FEMA's form MT-2 (Figure 10-4). This form and its instructions can be downloaded from DHS/FEMA's website, www.FEMA.gov.

Figure 10-4. The MT-2 form.

It is the applicant's responsibility to ensure that the request for a map revision is correct. The applicant is typically the party who would benefit most from a new map. Usually, the applicant is the property owner who wants to eliminate the flood insurance purchase requirement or the requirements of the community's flood damage prevention ordinance.

10.2.3. The community's role

In some cases, a community will submit a request for map revision. This happens, for example, when the community has completed a new flood study and wants to use it to replace the data shown on the FIRM.

If the request is for a change in the regulatory data, such as the base flood elevation, the request must have the community's agreement before DHS/FEMA will approve it.

Note that the community can continue to require that new construction be elevated to or above the old BFE, even if DHS/FEMA has issued a map revision that shows a lower one. The community's ordinance can always be more restrictive than the NFIP's minimum floodplain management criteria.

10.2.4. Floodway revisions

A request to change a floodway map can *only* be submitted by a local government or must be concurred with by the local government. Communities interested in changing the floodway boundaries should contact DHS/FEMA for assistance. Note that no floodway revision will be granted unless the revision still meets the requirements of the NFIP regulations.

10.2.5. Areas to be protected by a flood control project

DHS/FEMA may issue a map revision to communities with a flood control project under construction. The SFHA is designated as an "A99" Zone. See Section 10.4.5 for more information.

10.3. Letter of Map Amendment (LOMA)

Occasionally, individual structures or parcels of land may be inadvertently included in the Special Flood Hazard Area (SFHA). In other cases, it may be difficult to determine whether a structure or parcel of land is in the SFHA. A Letter of Map Amendment (LOMA) can be requested to show that the property is on natural high ground, at or above the base flood elevation (BFE).

10.3.1. Site elevations

Certification of the property's elevation is necessary when the best available maps do not clearly show a property higher than the BFE. The certification must be signed, sealed and dated by a licensed architect, engineer, or surveyor. It is recommended that DHS/FEMA's Elevation Certificate be used (Section 24.2).

For a lot with a building on it: It must be shown that the lowest adjacent grade (LAG) of natural ground is at or above the base flood elevation.

Lowest Adjacent Grade

Lowest Adjacent Grade (LAG) is the lowest point around the outside of a building where soil touches the foundation.

For a vacant lot: It must be shown that the *lowest elevation* within the boundaries of the property is at or above the BFE. If the proposed building site is at or above the BFE but some parts of the lot are below the BFE, a Conditional Letter of Map Amendment (CLOMA) can be requested.

10.3.2. Conditional LOMA (CLOMA)

A person may request a *Conditional* Letter of Map Amendment, or CLOMA. This is done when the structure has not yet been built, but ground elevations show that the building site is at or above the BFE. A CLOMA is based on the natural grade being at or above the BFE. If filling is proposed to bring the site at or above the BFE, a CLOMR-F is used (Section 10.5.1). Note the *conditional* part of a CLOMA as discussed in Section 10.1.3.

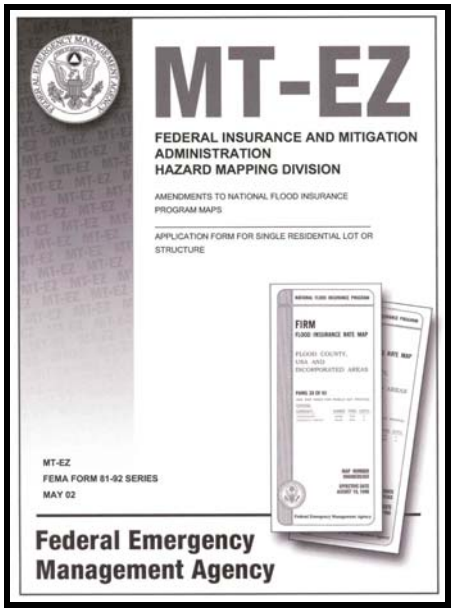


Figure 10-5. The MT-EZ form.

10.3.3. Procedures

Requests for LOMAs for a single lot are submitted using DHS/FEMA's form MT-EZ (Figure 10-5).

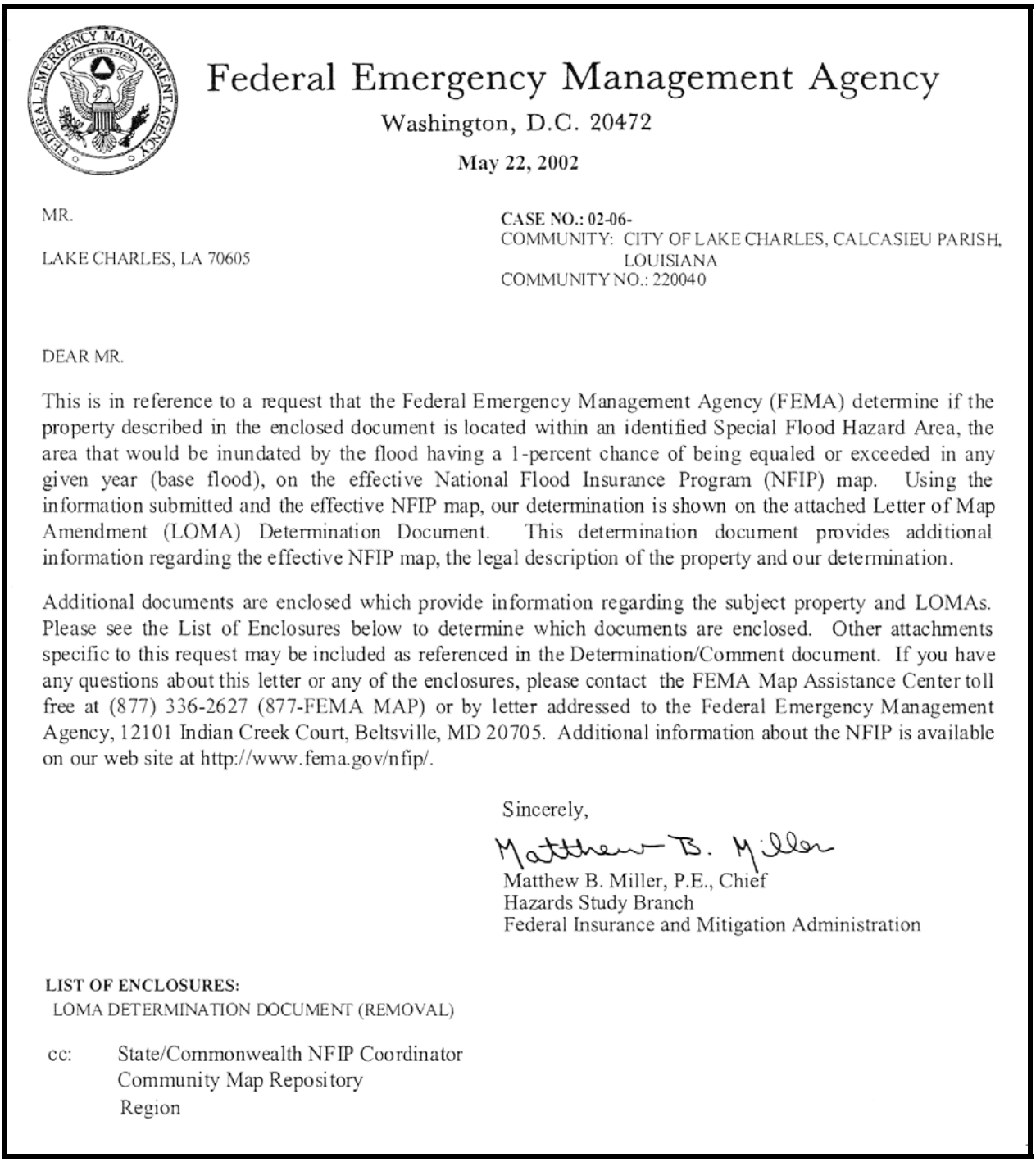
Requests for multiple lot LOMAs and Conditional LOMAs (CLOMAs) are submitted using DHS/FEMA's form MT-1 (Figure 10-10).

An elevation certificate is recommended if there is a building on the lot (Section 24.2). All forms and instructions can be downloaded from DHS/FEMA's website, www.FEMA.gov.

10.3.4. The community's role

It is the applicant's responsibility to ensure that the request for a map revision is correct. Since a LOMA does not propose revising flood data, there is no requirement for the community to comment or review the application. The community will be sent a copy of all LOMAs and CLOMAs after they are issued.

Figures 10-6 through 10-8 provide an example of a LOMA issued to amend the FIRM for Lake Charles. Note the additional considerations on the second page of the LOMA form—the community is advised that the LOMA only affects the structure and the rest of the lot is still subject to floodplain management regulations.



Federal Emergency Management Agency

Washington, D.C. 20472

May 22, 2002

MR.

LAKE CHARLES, LA 70605

CASE NO.: 02-06-
COMMUNITY: CITY OF LAKE CHARLES, CALCASIEU PARISH, LOUISIANA
COMMUNITY NO.: 220040

DEAR MR.

This is in reference to a request that the Federal Emergency Management Agency (FEMA) determine if the property described in the enclosed document is located within an identified Special Flood Hazard Area, the area that would be inundated by the flood having a 1-percent chance of being equaled or exceeded in any given year (base flood), on the effective National Flood Insurance Program (NFIP) map. Using the information submitted and the effective NFIP map, our determination is shown on the attached Letter of Map Amendment (LOMA) Determination Document. This determination document provides additional information regarding the effective NFIP map, the legal description of the property and our determination.

Additional documents are enclosed which provide information regarding the subject property and LOMAs. Please see the List of Enclosures below to determine which documents are enclosed. Other attachments specific to this request may be included as referenced in the Determination/Comment document. If you have any questions about this letter or any of the enclosures, please contact the FEMA Map Assistance Center toll free at (877) 336-2627 (877-FEMA MAP) or by letter addressed to the Federal Emergency Management Agency, 12101 Indian Creek Court, Beltsville, MD 20705. Additional information about the NFIP is available on our web site at http://www.fema.gov/nfip/.

Sincerely,

Matthew B. Miller

Matthew B. Miller, P.E., Chief
Hazards Study Branch
Federal Insurance and Mitigation Administration

LIST OF ENCLOSURES:
LOMA DETERMINATION DOCUMENT (REMOVAL)

cc: State/Commonwealth NFIP Coordinator
Community Map Repository
Region

Figure 10-6. Cover page of a LOMA.

Note: References to the property address and owner's name have been removed.

Page 1 of 2		Date: May 22, 2002	Case No.: 02-06-	LOMA

Federal Emergency Management Agency
Washington, D.C. 20472

LETTER OF MAP AMENDMENT
DETERMINATION DOCUMENT (REMOVAL)

COMMUNITY AND MAP PANEL INFORMATION		LEGAL PROPERTY DESCRIPTION
COMMUNITY	City of Lake Charles, Calcasieu Parish, Louisiana	Lot , Waterwood Estates, as shown on Plat, File No. 1792 , recorded in Plat Book 31, Page 217, filed on March 9, 1984, by the Recorder, Calcasieu Parish, Louisiana
	COMMUNITY NO.: 220040	
AFFECTED MAP PANEL	NUMBER: 2200400010E	
	NAME: City of Lake Charles, Calcasieu Parish, Louisiana	
	DATE: 07/03/1997	
FLOODING SOURCE: BAYOU CONTRABAND		APPROXIMATE LATITUDE & LONGITUDE OF PROPERTY: 30.178, -93.221 SOURCE OF LAT & LONG: MAPBLAST! DATUM: NAD 83

DETERMINATION

LOT	BLOCK/ SECTION	SUBDIVISION	STREET	OUTCOME WHAT IS REMOVED FROM THE SFHA	FLOOD ZONE	1% ANNUAL CHANCE FLOOD ELEVATION (NGVD 29)	LOWEST ADJACENT GRADE ELEVATION (NGVD 29)	LOWEST LOT ELEVATION (NGVD 29)
	—	Waterwood Estates	Drive	Structure	X (shaded)	11.4 feet	11.4 feet	—

Special Flood Hazard Area (SFHA) - The SFHA is an area that would be inundated by the flood having a 1-percent chance of being equaled or exceeded in any given year (base flood).

ADDITIONAL CONSIDERATIONS (Please refer to the appropriate section on Attachment 1 for the additional considerations listed below.)

PORTIONS REMAIN IN THE SFHA

This document provides the Federal Emergency Management Agency's determination regarding a request for a Letter of Map Amendment for the property described above. Using the information submitted and the effective National Flood Insurance Program (NFIP) map, we have determined that the structure(s) on the property(ies) is/are not located in the SFHA, an area inundated by the flood having a 1-percent chance of being equaled or exceeded in any given year (base flood). This document amends the effective NFIP map to remove the subject property from the SFHA located on the effective NFIP map; therefore, the Federal mandatory flood insurance requirement does not apply. However, the lender has the option to continue the flood insurance requirement to protect its financial risk on the loan. A Preferred Risk Policy (PRP) is available for buildings located outside the SFHA. Information about the PRP and how one can apply is enclosed.

This determination is based on the flood data presently available. The enclosed documents provide additional information regarding this determination. If you have any questions about this document, please contact the FEMA Map Assistance Center toll free at (877) 336-2627 (877-FEMA MAP) or by letter addressed to the Federal Emergency Management Agency, 12101 Indian Creek Court, Beltsville, MD 20705. Additional information about the NFIP is available on our web site at http://www.fema.gov/nfip/.

Matthew B. Miller

Matthew B. Miller, P.E., Chief
Hazards Study Branch
Federal Insurance and Mitigation Administration

Version 1.3.3

381703061179

Figure 10-7. First page of a LOMA.

Page 2 of 2		Date: May 22, 2002	Case No.: 02-06-	LOMA

Federal Emergency Management Agency
Washington, D.C. 20472

LETTER OF MAP AMENDMENT
DETERMINATION DOCUMENT (REMOVAL)
ATTACHMENT 1 (ADDITIONAL CONSIDERATIONS)

PORTIONS OF THE PROPERTY REMAIN IN THE SFHA (This Additional Consideration applies to the preceding 1 Property.)

This Determination Document has removed the subject of the determination from the Special Flood Hazard Area (SFHA). However, portions of the property may remain in the SFHA. Therefore, any future construction or substantial improvement on the property remains subject to Federal, State/Commonwealth, and local regulations for floodplain management.

This attachment provides additional information regarding this request. If you have any questions about this attachment, please contact the FEMA Map Assistance Center toll free at (877) 336-2627 (877-FEMA MAP) or by letter addressed to the Federal Emergency Management Agency, 12101 Indian Creek Court, Beltsville, MD 20705. Additional information about the NFIP is available on our web site at http://www.fema.gov/nfip/.

Matthew B. Miller

Matthew B. Miller, P.E., Chief
Hazards Study Branch
Federal Insurance and Mitigation Administration

Version 1.3.3

381703061179

Figure 10-8. Second page of a LOMA.

10.4. Letter of Map Revision (LOMR)

The reasons for requesting a LOMR are the same as for a physical map revision. The difference is that DHS/FEMA will issue a LOMR when the affected area is relatively small. If the area affected is large, it may be easier for DHS/FEMA to issue an entire new map or panel.

A LOMR may be issued for the same reasons as a physical map revision:

- When a flood study is prepared for an unnumbered A Zone
- When a new study revises the existing study
- If a new levee, reservoir, or channel modification affects the flow of the base flood

It is important to note that many small projects, such as channel clearing, low-level dams, private levees, land treatment, or retention basins in new subdivisions do not have a measurable effect on the base flood, and, therefore, do not warrant a map change.

10.4.1. Conditional LOMR (CLOMR)

The Conditional Letter of Map Revision (CLOMR) allows for approval of anticipated map revisions based on proposed modifications or conditions that are expected to exist in the future. Under this process, engineering data may be submitted for a proposed project or future condition with a request that DHS/FEMA review the data and issue a CLOMR describing the revision(s) that may be made upon completion of the proposed work.

DHS/FEMA only *requires* a CLOMR for proposed revisions involving the floodway or for a project that will cause more than a 1-foot increase in flood heights where no floodway has been delineated. This process normally involves revised modeling and it requires submittal of certified as-built plans of initial filling, grading, etc., so that a LOMR may be issued. As-built elevations must match proposed elevations.

Note the *conditional* part of a CLOMR**.** A CLOMR states that *if* a project is constructed as designed, the base flood elevations can be revised or modified (or the property in question can be removed from the SFHA) ***after*** the as-built specifications are submitted and the final LOMR is issued.

It is important for local officials to understand that a permit cannot be issued based on a lower base flood elevation or different floodway delineation proposed by a *conditional* letter until the final letter is issued. However, a permit can be issued for that part of the work not dependent on the changes that will result from the letter (e.g., construction in the fringe could be permitted while waiting for a LOMR that revises the floodway boundary). See also the discussion in Section 10.1.3.

10.4.2. Procedures

Requests for LOMRs and CLOMRs are submitted using DHS/FEMA's form MT-2 (Figure 10-9). This form and its instructions can be downloaded from DHS/FEMA's website, www.FEMA.gov.

There are processing fees for both LOMRs and CLOMRs.

It is the applicant's responsibility to ensure that the request for a LOMR or CLOMR is correct. The applicant is typically the party who would benefit most from a new map. Usually, the applicant is the property owner who wants to eliminate the flood insurance purchase requirement or the requirements of the community's flood damage prevention ordinance.

Figure 10-9. The MT-2 form.

10.4.3. The community's role

In some cases, a community will submit a request for map revision. This happens, for example, when the community has completed a new flood study and wants to use it to replace the data shown on the FIRM.

No matter who initiates the request for a LOMR, if it is for a change in the regulatory data, such as the base flood elevation, the request must have the community's agreement before DHS/FEMA will approve it.

As noted in Section 10.4.1, a permit should not be based on a lower base flood elevation or different floodway delineation proposed by a *conditional* letter until the final letter is issued.

Note that the community can continue to require that new construction be elevated to or above the old BFE, even if DHS/FEMA has issued a map revision that shows a lower one. The community's ordinance can always be more restrictive than the NFIP's minimum floodplain management criteria.

10.4.4. Floodway revisions

A request to change a floodway map can *only* be submitted by a local government or must be concurred with by the local government. Communities interested in changing the floodway boundaries should contact DHS/FEMA for assistance. Note that no floodway revision will be granted unless the revision still meets the requirements of Part 65.12 of the NFIP regulations.

10.4.5. Areas to be protected by a flood control project

DHS/FEMA may issue a Letter of Map Revision for a flood control project under construction. The SFHA is designated as an “A99” Zone. This designation will be changed to an X Zone when the flood control project is completed. The flood insurance purchase requirement remains in effect in an A99 Zone floodplain, but the rates are reduced to X Zone rates (see Section 25 on flood insurance rates).

If the project is federally funded, then DHS/FEMA will revise the FIRM to show an A99 Zone if the critical features of the project are under construction, 50% of the total cost has been expended, and 100% of the funding is authorized.

If a flood control project does not involve federal funds, DHS/FEMA would handle a map revision request as a Conditional Letter of Map Revision. The project sponsor must submit engineering and technical information to document the level of protection, how the floodplain is modified, the structural adequacy of the project, and operation and maintenance requirements. The FIRM would be changed after the project is complete and "as built" plans have been certified and submitted to DHS/FEMA.

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

A Letter of Map Revision Based on Fill (LOMR-F) removes a structure or property from the SFHA based on the placement of fill. No fill can be placed in the floodway.

Fill is defined as material from any source placed to raise the ground (natural grade) to or above the base flood elevation (BFE). The common construction practice of removing unsuitable existing material (topsoil) and backfilling with select structural material is not considered the placement of fill if the practice does not alter the existing (natural grade) elevation, which is at or above the BFE.

Fill that is placed *before* the date of the first NFIP map showing the area in a Special Flood Hazard Area (SFHA) is considered natural grade. If the building site is on natural grade at or above the BFE, a LOMA should be used to formally declare the site outside the SFHA (Section 10.3).

The LOMR-F process involves providing data on existing conditions but does not involve revisions to base flood elevations or floodway boundaries. What is needed for a LOMR-F depends on whether there is a building on the site.

- LOMR-Fs for a vacant lot, the lowest lot elevation must be at or above the base flood elevation
- LOMR-Fs for a lot with a building on it, the lowest adjacent grade (LAG) *and* the lowest floor (including basement) must be at or above the base flood elevation

Lowest Adjacent Grade

Lowest Adjacent Grade (LAG) is the lowest point around the outside of a building where soil touches the foundation.

In order for a building to be removed from the SFHA, the LAG and lowest floor (including basement) must be at or above the BFE. Certification of LAG, lowest floor, and fill compaction is required as well as community acknowledgment of the project.

10.5.1. Conditional LOMR-F (CLOMR-F)

The Conditional Letter of Map Revision Based on Fill (CLOMR-F) allows for approval of an anticipated filling project.

Note the *conditional* part of a CLOMR-F**.** A CLOMR-F states that *if* a project is constructed as designed, the property in question can be removed from the SFHA ***after*** the as-built specifications are submitted and the final LOMR-F is issued.

A permit to construct a building cannot be issued based on proposed filling until the final LOMR-F is issued. However, a permit can be issued for that part of the work not dependent on the changes that will result from the LOMR-F, such as approval to begin filling the site. See also the discussion in Section 10.1.3.

10.5.2. Procedures

Requests for a LOMR-F and a CLOMR-F are submitted using DHS/FEMA's form MT-1 (Figure 10-10). This form and its instructions can be downloaded from DHS/FEMA's website, www.FEMA.gov.

Figure 10-10. The MT-1 form.

There are processing fees for both a LOMR-F and a CLOMR-F.

10.5.3. The community's role

The community has two responsibilities. First, it must not issue a permit to construct a building based on *proposed* fill. The floodplain administrator must wait until the final LOMR-F is issued (Section 10.5.1).

The second responsibility is to comment on the application for a LOMR-F or CLOMR-F. The application must include a written assurance signed by a local official that the site will be "reasonably safe from flooding." The NFIP regulations, 44 CFR 65.2(c), define "reasonably safe from flooding" to mean that "base flood waters will not inundate the land or damage structures … and any subsurface waters related to the base flood will not damage existing or proposed buildings."

In May 2001, DHS/FEMA published *Ensuring That Structures Built on Fill In or Near Special Flood Hazard Areas Are Reasonably Safe from Flooding in Accordance with the National Flood Insurance Program* (Technical Bulletin 10-01). Here are some quotes from that document:

> By issuance of this Technical Bulletin, FEMA is noting that residual flood hazards may exist in areas elevated above the BFE [100-year flood elevation] by the placement of engineered earthen fill. Residual risks in these areas include subsurface flood conditions and flooding from events that exceed the base flood. This bulletin is intended to guide local floodplain management officials in determining whether structures placed in filled areas are reasonably safe from flooding. FEMA will require that the jurisdiction having authority for floodplain management determine that an area is reasonably safe from flooding before removing it from the SFHA....
>
> As required by state and local floodplain management ordinances, a proposed development must be determined to be reasonably safe from flooding. The official having the authority to make this determination should require all appropriate information for making the determination. This may include a certification by a qualified design professional that indicates the land or structures to be removed from the SFHA are reasonably safe from flooding, according to the criteria described in this technical bulletin. Such a professional certification may come from a professional engineer, professional geologist, professional soil scientist, or other design professional qualified to make such evaluations.

Technical Bulletin 10-01 can be downloaded from DHS/FEMA's website (www.fema.gov). On page 15 is a checklist that the local official can use to help make the determination. As noted above, it may help to require the developer to provide a certification by a qualified design professional that indicates the land or structures to be removed from the SFHA are reasonably safe from flooding. A sample of such a certification is shown in the technical bulletin.

The local official's written assurance should be on the "Community Acknowledgement Form" (FEMA Form 81-87B), that is included in the MT-1 package.

10.6. Community Responsibilities

A community has five responsibilities related to FIRM maintenance and revisions.

10.6.1. Submit corrections

The first responsibility is to submit corrections or revisions to maps when the community finds an error or change in conditions. A community participating in the NFIP is obligated by its agreement with DHS/FEMA to submit new or revised map information when it becomes available.

> **44 CFR 65.3 Requirement to submit new technical data: A community's base flood elevations may increase or …a community's 100-year flood elevations may increase or decrease resulting from physical changes affecting flooding conditions. As soon as practicable, but not later than six months after the date such information becomes available, a community shall notify [FEMA] of the changes by submitting technical or scientific data…**

10.6.2. Report annexations

If a municipality annexes property in the parish, documentation must be submitted to the DHS/FEMA Regional Office (Section 31). The submittal needs to include a copy of the ordinance of annexation. This must be done within one year of an annexation or when the community has assumed or relinquished authority to regulate development in a particular area (the NFIP has special procedures that need to be followed to ensure that these areas are properly mapped and regulated and remain eligible for flood insurance).

Because it is expensive to reprint and redistribute flood maps, corporate boundary changes are usually made only when maps are revised for other reasons, such as new or better flood data. The municipality does not need a new map if it has annexed an area that is shown on the parish's FIRM. It must use the parish's FIRM and the flood data in the parish's Flood Insurance Study (FIS) (Section 9.2.3).

10.6.3. Use the latest map information

As the primary repository for NFIP maps and studies, it is important for the community to maintain adequate copies and keep them updated. It should have at least one master map that includes all the changes, annexations, map revisions, etc.

Communities should always work off the most current FIRM, Floodway Map or Flood Hazard Boundary Map. The map user needs to be sure that the data and maps reflect annexations, LOMAs, LOMRs, and other changes.

Because LOMAs and LOMRs officially amend or revise the effective NFIP map, they are public records that the community must maintain. LOMAs and LOMRs should be noted on the community's master flood maps and filed by panel number in an accessible location.

When a Flood Insurance Study is revised, it will include a section explaining the changes that were made to the previously adopted data. Generally, the revision will incorporate all past LOMRs, but not necessarily all past LOMAs or LOMR-Fs (they may be too small to be reflected on the map).

Two products are available to help a community ensure that its file of LOMAs and LOMRs is complete:

1. The FIS Data List identifies the current map panels (FIRM and Floodway), panel by panel, and gives the effective date for each. It also lists the current FIS report date and all the LOMAs and LOMRs in effect within the community.

2. The Summary of Map Actions (SOMA) is issued when a FIRM is revised. It details the status of all map changes after the new FIRM becomes effective. The SOMA categorizes LOMAs by those that were incorporated into the new FIRM, those that could not be incorporated due to map scale limitations but will be revalidated, and those that will be superseded by updated flood hazard information.

These products can be special ordered through the Mapping Coordination Contractor (Section 31).

10.6.4. Review map revision requests

Map revisions, LOMRs, and LOMR-Fs are revisions to the community's regulatory data. DHS/FEMA will not approve an application unless the local regulatory authority agrees. This can be in the form of a memo to the DHS/FEMA Regional office (Section 31). See Sections 10.2.3, 10.3.4, 10.4.3 and 10.5.3 on the community's role for each type of map change.

10.6.5. Keep old maps

It is important for the community to keep copies of old, revised maps and studies. They provide a historical record of what was known and the basis of what was required in the past. For example, a property may not have been shown in the SFHA on an old FIRM, so there were no building requirements. If that property is later flooded, the community would have the old map to show that the property was not in the SFHA when it was built.

Similarly, people who purchased flood insurance based on the flood zone in effect at the time are entitled to keep that flood zone as the basis for their rates, as long as the policy is continuously maintained. These residents may need to see old FIRMs or Flood Hazard Boundary Maps to support this benefit.

Section 11. Rules for Elevated Buildings

Contents

***Note*:** Elevated buildings must also meet some of the requirements spelled out for all buildings in Section 12. Elevated buildings on the coast must also meet the requirements in Section 16.

11.1. Protecting Buildings

11.1.1. "Building" and "structure"

One of the prime objectives of the National Flood Insurance Program (NFIP) and local floodplain management programs is to protect new buildings. In this Desk Reference, the term "building" is the same as the term "structure" in the NFIP regulations and the DHS/FEMA model ordinance. The local ordinance may use either term.

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

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

How to determine if a building is substantially improved or substantially damaged is discussed in Sections 13 and 14. In this section, the term "building" is used as an all-encompassing term that includes substantial improvements and repairs of substantial damage to a building.

11.1.2. Protecting buildings

Buildings must be protected from the base flood. Many communities require protection to 1 foot or 2 feet above the base flood elevation (BFE). This is strongly encouraged and credited by the Community Rating System (CRS) (Section 26). In areas of this document that discuss protecting a building to the BFE, the reader must remember that a higher level is recommended and may be required by the community's ordinance.

Residential and nonresidential buildings are treated differently. A residential building built in the floodplain must be elevated to or above the base flood elevation. Nonresidential buildings, on the other hand, may be elevated or floodproofed.

This section reviews basic building protection requirements for elevated buildings. Other provisions, including floodproofing nonresidential buildings, are in Section 12. Additional requirements in coastal floodplains are explained in Section 16.

11.1.3. How high?

NFIP regulations require that the lowest floor of a building must be elevated to or above the base flood elevation. Note three things about this requirement:

1. The *minimum* requirement is to elevate to the BFE. Some communities require elevation to be 1 foot or 2 feet higher. As noted in Section 17.1, this is recommended.

2. In A Zones, under the minimum NFIP requirement, the lowest floor is measured from the top of the floor (Figure 11-1). However, it is recommended that buildings on elevated foundations, such as piles or a crawlspace, have supporting beams or floor joists above the BFE to protect them from flood damage.

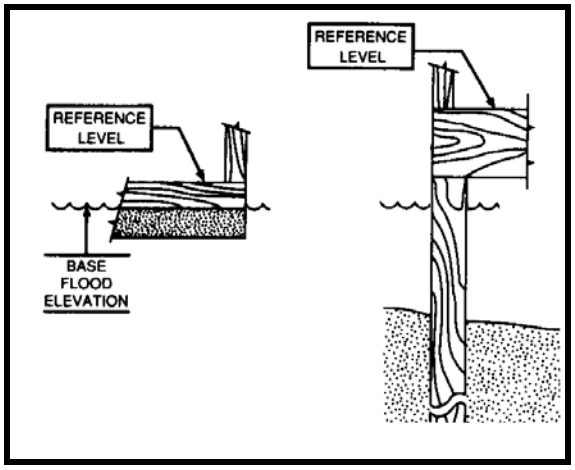


Figure 11-1. In A Zones, the top of the floor is the reference level.

3. The term "lowest floor" includes a basement and any other level below grade because all usable portions of a building must be protected from flood damage.

> **44 CFR 59.1: Definitions: "Lowest Floor" means the lowest floor of the lowest enclosed area (including basement). An unfinished or flood resistant enclosure, usable solely for parking of vehicles, building access or storage in an area other than a basement area is not considered a building's lowest floor; provided, that such enclosure is not built so as to render the structure in violation of the applicable non-elevation design requirements of Section 60.3.**

11.1.4. Elevation certificate

Since most new buildings built in the floodplain are residences, elevating them is one of the most important requirements of the NFIP. To ensure that a building is elevated to or above the BFE, the lowest floor is surveyed and a licensed surveyor, engineer, or architect completes an elevation certificate. The local permit office keeps a copy of the certificate. This is discussed in more detail in Section 24.2.

> Completing and maintaining the DHS/FEMA Elevation Certificate is an important element of a floodplain management program (Section 24.2).

11.2. Elevation Techniques

Elevating a building to or above the base flood elevation is the most common and secure way to protect a building from flood damage. It is the only way allowed for residential buildings.

> **44 CFR 60.3(c)(2) [Communities must] Require that all new construction and substantial improvements of residential structures within Zones A1-30, AE and AH zones on the community's FIRM have the lowest floor (including basement) elevated to or above the base flood level…**

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

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

11.2.1. Fill

NFIP regulations allow fill to be used, but restrictions apply in floodways where fill would cause an increase in flood heights and in V Zones. Where fill is the method of choice, it should be properly designed, installed in layers, and compacted. Simply adding dirt to the building site may result in differential settling over time.

The fill must not adversely affect the flow of drainage from or onto neighboring properties. The fill must be protected from erosion and scour during flooding. In areas with low velocity flooding, planting grass can do this (Figure 11-2). In higher velocity areas, rip rap or walls may be necessary.

Figure 11-2. This KFC restaurant in East Baton Rouge Parish was built on fill according to the parish's floodplain management ordinance. There was no water in the building during Tropical Storm Allison in 2002.

Source: *Promoting Mitigation in Louisiana – Performance Analysis*, p. 4

There are two schools of thought on the amount of fill that should be placed. Some communities want to provide a factor of safety for the building and its residents and require that the fill extend 10 feet to 15 feet beyond the walls of the structure before it drops below the BFE.

Other communities, concerned about too much fill displacing floodwater storage, do not allow filling to extend more than 2 feet beyond the walls. Where flooding is deep, this requires a chain wall or retaining wall.

DHS/FEMA's Technical Bulletin 10-01, *Ensuring That Structures Built on Fill In or Near Special Flood Hazard Areas Are Reasonably Safe from Flooding in Accordance with the National Flood Insurance Program,* has some good guidance on constructing buildings on fill. Additional concerns discussed in Section 10.5 should be reviewed if the builder intends to build on fill and submit a request for a Letter of Map Revision based on fill (LOMR-F).

> ***Note:*** State and Federal permits may be needed for filling certain areas (Section 20).

11.2.2. Piles, posts, piers, or columns

Piles, piers, posts, or columns are appropriate where there is deeper flooding and fill is not feasible (Figure 11-3). Elevation with no lower-area enclosure is preferred in areas where flooding is likely to have high velocities or create waves. This permits unrestricted flow of floodwater under a building, resulting in less force applied to the building by floodwaters and less impact on flood heights than if solid walls were used.

Figure 11-3. House elevated on piers (Slidell).

11.2.3. Walls or crawlspace

The third elevation technique is to build on solid walls. In shallower flooding areas, this elevation technique is the same as creating a crawlspace—a foundation of solid walls that puts the lowest floor to or above the flood level.

When solid walls are used, care must be taken to ensure that hydrostatic or hydrodynamic pressure does not damage the walls. As discussed in Section 2.2.2, these water pressures can break a solid wall or concrete floor.

Figure 11-4. Elevation on parallel walls.

There are two ways to prevent this:

- First, walls can be used on two sides, parallel to the flow of water. The other two sides are kept open (Figure 11-4) to minimize the obstruction to floodwaters and lessen pressure on the foundation.

- The second, more common, approach is to have openings large enough to allow floodwaters to flow in and out, preventing differential pressures on the walls. This is discussed in more detail in Section 11.3.

11.3. Enclosures

11.3.1. Problems with enclosures

Enclosures are areas created by a crawlspace or solid walls below the base flood elevation. Therefore, the walls of an enclosure are subject to hydrostatic and hydrodynamic forces. Damage to these walls can lead to damage to the entire structure. Depending on the height of the enclosure, people are often tempted to convert enclosures into additional living space or other uses that are subject to flood damage.

NFIP regulations allow certain uses in enclosures below the BFE because they are subject to minimal flood damage. Three uses are allowed in the area below the elevated floor:

- Building access
- Vehicle parking
- Storage of materials with low damage potential

The floodplain regulation requirements can be easier to accept if owners and builders are encouraged to think about the enclosed lower areas as usable space. If a building has to be elevated approximately 5 feet above grade, for example, the owner should be encouraged to go up 8 feet. The lower area could be used for parking and the owner would have an extra 3 feet of flood protection.

However, if the lower area is enclosed, the owner has the tendency to forget about the flood hazard and convert the enclosure to a bedroom or other finished room. This must be prevented. Future misunderstandings can be prevented by keeping thorough permit records, including the owner's signed acknowledgement of these stipulations. Figure 11-10 has an example statement that is signed by the owner.

11.3.2. Materials and utilities

The lower area on an elevated building must be floodable—it must be built of flood-resistant materials (Section 12.2.1 on what materials are acceptable). Finishings such as carpeting, paneling, insulation (both cellulose and fiberglass), and gypsum wallboard (also known as drywall and sheet rock) are not allowed.

Utilities that serve the upper level also must be protected from flood damage. Consequently, a water heater or air conditioner cannot be put in such an enclosure unless it is at or above the base flood elevation. Air conditioning units should be suspended from the first floor's floor joists or on a pedestal, at or above the BFE. Section 12.5.2 provides guidelines on protecting fuel storage tanks.

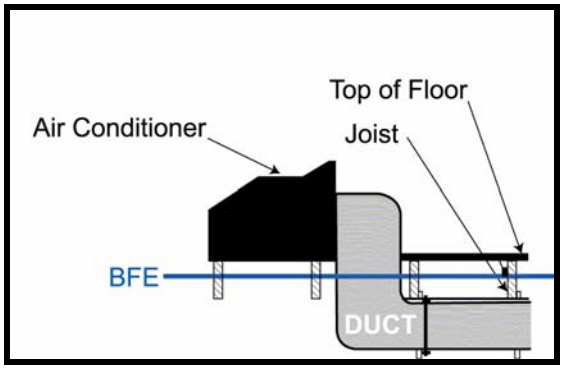


Figure 11-5. Just focusing on getting the lowest floor above the base flood elevation (BFE) means that floor joists and ductwork may still be flooded.

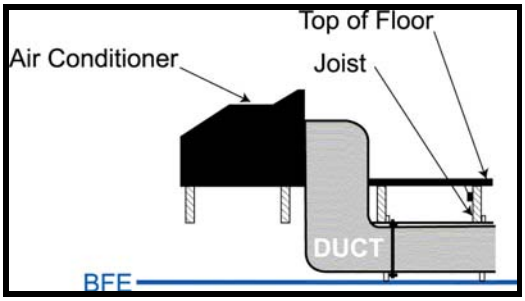


Figure 11-6. A properly elevated building has all damageable items, including floor joists, air conditioner, and ductwork, above the base flood elevation (BFE); the ductwork could also be run overhead, through the attic.

It is especially important to make sure that any ductwork in a crawlspace is also at or above the BFE (Figures 11-5 and 11-6). Refer to DHS/FEMA's guidebook, *Protecting Building Utilities from Flood Damage,* for additional information.

If the lower area is used for access to the upper level, a stairway that is resistant to flood damage can be easily designed. Installing an elevator is tricky, but there are ways to design and install an elevator that would face minimal flood damage, as explained in *Elevator Installation for Buildings Located in Special Flood Hazard Areas* (DHS/FEMA's Technical Bulletin 4-93).

11.3.3. Openings

As noted in Section 2.2.2, solid walls can collapse from hydrostatic pressure if floodwaters get too deep outside the building. To prevent this, the enclosure must have openings to allow floodwaters to enter and leave, thus automatically equalizing hydrostatic flood forces on both sides of the walls.

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

The design of a crawlspace or other enclosure must meet or exceed the following five criteria:

- Two or more openings must be installed in the foundation walls.
- The bottom of the openings must be no higher than 1 foot above grade.
- The openings should be on at least two walls of the enclosure to ensure that at least one will work if others become blocked or plugged.
- The openings must have a net area of not less than 1 square inch for every square foot of enclosed area that is subject to flooding. If the area of the enclosure is 1,000 square feet, the area of the openings combined must total at least 1,000 square inches.
- The openings must allow for automatic entry and exit of floodwaters.

A standard concrete block wall is 8 inches x 16 inches or 128 square inches (Figure 11-7). To determine how many openings would be needed in a concrete block wall, divide the square footage of the floor area by 128.

Example 1: $\frac{\text{1,280 square foot house}}{\text{128 square inches/opening}} = 10$ 10 openings will be needed

Example 2: $\frac{\text{2,000 square foot house}}{\text{128 square inches/opening}} = 15.62$ 16 openings will be needed

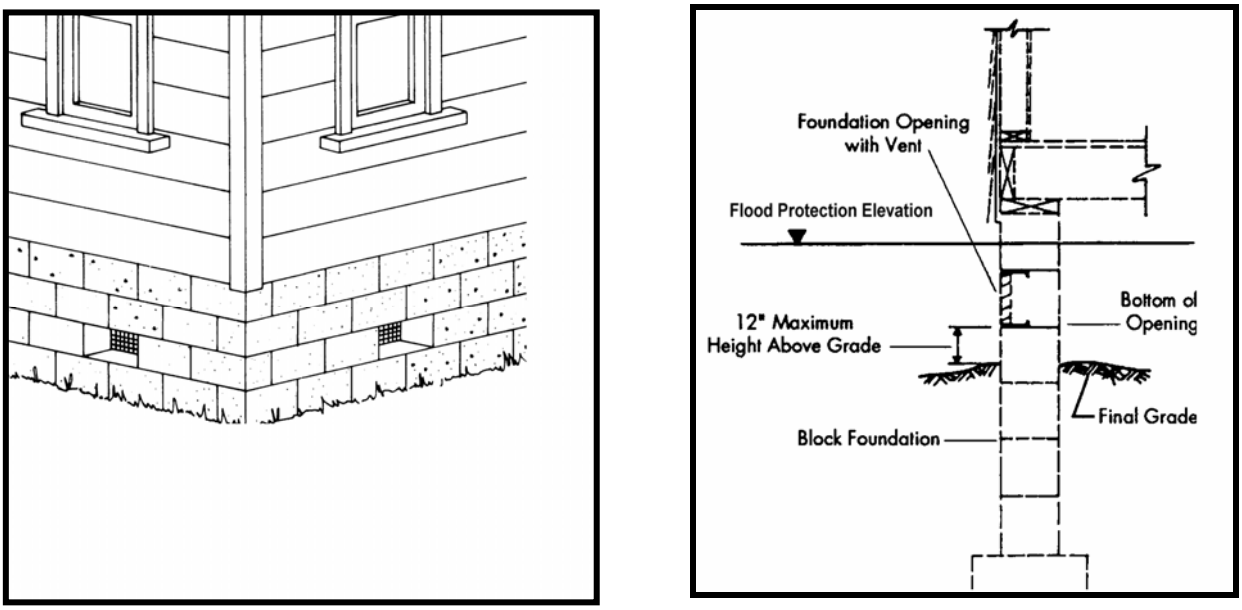


Figure 11-7. Opening location in solid foundation wall.

Openings may be equipped with screens, louvers, valves, or other coverings or devices to keep animals out of the enclosure. However, any covering must permit the automatic flow of floodwater in both directions. If the opening is covered by a standard crawlspace vent cover or grate, the net area of the opening must be used and the number of openings increased accordingly. Net areas can be found on manufacturer's specifications or estimated if specifications are not available.

The openings in Figure 11-8 are based on standard crawlspace vents, which most building codes require in a crawlspace for ventilation purposes. These are often located close to the floor joists to circulate air around the wooden members.

Such air circulation vents are located well above the ground in an elevated house and would not meet the NFIP requirement that the bottom of the opening be within 1 foot of grade (see the house on the right in Figure 11-8). However, NFIP requirements and building codes can be satisfied by the same vents if they meet the five criteria listed on the previous page.

Figure 11-8. The house on the left has compliant crawlspace openings. The openings in the foundation on the right are too high.

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

Openings are not required for chain wall foundations that have been backfilled for pouring of a concrete floor slab. See also, *Openings in Foundation Walls.*

There is an alternative to meeting these specifications. The builder may have a licensed professional engineer or architect certify that the foundation design meets the requirements of 44 CFR 60.3(c)(5).

11.3.4. Use of the area

Enclosed areas must be designed so there will be little or no flood damage. They must be used only for parking vehicles, storage, or access to the elevated living area. They should look like the interior in Figure 11-9.

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

Figure 11-9. This is how an enclosure below an elevated building should look, but over time the owner may want to improve and finish the area.

The builder and owner should be advised that a flood insurance policy will not cover items stored below an elevated floor. This limited coverage is explained more in Section 25.

The interior portion of an enclosed area should not be partitioned or finished into separate rooms, except to separate the garage from the access and storage areas. If interior walls are constructed, they must have openings that meet the same five criteria as openings in foundation walls.

If a building is elevated 8 feet or more, regulating the use of the enclosure presents special problems. Over time, the owner may forget the flood hazard and want to convert the floodable area into a finished room. Such an action would increase the flood damage potential for the building, violate the conditions of the building permit, and violate NFIP regulations.

However, because the room is hidden behind walls, it can be very hard for the permit office to catch such a conversion. The floodplain administrator should carefully check new building plans for signs, such as roughed-in plumbing and sliding glass doors, which indicate that the owner may plan to finish the area in the future. It is also a good idea to clearly state on the permit the construction rules and the limitations on use of the enclosed area.

11.3.5. Nonconversion agreement

Enforcing restrictions against conversion of enclosed areas below the BFE to habitable space is a problem for many floodplain administrators. Often, homeowners convert these spaces into bedrooms, recreation rooms, or other living areas long after the original permit for construction has been issued, resulting in a noncompliant structure. If the property changes ownership, new residents may claim ignorance of the restrictions. The conversions may be difficult to catch by even the most experienced building inspectors.

One way to help prevent conversions is to have the owner sign a nonconversion agreement. An example for A Zones is provided in Figure 11-10 and one for V Zones is in Figure 16-8. The owner and the Recorder of Deeds sign the form indicating that the restrictions on the below BFE enclosure have been recorded on the deed to the property. Since the deed follows the property, future homebuyers are informed of the restrictions.

Figure 11-10. On the next page is an example nonconversion agreement for buildings with enclosures below an elevated floor. This example can be photocopied and used locally. A nonconversion agreement is only necessary if the finished floor is 5 feet or more above grade. See Figure 16-8 for an example version to use in V Zones.

NONCONVERSION AGREEMENT
FOR CERTAIN STRUCTURES IN THE FLOODPLAIN

Application has been made for a Permit from _____ *[community name]*, Louisiana.

Permit # _____

Property Owner _____

Address _____

Deed dated _____, Recorded _____

Tax map _____, block _____, parcel _____.

Base Flood Elevation at the site is _____ feet (NGVD).

Map Panel Number _____, effective date _____.

In consideration for the granting of a Permit for the above structure, the Property Owner agrees to the following:

1. That the enclosed area below the base flood elevation shall be used solely for parking of vehicles, limited storage, or access to the building and will never be used for human habitation without first becoming fully compliant with the Flood damage prevention ordinance in effect at the time of conversion.

2. That all interior walls, ceilings, and floors below the Base Flood Elevation shall be unfinished or constructed of flood resistant materials.

3. That mechanical, electrical, or plumbing devices shall not be installed below the Base Flood Elevation.

4. The walls of the enclosed areas below the Base Flood Elevation shall be equipped with at least two vents which permit the automatic entry and exit of floodwater with total openings of at least one square inch for every square foot of enclosed area below flood level. The vents shall be on at least two different walls and the bottoms of the vents shall be no more than one foot above grade.

5. That any variation in construction beyond what is permitted shall constitute a violation of this agreement and Section ____of Ordinance #_____ .

6. That this Nonconversion Agreement becomes part of Permit # _____.

_____

Signature of Property Owner Witness Date

_____

At a minimum, the following has been recorded on the deed to the above property**:** "This structure has received special permission to be constructed in the Special Flood Hazard Area. The lowest floor shall not be finished or converted to a habitable space unless the enclosed area below the Base Flood Elevation becomes fully compliant with Ordinance #_____ in effect at the time of conversion. At this site, the Base Flood Elevation is _____feet, National Geodetic Vertical Datum."

_____

Signature, Recorder of Deeds Date

Section 12. Additional Rules for New Buildings

Contents

Note: The basic requirements for elevated buildings are spelled out in Section 11. Buildings on the coast must also meet the requirements in Section 16.

12.1. Floodproofing

Nonresidential buildings must be elevated or floodproofed. If they are elevated, they must meet the same standards as for residential buildings that were reviewed in Section 11. Elevation is the preferred method because it is more dependable. Elevated commercial and industrial buildings often can be designed so that they can continue to operate during a flood, thereby reducing or eliminating business disruptions. Another reason that elevation is preferred over floodproofing as a flood protection method is that it often proves to be less expensive. Section 24.3.3

12.1.1. NFIP requirements

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

44 CFR 60.3(c)(3) [Communities must] Require that all new construction and substantial improvements of non-residential structures within Zones A1-30, AE and AH zones on the community's firm (i) have the lowest floor (including basement) elevated to or above the base flood level or, (ii) together with attendant utility and sanitary facilities, be designed so that below the base flood level the structure is watertight with walls substantially impermeable to the passage of water and with structural components having the capability of resisting hydrostatic and hydrodynamic loads and effects of buoyancy;

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

For the purposes of regulating new construction, floodproofing is defined as measures incorporated into the design of the building so that below the base flood elevation (BFE):

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

Most floodproofing is appropriate only where floodwaters are less than 3 feet deep, since walls and floors may collapse under higher water levels.

A licensed professional engineer or architect must prepare the building plans and certify the floodproofing measures. The community Floodplain Administrator must document floodproofed buildings in floodplains, and the best documentation, in addition to the building plans, is the DHS/FEMA Floodproofing Certificate form (Section 24.3.3).

12.1.2. Human intervention

Human intervention means that in order for a floodproofing measure to work, a person has to take some action before the floodwater arrives, such as turn a valve, close an opening, or switch on a pump (Figure 12-1).

There are many potential causes of failure for these techniques, including inadequate warning time, no person on duty when the warning is issued, the responsible person can't find the right parts or tools, the person is too excited or too weak to install things correctly, and/or the electricity fails. Although the NFIP allows floodproofing techniques that require human intervention or an outside source of power, they should be discouraged.

Figure 12-1. This floodproofed restaurant in Mandeville is an example of where human intervention is needed. Protecting this nonresidential building is dependent on installing a doorway barrier in time.

Before plans are approved for a building that relies on human intervention to be floodproofed, the administrator should make sure that (1) the ordinance allows it and (2) there are plans and precautions to keep problems from occurring. Techniques that rely on human intervention should only be allowed in areas with adequate warning time and in situations where someone who is capable of implementing or installing the required measures will be present.

More information on floodproofing can be found in *Non-Residential Floodproofing Requirements and Certification for Buildings Located in Special Flood Hazard Areas* (DHS/FEMA Technical Bulletin 3-93).

12.1.3. How high?

The minimum NFIP requirement is to floodproof a building to the BFE. However, when a building is rated for flood insurance, 1 foot is subtracted from the floodproofed elevation. Therefore, a building floodproofed *to 1 foot above the base flood elevation* receives the same insurance rates as a building *elevated to the base flood elevation.* A minimum of 1 foot above the BFE helps the building owner reduce insurance costs.

12.2. Provisions for All Buildings

12.2.1. Flood-resistant material

Whether a building is elevated or floodproofed, it is important that all of the parts exposed to floodwaters be made of flood-resistant materials.

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

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

The following are examples of flood resistant materials:

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

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

12.2.2. Anchoring

44 CFR 60.3(a)(3) …If a proposed building site is in a floodprone area, all new construction and substantial improvements shall (i) be designed (or modified) and adequately anchored to prevent flotation, collapse, or lateral movement of the structure resulting from hydrodynamic and hydrostatic loads, including the effects of buoyancy…

Both elevated and floodproofed buildings must be properly anchored to stabilize them against flood forces. This means anchoring the building to its foundation and ensuring that the foundation will not move. Therefore, the floodplain administrator must ensure that there is adequate protection against hydrostatic and hydrodynamic forces, as well as erosion and scour, which can undercut the foundation.

In areas of shallow flooding and low flood velocities, normal construction practices suffice. Additional anchoring measures, such as reinforcing crawlspace walls, using deeper footings, using extra bolts to connect the sill to the foundation, or installing rods to connect the cap to the sill (Figure 12-2), should be required in three situations:

- Areas where the flood flows are faster than 5 feet per second
- In areas subject to waves and high winds
- In manufactured homes (Section 12.4.3)

It may be necessary in some areas to use foundations, such as piles or piers, which provide less resistance to floodwaters.

In areas where these conditions are present, the builder's architect or engineer should sign a statement saying that the design of the building includes "anchoring adequate to prevent flotation, collapse, and lateral movement" during the base flood.

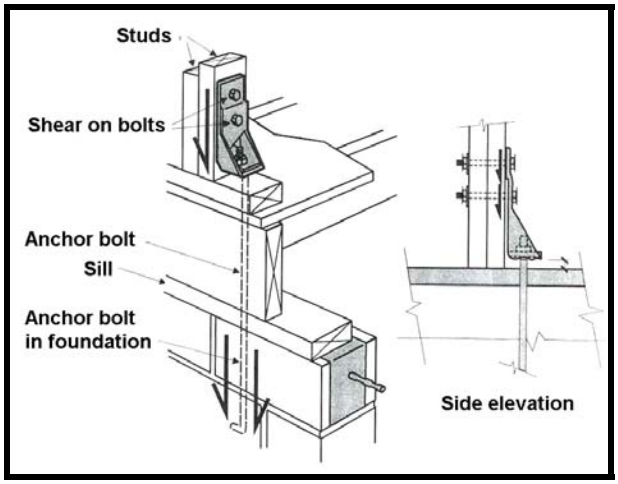


Figure 12-2. Details on anchoring a building for high velocity flooding and/or high winds.

Source: *Windstorm Mitigation Manual for Light Frame Construction*, Illinois Emergency Management Agency, 1997.

12.2.3. AO and AH Zones

AO Zones are shallow flooding areas where DHS/FEMA provides a base flood depth. They are discussed in Section 8.3.2. Since there is no BFE, the rules read a little differently.

In AO Zones, all new construction and substantial improvements of residential structures shall have the lowest floor (including basement) elevated above the highest adjacent grade:

- At least as high as the depth number specified in feet on the community's FIRM or
- At least 2 feet if no depth number is specified

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

AH Zones are sheet flow areas with base flood elevations. They are also discussed in Section 8.3.2. In AO and AH Zones, adequate drainage paths are required around structures on slopes to guide floodwater around and away from proposed structures. Requiring this throughout the community is a good idea because it will prevent local drainage problems from causing surface flooding.

12.2.4. Basements

The definition of the "lowest floor" includes basements and the definition of "basement" includes any floor level below grade.

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

Note that a floor that is below grade on only three sides with the fourth side at or above grade is not considered a basement. A sunken den, storm cellar, or other level in a building that is below grade on all sides is a basement for the purposes of the NFIP.

A basement is the lowest floor for both the regulatory and insurance aspects of the NFIP. For a new residential building in the floodplain, the lowest floor (including basement) must be at or above the base flood elevation. Because the lowest floor would have to be above grade, this essentially prohibits basements in the floodplain.

12.3. Subdivisions

The NFIP regulations protect insurable buildings and reduce future exposure to flood hazards. Sections 11 through 16 discuss rules for ensuring that new and existing buildings comply with the NFIP requirements.

This section covers additional requirements that help ensure that the buildings stay habitable and additional flood problems are not created.

12.3.1. Subdivision requirements

As noted in Section 9.3.4, larger subdivisions must provide BFEs if they are not already provided with the FIRM and Flood Insurance Study (FIS). With these data, new buildings must be properly elevated or floodproofed.

Subdivisions and other larger developments also must be reviewed to ensure they are reasonably safe from flood damage.

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

This review applies to subdivisions and other large developments, such as apartments, parks, shopping centers, schools, manufactured home parks, and planned unit developments. If these structures are floodprone, the builder should:

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

Site plans for new developments and proposed plats for subdivisions usually can be designed to minimize the potential for flood damage while still achieving the economic goals of the project.

Developers should be encouraged to view the floodplain as an amenity to be kept open to provide habitat, recreation and aesthetic benefits for future occupants. For example, lot size could be reduced, the lots could be clustered on high ground, and some building sites could have views of the floodplain (see also the discussion in Section 17).

12.3.2. Subdivision plats

Several Louisiana communities require subdividers to show the flood hazard on their final plats. These documents are filed with the official property records. When title searches or other property reviews are conducted, the hazard is disclosed. This is especially helpful for potential buyers. In the example in Figure 12-3, the community requires both the floodplain boundary and the minimum floor elevation to be posted on new subdivision plats.

Note: It is a good idea to reference the source of the flood hazard data on the plat so the designations can be superseded by later map revisions and amendments.

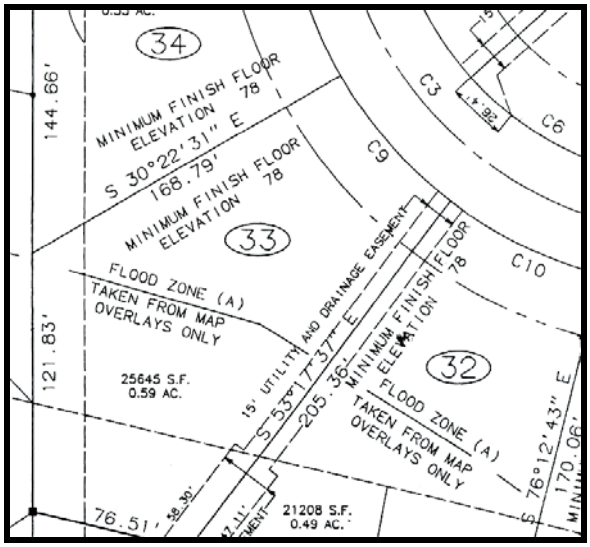


Figure 12-3. Subdivision plat showing flood hazard data.

12.3.3. Water and sewer systems

> **44 CFR 60.3(a)(5) [The community must] Require within floodprone areas new and replacement water supply systems to be designed to minimize or eliminate infiltration of flood waters into the systems; and**
>
> **44 CFR 60.3(a)(6) [The community must] Require within floodprone areas (i) new and replacement sanitary sewage systems to be designed to minimize or eliminate infiltration of flood waters into the systems and discharges from the systems into flood waters and (ii) onsite waste disposal systems to be located to avoid impairment to them or contamination from them during flooding.**

The objective of these requirements is to ensure that a building that is protected from flood damage can still be used after the flood recedes. In most instances, these criteria can be met through careful system design. Manholes should be raised above the base flood level or equipped with seals to prevent leakage. Pumping stations should have electrical panels elevated above the BFE.

Private septic systems, including any associated mechanical equipment, are subject to these requirements, too. The first objective should be to locate the system outside the flood hazard area. If this cannot be done, DHS/FEMA's *Protecting Building Utilities from Flood Damage*, contains guidelines for septic systems in the floodplain.

The municipal or parish health or sanitation department may already prohibit septic systems in the floodplain or have special design requirements that account for the wet conditions.

12.4. Manufactured homes

12.4.1. Definition

Under NFIP regulations, a manufactured home includes a building that is transportable, a mobile home, or a "double wide." The term does not include a "recreational vehicle," which is defined in Section 12.4.5. NFIP regulations use the term "manufactured home" to include mobile homes and prefabricated buildings.

> **44 CFR 59.1 Definitions: "Manufactured home" means a structure, transportable in one or more sections, which is built on a permanent chassis and is designed for use with or without a permanent foundation when attached to the required utilities. The term "manufactured home" does not include a "recreational vehicle."**

12.4.2. Elevation

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

> **44 CFR 59.1 Definitions: "Manufactured home park or subdivision" means a parcel (or contiguous parcels) of land divided into two or more manufactured home lots for rent or sale.**
>
> **44 CFR 60.3(c)(12) Require that manufactured homes to be placed or substantially improved on sites in an existing manufactured home park or subdivision within Zones A-1-30, AH, and AE on the community's FIRM that are not subject to the provisions of paragraph (c)(6) of this section be elevated so that either (I) the lowest floor of the manufactured home is at or above the base flood elevation, or (ii) the manufactured home chassis is supported by reinforced piers or other foundation elements of at least equivalent strength that are no less than 36 inches in height above grade and be securely anchored to an adequately anchored foundation system to resist floatation, collapse, and lateral movement.**

However, there can be difficulties in elevating manufactured homes to the BFE in an older manufactured home park due to small lot sizes and the split ownership of the manufactured home and the lot itself. Therefore, 44 CFR Section 60.3(c)(12) allows for a limited exemption to elevating to the BFE in pre-FIRM manufactured housing (mobile home) parks. In older parks, a newly placed manufactured home chassis may be elevated only 3 feet above grade, provided it "is supported by reinforced piers or other foundation elements of at least equivalent strength."

This exemption does *not* apply to:

- New manufactured housing (mobile home) parks
- Expansions to existing parks
- Manufactured housing located outside a pre-FIRM park

- Repairing or replacing a manufactured home (in a pre-FIRM park) substantially damaged by a flood

The exemption may not be necessary or appropriate for every community, especially if manufactured home parks are able to meet the requirement to elevate to the BFE. In other areas, the flood hazard may be so severe that the exemption may put lives and property at too great a risk.

NFIP/CRS

A community that does not allow this exemption for existing mobile home parks can receive Community Rating System (CRS) credit under Activity 430 (Higher Regulatory Standards).

12.4.3. Anchoring

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

A "permanent foundation" means more than a stack of concrete blocks. It should include the following factors:

- A below-grade footing capable of resisting overturning
- The depth must account for frost depth and expected scour
- The footing must be sized appropriately for the site's soil bearing capacity
- The design must account for seismic and other hazards

The following types of permanent foundations should be used:

- Reinforced piers
- Post-tensioned piers
- Posts
- Piles
- Poured concrete walls
- Reinforced block walls
- Compacted fill

"Adequately anchored" means a system of ties, anchors, and anchoring equipment that will withstand flood and wind forces. The system must work in saturated soil conditions. Usually this means over-the-top or frame tie-downs in addition to standard connections to the foundation (Figure 12-4).

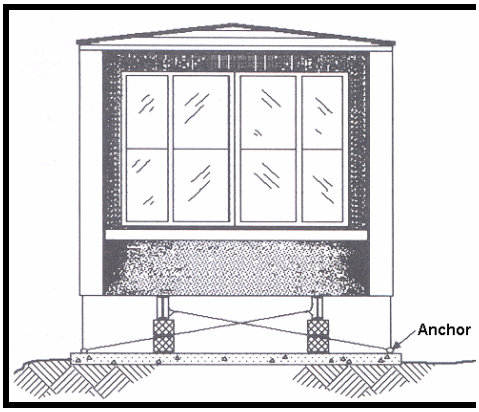


Figure 12-4. Manufactured home anchoring and tie-downs.

Source: *Manufactured Home Installation in Flood Hazard Areas.*

The Louisiana Manufactured Housing Commission is responsible for licensing and regulating the sale and installation of mobile homes. The law creating the Commission (RS 51:911.21 – 32) establishes a variety of installation requirements, including frame and roof tie downs. An installer must be licensed and must obtain a State permit. Installation must be done in accordance with manufacturers' specifications and the installer must certify to the Commission that the home is in compliance. These State installation standards preempt any local regulations.

The law notes, "In floodprone areas, the foundation shall comply with the requirements set forth in the manual, *Manufactured Home Installation in Flood Hazard Areas,* published by the Federal Emergency Management Agency."

12.4.4. Evacuation

In some areas, there is adequate warning time to remove a manufactured home from harm's way. Protecting such property should not be discouraged, so DHS/FEMA allows an evacuated manufactured home to be put back on the original site without having to meet the requirements for siting a new building (assuming it was on the site legally). A legally placed, existing manufactured home can be returned after an evacuation without being elevated, provided it is not enlarged or altered. However, because so much can go wrong when trying to evacuate a manufactured home, evacuation is not a substitute for permanently protecting the manufactured home by elevating it to or above the BFE.

12.4.5. Recreational vehicles

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

(a) built on a single chassis;

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

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

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

A recreational vehicle placed on a site in a Special Flood Hazard Area (SFHA) must be:

- On the site for fewer than 180 consecutive days
- Fully licensed and ready for highway use. "Ready for highway use" means that it is on its wheels or jacking system, is attached to the site only by quick disconnect type utilities, and has no permanently attached additions.

Otherwise, it must meet the elevation and anchoring requirements for manufactured homes.

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

12.5. Accessory Structures

Certain accessory structures may not qualify as "buildings." For example, open structures, such as gazebos and picnic pavilions, are not "buildings" and do not have to be elevated or floodproofed. However, such projects do have to meet all other ordinance requirements, such as not cause an obstruction in the floodway.

12.5.1. Small structures

In some cases, low-cost accessory buildings may not have to be elevated or dry floodproofed. With certain precautions taken, wet floodproofing is acceptable. These structures could include detached garages, small boathouses, pole barns, and storage sheds. However, a variance would be required (Section 21).

> ***Note:*** This section does not apply in V Zones. These criteria for small accessory buildings only apply where there is shallow, slow moving water.

An alternative to issuing a variance every time (which is not a good practice) is to adopt the appropriate specifications in the community's flood damage prevention ordinance. The draft language needs to be reviewed by the Department of Transportation and Development (LADOTD) and DHS/FEMA before the ordinance is amended to ensure it meets their requirements.

The following specifications can be used when approving a wet floodproofed accessory building, such as a small, detached garage or shed. These specifications should be included in the variance or ordinance language:

1. Use of the accessory structure must be limited to parking or limited storage and *not* for human habitation.
2. The structure must be no larger than 500 square feet.
3. The structure must meet all other ordinance requirements. For example, if the site is in the floodway, it must be demonstrated that the structure will not cause an obstruction to flood flows (Section 15).
4. The accessory structure must be built with flood-resistant materials for the exterior and interior building components and elements (i.e., foundation, wall framing, exterior and interior finishes, flooring, etc.) below the BFE (Section 12.2.1).
5. The accessory structure must be adequately anchored to prevent flotation, collapse, or lateral movement of the structure. (Section 12.2.2). All of the building's structural components must be capable of resisting specific flood-related forces, including hydrostatic, buoyancy, hydrodynamic, and debris impact forces (Section 2.2).
6. The accessory structure must meet the NFIP openings requirement spelled out in Section 11.3.3.

7. Any mechanical, electrical, or other utility equipment must be located above the BFE or floodproofed so that it is contained within a watertight, floodproofed enclosure capable of resisting damage during flood conditions.
8. Major equipment, machinery, or other contents must be located above the BFE.

These eight wet floodproofing specifications are very involved. There will be many instances where an applicant for a permit to build an accessory building will find it easier to build it elevated, or not to build it at all. From a floodplain management perspective, either approach would be preferred over wet floodproofing a new accessory building.

There are two precautions to note:

1. The community's action does not affect flood insurance rates. A separate policy on a wet floodproofed building can be very expensive.
2. Larger or more expensive buildings, attached garages, room additions, and similar modifications to a larger building must meet the regular flood protection requirements (e.g., substantial improvements to a residential building must be elevated above the BFE plus any required freeboard).

For additional guidance, see DHS/FEMA's *Wet Floodproofing Requirements for Structures Located in Special Flood Hazard Areas in Accordance with the National Flood Insurance Program (*Technical Bulletin 7-93) and *Protecting Building Utilities from Flood Damage.* Information on ordering these references is in Section 29.

12.5.2. Fuel storage tanks

There are two hazards with placing fuel storage tanks in the floodplain. First, if the tank is not full, it could float when surrounded by water. This will break the connection to the fuel line, causing the second hazard – fire, explosion, and/or spilling a hazardous material into floodwaters (Figure 2-3). A floating tank also adds to the debris that can batter structures downstream and block culverts and bridge openings.

Therefore, it is very important that fuel storage tanks are installed properly. Detailed guidance is provided in Section 3.2 of DHS/FEMA's *Protecting Building Utilities from Flood Damage* (Section 29).

The preferred technique is to elevate the tank on a platform. Here are some guidelines:

- The tank should be anchored to the platform with straps, which would constrain the tank in wind, earthquake, and other applicable forces.
- In coastal zones, the straps should be made of non-corrosive material to prevent rusting.
- In velocity flow areas, the platform should be supported by posts or columns that are adequately designed for all loads including flood and wind loads.

- The posts or columns should have deep concrete footings embedded below expected erosion and scour lines.
- The piles, posts, or columns should be cross-braced to withstand the forces of velocity flow, wave action, wind, and earthquakes. Cross-bracing should be parallel to the direction of flow to allow for free flow of debris.
- In non-velocity flow floodplains, the tank can be elevated on compacted fill that is above the BFE.

If the tank cannot be elevated above the BFE, the designer must account for the threats of flotation due to buoyancy, movement from velocity flows, and damage by floating debris. Locating the tank below ground will account for velocity flows and debris, but increases buoyancy forces.

Whether the tank is located below ground or above ground, the best approach is to attach it securely to a counterweight to prevent it from floating.

Because of the hazard presented by a fuel storage tank, the applicant should be required to provide engineering calculations that demonstrate that the system is strong enough to resist the effects of buoyancy from water up to the base flood elevation. Designers can be referred to the formulas in Section 3.2.3.1 of *Protecting Building Utilities from Flood Damage.*

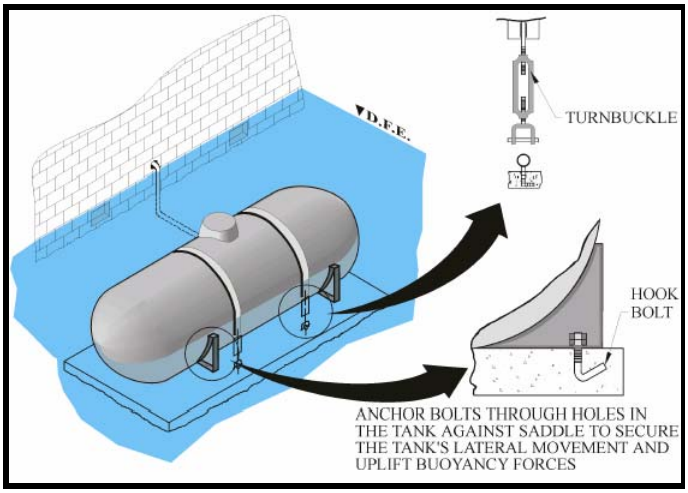


Figure 12-5. Typical anchoring arrangement for a propane tank: tie down straps over the top and a securely anchored saddle.

Source: *Protecting Building Utilities from Flood Damage*

Section 13. Substantial Improvement Rules

Contents

13.1. Substantial Improvement

Sections 11 and 12 focus on the rules and regulations that prevent or reduce damage from floods to *new* buildings. This section looks at what happens when an owner wants to make an improvement, such as an addition, to an existing building.

13.1.1. NFIP requirement

The basic rule is: If the cost of improvements equals or exceeds 50% of the market value of the building, the building must be brought up to current floodplain management standards. Under these conditions, an existing building must meet the requirements for new construction.

> **44 CFR 59.1: Definitions: "Substantial improvement" means any reconstruction, rehabilitation, addition or other improvement to a structure, the total cost of which equals or exceeds 50 percent of the market value of the structure before the start of construction of the improvement.**

13.1.2. Projects affected

All building improvement projects worthy of a permit must be considered, including:

- Remodeling projects
- Rehabilitation projects
- Building additions
- Repair and reconstruction projects (these are addressed in more detail in Section 14 on substantial damage)

> ***Note:*** If any part of a building is in the SFHA, the entire building is subject to these provisions.

If a community does not require permits for minor maintenance, such as re-roofing, or projects under a certain dollar amount, then such projects are not subject to the substantial improvement requirements. However, if a larger project includes re-roofing, etc., the cost of all of the improvements must be included in the project costs.

13.1.3. Multiple projects

One problem the floodplain administrator faces is a permit applicant trying to avoid the requirement by applying for a permit for only part of the job and then applying for another permit to finish the work a month or two later. If both applications are together worth more than 50% of the value of the building, the combined project should be considered a substantial improvement and subject to the rules.

In order to help enforce this, some communities count all applications submitted over one year as one project. The community attorney should be asked to verify whether the

ordinance clearly provides the authority to do this. If so, it should be spelled out in the permit papers given to the applicant.

Some communities require improvements to be calculated cumulatively over several years. All improvement and repair projects undertaken over a period of 5 years, 10 years, or the life of the structure, are added up. When they total 50%, the building must be brought into compliance as if it were new construction.

Community Rating System (CRS) credits tracking improvements to enforce a cumulative substantial improvement requirement. It also credits using a lower threshold than 50%. These credits are found under Activity 430, Section 431.c and d in the *CRS Coordinator's Manual* and the *CRS Application*. See also *CRS Credit for Higher Regulatory Standards* for example regulatory language.

The National Flood Insurance Program's (NFIP's) Increased Cost of Compliance benefits are explained in Section 14.3. A building that has been flooded twice (where on the average, the value of the damage equaled or exceeded 25% of the pre-flood value of the building) is eligible to receive this benefit. In order to make this provision available, the community must keep track of multiple repair projects (and have the ordinance language shown in Figure 14-3).

13.1.4. Post-FIRM buildings

The substantial improvement rules do not address only pre-Flood Insurance Rate Map (FIRM) buildings—they cover all buildings, including post-FIRM ones.

In most cases, a post-FIRM building is properly elevated or otherwise compliant with regulations for new construction. However, sometimes a map change results in a higher BFE or a change in flood zone. A substantial improvement to a post-FIRM building may require the building to be elevated to protect it from the new, higher, regulatory flood protection elevation.

All additions to a post-FIRM building must be elevated at least as high as the flood protection elevation in effect when the building was built. (The community cannot allow a compliant building to become noncompliant by allowing additions at grade).

If a map revision has taken place *and the BFE has increased*, then,:

- Additions that are substantial improvements must be elevated to the *new* flood protection elevation (see Example 8, Section 13,2,8).
- Small additions that do not meet the substantial improvement criteria must be elevated at least as high as the flood protection elevation in effect when the building was built (see Example 7, Section 13,2,7).
- Additions to non-residential buildings may be floodproofed to these required elevations.

13.1.5. The formula

A project is a substantial improvement if:

$$\frac{\text{Cost of improvement project}}{\text{Market value of the building}} > 50\%$$

For example, if a proposed improvement project will cost $60,000 and the value of the building is $100,000:

$$\frac{\$\ 60{,}000}{\$100{,}000} = 0.6 = \text{“60%”}$$

The cost of the project exceeds 50% of the building's value, so it is a substantial improvement. The floodplain regulations for new construction apply and the building must meet post-FIRM construction requirements. If the project is an addition that meets the criteria discussed in Sections 13.2.3 and 13.2.4, only the addition has to be elevated.

The formula is based on the cost of the project and the value of the building. These two numbers must be reviewed in detail. Keep good records of the applicant's estimates and calculations.

13.1.6. Project cost

The cost of the project means all structural costs or costs of the repair, including:

- All materials
- Built-in appliances
- Overhead
- Profit
- Repairs made to damaged parts of the building worked on at the same time
- Labor

A more detailed list is included in Figure 13-1. All work that is done must be counted as part of the project, even those things that would not normally require a permit, such as the cost of painting. If materials are donated or discounted, the cost of repairs must be made using the true value of the materials.

Labor is the “true” cost of hiring someone to do the job, i.e., the prevailing rates contractors charge. If the owner does it himself or has free help, the “true” cost of that labor must be included.

To determine substantial improvement, a detailed cost estimate is needed for the project, prepared by a licensed general contractor, professional construction estimator, or the permit office.

Items to be Included

- All structural elements, including:
  - Spread or continuous foundation footings and pilings
  - Monolithic or other types of concrete slabs
  - Bearing walls, tie beams and trusses
  - Floors and ceilings
  - Attached decks and porches
  - Interior partition walls
  - Exterior wall finishes (brick, stucco, siding) incl. painting and moldings
  - Windows and doors
  - Reshingling or retiling a roof
  - Hardware
- All interior finishing elements, including:
  - Tiling, linoleum, stone, or carpet over subflooring
  - Bathroom tiling and fixtures
  - Wall finishes (drywall, painting, stucco, plaster, paneling, marble, etc).
  - Kitchen, utility and bathroom cabinets
  - Built-in bookcases, cabinets, and furniture
  - Hardware
- All utility and service equipment, including:
  - HVAC equipment
  - Plumbing and electrical services
  - Light fixtures and ceiling fans
  - Security systems
  - Built-in kitchen appliances
  - Central vacuum systems
  - Water filtration, conditioning, or recirculation systems
- Cost to demolish storm-damaged building components
- Labor and other costs associated with moving or altering undamaged building components to accommodate improvements or additions
- Overhead and profits

Items to be Excluded

- Plans and specifications
- Carpeting over a finished floor
- Survey costs
- Permit fees
- Post-storm debris removal and clean up
- Outside improvements, including:
  - Landscaping
  - Sidewalks
  - Fences
  - Yard lights
  - Swimming pools
  - Screened pool enclosures
  - Detached structures (including garages, sheds and gazebos)
  - Landscape irrigation systems

Figure 13-1. Items included in calculating cost of the project.

The floodplain administrator must review the estimate submitted by the permit applicant. To verify it, the administrator can use his or her professional judgment and knowledge of local and regional construction costs or building code valuation tables published by the major building code groups. These tables can be used for determining estimates for particular replacement items if the type of structure in question is listed in the tables.

There are two possible exemptions to calculating the cost of an improvement or repair project: 1) improvements to correct pre-identified code violations and 2) historic buildings. These are explained in more detail in Section 13.3.

13.1.7. Market value

In simple terms, market value is the agreed-upon price between a willing buyer and seller. The market value of a structure reflects its original quality, subsequent improvements, physical age of building components, and current condition.

However, the market value of a property is more than just the value of its building. Market value of developed property varies widely due to the desirability of its location. For example, two houses of similar size, quality, and condition will have far different prices if one is on the coast, or in the best school district, or closer to town than the other—but the value of the building materials and labor that went into both houses will be nearly the same.

For the purposes of determining substantial improvement, however, market value pertains only to the structure in question. It does not pertain to the land, landscaping, or detached accessory structures on the property. Any value resulting from the location of the property should be attributed to the value of the land, not the building.

Acceptable estimates of market value can be obtained from these sources:

- An independent appraisal by a professional appraiser. The appraisal must exclude the value of the land and not use the “income capitalization approach,” which bases value on the use of the property, not the structure.
- Property values used for tax assessment purposes with an adjustment recommended by the tax appraiser to reflect current market conditions (adjusted assessed value). The value must also be adjusted for the appraisal cycle, low assessment levels, and the land value.
- Qualified estimates based on sound professional judgment made by the staff of the local building department or tax assessor’s office.

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

13.2. Substantial Improvement Examples

13.2.1. Example 1: Minor rehabilitation

Rehabilitation is defined as an improvement made to an existing structure that does not affect the external dimensions of the structure.

If the cost of the rehabilitation is less than 50% of the structure's market value, the building does not have to be elevated above the base flood elevation (BFE) or otherwise protected. However, it is advisable to incorporate methods to reduce flood damage, such as the use of flood-resistant materials and the installation of electrical, heating, and air conditioning units above the BFE.

Figure 13-2 shows a building with a small rehabilitation project. Central air conditioning was installed and the electrical system was upgraded. The value of the building before the project was $60,000. The value of the project was $12,000:

$12,000 = 0.2 = "20%" The project costs less than 50% of the building, so

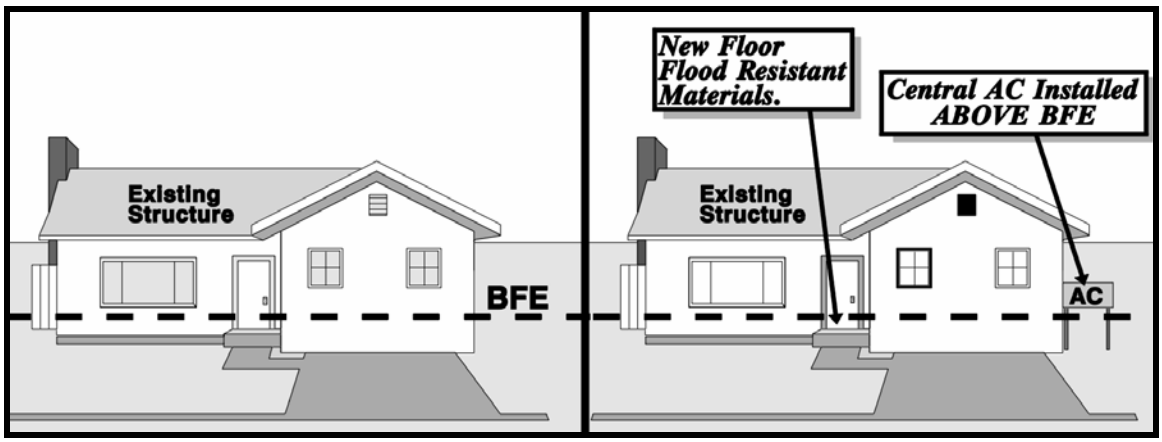


Figure 13-2. Minor rehabilitation using flood-resistant methods and materials. Neither structure would benefit from post-FIRM flood insurance rates because they are not elevated.

$60,000 this is not a substantial improvement.

Permit applicants for minor improvements to a floodprone building should be advised to consider incorporating inexpensive flood protection methods like those illustrated above. More information on these methods can be found at www.LouisianaFloods.org.

13.2.2. Example 2: Substantial rehabilitation

If the rehab costs more than 50% of the value of the building, the community's ordinance requires the existing structure to be elevated and/or the basement filled to meet the elevation standard.

Figure 13-3 shows a building that was allowed to run down, with a market value of $35,000. To rehab it will require gutting the interior and replacing all wallboard, built-in cabinets, bathroom fixtures, and air conditioning. The interior doors and flooring will be repaired. The house will get new siding and a new roof. The cost of this rehab will be $25,000:

$\frac{\$25,000}{\$35,000} = 71.4\%$ Because total cost of the project is greater than 50% the rehab is a substantial improvement

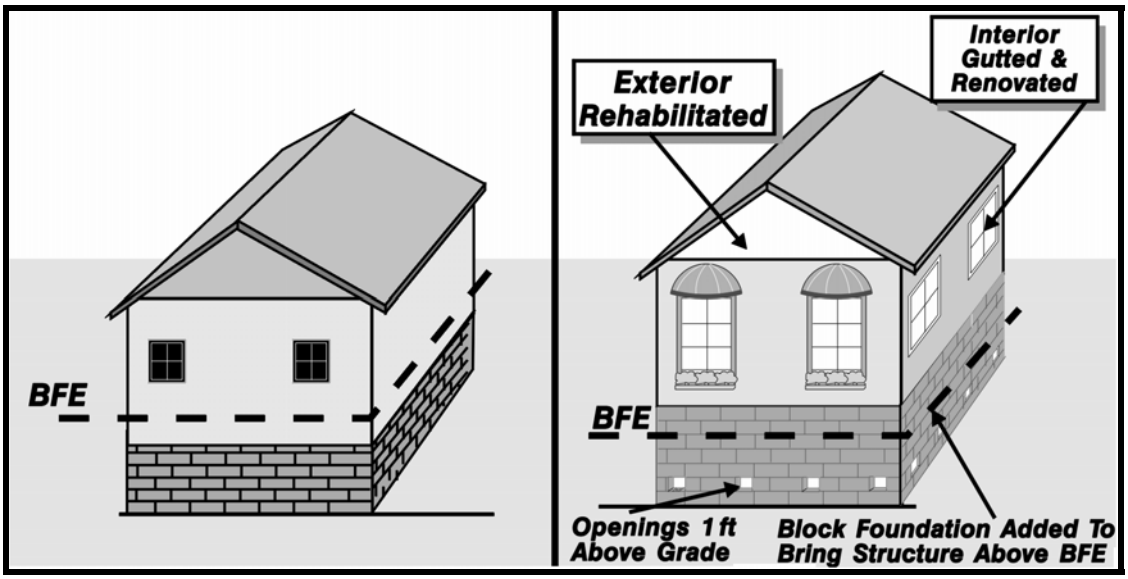


Figure 13-3. Substantially rehabilitated building elevated above the base flood elevation. The new structure would benefit from post-FIRM flood elevation rates.

13.2.3. Example 3: Lateral addition – residential

Additions are improvements that increase the square footage of a structure. Commonly, an addition changes the building footprint by the structural attachment of a bedroom, den, recreational room, garage, or other type of addition to an existing structure. Note that if one building is attached to another through a covered breezeway or similar connection, it is a separate building and not an addition. A separate building must meet all of the requirements for a new building.

When an *addition* is a substantial improvement (i.e., worth more than 50% of the original building), the addition must be elevated, provided that improvements to the *existing* structure are minimal (a nonresidential building's addition can be floodproofed). Figures 13-4 and 13-5 illustrate lateral additions that are compliant.

Depending on the flood zone and details of the project, the existing building may not have to be elevated. The determining factors are the common wall and what improvements are being made to the existing structure. If the common wall is demolished as part of the project, the entire structure must be elevated. If only a doorway is knocked through it and no other alterations are made to the wall, only the addition has to be elevated.

However, if significant improvements are made to the existing structure (such as a kitchen makeover), both the existing structure and the addition must be elevated and otherwise brought into compliance. Some communities require both the existing structure and lateral additions to be elevated in all cases.

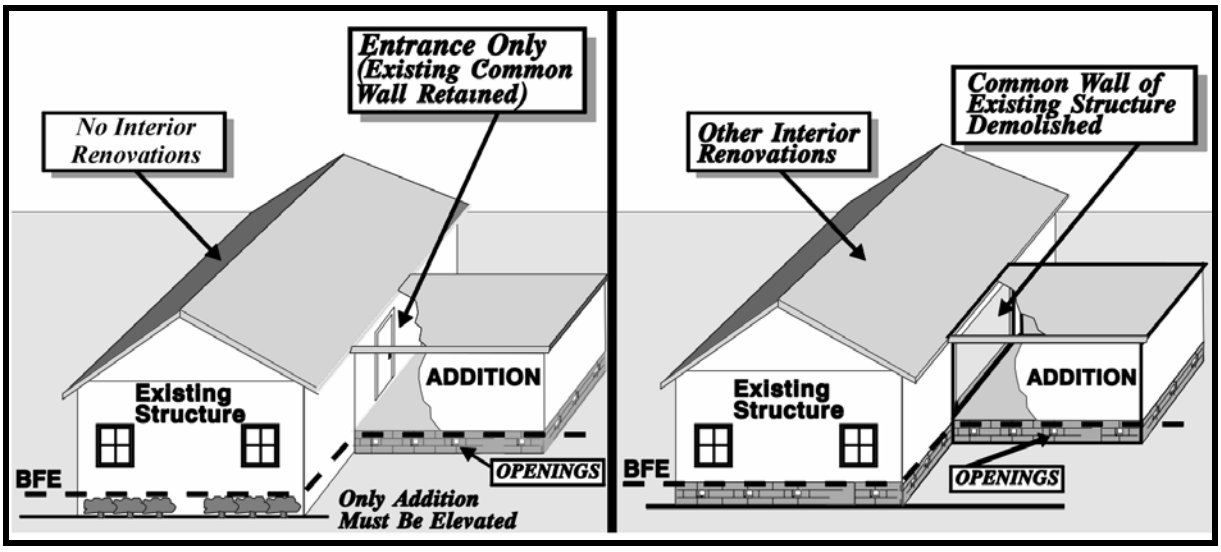


Figure 13-4. Lateral additions to a residential building. The structure on the left would not benefit from the post-FIRM flood insurance rates because it was not elevated.

13.2.4. Example 4: Lateral addition – nonresidential

A substantial improvement addition to a nonresidential building can be elevated or floodproofed (Figure 13-5). See Section 12.1 for floodproofing requirements. Otherwise, all of the criteria for residential buildings reviewed in Example 3 must be met.

If floodproofing is used, the builder must ensure that the wall between the addition and the original building is floodproofed.

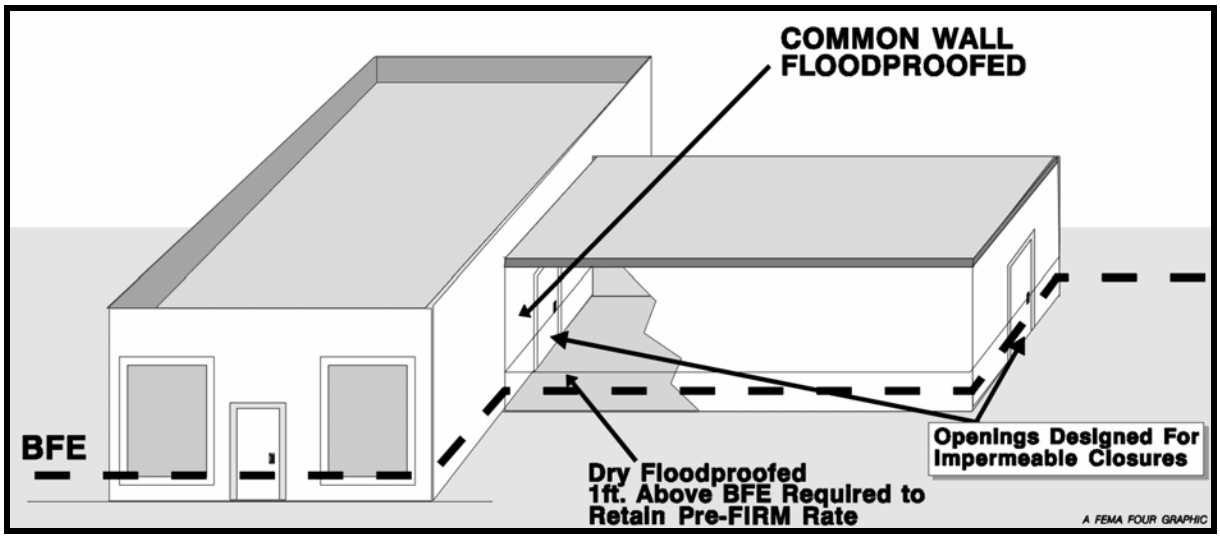


Figure 13-5 Lateral addition to a nonresidential building. The structure would *not* benefit from post-FIRM flood insurance rates because the original building was not elevated or floodproofed.

13.2.5. Example 5: Vertical addition in the V Zone – residential

When the proposed substantial improvement is a full or partial second floor, the entire structure must be elevated above the BFE, even though the building footprint is not changed (Figure 13-6). In this instance, the existing building provides the foundation for the addition. Failure of the existing building would also result in failure of the addition. The example below is for a house in the V Zone.

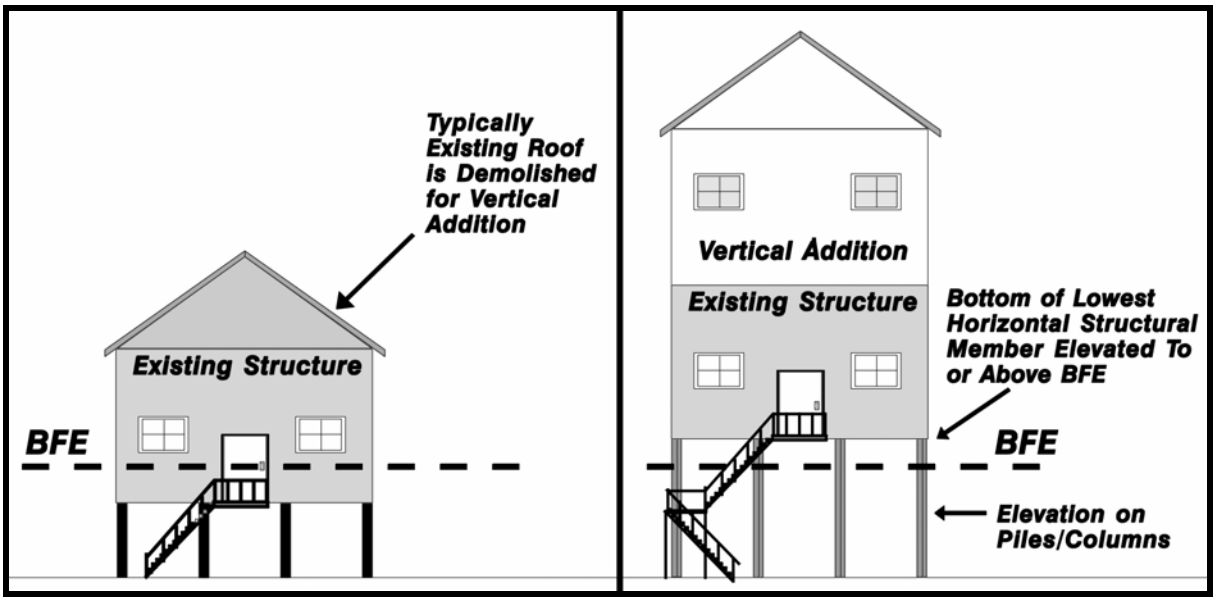


Figure 13-6. Vertical addition to a residential building in the V Zone. The new structure would benefit from post-FIRM flood insurance rates.

13.2.6. Example 6: Vertical addition – nonresidential

When the proposed substantial improvement is a full or partial second floor, the entire structure must be elevated above or floodproofed to the BFE (Figure 13-7).

The owner could obtain post-FIRM rates on the building if it is floodproofed to 1 foot above the BFE and he or she has a floodproofing certificate signed by a licensed professional engineer. An optional approach is to elevate the entire building and obtain an elevation certificate.

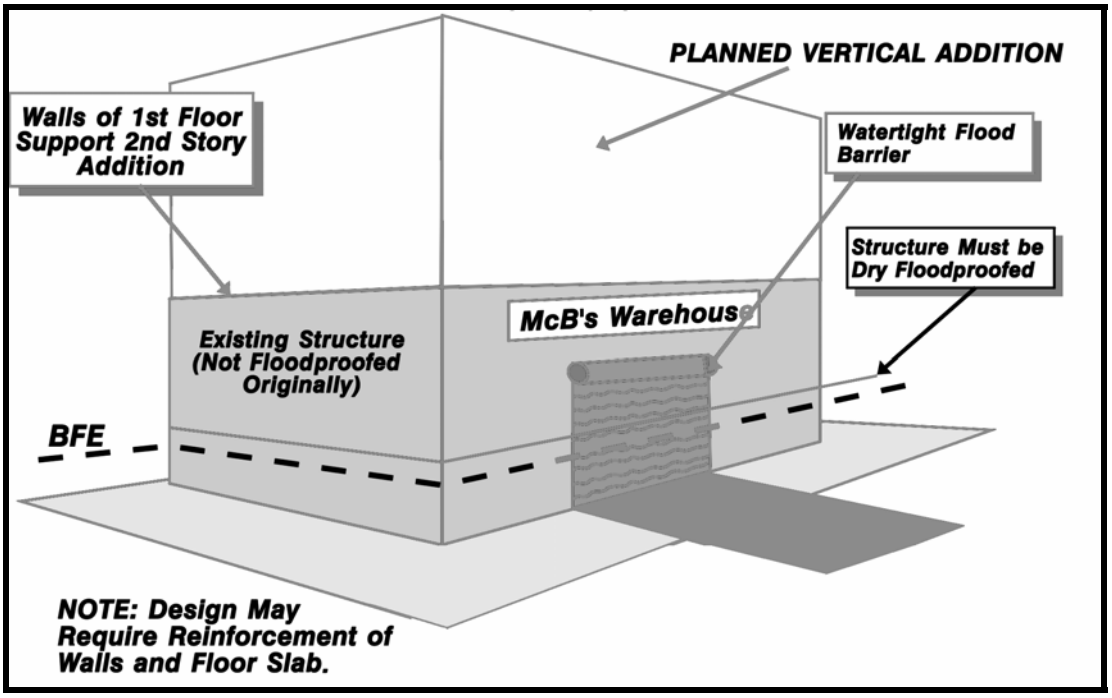


Figure 13-7. Vertical addition to a nonresidential building. The new floodproofed structure would benefit from post-FIRM flood insurance rates.

13.2.7. Example 7: Post-FIRM building addition

All additions to post-FIRM buildings are defined as new construction and they must obtain a permit and meet the requirements of the flood damage prevention ordinance, regardless of the size or cost of the addition (Figure 13-8).

If a map revision has taken place *and the BFE has increased*, only additions that are substantial improvements have to be elevated to the *new* flood protection elevation (see Example 8, next page). A minor addition that is not a substantial improvement to a residential structure must be elevated at least as high as the flood protection elevation in effect when the building was built, but does not have to be elevated to the new BFE.

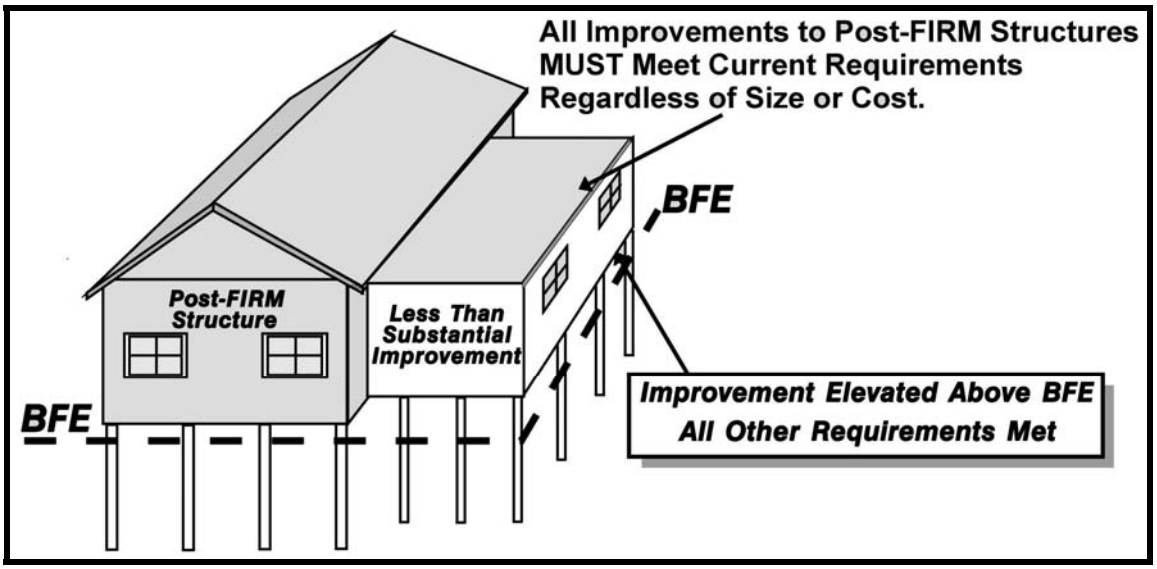


Figure 13-8. Small additions to post-FIRM buildings must be elevated.

13.2.8. Example 8: Post-FIRM building – substantial improvement

Substantial improvements made to a post-FIRM structure must meet the requirements of the current ordinance and be protected to the base flood elevation currently in effect. Figure 13-9 shows a lateral addition (without changes to the original structure) made after a map revision took place and the BFE was increased.

If a map revision has taken place *and the BFE has increased*, then,:

- Additions that are substantial improvements must be elevated to the *new* flood protection elevation.
- Small additions that do not meet the substantial improvement criteria must be elevated at least as high as the flood protection elevation in effect when the building was built (see Example 7, previous page).
- Additions to non-residential buildings may be floodproofed to these required elevations.

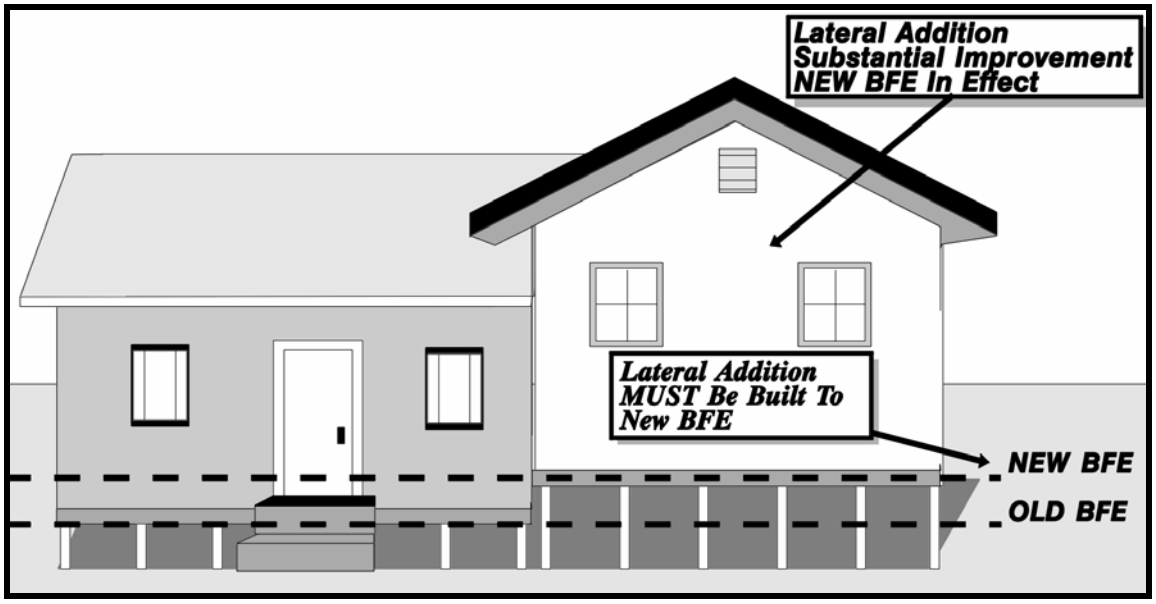


Figure 13-9. Substantial improvements to post-FIRM buildings must be elevated above the new base flood elevation. Nonresidential buildings may be floodproofed.

13.3. Special Circumstances

As noted, the substantial improvement and substantial damage requirements affect all buildings regardless of the reason for the improvement or the cause of the damage. There are three special circumstances that may apply: exempt expenses, historic buildings, and corrections of code violations.

13.3.1. Exempt expenses

Certain costs related to making improvements or repairing damaged buildings do not have to be counted toward the cost of the improvement or repairs. These include:

- Plans and specifications
- Surveying costs
- Permit fees
- Demolition or emergency repairs made for health or safety reasons, or to prevent further damage to the building
- Improvements or repairs to items outside the building, such as the driveway, fencing, landscaping, and detached structures

13.3.2. Historic structures

Historic structures are exempted from the substantial improvement requirements subject to the criteria listed below. A variance is still required, though.

If the improvements to a historic structure meet the following three criteria and are approved by the community through the variance procedure, the building does not have to be elevated or floodproofed. It can also retain its pre-FIRM flood insurance rating status:

1. The building must be a bona-fide "historic structure." See Figure 13-10 for notes on determining whether a structure is an "historic building." Historic buildings are also discussed in Section 21.2's review of variances.

2. The project must maintain the historic status of the structure. If the proposed improvements to the structure will result in it being removed from or ineligible for the National Register, then the proposal cannot be granted a variance from the substantial improvement rule.

   The best way to make such determinations is to seek written review and approval of proposed plans by the State's historical society. If the plans are approved, the variance can be granted. If not, no variance can be permitted.

Many older buildings are not considered historic, so the first thing to check is whether the structure proposed for a variance is historic. Look for it on a list maintained by:

- The National Register of Historic Places, available at www.crt.state.la.us/nhl2
- The Louisiana Division of Historic Preservation's historic standing structure survey available in the Louisiana section of the Louisiana State Library
- A certified local historic preservation review commission

Structures either are listed or may be eligible to be listed. The Louisiana Department of Culture, Recreation and Tourism, Division of Historic Preservation, or a certified local historic preservation committee should be consulted to determine if a structure proposed for the historic structure exception is indeed historic.

Figure 13-10. Definition of "historic building."

3. Take all possible flood damage reduction measures. Although the variance to the substantial improvement rule means the building does not have to be elevated to or above the BFE, or be renovated with flood-resistant materials that are not historically sensitive, many things can and should be done to reduce the flood damage potential. Examples include:

   - Locating mechanical and electrical equipment above the BFE or floodproofing it
   - Elevating the lowest floor of an addition to or above the BFE with the change in floor elevation disguised externally
   - Building the lowest floor of an addition with flood-resistant materials and providing hydrostatic openings

13.3.3. Correction of code violations

The definition of substantial improvement includes another exception:

44 CFR 59.1 Definitions: "Substantial improvement" means …. The term does not, however, include … Any project for improvement of a structure to correct existing violations of state or local health, sanitary, or safety code specifications which have been identified by the local code enforcement official and which are the minimum necessary to assure safe living conditions

Note the key words in this exception: *correct* existing violations, *identified* by the local official, and *minimum* necessary to assure safe conditions. This language was included to avoid penalizing property owners *who had no choice* but to make improvements to their buildings or face condemnation or revocation of a business license.

This exception was intended for an *involuntary* correction of a violation that existed before the improvement permit was applied for, or before the damage occurred; for example, a restaurant owner who must upgrade the wiring in the kitchen to meet current local and state health and safety codes.

The floodplain administrator can only exempt the items specifically required by code. For example, if a single stair tread was defective and had to be replaced, do not exempt the cost of rebuilding the entire stairway. Similarly, count only replacement in like kind and what is minimally necessary. If the owner chooses to upgrade the quality of a code-required item, the extra cost is not exempt from the formula—it is added to the true cost of the improvement or repairs.

Unfortunately, many property owners and builders pressure local building officials to exclude "code violation corrections" from their voluntary improvement proposals. There are "code violations" in all structures built before the current code was enacted. In many cases, those elements must be brought up to code as part of an improvement project.

This is very different from a code violation citation that forces a property owner to correct those violations and make improvements that were otherwise not planned. The floodplain administrator must know about and document the violations before or at the time the permit is issued.

Example: A small business in a 40-year-old building was damaged by a fire. The building's pre-fire market value was $100,000. The insurance adjuster and the permit office concluded that the total cost to repair would be $45,000.

The business is in an urban renewal area. The City had inspected it before the fire and cited the following violations:

- Replace unsafe electrical wiring
- Install missing fire exit signs, smoke detectors, and emergency lighting
- Inadequate bathrooms

The total cost of these code requirements would be $8,000. However, since the citation was issued before the fire occurred, they would not have to be counted toward the cost to repair. Based on the basic formula:

$\frac{\$45{,}000}{\$100{,}000} = 0.45$ or 45%	The building is not declared substantially damaged

In this example, the building can be repaired without elevating or floodproofing. However, the floodplain administrator should strongly recommend incorporating flood protection measures and flood-resistant materials into the repair project (as in the example in Figure 13-2).

Section 14. Substantial Damage Rules

Contents

14.1. Substantial Damage

14.1.1. NFIP requirement

Rules for regulating substantially damaged buildings are similar to those for substantial improvements (Section 13). The major difference is calculating the cost to repair, rather than the cost of the improvements.

> **44 CFR 59.1: Definitions: "Substantial damage" means damage of any origin sustained by a structure whereby the cost of restoring the structure to its before-damaged condition would equal or exceed 50 percent of the market value of the structure before the damage occurred.**

Two key points:

- The damage can be from any cause—flood, fire, earthquake, wind, rain, or other natural or human-induced hazard.
- The substantial damage rule applies to all buildings in a flood hazard area, regardless of whether the building was covered by flood insurance or whether disaster assistance is available.

The formula is essentially the same as for substantial improvements:

$$\frac{\text{Cost to repair}}{\text{Market value of the building}} \geq 50\%$$

Market value is calculated in the same way as for substantial improvements. Use the pre-damage market value.

Note: The special circumstances described in Section 13.3 also apply to substantial damage determinations.

14.1.2. Cost to repair

The formula uses "cost *to* repair" and not "cost *of* repairs." The cost to repair the structure must be calculated for full repair to the building's *before-damage* condition, even if the owner elects to do less. It must also include the cost of any improvements that the owner has opted to include during the repair project.

The total cost to repair includes the same items listed in Figure 13-1. As shown in Example 2 in Section 14.2.2, properly repairing a flooded building can be more expensive than people realize. The owner may opt not to pay for all of the items needed. Even if the owner does some of the work himself, obtains some of the materials free, has a volunteer organization do some of the work, or decides not to do some repairs, the cost to repair must be calculated based on current market costs of the work.

In short, substantial damage is determined regardless of the actual cost to the owner. The floodplain administrator must figure the true cost of bringing the building back to its pre-damage condition using qualified labor and materials obtained at market prices.

The owner has an incentive to show less damage than actually occurred in order to avoid the cost of bringing the building into compliance. Here are some pointers that can help the administrator reach a fair and accurate decision:

- Use an objective system that does not rely on varying estimates of market value or different opinions of what needs to be repaired. The Residential Substantial Damage Estimator Program discussed in the next section can be used.

- Floodplain administrators can use professional judgment and knowledge of local and regional construction costs, or can use building code valuation tables published by the major building code groups.

- Get the cost to repair from an objective third-party or undebatable source, such as:

  - A licensed general contractor
  - A professional construction estimator
  - Insurance adjustment papers (exclude damage to contents)
  - Damage assessment field surveys conducted by building inspection, emergency management, or tax assessment agencies after a disaster
  - The permit office

- Even if the permit office does not prepare the cost estimate, it must review the estimate submitted by the permit applicant.

- The applicant can appeal estimates of cost to repair or building values prepared by other sources. However, the appeal must be supported with estimates from qualified parties, such as a professional appraiser.

- Publicize the need for the regulations and the benefits of protecting buildings from future flooding. A well-educated public will not argue as much as one that sees no need for the requirement.

- Help the owner find financial assistance to meet the extra cost of complying with the code. In most cases, the owner would rather mitigate against future floods than remain exposed to repetitive damage.

- If there was a disaster declaration, sources of financial assistance as discussed in Section 28.3 may be available.

- If the owner had flood insurance and the building was substantially damaged by a flood, Increased Cost of Compliance coverage will help (Section 14.3).

14.1.3. Substantial damage software

DHS/FEMA has developed a software program to help local officials make substantial damage determinations. The software is Windows-based and works on Microsoft Windows. While it is based on Microsoft Access, the software is self-contained and does not require any software in addition to a Windows operating system.

Note: The RSDE software and its supporting manuals and other materials is currently (June 2008) being extensively revised. When it is released later in 2008, it will be a general substantial damage estimator (including non-residential buildings). Check with LADOTD or the DHS/FEMA Region (see Section 31) for availability of the revised tools. The software comes with a manual, *Guide on Estimating Substantial Damage Using the NFIP Residential Substantial Damage Estimator* (FEMA 311). The software includes a user's manual, a video, and worksheets that allow the calculations to be done manually.

Use of the Residential Substantial Damage Estimator (RSDE) hastens the process for determining damage estimations. The RSDE software is based on regulatory requirements of the National Flood Insurance Program (NFIP) and is provided free of charge as a tool for those responsible for preparing substantial damage determinations. The standardized software may enable your community to borrow inspectors utilizing inter-community agreements and still get consistent estimates.

Using the RSDE Damage Inspection Worksheet (a checklist), building inspectors go into the homes and manually record the building and damage data. The data is entered into the software. The software provides reasonable and defendable building values and damage estimates in a short time frame.

"The RSDE program is very user friendly, and the software works well," one user said. "You get into it, and it's somewhat self explanatory. The software also helps the citizen to understand that I'm not just throwing out a number when making a damage estimate. This is FEMA'S guideline. It's a standard. It helps them to realize that we are not doing things improperly."

DHS/FEMA does not require the use of the software. The homeowner has the right to require the use of alternatives, including professional appraisals, contractors' damage estimates, and community damage estimates for making substantial damage determinations. The software assists in assessing residential building values. It's a tool for evaluating a home's market value prior to the damage and for determining the amount of damage following a disaster event. It shows how to rapidly, efficiently, and consistently assess substantial damage. It allows communities to compile a data base of inspected houses as well as help to identify areas that have received repetitive damages.

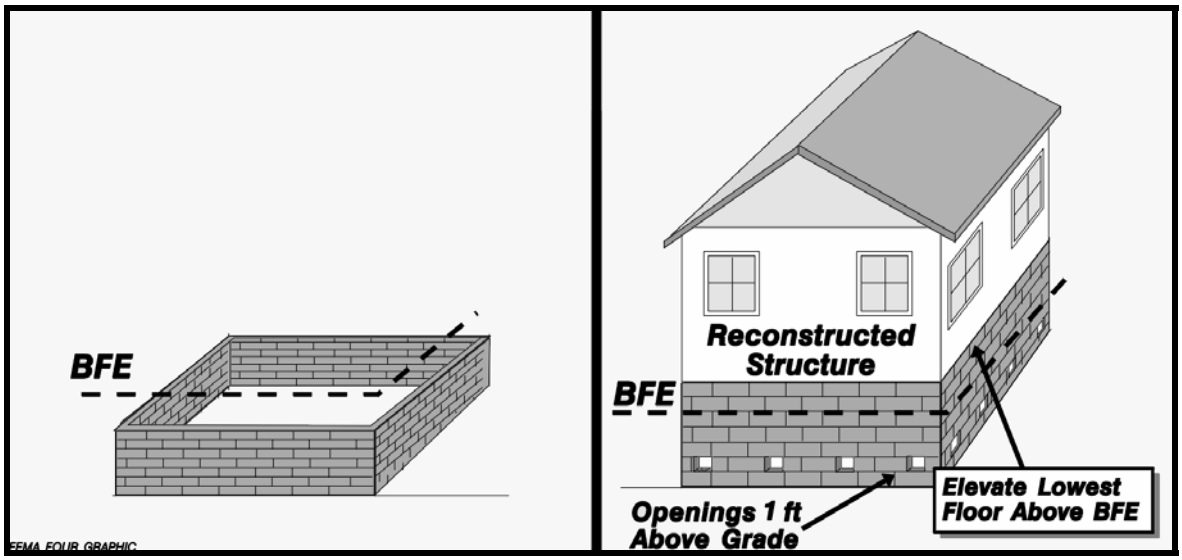
Contact the DHS/FEMA Regional Office for a copy of the software package (Section 31) and help in using it. Training sessions and technical assistance may be available after a major disaster declaration.

14.2. Substantial Damage Examples

14.2.1. Example 1: Reconstruction of a destroyed building

Reconstructions are cases in which an entire structure is destroyed, damaged, purposefully demolished, or razed, and a new structure is built on the old foundation or slab. The term also applies to an existing structure that is moved to a new site.

Reconstructions are, quite simply, "new construction." They must be treated as new buildings (Figure 14-1).



Razed or "totaled" building with remaining foundation

Reconstruction on existing foundation

Figure 14-1. A reconstructed house is new construction.

The Plainfield Tornado

In 1990, Plainfield, Illinois was hit by a tornado. Twenty buildings in the village's floodplain were destroyed. Faced with the substantial damage requirement to elevate their damaged homes, residents were encouraged **not** to rebuild, but to take advantage of acquisition funding assistance from DHS/FEMA disaster assistance and State programs. Eventually all 20 properties were acquired and the floodplain development was converted to public open space.

14.2.2. Example 2: Substantially damaged structure

To determine if a damaged structure meets the threshold for substantial damage, the cost of repairing the structure to its before-damaged condition is compared to the market value of the structure prior to the damage. The estimated cost of the repairs must include all costs necessary to fully repair the structure to its before-damaged condition.

If equal to or greater than 50% of that structure's market value before damage, the structure must be elevated (or floodproofed if it is nonresidential) to or above the level of the base flood and meet other applicable local ordinance requirements. This is the basic requirement for substantial damage.

Figure 14-2 illustrates the kind of damage that can occur to a building flooded only 2 feet to 3 feet deep. Even though the structure appears sound and there are no cracks or breaks in the foundation, the total cost of repair can be significant.

Figure 14-2. Even standing water can cause substantial damage.

The cost of repair after a flood that simply soaked the building typically includes the following structural items:

- Remove all wallboard and insulation
- Install new wallboard and insulation
- Tape and paint
- Remove carpeting and vinyl flooring
- Dry floor, replace warped flooring
- Replace cabinets in the kitchen and bathroom
- Replace built-in appliances
- Replace hollow-core interior doors
- Replace air conditioner and water heater
- Clean and disinfect duct work
- Repair porch flooring and front steps
- Clean and test plumbing (licensed plumber may be required)
- Replace outlets and switches, clean and test wiring (licensed electrician may be required)

The longer the water is in the building, the more damage it will cause. It can "wick" up the walls and damage a wallboard ceiling that is several feet above the high water line (Figure 2-11). Standing water (or the moisture it brings) causes warping, mold, and mildew that adds to the cost of repair.

Note: See Figure 17-1 for what happens to flood insurance premiums for a substantially damaged building that is not brought up to post-FIRM standards.

14.2.3. Manufactured homes

If a manufactured home is substantially damaged, all future homes placed on that pad or site must be elevated at or above the BFE. Homes adjacent to the site that were not substantially damaged are not affected.

If a manufactured home is flooded, but not substantially damaged, and is replaced by a new home, the new home must be elevated.

If a manufactured home is evacuated from a site prior to a flood, and therefore does not sustain substantial damage, it is not required to elevate when it is returned to the original site. If the home is altered or improved in any way, elevating at or above the BFE may be required based on the substantial improvement requirements of the community's ordinance.

14.3. Increased Cost of Compliance

ICC coverage: Flood insurance policy holders in Special Flood Hazard Areas (SFHAs) can get up to $30,000 of insurance coverage for the increased cost of compliance with their community's floodplain management ordinance (ICC coverage). If a building is substantially damaged, it must be brought into compliance as discussed in Section 14.1. Flood insurance only pays for the repairs to restore the building to its pre-flood condition. ICC coverage will help pay for elevation, relocation, demolition, and (for nonresidential buildings) floodproofing.

ICC claims: An owner can file an ICC claim under either of two conditions:

- If the community determines that a building is substantially damaged (see Section 14.1); or
- If the building has been identified as a repetitive loss property (see Section 28.4).

An ICC claim is adjusted separately from the standard flood insurance policy on the building. An owner can file an ICC claim only after your community has determined that the building has been substantially or repetitively flooded. This determination is made when the owner applies for the permits to repair the building.

In either of these cases, the community's building permit official or the floodplain administrator should explain to the owner the requirements of the community's floodplain management ordinance.

Once the community has made a determination that the building has been substantially or repetitively flooded, the owner files an ICC claim through the insurance company or agent that sold the policy. The insurer will assign a claims representative who will assist the owner in preparing the claim. The owner should start obtaining estimates for the costs of elevating, relocating, demolishing or floodproofing the building.

It may be possible for the building owner to obtain a partial payment for ICC when the compliance work begins. When the work is finished, the community must inspect the work and issue either a certificate of occupancy or a letter confirming that the building is compliant.

ICC Claims will only be paid on flood-damaged buildings, and can only be used to bring the building into compliance with the community's floodplain management ordinance.

Using ICC in concert with FEMA mitigation grants: In some cases, individual policyholders can take advantage of federal grant money to supplement the cost of mitigation activities. Policyholders can assign their ICC benefits to their community and enable the community to file a single claim on behalf of a community mitigation project. FEMA will count the ICC claim monies as non-federal matching funds when applying for mitigation grants, because ICC coverage is a direct contract between the policyholder and the insurer. The community can then use FEMA mitigation grant funds to help pay

for any additional portion of the cost of elevation, floodproofing, relocation, or demolition that is more than the ICC claim payment. It is extremely important for policyholders and community officials to work closely together at every stage of this process. Individual participation in a FEMA-funded community mitigation project is voluntary and the community is required to provide mitigation funds to any property owner whose ICC payment was counted towards the matching funds.

Community responsibilities: Note that the community's only responsibilities in the ICC process are:

- To determine if the building has been substantially or repetitively flooded;
- To issue permits for the work required to bring the building into compliance with the floodplain management ordinance; and
- To issue an certificate of occupancy or a confirmation letter.

However, many communities will do more for their residents, including answering questions, providing literature on the various compliance options, etc.

The Community Rating System (CRS) credits tracking permits to enforce a cumulative substantial damage requirement. The CRS Coordinator's Manual credits the ordinance language in Figure 14-3. These credits are found under Activity 430, Section 431.c in the CRS Coordinator's Manual and the CRS Application.

Option 1

A. Adopt the Following Definition:

"Repetitive Loss" means flood-related damage sustained by a structure on two separate occasions during a 10-year period for which the cost of repairs at the time of each such flood event, on the average, equals or exceeds 25 percent of the market value of the structure before the damage occurred.

B. And modify the "substantial improvement" definition as follows:

"Substantial Improvement" means any reconstruction, rehabilitation, addition, or other improvement of a structure, the cost of which equals or exceeds 50 percent of the market value of the structure before the "start of construction" of the improvement. This term includes structures that have incurred "repetitive loss" or "substantial damage," regardless of the actual repair work performed.

Figure 14-3. Sample ordinance language for ICC repetitive loss definitions.

Source: National Flood Insurance Program's Increased Cost of Compliance Coverage: Guidance for State and Local Officials, 2003 (FEMA 301).

Contact the DHS/FEMA Regional Office before revising your FEMA-approved ordinance.

Option 2

Modify the "substantial damage" definition as follows:

"Substantial Damage" means damage of any origin sustained by a structure whereby the cost of restoring the structure to its before-damaged condition would equal or exceed 50 percent of the market value of the structure before the damage occurred. Substantial damage also means flood-related damage sustained by a structure on two separate occasions during a 10-year period for which the cost of repairs at the time of each such flood event, on the average, equals or exceeds 25 percent of the market value of the structure before the damage occurred.

NOTE 1: Communities need to make sure that these definitions are tied to the floodplain management requirements for new construction and substantial improvements and to any other requirements of the ordinance, such as the permit requirements, in order to enforce this provision.

NOTE 2: An ICC Claim Payment is ONLY made for flood-related damage. The substantial damage part of the definition must still include "damage of any origin" to be compliant with the minimum NFIP Floodplain Management Regulations.

Figure 14-4 (Continued). Sample ordinance language for ICC repetitive loss definitions.

This language is necessary to trigger an ICC payment for a repetitive loss. No ordinance changes are needed for the ICC coverage for substantial damage incurred by a single flood.

Section 15. Floodway Rules

Contents

15.1. The Floodway Map

15.1.1. The floodway concept

During the 1800s, there were many occasions when railroads and other development blocked drainage ways and floodplains. After the floods and resulting damage, the builders were sued. Since then, courts have consistently ruled that it is illegal to block the flow of surface waters so as to cause damage to others.

Louisiana has a long history of laws and lawsuits relating to water. The State's Civil Code has several sections devoted to the duty of a property owner to not cause harm to his or her neighbors. These are known as the "Good Neighbor Law" (Section 17.6.3).

Art. 658 of the Civil Code states:

> The owner of an estate through which water runs, whether it originates there or passes from lands above, may make use of it while it runs over his lands. He cannot stop it or give it another direction and is bound to return it to its ordinary channel where it leaves his estate.

One of the key purposes of floodplain management is to prevent construction projects similar to those that created problems in the past. This is done by withholding the development permit until the project plans are reviewed to ensure that no obstruction to flood flows or increases in flood damages will be created.

Trying to determine a proposed project's effect on flood heights can be difficult and expensive, particularly when considering future developments. The floodway concept reduces this regulatory burden on communities and property owners.

44 CFR 59.1 Definitions: "Regulatory floodway" means the channel of a river or other watercourse and the adjacent land areas that must be reserved in order to discharge the base flood without cumulatively increasing the water surface elevation more than a designated height.

Note: For simplicity, this Desk Reference uses the term "floodway" instead of "regulatory floodway."

Section 6.3 explains the engineering method used to prepare a floodway map. This method is based on two legal premises:

- Property owners should be allowed to develop their land provided they do not obstruct flood flows and cause damage to others. The base flood level may be allowed to increase but not if significant damage would result.
- Properties on both sides of a stream must be treated equitably. The degree of obstruction permitted for one must also be permitted for the other.

The floodplain is divided into the floodway and the fringe. The floodway is the central portion of a riverine floodplain needed to carry the deeper, faster moving water (Figure 15-1). There must be restrictions on buildings, structures, and other development activities—such as fill—placed within the floodway because they are more likely to obstruct flood flows, causing the water to slow down and back up, resulting in higher flood elevations.

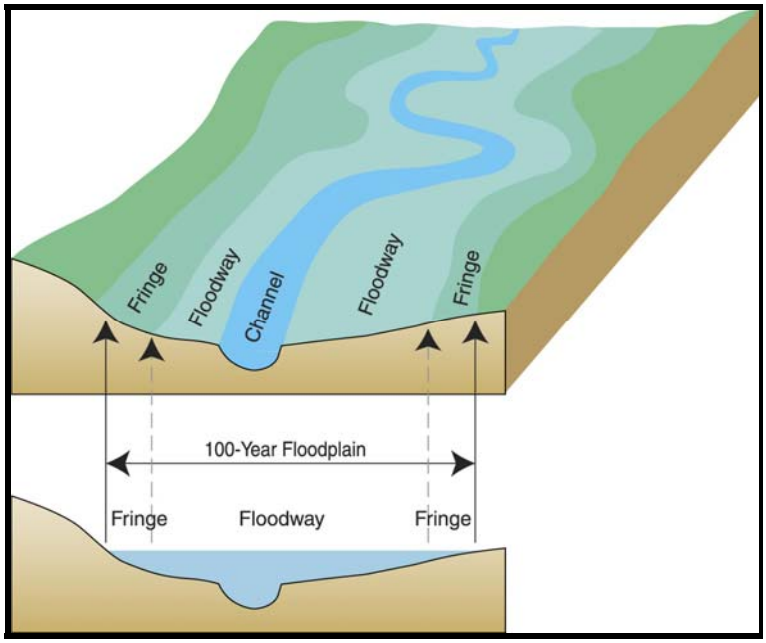


Figure 15-1. Floodway cross section and map.

15.1.2. Floodway map

Detailed Flood Insurance Studies (FISs) have been completed for many communities in Louisiana. The FIS defines the floodway and the fringe, which is then included on the community's floodplain map (Figures 15-2 and 15-3). The technique of preparing a floodway map is covered in Section 6.3. How to use a floodway map is described in Sections 8.2 and 9.1.4.

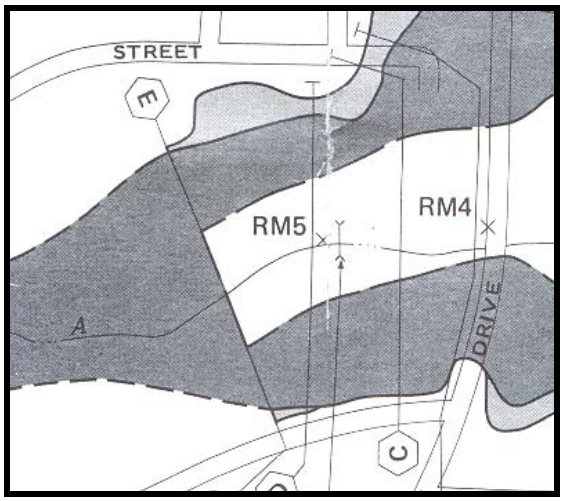


Figure 15-2. In the old Floodway Map format, the floodway is the white area in the middle of the Special Flood Hazard Area (SFHA), on each side of the channel.

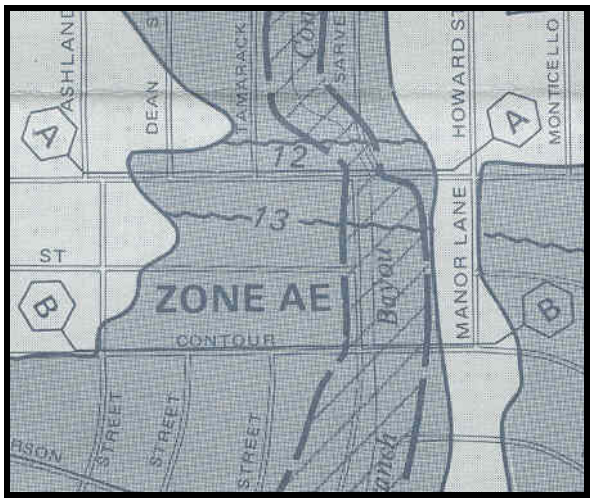


Figure 15-3. In the new FIRM format, the floodway is shown with slanted lines in the middle of the Special Flood Hazard Area (SFHA), on each side of the channel.

15.1.3. Changing the floodway map

In some situations, it may be in the public interest to allow an increase in flood heights greater than the NFIP regulations allow. For example, it would be hard to build a flood control reservoir without affecting flood heights. Because a dam would have a major impact on flood heights, there needs to be a way to permit such projects.

Any project that would change flood levels must also result in a change to the flood maps to reflect the new conditions. Floodway maps can also be revised to reflect changed conditions and/or better ground information.

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

If the community proposes to permit a project that will increase flood heights in excess of that allowed, it must apply to the DHS/FEMA Regional Office for conditional approval. This process is also explained in Section 10.4.

The following materials must be submitted with the application for conditional approval of a floodway map change:

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

Once DHS/FEMA has given a conditional approval of the map change, but before allowing construction, the community must adopt the revised flood level in its flood damage prevention ordinance and provide proof of adoption to DHS/FEMA.

15.2. Floodway Rules

15.2.1. Permit review: site in the fringe

When a permit application is submitted, the floodplain administrator checks the site location in relation to the floodway boundaries. See Section 9.1.4 for an example of how to do this.

If the site is in the fringe (i.e., outside of the floodway), the administrator knows the development will not cause flood damage to others by blocking flood flows: the floodway study already calculated that fringe obstructions will not cause a significant increase in flood heights. (***Note:*** This does not mean that the development will not create a localized drainage problem, only that it will not block the flow of waters from flooding of the stream that was studied).

No further floodway review is needed, but the project must still meet the other requirements of the ordinance, particularly the flood protection rules for new buildings.

15.2.2. Permit review: site in the floodway

All projects in the regulatory floodway must undergo a review to determine their effect on flood flows and ensure that they do not cause problems.

> **44 CFR 60.3(d)(3): [In the regulatory floodway, communities must] Prohibit encroachments, including fill, new construction, substantial improvements, and other development within the adopted regulatory floodway unless it has been demonstrated through hydrologic and hydraulic analyses performed in accordance with standard engineering practice that the proposed encroachment would not result in ANY increase in flood levels within the community during the occurrence of the base flood discharge.**

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

Once the community adopts its floodway, it must fulfill the requirements of 44 CFR 60.3(d). The key concern is that each project proposed in the floodway must be analyzed to determine if the project will increase flood heights or cause increased flooding downstream.

Some key points on this analysis:

- The regulations call for preventing ***any*** increase in flood heights. This does not mean the community can allow a foot or a tenth of a foot—it means ***zero*** increase. If small increases in flood heights from individual developments were allowed, the cumulative effect of several allowed increases will have significant impacts on flood stages and flood damage.

- Projects such as filling, grading, or construction of a new building must be reviewed to determine whether they will obstruct flood flows and cause an increase in flood heights upstream or adjacent to the project site.
- Projects such as grading, large excavations, channel improvements, and bridge and culvert replacements must also be reviewed to determine whether they will remove an existing obstruction, resulting in increases in flood flows downstream.
- The review must also consider what would happen if other properties in the same situation were to be allowed the same type of project.

It is the community's job to ensure that a floodway encroachment analysis is conducted to determine whether an activity will cause a problem. Most local permit officials are not qualified to conduct the analysis, so most require this to be done by an engineer at the developer's expense. The floodplain administrator has two options for doing this:

1) Require the applicant's engineer to certify that there will be no rise in flood heights, or

2) Advise the applicant that he can prepare a new flood study showing a different floodway delineation, submit it to DHS/FEMA, and obtain a LOMR (Section 10.4). However, until DHS/FEMA issues the final LOMR, no project can be approved without a certification that there will be no rise in flood heights.

15.2.3. No-rise certification

Most local permit officials are not qualified to make a technical encroachment review, so most require this to be done by an engineer at the developer's expense.

To ensure that the encroachment review is done correctly, most communities require the developer to provide a "no-rise" certification, which certifies that the development project will not affect flood heights. Example certification language is in Figure 15-4. The certification must be signed by an engineer and supported by technical data, which should be based on the same computer model used to develop the floodway shown on the community's map.

Although the community is required to review and approve the encroachment review, the floodplain administrator may request technical assistance and review from the DHS/FEMA Regional Office. If this alternative is chosen, the administrator should review the technical submittal package and verify that all supporting data are included in the package before it is sent to DHS/FEMA.

Figure 15-4. On the next page is an example of a no-rise certification. It may be photocopied and used locally.

*[**Note:** This certificate must be signed and sealed by an engineer.]*

Engineering “No Rise” Certification

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

It is further to certify that the attached technical data supports the fact that proposed

_____

(Name of Development)

will not impact (0.000 foot rise) the base (100-year) flood elevations, floodway elevations and floodway widths on

_____

(Name of Stream)

at published sections in the Flood Insurance Study for _____

(Name of Community)

dated _____ and will not impact (0.000 foot rise) the base (100-year) flood elevations, floodway elevations, and floodway widths at unpublished cross sections in the vicinity of the proposed development.

_____ _____

(Date) (Signature)

_____

(Title)

SEAL: _____

(Address)

_____

(License number)

Here is the guidance from the DHS/FEMA Regional Office:

The engineering or no-rise certification must be supported by technical data. The supporting technical data should be based upon the standard step-backwater computer model utilized to develop the 100-year floodway shown on the community's effective Flood Insurance Rate Map or Flood Boundary and Floodway Map (FBFM) and the results tabulated in the community's Flood Insurance Study (FIS).

A request for technical assistance and review from the DHS/FEMA Regional Office should be in the form of a Conditional Letter of Map Revision, (CLOMR), using the appropriate application and certification forms contained in the MT-2 application packet . See Section 10.4 for more information on CLOMRs. However, if this alternative is chosen, the community must review the technical submittal package and verify that all supporting data, listed in the following paragraphs, are included in the package before forwarding to FEMA.

To support a no-rise certification for proposed developments encroaching into the regulatory floodway, the following procedures must be followed:

1. Furnish a written request for copies of the hydraulic analysis used in the effective Flood Insurance Study, referred to as the Currently Effective Model, for the specified stream and community, identifying the limits of the requested data. A fee will be assessed for providing the data.

2. Upon receipt of the effective model, the engineer should run the model to duplicate the data in the effective FIS. The result is called the Duplicate Effective Model.

3. Revise the original step-backwater model to reflect site specific existing conditions by adding two or more new cross-sections in the vicinity of the proposed development. The resulting Corrected Effective Model must not reflect any man-made physical changes since the date of the effective model. Floodway limits should be manually set at the new cross-section locations by measuring from the effective FIRM or FBFM. The cumulative reach lengths of the stream should also remain unchanged.

4. The Corrected Effective Model is modified to produce the Existing or Pre-Project Conditions Model to reflect any modifications that have occurred within the floodplain since the date of the effective model but prior to the construction of the proposed project. If no modifications have occurred since the date of the effective model, then this model would be identical to the Corrected Effective Model.

5. Modify the Existing or Pre-Project Conditions Model to reflect the proposed development at the new cross-sections, while retaining the currently adopted floodway widths. The overbank roughness coefficients should remain the same unless a reasonable explanation of how the proposed development will impact Manning's "n" values should be included with the supporting data. The results of this floodway run (the Proposed Conditions Model) will indicate the 100-year floodway elevations for proposed conditions at the project site. These results must indicate NO impact, (0.000' rise), on the 100-year flood elevations, floodway elevations, or floodway widths shown in the Corrected Effective Model or in the Existing Pre-Project Conditions Model.

6. The "no-rise" supporting data and a copy of the engineering certification (Figure 15-4) must be submitted to and reviewed by the appropriate community official prior to issuing a permit.

The community must review the technical submittal package and verify that all supporting data are included in the package before forwarding to DHS/FEMA.

15.2.4. Streams without floodway maps

In some areas, floodways have not been designated for various reasons, such as high costs and historically low development pressure. Communities with base flood elevations, but no floodway map, are considered "60.3(c)" communities (Section 4.1.2).

Section 60.3(c) reads:

> **44 CFR 60.3(c)(10): [Communities must] Require until a regulatory floodway is designated, that no new construction, substantial improvements, or other development (including fill) shall be permitted within Zones A1-30 and AE on the community's FIRM, unless it is demonstrated that the cumulative effect of the proposed development, when combined with all other existing and anticipated development, will not increase the water surface elevation of the base flood more than one foot at any point within the community.**

A 60.3(c) community treats the entire riverine floodplain as a floodway.

In these situations, the applicant must conduct and provide a review that demonstrates that the *cumulative* effect of the proposed development, when combined with all other existing and anticipated development:

- Will not increase the water surface elevation of the base flood more than 1 foot at any point within the community, *and*
- Is consistent with the technical criteria contained in the Hydraulic Analyses Chapter in *Guidelines and Specifications for Flood Hazard Mapping Partners*

This review must be required for all development projects that may create an increase in flood flows, such as bridges, road embankments, buildings, and fills. A certificate similar to the one in Figure 15-4 should be required from the applicant's engineer.

15.2.5. Watercourse alterations

The community must notify adjacent communities and the Louisiana Department of Transportation and Development (LADOTD) prior to altering or relocating any river or stream within its jurisdiction. Copies of such notifications must be submitted to the DHS/FEMA Regional Office.

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

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

Any alteration or relocation of a watercourse should not increase the community's flood risks or those of any adjacent community. This could happen if the watercourse's capacity to carry flood flows is reduced because a smaller or less-efficient channel is created or the capacity is increased by straightening or widening the channel (Figure 15-5).

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

For any significant alteration or relocation, the floodplain administrator should consider requiring the applicant to have an engineer certify that the flood-flow carrying capacity is maintained and that there will be no increase in flood flows downstream. It is recommended that the community require the submittal and approval of a CLOMR from DHS/FEMA for large-scale proposals (CLOMRs are discussed in Section 10.4).

Figure 15-5. Channel alterations have special permit requirements.

Section 16. Coastal Construction Rules

Contents

Note: This section covers coastal construction rules that are *in addition to* the requirements for new buildings spelled out in Sections 11 and 12 and the requirements for substantially improved or damaged buildings in Sections 13 and 14. State and federal coastal construction regulations are discussed in Section 20.2.

16.1. V Zone Requirements

Section 7 describes how coastal hazards and V Zones are mapped. Sections 11 and 12 review the requirements for all new buildings built in a Special Flood Hazard Area (SFHA). There is a much greater hazard posed by breaking waves 3 feet high or higher (Figure 16-1). Therefore, DHS/FEMA has established minimum regulatory requirements for V Zone buildings that are more stringent than the minimum requirements for other floodplains. There are requirements in six areas:

- Location
- Sand dunes and mangrove stands
- Filling
- Elevation
- Foundation design
- Below the elevated floor

Due to these additional rules, the location of a building in relation to the A Zone/V Zone boundary on a FIRM can affect the design of a building. Note that a building or other structure with *any* portion of its foundation in a V Zone must be built to comply with V Zone requirements.

DHS/FEMA has concluded that the AE Zone standards may not provide adequate protection in coastal AE Zones subject to wave effects, velocity flows, erosion, scour, or combinations of these forces. Wave tank studies have shown that breaking waves considerably less than the 3-foot criteria used to designate VE Zones can cause considerable damage. Therefore, communities with coastal AE Zones are encouraged to revise their ordinances to apply all or some of the V Zone standards to these areas.

In addition to specific requirements for coastal construction, DHS/FEMA has produced a number of publications on coastal construction, including

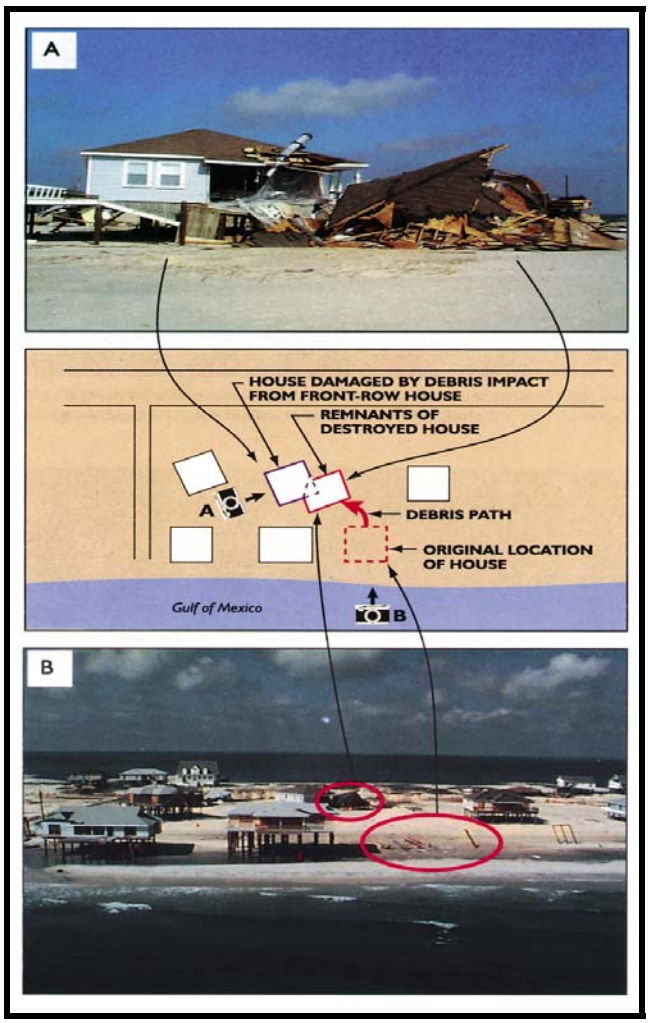


Figure 16-1. One house collapsed during a storm and washed into another building, showing the need for additional requirements on the coast.

Recommended Residential Construction for the Gulf Coast, FEMA 550, *Building Performance Assessment Report: Hurricane Georges in the Gulf Coast*, FEMA 338, *Hurricane Katrina in the Gulf Coast: Mitigation Assessment Team Report*, FEMA 549 and others. See Section 29 and the FEMA online library.

16.1.1. Location

New or substantially improved buildings in V Zones cannot be over water. They must be located landward of the reach of mean high tide (i.e., the mean high water line). In fact, it is best to be as far back from the shore as possible to avoid more dangerous areas subject to waves and erosion.

16.1.2. Sand dunes and mangrove stands

Man-made alterations of sand dunes or mangrove stands are prohibited if they would increase potential flood damage. Both of these natural features are protected against alteration because they are important first lines of defense against coastal storms and can reduce losses to inland coastal development.

Generally, it can be assumed that any removal or other alteration of a sand dune will increase flood damage. The burden should be placed on the permit applicant to demonstrate that this will not occur. This will require a report by a coastal engineer or geologist.

Because mangroves are critical areas in the Louisiana coastal zone, the State avoids issuing a Coastal Use Permit for filling these areas (Section 20.2.2). Therefore, developers can save themselves a lot of work by avoiding mangrove stands altogether.

16.1.3. Fill

The National Flood Insurance Program (NFIP) prohibits the use of fill for structural support of buildings in V Zones. A minimal amount of fill may be used on coastal building sites for landscaping and site grading, as long as the fill does not interfere with the free passage of floodwaters and debris underneath the building. It also must not cause changes in flow direction during coastal storms such that floodwaters will cause additional damage to buildings on the site or to any adjacent buildings.

An example of unacceptable placement of fill would be the construction of a small berm or retaining wall that is backfilled and used for landscaping purposes, when it has been determined that ramping or deflection of floodwaters would have an adverse effect on adjacent buildings and thereby create additional flood damage potential.

> There are additional state and federal permit requirements for fill and for altering coastal features. These are discussed in Section 20.2.

16.1.4. Accessory Buildings

Unless properly elevated on piles or columns (Section 16.2), buildings in V Zones must be limited to low-value or small structures such as small metal or wooden sheds that are "disposable." If a low-cost or small building is placed on a site, consideration must be given to the effects the debris from the building will have on the building or adjacent buildings (Figure 16-1). If the building is of significant size and strength to create either a debris impact or flow diversion problem, it must be elevated as described in Section 16.2.

For purposes of defining and administering the flood damage prevention ordinance, if a community wishes to allow unelevated accessory buildings, it must establish the meaning of "low-cost" and "small accessory buildings." DHS/FEMA recommends that "low-cost" be defined as having a value of less than $500 and "small" be defined as less than 100 square feet of floor space.

Accessory buildings meeting these criteria must be unfinished on the interior, constructed with flood-resistant materials below the BFE, and used only for storage (Figure 16-2). Unless properly elevated on piles or columns, detached garages are not allowed in V Zones.

As with any structure in an area subject to waves or high velocity flooding, accessory buildings must be adequately anchored or they can become debris that can cause significant damage to nearby structures. In V Zones, it is recommended that the flood-plain administrator require an architect's or engineer's statement saying that "the design of the building includes anchoring adequate to prevent flotation, collapse, and lateral movement during the base flood."

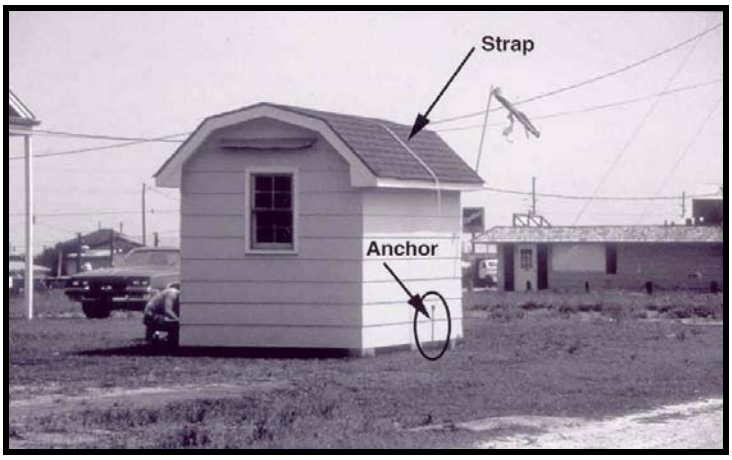


Figure 16-2. Storage building anchored with strap and ground anchor. This anchoring system will resist only low-level flooding and moderate winds.

16.2. Building Elevation

16.2.1. NFIP requirement

Note: This section covers coastal construction rules that are *in addition to* the requirements for new buildings spelled out in Sections 11 and 12.

This section reviews the requirements in the V Zone. However, these standards are also recommended for coastal A Zones that experience wave action. Buildings must be elevated on pilings, posts, piers, or columns so that the bottom of the lowest horizontal structural member of the lowest floor (excluding the vertical foundation members) is at or above the base flood elevation (BFE).

> **44 CFR 60.3(e)(4) [The community must] Provide that all new construction and substantial improvements in Zones V1-30 and VE, and also Zone V if base flood elevation data is available, on the community's FIRM, are elevated on pilings and columns so that (i) the bottom of the lowest horizontal structural member of the lowest floor (excluding the pilings or columns) is elevated to or above the base flood level…**

Other methods of elevating buildings, on fill, solid walls, or crawlspaces and floodproofing, are prohibited because they present obstructions to wave action. The force of a breaking wave is so great that these types of foundations would be severely damaged, resulting in collapse of the building. Waves can also ramp up on fill and reach the elevated portions of the building.

Construction on piles or columns allows waves to pass under the building without transmitting the full force of the waves to the building's foundation (Figure 16-3). A special case is made for installing breakaway walls between the pilings or columns, but such walls are not supporting foundation walls.

This requirement is for *all* types of buildings— new nonresidential buildings must also be elevated and cannot be flood-proofed in the V Zone.

For more details on construction standards, see DHS/FEMA's *Coastal Construction Manual.*

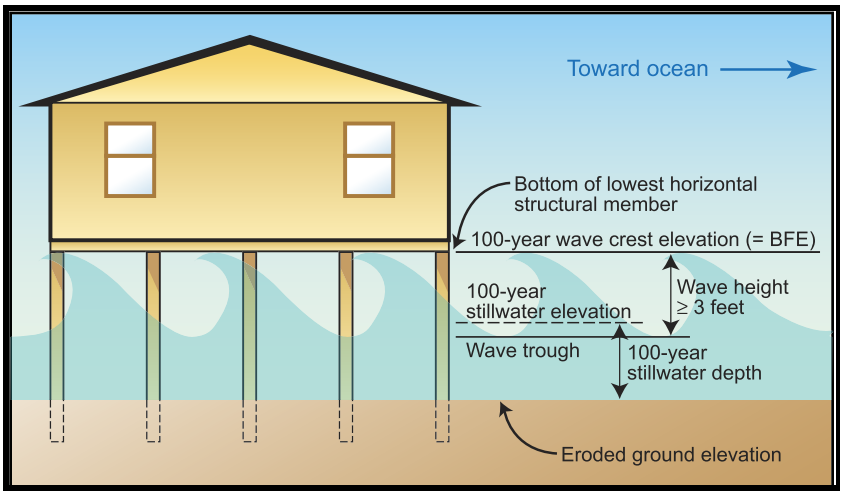


Figure 16-3. V Zone elevation requirements.

16.2.2. Height requirement

Determining the BFE in a coastal floodplain is covered in Section 7.4.2.

Within V Zones, the controlling elevation is the bottom of the lowest horizontal structural member of the lowest floor (Figure 16-4). (In comparison, the controlling elevation within A Zones is the *top* of the lowest floor.) This is to keep the entire building above the anticipated breaking wave height of a base flood storm surge.

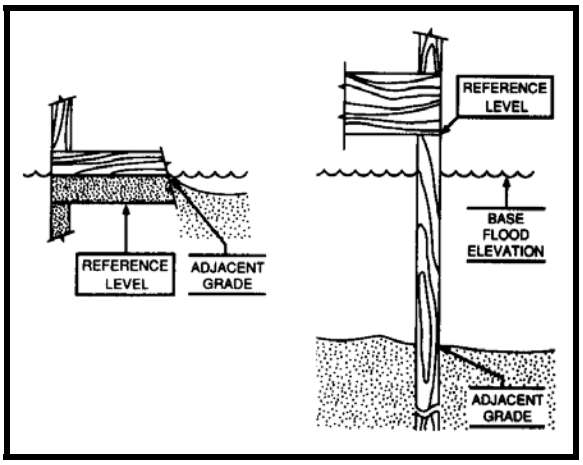


Figure 16-4. In V Zones, the lowest floor is measured from the bottom of the lowest horizontal structural member.

16.2.3. Foundation construction

The design of the supporting foundation must account for wind loads in combination with the forces that accompany the base flood (Figure 16-5). Posts of wood, steel, or pre-cast concrete are preferred over block columns and similar foundations that are less resistant to lateral forces. Pilings are necessary in areas subject to erosion and scour. It is also critical that they be embedded deep enough (Figure 16-6).

44 CFR 60.3(e)(4) …(ii) [The community must ensure that] the pile or column foundation and structure attached thereto is anchored to resist flotation, collapse and lateral movement due to the effects of wind and water loads acting simultaneously on all building components. Water loading values used shall be those associated with the base flood. Wind loading values used shall be those required by applicable State or local building standards. A registered professional engineer or architect shall develop or review the structural design, specifications and plans for the construction, and shall certify that the design and methods of construction to be used are in accordance with accepted standards of practice for meeting the provisions of (e)(4)(i) and (ii) of this section.

Figure 16-5. This house had inadequate pile embedment and cross bracing.

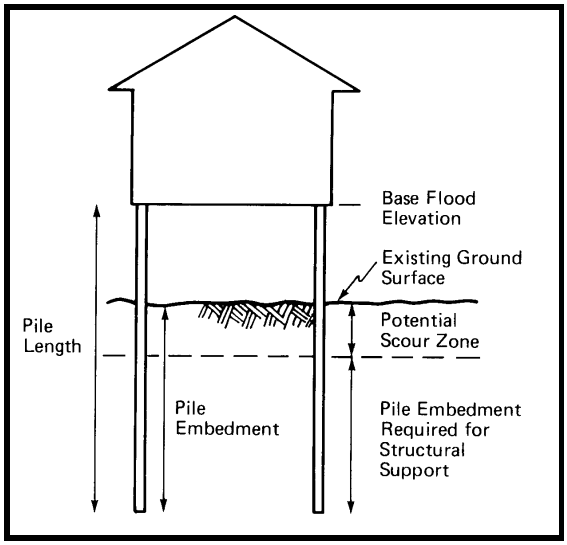


Figure 16-6. Piles must be embedded well below the scour depth.

Bracing provides lateral wind-resistance support to a pile or column foundation by stiffening the foundation system. While diagonal bracing is allowed under the NFIP, to some degree it will obstruct velocity floodwaters and waves and will often trap debris. Foundation bracing may not be necessary for a V Zone building if the number, size, and embedment of the piles or columns are adequate.

Bracing should be placed parallel to the primary direction of flow, generally perpendicular to the shoreline. Only the minimum amount of bracing necessary to stiffen the foundation may be used. Bracing should consist of members that will offer the least resistance to floodwaters flowing under the elevated building.

Grade beams, made of wood or reinforced concrete, tie together the perimeter piles or columns to provide additional lateral support. Grade beams placed with their upper surfaces flush with the natural grade are allowed under the NFIP.

Storm erosion and localized scour generally expose grade beams, leaving them elevated above the post-storm beach profile. Therefore, grade beams must be designed to remain in place when erosion and localized scour remove the supporting soil beneath them. Grade beams are not to be used as a substitute for adequate number, size, and embedment of piles or columns.

16.2.4. V Zone certification

A registered professional engineer or architect must develop or review the structural design, specifications, and plans for the construction of a V Zone building. It also must be certified that the design and planned methods of construction are in accordance with accepted standards of practice for meeting the above provisions.

Construction elements that will increase storm-related loadings on the building (and that are not specifically precluded by the NFIP regulations) may be constructed if the buildings are designed to withstand the additional impact (hydrodynamic) forces.

A copy of the engineer's or architect's certification must be kept in the permit file for all structures built or substantially improved in the V Zone.

See also DHS/FEMA's *Coastal Construction Manual* for technical details.

Figure 16-7. On the next page is an example, but unofficial, V Zone certification. It may be photocopied and used locally.

V Zone Certification

Property Information	For Insurance Company Use
Name of Structure Owner	Policy Number
Structure Address or Other Description	
City State Zip Code	

SECTION I: FLOOD INSURANCE RATE MAP (FIRM) INFORMATION

1. Community Number	2. Panel Number	3. Suffix	4. Date of FIRM Index	5. FIRM Zone

SECTION II: ELEVATION INFORMATION

This form is not a substitute for an Elevation Certificate. Elevations should be rounded to nearest tenth of a foot.

1. Elevation of the Bottom of Lowest Horizontal Structure Member _____feet
2. Base Flood Elevation _____feet
3. Elevation of Lowest Adjacent Grade _____feet
4. Approximate Depth of Anticipated Scour/Erosion Used for Foundation Design _____feet
5. Embedment Depth of Pilings or Foundation Below Lowest Adjacent Grade _____feet
6. Datum Used: _____ NGVD '29 _____ NAVD '88 _____ Other

SECTION III: FOUNDATION CERTIFICATION

Note: This section must be certified by a registered professional engineer or architect

I certify that I have developed or reviewed the structural design, plans and specifications for construction and that the methods of construction to be used are in accordance with accepted standards of practice for meeting the following provisions:

a) The bottom of the lowest horizontal structure member of the lowest floor (excluding the pilings or columns) is elevated to or above the BFE; and,

b) The pile or column foundation and structure attached thereto is anchored to resist flotation, collapse and lateral movement due to the effects of the wind and water loads acting simultaneously on all building components. Water loading values used are those associated with the base flood including wave action. Wind loading values used are those required by the applicable State or local building code. The potential for scour and erosion at the foundation has been anticipated for conditions associated with the flood, including wave action.

SECTION IV: BREAKAWAY WALLS CERTIFICATION

Note: This section must be certified by a registered professional engineer or architect

I certify that I have developed or reviewed the structural design, plans and specifications for construction and that the design and methods of construction to be used for the breakaway walls are in accordance with accepted standards of practice for meeting the following provisions:

a) Breakaway collapse shall result from water load less than that which would occur during the base flood; and,

b) The elevated portion of the building and supporting foundation system shall not be subject to collapse, displacement, or other structural damage due to the effects of wind and water loads acting simultaneously on all building components (wind and water loading values defined in Section III).

SECTION V: CERTIFICATION

(Check: Section III _____ and/or Section IV _____)

Name of Certifier	Title	
Firm Name		License Number
Street Address		Phone Number ( )
City	State	Zip Code
Signature		Date

16.3. Below the Elevated Floor

This section reviews the requirements in the V Zone. However, these standards are also recommended for coastal A Zones that experience wave action. There are two major concerns with what is done below the elevated floor of a building in the coastal floodplain:

- The area must be free of obstruction.
- Any enclosure must be free from future flood damage. This requirement is for both A and V Zones and is discussed in Section 11.3. Specifically:
    - The area must be constructed of materials and utilities that are resistant to flood damage (Section 11.3.2)
    - In coastal A Zones, proper openings are required (Section 11.3.3)
    - The enclosed area can only be used for building access, vehicle parking, or storage of materials with low damage potential (Section 11.3.4)

16.3.1. Obstructions

Due to the hydrodynamic forces that waves place on a structure, it is important to keep the area below the elevated floor free of any obstruction that will transfer the impact of a breaking wave to the rest of the structure. Nothing placed below the elevated floor can cause collapse, displacement, or other structural damage to the elevated portion of the building or the supporting foundation system.

In short, the space below all newly constructed, substantially damaged, and substantially improved buildings must be completely open or enclosed only by:

- Open wood latticework
- Insect screening
- Non-supporting certified breakaway walls

Open wood latticework and insect screening let water flow freely under the structure. They also help permit officials ensure that the lower area is not altered later so as to increase the potential for flood damage.

Any construction element, such as a garage, deck, bulkhead, or accessory building, that is structurally dependent on or attached to a V Zone building is considered part of that building and must meet these requirements. If any of these elements are attached to the building and located below the lowest horizontal structural member of the building, they constitute an obstruction and are prohibited unless constructed to the breakaway standards of Section 60.3(e)(5).

Construction elements outside the perimeter of and not attached to a coastal building (such as bulkheads, swimming pools, and accessory buildings) may alter the physical characteristics of flooding or significantly increase wave or debris impact forces affecting nearby buildings.

16.3.2. Breakaway walls

The area beneath the elevated floor of a V Zone building may be enclosed, but only with non-load bearing breakaway walls. Breakaway walls provide security for the area below the elevated floor. However, they may also lead a property owner to believe that he or she can modify the enclosed area. Over time, enclosed areas that are out of sight from permit officials can be converted to finished areas, increasing their susceptibility to water damage. One way to help prevent this is with a nonconversion agreement. An example is in Figure 16-8.

A second problem with breakaway walls is that it is difficult to be sure that they will actually break away when the storm occurs. What may start with an excellent design may be altered during construction or with later use and alterations. Because of these concerns, breakaway walls are not encouraged.

Solid breakaway walls are intended to collapse under the force of wave impacts without damaging the building's foundation or the elevated portion of the building. Section 60.3(e)(5) of the NFIP regulations specify a design safe loading resistance for breakaway walls of not less than 10 pounds/square foot and not more than 20 pounds/ square foot. However, the regulations also provide for the use of alternative designs that do not meet the specified loading requirements.

In general, breakaway walls built according to alternative designs are permitted if a registered professional engineer or architect certifies that the walls will collapse under a water load less than that which would occur during the base flood. Furthermore, it must be certified that the elevated portion of the building and supporting foundation system will not be subject to collapse, displacement, or other structural damage due to the effects of wind and water loads acting simultaneously on all components of the building.

There are no NFIP restrictions on the size of the area that may be enclosed. However, V Zone buildings with lower area enclosures constructed with breakaway walls that exceed 300 square feet may be subject to higher insurance premiums due to the potential for increased loadings on the foundation system caused by the enclosure.

All breakaway walls need to have their designs certified by a registered professional engineer or architect. Guidance on breakaway walls can be found in *Design and Construction Guidance for Breakaway Walls Below Elevated Coastal Buildings* (FEMA Technical Bulletin 9). The criteria address breakaway wall construction materials, including wood framing, light-gauge steel framing, and masonry; attachment of the walls to floors and foundation members; utility lines; wall coverings, such as interior and exterior sheathing, siding, and stucco; and other design and construction issues.

16.3.3. Stairways and elevators

Access stairs and elevators attached to or beneath an elevated building are excluded from the breakaway requirement but must meet the flood-resistant material requirements of Section 12.2.1. Although access stairs and elevators do not have to be breakaway, the potential loads generated by these obstructions must be taken into account in the design of the building.

Further requirements regarding elevators can be found in *Elevator Installation* (FEMA Technical Bulletin 4).

Figure 16-8. On the next page is an example nonconversion agreement for buildings with enclosures below an elevated floor. It may be photocopied and used locally. A nonconversion agreement is only necessary if the finished floor is 5 feet or more above grade. Note that this form should not be used in A Zones. An A Zone example is in Figure 11-10.

NONCONVERSION AGREEMENT
FOR CERTAIN STRUCTURES IN THE COASTAL FLOODPLAIN

Application has been made for a Permit from _____ *[community name]*, Louisiana.

Permit # _____

Property Owner _____

Address _____

Deed dated _____, Recorded _____

Tax map _____, block _____, parcel _____.

Base Flood Elevation at the site is _____ feet (NGVD).

Map Panel Number _____, effective date _____.

In consideration for the granting of a Permit for the above structure, the Property Owner agrees to the following:

1. That the enclosed area below the base flood elevation shall be used solely for parking of vehicles, limited storage, or access to the building and will never be used for human habitation without first becoming fully compliant with the Flood damage prevention ordinance in effect at the time of conversion.

2. That the walls shall not be reinforced or altered to negate their ability to break away during a storm and all interior walls, ceilings, and floors below the Base Flood Elevation shall be unfinished or constructed of flood resistant materials.

3. That mechanical, electrical, or plumbing devices shall not be installed below the Base Flood Elevation.

4. That any variation in construction beyond what is permitted shall constitute a violation of this agreement and Section ____of Ordinance #_____ .

5. That this Nonconversion Agreement becomes part of Permit # _____.

_____

Signature of Property Owner Witness Date

_____

At a minimum, the following has been recorded on the deed to the above property**:** "This structure has received special permission to be constructed in the Special Flood Hazard Area. The lowest floor shall not be finished or converted to a habitable space unless the enclosed area below the Base Flood Elevation becomes fully compliant with Ordinance #_____ in effect at the time of conversion. At this site, the Base Flood Elevation is _____feet, National Geodetic Vertical Datum."

_____

Signature, Recorder of Deeds Date

Section 17. Higher Regulatory Standards

Contents

17.1. Building Requirements

Sections 11 through 16 cover the minimum requirements of the National Flood Insurance Program (NFIP). A community can also (and is encouraged to) set higher standards for structures built in the floodplain and for development in the watershed that affects flood levels.

17.1.1. Freeboard

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

While not required by the NFIP standards, communities are encouraged to adopt at least a 1-foot freeboard to account for the 1-foot rise built into the concept of designating a regulatory floodway and the encroachment requirements where floodways are not identified (Section 15).

There are other reasons for considering a freeboard:

- Accounts for future increases in flood stages if additional development occurs in the floodplain
- Accounts for future flood increases due to upstream watershed development
- Acts as a hedge against backwater conditions caused by debris dams
- Reflects uncertainties inherent in flood hazard modeling, topography, mapping limitations, and floodplain encroachments
- Provides an added measure of safety against flooding
- Results in significantly lower flood insurance rates due to lower flood risk, well below the rates for properties outside the floodplain (Figure 17-1)

Building Exposure	Premium
In the Special Flood Hazard Area (AE Zone)	
Pre-FIRM ("subsidized") rate	$1,345
Post-FIRM (actuarial) rates	
2 feet above the base flood elevation	$413
1 foot above the base flood elevation	$575
At the base flood elevation	$841
1 foot below the base flood elevation	$3,085
2 feet below the base flood elevation	$3,901
Outside the Special Flood Hazard Area	$792

Premiums are for $150,000 in building coverage and $75,000 in contents coverage for a one-story house with no basement and a $500 deductible. Premiums are lower in Community Rating System (CRS) communities.

Figure 17-1. Example flood insurance premiums.

Freeboard safety factors are common in the design of flood control projects and floodplain development. Many communities have incorporated freeboard requirements into the elevation and floodproofing requirements stipulated by the NFIP. Communities have adopted freeboard requirements of up to 4 feet.

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

Example ordinance language:

> Residential Construction: New construction or substantial improvement of any residential building (or manufactured home) shall have the lowest floor, including basement mechanical and utility equipment, and ductwork, elevated no lower than 1 foot above the base flood elevation.
>
> Non-Residential Construction: New construction or substantial improvement of any commercial, industrial, or non-residential building (or manufactured home) shall:
>
> a. Have the lowest floor, including basement, mechanical and utility equipment, and ductwork, elevated no lower than 1 foot above the level of the base flood elevation or
>
> b. Be floodproofed to a level no lower than 1 foot above the level of the base flood elevation, provided that all areas of the building (including mechanical and utility equipment) below the required elevation are watertight with walls substantially impermeable to the passage of water and use structural components having the capability of resisting hydrostatic and hydrodynamic loads and the effects of buoyancy.

Contact the DHS/FEMA Regional Office before revising your FEMA-approved ordinance.

The Arizona statutes define the "Regulatory Flood Elevation" as one foot above the level of the base flood elevation. All buildings are required to be elevated or floodproofed to or above the Regulatory Flood Elevation, providing one foot of freeboard.

After determining that manufactured homes suffer extensive damage even before floodwater reaches the finished floor elevation, the State of Arizona requires that manufactured homes be placed so that "the bottom of the structural frame is at or above the Regulatory Flood Elevation." Compared to the NFIP minimum requirements, all manufactured homes have two feet of freeboard.

The Community Rating System (CRS) credits freeboard under Activity 430, Section 431.a in the *CRS Coordinator's Manual* and the *CRS Application*. Under Activity 450, Section 451.c, the CRS credits requiring all buildings to be elevated above the street level to prevent flood problems caused by local drainage.

17.1.2. Foundation standards

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

However, the NFIP performance standards do not specify how a building's foundation should be constructed. Especially in areas where the NFIP regulations do not require an engineer's certificate, more specific foundation construction standards would help protect buildings from flood damage. One option is to require a registered professional engineer or architect to certify the adequacy of elevated building foundations and the proper placement, compaction, and protection of fill when it is used in building elevation.

There is some foundation and soil compaction language in Sections 1612 and 1803.4 and Appendix K of the *International Residential Code* and Sections R401.2 and R506.2.1 of the *International Building Code* of the International Code Council (ICC). The floodplain administrator should review with the building department how these standards are enforced.

An alternative is to require a specific construction standard, such as requiring the V Zone standard and certification for new structures in coastal A Zones.

Example ordinance language:

> Buildings on Fill: A residential or non-residential building may be constructed on permanent fill in accordance with the following:
>
> a. The lowest floor (including basement) of the building or addition shall be at or above the base flood elevation plus 1 foot.
>
> b. The fill shall be placed in layers no greater than 1 foot deep before compacting and should extend at least 10 feet beyond the foundation of the building before sloping below the base flood elevation.
>
> c. The top of the fill shall be above the base flood elevation. However, the 10-foot minimum may be waived if a structural engineer certifies an alternative method to protect the building from damage due to erosion, scour, and other hydrodynamic forces.
>
> d. The fill shall not adversely affect the flow or surface drainage from or onto neighboring properties

Contact the DHS/FEMA Regional Office before revising the ordinance FEMA approved. Note also that State and Federal permits may be needed for filling certain areas (Section 20).

The Community Rating System credits foundation protection under Activity 430, Section 431.b in the *CRS Coordinator's Manual* and the *CRS Application*.

17.1.3. Limitations on enclosures

Most new buildings constructed in floodplains are elevated. If the building is on an elevated foundation, rather than on fill, the area below the first floor must be kept open to allow flood waters to flow inside and equalize hydrostatic pressures on the walls.

Where flood depths exceed 5 feet or 6 feet, builders often elevate the lowest floor 8 feet above grade. This allows the lower area to be easily used for parking and storage.

In coastal high hazard areas, the potential for structural damage is greater (Figure 17-2). Therefore, new buildings in V Zones must be elevated on open foundations to present the minimum obstruction to breaking waves. Owners are allowed to have "breakaway walls," i.e., walls that will be knocked down by waves rather than remain to transfer the impact of the waves to the structure.

Figure 17-2. This coastal building suffered extensive damage to the enclosed lower area.

One problem that has arisen is that owners enclose the lower areas of elevated buildings and put materials in them that are subject to flood damage. Owners forget (or new owners are not aware of) the reason for keeping the lower areas open and free from items that can be damaged by a flood. The open areas become enclosed or the breakaway walls become solid and the interior is converted to family rooms, bedrooms, and even bathrooms (Figure 17-3).

Figure 17-3 This house was properly elevated. Some time after the permit was issued, the owner improved the lower area and subsequently suffered flood damage. This shows the benefit of requiring lower areas to stay open.

Some communities and states know that this happens and have adopted regulatory language that prevents enclosing the area below the regulatory flood elevation. This can be in the form of prohibiting all enclosures, limiting enclosures to small areas reserved for building access, limiting walls to a percentage of the surface area, or allowing only transparent walls, such as screening and open latticework.

Regulations to limit enclosures below the base flood elevation have two objectives. First, they minimize a potential source of debris that may hit other buildings. Second, they discourage finishing the area below the BFE and storing valuable or hazardous items there.

Some communities enforce these enclosure limits only where the lowest floor is more than 5 feet above grade. Where the lowest floor is less than 5 feet above grade, a crawlspace with the proper openings may be more appropriate than an open area elevated on columns or piles. With less than 5 feet in height, the lower area is not likely to be improved or modified into a livable space and the enclosure limits are not necessary.

Example ordinance language:

> New construction or substantial improvements of elevated buildings that include enclosed areas formed by foundation and other exterior walls shall be designed to preclude finished living space below the base flood elevation by providing openings in each wall having a total net area of not less than 50% of the total wall area subject to flooding. At least one opening per wall shall be no higher than 1 foot above grade to allow for the entry and exit of floodwaters to automatically equalize hydrostatic flood forces on the exterior walls.

Contact the DHS/FEMA Regional Office before revising your FEMA-approved ordinance.

The previous example ordinance language calls for keeping the walls at least 50% open. "Openings" mean permanent openings, such as vents. Windows, doors, and garage doors do not qualify as "openings." Generally, this requirement is met by using latticework (Figure 17-4).

Figure 17-4. An example of restricting most of the enclosed lower area to latticework. Note the elevated electric meter and utilities.

NFIP/CRS

The Community Rating System credits limitations on enclosures under Activity 430, Section 431.h in the *CRS Coordinator's Manual* and the *CRS Application*.

17.2. Safety Requirements

17.2.1. Hazardous materials

Many communities prohibit storage of hazardous materials in floodplains or, at least, require them to be elevated above the BFE.

The following lists were taken from the U.S. Army Corps of Engineers' *Flood Proofing Regulations*. The first list of items is extremely hazardous or vulnerable to flood conditions so they should be prohibited from the SFHA or even the 500-year floodplain:

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

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

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

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

- Drugs
- Tires
- Soaps/detergents
- Food products
- Matches/sulfur products

Example ordinance language:

> Storage of materials and equipment that are flammable, explosive, or injurious to human, animal, or plant life is prohibited unless elevated a minimum of 1 foot above the base flood level. Other material and equipment must either be similarly elevated or (i) not be subject to major flood damage and be anchored to prevent movement due to flood waters or (ii) be readily removable from the area within the time available after flood warning.

Contact the DHS/FEMA Regional Office before revising your FEMA-approved ordinance.

The Community Rating System credits regulations on hazardous materials under Activity 430, Section 431.g in the *CRS Coordinator's Manual* and the *CRS Application*.

17.2.2. Critical facilities

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

The DHS/FEMA defines four kinds of critical facilities:

- Structures or facilities that produce, use, or store highly volatile, flammable, explosive, toxic, and/or water-reactive materials
- Hospitals, nursing homes, and housing likely to have occupants who may not be sufficiently mobile to avoid injury or death during a flood
- Police stations, fire stations, vehicle and equipment storage facilities, and emergency operations centers that are needed for flood response activities before, during, and after a flood
- Public and private utility facilities vital to maintaining or restoring normal services to flooded areas before, during, and after a flood (Figure 17-5)

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

Figure 17-5. Example of a critical facil-ity in the floodplain.

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

According to Executive Order 11988, federal agencies must meet rigorous alternative site evaluations and design standards before funding, leasing, or building critical facilities in the 500-year floodplain. Executive Order 11988 is discussed further in Section 20.4.2.

Example ordinance language:

> Critical facilities shall be constructed on properly compacted fill and have the lowest floor (including basement) elevated at least 1 foot above the elevation of the 500-year flood. A critical facility shall have at least one access road connected to land outside the 500-year floodplain that is capable of supporting a 4,000-pound vehicle. The top of the road must be no lower than 6 inches below the elevation of the 500-year flood.

Contact the DHS/FEMA Regional Office before revising your FEMA-approved ordinance.

NFIP/CRS

The Community Rating System credits prohibiting critical facilities or requiring them to be protected from damage by the 500-year flood in Activity 430, Section 431.e in the *CRS Coordinator's Manual* and the *CRS Application*.

17.2.3. Dry land access

Fire prevention, evacuation, and rescue operations are common emergency response activities associated with flooding. The effectiveness and success of these efforts greatly depend on readily available access. However, streets and roads are usually the first things to be inundated in the event of a flood.

To ensure access, some communities have enacted ordinance provisions requiring that all roads and other access facilities be elevated to or above the BFE. Some require elevation to within 1 foot of the BFE so at least fire and rescue equipment can travel on them during a flood (Figure 17-6).

Figure 17-6. Critical facility without dry land access.

Four people died in this nursing home during a 1978 flood in Rochester, Minnesota. It was isolated by high velocity floodwaters. Because there was no dry land access, firefighters could not rescue the occupants.

While some local officials may feel that this approach is too restrictive, it is important to note that emergency response personnel die every year attempting to rescue flood-stranded citizens. Also, others may die or be seriously injured because they cannot be rescued in time.

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

Example ordinance language:

> Each subdivision of 10 or more lots shall have at least one access road connected to land outside the Special Flood Hazard Area that is capable of supporting a 4,000-pound vehicle. The top of the road must be no lower than 6 inches below the base flood elevation.

Contact the DHS/FEMA Regional Office before revising your FEMA-approved ordinance.

NFIP/CRS

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

17.3. Higher Coastal Standards

Note: Most of the other higher regulatory standards reviewed in this section are also useful in coastal situations, especially freeboard and limitations on enclosures.

17.3.1. Higher elevation requirements

Freeboard, and the rationale for a freeboard requirement, is discussed in Section 17.1.1. Along the coast, there is an additional reason for requiring new and substantially improved buildings to be elevated higher than the BFE.

The Flood Insurance Rate Map (FIRM) for a community in a coastal area shows Special Flood Hazard Areas (SFHA, i.e., A1-30, AE, V1-30, and VE Zones) and base flood elevations based on predicted storm surge and wave effects from a 1% annual chance coastal storm. Hurricane storm surge inundation maps prepared by the U.S. Army Corps of Engineers and DHS/FEMA also provide information on areas subject to coastal flooding. The maps show areas that are predicted to be flooded by hurricanes varying in intensity, based on the Saffir-Simpson Hurricane Damage Potential scale (Figure 17-7).

Type	Category	Winds (mph)	Storm Surge (ft)
Depression	TD	< 39	
Tropical Storm	TS	39-73	
Hurricane	1	74-95	4-5
Hurricane	2	96-110	6-8
Hurricane	3	111-130	9-12
Hurricane	4	131-155	13-18
Hurricane	5	>155	>18

Figure 17-7. Saffir-Simpson Scale.

A Category 3 hurricane is considered the closest equivalent to a 100-year coastal storm event. The Category 3 inundation area delineated on a U.S. Army Corps of Engineers or DHS/FEMA storm surge inundation map may be larger or smaller than the SFHA shown on the corresponding FIRM, depending on the difference in predicted surge levels. Areas subject to rain-induced (i.e., riverine) flooding are not shown on hurricane storm surge inundation maps.

If the most recent hurricane storm surge inundation map shows that areas of the community outside of the SFHA mapped on the FIRM are predicted to flood during a Category 3 hurricane, the larger area should be adopted for regulatory purposes.

This higher standard may prevent loss of life and property damage during flood events, since new and substantially improved structures in areas likely to be inundated by hurricane storm surge will be constructed to higher regulatory standards. Residents in the additional areas identified as regulatory floodplain will be alerted to the need to obtain flood insurance. Because these areas are not identified as SFHAs on the FIRM, residents will be able to obtain flood insurance at lower non-floodplain rates. This higher standard is credited by the Community Rating System (Activity 410 – Additional Flood Data).

The Community Rating System credits any requirement to elevate buildings higher than the BFE on the FIRM as freeboard under Activity 430, Section 431.a in the *CRS Coordinator's Manual* and the *CRS Application*.

17.3.2. V Zone standards in coastal A Zones

Areas where wave heights are estimated to be 3 feet or higher are designated as V Zones on FIRMs for coastal communities; areas where wave heights are estimated to be less than 3 feet are designated as A Zones. Structures in these A Zones are subject to moderate wave action during storm events and therefore are referred to as coastal A Zones. The impact of "moderate" wave action on a structure should not be underestimated.

DHS/FEMA has concluded that its criteria for construction in A Zones do not provide adequate protection in coastal AE Zones subject to wave effects, velocity flows, erosion, scour, or combinations of these forces. Wave tank studies conducted by DHS/FEMA show that breaking waves less than the 3-feet criteria used to designate VE Zones can cause considerable damage.

Post-disaster evaluations and insurance claims data also support this conclusion, particularly for those buildings with enclosures below the elevated floor. DHS/FEMA's new *Coastal Construction Manual* strongly encourages the use of some or all of the VE Zone construction methods in coastal AE Zones, depending on the hazard.

Coastal areas that are prone to rapid erosion become increasingly vulnerable to wave attack. Consequently, many homes and businesses located landward of the primary frontal dunes experience significant wave damage in storm events, even though these areas are usually designated as AE or AO Zones on a FIRM. Structures that are not elevated on pilings or columns are particularly vulnerable, as are piling-elevated structures with below-BFE enclosures that do not comply with V Zone requirements.

Because of these factors, some communities have extended the area where they enforce V Zone standards inland from the V Zone boundary on their FIRM. This higher standard should be applied selectively because not all A Zones under a coastal community's jurisdiction may be vulnerable to wave action, even under conditions of severe coastal erosion.

The Community Rating System credits higher standards in coastal A Zones under Activity 430, Section 431.p in the *CRS Coordinator's Manual* and the *CRS Application*.

17.3.3. Noncompliant enclosures

A community may prohibit repair or reconstruction of noncompliant enclosures below the elevated floor, regardless of whether the damage to the structure exceeds 50% of the pre-damage market value of the structure. The property owner would be required to make the area below the reference floor free of obstruction, or to construct any enclosed area with breakaway walls that comply with the requirements of 44 CFR 60.3 (e)(5).

A variation on this would be a lower substantial damage threshold that only affected areas below the elevated floor. Those areas would have to be made compliant, but the entire structure would not (unless damage exceeds 50% of the structure's value). Of course, this means that the local floodplain administrator would have to review damage and improvement permits more closely to make a substantial damage and/or substantial improvement determination and, in turn, issue a letter stating his or her determination.

The Community Rating System credits higher standards for substantial damage thresholds under Activity 430, Section 431.d in the *CRS Coordinator's Manual* and the *CRS Application*.

17.3.4. Manufactured homes and recreational vehicles

The criteria for installing manufactured homes and recreational vehicles are covered in Section 12.4. They can be located in coastal floodplains if they meet these standards. It is recommended that they be prohibited altogether from coastal high hazard areas.

Manufactured homes are typically more vulnerable to the effects of coastal storms than conventional coastal structures that are built in accordance with the local building code. Even when elevated on pilings, a manufactured home is extremely vulnerable to wind and wave damage if wave heights and/or storm surge exceed the required elevation height.

Recreational vehicles are similarly vulnerable to the effects of winds and waves. Current NFIP regulations do not require elevation to or above the BFE in V Zones, as long as the vehicle is not permanently located at the site.

The underlying assumption is that RVs can be moved out of V Zones to safer locations when a storm threatens. This places a burden on the local floodplain administrator to enforce the 180 days on site and highway-ready regulations for vehicles that may be located in remote areas and/or are difficult to move without prior notification. It also places a burden on local emergency management officials who must make allowances for evacuation over congested coastal evacuation routes of potentially large numbers of RVs on short notice.

Communities should designate locations outside of V Zones that are acceptable for manufactured homes and RVs. Since RVs are more mobile, it will probably be necessary to post notices in V Zone areas where RVs are not permitted.

The Community Rating System has credited restrictions on siting manufactured housing and recreational vehicles under Activity 430, Section 431.i in the *CRS Coordinator's Manual* and the *CRS Application*.

17.4. Planning and Zoning

17.4.1. NFIP planning considerations

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

In fact, the NFIP requires communities to at least consider additional measures which are found in 44 CFR 60.22, Planning Considerations for Floodprone Areas. They are summarized in Figure 17-8.

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

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

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

Figure 17-8. NFIP planning considerations (44 CFR 60.22).

17.4.2. Site planning

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

- Buildings are not isolated by floodwaters, putting a strain on local emergency services to guard them or to evacuate or rescue their occupants
- The neighborhood will have waterfront open space and recreation areas—a valuable amenity in most communities

A housing development can be concentrated or clustered outside the floodplain, as shown in Figure 17-9, so the developer can sell the same number of home sites as a conventional subdivision. The Planned Unit Development (PUD) process allows flexibility while requiring developments to meet the objectives of the regulations.

The planner's toolbox contains other tools for encouraging developers to avoid floodplains. A density transfer can be used to trade development rights with a flood-free site, for example. Credits or bonuses can be given to increase the allowable density if the developer puts building sites on high ground or does not disturb a wetland. See also the American Planning Association's *Subdivision Design in Flood Hazard Areas* (information on how to order a copy is in Section 29).

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

The Community Rating System credits a variety of approaches that avoid or minimize the number of buildings allowed in a floodplain. The credit is found in Section 431LD.a in the *CRS Coordinator's Manual* and the *CRS Application*.

17.4.3. Setbacks

Setbacks may be used to keep development out of harm's way. Setback standards establish minimum distances that structures must be positioned—set back—from river channels. Setbacks can be defined by vertical heights or horizontal distances.

While floodplain boundaries are defined by vertical measures, horizontal setbacks also provide protection from flood damage, especially along lakes and wide rivers where the effects of waves decrease further inland.

Setbacks are especially appropriate for protecting new construction from riverine erosion. They prevent disruption to the channel banks and protect riparian habitat. Such setbacks are frequently created to serve as isolation distances to protect water quality and stream and wetland resources.

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

Example ordinance language:

Contact the DHS/FEMA Regional Office before revising your FEMA-approved ordinance.

For all activities involving construction within 25 feet of the channel, the following criteria shall be met:

(a) A natural vegetation buffer strip shall be preserved within at least 25 feet of the mean high water level of the channel.

(b) Where it is impossible to protect this buffer strip during the construction of an appropriate use, a vegetated buffer strip shall be established upon completion of construction.

(c) The use of native riparian vegetation is preferred in the buffer strip. Access through this buffer strip shall be provided for stream maintenance purposes.

The Community Rating System credits setbacks that prevent disruption to shorelines, stream channels, and their banks under Activity 430, Section 431.g.2 in the *CRS Coordinator's Manual* and the *CRS Application*.

17.4.4. Zoning

A zoning ordinance regulates development by dividing a community into zones or districts and setting development criteria for each zone or district. Zoning codes are considered the primary tool for implementing a comprehensive plan's guidelines for how land should be developed.

There are three ways a zoning ordinance can set a higher regulatory standard for floodplain development. The first is to restrict the type of uses allowed in floodplain districts. As shown in Figure 17-10, the zoning map can designate the floodplain or the more hazardous floodway for open space uses, such as agriculture.

Developers often produce a standard grid layout, similar to the one shown in the R-1 district in Figure 17-10. The second way zoning can help is to offer an alternative. The ordinance can allow or encourage flexibility in lot sizes and location so developers can avoid hazardous areas. One way to do this is through the Planned Unit Development (PUD) approach (Section 17.4.2 and Figure 17-9).

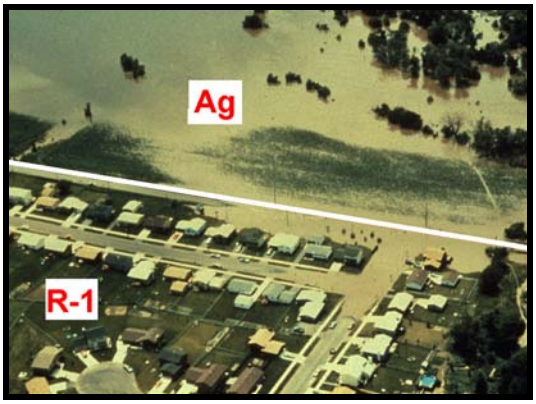


Figure 17-9. A zoning ordinance can designate wetlands and floodprone areas for agricultural, conservation, or other uses that suffer minimal damage from a flood.

The third zoning approach is to limit the density of development. For example, it is better to have a floodplain zoned for minimum lot sizes of 5 acres or 10 acres than to allow four single-family homes to every acre. In some areas, "residential estate" zones with minimum lot sizes of 2 acres to 5 acres provide lots large enough that homes can be built out of the floodplain.

NFIP/CRS

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

17.5. Flood Conveyance and Storage

17.5.1. Encroachment standards

Some states and communities are not comfortable with allowing development in the fringe to increase flood heights by up to 1 foot. A 1-foot increase in flood heights increases the potential for flood damage to floodprone buildings and affects properties that were otherwise not threatened by the base flood. This is especially true in flat areas, such as most of Louisiana, where a 1-foot increase could extend the floodplain boundary by blocks.

These states and communities require floodway mapping and encroachment studies to allow a smaller surcharge, usually 0.5 foot or 0.1 foot. Twelve states require regulatory maps to use a smaller floodway mapping surcharge than the NFIP 1-foot minimum standard. This results in a wider floodway, but less potential for increased flood losses due to future development.

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

17.5.2. Compensatory storage

The NFIP floodway standard in 44 CFR 60.3(d) restricts new development from obstructing the flow of water and increasing flood heights. However, this provision does not address the need to maintain flood storage. The floodplain provides a valuable function by storing floodwaters, especially in flat areas.

When fill or buildings are placed in the fringe, the flood storage areas are lost and flood heights increase because there is less room for the floodwaters. This is particularly important in smaller watersheds, which respond sooner to changes in the topography.

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

On the other hand, some communities prefer buildings on fill because it provides a safe spot above flood levels outside the building walls. In this situation, a compensatory storage provision can offset any loss of flood storage capacity.

A compensatory storage provision requires the developer to offset new fill put in the floodplain by excavating an additional floodable area to replace the lost flood storage area. This should be done at "hydraulically equivalent" sites—fill put in below the 10-year flood elevation should be compensated by removal of soil below that elevation elsewhere in the floodplain.

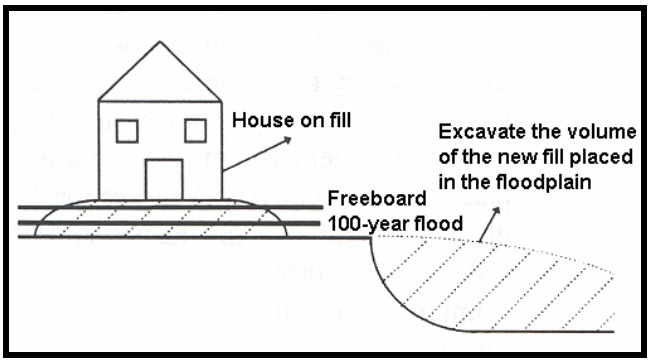


Figure 17-10. The compensatory storage concept.

Example ordinance language:

> Whenever any portion of a floodplain is authorized for development, the volume of space occupied by the authorized fill or structure below the base flood elevation shall be compensated for and balanced by a hydraulically equivalent volume of excavation taken from below the base flood elevation. All such excavations shall be constructed to drain freely to the watercourse. No area below the waterline of a pond or other body of water can be credited as a compensating excavation.

Contact the DHS/FEMA Regional Office before revising your FEMA-approved ordinance.

NFIP/CRS

The Community Rating System credits prohibition of fill and compensatory storage under Activity 430, Section 431.f in the *CRS Coordinator's Manual* and the *CRS Application*.

17.6. Regulation of Development Outside the Floodplain

17.6.1. Stormwater management

A floodplain management program in an urbanizing area must confront the increase in flood flows caused by development within the watershed. As forests, fields, and farms are covered by impermeable surfaces such as streets, rooftops, and parking lots, more rain runs off at a faster rate. In an urbanized area, the rate of runoff can increase four times or more (Section 2.3.1).

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

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

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

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

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

Stormwater management also has water quality aspects. Most stormwater runoff is not collected and sent to a wastewater treatment plant, it flows directly into a body of water. On its way, it collects sediments from soil erosion as well as road oil, pesticides, lawn treatment chemicals, and other pollutants. Where there is no treatment facility to clean this runoff water, the result is called nonpoint source pollution.

Where there are on-site disposal systems, timber harvesting, tilling of soil, mining, or other development, stormwater runoff can be cleaned using techniques such as grass filters, buffer zones, and stream setbacks.

Many communities are now required by federal law to develop programs to address nonpoint source pollution under the National Pollution Discharge Elimination System (NPDES). Each community develops its own program, which should have public information, inspection, and regulatory aspects. It is recommended that these communities coordinate or combine the flood protection aspects with the water quality aspects of their local stormwater management program.

Example ordinance language:

a. The volume of water to be detained shall be the amount of water generated by the 25-year design storm and the rate at which such water may be gradually released shall be the amount of stormwater generated by the 10-year storm.

Contact the DHS/FEMA Regional Office before revising your FEMA-approved ordinance.

b. In flood-sensitive areas as defined herein [the 100-year floodplain and other areas designated by the City Engineer], the volume of water to be detained shall be the amount of water generated by the 100-year design storm and the rate at which such water may be gradually released shall be the amount of stormwater generated by the 10-year storm.

By this ordinance language, the City of Shreveport controls increased runoff from new development and redevelopment.

The Community Rating System credits both water quantity and water quality stormwater management regulations and plans under Activity 450 in the *CRS Coordinator's Manual* and the *CRS Application*.

17.6.2. Dealing with local drainage problems

Most cities, towns, villages, and parishes have one or several clearly recognizable flood-prone areas, usually along a river or stream or other large body of water. These areas usually are identified as the Special Flood Hazard Area (SFHA) on the community's FIRM. The NFIP and communities address these flood-prone areas through maps, floodplain management criteria, ordinances, and community assistance programs.

However, many communities also have shallow, localized flooding problems outside of the SFHA resulting from ponding, poor drainage, inadequate storm sewers, clogged culverts or catch basins, sheet flow, obstructed drainageways, sewer backup, or overbank flooding from small streams. These kinds of flood events can occur anywhere in a community. In some areas localized flooding can be chronic, so that over the years the cumulative damage and recurring disruption from localized flooding can be more than that caused by flooding on major rivers and streams. The costs of insuring buildings that are subject to this repeated damage add up as well.

Local and state officials confirm that localized flooding is a problem. They characterize it as "a drainage issue," "low-level nuisance flooding," and "headwater flooding." According to one local official, citizens seem to present more complaints about repetitive localized flooding than about deeper, more destructive flooding from larger bodies of water.

A community's floodplain management requirements in the SFHA will protect new construction from localized flooding. However, most communities do not have such regulations for development outside the SFHA, in areas mapped as B Zones, C Zones, or X Zones. If action is not taken, local flooding problems will likely increase over time as development in watersheds and in B, C, and X Zones continues without sufficient land use and building regulations.

Flood insurance is available for all eligible buildings within a community that participates in the NFIP. However, the NFIP currently has no floodplain management criteria for those areas that lie outside of the SFHA—and no requirements for communities to take action to reduce or prevent losses in these areas. The result is significant financial losses for the NFIP. Here are some statistics that show the cost of localized flooding to the NFIP:

- Since 1978 the NFIP has paid over $2.8 billion in claims in B, C, and X Zones.
- Of that, $1.1 billion was paid for claims on repetitive loss properties.
- Between 20 percent and 25 percent of all repetitive loss properties are rated as being in B, C, and X Zones.
- In some communities, over half of the repetitive loss buildings are in B, C, and X Zones.

There are additional reasons for a community to be concerned about localized flooding:

- Safety Hazards - People are at risk even in shallow flooding. It is not unusual for children, especially, to drown after slipping in shallow water or to be swept into a ditch or storm drain. Even adults can be knocked down by just a few inches of moving water.
- Health Concerns - In addition to the obvious risks of drowning and electrocution, there are many less well-known health hazards, including the growth of mold and mildew in flooded buildings, snakes and rodents forced out of their natural habitat by flood waters, gasoline, pesticides, fuel oil, chemicals, and other substances can be brought into the area and into buildings by flood waters. They soak into the soil, building components, and furniture, and can result in long-term health problems and standing water and wet conditions are breeding grounds for mosquitoes.
- Disruption - Flood waters can block streets, disrupt traffic patterns, and hinder access to homes and businesses. This can affect the entire community, not just those whose property is flooded.

- Costs to Local Government - Localized flooding can cause damage to public property, particularly if the flooding recurs periodically.

A community should have an overall strategy that outlines how it will address its localized flooding problems. It may be as simple as doing nothing or funding drainage improvements in response to complaints. The more the community intends to do, the more involved the strategy must become.

Some localized drainage problems may be prohibitively expensive in the short run, like building new drainage facilities or acquiring buildings. However, solving many problems may be quick and inexpensive, such as:

- Rescheduling routine maintenance, including cleaning drain inlets and mowing;
- Adopting an ordinance prohibiting dumping in drainageways, with a public education program to support the ordinance;
- Neighborhood volunteer projects, like removing debris from drainage facilities.

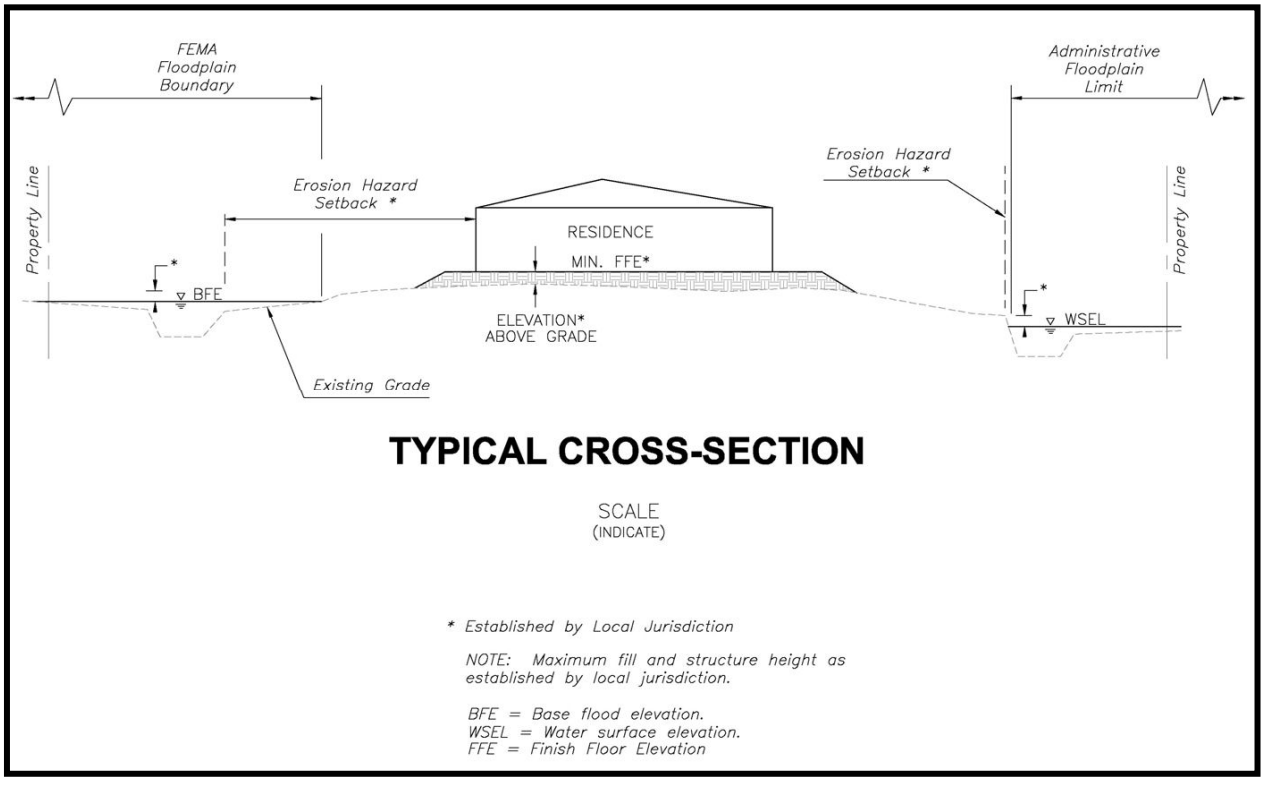


Figure 17-11. Arizona requirement to provide positive drainage away from new buildings outside the SFHA.

A recent publication, *Reducing Damage from Localized Flooding: A Guide for Communities,* FEMA 511, discusses this problem and ways to address it.

The Community Rating System credits several activities that address localized flooding, including elevating or providing positive drainage away from buildings outside the floodplain, drainage system maintenance, anti-dumping ordinances and others. See the *CRS Coordinator's Manual* and the *CRS Application*.

17.7. No Adverse Impact Legal Review

No Adverse Impact (NAI) is a concept developed and encouraged by the Association of State Floodplain Managers (ASFPM). NAI is an explanation and rationale for higher regulatory standards and other local actions to ensure that flood problems are not increased. The following information is taken from materials published by the ASFPM following a review of recent court cases. More information, including a legal review, can be found at the Association's website, www.floods.org.

17.7.1. Community liability

When individuals are damaged by flooding or erosion, they often file law suits against governments, claiming that the government has caused the damages, knowingly allowed actions which contributed to the damages, or failed to provide adequate warnings of natural hazards. Courts and legislative bodies have expanded the basic rules of liability to make governments responsible for actions which result in, or increase, damages to others.

Courts in the U.S. have long followed the maxim *Sic utere tuo ut alienum non laedas*, or "so use your own property that you do not injure another's property." The NAI approach coincides with traditional common law concerning the rights and responsibilities of public and private landowners with regard to the use of land and water. Lawsuits are most commonly predicated upon one of four causes of action:

- **Negligence:** All individuals have a duty to other members of society to act reasonably in a manner not to cause damage to other members of society. The standard of conduct is that of a reasonable person in the circumstances. Negligence is the primary legal basis for public liability for improper design of hazard reduction measures such as flood control structures, improperly prepared or issued warnings, and inadequate processing of permits.
- **Nuisance:** No landowner, public or private, has a right to use his or her land in a manner that substantially interferes, in a physical sense, with the use of adjacent lands. "Reasonable conduct" is usually no defense against a nuisance suit.
- **Trespass:** Landowners can file trespass suits for certain types of public and private actions which result in physical invasion of private property, such as increased flooding or drainage.
- **Law of Surface Water:** In most states, landowners cannot substantially damage other landowners by blocking the flow of diffused surface waters, increasing that flow, or channeling that flow to a point other than the point of natural discharge. Landowners are liable for damages caused by their interference with the natural flow of surface water when their actions are "unreasonable."

The overall issue, in most instances, is the reasonableness of an action by the community or property owner. Due to advances in technology and products, there is an increasingly high standard of care for "reasonable conduct." The "act of God" defense is

seldom successful because even rare flood events are now predictable. As technology advances, techniques and approaches also advance for “reasonable conduct” by engineers and other professionals. Governments are negligent if they fail to exercise the same “reasonable conduct” expected of technical professionals.

In summary, NAI is a *principle* that leads to a *process* which is legally acceptable, nonadversarial (neither pro- nor anti-development), understandable, and palatable to the community as a whole. The process clearly establishes that the “victim” in a land use development is not the developer, but rather the other members of the community who would be adversely affected by a proposed development. The developer is liberated to understand what the communities concerns are so they can plan and engineer their way to a successful, beneficial development.

17.7.2. The minimum NFIP standards

The National Flood Insurance Program requires the adoption of a minimum set of floodplain management criteria in order for communities to be eligible for flood insurance, certain types of disaster assistance, and other federal support. The minimum standards reduce overall flood damages for new construction and may be appropriate for the purposes of managing the flood insurance fund, but DHS/FEMA has long supported the adoption of higher standards through its regulations and programs such as the Community Rating System.

Current NFIP standards for floodplain management allow the following. These impacts may result in successful common law or “takings” suits despite community compliance with minimum federal standards:

- Floodwaters to be diverted onto other properties
- Channel and overbank conveyance areas to be reduced
- Essential valley storage to be filled
- Velocities changed with little or no regard as to how these changes affect others in the floodplain and watershed

In general, if a community permits development that results in an adverse impact, that community may be liable, even if it meets the minimum federal standards.

In the legal research paper "No Adverse Impact Floodplain Management and the Courts," Jon Kusler, Esq. concludes that under common law, no landowner, public or private, has the right to use his or her land in a way that substantially increases flood or erosion damages on adjacent lands.

Communities that cause or permit an increase in flood or erosion hazards may be liable for monetary damages to injured individuals. Increased flood and erosion hazards can be caused by construction projects undertaken, or permitted, by a local government. Landowners damaged by flooding are also suing governmental entities that fail to adequately administer or enforce floodplain regulations, particularly where an issued permit resulted in damage to other lands.

> The Association of State Floodplain Managers recommends a "No Adverse Impact" approach as a general guideline for landowner and community actions throughout the watershed, not just in the floodplain regulated by the federal standards.
>
> In essence, "No Adverse Impact" floodplain management is an approach that assures that the action of one property owner or a community does not adversely affect the properties and rights of other property owners. The true strength of the "No Adverse Impact" approach is that it encourages local decision-making to ensure that future development impacts will be considered and mitigated—a comprehensive strategy for reducing flood losses and costs.

Communities can protect themselves from liability by incorporating the "No Adverse Impact" approach and making sure that the actions taken in the floodplain, and throughout the watershed, do not lead to adverse effects on neighbors and neighboring communities. Adverse impacts must be mitigated to prevent transferring the problems to another property or community.

Courts have broadly and consistently upheld performance-oriented floodplain regulations, including those that exceed minimum DHS/FEMA standards. The courts have consistently upheld regulations that require additional freeboard, establish setbacks, impose tighter floodway restrictions, or very tightly regulate high risk areas.

17.7.3. "Good Neighbor" law

Louisiana has its own legal basis for "No Adverse Impact." Several provisions in the Civil Code statutes state that one person cannot adversely affect others by changing the course of water:

> Art. 658. Estate through which water runs:
>
> The owner of an estate through which water runs, whether it originates there or passes from lands above, may make use of it while it runs over his lands. He cannot stop it or give it another direction and is bound to return it to its ordinary channel where it leaves his estate. Acts 1977, No. 514, §1.
>
> Art. 667. Limitations on use of property:
>
> Although a proprietor may do with his estate whatever he pleases, still he cannot make any work on it, which may deprive his neighbor of the liberty of enjoying his own, or which may be the cause of any damage to him. However, if the work he makes on his estate deprives his neighbor of enjoyment or causes damage to him, he is answerable for damages only upon a showing that he knew or, in the exercise of reasonable care, should have known that his works would cause damage, that the damage could have been prevented by the exercise of reasonable care, and that he failed to exercise such reasonable care… Acts 1996, 1st Ex. Sess., No. 1, §1, eff. April 16, 1996.

Section 18. The Floodplain Administrator

Contents

Note: DHS/FEMA's model ordinance and most community's flood damage prevention ordinances designate the "floodplain administrator" as responsible for administering the community's floodplain management program.

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

Throughout this Desk Reference, the person designated as responsible for administering the flood damage prevention ordinance is called "the administrator."

18.1. Duties

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

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

18.1.1. Understand the regulations

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

18.1.2. Ensure that permits are applied for

People often do not realize they need to apply for a permit for a project in the floodplain. The administrator needs to ensure that the public is informed about when permits are required and how they are obtained. Anyone engaged in a development project without a permit must be told to stop and apply for one.

18.1.3. Process permit applications

The administrator's primary role is to review permit applications for compliance with applicable local regulations. This involves:

- Collecting permit fees, where applicable
- Assessing the accuracy and completeness of the application
- Evaluating site plans, topographic data, building design plans, and other technical data
- Identifying deficiencies and devising ways to correct them
- Issuing or denying the permit
- Helping applicants pursue appeals or requests for variances

18.1.4. Coordinate with other programs

Responsibility for permit review may reside in or be shared with other offices, such as public works, planning and zoning, code enforcement, or housing departments. Depending on the administrator's duties, he or she may be involved in coordinating permit reviews.

The administrator must advise the applicant of any need for additional local, state, or federal permits for the proposed development (Section 20). The office could have copies of the permit application forms or advise applicants on whom they should contact.

One of the community's National Flood Insurance Program (NFIP) responsibilities is to notify adjacent communities and the Louisiana Department of Transportation and Development (LADOTD) prior to any alteration or relocation of a watercourse. The administrator must submit evidence of such notification to the DHS/FEMA Regional Office.

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

18.1.5. Ensure projects are built according to approved permits

The permit staff must perform periodic and timely on-site inspections to visually confirm that development is following the approved plans. The best way to do this is through a series of inspections at appropriate stages in the construction process, as discussed in Section 22. A certificate of use or occupancy is a final permit that allows the owner to use the building. It should not be given until a final inspection confirms that everything was done according to the approved plans.

18.1.6. Take enforcement actions

The administrator must evaluate complaints, conduct investigations, and use legal recourse when necessary to correct violations.

When noncompliant activities are uncovered, the administrator must act to resolve the situation. This may involve issuing stop-work orders or other violation notices, coordinating enforcement procedures with the community's attorney, or appearing in court. Enforcement is covered in more detail in Section 23.

18.1.7. Keep records

The administrator should keep a sufficient supply of current permit applications, variance requests, and other administrative forms on hand. A project file should be kept for every development permit application. Records are covered in more depth in Section 24.

18.1.8. Keep the regulations updated

If notified of changes in federal or state laws and/or regulations that would require changing its flood damage prevention ordinance, the community must revise its ordinance within 6 months.

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

Similarly, if DHS/FEMA provides new flood data, the community has 6 months to update the ordinance to adopt the data and the regulatory requirements appropriate for that level of data. A certified copy of any ordinance revision should be submitted to the DHS/FEMA Regional Office and to LADOTD promptly after adoption.

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

18.1.9. Maintain and update flood data and maps

As noted in Section 10.6, the administrator should maintain an adequate supply of maps showing the regulatory floodplain for the permit office and public use. All map corrections and notices of map revisions should be recorded and noted on administrative maps; details should be kept in an indexed file.

The administrator should also cooperate with federal, state, and local agencies, and private firms, which are undertaking flood studies. The community must submit all new floodplain data to the DHS/FEMA Regional Office within 6 months of its development. Community staff should review revisions to maps (including Conditional Letters of Map Revision [CLOMR] and Letters of Map Revision [LOMR]) to ensure they meet local regulatory requirements.

The community must notify the DHS/FEMA Regional Office and LADOTD within one year of an annexation or when the community has assumed or relinquished authority to adopt or enforce floodplain management regulations for a particular area.

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

The administrator must notify the DHS/FEMA Regional Office and the State within 6 months of physical changes that can affect flooding conditions, such as channel modifications or upstream detention.

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

18.2. Skills and Training

18.2.1. Qualifications

Louisiana does not set minimum requirements for the person who administers the flood damage prevention ordinance. This does not mean just anyone can do any part of the job of administering the ordinance. The floodplain administrator needs to know the following:

- Basic NFIP requirements
- Additional requirements of the community's ordinance
- How to use the NFIP maps and regulatory flood data
- How maps are reviewed and revised
- When permits are needed
- Whether a proposed project meets the ordinance's standards
- Whether a completed project complies with the approved plans
- What records are needed
- How to deal with citizens and builders
- How to deal with violations
- How floodplain development regulations and flood insurance ratings are related
- Where citizens and builders can get more information or help

Most people are not hired with all this knowledge. Training on these topics is discussed in Sections 18.2.4 through 18.2.6.

18.2.2. Supporters

Generally, the permit office does not do all the work. One job of the administrator is to make sure that he or she gets help from others with the right qualifications. The administrator should develop a good working relationship with them to ensure that new construction is built correctly. Support is often needed from three other professions:

- Some tasks should be conducted by a licensed professional engineer (P.E.) experienced in hydrologic and hydraulic studies, such as reviewing a developer's flood study before new flood elevations are accepted. Some ordinances call for an engineer to review certain permits.
- Once a building has been constructed in the floodplain, the administrator will need an elevation certificate that must be completed by a professional land surveyor or professional engineer.
- The administrator should always consult the community's attorney before initiating an enforcement action.

18.2.3. Dealing with the public

The floodplain administrator interacts with the residents, builders, developers, and public officials of the community. It is important that he or she convey the need to abide by the floodplain regulations for their safety and others in the community. This will encourage voluntary compliance and reduce the number of problems that can be faced.

The floodplain administrator is, in effect, the public relations manager for floodplain management in the community. If the rules are explained in a way that shows the positive side (flood damage prevented, lives saved), floodplain management will be more successful than if people think the administrator is grudgingly enforcing some unwelcome federal mandate.

Brochures, newsletters, and newspaper articles are often used to help educate the general public and permit applicants. DHS/FEMA has many pamphlets that explain the flood hazards, flood insurance, and things to do after a flood. Some communities develop their own pamphlets or mailings to explain the reasons for their floodplain ordinances and the importance of protecting the floodplain and the drainage system from improper development**.**

The administrator may also want to consider educating the city council, parish police jury, or other public officials. The citizenry, elected officials, and members of a board of appeals should understand and support the regulatory program because they are the ones who decide whether variances will be issued or if the ordinance will be amended.

One place to start is to give them a copy of *Addressing Your Community's Flood Problems: A Guide for Elected Officials* from the Association of State Floodplain Managers (ASFPM). ASFPM has also recently released *Building Public Support For Floodplain Management: A Catalog of Good Practices.*

Information on ordering copies is in Section 29.

18.2.4. Training

The topics listed in Section 18.2.1 are not taught at any high school or college and the administrator will require additional training. Here are some ways to get it:

- Attend the workshops and conferences of the Louisiana Floodplain Management Association
- Attend and/or sponsor a "Flood Forum," a DHS/FEMA-sponsored workshop for permit officials, insurance agents, and lenders involved in the NFIP
- Spend time with the floodplain administrator in a neighboring community

LFMA

The Louisiana Floodplain Management Association (LFMA) is an organization of professionals interested in improving the level of floodplain management in the State. It has a newsletter and conducts workshops and an annual conference at different sites around the State (Section 31.3.1.).

- Check with the DHS/FEMA Regional Office and/or LADOTD before issuing the first few permits or certificates of occupancy
- Request a Community Assistance Visit (CAV) in which a DHS/FEMA or State person will visit and review local procedures
- Attend a workshop put on by LADOTD or DHS/FEMA; every other year, LADOTD and DHS/FEMA conduct a week-long course on floodplain management in Louisiana
- Attend the Emergency Management Institute
- Visit DHS/FEMA's website periodically
- Order and review the publications listed in Section 29

18.2.5. The Emergency Management Institute

The Emergency Management Institute (EMI) in Emmitsburg, Maryland provides several courses related to the administrator's job, both as resident courses and home study.

The introductory course is "Managing Floodplain Development Through the National Flood Insurance Program" (E273). However, it covers the same information as this reference book (without the additional information on Louisiana State programs). This course is given four or five times a year at EMI, but a field-deployed version of this course is given every other year in the State.

EMI offers four other helpful courses:

- National Flood Insurance Program/Community Rating System (E278)
- Digital Hazard Data (how to use digital FIRMs and other data) (E234)
- Retrofitting Floodprone Residential Buildings (E279)
- Residential Coastal Construction (E386)

These courses provide step-by-step practical knowledge and experience. In addition, the administrator can meet other local administrators from around the country from whom they can also learn the ins and outs of floodplain management administration.

EMI courses run Monday through Friday, one to four times a year. They are free for state and local officials. DHS/FEMA generally pays for transportation to Emmitsburg and provides housing in dormitories on campus.

For more information, upcoming course dates, etc., contact EMI through the DHS/FEMA website, www.FEMA.gov.

To register for a resident course, all applications must be submitted through the Emergency Management Division's Training Office and the DHS/FEMA Regional Office (Section 31).

18.2.6. Home study

The Federal Emergency Management Agency (DHS/FEMA) offers *Floodplain Management Requirements: A Study Guide and Desk Reference for Community Officials* (FEMA-480) as an aid to community officials. FEMA-480 is included with the digital version of this Desk Reference. It basically includes the information in this volume without the specific references to Louisiana situations.

Home study courses are also available through RedVector.com, a commercial operation that specializes in continuing education courses for architects, engineers, and code enforcement staff. The Association of State Floodplain Managers has reviewed and accredited those courses most useful to local permit officers. These can be viewed at www.redvector.com.

18.2.7. Certified Floodplain Manager (CFM)

The Association of State Floodplain Managers has a certification program for floodplain managers. People interested in professional certification submit an application form, which includes a signed code of professional conduct. Once approved, the applicant is eligible to take the exam. Examinations are given at the annual Association conference and other locations throughout the nation.

The CFM designation is valid indefinitely, provided that the applicant complies with the biennial (every two years) renewal requirements: payment of a renewal fee and submittal of proof of continuing education credits. The continuing education requirement can be met through attendance at floodplain management conferences or workshops, formal courses, home study courses, and other approved technical meetings.

What is a Certified Floodplain Manager? At a recent conference, the Chair of the Certification Board of Regents answered this question with the following.

> I think the simplest way to put it is that Certified Floodplain Managers are people who know their stuff. They have a proven level of expertise in
>
> - Floodplain mapping
> - The requirements and standards of the National Flood Insurance Program
> - The requirements and standards of their state floodplain management programs
> - The administrative procedures needed to make floodplain management work at the community level
>
> How do we know this? Because a certified floodplain manager has passed a rigorous closed-book test. It is not easy. Nationally, one-third of those who have tried have failed that test.

Why should you want to go through the pain and suffering of preparing for and taking an exam? Let me list four benefits of becoming certified:

- First, you will have confidence in your level of knowledge. You cannot pass the exam unless you know your stuff.
- Second, being certified tells others that your professional capabilities have been recognized by a national program.
- Third, certification is the motivation for continuing education. You cannot stay certified unless you stay abreast of developments in the field by attending workshops, conferences, or training courses.
- Fourth, it can help you in the job market. If you are an employer, you can count on CFMs to know their stuff.

For more information on the CFM program, contact the Association of State Floodplain Managers or its website (Section 31). ***Note:*** Reading this Desk Reference is the best preparation for the certification exam.

18.3. Liability

Section 17.6.1 notes that a community is exposed to liability if it does not adequately protect people from flood damage. Floodplain administrators naturally fear they could be held liable if a person gets flooded or a building they permitted is damaged by a flood. Debated nationally for some time, this issue has been studied extensively by Dr. Jon Kusler, a nationally known attorney in floodplain management law.

18.3.1. Legal findings

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

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

- Government agencies are generally not liable for flood damage unless the flood was caused by a government action. "Except in a few instances, governments are not liable for naturally occurring flood damages. Government has, in general, no duty to construct dams, adopt regulations, or carry out other hazard reduction activities unless required to do so by a statute. It is only where a government unit causes flood damages or increases natural flood damages that liability may arise." (*Floodplain Management in the United States: An Assessment Report*, Volume 2, p. 1012).

- Liability is based on negligence; a community is well defended by a properly administered program. "In general, government units are not 'strictly or absolutely' responsible for increased flood damages. Liability usually results only where there is a lack of reasonable care. ... Where the standard of reasonable care is judicially applied to an activity, the seriousness of foreseeable threat to life or economic damage is an important factor in determining reasonableness of conduct. In general, the more serious the anticipated threat, the greater the care the government entity must exercise." (*Floodplain Management in the United States: An Assessment Report*, Volume 2, p. 1013).

- It is better to have clear standards spelled out in the ordinance adopted by the governing board than to leave a lot of interpretation up to the administrator. "As a general rule, courts do not hold legislative bodies or administrative agencies liable for policy decisions or errors in judgment where the Legislature or [agency] exercises policymaking or discretionary powers. But they often hold agencies responsible for failure to carry out non-discretionary duties or for negligence in carrying out ministerial actions." (*Floodplain Management in the United States: An Assessment Report*, Volume 2, p. 1013).

- "... from a legal perspective it may be desirable to submit proposed standards ... to a community's legislative body (e.g., community council) for debate and approval. Due to the special way legislative decisions are treated by the courts, legislative judgments, particularly those of a discretionary nature, are less likely to result in a successful liability suit than are division decisions. Courts generally defer to legislative judgment." (*Floodplain Management in the United States: An Assessment Report*, Volume 2, p. 1017).

- Government employees are usually protected from liability suits. "Although governments may be liable for increased flood or drainage losses in a broad range of contexts, government employees are usually not personally liable for planning, permit issuance, operation of dams, and adoption of regulations or other activities. ... No personal liability results where a government employee acts in good faith, within the scope of his or her job, and without malice. Successful lawsuits for hazard-related damages against government employees under common law theories or pursuant to Section 1983 of the Civil Rights Act are apparently nonexistent." (*Floodplain Management in the United States: An Assessment Report*, Volume 2, pp. 1013 - 1014).

18.3.2. How to protect oneself

Based on Dr. Kusler's findings, the floodplain administrator can protect him or herself from lawsuits by taking the following steps:

- **Adopt sound and appropriate flood protection standards:** Remember: NFIP standards are minimums. Buildings should not be allowed in a mountainous floodplain with no warning time and very high velocities, even though the NFIP minimums would allow it. If people know flooding could be or has been higher than the BFE shown on the FIRM, they are not doing their residents any favors by allowing them to build buildings that will be exposed to a known hazard.

- **Become technically competent in the field:** A person will not be sued if he or she has ensured that the project was properly constructed. There are no grounds for a suit if no one is damaged by flooding: "... 'liability can be avoided if flood damages are avoided.' From a legal perspective, this is a sound philosophy." (*Floodplain Management in the United States: An Assessment Report*, Volume 2, p. 1017.)

- **Insure the community:** The community may want to purchase liability insurance or establish a self-insurance pool or plan to protect itself.

- **Encourage property owners to buy flood insurance coverage:** If people are compensated for any flood losses, they are less likely to file a lawsuit.

- **Adopt an ordinance provision that exempts the community from liability:** DHS/FEMA's model ordinances have a section entitled, "Warning and Disclaimer of Liability." It reads as follows:

Contact the DHS/FEMA Regional Office before revising your FEMA-approved ordinance.

> The degree of flood protection required by this ordinance is considered reasonable for regulatory purposes and is based on scientific and engineering considerations. On rare occasions greater floods can and will occur and flood heights may be increased by man-made or natural causes. This ordinance does not imply that land outside the areas of special flood hazards or uses permitted within such areas will be free from flooding or flood damages. This ordinance shall not create liability on the part of the community or any official or employee thereof for any flood damages that result from reliance on this ordinance or any administrative decision lawfully made thereunder.

Also, look again at the discussion on liability in Section 7.6, No Adverse Impact Legal Review.

Section 19. Development Permits

Contents

19.1. Requirements for a Permit

19.1.1. "Development"

A community in the National Flood Insurance Program (NFIP) must regulate all development in its floodplain. To do this, it must require a permit for all development in the Special Flood Hazard Area (SFHA). "Development" means "any man-made change to improved or unimproved real estate." This includes, but is not limited to:

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

44 CFR 59: Definitions: "Development" means any man-made change to improved or unimproved real estate, including but not limited to buildings or other structures, mining, dredging, filling, grading, paving, excavation or drilling operations or storage of equipment or materials.

19.1.2. Where required

Development permits are required for all development projects in the SFHA shown on the Flood Insurance Rate Map (FIRM). Communities are encouraged to require them outside the SFHA where there is a known flood hazard or where the ground elevation is lower than the base flood elevation (BFE).

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

Section 4.1.2 describes community types. A 60.3(a) community does not have a FIRM. Consequently, this type of community must require a permit for all development projects *throughout* the community.

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

19.1.3. Building permits

Most communities have long had a system for issuing building permits, but few have a permit system for "development." Regulating all development in floodplains is essential because fill or other material can just as easily obstruct flood flows as structures can.

Because a "building permit" often covers only construction or modifications of buildings, this reference uses the term "development permit." The administrator should check his or her permit system to ensure that in the floodplain, permits are required for all projects that meet the definition of development, not just "building" projects. Make sure the following are regulated in addition to the traditional building projects:

- Filling and grading
- Excavation, mining, and drilling
- Storage of materials
- Erection of fences and walls
- Repairs to a damaged building (even those that do not affect structural members)
- Temporary stream crossings
- Activities by other government agencies, including roads, bridges, and school buildings

If the building permit system does not require permits for these activities, the administrator should revise the system, enact a new type of "development permit," or otherwise ensure that people know they need to apply for a permit for these non-building projects (Figure 19-1).

Figure 19-1 On the next page is an example public notice to remind people that permits are needed for more than just construction of new buildings.

This example may be photocopied and used locally.

PUBLIC NOTICE

PERMIT REQUIRED BEFORE YOU DEVELOP

Notice is hereby given that _____
[name of community]
has an adopted ordinance which requires property owners to secure a permit before doing any development (building, major remodeling, filling, grading, channel alteration, placement of manufactured homes, etc.).

This action is in compliance with the regulations of the National Flood Insurance Program. The Louisiana Legislature has delegated the responsibility of implementation of this program to local government units.

Areas of _____ may be
[name of community]
subject to periodic inundation which may result in loss of life and property and cause health and safety hazards.

Applications for development permits can be obtained from the _____ Permit Office located at
[name of community]

_____
[address and telephone number of permit office]

The applicant must provide all information necessary to complete the application.

Complete provisions of this ordinance are on file and can be reviewed at the _____ Permit Office.
[name of community]

_____
[Community official]

_____
[Community official's title]

19.1.4. Public projects

A community in the NFIP is responsible for enforcing the floodplain management regulations on all development within its jurisdiction.

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

The community cannot exempt activities by its own offices. The community's ordinance and its agreement with the NFIP say that it will ensure that all development within its jurisdiction will be regulated.

While the street or sewer departments do not have to actually apply for a permit from the building department, the community needs some system to ensure that their activities meet the ordinance's regulatory standards. One way to do this is to follow the regular permit process. This will provide the documentation necessary to show that the community is meeting all of its obligations to the NFIP.

Louisiana Revised Statutes (RS 38:84.1) requires that

> Each state agency, and each public and quasi-public agency of the state, shall, except with respect to the construction and maintenance of bridges and highways, comply with all ordinances, rules and regulations, including zoning and land use regulations, adopted by any parish or municipality of the state pursuant to the authority of the National Flood Insurance Act of 1968…

Construction and maintenance of bridges and highways are exempt from this provision. However, all other projects to be constructed by State and other public agencies must meet the requirements of the local flood damage prevention ordinance. As with other departments in the community, the other agencies may not have to actually apply for a permit, but procedures should be developed to ensure that their projects comply with the flood damage prevention ordinance.

19.2. Permit Application Form

Forms are a valuable and necessary tool in reviewing development proposals for regulatory compliance. When designed properly, they can be the most efficient way to get information that is essential to conducting an effective and thorough review.

A good administrative form can serve as a checklist for identifying the kinds of information that should accompany a permit application. The forms should be revised periodically to remain current with changes in the floodplain management ordinance and to include pertinent information.

Each community should have its own permit application form. Check to be sure that it includes all NFIP requirements. An example permit application form is shown in Figures 19-2 through 19-4. The first page is actually the application; the other two are checklists and records for the floodplain administrator.

Make sure the person who signs the form is either the property owner or someone who can speak for the owner. If in doubt, talk to the owner or get it in writing that the person signing the application is authorized to commit the owner to meeting the requirements.

> In this reference, the term "building" is the same as the term "structure" in the NFIP regulations. Local ordinances may use either term. The terms are reviewed in more detail in Section 11.1.

Figures 19-2 − 19-4. On the following three pages is an example permit application form.

It may be photocopied and used locally.

Floodplain Development Application

Application Number: _____ Date: _____

Section 1: Applicant's Agreement:
The undersigned agrees that the floodplain maps and other flood data used in evaluating the flood hazards to the proposed development are considered reasonable and accurate for regulatory purposes and are based on best available scientific and engineering data. On rare occasions greater floods can and will occur and flood heights may be increased by man-made or natural causes

The undersigned also agrees that all statements herein and in attachments to this application are true and accurate, to best of their knowledge and all work shall be done in accordance with the _____ [name of City/Parish] _____ [title of floodplain management ordinance] and with all applicable federal, state, parish and city laws and regulations.

_____ _____
(Applicant's signature) (Date)

Section 2: Applicant Information

1. Name Address Telephone

_____
Applicant

_____
Builder

_____
Engineer

2. Location of property (street address, lot number or legal description). An attached plat of survey or map is helpful.

_____

_____

3. Type of Construction (check all that apply)

Structural	Activity	Structure type
	☐ New structure	☐ Residential (1-4 Family)
	☐ Addition	☐ Residential (more than 4 Family)
	☐ Relocation	☐ Non-residential
	☐ Demolition	☐ Manufactured Home

Other Development Activities

☐ Clearing ☐ Filling ☐ Grading ☐ Mining ☐ Drilling
☐ Excavation
☐ Subdivision
☐ Alteration of Waterway or drainage
☐ Road or Bridge Construction
☐ Utility Work
☐ Other_____

4. Estimated cost of project $_____

After completing Section 2, the applicant should submit the application and any attachments to the floodplain administrator for review.

(**The following sections are for community use only)**

Section 3: Floodplain determination

1. FIRM Panel No. _____ Dated _____
2. The proposed development:
   - ☐ Is not located in a Special Flood Hazard Area (no floodplain development permit required)
   - ☐ Is partially located in the SFHA but the building or development is not (no floodplain development permit required.)
   - ☐ Is located in a SFHA: Flood Zone ____ Base flood elevation _____
   - ☐ Base flood elevation is not available (See Section 4, contact applicant to discuss)
   - ☐ Is located in the floodway (Panel No. _____ Dated _____)

Section 4: Additional Information

The applicant must submit the following information to process the application:

- ☐ Site plan, showing property lines, topography, floodplain and floodway boundaries, existing and proposed structures, etc.
- ☐ Development plans
- ☐ Building plans showing, proposed first floor elevation, anchoring details, floodproofing of utilities below the first floor, details of enclosures below the first floor, etc.
- ☐ Base flood elevation (If the development exceeds 50 lots or 5 acres)
- ☐ Floodway construction: hydraulic/hydrologic calculations showing no increase in the base flood height
- ☐ Certified design of openings for enclosures (if an alternative to the NFIP standard is proposed)
- ☐ Nonconversion agreement (full-story enclosures)
- ☐ Other permits as required

  Corps of Engineers: ☐ Yes ☐ No If yes, Permit # _____
  Date received: _____

  Coastal Use Permit: ☐ Yes ☐ No If yes, Permit # _____
  Date received: _____

- ☐ Other: _____
  _____

Section 5: Permit Determination

The permit is ☐ Approved ☐ Denied (see reasons below)
Signed _____ Date _____
(The applicant may revise and resubmit an application or may request an appeal.)
Reasons for denial _____
_____

Appeals: Appealed to Board of Standards and Appeals ☐ Yes ☐ No
Hearing date: _____
Board decision – approved ☐ Yes ☐ No
Reasons/ Conditions: _____
_____
_____
_____
_____

Section 6: Inspection Record

The floodplain administrator or designee will complete this section based on inspections to ensure compliance with the flood damage prevention ordinance.

	Date	Inspector	Comments
Pre-construction:			
Elevation:			
Final:			

Section 7: Certificate of Occupancy

☐	Elevation Certificate required	☐ Reviewed	☐ Approved	☐ Rejected
☐	Floodproofing Certificate required	☐ Reviewed	☐ Approved	☐ Rejected
☐	V Zone Certificate required	☐ Reviewed	☐ Approved	☐ Rejected

Reason for rejection: _____
_____

Certificate issued: Date:_____ By: _____

19.3. Application Review

This section reviews a standard process. It is not a mandatory process, but it does ensure that all of a community's NFIP requirements will be met. If the community already has a successful permit process, this section should be reviewed to see if there are things that should be added to the process.

Figure 19-5 shows the permit process that forms the organization for this section. The floodplain administrator may want to develop the community's own checklist.

19.3.1. Review for completeness

The submission of a development permit application begins the permit process. Before submitting an application, the prospective applicant often contacts the floodplain administrator to obtain a copy of the regulations, locate the proposed site in relation to the NFIP maps, determine flood elevations, or gather procedural and technical information necessary to complete the application.

This informal part of the permit process can be important in guiding the applicant to locate and design the development in compliance with the community's regulations. It also can help the applicant prepare a complete application, avoiding unnecessary delays at the outset. Some communities ensure that the permit process will go smoothly by having a pre-application meeting with a developer to review a preliminary plan.

The application package should contain all of the administrative forms, plans, blueprints, and technical documentation required for the administrator to review the proposed project for regulatory compliance. If the application package is incomplete, the review should stop. The applicant should be advised (in writing) of missing documents and told (in writing) that the review will not start until the missing documents are submitted.

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

19.3.2. Check all forms

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

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

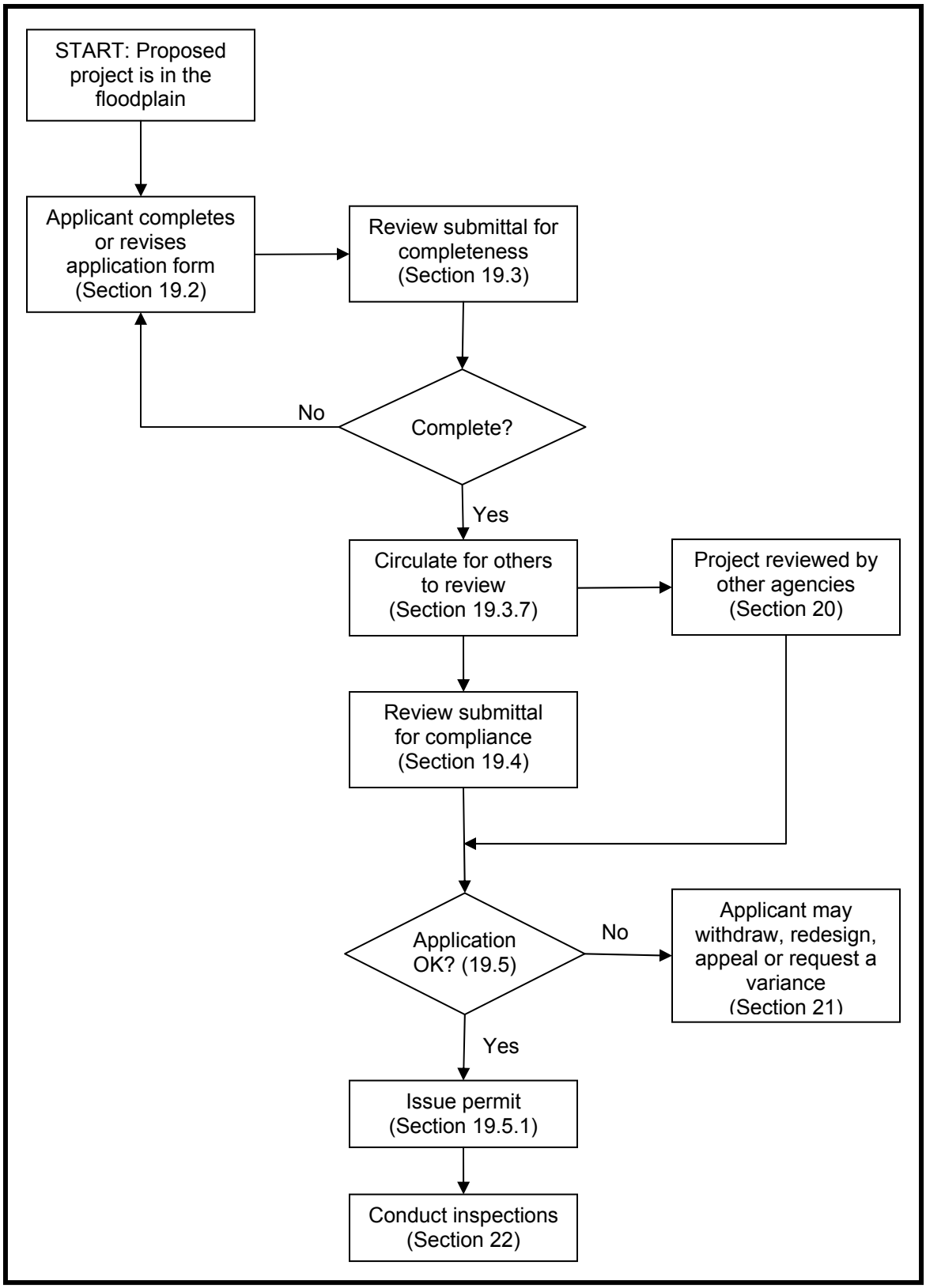


Figure 19-5. Permit review flow chart.

19.3.3. Check site plan for completeness

Depending on the specificity or detail of the administrative forms, the various plans that accompany the application will provide the technical data needed for a thorough review. At a minimum, there should be a site plan, drawn to scale. Such a plan should show:

- Location of property lines
- Required set back lines and easements
- Topographic information, such as contour lines or spot elevations
- Streets
- Watercourses
- Location of existing and proposed structures
- All clearing, filling, and other proposed changes to the ground
- Floodway and floodplain boundaries
- Base flood elevations
- In V Zones, the line of the mean high tide and Zone V/Zone A boundary; if there is more than one Zone on the lot, the base flood and boundary locations should be depicted on the plans
- When a licensed professional architect, engineer, or land surveyor prepares a plan, it should be stamped with the license seal to certify technical accuracy

19.3.4. Check building plan for completeness

If a building site is located in the Special Flood Hazard Area (SFHA) shown on the FIRM, each building must be protected to the base flood elevation (plus any freeboard). The application package must include building design plans that show:

- The kind and potential use of the structure
- Proposed lowest floor elevations of all new construction and the existing lowest floor for substantially improved or substantially damaged buildings
- Proposed elevations of adjacent grades
- The type of foundation system
- The existence of any enclosure below the lowest floor, along with electrical and plumbing plans for the area, location and dimensions of openings, and materials proposed for use in an enclosure below the base flood elevation
- The height to which a nonresidential structure is to be floodproofed and the complete list of floodproofing techniques to be used, with detailed drawings

19.3.5. Check certifications

The floodplain administrator must ensure that all necessary certifications are included and properly signed. The applicant must provide all completed certifications necessary for the permit review.

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

- **No-rise certification:** If any part of the proposed project is to be located in a floodway, the applicant must submit an engineering certification and documentation demonstrating that the proposed encroachment would not result in any increase in base flood heights. If the project is in a riverine floodplain where no floodway has been adopted, the certification would show that the project will not exceed the allowable increase in flood heights (Section 15.2.3).
- **Floodproofed building:** In the event a nonresidential structure is to be floodproofed, the applicant must submit a statement from a licensed professional engineer or architect certifying that the design and methods of construction meet these standards (44 CFR 60.3(c)(4)). A second, as-built, certificate is also required (Sections 12.1 and 24).
- **Enclosures below the lowest floor:** Section 11.3.3 covers the requirements for openings in enclosures. If an applicant designs an enclosure below the lowest floor using an alternative to the NFIP standard, a licensed professional architect or engineer must certify the design (44 CFR 60.3(c)(5)). If a full-story enclosure is planned below the lowest floor, a nonconversion agreement should be required (Section 11.3.5).
- **V Zone construction:** An applicant proposing to construct a building in a V Zone must provide a statement from a licensed professional engineer or architect certifying the design and method of construction of the elevated building and the design of breakaway walls (44 CFR 60.3(e)(4)) (Section 16.2.4).

19.3.6. Check for Federal and State permits

The floodplain administrator must ensure that all necessary federal and state permits are obtained. The administrator must review the application package to determine whether federal and state permits are necessary (44 CFR 60.3(a)(2)). To help the administrator and the applicant, the agency or program names can be included as a checklist on the permit application form. See Section 20 on other agencies that probably will have to review the project.

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

For example, getting a Section 404 wetlands permit from the U.S. Army Corps of Engineers may take several months. Under such circumstances, the floodplain administrator may issue a local permit with the stipulation that the applicant must have obtained all required permits before beginning construction. This can be verified at the first inspection.

Note: This approach may be asking for problems if the developer misinterprets conditional approval for complete permission. The safest approach is to wait for all required permits, but the community has some flexibility if this puts a hardship on the builder who can proceed without affecting the area subject to the other regulations.

19.3.7. Circulate for others to review

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

See Section 20.1.2 for a list of departments and agencies that might need to review a portion of an application to build in the floodplain.

Floodplain administrators should contact these agencies, determine what, if anything, they need to review, and prepare a checklist for permit applicants that advises them of the other approvals that will be required.

19.4. Review for Compliance

Now that the floodplain administrator has a complete application package, the following recommended procedures can help verify that the project will meet all of the community's ordinance requirements.

19.4.1. Examine site information

Check the site plan to ensure that the plotted floodplain and floodway boundaries appear accurately plotted. Look for possible obstructions in the floodway and other potential violations.

Inspect the plan carefully and compare it with the FIRM, Floodway Map, and profile. Some project sites may be located close to the boundaries of the SFHA. Because the map scale is small, or it is difficult to pinpoint the project site, the administrator may have trouble determining whether the project will be in or out of the SFHA. See Section 9.1 on reading maps and making floodplain and floodway boundary determinations.

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

> **Note:** While better ground elevation data can be used to determine that a building location is at or above the base flood elevation (erroneously included in the SFHA), the property will remain in the SFHA on the FIRM. That means that it is still subject to the flood insurance purchase requirement and the rates will be set at SFHA rates. It is the owner's responsibility to submit a request for a Letter of Map Amendment (LOMA) in order to have the FIRM reflect the better data (Section 10.3).

19.4.2. Review building plans

Any conflict or inconsistency with applicable regulations will require adjustments to the building plans. Check the proposed elevations against the base flood elevation (and any freeboard). Be sure to review what is planned to be installed below the lowest floor, such as in a crawlspace. Items such as ductwork must be elevated above the BFE (plus any freeboard) or otherwise protected from flood damage.

19.4.3. Review engineering documents

Have the community engineer review engineering documents. As listed previously, depending on the type and location of the structure being proposed, an engineering document or certification may be required to show compliance with NFIP requirements concerning floodproofing and enclosures below the lowest floor.

The community's staff engineer, or a consulting engineer, should examine all engineering documents to ensure that acceptable technical standards were used and that calculations are correct. If the community does not have a staff engineer, the DHS/FEMA Regional Office may be able to help review the data.

19.5. Application Approval or Denial

Once the floodplain administrator completes the review of the permit application papers for completeness and technical compliance with the ordinance, he or she must approve or deny the permit.

19.5.1. Approval

If the proposed development is in compliance with regulations, the administrator may issue a permit (Figure 19-6). Somewhere in the permit record, such as the approved plans, the application form, or the permit form itself, a record should be kept of the BFE and the required floor elevation. There should also be a general statement that all construction will be in accordance with all codes and ordinances. The example application form in Figure 19-2 provides such a record.

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

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

Another approach is to require that work continue to proceed over a given period. If work stops for a certain length of time, the permit is withdrawn.

Note that a permit for the placement of a temporary structure should not receive an automatic renewal.

19.5.2. Denial

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

- Withdraw the permit application
- Redesign the project to bring it into compliance with regulations
- Appeal to the Board of Adjustments or other review board (Section 21.1)
- Ask for a variance to the regulations (Section 21.2)

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

Appeals and variances are covered in Section 21. Clarifying the deficiencies for the applicant also can help reduce the number of appeals of administrative and regulatory decisions.

Figure 19-6. On the next page is a sample permit form.

It may be photocopied and used locally.

FLOODPLAIN DEVELOPMENT PERMIT

Specify for what purpose the permit is issued−
New construction, alteration, fill, excavation, other

ISSUED TO: _____

ADDRESS: _____

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

ISSUED BY: _____
(Floodplain Administrator)

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

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

Section 20. Permits from Other Agencies

Contents

Note: This section reviews what activities need to have permits from agencies other than the community. The procedures for reviewing a permit application are covered in Section 19. It must be remembered that even if a state or federal agency issues a permit, the community is still responsible for ensuring that a new building or other development project meets the standards discussed in Sections 11 through 16.

20.1. Permits from Other Agencies

20.1.1. NFIP requirement

44 CFR 60.3(a)(2) requires all National Flood Insurance Program (NFIP) communities to ensure that other federal and state permits have been obtained. A local permit should not be issued until the administrator is certain that the other agencies' requirements are met.

> **Minimum standards for communities are as follows: …**
>
> **(2) Review proposed development to assure that all necessary permits have been received from those governmental agencies from which approval is required by federal or state law, including section 404 of the Federal Water Pollution Control Act Amendments of 1972, 33 U.S.C. 1334;**

The purpose of this requirement is to ensure that there is coordination between the various agencies that manage development in floodplains. The requirement has an added benefit: permit applicants will obtain all of the permits they need before they make a major financial investment. The community's residents and businesses are not well served if they are allowed to proceed with a project only to have work stopped later by a federal or state agency because they have not obtained all the necessary permits.

Some communities allow their permit officials to issue the local permit on the condition that other required permits are obtained. However, this is not as effective as holding the local permit until the applicant can show that the other agencies have issued or will issue their permits. Otherwise, the project may get underway before the administrator is sure that it meets all legal requirements.

To implement this requirement, floodplain administrators are encouraged to develop a list of permits required in their jurisdiction.

20.1.2. Local agencies

The administrator should first check with other local offices. Each office may have some permit review authority, or interest, so the administrator must decide which projects, if any, should be reviewed by them before a floodplain development permit is issued. Offices to coordinate with include:

- Building department
- Planning department
- Zoning department
- Sanitation department
- Fire marshal

- Engineer
- Public works, streets, or highways

Other local governments should also be contacted. The following local authorities may have jurisdiction over some aspects of floodplain development:

- The parish
- Adjacent municipalities (pursuant to intergovernmental agreements)
- Drainage districts
- Levee district
- Sanitary district
- River conservancy district
- Park district
- Parish health or sanitation department

20.1.3. Soil and water conservation districts

The soil and water conservation district can be especially helpful. Many communities have entered into intergovernmental agreements with their local district to review the impact of a development on natural resources. The district's staff can provide an expert technical review of how the project will affect other concerns as well as flooding.

Generally, each parish has its own soil and water conservation district. Check in the parish seat's telephone book under the parish's name, e.g., "_____ Parish Soil and Water Conservation District." The districts are separate from parish government and are co-located with the local office of the U.S. Department of Agriculture's Natural Resources Conservation Service.

20.2. Coastal Agencies

20.2.1. The coastal zone

The State of Louisiana administers a regulatory program within the jurisdiction of its coastal zone (Figure 20-1).

The coastal zone boundary for Louisiana begins at the State line of Texas and Louisiana, easterly through the parishes of Calcasieu and Cameron, then south through Vermilion, Iberia, St. Mary, St. Martin, Assumption, Terrebonne, and Lafourche parishes. The boundary then turns to the north to include the parishes of St. Charles, St. John the Baptist, St. James, and east through Livingston, Tangipahoa, and St. Tammany parishes. The parishes of Orleans, Jefferson, St. Bernard, and Plaquemines are also within the boundary.

Figure 20-1. The State's coastal zone.

The seaward boundary of the coastal zone is the outer limit of the U.S. territorial sea.

20.2.2. Coastal use permits

The Coastal Management Division (CMD) of the Louisiana Department of Natural Resources is charged with implementing the Louisiana Coastal Resources Program under authority of the Louisiana State and Local Coastal Resources Management Act of 1978 (Act 361, La.R.S.49: 214.21). Under this authority, the CMD established the Coastal Use Permit (CUP) Program to help ensure the management and reasonable use of the State's coastal lands.

The CUP program carries the authority to enforce either legal or administrative procedures, including levying fines, issuing cease and desist orders, and requiring mitigation or restoration. The CMD Support Services Section monitors permitted activities in the coastal zone for compliance with permit conditions and patrols the entire coastal zone by air, land, and water for unauthorized activities.

The CUP Program has oversight for activities in the designated coastal zone that involve dredging, fill, or other earth-moving or drainage affecting activities. Activities that may require a coastal use permit include dredge and fill projects, sewage treatment plant siting, waste-water discharge, drainage projects, pumping facilities, marsh management activities, water level control, levee construction, solid waste dump siting, roads and bridges, park siting, freshwater diversion, and mosquito control.

Activities not requiring a Coastal Use Permit include agricultural, forestry, and aquaculture activities on lands consistently used in the past for such activities; preservation of scenic, historic, and scientific areas and wildlife preserves; normal maintenance or repair of existing structures, including emergency repairs of damage caused by accident, fire, or the elements; construction of a residence or camp; activities that do not have a direct and significant impact on coastal waters; and activities on lands 5 feet or more above sea level or within fastlands (areas protected by a levee) that do not normally have direct and significant impacts on coastal waters.

Advice on Coastal Use Permits

The Coastal Management Division (CMD) offers the following suggestions to permit applicants:

First, ask the CMD to determine if your project is in the coastal zone. For example, the northern part of Lafourche Parish is outside the Louisiana coastal zone.

Second, if your project is on land above 5 feet Mean Sea Level or within fastlands, you may not need a coastal use permit. Fastlands are certain areas protected by public levees. Request a determination of jurisdiction from CMD by submitting an application form with the processing fee.

Third, when you need a coastal use permit, meet with representatives of the Coastal Management Division to discuss the project and how it relates to the coastal program guidelines. At the meeting, ask if your project is of State or local concern so you can file the permit application with the right office. Request the most recent information about the permit process, including forms, brochures, and associated materials.

Fourth, complete the application form supplied by the Coastal Management Division. Return it either to the parish program administrator for uses of local concern where there is a local coastal zone program (Section 20.2.4) or to the State office for uses of State concern.

Fifth, distribute the permit application as directed by CMD.

Sixth, respond to requests for information in a timely manner.

Louisiana's Coastal Use Guidelines apply to permitted activities in the coastal zone. The Guidelines include general provisions applicable to all uses and specific provisions applicable to certain types of uses. Specific guidelines have been promulgated for:

- Levees
- Linear facilities
- Dredged spoil deposition
- Shoreline modification
- Surface alterations
- Hydrologic and sediment transport modifications
- Disposal of wastes
- Uses that result in the alteration of waters draining into coastal waters
- Oil, gas, and other mineral activities

See also the Frequently Asked Questions about CMD permits in Figure 20-3.

20.2.3. Corps of Engineers coastal permits

The U.S. Army Corps of Engineers administers a wetland permit program known as Section 404 (Section 20.4.4). Where wetlands are located in the coastal zone,

development proposals need permits from both CMD and the U.S. Army Corps of Engineers.

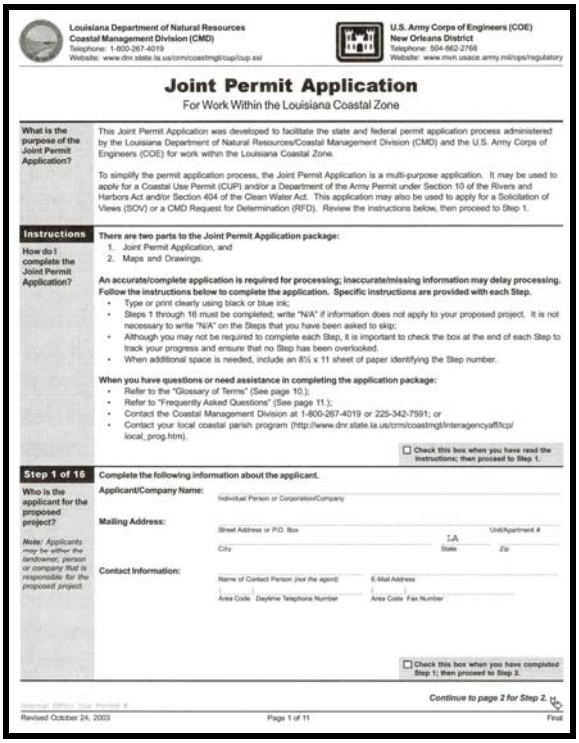
There are three U.S. Army Corps of Engineers districts in Louisiana's coastal zone. The Vicksburg District reviews activities in the Pearl River basin, the New Orleans District reviews proposals between the Pearl River basin and Johnson's Bayou, and the Galveston District is responsible for activities west of Johnson's Bayou (Figure 20-7).

The New Orleans District and CMD have developed a "Joint Public Notice" agreement through which CMD serves as the initial point of contact for applicants in that portion of the coastal zone also regulated by the New Orleans District.

This joint application form process also assures that other state and federal agencies with a possible interest in the project will be advised. This includes the U.S. Fish and Wildlife Service, which reviews projects for their impact on endangered species.

As similar agreements are not in place with the Vicksburg and Galveston Districts, activities in those parts of the coastal zone must be submitted directly to the applicable COE district as well as to CMD.

Working in conjunction with other state and federal resource agency partners, CMD has recently developed a new "Joint Permit Application" (Figure 20-2). Communities should have copies of this form and other advisory materials (Figure 20-3) on hand for applicants. The latest version can be downloaded from the CMD website (Section 31).



Louisiana Department of Natural Resources
Coastal Management Division (CMD)
Telephone: 1-800-267-4019
Website: www.dnr.state.la.us/crm/coastmgt/cup/cup.asl

U.S. Army Corps of Engineers (COE)
New Orleans District
Telephone: 504-862-2766
Website: www.mvn.usace.army.mil/ops/regulatory

Joint Permit Application

For Work Within the Louisiana Coastal Zone

What is the purpose of the Joint Permit Application?

This Joint Permit Application was developed to facilitate the state and federal permit application process administered by the Louisiana Department of Natural Resources/Coastal Management Division (CMD) and the U.S. Army Corps of Engineers (COE) for work within the Louisiana Coastal Zone.

To simplify the permit application process, the Joint Permit Application is a multi-purpose application. It may be used to apply for a Coastal Use Permit (CUP) and/or a Department of the Army Permit under Section 10 of the Rivers and Harbors Act and/or Section 404 of the Clean Water Act. This application may also be used to apply for a Solicitation of Views (SOV) or a CMD Request for Determination (RFD). Review the instructions below, then proceed to Step 1.

Instructions

How do I complete the Joint Permit Application?

There are two parts to the Joint Permit Application package:

1. Joint Permit Application, and
2. Maps and Drawings.

An accurate/complete application is required for processing; inaccurate/missing information may delay processing. Follow the instructions below to complete the application. Specific instructions are provided with each Step.

- Type or print clearly using black or blue ink;
- Steps 1 through 16 must be completed; write "N/A" if information does not apply to your proposed project. It is not necessary to write "N/A" on the Steps that you have been asked to skip;
- Although you may not be required to complete each Step, it is important to check the box at the end of each Step to track your progress and ensure that no Step has been overlooked.
- When additional space is needed, include an 8½ x 11 sheet of paper identifying the Step number.

When you have questions or need assistance in completing the application package:

- Refer to the "Glossary of Terms" (See page 10.);
- Refer to "Frequently Asked Questions" (See page 11.);
- Contact the Coastal Management Division at 1-800-267-4019 or 225-342-7591; or
- Contact your local coastal parish program (http://www.dnr.state.la.us/crm/coastmgt/interagencyaff/lcp/local_prog.htm).

☐ **Check this box when you have read the instructions; then proceed to Step 1.**

Step 1 of 16

Who is the applicant for the proposed project?

Note: Applicants may be either the landowner, person or company that is responsible for the proposed project.

Complete the following information about the applicant.

Applicant/Company Name: Individual Person or Corporation/Company

Mailing Address: Street Address or P.O. Box; Unit/Apartment #; City; LA State; Zip

Contact Information: Name of Contact Person (not the agent); E-Mail Address; Area Code Daytime Telephone Number; Area Code Fax Number

☐ **Check this box when you have completed Step 1; then proceed to Step 2.**

Continue to page 2 for Step 2.

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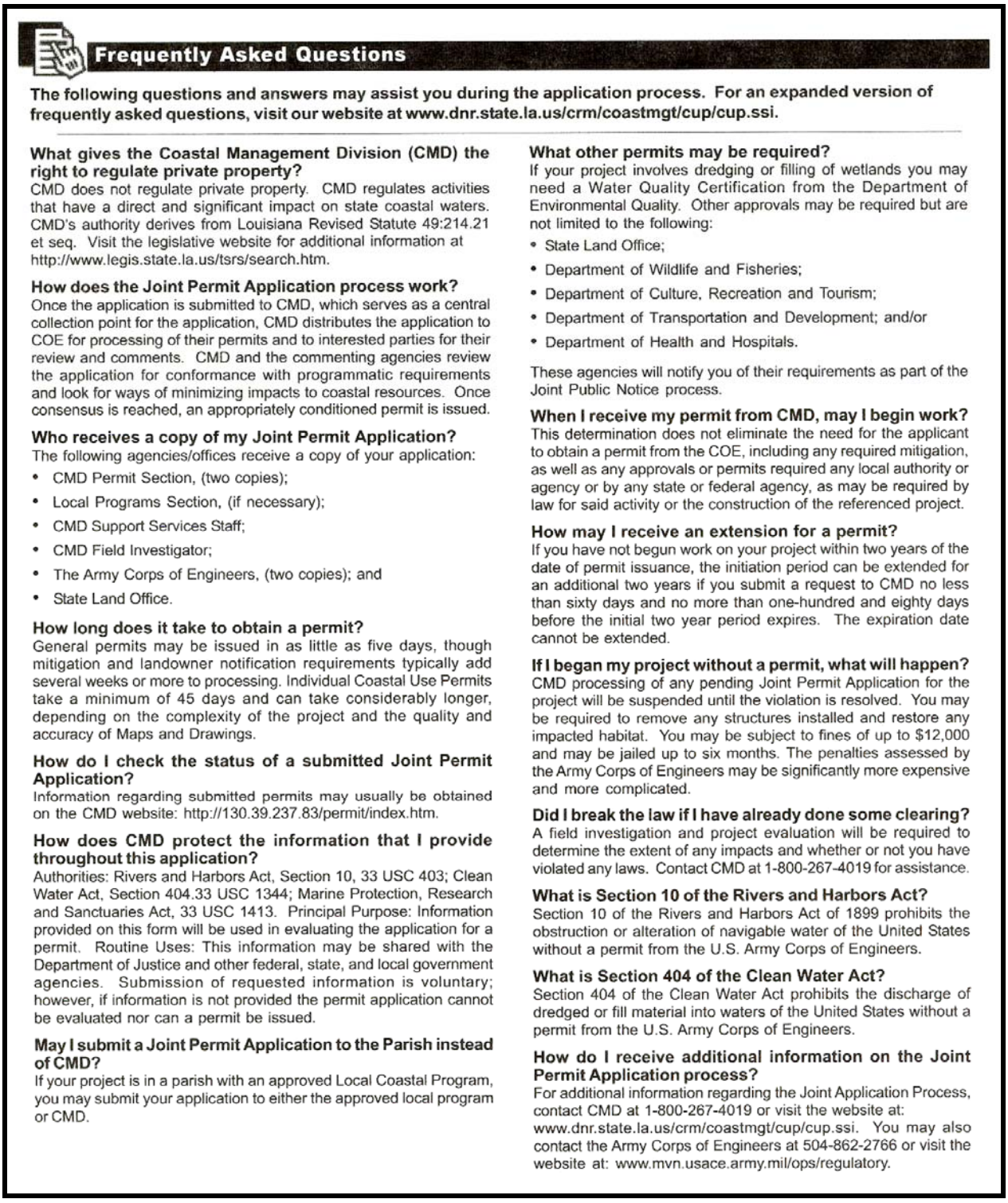
Figure 20-2. Joint CMD – U.S. Army Corps of Engineers permit form.



Frequently Asked Questions

The following questions and answers may assist you during the application process. For an expanded version of frequently asked questions, visit our website at www.dnr.state.la.us/crm/coastmgt/cup/cup.ssi.

What gives the Coastal Management Division (CMD) the right to regulate private property?
CMD does not regulate private property. CMD regulates activities that have a direct and significant impact on state coastal waters. CMD's authority derives from Louisiana Revised Statute 49:214.21 et seq. Visit the legislative website for additional information at http://www.legis.state.la.us/tsrs/search.htm.

How does the Joint Permit Application process work?
Once the application is submitted to CMD, which serves as a central collection point for the application, CMD distributes the application to COE for processing of their permits and to interested parties for their review and comments. CMD and the commenting agencies review the application for conformance with programmatic requirements and look for ways of minimizing impacts to coastal resources. Once consensus is reached, an appropriately conditioned permit is issued.

Who receives a copy of my Joint Permit Application?
The following agencies/offices receive a copy of your application:

- CMD Permit Section, (two copies);
- Local Programs Section, (if necessary);
- CMD Support Services Staff;
- CMD Field Investigator;
- The Army Corps of Engineers, (two copies); and
- State Land Office.

How long does it take to obtain a permit?
General permits may be issued in as little as five days, though mitigation and landowner notification requirements typically add several weeks or more to processing. Individual Coastal Use Permits take a minimum of 45 days and can take considerably longer, depending on the complexity of the project and the quality and accuracy of Maps and Drawings.

How do I check the status of a submitted Joint Permit Application?
Information regarding submitted permits may usually be obtained on the CMD website: http://130.39.237.83/permit/index.htm.

How does CMD protect the information that I provide throughout this application?
Authorities: Rivers and Harbors Act, Section 10, 33 USC 403; Clean Water Act, Section 404.33 USC 1344; Marine Protection, Research and Sanctuaries Act, 33 USC 1413. Principal Purpose: Information provided on this form will be used in evaluating the application for a permit. Routine Uses: This information may be shared with the Department of Justice and other federal, state, and local government agencies. Submission of requested information is voluntary; however, if information is not provided the permit application cannot be evaluated nor can a permit be issued.

May I submit a Joint Permit Application to the Parish instead of CMD?
If your project is in a parish with an approved Local Coastal Program, you may submit your application to either the approved local program or CMD.

What other permits may be required?
If your project involves dredging or filling of wetlands you may need a Water Quality Certification from the Department of Environmental Quality. Other approvals may be required but are not limited to the following:

- State Land Office;
- Department of Wildlife and Fisheries;
- Department of Culture, Recreation and Tourism;
- Department of Transportation and Development; and/or
- Department of Health and Hospitals.

These agencies will notify you of their requirements as part of the Joint Public Notice process.

When I receive my permit from CMD, may I begin work?
This determination does not eliminate the need for the applicant to obtain a permit from the COE, including any required mitigation, as well as any approvals or permits required any local authority or agency or by any state or federal agency, as may be required by law for said activity or the construction of the referenced project.

How may I receive an extension for a permit?
If you have not begun work on your project within two years of the date of permit issuance, the initiation period can be extended for an additional two years if you submit a request to CMD no less than sixty days and no more than one-hundred and eighty days before the initial two year period expires. The expiration date cannot be extended.

If I began my project without a permit, what will happen?
CMD processing of any pending Joint Permit Application for the project will be suspended until the violation is resolved. You may be required to remove any structures installed and restore any impacted habitat. You may be subject to fines of up to $12,000 and may be jailed up to six months. The penalties assessed by the Army Corps of Engineers may be significantly more expensive and more complicated.

Did I break the law if I have already done some clearing?
A field investigation and project evaluation will be required to determine the extent of any impacts and whether or not you have violated any laws. Contact CMD at 1-800-267-4019 for assistance.

What is Section 10 of the Rivers and Harbors Act?
Section 10 of the Rivers and Harbors Act of 1899 prohibits the obstruction or alteration of navigable water of the United States without a permit from the U.S. Army Corps of Engineers.

What is Section 404 of the Clean Water Act?
Section 404 of the Clean Water Act prohibits the discharge of dredged or fill material into waters of the United States without a permit from the U.S. Army Corps of Engineers.

How do I receive additional information on the Joint Permit Application process?
For additional information regarding the Joint Application Process, contact CMD at 1-800-267-4019 or visit the website at: www.dnr.state.la.us/crm/coastmgt/cup/cup.ssi. You may also contact the Army Corps of Engineers at 504-862-2766 or visit the website at: www.mvn.usace.army.mil/ops/regulatory.

Figure 20-3. Frequently asked questions about coastal permits.

20.2.4. Local coastal programs

The 1978 Louisiana State and Local Coastal Resources Management Act authorized the development, at the parish level, of local coastal management programs. Once a program has received federal and State approval, the parish becomes the permitting authority for coastal uses of local concern defined as "those uses which directly and significantly affect coastal waters and are in need of coastal management but are not uses of State concern and which should be regulated primarily at the local level if the local government has an approved program." To date, 10 coastal parishes (Calcasieu, Cameron, Lafourche, Jefferson, Orleans, Plaquemines, St. Bernard, St. James, St. Tammany, and Terrebonne) have approved active local coastal management programs. Two more are in development, St. Charles and St. John the Baptist.

Among the reasons for developing a local coastal management program are:

- A local coastal management program can serve as a centralized information hub or cross-roads, helping coordinate local implementation of the resource management programs of the many state and federal agencies.

- Through regular meetings of a parish coastal management advisory board, local coastal programs provide a forum for local folks who know the area best to help determine priority issues for local natural resource conservation, and identify local economic considerations.

- State and federal law says that there will be management and regulation of coastal resource use by some governmental body. Establishing a local coastal program reasserts an increased level of local control over activities and uses that would typically be regarded as uses of local concern, but would fall to state oversight in the absence of a local coastal management program.

- Establishing a local coastal management program demonstrates that the parish is serious about taking an active role in participating in the decision-making that shapes coastal management policy in not only that parish, but for all of coastal Louisiana. It is a step toward sustainability (see Section 28.4) and no adverse impact (see Section 28.5).

- Local coastal programs can help facilitate communications regarding access to funds for resource management.

For more information on local coastal programs, see the website of the Office of CRM at http://dnr.louisiana.gov/crm/coastmgt/interagencyaff/lcp/lcp.asp

20.3. State Agencies

20.3.1. Water quality certification

Under the provisions of the Clean Water Act, any project that involves placing dredged or fill material in U.S. waters or wetlands, or that uses mechanized clearing of wetlands, needs a water quality certification from the Louisiana Department of Environmental Quality (LDEQ), Office of Environmental Services. This certification is mandatory for all projects requiring a U.S. Army Corps of Engineers Section 404 permit (Section 20.4.4). This certification is the Department's concurrence that the State's water standards have been met.

If the project involves filling in waters and/or wetlands, the U.S. Army Corps of Engineers and/or the Coastal Management Division of the Louisiana Department of Natural Resources will generate a joint public notice with LDEQ. LDEQ will provide to the applicant a water quality certification application form and instructions for applying. If a Section 401 water quality certification is issued, LDEQ will send a copy of the Water Quality Certification to the U.S. Army Corps of Engineers.

Additional permits may be required for activities such as construction of sanitary sewers, construction and operation of wastewater and water treatment plants, landfill and mining activities, special waste hauling, solid waste disposal, water withdrawal and water storage permits, disposal of dredged material, and other miscellaneous activities.

20.3.2. Waterbottom permits

The State of Louisiana owns the bottoms of most rivers and streams, as well as lakes, bays, and the Gulf of Mexico. This ownership generally extends to the average low water shoreline in rivers and other streams. The ownership in most lakes, bays, sounds, and similar water bodies and in the Gulf of Mexico extends to the mean high water line.

The Division of Administration, State Land Office requires permits within the State-owned waterbottoms for:

- Construction and maintenance of wharves, piers, docks, and other commercial structures
- Reclamation and fill of non-eroded areas
- Reclamation of eroded areas

If any work is planned in State-owned waterbottoms, the State Land Office should be contacted. Fees sometimes have to be paid to the State of Louisiana for use of State-owned waterbottoms. If material is removed from State-owned waterbottoms for fill or sale, there is a fee payable to the Louisiana Department of Wildlife and Fisheries based on the amount of material removed.

20.3.3. Class B Scenic Streams permits

The State's Natural and Scenic River System includes 53 stream segments, which are shown in Figure 20-4 and listed in Figures 20-5 and 20-6. The system varies from fast moving streams and rivers to tidal creeks in coastal marshes. The regulated system changes periodically and the list of affected streams should be checked periodically on the Louisiana Department of Wildlife and Fisheries website (Section 31).

Certain uses are prohibited on these designated watercourses in order to preserve, protect, develop, reclaim, and enhance their natural and scenic qualities (Act 947 of 1988). Prohibited uses are:

- Channelization
- Channel realignment
- Clearing and snagging
- Reservoir construction (impoundment)
- Clear cutting of trees for commercial purposes within 100 feet of the ordinary low water mark of a designated Natural and Scenic River

Uses other than those that are prohibited and that have the potential of causing direct and significant degradation to a scenic river or its tributaries require a permit from the Louisiana Department of Wildlife and Fisheries. Examples include crossings by roads, pipelines, and utilities; discharges; mining; piers; bulkheads; and other non-conforming structures and activities.

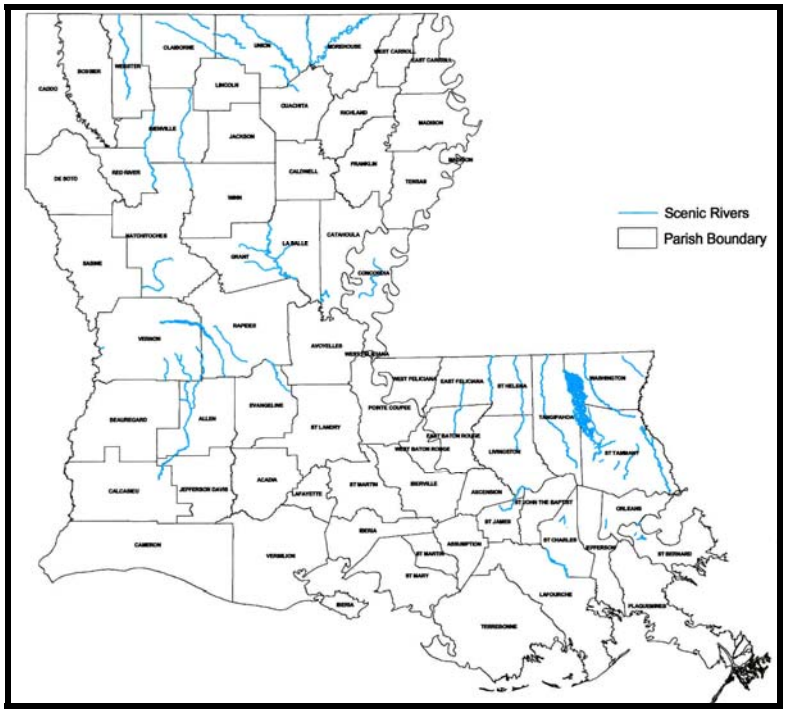


Figure 20-4. Map of Louisiana's Scenic Rivers System.

Abita River – St Tammany Parish – From its origin to the Bogue Falaya River

Amite River - St. Helena, East Feliciana Parishes - From the confluence of East Fork and West Fork to La. Hwy 37 at Grangeville.

Bashman Bayou - St. Bernard Parish- From its origin at T 13 S - R 13 E, Section 26 to Bayou Dupre.

Bayou Bartholomew - Morehouse Parish - From the Louisiana-Arkansas State line to Dead Bayou T 20 N - R 4 E Section 15.

Bayou Bienvenue - St. Bernard Parish - From Bayou Villere to Lake Borgne.

Bayou Cane - St. Tammany Parish - From its headwaters in St. Tammany State Forest T 8 S - R 12 E, Section 42 to Lake Pontchartrain.

Bayou Chaperon - St. Bernard Parish - From its origin T13S - R13E Section 22 to its end T13S - R13E Section 23.

Bayou Chincuba - St. Tammany Parish - From the West Causeway Approach to Lake Pontchartrain.

Bayou Cocodrie - Concordia Parish - From Little Cross Bayou T 7 N - R 8 E Section 14 near Ferriday to Wild Cow Bayou T 4 N - R 7 E Section 3.

Bayou Cocodrie - Rapides, Evangeline Parishes - From U.S. Hwy 167 to the Bayou Boeuf-Cocodrie Diversion Canal

Bayou D'Arbonne - Union, Ouachita Parishes - From the Lake D'Arbonne dam to its entrance into the Ouachita River.

Bayou Des Allemands - Lafourche, St. Charles Parishes - From Baie Des Deux Chenes of Lac Des Allemands T 14 S at the line dividing R 19 and 20 E, to Lake Salvadore T 16 S-R 21 E Section 38.

Bayou Dupre - St. Bernard Parish- From the Lake Borgne (Violet) Canal to Terre Beau Bayou.

Bayou Kisatchie - Natchitoches Parish - From its entrance into Kisatchie Nation Forest T 5 N - R 8 W Section 7 to its entrance into Old River T 7 N - R 6 W, Section 55.

Bayou La Branche - St. Charles Parish - From its origin near U.S. Hwy 61 at Good Hope to its confluence with Lake Pontchartrain.

Bayou LaCombe - St. Tammany Parish - From its origin at Talisheek near the junction of Hwy 41 and Hwy 435 T6S - R13E, Section 14 to Lake Pontchartrain.

Bayou L'Outre - Ouachita, Union Parishes - From the Louisiana-Arkansas State line to its entrance into the Ouachita River.

Bayou St. John - Orleans Parish - From its origin to Lake Pontchartrain.

Figure 20-5. Louisiana's Scenic Rivers.

Bayou Trepagnier - St. Charles Parish - From the Shell Oil Refinery at Norco to its confluence with Bayou La Branche.

Big Creek - Grant Parish - From Hwy 167 in Grant Parish to its confluence with Little River.

Black Lake Bayou - Red River, Winn, Bienville Parishes - From the Webster-Bienville Parish line T 17 N - R 8 W, Section 24, to Black Lake in Natchitoches Parish, T 12 N - R 8 W, Section 14.

Blind River - St. James, Ascension, Livingston, St. John the Baptist Parishes - From its origin in St. James Parish T 11 S - R 4 E Section 44, to its entrance into Lake Maurepas at Dutch Bayou in St. John the Baptist Parish.

Bogue Chitto River - Washington, St. Tammany Parishes - From the Louisiana-Mississippi State line to its entrance into the Pearl River Navigation Canal.

Bogue Falaya River - St. Tammany Parish - From the confluence of East and West Prong to Highway 437 bridge north of Covington.

Bradley Slough - St. Tammany Parish - From its origin at the Bogue Chitto River to its confluence with Wilson Slough.

Calcasieu River - Vernon, Rapides Parishes - From La Hwy 8 east through Vernon Parish and all of that portion of the river within Rapides Parish to the Allen Parish line. From the mouth of the Whisky Chitto Creek to Ward 8 Park in Calcasieu Parish above Moss Bluff.

Comite River - East Feliciana, East Baton Rouge Parishes - From the Wilson-Clinton Hwy (La. Hwy 10) in East Feliciana Parish to its confluence with Whites Bayou in East Baton Rouge Parish.

Corney Bayou - Claiborne, Union Parishes - From the Louisiana-Arkansas State line to Corney Lake and from Corney Lake Dam to Lake D'Arbonne.

Dorcheat Bayou - Webster Parish - From the Louisiana-Arkansas State line to its entrance into Lake Bistineau, T18N - R10W, Section 36.

Fish Creek - Grant Parish - From its origin near Williana to its confluence with Little River.

Holmes Bayou - St. Tammany Parish - From its origin as a distributary of the East Pearl River to its confluence with the West Pearl River.

Lake Borgne (Violet) Canal - St. Bernard Parish- From the Forty Arpent Canal to Bayou Dupre.

Little River - Rapides, Grant, LaSalle Parishes - From the confluence of Dugdemona River and Castor Creek to its entrance into Catahoula Lake.

Middle Fork of Bayou D'Arbonne - Claiborne, Union Parishes - From its origin near La. Hwy 2 Alternate at the town of Haynesville to Lake D'Arbonne. Morgan River - St. Tammany Parish - From its juncture with the Porters River to its reentry into the West Pearl River.

Ouachita River - Morehouse and Union Parishes - From the Arkansas State line to Bayou Bartholomew.

Figure 20-5 (Continued). Louisiana's Scenic Rivers.

Pearl Creek - Vernon Parish - From La. Hwy 111 at Burr Ferry to the Sabine River.

Pirogue Bayou - St. Bernard Parish - From Bayou Dupre to New Canal.

Pushepatapa Creek - Washington Parish - From the confluence of East and West Fork near the Community of State Line, Louisiana to Cross Creek in the Pearl River swamp T 2 S - R 14 E Section 50.

Saline Bayou - Bienville, Winn, Natchitoches Parishes - From its origin near the Town of Arcadia, Bienville Parish T 18 N - R 5 W Section 19 to Hwy 156 in Winn Parish.

Six Mile Creek - Allen, Vernon Parishes - Includes the East and West Forks and begins at the southern boundary of Fort Polk Military Reservation (Lookout Road) to its confluence with Whisky Chitto Creek.
(12) Ten Mile Creek - Rapides, Allen, Vernon Parishes - From the eastern boundary of Fort Polk Military Reservation (Lookout Road) to its confluence with Whisky Chitto Creek.

Spring Creek - Rapides Parish - From its origin near Otis T 3 N - R 4 W Section 27 to Cocodrie Lake T 1 S - R 1 W Section 7.

Saline Bayou - Catahoula, LaSalle Parishes - From Saline Lake to Larto Lake.

Tangipahoa River - Tangipahoa Parish - From the Louisiana-Mississippi State line to Lake Pontchartrain.

Tchefuncte River and its tributaries upstream of the confluence with Bogue Falaya - Washington, Tangipahoa, St. Tammany Parishes - From its origin in Tangipahoa Parish T 2 S - R 9 E Section 6 to Bogue Falaya and the main stream only from Bogue Falaya to Lake Pontchartrain in St. Tammany Parish.

Terre Beau Bayou - St. Bernard Parish- From Bayou Dupre to the New Canal

Tickfaw River - St. Helena, Livingston Parishes - From the Louisiana-Mississippi State line to La. Hwy 42 at Springville.

Trout Creek - LaSalle Parish - From its origin near Hwy 8 at the community of Eden to its confluence with Little River.

West Pearl River - St. Tammany Parish - From the confluence of Wilson Slough and Bradley Slough to the point where East Mouth and West Mouth split around Hog Island near Lake Borgne.

Whisky Chitto Creek - Allen, Vernon Parishes - From the southern boundary of Fort Polk Military Reservation (Lookout Road) to the Vernon-Beauregard Parish line and from the Beauregard-Allen Parish line to the Calcasieu River.

Wilson Slough - St. Tammany Parish - From its origin as a distributary of the Bogue Chitto River to its confluence with Bradley Slough forming the West Pearl River.

Figure 20-5 (Continued). Louisiana's Scenic Rivers.

The permits are reviewed by the Department of Wildlife and Fisheries, Department of Environmental Quality, Department of Agriculture and Forestry, Department of Culture, Recreation, Tourism, and the Office of State Planning and Budget, and often other State and federal agencies.

20.3.4. Dam safety program

Construction of or modification to a dam requires a permit from LADOTD Public Works and Intermodal Transportation Division. “Dams” are defined in Title 70, Part XIII of Louisiana Administrative Code. Generally, all barriers that are 6 feet or more in height with a maximum storage capacity of 15 acre-feet or more must be submitted for review. The height is measured from the downstream toe of the barrier or the lowest elevation of the outside limit of the dam to the top of the dam.

This permitting process may be reduced if the dam meets the requirements of the National Resources Conservation Service “Pond Standard 378” in the *National Handbook for Conservation Practices* and if the NRCS staff provides the design, layout, construction inspection, and certifies that the structure meets “Pond Standard 378.” The NRCS will then agree to periodic inspection of the dam.

The LADOTD conducts periodic inspections of all other dams in the program. Owners of these structures are responsible for periodic inspections and submittal of written reports to the department. The owner is responsible for notifying the Department if the condition or safety of the dam is of concern. LADOTD has the ability to require repairs or remediation as necessary.

20.3.5. Highways

Highways connect one community with another and this usually involves crossing a river. There will be many instances where a highway or bridge must be constructed in a floodplain. While all other State agencies must comply with the local flood damage prevention ordinance, highways are exempt by State law (RS 38:84.1). However, LADOTD has developed procedures to coordinate construction activities with local concerns.

When there is a pending highway project, LADOTD or a consultant contacts the local officials through a “Solicitation of Views” letter. At this time, the community has the opportunity and responsibility to advise the agency or consultant of any floodplain concerns and special local regulations.

20.4. Federal Agencies

20.4.1. DHS/FEMA

DHS/FEMA does not directly permit development projects. The agency's role is to set minimum standards for local regulations and to provide assistance to local officials.

DHS/FEMA is involved in map revisions and requests for map revisions often go hand-in-hand with development proposals, especially larger ones. Map revision procedures are explained in Section 10.

20.4.2. Executive Order 11988

Executive Order 11988 sets minimum requirements for federal agencies to follow when they build in the floodplain, fund projects in the floodplain, or are otherwise responsible for floodplain development. The Order does not prohibit floodplain development. It requires agencies to "consider alternatives to avoid adverse effects and incompatible development in the floodplains."

Each agency publishes its own regulations on how it administers the requirements of Executive Order 11988. Most agencies follow guidelines published by the U.S. Water Resources Council (which has since been disbanded).

Federal guidelines recommend an eight-step decision making process. The numbering of Steps 1 through 8 does not mean that the steps have to be followed sequentially. As information is gathered throughout the decision-making process, and as additional information is needed, reevaluation of lower-numbered steps may be necessary.

The following description of the eight-step decision making process has been taken from DHS/FEMA's regulations, 44 CFR Part 9, Section 9.6. Most agencies have similar language:

> Step 1. Determine whether the proposed action is located in a wetland and/or the 100-year floodplain (500-year floodplain for critical actions); and whether it has the potential to affect or be affected by a floodplain or wetland.
>
> Step 2. Notify the public at the earliest possible time of the intent to carry out an action in a floodplain or wetland, and involve the affected and interested public in the decision-making process.
>
> Step 3. Identify and evaluate practicable alternatives to locating the proposed action in a floodplain or wetland (including alternative sites, actions, and the "no action" option). If a practicable alternative exists outside the floodplain or wetland, DHS/FEMA must locate the action at the alternative site.

Step 4. Identify the potential direct and indirect impacts associated with the occupancy or modification of floodplains and wetlands and the potential direct and indirect support of floodplain and wetland development that could result from the proposed action.

Step 5. Minimize the potential adverse impacts and support to or within floodplains and wetlands to be identified under Step 4; restore and preserve the natural and beneficial values served by floodplains; and preserve and enhance the natural and beneficial values served by wetlands.

Step 6. Reevaluate the proposed action to determine first, if it is still practicable in light of its exposure to flood hazards, the extent to which it will aggravate the hazards to others, and its potential to disrupt floodplain and wetland values and second, if alternatives preliminarily rejected at Step 3 are practicable in light of the information gained in Steps 4 and 5. DHS/FEMA shall not act in a floodplain or wetland unless it is the only practicable location.

Step 7. Prepare and provide the public with a finding and public explanation of any final decision that the floodplain or wetland is the only practicable alternative.

Step 8. Review the implementation and post-implementation phases of the proposed action to ensure that the requirements … are fully implemented. Oversight responsibility shall be integrated into existing processes.

20.4.3. United States Coast Guard – Bridge Permits

Permits are required from the U.S. Coast Guard for all bridges that cross navigable waterways of the United States. Permits are issued by the Eighth District office in New Orleans (Section 31).

20.4.4. Section 404 permits

The objective of the Section 404 permit program is to protect the “waters of the United States,” specifically wetlands, lakes, and steam channels. Any filling that affects these waters needs a 404 permit.

Section 404 permits are issued by the U.S. Army Corps of Engineers with advice and comment by the U.S. Environmental Protection Agency. There are four Corps of Engineers districts in Louisiana (Figure 20-7 and Section 31.2.4). Section 20.2.3 discusses how the 404 program is coordinated with the State’s coastal zone management program in the coastal zone.

Section 9 of the Rivers and Harbors Act of 1899 (33 U.S.C.A. 401-406) gives the U.S. Army Corps of Engineers permit authority to approve the planning and placement of dams or dikes across navigable waterways. Section 10 is the authority to issue permits for structures or alterations of any navigable waters. Alterations include the excavation from or depositing of material in navigable waters or other actions that affect the course, location, condition, or capacity of navigable waters. Section 9 and 10 permits are usually handled in conjunction with the Section 404 permit.

Section 404 of the Clean Water Act (33 U.S.C.A. 1251-1376) applies to the discharge of dredged or fill material into waters of the United States (33 CFR Part 323). Activities exempted from the permitting include normal farming and ranching, silviculture, farm and stock ponds, and farm and forest roads. However, if an action is designed to change adjacent land uses or convert wetlands to dry lands, the exemptions do not apply.

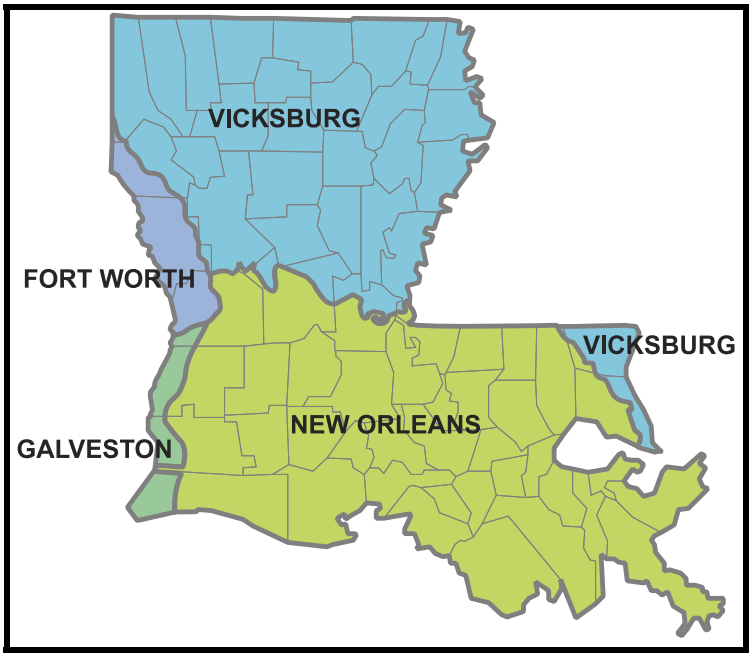


Figure 20-6. Corps of Engineers Districts in Louisiana.

Day-to-day administration of the Section 404 permit program is vested with the U.S. Army Corps of Engineers. However, the Environmental Protection Agency (EPA) has oversight and veto ability. A standardized procedure has evolved for processing permit applications. The floodplain administrator should obtain the most recent permit application booklets and guidance documents from the U.S. Army Corps of Engineers to help permit applicants.

A Section 404 permit applies to most wetland related activities, whether large or small. Although the U.S. Army Corps of Engineers' goal is "issuance or denial within 60 days of receipt of a complete application," this only happens for very small projects. In reality, most permit applications take significantly longer than 60 days to process for many reasons, including an incomplete application, insufficient data from the landowner, poorly designed projects, over commitment of U.S. Army Corps of Engineers personnel, changing federal and state standards and guidelines, possible objections from federal or state agencies, and negative comments resulting from public review.

Permit processing on a large project will probably take a minimum of 12 months. A proposed project that does not build on extensive planning, design, and engineering will take from 18 months to more than 36 months, and after all the effort and expense there is no guarantee that a permit will be issued.

The Environmental Protection Agency is a partner in the federal permitting process. Section 404(c) of the Clean Water Act gives EPA the authority to veto a Section 404 permit if activity has unacceptable adverse impacts on municipal water supplies, shellfish beds, fishery areas (including spawning and breeding areas), wildlife, or recreational areas.

When reviewing Section 404 permit applications EPA uses criteria known as the 404(b)(1) guidelines (40 CFR 230.1-.77). According to the regulations, no 404 permit will be issued if a project:

- Violates the water quality standards of the State or the Clean Water Act
- Jeopardizes threatened or endangered species
- Violates any marine sanctuary
- Significantly degrades U.S. waters
- Has significant adverse effects on human health and welfare
- Causes pollution or loss of habitat
- Significantly affects recreational, aesthetic, and economic values of an area
- Has practical alternatives available to the project sponsor
- Steps have not been taken to minimize unavoidable impacts to the environment

More than the U.S. Army Corps of Engineers and EPA are involved in the Section 404 permit process. The National Marine Fisheries Service (Department of Commerce) and the Fish and Wildlife Service (Department of the Interior) have comment responsibility on projects. While both are conservation agencies, the National Marine Fisheries Service focuses on protecting marine fisheries and their habitat, while the Fish and Wildlife Service directs its attention to non-marine fisheries and wildlife habitat.

The two agencies may have conflicting recommendations and views about coastal projects as a consequence of similar missions but different spheres of responsibility. Permit applicants should contact both agencies early on in the process to learn of their concerns and recommended solutions. Compromises are possible, but they will take time to develop.

Advice on 404 Permits

Start with the appropriate U.S. Army Corps of Engineers' District Office (Section 31), but be sure to contact the other agencies that will review the permit. Here is some advice from the U.S. Army Corps of Engineers:

Talking early to government representatives results in a more organized project that draws them into solving problems. Always contact Federal and State regulatory agencies and request the most recent instructions and application forms, and meet with the agency personnel at the initiation of their project. Procedures change as laws are enacted and regulations refined. Personnel move internally or to other jobs and new faces bring different interpretations to the permit procedures. What applied last year or even last month may be obsolete today.

Listen to what is said and for what is not said rather than extracting what you want to hear. Attentiveness saves time, money, and frustration. Agency reviewers will critique the project and identify critical issues and conflicts that must be addressed or resolved. But be careful. Don't over interpret what is presented. Talk often and talk honestly because once you lose their trust, the permit process will extend beyond the normal review time waiting for additional studies, data, and guarantees.

20.4.5. Fish and Wildlife Service

The Fish and Wildlife Service (FWS) is in the U.S. Department of the Interior. It administers several programs to protect marine and land animals and plants. The two programs that most affect floodplain permits are the Section 404 program and the Endangered Species Act. For the former, the Service is an advisor to the Corps on 404 permits, which is explained in the previous section.

The Endangered Species Act of 1973 gave FWS authority to regulate certain activities that can adversely affect endangered and threatened species of animals and plants. These include prohibiting "taking" (e.g., hunting or trapping) and selling endangered animals. Such activities require permits from FWS. The Service uses the term "incidental take" to describe actions that may harm protected species that result from an otherwise legal activity. An example is developing land that is also habitat for a listed species.

Incidental take permits are required when non-federal activities will result in the "take" of threatened or endangered species. An incidental take permit allows for development and the incidental take of the listed species that may result from the project. To offset any such take, the developer agrees to follow conservation measures.

An application for an incidental take permit must include a habitat conservation plan that shows the project will minimize and mitigate the effects on the habitat. Getting a permit is contingent upon obtaining any required state permit.

Section 21.

Appeals and Variances

Contents

21.1. Appeals and Variances

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

21.1.1. Appeals

Ambiguous language or differing interpretations can lead the applicant and permit office to disagree. The community's ordinance should have a process for referring these disagreements to a board, such as a Board of Zoning Adjustment, Board of Building Standards and Appeals, or a City Council, which will interpret the ordinance and settle the dispute.

21.1.2. Conditional or special uses

Some regulations use the conditional use, special use, or special exception process to allow some use of the floodplain. This process allows a community to review the project completely and place special conditions on the permit.

An example of conditional uses in a floodway would be a carnival, which could be limited in the number of days it is open, or a marina, which could be limited in size and use of structures. A zoning board or other governing board is responsible for reviewing such requests.

Any time a community varies from the letter of its DHS/FEMA-approved ordinance, staff should check with LADOTD and DHS/FEMA to ensure that the community's standing in the National Flood Insurance Program will not be jeopardized.

21.1.3. Variances

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

A variance can mean that the minimum standards of the National Flood Insurance Program (NFIP) may not be met by a project due to a special local circumstance. Because of this, most of Section 21 is devoted to variances.

21.1.4. Boards

In all three of the above cases, the applicant submits a request to a knowledgeable board of arbiters. These boards do not have authority to change the ordinance; they just apply or interpret the ordinance's provisions. They may or may not have the authority to make a final decision. If not, they make recommendations to the governing board or police jury for the final decision.

21.2. Variance Guidance

21.2.1. Background

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

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

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

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

Characteristics that might justify a variance include a small irregularly shaped lot or a parcel with an unusual geologic condition below ground level. It is difficult, however, to imagine any physical characteristic that would result in a hardship sufficient to justify issuing a variance to a flood elevation requirement. Further, there are usually alternative ways to construct a compliant building even in these situations.

The need for the variance also cannot be caused by an action of the applicant. For example, if the owner of the parcel subdivides it into two parcels, one completely outside of the floodway and one completely in the floodway, the community should not grant a variance to construct a structure in the floodway that does not meet its floodplain management requirements.

The community should grant variances based only on a structure-by-structure review. Variances should never be granted for multiple lots, phases of subdivisions, or entire subdivisions.

The issuing of variances is guided strictly by the requirements of the community's ordinance and state and federal regulations. Variations to the flood protection regulations should be avoided and only issued because of special situations.

21.2.2. NFIP requirements

The NFIP regulations do not address appeals, special uses, or conditional permits. However, because variances may expose insurable property to a higher flood risk, NFIP regulations set guidelines for granting them. The guidelines, which are designed to screen out situations in which alternatives, other than a variance, are most appropriate, appear in 44 CFR 60.6(a). These guidelines should be incorporated into the community's ordinance.

A review board hearing a variance request must not only follow procedures provided in the ordinance, it must consider the ordinance's criteria in making its decision. When the ordinance is followed, few situations qualify for a variance. Figure 21-1 provides a handout to guide the review board members.

If the ordinance includes things that are not minimum NFIP requirements, DHS/FEMA expects the community to enforce its complete floodplain management program. Issuing variances is not a good practice, even variances from a community's own higher local standard. DHS/FEMA considers a variance to the standards as a variance to the flood damage prevention ordinance.

If a community makes a practice of varying from its ordinance's standards, it could be subject to the sanctions for noncompliance (Section 3.5.5). If the community makes a practice of varying from its own higher standards (even though the projects meet the NFIP criteria), DHS/FEMA recommends that it revise its regulations rather than enforce them inconsistently.

21.2.3. Variance concerns

Local authority: A local government does not have the authority to vary from the requirements of a U.S. Army Corps of Engineers permit or other state or federal agency.

Public safety and expense: Flood damage prevention ordinances are intended to help protect the health, safety, well-being, and property of local citizens. Variances must not create threats to public safety or nuisances.

Floodways: Because it would increase damage to other property owners, no variance within a regulatory floodway may be issued that would result in any increase in the base flood elevation (BFE) (44 CFR 60.6(a)(1)).

Figure 0-1. On the next page is a handout for a community's variance review board. It may be photocopied and used locally.

Should a Floodplain Variance Be Issued?

A city or parish is authorized to approve variances from the letter of its floodplain regulations. A variance is a grant of relief to a person from the requirement of the community's ordinance when specific enforcement would result in unnecessary hardship.

A variance, therefore, permits construction or development in a manner otherwise prohibited by the community ordinance. Variations to flood protection regulations should be avoided and only issued because of special situations.

When considering a variance application, ask the following 11 questions:

1. Can the project be built in a flood-free location?
2. Is the variance requested on land that is unique? Each variance request must be considered on a structure-by-structure and lot-by-lot basis. The community must consider if the lot is unique. If it is not unique, other similarly situated land would also be eligible for a variance for the same reasons.
3. Would failure to grant the variance result in exceptional hardship to the applicant? The key word is " exceptional." For example, physical handicaps and financial hardship do not qualify. Here are some examples of what does *not* meet exceptional hardship:

   – The land value will drop

   – The owner does not have enough money to comply

   – The house will be elevated and will look different from the neighbors

   – The homeowner cannot walk up steps into an elevated addition

   Remember, granting a variance because of a physical hardship may not only put the occupants at additional risk, but first responders as well.
4. Is the property in a floodway? If it is, no variance can be issued if any increase in flood levels would occur during the base flood. The developer's engineer must provide the data to the satisfaction of the floodplain administrator's staff.
5. Will granting the variance increase flood heights and velocities?
6. Will granting the variance increase the threat to public safety? Can people get to safety during a flood? Can emergency vehicles reach the property during flooding? Will there be hazardous materials or loose objects that will be swept downstream onto other properties?
7. Will the water supply and sanitation systems still be able to operate and prevent disease, contamination, and unsanitary conditions?
8. Will granting the variance result in extraordinary public expense? Every new floodplain building adds to a community's responsibility during a flood. Consider the costs of maintenance and repair of public utilities, streets, and bridges.
9. Will granting the variance create nuisances, or cause fraud on or victimization of the public?
10. Is the project compatible with existing local plans, laws, or ordinances? Is it compatible with existing and anticipated development?
11. Will the variation be the minimum necessary? A variance is a request to vary from the rules, not to ignore them. Any variance should allow only minimum deviation from local requirements.

Fraud and victimization: Variances must not defraud or victimize the public. Any buildings permitted below the BFE face increased risk of damage from floods Future owners of the property and the community will be subject to all the costs, inconvenience, danger, and suffering that the increased flood damages may bring. Future owners may purchase the property unaware that because of a variance it is subject to potential flood damages and can only be insured at high rates.

The review board's work should conclude with written findings of fact that address each of these 11 questions. If the review board finds that a variance is deserved, the applicant should be notified (in writing) that granting the variance will result in:

- Increased risks to life and property
- Increased flood insurance premium rates, up to $25 per $100 of coverage. In many instances, the variance-induced rates will be so high as to make the building essentially uninsurable because the owners cannot afford the premium.

Points to remember:

- A local variance does not mean that the applicant receives a variance from flood insurance premium rates.
- The community does not have the authority to vary from the requirements of a state or federal agency.
- The community does not have the authority to approve a project within a regulatory floodway that will result in any increase in the BFE.
- A variance is a request to vary from the rules, not to ignore them. Any variance should allow only minimum deviation from the requirements.
- Record the findings and conditions with the parish deed records so future owners or occupants will be told of the terms and conditions.

Minimum variation necessary: A variance is a request to vary from the rules, not to ignore them. Any variance should only allow minimum deviation from the requirements. As most ordinances in Louisiana do not require homes to be built higher than the base flood elevation, variances should be uncommon. Any structure built below the BFE would have a drastically increased cost of flood insurance (Section 21.3.1).

In considering variances, the review board should use technical staff expertise and recommendations from the building, planning, zoning, or engineering departments. The local staff should consider varying other requirements in order to provide the necessary flood protection. For example, it may be more appropriate to issue a variance to the front yard setback requirement to get a building out of the floodplain.

21.2.4. Hardship

The concept of unnecessary hardship is the cornerstone of all variance standards. Strict adherence to this concept across the country has limited the granting of variances.

The applicant has the burden of proving unnecessary hardship. Reasons for granting the variance must be substantial and the proof must be compelling. The claimed hardship must be exceptional, unusual, and peculiar to the property involved.

Financial hardship, inconvenience, aesthetic considerations, physical handicaps, personal preferences, or the disapproval of one's neighbors do *not* qualify as exceptional hardships. Nor do problems caused by previous action of the applicant or property owner.

The review board must weigh the applicant's plea of hardship against the purpose of the ordinance. Given a request for a variance from floodplain elevation requirements, the board must decide whether the hardship the applicant claims outweighs the long-term risk that the owners and occupants of the building would face. Additionally, the board must consider the community's need for strictly enforced regulations that protect its citizens from flood danger and damage.

When considering variances to flood damage prevention ordinances, local boards continually face the difficult task of having to deny requests from applicants whose personal circumstances evoke compassion, but whose hardships are simply not sufficient to justify deviation from community-wide flood damage prevention requirements.

These problems can be resolved through other means, even if the alternatives to a variance are more expensive or complicated than building with a variance, or if they require the property owner to put the parcel to a different use than originally intended, or to build elsewhere.

The following are common claims of hardship, but they are *not* good and sufficient causes for a variance:

- The value of the property will drop somewhat
- It will be inconvenient for the property owner
- The owner doesn't have enough money to comply
- The property will look different from others in the neighborhood
- The owner began building without a permit and now it will cost a lot to bring the building into compliance

21.2.5. Hardship example

A property owner seeks a variance because he would have to spend several thousand dollars to elevate a house to comply with the ordinance and several thousand more to build a wheelchair ramp or an elevator to provide access for a handicapped member of the family.

While financial considerations are important to property owners and the needs of a handicapped person must be accommodated, these difficulties do not put this situation in the category of "exceptional hardships" because:

- The characteristics that result in the claimed hardship do not pertain to the property but are personal
- A variance is not necessary to provide day-to-day access to the building, which can be provided by building a ramp or elevator
- Having a handicapped person occupy a floodprone dwelling raises a critical public safety concern to both the residents and emergency responders

If a variance is granted and the building is constructed at grade, the handicapped or infirm person must leave when floodwaters begin to rise, yet he or she may need help to do so. This poses an unnecessary danger to the handicapped person and places an extra demand on the community's emergency services personnel, who may be called upon to rescue the resident in the event of a flood.

On the other hand, if the building is properly elevated, the handicapped person either can be evacuated or can survive the flood by remaining at home safely above the floodwaters.

In effect, the variance would not relieve the property owner of his difficulty, but probably only postpone and perhaps ultimately increase it. It would not help the community, either, as the building would be susceptible to damage long after the current owners are gone.

It would be more prudent for the owner and the community if the variance was denied and the home was built at the proper elevation with handicapped access. This would ensure the safety of all family members when floodwaters rise and protect the property owner's and the community's investment in the property.

21.3. Related Issues

21.3.1. Flood insurance rates

While a variance may allow deviation from building standards specified in a local ordinance, flood insurance rates and the flood insurance purchase requirement—which must be enforced by lending institutions—cannot be waived.

This can create severe financial consequences for a property owner because insurance rates for a building built below the BFE can be substantially higher than rates for elevated buildings. A variance from elevation requirements—the most common kind of variance requested—increases the risk to a building, which is reflected in higher annual insurance premiums.

If a variance is requested to construct a building below the BFE, the floodplain administrator must notify the applicant (in writing) that granting the variance will result in increased flood insurance premium rates, up to $25 per $100 of coverage. In many instances, the variance-induced rates will be so high as to make the building essentially uninsurable because the owners cannot afford the premium.

The original owner who applied for a variance may not care, but if approved, the impact of the variance may matter a great deal to subsequent potential owners who cannot afford the property's high insurance rates. The result may be owner abandonment; the community could be left with a vacant, flood-damaged, and essentially uninsurable building.

Figure 21-2 shows example premiums for a single-family home protected to different flood levels. If a variance were granted to allow a new home (or substantially damaged or substantially improved home) to be 2 feet below the base flood elevation, the rates would be at least five times greater than if the building met the ordinance's requirements.

Building Exposure	Premium
In the Special Flood Hazard Area (AE Zone)	
Pre-FIRM ("subsidized") rate	$1,707
Post-FIRM (actuarial) rates	
2 feet above the base flood elevation	$458
1 foot above the base flood elevation	$661
At the base flood elevation	$1,185
1 foot below the base flood elevation	$4,451
2 feet below the base flood elevation	> $5,000
Outside the Special Flood Hazard Area	$1,085
Premiums are for $150,000 in building coverage and $75,000 in contents coverage for a one-story house with no basement and a $500 deductible. Rates are as of May 1, 2008. Premiums are lower in Community Rating System communities.	

Figure 0-2. Example flood insurance premiums.

There are no published insurance rating tables for a building with the lowest floor more than 2 feet below the BFE. In those cases, the insurance agent has to conduct a "submit for rate." A submit for rate is a procedure in which the insurance company collects more information about the structure and the risk and calculates a site-specific premium, which would be well more than $5,000 per year.

21.3.2. Historic buildings

A variance may be issued for the reconstruction, rehabilitation, or restoration of historic structures if the variance is the minimum necessary to preserve the historic character and design of the structure. Historic structures are defined in Section 13.3.2.

Changes to the structure must not destroy or alter the characteristics that made it a historic building. The variance review process should ensure that whatever mitigation measures can be taken to reduce future flood damage must be required, such as elevating an air conditioner or using flood-resistant materials.

21.3.3. Functionally dependent use

A variance may be issued for new construction, substantial improvements, and other development necessary for the conduct of a functionally dependent use. A functionally dependent use is one that must be located or carried out close to water.

The term only includes docking facilities, port facilities that are necessary for the loading and unloading of cargo or passengers, and ship building and ship repair facilities, but it does not include long-term storage or related manufacturing facilities. Those activities are not dependent on a waterside location—they can be conducted outside the floodplain.

A functionally dependent use variance could be issued provided that:

- There is good and sufficient cause for providing the relief
- The variance will be the minimum necessary to provide relief
- The variance does not cause a rise in the base flood level within a regulatory floodway

The structure or other development must be protected by methods that minimize flood damage, such as using flood resistant materials, elevating mechanical equipment, locating offices above the base flood elevation, using ground fault interrupt electrical circuits, and developing an emergency plan to remove contents before a flood. The project cannot create any additional threats to public safety.

21.3.4. Records

The community must keep a record of all variances and the reasons why they were granted. These are usually prepared as a “findings of fact” document.

The “findings of fact” document must show that:

- A careful process was followed
- The rationale for granting the request is clearly stated

- The board reviewed all of the criteria for granting or denying a variance so the decision does not appear arbitrary

The records and the findings are subject to DHS/FEMA review during a Community Assistance Visit.

The records must include a copy of the written notification to the applicant that the issuance of a variance to construct a building below the BFE will result in increased flood insurance premium rates as high as $25 per $100 of coverage and such construction below the base flood elevation increases risk to life and property.

The variance findings, conditions, and authorization should be recorded in the parish deed records. This provides a way of permanently notifying future or prospective owners about the terms and conditions of the variance.

Section 22. Inspections

Contents

22.1. Types of Inspections

The job of the floodplain administrator is not finished when the permit is issued. Follow-up conversations and inspections are vital to ensure that the applicant adheres to the requirements of the permit. Taking a hands-off approach to construction can create many problems for the project's owners and the community.

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

A series of at least three inspections is recommended for every project, especially any project that involves construction of a building:

1. Pre-construction inspection

2. Elevation inspection

3. Final inspection

The pre-construction inspection allows the floodplain administrator to ensure that the development is located correctly before construction begins, thereby avoiding a floodway encroachment or unpermitted fill in the floodplain. The elevation inspection, if timed correctly, can prevent a very expensive error if the lowest floor is placed below the flood protection level.

The final inspection ensures that all permit requirements have been met and all necessary certificates are in the community's files before the development is approved for use or occupancy. A checklist for this recommended approach is included as Figure 22-1.

It is also recommended that the administrator have some way of withholding approval—a certificate of occupancy, for example—if the permit conditions are not met. The certificate would be issued upon final approval. If a certificate is not issued, some communities withhold services such as water or power.

Figure 22-1. On the next page is an example inspection checklist. This may be photocopied and used locally.

FLOODPLAIN INSPECTION REPORT

Date: _____Inspector:_____

Permit #: _____Applicant: _____

Type of inspection: ☐ Pre-construction* ☐ Elevation ☐ Final

Pre-Construction Inspection*

Office Work

☐ Review permit file before going to the field

☐ Check for any necessary state or federal permits

Pre-construction field inspection

☐ Locate floodplain and floodway boundaries on the ground

☐ Check setbacks from lot lines, shoreline, and channel banks

☐ Verify no encroachment planned in the floodway

Elevation Inspection

☐ Check elevation of the lowest floor. Is it at or higher than the permitted elevation?

☐ YES, development continues ☐ NO, TAKE IMMEDIATE ACTION

☐ If fill is used, check fill location, compaction, and side slopes

Final Inspection

☐ Check that foundation and floor elevation have not been altered

☐ Obtain Elevation or Floodproofing Certificate for the files

☐ Check use of enclosure(s) below the BFE and the number and size of openings

☐ Check that the air conditioner, ductwork, etc. are elevated at or above the lowest floor elevation

☐ Check fill and grading for any floodplain or floodway encroachment

☐ For manufactured homes, check anchoring

INSPECTION APPROVED ☐ YES ☐ NO, SEE NOTES ON OTHER SIDE

* If no pre-construction inspection was done, inspect these items at the time of the elevation inspection.

22.2. Pre-construction inspection

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

The following should be checked during the pre-construction inspection:

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

If the building, filling, etc., as staked out are in violation of the approved plans or of the ordinance requirements, the administrator must tell the developer to make revisions. The project must not be allowed to proceed until the administrator has gone back and verified that it is in compliance.

The floodplain administrator should take photographs, document the problem in writing, and issue a stop work order to the builder until the problems have been corrected.

Many communities use a variation of the pre-construction inspection by requiring the developer to submit a “first shot EC.” This Elevation Certificate, signed by a surveyor, provides professional documentation of the zone and BFE determinations and existing grade elevation. This can help prevent the applicant from misunderstanding the building elevation requirements.

22.3. Elevation Inspection

This inspection is for a project involving a new building or addition to a building. It is scheduled just before installation of the lowest floor. The floodplain administrator needs to ensure that the lowest floor will be built at the height stipulated in the permit application and that the foundation is the type specified in the plans.

22.3.1. Timing

The type of foundation dictates the timing of the inspection:

- If the building is on a slab foundation, the inspection is best done when the forms are placed. The floodplain administrator can check the proposed floor elevation by checking the elevation of the top of the forms. If the forms are high enough, the pouring of the slab can be approved.
- If the building is on an elevated foundation (crawlspace, piles, etc.), the inspection is best done when the foundation is completed. If the top of the foundation is high enough, the administrator can approve placement of the floor. Make sure the crawlspace floor is higher than the lowest adjacent grade, or the area will be considered a basement under National Flood Insurance Program (NFIP) rules (Section 11.3).
- If the building is to be floodproofed and the floodproofing technique is easy to identify, such as a reinforced concrete stem wall up to the base flood elevation, this inspection should be conducted when that portion of the project is completed.

Ensuring a structure is properly elevated is key to the entire regulatory process. If the structure is not properly elevated, the permit process is a wasted effort. Therefore, an inspection at the point of initial construction, where changes to the height of the foundation can be made without major difficulty, is best. Once the foundation is poured or laid, it can be very expensive for the property owner to change the building location or the elevation of the lowest floor.

22.3.2. Checking elevations

The floodplain administrator can confirm the floor elevation at this stage in one of two ways:

More information on checking elevations is provided in Section 22.6.

1. The administrator can have the builder certify the floor elevation. This must be done by a surveyor or engineer.

2. The floodplain administrator can do the checking. Here's how:

    - Before construction or sometimes as part of the pre-construction inspection, the developer's surveyor or the community's engineer shoots an elevation reference

mark to a nearby stationary object such as a tree or telephone pole. The mark should be at the same elevation as the height to which the lowest floor should be elevated.

- During the elevation inspection, the floodplain administrator can use a hand level to determine whether the lowest floor will be as high as the reference mark. This will provide a rough estimate that the building will be close to the correct elevation. A hand level will not provide accurate elevations, so if in doubt, the floodplain administrator should obtain a survey.

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

22.3.3. Other checks

During the elevation inspection, the administrator should also check:

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

22.4. Final Inspection

22.4.1. Purpose

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

- Ensure that the foundation and floor elevations have not been altered since the second inspection
- Obtain an as-built elevation or floodproofing certificate
- Verify that enclosures below the lowest floors have adequate openings
- Ensure that nothing subject to flood damage, such as an air conditioning unit or ductwork, has been located below the lowest floor
- Verify that there are no items that were not in the original permit
- Check for floodway encroachments
- Check the anchoring system used in securing manufactured homes

It is a good idea to take photographs to document compliance. They should be noted with the date and circumstances when they were taken and kept in the permit file. Such photographs can be useful if the property owner later makes alterations to the building without obtaining permits (such as modifying the enclosure below the BFE).

22.4.2. Certificate of occupancy

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

This certificate allows the owner to move into the newly constructed building or addition. A new building usually cannot be sold until the seller has this certificate. Some utility companies will not start service until the certificate is presented. Therefore, if the project does not comply with the permit requirements, withholding the certificate of occupancy can prevent the owner from using or occupying the building.

Before a certificate is completed, the floodplain administrator must make sure that all of the necessary documents have been received and checked. These include an elevation certificate and other forms noted in Section 24.

22.5. Future Inspections

22.5.1. Compliance inspection

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

The floodplain administrator should periodically drive through floodplain areas, checking to ensure that the property continues to remain in compliance. Property owners are often not aware of permitting requirements for additions and improvements. Later inspections are particularly important when a structure contains an enclosure below the lowest floor. Such areas can be easily modified and made into habitable spaces, in violation of the ordinance.

In some cases, the administrator may want to condition issuance of a permit or certificate of occupancy on being allowed to make future inspections. An example of this would be for the nonconversion agreement discussed in Section 11.3.5.

If the administrator finds an unpermitted activity, he or she needs to take appropriate action to bring the structure back into compliance. This may mean requiring the homeowner to remove the unpermitted work or restoring an enclosure below the BFE to its original condition.

22.5.2. Post-damage inspection

After a flood, fire, tornado, or other natural or man-made damage, the community has an obligation to inspect floodplain buildings. The floodplain administrator should move quickly as most homeowners are quick to begin their repairs. Flyers should be distributed during this inspection, letting property owners know what type of repair work requires a building permit.

The floodplain administrator must determine if the structure has been "substantially damaged" (Section 14). In general, if the flood crested 2 feet above a building's adjacent grade, the administrator should carefully check the building's damage.

Section 27 discusses actions to take in the event of a flooding disaster. This information also applies to other disasters. A sample letter to the property owner and an inspection checklist is provided.

22.6. Checking Elevations in the Field

This section explains how elevations are shot and checked in the field. While a local permit official may not feel comfortable shooting elevations for regulatory purposes, this section shows what is involved and what a surveyor does.

Note: These are basic instructions for use with basic tools. Today's surveyors usually use Global Positioning System (GPS) equipment that works differently, but these instructions are based on the same techniques.

Three pieces of equipment are needed: a level, rod, and record book. The first two can usually be found in the local street or highway department. If not, the consulting engineer or a neighboring community may loan one. If one is needed all the time, new levels can be purchased for as little as $400. (This cost can be recovered from permit fees.)

22.6.1. Starting elevation

Typically, the hardest part of field checking elevations is finding a point of known elevation from which to start. U.S. Geological Survey benchmarks are the best place to start but they can be several miles apart. Flood Insurance Studies (FIS) provide some reference marks (Sections 5.3.5 and 8.1.7).

The local engineer often keeps elevation records from sewer or street projects. (***Note:*** Make sure local records or benchmarks are based on the same datum as the flood elevation). A community with no known elevations should contact the U.S. Army Corps of Engineers for assistance.

22.6.2. Running the level

A two-person team is required. The second person could be the developer or someone else working at the site. This person places the rod on the starting elevation, i.e., a point where the elevation is known, such as a reference mark from a Flood Insurance Study. It is important for the person holding the rod to hold it plumb so that accurate readings can be obtained.

The permit official levels the instrument and reads the height where the cross hairs show on the rod. This is called the "backsight." Add this number to the starting elevation to produce "HI," or the height of the instrument (Figure 22-2).

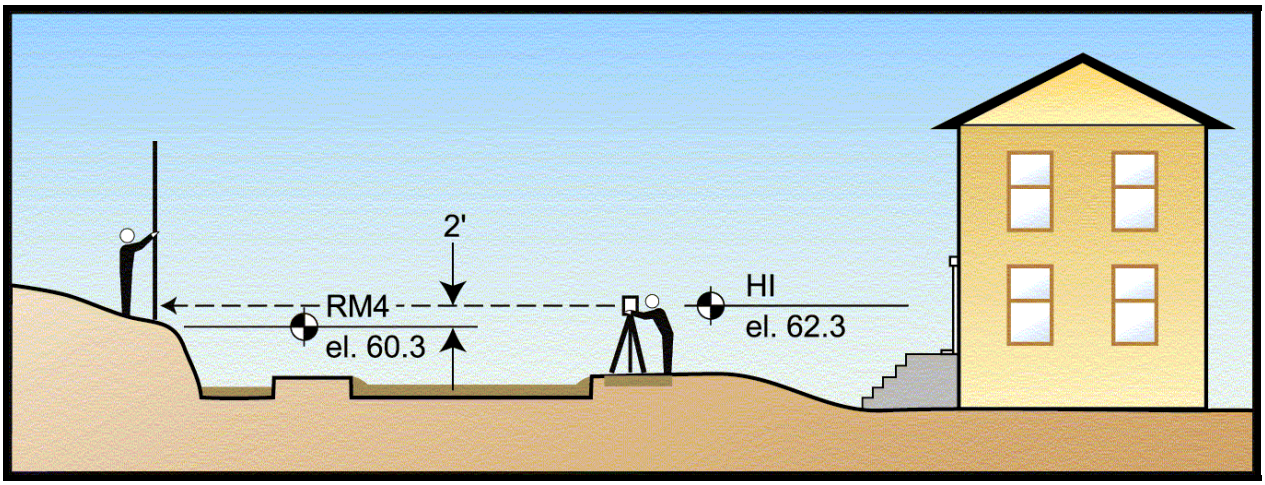


Figure 22-2. Starting elevation (60.3) + reading on rod (2 feet) = Height of Instrument (HI) = 62.3.

Next, the person with the rod places the rod on the reference floor (usually the front doorstep). Keeping the instrument level, the permit official turns it to the rod and reads the height. This height is called the "foresight." This number is subtracted from HI and gives the elevation of the lowest floor (Figure 22-3).

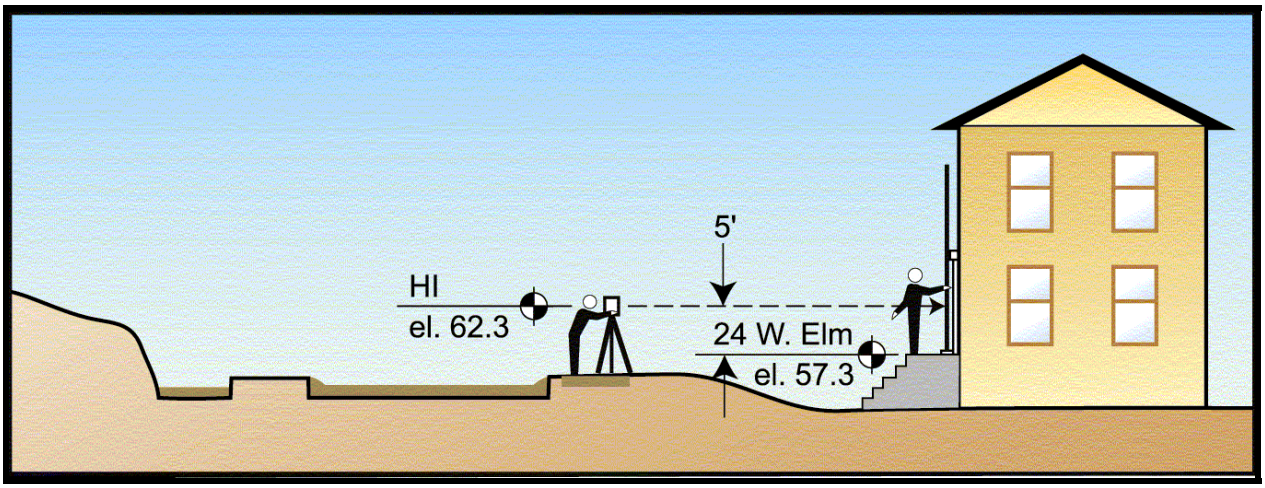


Figure 22-3. HI (62.3) minus foresight (5 feet) = lowest floor elevation (57.3).

22.6.3. Records

Figure 22-4 shows the standard way of recording the figures obtained. This method should be followed to assist engineers or other permit officials in understanding what was done. It is important for the records to be kept as detailed as possible,

PERMIT NO. 85-12-03-11 BUILDING OFFICIAL Bill D. Best
SITE 24 West Elm FLOOD PROTECTION ELEVATION 56.0

Station	back-sight	HI	fore-sight	Elevation	Description
RM 4	2'	62.3		60.3	Flood Insurance Study Reference Mark
24 West Elm			5'	57.3	Top of Floor at Front Door

Figure 22-4. Standard surveying record format.

especially the location of where the rod was placed, since this will enable later field checks to refer to the elevation records. This record should be kept with the permit records.

22.6.4. Running a turn

When the starting elevation is too far to see from the site to be shot, a "turn" must be run. This is simply shooting the foresight to a selected "turning point." The level is then moved and a backsight is read with the turning point acting as the new starting elevation (Figure 22-5).

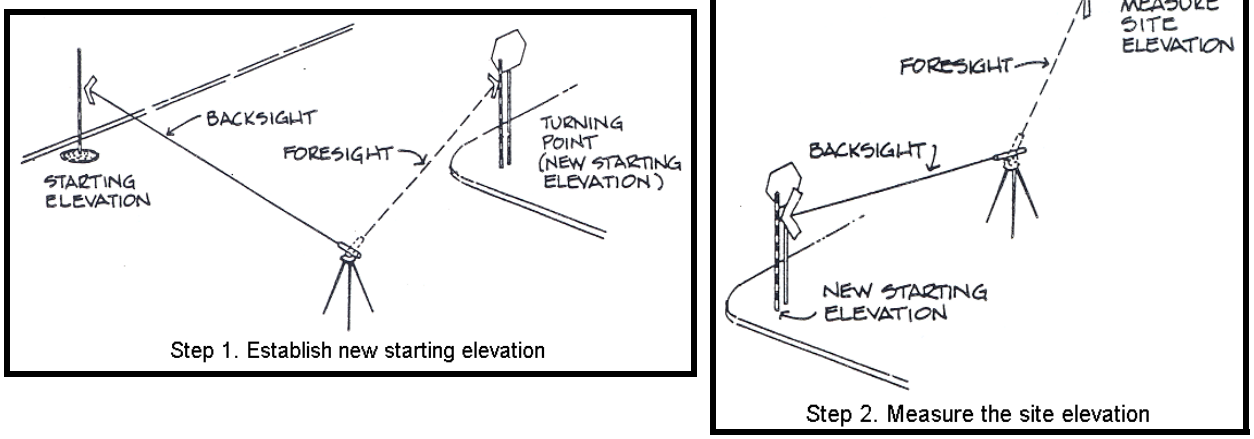


Figure 22-5 Running a turn

The permit official may want to help the developer (and future enforcement work) by running the level before the permit is approved. The BFE could be marked at the building site. This shows the developer how high the structure must be built and can be helpful if plans must be modified. It will also make checking the "as built" elevation much quicker. (See also the note on a "first shot EC" in Section 22.2.)

A thorough record must be kept describing the mark to ensure that it will not be moved (e.g., "nail with red tape 4 feet from ground in largest oak tree in northeast corner of lot = BFE = 65.2 feet NGVD").

22.6.5. Helpful hints

The following hints on checking elevations in the field come from experienced personnel:

- A level mounted on a tripod, although more expensive, is more accurate and easier to use.
- Use an "automatic level." It levels itself, saving time, particularly when there are many turning points.

- A light-weight fiberglass rod saves wear and tear on the person holding the rod. The ability to extend it up to 25 feet is a very useful feature in steep terrain and for long shots.
- High-power magnification is also helpful on long shots.
- Because there are never enough benchmarks, make an agreement with the highway department to be allowed to establish reference marks on pavements, bridges, etc.
- Maintain a reference file of area benchmarks with information from Flood Insurance Studies, State or parish highway departments, and utility companies. The community can receive CRS credit for this.

Section 23. Enforcement

Contents

23.1. Enforcement Actions

Adequate, uniform, and fair enforcement means two things:

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

To ensure that development is meeting these requirements, the floodplain administrator must monitor the floodplain, and where necessary, conduct an inspection of a property. He or she needs review authority to gain access to private property with the community's attorney.

If the floodplain administrator discovers development activities without permits or contrary to approved plans, he or she must enforce the ordinance. This section explores several methods for enforcing the ordinance.

23.1.1. Voluntary compliance

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

If the issue is protection of a building, the flood insurance rate table in Figure 21-2 can show how expensive insurance can be for a noncompliant structure. Even if the developer or the current property owner is not interested in flood insurance, future owners may want it and probably will be required to purchase it as a condition of a mortgage or loan. Expensive flood insurance may make the building very difficult to sell.

If voluntary efforts are not successful, there are other compliance tools.

23.1.2. Administrative steps

The first steps in enforcement involve what the floodplain administrator can do as an ordinance administrator. The following should be reviewed with the community's attorney before starting:

1. Contact the property owner or building contractor in person or by telephone to explain the concerns. Give them a deadline to respond.

2. Follow up with a written notice.

3. Notify the property owner (in writing, preferably via certified mail) of the nature of the violations, what to do to correct them, and a deadline. This is commonly called a "stop work order."

4. Post a violation notice on the property.

23.1.3. Other steps

If a problem is found during construction of a permitted project, the floodplain administrator has additional tools:

- If the violation is a serious one, or if the problem still exists after a follow-up inspection, the administrator can pursue legal action, in coordination with the community's attorney, such as obtaining a restraining order (Section 23.2.4).
- The certificate of occupancy can be withheld until the problem is corrected. Usually utilities will not be turned on and a bank loan will not be closed until the certificate of occupancy is issued.
- The floodplain administrator may be able to record the violation in the property's deed records. This will inform potential purchasers and "cloud the deed," making it hard for the owner to sell the property. This approach is more appropriate for new developments that are likely to be sold in the near future.
- The administrator can request a Section 1316 denial of flood insurance (Section 23.3).

23.1.4. Help

The community is not the only agency that wants floodplain management regulations enforced. Help in dealing with violations is often available from other sources. The first point of contact should be the Louisiana Department of Transportation and Development (LADOTD). State staff can help determine the best way to deal with a particular violation and provide expert advice.

If the project is in a wetlands area, development without a U.S. Army Corps of Engineers permit may be a violation of federal law. If it affects the coastal zone, it may be a violation of state coastal regulations. A review of Section 20 can identify other programs and agencies that might be interested in discussing mutual enforcement actions.

23.2. Legal Recourses

23.2.1. Coordination with the attorney

If the administrative measures reviewed in the preceding section do not bring results, the floodplain administrator should discuss the next steps with the community attorney. Generally, the attorney will write a letter, listing the violations and how the owner can comply.

The administrator can help the attorney by having complete records of all correspondence and meetings with the person accused of the violation. There should be dated photographs showing the violation. The floodplain administrator should also identify which section of the ordinance was violated, when and how, and what was specifically allowed in the approved permit.

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

If the letter does not bring compliance, the attorney can take the case to court and request that additional enforcement measures be brought to bear. Louisiana Revised Statutes allow municipalities and parishes to enforce their ordinances through a mayor's court and a police jury, respectively.

23.2.2. Penalty clause

A requirement of participation in the National Flood Insurance Program (NFIP) is that the community's ordinance must be enforceable. Generally, this means that there is a penalty for violating the ordinance's provisions.

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

The DHS/FEMA model flood damage prevention ordinance has the following suggested wording for a penalty clause for the ordinance. It is probably the same language as in most community's regulations. This language gives the community and the attorney the authority to pursue a penalty for violations of the ordinance.

Example ordinance language:

> Contact the DHS/FEMA Regional Office before revising your FEMA-approved ordinance.

PENALTIES FOR NONCOMPLIANCE

No structure or land shall hereafter be constructed, located, extended, converted, or altered without full compliance with the terms of this ordinance and other applicable regulations. Violation of the provisions of this ordinance by failure to comply with any of its requirements (including violations of conditions and safeguards established in connection with conditions) shall constitute a misdemeanor. Any person who violates this ordinance or fails to comply with any of its requirements shall upon conviction thereof be fined not more than $ _____or imprisoned for not more than _____days, or both, for each violation, and in addition shall pay all costs and expenses involved in the case. Nothing herein contained shall prevent the _____ *[name of community]* from taking such other lawful action as is necessary to prevent or remedy any violation.

23.2.3. Fine

The above penalty clause authorizes a fine for a builder, owner, contractor, etc., for violations of the flood damage prevention ordinance. The penalty, per Louisiana Revised Statutes, varies depending on community size and whether the community is a parish or a municipality. The community's attorney should be consulted regarding local options.

An appeals process should also be defined. The appellant must specify the grounds for appeal. The Louisiana Revised Statutes Section 33:4727 defines the procedures for appeals to decisions made to a Board of Adjustment. In most cases, an appeal must be made within 30 days. All parties must be notified once the appeal is scheduled and a decision must be rendered within a reasonable time period.

Note: If the approval of an appeal requires a variance from the ordinance, the variance procedures, including notification of DHS/FEMA, must then be followed.

23.2.4. Restraining order

A stop work or restraining order is an order to stop further non-compliant conduct. Most community officials authorized to issue permits may issue such an order if construction is in violation of the ordinance. Again, a check is needed with the community's attorney to see if the order must be issued through a mayor's court or police jury. The community attorney should draft or approve the format and procedures for a restraining order.

23.3. Section 1316

23.3.1. Overview

Section 1316 of the National Flood Insurance Act authorizes DHS/FEMA to deny flood insurance to a property declared in violation of the community's ordinance. Section 1316 is used when all other legal means to remedy the violation have been exhausted and the structure is still noncompliant. Section 1316 is a way the NFIP can support communities in the enforcement of their ordinances.

> **44 CFR § 73.3 Denial of flood insurance coverage:**
>
> **(a) No new flood insurance shall be provided for any property which the Administrator finds has been declared by a duly constituted state or local zoning authority or other authorized public body, to be in violation of state or local laws, regulations or ordinances which are intended to discourage or otherwise restrict land development or occupancy in flood-prone areas.**
>
> **(b) New and renewal flood insurance shall be denied to a structure upon a finding by the Administrator of a valid declaration of a violation.**
>
> **(c) States and communities shall determine whether to submit a declaration to the Administrator for the denial of insurance.**

If invoked under Section 1316, denying flood insurance means:

- Insurance coverage will be terminated as of the date DHS/FEMA issues the Section 1316 declaration letter
- No new or renewal policy can be issued on the property
- No claim can be paid on any policy on the property, even if one is inadvertently issued or renewed
- The property may be difficult or impossible to sell
- The market value of the property may fall
- The cost of suffering flood damage without insurance may be too great a risk for the property owner
- Lending institutions holding the property's mortgage may threaten to foreclose
- Any permanent reconstruction will be denied disaster assistance

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

> ***Note:*** Section 1316 is designed to *supplement* the community's enforcement work, not replace it. The floodplain administrator must continue enforcement work to bring the property into compliance.

Currently, more than 500 structures in the U.S. have been denied flood insurance coverage under Section 1316.

If a building that has received a Section 1316 declaration is made compliant, then the declaration can be rescinded by the community and the property's eligibility for flood insurance will be restored.

23.3.2. Declaration

The declaration itself must be in writing, from the community to the DHS/FEMA Regional Office (Section 31). It must include:

- A reference to the specific state or local law, regulation, or ordinance of which the structure is in violation
- A reference to the specific enforcement provision of the law, regulation, or ordinance that authorizes the state or local body or individual to declare the structure to be in violation
- An adequate street address or legal description of the structure in violation and the name of the property owner
- Evidence that the property owner has been provided notice of the violation and of the prospective denial of insurance
- A clear description of the violation in a statement specifically declaring the identified structure to be in violation of the law, regulation, or ordinance provision referenced

If the community has a procedure for issuing formal citations for violations, and if the citation includes all five of the components listed above, the citation can serve as a valid declaration. If such a procedure does not exist, then a letter from the appropriate authorized official to the property owner and DHS/FEMA that contains all five of the components listed above will constitute a valid declaration. Citations containing ambiguous language cannot be accepted for purposes of Section 1316.

44 CFR § 73.3(d) A valid declaration shall consist of:

(1) The name(s) of the property owner(s) and address or legal description of the property sufficient to confirm its identity and location;

(2) A clear and unequivocal declaration that the property is in violation of a cited state or local law, regulation or ordinance;

(3) A clear statement that the public body making the declaration has authority to do so and a citation to that authority;

(4) Evidence that the property owner has been provided notice of the violation and the prospective denial of insurance; and

(5) A clear statement that the declaration is being submitted pursuant to section 1316 of the National Flood Insurance Act of 1968, as amended.

An example form letter for a 1316 declaration is in Figure 23-1.

[Community letterhead]

Department of Homeland Security
DHS/FEMA – Region VI
FRC 800 North Loop 288
Denton, TX 76209

As authorized by _____ (the specific enforcement provisions) of _____ (the local floodplain management regulations) as _____ (community official's title), of _____ (name of community), I hereby declare the structure(s) listed below to be in violation of _____ (the local floodplain management regulations) which is intended to discourage or otherwise restrict land development or occupancy in floodprone areas. The _____ (name of community) therefore, requests that DHS/FEMA deny the availability of flood insurance coverage to the following structure(s) pursuant to the provisions of Section 1316 of the National Flood Insurance Act of 1968, as amended:

Owner/Property Address	Type of Structure	Violation Statement
Name Complete Address Community & State Zip code	Structure type, e.g., residence in Zone AE	Clear description of the violation in relation to the specific enforcement provisions of the local floodplain management regulations.

_____ _____

DATE Signed - Official's Name and Title

Enclosure(s): (Note: Provide documentation that due process has been accomplished.)

CC: Property Owner

Figure 23-1. Sample community Section 1316 declaration.

23.4. Resolving Violations

If a pattern of a lack of enforcement is found during a Community Assistance Visit (CAV), DHS/FEMA may consider one of the compliance actions discussed in Section 3.5. The floodplain administrator must show that the community is doing more than only relying on Section 1316.

Two scenarios are presented below to show how problems could be resolved. ***Note:*** To be sure that the resolution is compliant with the NFIP and state law, discuss the situation with DHS/FEMA and LADOTD before reaching an agreement with the property owner.

23.4.1. Example violation #1: Fill in the floodway without a permit

The property owner placed fill in the floodway. Some ways this type of case could be resolved are:

Abatement option 1: Remove the fill. If removal of the fill is the option selected, it may entail more than removing a pile of dirt. If the fill has been graded and the original "natural" elevation can no longer be discerned, the floodplain administrator must determine (as near as possible) the original elevations and slope. Then, he or she must require the violator to remove the fill only to that elevation and slope. Complex cases may require the developer to submit an engineer's certification that the originally mapped floodway characteristics have been reestablished.

Abatement option 2: Leave the fill and get a permit. The floodplain administrator could agree to leave the fill in place and have the violator apply for a permit, supply a "no-rise certification," and get a Letter of Map Revision (LOMR). If so, copies of all pertinent application forms must be given to the violator and a specific date needs to be established by which the community must receive all applications and data.

The floodplain administrator then needs to coordinate the response with all other applicable agencies and inform DHS/FEMA in writing of the proposed actions. The administrator must monitor the situation and be ready to fall back to Option 1 if the violator fails to meet his or her part of the agreement.

If the floodplain administrator does not receive the permit application and LOMR data as agreed, the violation must be considered active and all violation notices should remain in effect until the LOMR and permit application are received. The administrator should inform the violator that the violation is still active, provide a second due date for the submission of the data, and inform him or her that if the information is not received, the community will initiate litigation.

23.4.2. Example violation #2: House built too low

A single-family dwelling was not constructed to the required elevation. The lowest floor is 2 feet below the base flood elevation (in violation of both the local ordinance and DHS/FEMA regulations). Some ways this could be resolved are:

Abatement option 1: Elevate. If the structure was built on a crawlspace, elevation is the best option. If the structure has been built on slab, elevation may be an option, but would probably be more expensive. Special care must be taken to ensure that the new elevation meets the elevation requirements of the ordinance.

Abatement option 2: Allow to remain. If the floodplain administrator agrees that the structure should remain on the site as is, then several actions should be taken:

1. The violator must be required to floodproof the structure to the maximum extent possible and submit a certified elevation certificate, a floodproofing certificate, and a copy of a letter requesting rating or re-rating of the structure for flood insurance purposes.

2. The violator should file a notice with the parish recorder of deeds notifying any future purchasers that the property does not conform to the floodplain management requirements of the community. A copy of the notice should also be filed with the title abstract. This option should be considered only if all requirements of the ordinance cannot be met.

3. The community should submit the appropriate information to DHS/FEMA so the building will be a “submit to rate,” i.e., its flood insurance premiums will reflect the true hazard to which it is exposed.

4. The community must document the violation and its remediation.

Abatement option 3: Demolish. If the building cannot be retrofitted, the ultimate resolution is to remove it. Several Louisiana communities have required non-compliant structures to be demolished.

Section 24. Permit Records

Contents

Note: Communities need to keep a variety of records for different purposes. Section 10.6 discusses floodplain maps and studies that should be maintained. This section reviews the more common and useful permit records that are needed to administer the flood damage prevention ordinance.

24.1. Permit File

Records show what was approved and what the floodplain administrator told the developer, forming a "paper trail" necessary for administrative or legal proceedings related to development projects. Such records are vital in case the project is built in violation of the community's ordinance or the conditions of a permit. They also provide future owners information on the property.

Records are also checked by the DHS/FEMA or the Louisiana Department of Transportation and Development (LADOTD) to determine if the community is in full compliance with the National Flood Insurance Program (NFIP).

24.1.1. Organization

Each community should have a permit record system that is keyed to a geographical identifier (not just a building permit number), such as street address, subdivision, lot and block number, or parish assessor's property identification number.

The floodplain administrator should have a file for each permit application. The files should have some indicator on the folder, such as a different color folder or label, to show that it is a floodplain permit.

24.1.2. Contents

Permit files should contain copies of these items, as appropriate:

- The permit application form and all attachments, including the site plan
- All correspondence pertinent to the project
- Flood and floodway data prepared by the developer
- Engineering analyses of floodway encroachments and watercourse alterations
- Special engineering designs for enclosures below the base flood
- Any variances or appeals proceedings
- Records of inspections of the project while under construction
- Documentation of the "as-built" lowest floor elevation of all new and substantially improved buildings
- Certification of the elevation to which any nonresidential building has been floodproofed
- V Zone certifications
- Certificates of compliance or occupancy

Keeping these records is a requirement to participate in the NFIP. The floodplain administrator may want to keep a separate log, record, or file of floodplain permits so he or she can readily retrieve these floodplain projects to show DHS/FEMA or LADOTD staff.

24.1.3. File retention

It is not necessary to keep all of the building plans and other documents longer than is required for local code purposes. However, here are some reasons to keep floodplain permit-related materials (in a retrievable format) for as long as possible:

- If the community allows below-base flood enclosures, the floodplain administrator will need the approved ground floor plan of each building in case future owners modify that area (Section 11.3).
- If a flood insurance “submit to rate” issue arises, the administrator has to be able to show whether the building was originally built according to regulations (Section 25.3.2).
- Communities in the Community Rating System (CRS) must keep elevation and floodproofing certificates and make them available as long as the community wants to stay in the CRS. Other records are necessary for the cycle verification visits.

24.2. Elevation Certificate

The community's permit file must include an official record that shows how high new buildings and substantial improvements were elevated. This is necessary both to show compliance with the ordinance and for the owner to obtain a flood insurance policy.

24.2.1. DHS/FEMA's form

There is no mandated form for keeping building elevation records, but it is strongly recommended that the floodplain administrator use DHS/FEMA's Elevation Certificate Form.

If the community is participating in the Community Rating System, the DHS/FEMA form *must* be used for new construction and substantial improvements to existing buildings. Insurance agents writing flood insurance policies also must use this form to properly rate all new and post-Flood Insurance Rate Map (FIRM) buildings in the floodplain. DHS/FEMA encourages communities to use this form to help their residents obtain flood insurance without the additional cost of another survey.

The DHS/FEMA form is a 16-page packet. It includes the three-page FEMA Form 81-31, Elevation Certificate, and instructions on how to complete it. Additional copies of the packet are available at no cost from DHS/FEMA. The three pages that are filled out are shown in Figures 24-1 through 24-3.

The Elevation Certificate form can also be downloaded from DHS/FEMA's website, in both .pdf form and Microsoft Word. The Word version allows the user to enter the appropriate information and print the completed form.

Note: If the software version is used or if elevation records are kept on a computer database, the floodplain administrator also must keep the original signed "hard copy" of the surveyor's certification.

24.2.2. Completing the form

Responsibility for obtaining and filing an elevation certificate rests on the local permit official. Part or all of the form may be completed by a land surveyor, engineer, architect, or local official authorized by ordinance to provide floodplain management information.

The floodplain administrator may give property owners or surveyors blank forms and expect them to complete the entire form. The administrator should double-check the form to ensure that it is complete and that Sections A and B (on property and map information) are correct. Local officials in CRS communities are obligated to ensure that the forms are complete and accurate.

Figures 24-4 through 24-7 provide helpful information on how to properly complete the Certificate. Additional guidance is in DHS/FEMA's Floodplain Management Bulletin, *Elevation Certificate*, May 2004, which can be found at www.fema.gov/fima/fpmbul.shtm

U.S. DEPARTMENT OF HOMELAND SECURITY
Federal Emergency Management Agency
National Flood Insurance Program

ELEVATION CERTIFICATE

OMB No. 1660-0008
Expires February 28, 2009

Important: Read the instructions on pages 1-8.

SECTION A - PROPERTY INFORMATION

For Insurance Company Use:

A1. Building Owner's Name — Policy Number

A2. Building Street Address (including Apt., Unit, Suite, and/or Bldg. No.) or P.O. Route and Box No. — Company NAIC Number

City State ZIP Code

A3. Property Description (Lot and Block Numbers, Tax Parcel Number, Legal Description, etc.)

A4. Building Use (e.g., Residential, Non-Residential, Addition, Accessory, etc.) _____

A5. Latitude/Longitude: Lat. _____ Long. _____ Horizontal Datum: ☐ NAD 1927 ☐ NAD 1983

A6. Attach at least 2 photographs of the building if the Certificate is being used to obtain flood insurance.

A7. Building Diagram Number_____

A8. For a building with a crawl space or enclosure(s), provide:
- a) Square footage of crawl space or enclosure(s) _____ sq ft
- b) No. of permanent flood openings in the crawl space or enclosure(s) walls within 1.0 foot above adjacent grade _____
- c) Total net area of flood openings in A8.b _____ sq in

A9. For a building with an attached garage, provide:
- a) Square footage of attached garage _____ sq ft
- b) No. of permanent flood openings in the attached garage walls within 1.0 foot above adjacent grade _____
- c) Total net area of flood openings in A9.b _____ sq in

SECTION B - FLOOD INSURANCE RATE MAP (FIRM) INFORMATION

B1. NFIP Community Name & Community Number	B2. County Name	B3. State

B4. Map/Panel Number	B5. Suffix	B6. FIRM Index Date	B7. FIRM Panel Effective/Revised Date	B8. Flood Zone(s)	B9. Base Flood Elevation(s) (Zone AO, use base flood depth)

B10. Indicate the source of the Base Flood Elevation (BFE) data or base flood depth entered in Item B9.
☐ FIS Profile ☐ FIRM ☐ Community Determined ☐ Other (Describe) _____

B11. Indicate elevation datum used for BFE in Item B9: ☐ NGVD 1929 ☐ NAVD 1988 ☐ Other (Describe) _____

B12. Is the building located in a Coastal Barrier Resources System (CBRS) area or Otherwise Protected Area (OPA)? ☐ Yes ☐ No
Designation Date_____ ☐ CBRS ☐ OPA

SECTION C - BUILDING ELEVATION INFORMATION (SURVEY REQUIRED)

C1. Building elevations are based on: ☐ Construction Drawings* ☐ Building Under Construction* ☐ Finished Construction
*A new Elevation Certificate will be required when construction of the building is complete.

C2. Elevations – Zones A1-A30, AE, AH, A (with BFE), VE, V1-V30, V (with BFE), AR, AR/A, AR/AE, AR/A1-A30, AR/AH, AR/AO. Complete Items C2.a-g below according to the building diagram specified in Item A7.

Benchmark Utilized _____ Vertical Datum_____

Conversion/Comments _____

		Check the measurement used.	
a)	Top of bottom floor (including basement, crawl space, or enclosure floor) _____.____	☐ feet	☐ meters (Puerto Rico only)
b)	Top of the next higher floor _____.____	☐ feet	☐ meters (Puerto Rico only)
c)	Bottom of the lowest horizontal structural member (V Zones only) _____.____	☐ feet	☐ meters (Puerto Rico only)
d)	Attached garage (top of slab) _____.____	☐ feet	☐ meters (Puerto Rico only)
e)	Lowest elevation of machinery or equipment servicing the building (Describe type of equipment in Comments) _____.____	☐ feet	☐ meters (Puerto Rico only)
f)	Lowest adjacent (finished) grade (LAG) _____.____	☐ feet	☐ meters (Puerto Rico only)
g)	Highest adjacent (finished) grade (HAG) _____.____	☐ feet	☐ meters (Puerto Rico only)

SECTION D - SURVEYOR, ENGINEER, OR ARCHITECT CERTIFICATION

This certification is to be signed and sealed by a land surveyor, engineer, or architect authorized by law to certify elevation information. *I certify that the information on this Certificate represents my best efforts to interpret the data available. I understand that any false statement may be punishable by fine or imprisonment under 18 U.S. Code, Section 1001.*

☐ Check here if comments are provided on back of form.

PLACE SEAL HERE

Certifier's Name License Number

Title Company Name

Address City State ZIP Code

Signature Date Telephone

FEMA Form 81-31, February 2006 See reverse side for continuation. Replaces all previous editions

Figure 24-1 FEMA Elevation Certificate, page 1

IMPORTANT: In these spaces, copy the corresponding information from Section A.	For Insurance Company Use:
Building Street Address (including Apt., Unit, Suite, and/or Bldg. No.) or P.O. Route and Box No.	Policy Number
City State ZIP Code	Company NAIC Number

SECTION D - SURVEYOR, ENGINEER, OR ARCHITECT CERTIFICATION (CONTINUED)

Copy both sides of this Elevation Certificate for (1) community official, (2) insurance agent/company, and (3) building owner.

Comments

Signature Date

☐ Check here if attachments

SECTION E - BUILDING ELEVATION INFORMATION (SURVEY NOT REQUIRED) FOR ZONE AO AND ZONE A (WITHOUT BFE)

For Zones AO and A (without BFE), complete Items E1-E5. If the Certificate is intended to support a LOMA or LOMR-F request, complete Sections A, B, and C. For Items E1-E4, use natural grade, if available. Check the measurement used. In Puerto Rico only, enter meters.

E1. Provide elevation information for the following and check the appropriate boxes to show whether the elevation is above or below the highest adjacent grade (HAG) and the lowest adjacent grade (LAG).
a) Top of bottom floor (including basement, crawl space, or enclosure) is _____. ____ ☐ feet ☐ meters ☐ above or ☐ below the HAG.
b) Top of bottom floor (including basement, crawl space, or enclosure) is _____. ____ ☐ feet ☐ meters ☐ above or ☐ below the LAG.

E2. For Building Diagrams 6-8 with permanent flood openings provided in Section A Items 8 and/or 9 (see page 8 of Instructions), the next higher floor (elevation C2.b in the diagrams) of the building is _____. ____ ☐ feet ☐ meters ☐ above or ☐ below the HAG.

E3. Attached garage (top of slab) is _____. ____ ☐ feet ☐ meters ☐ above or ☐ below the HAG.

E4. Top of platform of machinery and/or equipment servicing the building is _____. ____ ☐ feet ☐ meters ☐ above or ☐ below the HAG.

E5. Zone AO only: If no flood depth number is available, is the top of the bottom floor elevated in accordance with the community's floodplain management ordinance? ☐ Yes ☐ No ☐ Unknown. The local official must certify this information in Section G.

SECTION F - PROPERTY OWNER (OR OWNER'S REPRESENTATIVE) CERTIFICATION

The property owner or owner's authorized representative who completes Sections A, B, and E for Zone A (without a FEMA-issued or community-issued BFE) or Zone AO must sign here. *The statements in Sections A, B, and E are correct to the best of my knowledge.*

Property Owner's or Owner's Authorized Representative's Name

Address City State ZIP Code

Signature Date Telephone

Comments

☐ Check here if attachments

SECTION G - COMMUNITY INFORMATION (OPTIONAL)

The local official who is authorized by law or ordinance to administer the community's floodplain management ordinance can complete Sections A, B, C (or E), and G of this Elevation Certificate. Complete the applicable item(s) and sign below. Check the measurement used in Items G8. and G9.

G1. ☐ The information in Section C was taken from other documentation that has been signed and sealed by a licensed surveyor, engineer, or architect who is authorized by law to certify elevation information. (Indicate the source and date of the elevation data in the Comments area below.)

G2. ☐ A community official completed Section E for a building located in Zone A (without a FEMA-issued or community-issued BFE) or Zone AO.

G3. ☐ The following information (Items G4.-G9.) is provided for community floodplain management purposes.

G4. Permit Number	G5. Date Permit Issued	G6. Date Certificate Of Compliance/Occupancy Issued

G7. This permit has been issued for: ☐ New Construction ☐ Substantial Improvement

G8. Elevation of as-built lowest floor (including basement) of the building: _____. ____ ☐ feet ☐ meters (PR) Datum_____

G9. BFE or (in Zone AO) depth of flooding at the building site: _____. ____ ☐ feet ☐ meters (PR) Datum_____

Local Official's Name Title

Community Name Telephone

Signature Date

Comments

☐ Check here if attachments

FEMA Form 81-31, February 2006 Replaces all previous editions

Figure 24-2. FEMA Elevation Certificate, page 2.

Building Photographs

See Instructions for Item A6.

Building Street Address (including Apt., Unit, Suite, and/or Bldg. No.) or P.O. Route and Box No.	For Insurance Company Use: Policy Number
City State ZIP Code	Company NAIC Number

If using the Elevation Certificate to obtain NFIP flood insurance, affix at least two building photographs below according to the instructions for Item A6. Identify all photographs with: date taken; "Front View" and "Rear View"; and, if required, "Right Side View" and "Left Side View." If submitting more photographs than will fit on this page, use the Continuation Page, following.

Figure 24-3. FEMA Elevation Certificate, page 3.

Figure 24-4. Elevation Certificate Guidance, Sections A and B.

Figure 24-5. Elevation Certificate Guidance, Sections C and D.

Figure 24-6. Elevation Certificate Guidance, Sections D, E and F.

LA DOTD Version August 2008

Section G:

- The **community official** who is authorized by law or ordinance to administer the community's floodplain management ordinance can complete Sections A, B, C (or E) and G of this Elevation Certificate.
- Section C records the elevations of various building components. **The community must: 1) determine the lowest floor of the building, and 2) determine whether the building, as constructed, complies with the community's floodplain management ordinance.** Completion of Section G will meet the flood-plain management documentation requirement.
- If the authorized community official completes Section C, E or G, complete the appropriate item(s) and sign this section.

G1:

- Check if Section C is completed with elevation data from other documentation, including elevation elevations obtained from Community Rating System software that has been signed and embossed by a licensed engineer, surveyor or architect. Indicate the source of the elevation data and the date it was obtained in Section G.
- If you are both a community official and a licensed engineer, surveyor or architect authorized by law to certify elevation data, and you performed the actual survey for a building in Zones A1 – A30, AE, AH, A (with BFE), V1 – V30, VE, V (with BFE), AR, AR/A, AR/A1 – A30, AR/AE, AR/AH or AR/AO, you must also complete Section D.

G2:

- Check if information is entered in Section E by the community for a building in Zone A (without either a FEMA or community issues BFE) or Zone AO.

G3:

- Check if the information in items G4 – G9 has been completed for community floodplain management purposes to document the as-built lowest floor elevation of the building.

Top Section on page 3: Copy the information from Section A on page 1.

Building Photos: Photos are only required for NFIP insurance. However, a community may require them by ordinance if they wish.

SECTION G - COMMUNITY INFORMATION (OPTIONAL)

The local official who is authorized by law or ordinance to administer the community's floodplain management ordinance can complete Sections A, B, C (or E), and G of this Elevation Certificate. Complete the applicable item(s) and sign below. Check the measurement used in Items G8. and G9.

G1. ☐ The information in Section C was taken from other documentation that has been signed and sealed by a licensed surveyor, engineer, or architect who is authorized by law to certify elevation information. (Indicate the source and date of the elevation data in the Comments area below.)

G2. ☐ A community official completed Section E for a building located in Zone A (without a FEMA-issued or community-issued BFE) or Zone AO.

G3. ☐ The following information (Items G4.-G9.) is provided for community floodplain management purposes.

G4. Permit Number	G5. Date Permit Issued	G6. Date Certificate Of Compliance/Occupancy Issued

G7. This permit has been issued for: ☐ New Construction ☐ Substantial Improvement

G8. Elevation of as-built lowest floor (including basement) of the building: _____. ____ ☐ feet ☐ meters (PR) Datum _____

G9. BFE or (in Zone AO) depth of flooding at the building site: _____. ____ ☐ feet ☐ meters (PR) Datum _____

Local Official's Name | Title

Community Name | Telephone

Signature | Date

Comments

☐ Check here if attachments

FEMA Form 81-31, February 2006 Replaces all previous editions

Building Photographs

See Instructions for Item A6.

Building Street Address (including Apt., Unit, Suite, and/or Bldg. No.) or P.O. Route and Box No.			For Insurance Company Use:
			Policy Number
City	State	ZIP Code	Company NAIC Number

If using the Elevation Certificate to obtain NFIP flood insurance, affix at least two building photographs below according to the instructions for Item A6. Identify all photographs with: date taken; "Front View" and "Rear View"; and, if required, "Right Side View" and "Left Side View." If submitting more photographs than will fit on this page, use the Continuation Page, following.

Figure 24-7. Elevation Certificate Guidance, Section G and Page 3.

The local permit official is also responsible for Section G. Although it is optional, Section G contains information that helps determine if a building is compliant. Item G8 is particularly important. The floodplain administrator should make a habit of completing this section for every new building in the Special Flood Hazard Area (SFHA).

Note that it is stated on the Elevation Certificate that photographs are only required if the Certificate is to be used for NFIP flood insurance purposes. However, a community may find it useful to require photos when using the Certificate for floodplain management purposes. Examination of the photos some years after the building is built may help document enclosures below the BFE, building additions and other violations.

24.2.3. Annexations

The FEMA Elevation Certificate form is self-explanatory. A problem arises when a city annexes Special Flood Hazard Areas in the unincorporated areas of the parish. This situation can lead to considerable confusion as to flood zone determination, as well as knowing which community number and panel numbers should be used on Elevation Certificates and other NFIP documents.

Flood zone determination: If the subject property is located within areas annexed from the parish, use the parish FIRM to determine the appropriate flood zone.

Community Identification Number: In Section B of the FEMA form, item B1 ("NFIP Community Name & Number"), use the municipality's NFIP number once a property is annexed. See Sections 8.1.3 and 8.1.4 on how to find this number on the FIRM.

Flood Map Panel Number: For property located in an annexed area, for item B4 of Section B ("Map and Panel Number"), use the entire parish ID and panel number — "220087 0005," not just "0005." For sites within the "area not included," state "No NFIP Map." For items B5 – B7, refer to the parish's map. See Figure 8-3 on how to find this number on the FIRM.

24.3. Other Forms

24.3.1. No-rise certificate

The floodplain administrator should require the developer to provide a "no-rise" certification to ensure that a floodway encroachment review is done correctly. It certifies that the development project will not affect flood heights. An example of a format is provided in Figure 15-4. More information can be found in Section 15.2.3.

24.3.2. V Zone certificate

A registered professional engineer or architect must develop or review the structural design, specifications, and plans for the construction of a V Zone building. He or she must also certify that the design and planned methods of construction are in accordance with accepted standards of practice for meeting the above provisions.

The floodplain administrator must maintain a copy of this certificate in the permit file. There is no official DHS/FEMA form, but an example is provided in Figure 16-7. More information can be found in Section 16.2.4.

24.3.3. Floodproofing certificate

Floodproofing means making a building watertight or substantially impermeable to floodwater. It is discussed in Section 12.1. New and substantially improved residential buildings cannot be floodproofed; they must be elevated.

Designs for a floodproofed building must account for flood warning time; rate of rise of floodwaters; uses of the building; mode of entry to and exit from the building; and the site, floodwater velocities, flood depths, debris impact potential, and flood frequency. FEMA's *Non-Residential Floodproofing Requirements and Certification for Buildings Located in Special Flood Hazard Areas* (Technical Bulletin 3-93), has a detailed discussion on each of these considerations.

For insurance rating purposes, the building's floodproofed design elevation must be at least 1 foot above the base flood elevation (BFE) to receive rating credit. If floodproofed only to the BFE, the floodproofing credit cannot be used, resulting in higher flood insurance rates.

44 CFR Sections 60.3(b)(5) and (c)(4) require the community to obtain and maintain a licensed professional engineer's certification that a nonresidential building was properly floodproofed. Communities are encouraged to use the one-page FEMA certificate, Form 81-65, because it fulfills NFIP insurance rating needs as well as floodplain management requirements.

The FEMA Floodproofing Certificate is shown in Figure 24-8. It can also be downloaded from DHS/FEMA's website, http://www.fema.gov/library/viewRecord.do?id=1600

O.M.B. NO. 3067-0077
Expires July 31, 2002

FEDERAL EMERGENCY MANAGEMENT AGENCY
NATIONAL FLOOD INSURANCE PROGRAM

FLOODPROOFING CERTIFICATE

FOR NON-RESIDENTIAL STRUCTURES

The floodproofing of non-residential buildings may be permitted as an alternative to elevating to or above the Base Flood Elevation; however, a floodproofing design certification is required. This form is to be used for that certification. Floodproofing of a residential building does not alter a community's floodplain management elevation requirements or affect the insurance rating unless the community has been issued an exception by FEMA to allow floodproofed residential basements. The permitting of a floodproofed residential basement requires a separate certification specifying that the design complies with the local floodplain management ordinance.

BUILDING OWNER'S NAME

STREET ADDRESS (Including Apt., Unit, Suite, and/or Bldg. Number) OR P.O. ROUTE AND BOX NUMBER

OTHER DESCRIPTION (Lot and Block Numbers, etc.)

FOR INSURANCE COMPANY USE
POLICY NUMBER
COMPANY NAIC NUMBER

CITY STATE ZIP CODE

SECTION I FLOOD INSURANCE RATE MAP (FIRM) INFORMATION

Provide the following from the proper FIRM:

COMMUNITY NUMBER	PANEL NUMBER	SUFFIX	DATE OF FIRM INDEX	FIRM ZONE	BASE FLOOD ELEVATION (In AO Zones, Use Depth)

SECTION II FLOODPROOFING INFORMATION (By a Registered Professional Engineer or Architect)

Floodproofing Design Elevation Information:

Building is floodproofed to an elevation of ..... feet NGVD. (Elevation datum used must be the same as that on the FIRM.)

Height of floodproofing on the building above the lowest adjacent grade is ..... feet.

(NOTE: for insurance rating purposes, the building's floodproofed design elevation must be at least one foot above the Base Flood Elevation to receive rating credit. If the building is floodproofed only to the Base Flood Elevation, then the building's insurance rating will result in a higher premium.)

SECTION III CERTIFICATION (By Registered Professional Engineer or Architect)

Non-Residential Floodproofed Construction Certification:

I certify that, based upon development and/or review of structural design, specifications, and plans for construction, the design and methods of construction are in accordance with accepted standards of practice for meeting the following provisions:

The structure, together with attendant utilities and sanitary facilities, is watertight to the floodproofed design elevation indicated above, with walls that are substantially impermeable to the passage of water.

All structural components are capable of resisting hydrostatic and hydrodynamic flood forces, including the effects of buoyancy, and anticipated debris impact forces.

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

CERTIFIER'S NAME LICENSE NUMBER (or Affix Seal)

TITLE COMPANY NAME

ADDRESS CITY STATE ZIP CODE

SIGNATURE DATE PHONE

Copies should be made of this Certificate for: 1) community official, 2) Insurance agent/company, and 3) building owner.

FEMA Form 81-65, AUG 99 Replaces all previous editions F-056 (8/99)

Figure 24-8. FEMA Floodproofing Certificate.

24.3.4. Biennial report

Every two years, participating communities must complete a form that describes the community's progress over the past two years in implementing floodplain management measures (44 CFR 59.22). A copy of a biennial report appears in Figure 24-8. It can be completed using the paper copy or filled out over the Internet on DHS/FEMA's website.

DHS/FEMA sends the one-page form to the community's chief elected official. It must be completed and returned to DHS/FEMA within 45 days.

The only way the biennial report can be completed is to have complete and accessible permit records. The floodplain administrator must keep track of:

- Changes in community boundaries
- Physical or topographical changes that affect flood hazard areas
- New flood or watershed studies
- Amendments to the flood damage prevention ordinance
- The number of building permits issued in the floodplain
- The number of variances issued

The administrator also must be able to tell DHS/FEMA:

- The number of people and number of buildings in the floodplain. While these numbers can be approximate, accurate figures will greatly help DHS/FEMA and its programs.
- The permanent year-round population in your community and in you floodplains.
- Whether any floodplain management assistance is requested.

Counting buildings: Providing an accurate building count for the Biennial Report is not too difficult for most communities. You need four building counts for Section E:

- The number of 1-4 family buildings in the community;
- The number of 1-4 family buildings in the SFHA;
- The number of other buildings in the community; and
- The number of other buildings in the SFHA.

Whatever method you use to count buildings, approach this task systematically:

- First, count all buildings in the community.
- Second, count the buildings in the SFHA.
- Third, count the number of 1-4 family buildings in the community. The difference between the first number and this number will be "other buildings."

- Finally, count the number of 1-4 family buildings in the SFHA. The difference between the first number and this number will be "other buildings."

Select the method of counting or estimating the number of buildings most appropriate for your community, given its size, resources and the data it has available:

- For a small community (perhaps up to 2,500 population), the simplest way to count the buildings may be to drive through the community and count each building. It is necessary for the people doing this to be very familiar with the locations of floodplains in the community. Be sure to keep separate counts of 1-4 family residences and other buildings.
- If there are fairly recent (within perhaps 10 years) aerial photos or orhto-photoquads available for the community, overlay the floodplain maps on these photos and count the buildings. Then, add in the buildings for which permits have been issued since the date of the photos. A field check will be needed to determine the uses of the buildings.
- If your community has its assessor's maps and its floodplain maps as layers in the GIS, overlay these two layers and count the buildings. If the assessor's maps do not show the type of occupancy, a field check will be needed to determine the uses of the buildings.

An accurate count of buildings in the entire community should be fairly easy to obtain. Dividing the buildings by occupancy will be somewhat more difficult.

Deciding if a building is in or out of the SFHA is not too critical. If you are trying to get an accurate count, any errors you make should cancel out. You may decide to put all "close calls" in the SHFA.

The Community Rating System (CRS) requires counts of buildings in the SFHA for several activities.

DEPARTMENT OF HOMELAND SECURITY
EMERGENCY PREPAREDNESS AND RESPONSE DIRECTORATE
NATIONAL FLOOD INSURANCE PROGRAM

Biennial Report for
Calendar Year 2001 and 2002

REGULAR PROGRAM
(With Base Flood Elevations)

O.M.B. No. 1660-0003
Expires October 31, 2005

See reverse side for Paperwork Burden Notice

RETURN TO:
Federal Emergency Management Agency
Biennial Report Coordinator
P.O. Box 1038
Jessup, Maryland 20794-1038

Instructions

1. This report should be completed by the locally designated Floodplain Manager (e.g. your Community Manager, Community Planner, Building Inspector, etc.)
2. Please return this report within 45 days of receipt to the address above, or fax it to 1-800-358-9620. If you would like to respond via the Internet, go to www.floodmaps.fema.gov/br and use the following PIN number _____

For more information, contact the FEMA Map Assistance Center toll free at 1-877-FEMA Map (1-877-336-2627).

SECTION I - Changes in your community that may have affected flood hazard areas:
If you answer "yes" to any question in this section, please be prepared to provide explanatory information and/or technical data including, when appropriate, your own community map or a copy of the Flood Insurance Rate Map showing the areas affected. Do not send this information at this time. FEMA may contact you by phone in the near future for this information.

	YES	NO
A. Does your community have any changes to the base data on your Flood Insurance Rate Maps? *(e.g. adding/correcting streets, adding Letters of Map Revision, or annexations/corporate limit changes)*	☐	☐
B. Have the characteristics of watersheds in your community changed to the extent that your floodplain needs to be restudied? *(e.g., major landuse changes due to urbanization, deforestation, wildfires, or stream relocation due to erosion/siltation)*	☐	☐
C. Does your community have information that may be incorporated into Flood Insurance Insurance Rate Map? (e.g., watershed studies or Base Flood Elevations established by developers)	☐	☐
D. Has there been a significant man-made change affecting your designated flood hazard areas? *(e.g., levees, bridges, culverts, extensive filling, excavation or stream channalization)*	☐	☐

SECTION II - Community Floodplain Management Data during the last 2 years (calendar 2001-2002 only):

A. Has your community updated its floodplain management ordinance during the reporting period? If so, please send a copy of the new ordinance to the return address identified above.	☐	☐
B. How many building **permits** were granted within the last 2 calendar years for new structures (including substantial improvements to existing structures) in the designated flood hazard areas shown on your community's Flood Insurance Rate Map?	☐	
C. How many variances to your local floodplain management ordinance were granted within the last 2 calendar years for new structures or substantial improvements to existing structures in the designated flood hazard areas shown on your community's Flood Indurance Rate Map? Please provide ONLY the number of variances granted for structures with the lowest floor below the Base Flood Elevation.	☐	
D. Is your community in need of technical assistance in improving local floodplain management, such as regulation interpretation, planning, enforcement procedures, floodproofing, or a community visit?	☐	☐

E. Please update the demographic information on your community that was provided to FEMA when your community last reported to the National Flood Insurance Program. If any numbers are NOT correct or a "0" appears, please provide the revised number in the space below. If precise data is not available, please give us your best estimate.

	Permanent Year-Round Population	1-4 Family Structures	All Other Structures
1. In your entire community (including flood hazard areas)			
2. In your flood hazard areas only.			

2b. How did you determine the number of structures in the flood hazard areas?
☐ GIS data ☐ best estimate ☐ tax map overlays ☐ other (explain) _____

NAME, TITLE, AND SIGNATURE AND E-MAIL ADDRESS	PHONE NO. *(include area code)*	DATE MONTH	DATE YEAR

Figure 24-9. The DHS/FEMA Biennial Report.

Section 25. Flood Insurance

Contents

25.1. Introduction

One of the main reasons why a community has a floodplain management program is to make insurance available to people who want to protect themselves financially from flood hazards. This section reviews how the insurance part of the National Flood Insurance Program (NFIP) works and how rates and coverage depend on how well buildings comply with the community's ordinance.

25.1.1. Orientation

This section is devoted to flood insurance policies—what's covered, what's not, when a policy must be bought, and other rules. This information is important for the floodplain administrator to know because some construction decisions affect what is eligible for insurance coverage.

If there are additional questions, refer to:

- *Answers to Questions About the National Flood Insurance Program* (Section 29), questions 21–66 cover the topics in this section
- DHS/FEMA's NFIP website (www.fema.gov/nfip/)
- Local insurance agents. They may have additional references, including DHS/FEMA's *Flood Insurance Manual (*or view it on DHS/FEMA's NFIP website).

As noted in Section 3.4.3, almost all of Louisiana's communities in the NFIP are in the Regular Phase. Only a few communities with minor flood problems are still in the Emergency Phase. This section only discusses the Regular Phase provisions. The only major difference between the two phases is that Emergency Phase policies are all pre-FIRM and have limited amounts of coverage.

As you learn about flood insurance in this chapter, think about how your floodplain management program could save money for many of your residents. In Section 25.3.4, you will see examples of calculated flood insurance premiums with and without a discount from the Community Rating System (CRS). Whether your community has 10 NFIP policies or 10,000, you can save a substantial amount of money for many of those policies and build grassroot support for your floodplain management program. See Section 26 for information on the CRS.

25.1.2. Insurance companies

Flood insurance policies are obtained through local property insurance agents. The agents may sell a policy through one of the "Write Your Own" insurance companies or a "direct" policy through DHS/FEMA. Both approaches result in the issuance of a "Standard Flood Insurance Policy" that meets all the requirements and rates set by DHS/FEMA.

If an insured property is flooded, the property owner contacts his or her insurance agent. The agent arranges for an adjuster to review the damage and work with the insured to settle a claim. Property owners always work through their insurance agents—they do not deal with DHS/FEMA.

25.1.3. Insurance data

Flood insurance data can be very helpful to a local floodplain management program. Here are three ways the floodplain administrator can use the data.

Communicate flood risk: The most common usage of flood insurance data is the rating tables, such as the ones in Figures 25-3 and 25-4. These insurance rates are based on the risk of damage: the floodplain administrator can show a builder or permit applicant how building above the base flood elevation (BFE) reduces the risk. It is not just a case of saving insurance premiums; it is a clear reduction in the likelihood of flood damage to the structure.

Conversely, if an owner or builder wants to ignore the community's regulations or request a variance, the cost of insurance can be very expensive. This is discussed in Section 21.3.1.

Planning: A local official can request data on flood insurance policies and past claims in the community. DHS/FEMA can provide the following printouts or digital files:

- Current flood insurance policies in force
- Historical flood insurance claims (since 1978)
- Repetitive flood insurance claims

This information can be very helpful in preparing floodplain management or hazard mitigation plans. Claims records identify areas (including those outside the mapped Special Flood Hazard Areas [SHFAs]) where people have experienced flooding. The amount of the claim payments conveys how serious the flood problems have been. Repetitive claims show chronic problems that are a priority for DHS/FEMA's mitigation programs.

The Privacy Act

Note: Use of flood insurance claim data is subject to the Privacy Act, which prohibits public release of the names of policyholders and the amount of the claim payment. Averages or totals and maps showing areas where claims have been paid can be made public.

Substantial damage: A third opportunity to use flood insurance data comes after a flood. NFIP claims adjusters estimate total property damage. If the adjuster concludes that the property might be substantially damaged, he or she submits a special report to DHS/FEMA. After a flood, the floodplain administrator should contact the State Coordinator's office, DHS/FEMA Region VI, or the Disaster Field Office to determine what procedures are being used to make the adjuster's data available to communities.

25.2. Coverage

Flood insurance coverage is provided for insurable buildings and their contents for properties in communities participating in the NFIP. Note that policy coverage details can change from year to year, so a purchaser should carefully read the policy when it is issued and renewed.

25.2.1. Building coverage

Building coverage is for the structure. This includes all things that typically stay with the building when it changes ownership, including:

- Utility equipment, such as a water heater or central air conditioning
- Carpet permanently installed over unfinished flooring
- Built-in appliances
- Wallpaper and paneling

Ten percent of a dwelling's building coverage may be applied to a detached garage at the same location. Detached garages on multi-family and nonresidential properties and other appurtenant structures must be insured under a separate policy.

25.2.2. "Building" defined

A "building" is defined as a walled and roofed structure, including a manufactured home that is principally above ground and affixed to a permanent site. This definition has three parts:

- "Walled and roofed" means it has two or more exterior rigid walls in place and the roof fully secured so that the building will resist flotation, collapse, and lateral movement.
- "Manufactured (mobile) home" is a building transportable in one or more sections, which is built on a permanent chassis and is designed for use with or without a permanent foundation when attached to the required utilities. A travel trailer without wheels and on a chassis that is affixed to a permanent foundation is also a building and can be insured (and is subject to the community's flood damage prevention ordinance).
- "Principally above ground" means at least 51% of the actual cash value of the structure, including machinery and equipment (but not land value), is above ground.

This definition is similar to the definition for "building" or "structure" used for floodplain management and defined in Section 11.1.1.

Buildings in the course of construction that have yet to be walled and roofed are eligible for coverage except when construction has been halted for more than 90 days and/or if

the lowest floor used for rating purposes is below the base flood elevation. Materials or supplies intended for use in such construction, alteration, or repair are not insurable unless they are contained within the enclosed building on the premises or adjacent to the premises.

Examples of things that are not considered insurable buildings include:

- Gas or liquid storage tanks
- A structure with more than 49% of its value underground, such as a wastewater treatment plant, an underground pumping station, well, or septic tank
- Tents
- Tennis and swimming pool bubbles
- Swimming pools
- Fences, docks, and driveways
- Open pavilions for picnic tables and bleachers
- Detached carports with open sides
- Sheds on skids that are moved to different construction sites
- Licensed vehicles, campers, and travel trailers (unless permanently attached to the site)
- A building declared in violation of a state or local law (see Section 23.3 on Section 1316)
- Buildings completely over water that were built on or after October 1, 1982
- Landscaping, crops, and other items outside of a building

25.2.3. Contents coverage

Contents coverage is for the removable items inside an insurable building. A renter can take out a policy with contents coverage, even if there is no structural coverage.

Certain contents are not insurable. These include:

- Animals and livestock
- Licensed vehicles
- Jewelry, artwork, furs, and similar items valued at more than $2,500
- Money or valuable papers
- Personal property that is not secured to prevent flotation located in a building that is not fully enclosed (such as garden tools stored in an open carport)

25.2.4. Enclosures

There is limited coverage in enclosures below the lowest floor of an elevated post-FIRM building (including manufactured housing) located in a Special Flood Hazard Area:

- There is no contents coverage in these enclosures
- The only structural coverage is for the required utility connections and the foundation and anchoring system required to support the building

Details of the limited coverage are spelled out in Figure 25-1. It is to the floodplain administrator's advantage to ensure that air conditioners and other items that can be damaged by floodwater are not allowed in a crawlspace or other enclosure below an elevated lowest floor.

25.2.5. Amount of coverage

Insurance rates for all buildings are based on a two-tiered system: a first or basic layer of coverage and a second or additional layer. The maximum amounts available under each layer are shown in Figure 25-1.

Building Coverage	Basic Insurance Limits	Additional Insurance Limits	Total Insurance Limits
Single-family dwelling	$50,000	$200,000	$250,000
2-4 family dwelling	$50,000	$200,000	$250,000
Other residential	$150,000	$100,000	$250,000
Nonresidential	$150,000	$350,000	$500,000
Contents coverage			
Residential	$20,000	$80,000	$100,000
Nonresidential	$130,000	$370,000	$500,000

Figure 25-1. Amount of flood insurance available.

Note: This table is for communities in the Regular Phase of the NFIP. If a community has a FIRM and is participating in the NFIP, it is in the Regular Phase. Coverage amounts are from the May 1, 2004 flood insurance *Agent's Manual*.

25.2.6. Waiting period

A 30-day waiting period follows the purchase of a flood insurance policy before it goes into effect. There are some exceptions when a policy goes into effect immediately; e.g., when a policy is purchased at the time of a making, extending, or increasing a new mortgage or title transfer, and when a new FIRM puts a property into the SFHA.

The objective of the 30-day waiting period is to encourage people to keep a policy at all times. DHS/FEMA does not want people to wait for the river to rise before they buy their coverage. Also, to be on a sound financial basis, the NFIP needs everyone at risk to pay his or her share of the premiums.

Many people have found out about the waiting period the hard way. A community would be wise to publicize availability of flood insurance so residents can be protected when a flood comes.

The National Flood Insurance Program has limited coverage for enclosures below the lowest floor of an elevated post-FIRM building and for basements. The NFIP defines "basement" as "Any area of the building, including any sunken room or sunken portion of a room, having its floor below ground level (subgrade) on all sides." (Article II. of the Standard Flood Insurance Policy, October 1, 2002).

Coverage under building or structural coverage is limited to:

a. Any of the following items, if installed in their functioning locations and, if necessary for operation, connected to a power source:

(1) Central air conditioners;
(2) Cisterns and the water in them;
(3) Drywall for walls and ceilings in a basement and the cost of labor to nail it, unfinished and unfloated and not taped, to the framing;
(4) Electrical junction and circuit breaker boxes;
(5) Electrical outlets and switches;
(6) Elevators, dumbwaiters, and related equipment, except for related equipment installed below the base flood elevation after September 30, 1987;
(7) Fuel tanks and the fuel in them;
(8) Furnaces and hot water heaters;
(9) Heat pumps;
(10) Nonflammable insulation in a basement;
(11) Pumps and tanks used in solar energy systems;
(12) Stairways and staircases attached to the building, not separated from it by elevated walkways;
(13) Sump pumps;
(14) Water softeners and the chemicals in them, water filters, and faucets installed as an integral part of the plumbing system;
(15) Well water tanks and pumps;
(16) Required utility connections for any item in this list; and
(17) Footings, foundations, posts, pilings, piers, or other foundation walls and anchorage systems required to support a building.

b. Clean-up. (Article III. Section A.8).

Coverage under personal property coverage is limited to the following items, if installed in their functioning locations and, if necessary for operation, connected to a power source:

a. Air conditioning units, portable or window type;

b. Clothes washers and dryers; and

c. Food freezers, other than walk-in, and food in any freezer. (Article III. Section B.3.)

Figure 25-2. Flood insurance coverage limitations on enclosures below the elevated floor of a post-FIRM building located in a Special Flood Hazard Area.

25.3. Rating Buildings

The insurance agent calculates the premium for a flood insurance policy on a property. The premiums on new buildings are based on the risk of flooding and flood damage. If a building is built incorrectly, the owner may be faced with very high premiums or insufficient coverage. On the other hand, if a building is built properly, the owner will pay less than what it costs to insure a pre-FIRM building under the "subsidized" rates.

The three aspects of the NFIP—mapping, insurance, and regulations—reinforce each other. How well local floodplain management regulations are enforced in the mapped floodplain affects the flood insurance rates paid by the citizens of the community. Consequently, it is important for the floodplain administrator to know how flood insurance rates are set for new and substantially improved buildings.

As noted earlier, 98% of Louisiana communities in the NFIP are in the Regular Phase. Only a few communities with minor flood problems are still in the Emergency Phase. This section only discusses the Regular Phase rates. Emergency Phase policies are rated similarly to pre-FIRM policies.

25.3.1. Rating pre-FIRM buildings

Pre-FIRM buildings are those built on or before the effective date of the community's first Flood Insurance Rate Map (FIRM) or December 31, 1974, whichever is later. This means they were built before detailed flood hazard data and flood elevations were provided to the community and usually before the community enacted comprehensive regulations on floodplain construction.

Pre-FIRM buildings are rated using "subsidized" rates that, in most cases, are significantly less than actuarial rates that fully reflect their risk of flooding. They are designed to help people afford flood insurance even though their buildings were not built with flood protection in mind. Making insurance available for pre-FIRM buildings is one of the primary reasons for a community to join the NFIP.

The "subsidy" in the subsidized rate is not funded by taxpayers. It is revenue foregone by the NFIP. This impedes the program's ability to build up a surplus for unusually large floods. In those cases, funds may have to be borrowed from the Treasury to pay claims because there is not a large enough reserve.

The pre-FIRM building rates for a single-family house are shown in Figure 25-3. They are based on the building type and flood zone. The elevation of the building is not counted because most people do not have elevation data on pre-FIRM buildings. If there is an elevation certificate or similar record, the building can be rated at the post-FIRM rate, if it is lower.

If a pre-FIRM building is substantially damaged or substantially improved, it will be re-rated as a post-FIRM building when the policy is renewed (see Sections 13 and 14 on determining substantial damage and substantial improvement).

	A, AE, A1-A30, D Zones		V, VE, V1-V30 Zones		B, C, X Zones	
Building types	**Building**	**Contents**	**Building**	**Contents**	**Building**	**Contents**
No basement	.76/.54	.96/.97	.99/1.35	1.23/2.32	.78/.21	1.20/.37
With enclosure	.81/.96	.96/.97	1.06/2.38	1.23/2.31	.89/.34	1.36/.49
Mobile home	.76/.54	.96/.97	.99/6.11	1.23/2.31	.78/.38	1.20/.37

Figure 25-3 Rates for pre-FIRM single-family dwellings

Note: Rates are per $100 coverage. The two numbers under each category (Building or Contents) reflect the rates for the basic and additional layers of coverage explained in Figure 25-1. The flood zone designations are explained in Figure 8-12. Figures are from the May 1, 2008, flood insurance *Agent's Manual* and may be adjusted periodically.

25.3.2. Rating post-FIRM buildings

Premium rates for new or post-FIRM construction are actuarial, meaning they are based on the known risk to which the building is exposed. Post-FIRM rates base the risk on the flood zone and the elevation of the lowest floor (including the basement) of the building in relation to the base flood elevation (BFE). These rates are shown for a single-family residence in Figure 25-4.

Lowest floor vs. BFE	AE, A1 – A30 Zones	
	Building	**Contents**
+4	.24/.08	.38/.12
+3	.24/.08	.38/.12
+2	.39/.08	.38/.12
+1	.74/.08	.52/.12
0	1.44/.08	1.24/.12
-1	3.80/1.39	3.74/.75
-2	Submit-for-rate	

Figure 25-4. Rates for post-FIRM single-family dwellings in the SFHA.

Note: Rates are per $100 coverage. Rates are for one floor, no basement. The two numbers reflect the rates for the basic and additional layers of coverage explained in Figure 25-1. Rates for V Zone properties are higher. Rates for B, C, and X Zone properties are not based on building elevation in relation to the BFE. Rates are from the May 1, 2008, flood insurance *Agent's Manual* and may be adjusted periodically.

Figure 25-4 shows how the post-FIRM rates are dependent on the elevation of the lowest floor in relation to the base flood elevation. The higher the floor is, the lower the rate. A building with the lowest floor 1 foot above the BFE ("+1" in Figure 25-4) benefits from a lower rate than a pre-FIRM building's "subsidized" rate: 74 cents per $100 for the first layer compared to 76 cents per $100 for a pre-FIRM building in the AE Zone. A post-FIRM building elevated 2 feet above the BFE pays 39 cents, about half of the pre-FIRM rate of 76 cents.

Submit-for-rate: Because of peculiarities in their exposure to flooding, certain properties at high flood risk do not lend themselves to preprogrammed rates. These

risks require an in-depth underwriting analysis and their rates are not included in the insurance agent's *Flood Insurance Manual*.

The insurance agent's rate tables do not cover cases in which the building is 2 feet or more below the BFE. The agent must send the application to his or her company headquarters for a special, individualized rating. This procedure is known as "submit-for-rate."

Submit for rate premiums on policies that are significantly below the BFE can be as high as $25 per $100 coverage.

Since a submit for rate policy often is an indicator of the property owner's noncompliance with a community's regulations, the community's failure to enforce its regulations, or the result of a variance action, these cases are forwarded to the DHS/FEMA Regional Office for investigation.

Elevation certificates: It is very important for the owner to have the building properly rated. A key tool for doing this is the Elevation Certificate, which tells the insurance agent the elevation of the building and the BFE (Section 24.2).

Floodproofing: A floodproofed nonresidential building is rated according to the following rules:

- If the building is floodproofed to 1 or more feet above the BFE, 1 foot is subtracted from the floodproofed elevation and the resulting elevation is used to determine the rate. For example, a building that is floodproofed to 2 feet above the BFE receives the same rate as a building elevated to 1 foot above the BFE.
- If the building is floodproofed to less than one foot above the BFE, the rate is based on the elevation of the lowest floor. In other words, the flood insurance premium will not reflect the fact that the building has been floodproofed.

Floodproofed buildings require floodproofing certificates, as explained in Sections 12.1.1 and 24.3.3.

25.3.3. Rating in approximate A Zones

Approximate A Zones are floodplains mapped on the FIRM without a BFE. They are discussed in Section 9.3. Post-FIRM buildings in approximate A Zones cannot be rated using tables such as Figure 25-4.

A post-FIRM single-family home in an approximate A Zone with no BFE and no elevation certificate will be subject to a rate of $4.06/$1.42 for building coverage and $3.36/$1.00 for contents coverage (as of May 1, 2008). These rates are much higher than the rates in Figures 25-3 and 25-4. This can be a real disincentive for people to buy flood insurance on post-FIRM buildings in approximate A Zones.

There are two ways to obtain lower rates in approximate A Zones. In either case, an elevation certificate is necessary:

- If the community provides a locally developed BFE and the building is elevated to or above that BFE, the rates are comparable to those for buildings in AE Zones. Communities are encouraged to do this, as explained in Section 9.3.
- If there is no BFE from any source, rates can be set based on the height of the building above its highest adjacent grade. Rates are reduced for buildings 1 foot, 2 feet, and 5 feet or more above grade (the higher the building, the lower the rate). Buildings built at or below grade can use the submit-for-rate approach.

25.3.4. Premiums

A policyholder's total payment is calculated by:

- Multiplying the amount of building coverage desired times the rate (done once for the basic coverage and again for the additional limits).
- Multiplying the amount of contents coverage times the rate desired (done once for the basic coverage and again for the additional limits).
- Factoring in the deductible amount the policyholder wants.
- Adding the premium for Increased Cost of Compliance coverage. (This varies from $4 to $75, depending on the type of building and flood zone. See Section 14.3 on ICC coverage.)
- Deducting the Community Rating System (CRS) premium discount (see below).
- Adding the federal policy fee (currently $30 to help pay for administrative costs, such as floodplain mapping).

Two examples of this rating procedure can be seen in Figures 25-5 and 25-6.

Rates can vary based on the community's floodplain management program. If the community has not properly enforced its flood damage prevention ordinance, it could be put on probation. Under probation, all policies have an additional $50 surcharge (Section 3.5.3).

Conversely, a community that has an exemplary program that includes floodplain management activities above and beyond the minimum NFIP criteria may apply for a Community Rating System (CRS) classification. This system has reduced flood insurance premiums in 1,000 communities by up to 40%. The CRS is explained in more detail in Section 26.

REGULAR PROGRAM, POST-FIRM, ELEVATION RATED, $5,000/$5,000 DEDUCTIBLE OPTION, ZONE AE

Data Essential To Determine Appropriate Rates and Premium:

- **Regular Program**
- Flood Zone: AE
- Occupancy: Non-Residential
- # of Floors: 2 Floors
- Basement/Enclosure: None
- Deductible: $5,000/$5,000
- Deductible Factor: .870
- Contents Location: Above Ground Level and Higher Floors
- Date of Construction: Post-FIRM
- Elevation Difference: +4
- Flood Proofed Yes/No: No
- Building Coverage: $500,000
- Contents Coverage: $500,000
- ICC Premium: $4
- CRS Rating: 5
- CRS Discount: 25%

Determined Rates:
Building: .20/.08 Contents: .22/.12

COVERAGE	BASIC LIMITS AMOUNT OF INSURANCE	BASIC LIMITS RATE	BASIC LIMITS ANNUAL PREMIUM	ADDITIONAL LIMITS (REGULAR PROGRAM ONLY) AMOUNT OF INSURANCE	ADDITIONAL LIMITS (REGULAR PROGRAM ONLY) RATE	ADDITIONAL LIMITS (REGULAR PROGRAM ONLY) ANNUAL PREMIUM	DEDUCTIBLE PREM. REDUCTION/ INCREASE	BASIC AND ADDITIONAL TOTAL AMOUNT OF INSURANCE	TOTAL PREMIUM
BUILDING	150,000	.20	300	350,000	.08	280	-75	500,000	505
CONTENTS	130,000	.22	286	370,000	.12	444	-95	500,000	635

RATE TYPE: (ONE BUILDING PER POLICY—BLANKET COVERAGE NOT PERMITTED)

☐ MANUAL ☐ SUBMIT FOR RATING
☐ ALTERNATIVE ☐ V-ZONE RISK RATING FORM
☐ MORTGAGE PORTFOLIO PROTECTION PROGRAM
☐ PROVISIONAL RATING

PAYMENT OPTION:
☐ CREDIT CARD
☐ OTHER: _____

THE ABOVE STATEMENTS ARE CORRECT TO THE BEST OF MY KNOWLEDGE. I UNDERSTAND THAT ANY FALSE STATEMENTS MAY BE PUNISHABLE BY FINE OR IMPRISONMENT UNDER APPLICABLE FEDERAL LAW.

SIGNATURE OF INSURANCE AGENT/BROKER _____ DATE (MM/DD/YY) _____

ANNUAL SUBTOTAL	1,140
ICC PREMIUM	4
SUBTOTAL	1,144
CRS PREMIUM DISCOUNT 25%	-286
SUBTOTAL	858
PROBATION SURCHARGE	—
FEDERAL POLICY FEE	35
TOTAL PREPAID AMOUNT	893

Premium Calculation:

1. Multiply Rate x $100 of Coverage: Building: $580 / Contents: $730
2. Apply Deductible Factor: Building: .870 x $580 = $505 / Contents: .870 x $730 = $635
3. Premium Reduction: Building: $580 - $505 = $75 / Contents: $730 - $635 = $95
4. Subtotal: $1,140
5. Add ICC Premium: $4
6. Subtract CRS Discount: -$286 (25%)
7. Subtotal: $858
8. Probation Surcharge: N/A
9. Add Federal Policy Fee: $35
10. Total Prepaid Amount: $893

Figure 25-5. Rating example for a post-FIRM nonresidential building in a community in the CRS.

REGULAR PROGRAM, PRE-FIRM CONSTRUCTION, $500 DEDUCTIBLE OPTION (SURCHARGE), ZONE AE

Data Essential To Determine Appropriate Rates and Premium:

- **Regular Program**
- Flood Zone: AE
- Occupancy: Single-Family Dwelling
- # of Floors: 2 Floors
- Basement/Enclosure: Enclosure
- Deductible: $500/$500
- Deductible Factor: 1.100 (Surcharge)
- Contents Location: Enclosure and Above
- Date of Construction: Pre-FIRM
- Elevation Difference: N/A
- Flood Proofed Yes/No: No
- Building Coverage: $150,000
- Contents Coverage: $60,000
- ICC Premium: $75
- CRS Rating: N/A
- CRS Discount: N/A

Determined Rates:
Building: .81/.96 Contents: .96/.97

COVERAGE	BASIC LIMITS			ADDITIONAL LIMITS (REGULAR PROGRAM ONLY)			DEDUCTIBLE	BASIC AND ADDITIONAL	TOTAL PREMIUM
	AMOUNT OF INSURANCE	RATE	ANNUAL PREMIUM	AMOUNT OF INSURANCE	RATE	ANNUAL PREMIUM	PREM. REDUCTION/ INCREASE	TOTAL AMOUNT OF INSURANCE	
BUILDING	50,000	.81	405	100,000	.96	960	+137	150,000	1,502
CONTENTS	20,000	.96	192	40,000	.97	388	+58	60,000	638

RATE TYPE: (ONE BUILDING PER POLICY—BLANKET COVERAGE NOT PERMITTED)

☐ MANUAL ☐ SUBMIT FOR RATING
☐ ALTERNATIVE ☐ V-ZONE RISK RATING FORM
☐ MORTGAGE PORTFOLIO PROTECTION PROGRAM
☐ PROVISIONAL RATING

PAYMENT OPTION:
☐ CREDIT CARD
☐ OTHER: _____

THE ABOVE STATEMENTS ARE CORRECT TO THE BEST OF MY KNOWLEDGE. I UNDERSTAND THAT ANY FALSE STATEMENTS MAY BE PUNISHABLE BY FINE OR IMPRISONMENT UNDER APPLICABLE FEDERAL LAW.

SIGNATURE OF INSURANCE AGENT/BROKER _____ DATE (MM/DD/YY) _____

ANNUAL SUBTOTAL	2,140
ICC PREMIUM	75
SUBTOTAL	2,215
CRS PREMIUM DISCOUNT ___%	—
SUBTOTAL	2,215
PROBATION SURCHARGE	—
FEDERAL POLICY FEE	35
TOTAL PREPAID AMOUNT	2,250

Premium Calculation:

1. Multiply Rate x $100 of Coverage: Building: $1,365 / Contents: $580
2. Apply Deductible Factor: Building: 1.100 x $1,365 = $1,502 / Contents: 1.100 x $580 = $638
3. Premium Increase: Building: $1,502 - $1,365 = $137 / Contents: $638 - $580 = $58
4. Subtotal: $2,140
5. Add ICC Premium: $75
6. Subtract CRS Discount: N/A
7. Subtotal: $2,215
8. Probation Surcharge: N/A
9. Add Federal Policy Fee: $35
10. Total Prepaid Amount: $2,250

Figure 25-6. Rating example for a pre-FIRM house.

25.4. The Mandatory Purchase Requirement

The Flood Disaster Protection Act of 1973 added a key requirement to the NFIP: If a community participates in the NFIP, flood insurance is a prerequisite for receiving money from a federal agency or a federally supported financial program.

25.4.1. Where it applies

The mandatory purchase requirement applies to all forms of federal or federally related financial assistance for buildings located in Special Flood Hazard Areas (SFHAs, i.e., A and V Zones). This requirement affects loans and grants for the purchase, construction, repair, or improvement of any publicly- or privately-owned building in the SFHA, including machinery, equipment, fixtures, and furnishings contained in such buildings.

Financial assistance programs affected include loans and grants from agencies such as the Department of Veterans Affairs, USDA Rural and Housing Services, Federal Housing Administration, Small Business Administration, and DHS/FEMA.

The requirement applies to secured mortgage loans from financial institutions, such as commercial lenders, savings and loan associations, savings banks, and credit unions that are regulated, supervised, or insured by federal agencies such as the Federal Deposit Insurance Corporation and the Office of Thrift Supervision.

The requirement comes into play if a loan is made, increased, renewed, or extended—at any of those steps, the lender must check to see if the building is in a SFHA at that time. For example, a building in an X Zone when the original mortgage was taken out would be affected if the area is remapped in the SFHA and the loan is later refinanced.

The requirement also applies to all mortgage loans that Fannie Mae or Freddie Mac purchase in the secondary mortgage market.

25.4.2. How it works

Before a person can receive a loan or other financial assistance from one of the affected agencies or lenders, the building must be checked to see if it is in a SFHA on the FIRM. The agency or lender is responsible for checking the FIRM to determine if the building is in a SFHA, although many communities provide assistance. Usually, the lender will have the determination done by a third party flood hazard determination company that provides a guarantee that the determination is correct. The lender must document the determination and whether flood insurance is required on a Standard Flood Hazard Determination Form (FEMA Form 81-93), which is discussed in Section 9.5.1. The lender will notify the borrower if flood insurance is required.

If the building is located in a SFHA, the law requires the agency or lender to require the recipient to purchase a flood insurance policy on the building. Federal law requires building coverage equal to the value of building (not the land), the amount of the loan

(or other financial assistance), or the maximum amount of flood insurance available, whichever is less.

> ***Note:*** Many people who are required to get building coverage do not realize that their contents are not covered unless they voluntarily purchase contents coverage. A local public information program would help inform residents of this and other basic facts, such as the 30-day waiting period and the availability of insurance for properties outside the floodplain.

The mandatory purchase requirement does not affect loans or financial assistance for items not covered by a flood insurance policy, such as vehicles, business expenses, landscaping, and vacant lots. It does not affect loans for buildings that are not in the floodplain, even though a portion of the lot may be floodprone. While not mandated by law, a lender may require a flood insurance policy as a condition of a loan for a property in any zone on a FIRM, and may require more coverage than the minimum required by federal law.

25.4.3. Flood insurance for the community

As a recipient of federal financial assistance, a local government may have been subject to the mandatory purchase requirement. The floodplain administrator should determine if there are any insurable publicly owned or leased buildings in the floodplain. If so, they should be checked to see if they received federal aid in the past. Likely prospects include:

- A wastewater treatment plant building (always located near a body of water) that received a grant from the Environmental Protection Division
- Public housing or a neighborhood center funded with help from the Department of Housing and Urban Development or the Community Development Block Grant
- Any facility that received disaster assistance after a flood or other disaster declaration

Whether there was a requirement to buy insurance or not, the administrator should advise the community's risk manager or other appropriate officials about the buildings exposed to flooding. Many agencies find out too late that their "all risk" insurance policies do not cover flooding.

Over the last several years, Congress has taken steps to encourage public agencies and private property owners to purchase flood insurance instead of relying on disaster assistance for help after a flood. Disaster assistance for a public building will be reduced by the amount of insurance coverage (structural and contents) a community should carry on the building (regardless whether the community is carrying a policy).

If an eligible insurable facility damaged by flooding is located in a [mapped floodplain] … and the facility is not covered (or is underinsured) by flood insurance on the date of such flooding, FEMA is required to reduce federal disaster assistance by the *maximum* amount of insurance proceeds that would have been received had the buildings and contents been fully covered under a National Flood Insurance Program (NFIP) standard flood insurance policy. [Generally, the maximum amount of proceeds for a non-residential property is $500,000.]

[Communities] Need to:

- **Identify all insurable facilities, and the type and amount of coverage (including deductibles and policy limits) for each. The anticipated insurance proceeds will be deducted from the total eligible damages to the facilities.**
- **Identify all facilities that have previously received federal disaster assistance for which insurance was required. Determine if insurance has been maintained. *A failure to maintain the required insurance for the hazard that caused the disaster will render the facility ineligible for Public Assistance funding….***
- **[Communities] *must* obtain and maintain insurance to cover [their] facility—buildings, equipment, contents, and vehicles—for the hazard that caused the damage in order to receive Public Assistance funding. Such coverage must, at a minimum, be in the amount of the eligible project costs. FEMA will not provide assistance for that facility in future disasters if the requirement to purchase insurance is not met**

FEMA Response and Recovery Directorate Policy No. 9580.3, August 23, 2000, re: Section 406(d) of the Stafford Act.

In effect, disaster assistance for public agencies now has a very large deductible equal to the insurance policy it should carry. The law expects public agencies to be fully insured as a condition of receiving federal disaster assistance.

Example: The maximum amount of structural flood insurance available for a non-residential building is $500,000. Floodville's $2 million city hall is flooded and receives $600,000 in damage. If the city hall is in a SFHA, the disaster assistance program will assume it is insured for $500,000. Federal aid to repair or rebuild the city hall will be 75% of $100,000 ($600,000 - $500,000).

Floodville will receive $75,000 in disaster assistance for a building that suffered $600,000 in damage. If the city hall was not insured, Floodville's taxpayers are going to have to come up with the balance. If it was insured, the city will have $575,000 ($500,000 in insurance claim and $75,000 from disaster assistance) toward repairs and reconstruction.

The community should not wait for the next disaster to become familiar with this rule. The floodplain administrator should advise the appropriate people of the need to purchase flood insurance coverage on the community's buildings.

25.4.4. Dealing with insurance issues

Although many community floodplain managers do not consider flood insurance to be part of their jobs, the knowledge they have of floods and floodplains may enable them to help their residents in ways they have not explored.

Community Rating System: First, if your community does not participate in the Community Rating System (CRS), consider applying for participation. See Section 26.

Second, if a resident has a question about flood insurance, listen to them and see if there is an issue that you can help with. Two common areas of concern for property owners are the mandatory purchase requirement (Section 25.4) and the premium rates (Section 25.3). You may be able to provide information that can help in either of these areas.

Mandatory purchase requirement: A lender can choose to protect a loan on any property with flood insurance, just as they can require insurance against fire or liability. If the property is in a Special Flood Hazard Area (SFHA), many lenders must require flood insurance.

However, if a lender requires flood insurance for a property that is outside the SFHA, a letter from the community may help ensure that the property is correctly rated as an X zone property so that the buyer/owner get a lower premium rate on the insurance.

Misrated policies: It is the responsibility of the owner/buyer's insurance agent to determine the correct insurance rate for a NFIP flood insurance policy. If a property is not rated correctly, the insurance premium may be higher than it should be. It is very likely that you, the community floodplain manager, know more about the FIRM zones in your community than an insurance agent who may be from another community or state.

Section 24.2 discusses the use of the FEMA Elevation Certificate (EC) for maintaining the community's records. In addition to the flood and building elevation information the community needs for NFIP compliance, the EC includes all of the information needed to determine the insurance premium. If you review all of the EC to ensure that it is complete and correct, you can help your residents pay no more than necessary for their flood insurance.

If a policy is misrated where you are not obtaining an EC, you may still be able to help. For example, if a building is rated as a non-compliant post-FIRM building, and your records show that the building is pre-FIRM, a letter from you may help convince the insurance agent to re-rate the policy and reduce the premiums.

Section 26. The Community Rating System

Contents

26.1. Introduction

The National Flood Insurance Program (NFIP) has been successful in requiring new buildings to be protected from damage by a base flood. However, flood damage still results from floods greater than the base flood and from flooding in unmapped areas. Under the Community Rating System (CRS), there is an incentive for communities to do more than just regulate construction of new buildings to minimum national standards.

Under the CRS, flood insurance premiums are adjusted to reflect community activities that reduce flood damage to existing buildings, manage development in areas not mapped by the NFIP, protect new buildings beyond the minimum NFIP protection level, help insurance agents obtain flood data, and help people obtain flood insurance.

Community participation in the CRS is voluntary. Any community in full compliance with the rules and regulations of the NFIP may apply for a CRS classification better than a Class 10.

The CRS is the ultimate correlation between floodplain management and flood insurance. It provides a national recognition of how well a community's program exceeds the minimum requirements of the NFIP and it reduces the flood insurance premiums community residents must pay.

26.1.1. Objective

The objective of the CRS is to reward communities that are doing more than meeting the minimum NFIP requirements to help their citizens prevent or reduce flood losses. The CRS also provides an incentive for communities to initiate new flood protection activities. The goal of the CRS is to encourage, by the use of flood insurance premium adjustments, community and state activities beyond those required by the National Flood Insurance Program to:

- Reduce flood damage to insurable property,
- Strengthen and support the insurance aspects of the NFIP, and
- Encourage a comprehensive approach to floodplain management.

Prerequisites: There are four prerequisites for a community to become a CRS community:

1. The community must have been in the Regular Phase of the NFIP for at least one year;

2. The community must be in full compliance with the minimum requirements of the NFIP. If a Community Rating System (CRS) community is determined at any time not to be in full compliance, it will revert to a CRS Class 10;

3. If there are one or more repetitive loss properties in the community, the community must take certain actions as specified in Sections 501–503 of the *CRS Coordinator's Manual*; and

4. The community must maintain NFIP flood insurance policies that it has been required to carry on properties owned by the community. A community may have been required to carry NFIP flood insurance as a result of an earlier disaster.

26.1.2. Credited activities

To be recognized in the insurance rating system, community floodplain management activities must be described, measured, and evaluated. The basic tool for this is the *CRS Coordinator's Manual*, which sets forth the application procedures, creditable activities, and the credit points assigned to each activity.

Once a community meets certain prerequisites, it receives a CRS classification based upon the total score for its activities. The *Coordinator's Manual* explains the scoring and offers examples of activities and how their credit is calculated.

There are 10 CRS classes: Class 1 requires the most credit points and gives the greatest premium reduction; Class 10 receives no premium reduction. A community that does not apply for the CRS, or does not obtain the minimum number of credit points, is a Class 10 community.

The applicant community submits the *CRS Application* along with documentation which shows that it is implementing the activities for which credit is requested. All CRS credit is verified according to the detailed discussion of the activities in the *Coordinator's Manual*. The application process is discussed in more detail in the *CRS Application*.

Class	Points	Premium Reduction In Floodplain	Premium Reduction Outside Floodplain
1	4,500+	45%	10%
2	4,000–4,499	40%	10%
3	3,500–3,999	35%	10%
4	3,000–3,499	30%	10%
5	2,500–2,999	25%	10%
6	2,000–2,499	20%	10%
7	1,500–1,999	15%	5%
8	1,000–1,499	10%	5%
9	500– 999	5%	5%
10	0 – 499	0	0

Figure 26-1 Community Rating System premium reductions

The *Coordinator's Manual* identifies 18 creditable activities, organized under four categories labeled Sections 300 through 600: Public Information, Mapping and Regulations, Flood Damage Reduction, and Flood Preparedness (see Figure 26-3 and Section 26.3.3 for the full list). The *Coordinator's Manual* assigns credit points based upon the extent to which an activity advances the three goals of the CRS. Communities are invited to propose alternative approaches to these activities in their applications.

Some CRS activities may be implemented by a state or a regional agency rather than the community level. For example, Louisiana administers a dam safety program that

provides 74 points. Every community in Louisiana receives those credit points because the program benefits everyone.

Credit criteria change over time as experience is gained in implementing, observing, and measuring the activities and as new concepts in floodplain management come into common practice. As innovations arise, they are considered for recognition.

26.1.3. Application and verification

An application for a CRS classification may be submitted at any time. A community applies by sending a completed *CRS Application* with appropriate documentation to its ISO/CRS Specialist. Copies of all or parts of the application are sent to the DHS/FEMA Regional Office and to the Louisiana Department of Transportation and Development (LADOTD).

ISO: More than 1,300 insurance companies subscribe to the Insurance Services Office, Inc. (ISO). Among other services, ISO develops and provides advisory fire insurance classifications for community fire protection programs. It also administers the Building Code Effectiveness Grading Schedule, which reviews community building departments. ISO administers the CRS for DHS/FEMA. ISO staff reviews CRS applications, verifies the community's credit points, and performs program improvement tasks. Section 31 contains the latest CRS contact information.

The community's activities and performance are reviewed during a verification visit by the ISO/CRS Specialist. DHS/FEMA sets the credit to be granted and notifies the community, the state, insurance companies, and other appropriate parties. The classification is effective on either May 1 or October 1, depending on when the community's program is verified.

Community	Points	Class
Ascension Parish	1,063	8
Baker, City of	783	9
Bossier City, City of	1,012	8
Caddo Parish	1,333	8
Calcasieu Parish	1,226	8
Denham Springs, City of	870	9
Deridder, City of	539	9
East Baton Rouge Parish	1,709	7
French Settlement, Village of	681	9
Gonzales, City of	694	9
Gretna, City of	1,036	8
Houma, City of	1,117	8
Jefferson Parish	1,593	7
Kenner, City of	1,240	8
Lake Charles, City of	693	9
Livingston Parish	723	9
Lutcher, Town of	698	9
Mandeville, City of	1,203	8
Monroe, City of	631	9
Morgan City, City of	1,289	8
New Orleans/Orleans Parish	1,039	8
Ouachita Parish	776	9
Rayne, City of	744	9
Ruston, City of	941	9
Shreveport, City of	1,489	8
Slidell, City of	905	9
Sorrento, Town of	663	9
St. Charles Parish	1,293	8
St. James Parish	1,190	8
St. John The Baptist Parish	757	9
St. Tammany Parish	751	9
Tangipahoa Parish	710	9
Terrebonne Parish	1,119	8
Walker, Town of	635	9
West Baton Rouge Parish	1,267	8
Westwego, City of	1,113	8
Zachary, City of	1,066	8

Figure 26-2 Louisiana CRS communities

Data as of January 1, 2008.

Currently, 37 Louisiana communities are participating (Figure 26-2). In these communities, more than 400,000 building owners will receive more than $20 million in CRS discounts in 2008.

Each year the community must recertify or reverify that it is continuing to perform the activities being credited by the CRS. Recertification is an annual activity that includes progress reports for certain activities. The reverification takes place every few years and is conducted in the form of another verification visit to the community.

If a community is not properly or fully implementing the credited activities, its credit points, and possibly its CRS classification, are revised. A community can add or modify credited activities each year to improve its CRS classification.

Communities are encouraged to call on their ISO/CRS Specialist for assistance at any time. A week-long CRS course for local officials is offered free at DHS/FEMA's Emergency Management Institute. The ISO/CRS Specialist, LADOTD, and DHS/FEMA Regional Office have more information on this course, State workshops, and other CRS training opportunities.

26.1.4. Community responsibilities

Once it has submitted its *CRS Application*, a community must continue to implement its credited activities to keep its classification. Specifically, a community is responsible for:

- Designating someone as the community's CRS Coordinator who is familiar with the agencies that implement CRS activities
- Cooperating with the ISO/CRS Specialist and the verification procedures
- Recertifying each year that it continues to implement its activities
- Submitting the appropriate documents with its recertification
- Advising DHS/FEMA and its ISO/CRS Specialist of modifications in its activities
- Maintaining accurate and complete elevation certificates (Section 24.2), other permit records, and old Flood Insurance Rate Maps (FIRMs) forever (Section 10.6.5)
- Maintaining other records of its activities for 5 years, or until the next reverification visit, whichever comes sooner
- Participating in the reverification process

Communities receive periodic updates to the *CRS Coordinator's Manual* and other CRS materials. They are encouraged to order the background publications, attend CRS workshops and ask their ISO/CRS Specialists for help in understanding the CRS credit criteria for their current and planned activities.

26.1.5. Costs and benefits

Communities should prepare and implement those activities which best deal with their local problems, whether or not they are creditable under the CRS. Few, if any, of the CRS activities will produce premium reductions equal to or in excess of their implementation costs. In considering whether to undertake a new floodplain management activity, a community must consider all of the benefits the activity will provide (not just insurance premium reductions) in order to determine whether it is worth implementing.

Costs: No fee is charged for a community to apply for participation in the CRS, but a CRS community incurs two kinds of expenses:

- Costs to implement floodplain management activities that are being credited. Examples are public information mailings, drainage system inspections and record keeping, all of which are costs the community is likely to be incurring already as part of administering a good local floodplain management program.

- The staff time necessary to prepare the *CRS Application* and submit annual status reports.

Benefits: It is important to note that reduced flood insurance rates are only one of the rewards a community receives from participating in the CRS. Communities receive several other benefits:

1. The CRS floodplain management activities provide enhanced public safety, a reduction in damage to property and public infrastructure, avoidance of economic disruption and losses, reduction of human suffering, and protection of the environment.

2. A community's flood programs become better organized and more formal. Ad hoc activities, such as responding to drainage complaints rather than an inspection program, are conducted on a sounder, more equitable basis.

3. A community can evaluate the effectiveness of its flood program against a nationally recognized benchmark.

4. Technical assistance in designing and implementing some activities is available at no charge.

5. Public information activities build a knowledgeable constituency interested in supporting and improving flood protection measures.

CRS Resource Center

More information, including sample activities, public information materials, and local examples can be found on the CRS Resource Center website at

http://training.fema.gov/EMIWeb/CRS/

6. A CRS community's flood program benefits from the added incentive of maintaining its flood programs over the years. The fact that the community's CRS status could be affected by the elimination of a flood-related activity, or a weakening of the regulatory requirements for new development, should be taken into account by the governing board when considering such actions. A similar system used in fire insurance rating has had a strong impact on the level of support local governments provide to their fire protection programs.

7. Implementing some CRS activities, such as floodplain management planning, can help a community qualify for certain federal assistance programs.

26.2. CRS Activities

The *CRS Coordinator's Manual* describes the 18 floodplain management activities credited by the CRS and the documentation required to receive credit for each activity. The credits and formulae used to calculate credit are also included. The 18 activities are itemized in the next section. These activities are divided into four categories:

Public information (Series 300): This series credits programs that advise people about the flood hazard, flood insurance, and ways to reduce flood damage. These activities also provide data that insurance agents need to provide accurate flood insurance ratings. They generally serve all members of the community and work toward all three CRS goals.

Mapping and regulations (Series 400): This series credits programs that provide increased protection to new development. These activities include mapping areas not shown on the FIRM, preserving open space, enforcing higher regulatory standards, and managing stormwater. The credit is increased for growing communities. These activities work toward the first and second goals of the CRS, damage reduction and accurate insurance rating.

Flood damage reduction (Series 500): This series credits programs for areas in which existing development is at risk. Credit is provided for a comprehensive floodplain management plan, relocating or retrofitting floodprone structures, and maintaining drainage systems. These activities work toward the first goal of the CRS, damage reduction.

Flood preparedness (Series 600): This series credits flood warning, levee safety, and dam safety programs. These activities work toward the first and third goals of the CRS, damage reduction and hazard awareness.

All the activities (except for 320 Map Information) have more than one element for which credit may be provided. Every CRS community must maintain Elevation Certificates (Activity 310) from the date of its application to the CRS. With that exception, a community can choose which activities and elements it wants to implement and which it wants credit for.

The CRS activities are not design standards for local floodplain management. The *CRS Coordinator's Manual* is an insurance tool that describes methods of calculating credit points for various community activities. The fact that the CRS does not provide a direct credit for some activities does not mean that communities that need them should not implement them.

Some activities and elements are not directly recognized by the CRS for one of three reasons:

1. They do not directly affect buildings that can be insured under the NFIP (e.g., uninsurable items such as streets and land values).

2. They are recognized by other aspects of the flood insurance rating program (e.g., flood control projects reduce the size of floodplains, thereby reducing the flood insurance premiums in protected areas).

3. The impact of an activity cannot be measured for CRS credit (e.g., preserving floodplains for aesthetic reasons).

Uniform minimum credit: Many communities can qualify for "uniform minimum credit" in which a parish or regional agency can apply for a CRS activity that it is implementing on behalf of its communities. For example, CRS credit is provided for some public information activities that the Amite River Basin Commission is implementing.

If the community has its own program that deserves more credit points, it may apply for more than the uniform minimum credit points. This approach saves time and money for everyone involved.

26.3. Credit Points

26.3.1. Application for credit

The Community Rating System (CRS) provides 10 classes: Class 1 has the most premium credit and communities in Class 10 receive none (Figure 26-1). A community's CRS class is based on the number of credit points calculated for the activities it undertakes to reduce flood losses, facilitate accurate insurance ratings, and promote the awareness of flood insurance.

A community is automatically a Class 10 community, unless it applies for a CRS classification and shows that the activities it is implementing warrant a higher classification. A community may apply for CRS credit by submitting a *CRS Application* with appropriate documentation to its ISO/CRS Specialist.

A community uses the *CRS Application* for its initial application for CRS classification. The community must have at least 500 points using the *CRS Application* to apply for CRS Classification. The ISO/CRS Specialist calculates the final score after a review of the documentation and the community's implementation of its activities at the verification visit.

A community should apply only for those activities it is actively undertaking and those it knows it can implement in accordance with the *CRS Coordinator's Manual.* A community should not be overly ambitious and overestimate its first year credit points at the risk of losing credit later for activities it is unable to implement. For example, no credit is provided for draft ordinances. Communities can only receive credit for regulations that have been enacted and enforced.

26.3.2. Activity credit points

The activities and their maximum credit points are shown in Figure 26-3. The third column shows the average credit points received by previous years' applicants for each activity. The averages are based upon the number of applicants for each activity, not the total number of applicants to the CRS.

The fourth column shows the percentage of all applicants that received credit for each activity. Communities should note the average credits for these activities. They provide a better indication than the maximum points available of what an applicant can expect for an activity.

For example, in order to receive 3,200 points for Activity 520 (Acquisition and Relocation), a community must have removed 100% of the structures from the Special Flood Hazard Areas (SFHAs) shown on its FIRM. The 9% of all communities that applied for credit under Activity 520 averaged 177 points received for their acquisition and relocation work. One CRS community received 2,364 points for Activity 520.

Activity	Maximum possible points[1]	Average points earned[2]	Maximum points earned[3]	Percentage of communities credited[4]
300 Public Information Activities				
310 Elevation Certificates	162	69	142	100%
320 Map Information Service	140	138	140	95%
330 Outreach Projects	380	90	290	86%
340 Hazard Disclosure	81	19	81	61%
350 Flood Protection Information	102	24	66	87%
360 Flood Protection Assistance	71	53	71	48%
400 Mapping & Regulatory Activities				
410 Additional Flood Data	1,346	86	521	29%
420 Open Space Preservation	900	191	734	83%
430 Higher Regulatory Standards	2,740	166	1,041	85%
440 Flood Data Maintenance	239	79	218	68%
450 Stormwater Management	670	98	490	74%
500 Flood Damage Reduction Activities				
510 Floodplain Management Planning	359	115	270	20%
520 Acquisition and Relocation	3,200	213	2,084	13%
530 Flood Protection	2,800	93	813	6%
540 Drainage System Maintenance	330	232	330	69%
600 Flood Preparedness Activities				
610 Flood Warning Program	255	93	200	30%
620 Levee Safety	900	198	198	1%
630 Dam Safety	175	66	87	81%

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

[2] *The average points earned are based on communities' scores that have been verified since the 2007* CRS Coordinator's Manual *became effective. The average points earned include credit for growth rates.*

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

[4] *The percentage of communities credited is based on the number of CRS communities with verified credits since the 2007* CRS Coordinator's Manual *became effective.*

Figure 26-3. Credit points awarded for CRS activities.

26.3.3. Quick check of potential CRS credit

Purpose: A minimum of 500 points is required to receive a CRS classification of Class 9, which reduces premium rates. The quick check in Figures 26-4 and 26-5 provides some basic information for local officials to determine if their communities have enough points to attain Class 9.

If a community does not qualify for at least 500 points, it may want to initiate new activities to attain Class 9. For example, some of the public information activities can be implemented quickly for a very low start-up cost. The quick check can identify where points can be earned for new activities.

Quick check instructions: The section numbering system is used throughout all CRS publications. Sections 300 through 600 describe the 18 creditable activities. Activity 310 (Elevation Certificates) is required of all CRS communities and Activity 510 (Floodplain Management Planning) is required of designated repetitive loss communities. The rest of the activities are optional. Only the elements most frequently applied for are listed.

If the activity is applicable, the average community score (which is in parentheses) should be entered in the blank to the left to provide a rough estimate of the community's initial credit points.

Minimum requirements Section 211 (Prerequisites): The community must be in the Regular Phase of the NFIP and be in full compliance with the minimum requirements of the NFIP. The application must include a letter from the DHS/FEMA Regional Office confirming that the community is meeting all of the latest NFIP requirements.

Activity 310 (Elevation Certificates): All CRS communities must maintain DHS/FEMA's elevation certificates for all new and substantially improved construction in the floodplain after the date of application for CRS classification (Section 24.2).

Sections 501–503 (Repetitive Loss Areas): A community with properties that have received repeated flood insurance claim payments must map the areas affected. Communities with 10 or more such properties must prepare, adopt, and implement a plan to reduce damage in repetitive loss areas. The ISO/CRS Specialist and the DHS/FEMA Regional Office can determine if this applies to any given community.

Other activities: If the activity is applicable, the average community score (which is in parentheses) should be entered in the blank at left to provide a rough estimate of the community's initial credit points.

Quick Check of Potential CRS Credit

The national average community score is in parentheses. Enter this number in the blank to the left to provide a rough estimate of the community's initial credit points.

Public Information Activities (Series 300)

_____ (69) 310 (Elevation Certificates). Maintain DHS/FEMA elevation certificates for all new construction. Maintaining them after the date of CRS application is a minimum requirement for any CRS credit

_____ (138) 320 (Map Information). Respond to inquiries to identify a property's flood zone and publicize this service.

_____ (90) 330 (Outreach Projects). Send information about the flood hazard, flood insurance, and flood protection measures to floodprone residents or all residents of the community.

_____ (19) 340 (Hazard Disclosure). Real estate agents advise potential purchasers of floodprone property about the flood hazard; or regulations require a notice of the flood hazard.

_____ (24) 350 (Flood Protection Information). Public libraries and local web sites maintain references on flood insurance and flood protection.

_____ (53) 360 (Flood Protection Assistance). Provide inquiring property owners with technical advice on how to protect their buildings from flooding and publicize this service.

Mapping and Regulatory Activities (Series 400)

_____ (86) 410 (Additional Flood Data). Develop new flood elevations or floodway delineations for areas not mapped in detail by DHS/FEMA.

_____ (191) 420 (Open Space Preservation). Guarantee that a portion of currently vacant floodplain will be kept free from development.

_____ (166) 430 (Higher Regulatory Standards). Require freeboard; require soil test or engineered foundations; require compensatory storage; zone the floodplain for minimum lot sizes of one acre or larger; or have regulations tailored to protect critical facilities or areas subject to special flood hazards (e.g., land subsidence).

_____ TOTAL FIRST PAGE

Figure 26-4. Quick Check form, page 1.

_____ (79) 440 (Flood Data Maintenance). Keep flood and property data on computer records (e.g., GIS); use better base maps; or maintain elevation reference marks.

_____ (98) 450 (Stormwater Management). Regulate new development throughout the water shed to ensure that post-development runoff is no worse than pre-development runoff.

Flood Damage Reduction Activities (Series 500)

_____ (115) 510 (Floodplain Management Planning). Prepare, adopt, implement, and update a comprehensive plan using a standard planning process.

_____ (213) 520 (Acquisition and Relocation). Acquire and/or relocate floodprone buildings so that they are out of the floodplain.

_____ (93) 530 (Flood Protection). Document that buildings are protected by elevation, floodproofing, or structural flood control projects.

_____ (232) 540 (Drainage System Maintenance). Conduct periodic inspections and maintenance of all channels and retention basins.

Flood Preparedness Activities (Series 600)

_____ (93) 610 (Flood Warning Program). Provide early flood warnings to the public and have a detailed flood response plan keyed to flood crest predictions.

_____ (138) 620 (Levee Safety). Maintain levees that are not credited with providing 100-year flood protection.

_____ (66) 630 (Dam Safety). All communities in Louisiana receive 74 points.

_____ TOTAL SECOND PAGE

_____ TOTAL FIRST PAGE

_____ TOTAL ESTIMATED POINTS FOR THE COMMUNITY

If this quick check shows that the community could receive at least 500 points, it may want to check its status in the NFIP with the DHS/FEMA Regional Office and apply for a CRS classification using the *CRS Application*.

Figure 26-5 Quick Check form, page 2

26.4. Publications

The following documents are available at no cost. They can be ordered by calling (317) 848-2898, e-mailing NFIPCRS@iso.com, or downloading from the CRS page on DHS/FEMA's CRS website (http://training.fema.gov/EMIWeb/CRS/)

26.4.1. General references

CRS Application. 66 pages. Instructions and worksheets for a community to apply for an initial CRS classification. The activities are summarized and the activity descriptions are combined with checklists that are submitted for application.

CRS Coordinator's Manual. 708 pages. The *CRS Coordinator's Manual* is the primary document used by communities for the Community Rating System. It includes detailed discussion of credits provided for various floodplain management activities and instructions on the calculation of credit. The *CRS Coordinator's Manual* is used to verify CRS credit and for modifications of a community's CRS credit for a better classification.

The National Flood Insurance Program's Community Rating System. These color brochures provide a brief summary description of the CRS for distribution to elected officials, residents, and others who want an overview of the program.

"Computerized Calculations for the Community Rating System." A stand-alone program for IBM-compatible personal computers (on a compact disk) that guides data entry and calculates credit points. A copy of the user's guide is included. This software prints worksheets that may be used for submitting modifications as an alternative to the paper Activity Worksheets.

CRS Record-Keeping Guidance, 26 pages. Guidance on keeping track of records and annual actions such as outreach projects for CRS credit. The guide includes sample forms.

26.4.2. References on specific activities

"Computerized Format for FEMA Elevation Certificates." A program for entering and retrieving data from DHS/FEMA Elevation Certificates. Meets the requirements for credit for elevation certificates in computerized format under Activity 310 of the CRS. Requires an IBM-compatible PC and a compact disk drive.

CRS Credit for Dam Safety. 38 pages. A discussion of the credit under Activity 610 (Dam Safety) in the *CRS Coordinator's Manual*, with examples.

CRS Credit for Drainage System Maintenance. 64 pages. A discussion of the credit under Activity 540 (Drainage System Maintenance) in the *CRS Coordinator's Manual*, with examples (including one from Jefferson Parish).

CRS Credit for Flood Warning Programs. 62 pages. A discussion of the credit under Activity 610 (Flood Warning Program) in the *CRS Coordinator's Manual*, with examples.

CRS Credit for Outreach Projects. 112 pages. A discussion of the credit under Activity 330 (Outreach Projects) in the *CRS Coordinator's Manual*, with examples.

CRS Credit for Higher Regulatory Standards. 78 pages. A discussion of the credit under Activity 430 (Higher Regulatory Standards) in the *CRS Coordinator's Manual,* with examples.

CRS Credit for Management of Coastal Erosion Hazards, 52 pages. This publication discusses the credits provided by the CRS for mapping and management of coastal erosion hazards.

CRS Credit for Stormwater Management. 57 pages. A discussion of the credit under Activity 450 (Stormwater Management) in the *CRS Coordinator's Manual,* with examples.

Example Plans. 1,327 pages. A discussion of credit for Floodplain Management Planning (Section 510 in the *CRS Coordinator's Manual*), with three complete example plans.

Section 27. Disaster Operations

Contents

27.1. Disaster Operations

27.1.1. The setting

Louisiana is no stranger to disasters (Figure 27-1). Floodplain managers agree: It's not *if* a community will be flooded, it's *when.*

Parish	Total	Parish	Total	Parish	Total
St. Tammany	9	Ouachita	6	St. Mary	4
Ascension	8	Richland	6	Union	4
La Salle	8	St. Bernard	6	Vernon	4
Livingston	8	St. Charles	6	West Carroll	4
Rapides	8	Terrebonne	6	Winn	4
St. Martin	8	Avoyelles	5	Iberia	3
Caldwell	7	Bienville	5	Jefferson Davis	3
Catahoula	7	Calcasieu	5	Madison	3
East Baton Rouge	7	East Feliciana	5	Red River	3
Franklin	7	Morehouse	5	Sabine	3
Iberville	7	Washington	5	West Feliciana	3
Jefferson	7	Webster	5	Acadia	2
Lafayette	7	Allen	4	Cameron	2
Lafourche	7	Bossier	4	De Soto	2
Orleans	7	Caddo	4	East Carroll	2
Pointe Coupee	7	Claiborne	4	Jackson	2
Tangipahoa	7	Concordia	4	St. Helena	2
Vermilion	7	Lincoln	4	Tensas	2
Assumption	6	St. James	4	West Baton	2
Beauregard	6	St. John the	4	Evangeline	1
Grant	6	St. Landry	4	Plaquemines	1
Natchitoches	6				

Figure 27-1. Disaster declarations from flooding in Louisiana, 1965 – 2002.
Source: Louisiana Office of Homeland Security and Emergency Preparedness

Those who have been hit by a flood or other disaster usually regret they were unprepared. Whether it's a house or a city, floodplain administrators can take steps to prepare for the inevitable.

This section covers the steps and procedures that a permit office should follow after a disaster. The rules are the same for floods or any other kind of disaster. Remember: it does not matter what damaged the buildings in the floodplain. If they are damaged, the floodplain administrator is responsible for seeing that they are repaired according to the standards in the flood damage prevention ordinance.

Everyone will expect the administrator to respond quickly and efficiently after a disaster, without regard to other priorities. He or she will have to take on emergency post-disaster responsibilities, often at the expense of not performing normal duties.

In addition, floodplain administrators may have suffered damage or losses of their own. So, while they are at work helping others, they may not be getting the help they need.

Their challenges are compounded by the fact that they need to be available 12 hours a day and they may have few trained helpers.

There may be pressure from the public and elected officials to waive normal procedures and regulations in order to help people return to normal as fast as possible. This is often despite the fact that "back to normal" may mean exposing people and buildings to the type of flooding that may have caused the disaster in the first place.

In short, residents and businesses are primarily concerned with getting back to normal. Stress levels are high, patience can be low, the environment is unfamiliar, and there is never enough time or money. All of this adds up to good reasons to prepare now, before the next disaster hits.

It is strongly recommended that floodplain administrators set up procedures to prepare for this situation that will ensure full and fair enforcement of the regulations during this time of stress, confusion, and controversy.

27.1.2. Emergency operations

The emergency manager is responsible for disaster and emergency response activities, such as evacuation, rescue, sandbagging, and coordination with the parish, state, and federal agencies. Once the disaster is big enough, the emergency manager will open the Emergency Operations Center (EOC).

The floodplain administrator may have a role during the emergency. The permit office usually is expected to have a representative in the EOC during the disaster.

The administrator should meet with the emergency manager to review what he or she expects to be done before, during, and after the disaster. It is very important to clarify roles as soon as possible. The emergency manager may need the floodplain administrator for damage assessment when he or she wants to start inspecting individual buildings.

At some time the community will move from the emergency phase to the recovery phase. The administrator should review with the emergency manager what the office needs to do to help the community recover and at what point staff are free to pursue the activities covered in this section.

27.1.3. Building condition survey

A building condition survey is conducted to help the permit office manage time and resources most efficiently. The survey determines:

- If any building is so dangerous that it should not be reentered without a careful inspection

- Which buildings will need a building permit before they can be repaired or reoccupied

When possible, the building condition survey is done in conjunction with the emergency manager's initial damage assessment. If the area affected is relatively small, the survey may be skipped and the permit office can immediately begin inspecting damaged buildings.

The permit office should have work maps of the floodplain that show buildings, addresses, and elevation contour lines. They should be sized for use during the survey. They should be made in advance of a disaster and be on letter or legal size paper so that they will be easy to use in a vehicle.

Before the survey, the floodplain administrator should review the work maps for the affected area(s) and, using the high water mark data, determine which areas were hit worst. This can be done by plotting known flood boundaries or matching high water marks to the elevation contour lines.

Any area where the flood crest was 2 feet or more above the building's adjacent grade should be outlined on the map and designated as the first priority for the building condition survey.

The building condition survey is conducted from the outside of all buildings, usually from a vehicle. Depending on the severity and duration of flooding, the survey may be conducted concurrently with the emergency manager's initial damage assessment. A photo should be taken of each building, showing any damage that is visible from outside.

On the work maps, each building should be coded with an "A," "B," or "C" for the three categories of building condition:

A - Apparently safe: No exterior signs of structural damage. People can be allowed back in, but they will need building permits for repairs.

B - Building obviously substantially damaged: The flood swept the building away, it has collapsed, or it is missing one or more walls. The building cannot be reoccupied without major structural work.

C - Could be substantially damaged: The building may be substantially damaged, but such damage is not obvious. Any building with more than 2 feet of water over its first floor falls into this category if it does not qualify for category B.

When the field work is complete, summarize the survey findings and plot them on a master mitigation map. Use color coding, so areas coded B and C—those that are or may be substantially damaged—will stand out.

27.1.4. Notice to owners

Upon completing the survey, the floodplain administrator should hand-deliver a letter to each property surveyed, including those assessed as apparently safe. Each letter should include the building's address and, where known, the owner's name. A sample letter is in Figure 27-2.

Keep copies in the permit office and start a file on each property designated as "B - Building obviously substantially damaged" or "C - Could be substantially damaged."

Include a copy of the DHS/FEMA/Red Cross book, *Repairing Your Flooded Home* with the letter. Supplies are available from DHS/FEMA or the Red Cross. If too few copies are available, *Repairing Your Flooded Home* can be reproduced, even with the community's name on the cover. DHS/FEMA and the Red Cross encourage this because it makes the book more pertinent to local readers.

The requirements stated in the notice should also be publicized. Sometimes well-meaning friends and organizations help people clean up and repair so fast that they do not realize a permit may be needed.

27.1.5. High water marks

High water marks are valuable records and should be marked with spray paint or other highly visible method on telephone poles, trees, etc. These marks can help residents relate the last flood to the regulatory protection level. For example, if the flood was estimated to be 2 feet below the base flood, people can be told that if they were substantially damaged, they will have to elevate their homes at least 3 feet above the high water marks.

High water marks are also important for recording the extent of the flood and adding to the hydrologic record. Someone, usually the community engineer, should be responsible for obtaining readings from stream gauges and other high water marks as they are reported. Using these high water marks, the engineer should prepare a flood boundary map and estimate a flood recurrence interval.

27.1.6. Insurance adjustments

Flood insurance adjusters fill out a Preliminary Damage Assessment Form if they think a building may be substantially damaged (Section 14). The form is faxed to a central NFIP adjustment office, which makes it available to the DHS/FEMA Region.

The DHS/FEMA Regional staff can provide this information to local building departments. This procedure can help flag potentially substantially damaged buildings. While this can be a useful tool for code enforcement, it is only preliminary data and subject to revision when a more thorough damage estimate and claims adjustment are conducted.

Dear [Name]

The permit office conducted a windshield survey of flooded buildings in your neighborhood. A review of your building from the outside indicates that the structure was affected by the recent flood. Here are some things you should know:

1. Repairs to your building require a permit from the City's permit office. Before you remove, alter, or replace any of the following items you MUST obtain a building permit: the roof, walls, siding, wallboard, plaster, insulation, paneling, cabinets, flooring, electrical system, plumbing, heating, or air conditioning.
2. The permit office will conduct a complimentary inspection of the damage to your building. This inspection will help you identify what needs to be repaired. It will also identify if a permit is needed and if your building could be substantially damaged. There is no cost for this inspection but it must be taken before you begin your repairs or reconstruction. We will contact you when we plan to do the inspection. If you have a preferred time, please call us to arrange an appointment.
3. You may proceed with clean-up activities and temporary emergency repairs without a permit. These include:
    1. Removing and disposing of damaged contents, carpeting, wallboard, insulation, etc.
    2. Hosing, scrubbing, or cleaning floors, walls, ductwork, etc.
    3. Opening walls and drying out cavities to prevent mold.
    4. Covering holes in roofs or walls and covering windows to prevent the weather from inflicting further damage.
    5. Removing sagging ceilings, shoring up broken foundations, and other actions to make the building safe to enter.
4. Some day in the future, your area will flood again. There are things you can do during repair and reconstruction to reduce damage from the next flood. Many of these are discussed in the attached book, *Repairing Your Flooded Home*. We'll be glad to talk to you about protecting your property from future flooding. If we receive a disaster declaration, there may be some financial assistance to help pay for making your property safer than it was before. In the meantime, read Step 8 in *Repairing Your Flooded Home* for some ideas.
5. In order to screen out possible opportunists from taking advantage of the current situation, any contracted work must be done by a firm licensed to work in the City. Furthermore, residents are cautioned and warned *not* to sign blank contracts, agree to have work performed without first seeing the contractor's registration card, or allow work or alterations not authorized by the City permit office.

For further information, please contact the permit office at _____.

Sincerely,

[Name], Director

Permit Office

Attachment: *Repairing Your Flooded Home*

Figure 27-2. Sample letter to flood damaged property owner.
(Reword for other types of disasters)

27.2. Regulating Reconstruction

27.2.1. Permit requirements

The floodplain administrator should contact the Louisiana Department of Transportation and Development (LADOTD) and the DHS/FEMA Regional Office as soon as possible after the flood to review reconstruction regulatory requirements and see if there are any new guidance documents or data from claims adjusters.

The community must require a permit to repair any flooded building in order to determine if any buildings are substantially damaged. The floodplain administrator cannot wait for property owners to voluntarily apply for a permit. The substantial damage determination must be done promptly after the damage, even if the owner delays actual repairs. A permit is required for each building that will be repaired by removing, altering, or replacing the roof, walls, siding, wallboard, plaster, insulation, paneling, cabinets, flooring, electrical system, plumbing, heating, or air conditioning. These repair/ reconstruction projects must meet the community's building code and flood damage prevention ordinance.

Prompt Work Pays Off

Terrebonne Parish conducted substantial damage determinations promptly after Hurricane Lili in 2002. A few months later, the purchaser of a damaged house applied for a repair permit and was surprised by the substantial damage elevation requirement. The parish had wisely documented the earlier notification to the seller. The buyer had been wronged, but not by the parish! The Parish's work also helped over 100 owners get ICC monies to elevate their homes.

The permit requirement cannot be waived, although the governing board may opt to waive permit fees. The board may not reduce or ignore the NFIP substantial damage requirement. To do so would subject the community to NFIP sanctions (Section 3.5.5).

27.2.2. Cleanup and emergency repairs

The community may allow cleanup and temporary emergency repairs to proceed without a permit. These include:

- Removing and disposing of damaged contents, carpeting, wallboard, insulation, etc.
- Hosing, scrubbing, or cleaning floors, walls, ductwork, etc.
- Opening walls and drying out cavities to prevent mold
- Covering holes in roofs or walls and covering windows to prevent weather from inflicting further damage
- Making the building safe to enter by removing sagging ceilings, shoring up broken foundations, and other actions

The floodplain administrator may want to identify which buildings may need emergency work and review with the owner the benefits of using professional contractors to do some of the repairs.

Structural alterations—such as removing floors or studs, or replacing central air conditioning—are not allowed without a permit.

Unless the building presents a safety hazard, owners of potentially substantially damaged buildings should be advised against making major repairs, since their buildings may be purchased, modified, and/or demolished later.

27.2.3. Initial inspection

Section 27.1.4 covers the first step in enforcing the repair permit requirement: Deliver notices to property owners after the building condition survey and start a file on each property.

As soon as possible after the notice is delivered, the floodplain administrator should inspect each flooded property to review needed repairs and determine if a permit is required.

Use a checklist to make the inspection quick and consistent. A sample checklist is shown in Figures 27-3 and 27-4. Give a copy of the completed inspection to the property owner, along with safety, health, and repair information.

Helpful Inspection Tool

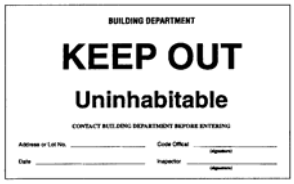
DHS/FEMA's *Residential Substantial Damage Estimator* (RSDE) software can greatly assist the floodplain administrator at this stage (Section 14.1.3). It is objective, quick, and it fulfills all NFIP documentation requirements

27.2.4. Posting

Upon completion of the inspection, the floodplain administrator should post the appropriate sign on the front of the building so it is clearly visible from the street. Appropriate colored signs can be obtained in volume from the International Code Council on line at www.iccsafe.org/e/category.html. They are color coded for easy viewing from the street.

If the building needs repairs that do not require a permit, post "Safe for Occupancy" and "Approved to Connect" (utilities) signs. These are often green signs.

If a permit to make repairs is required, post the "Habitable—Repairs Necessary" sign. These could be yellow signs.



If it is not safe to clean up or work on the building without major structural repairs, post a "Keep Out—Uninhabitable" sign. Making these red gets the message across and underscores "red tagging."

Post-Disaster Building Inspection Checklist – Page 1

Property address:_____ Date: _____

Owner: _____ Phone: _____

Check the appropriate column. Column 1 items note that the damage is minor, column 2 items can be expensive to repair, and column 3 items are indicators of substantial damage. Do not count clean-up costs or damage to contents (including plug-in appliances) and other items not part of the building's structure (detached structures, fences, sidewalks, swimming pools, etc.).

1	2	3	**General condition**
__			Building appears sound and safe to enter, needs minor work to make habitable
	__		Apparently safe to enter, needs extensive cleaning/repairs
		__	Foundation, floor, wall, or ceiling damage such that building not safe to enter
			Depth of water
__			In crawlspace, <2" in unfinished basement, not in building
__			In unfinished basement, only affected contents and utilities
	__		< 3' in finished basement or over first floor
		__	≥ 3' over first floor or in finished basement
			Foundation
			Type of foundation: ___ Slab ___ Basement/split level ___ Crawlspace
__			No signs of cracks or settling.
	__		Cracks in basement or crawlspace walls
		__	Buckling of slab or basement floor, broken crawlspace, or basement wall
			Exterior
			Type of exterior walls: ____ Masonry ____ Wood/aluminum/vinyl siding
__			No signs of cracks or swelling, doors/windows stick but work
	__		Some swelling or warping of walls, doors/windows may need to be replaced
	__		Deck, porch, balcony damaged
		__	Shifting of wall on foundation, wall broken
			Floors
__			Concrete/tile/bare wooden floors: No signs of damage
__			Tile//vinyl/linoleum coming loose, can be cleaned and reglued
	__		Carpeting/vinyl/linoleum soaked, needs to be replaced
		__	Wooden floor or subfloor warped, broken, or needs replacement
			Interior
__			Water did not reach any wallboard, paneling, or insulation; doors stick but work
	__		First 4 feet of wallboard, paneling, or insulation must be replaced
	__		All wallboard, paneling or insulation in the lowest floor must be replaced
	__		Doors/molding/built-in bookcases swollen, warped, need to be replaced
		__	Studs/walls broken, shifted
		__	Ceiling sagging/collapsing

Figure 27-3. First page of sample building inspection checklist.

Post-Disaster Building Inspection Checklist – Page 2

1	2	3	**Heating & central air conditioning**
			Type of system: ____ Forced air ____ Electric baseboard ____ Other: ____
__			Water did not reach any electrical parts, gas jets, or ductwork
	__		Ductwork needs to be disassembled and cleaned or replaced
	__		Gas jets and/or electrical parts need to be cleaned or replaced
	__		Propane/fuel tank needs to be reconnected and/or anchored
			Electrical
__			Water did not reach any outlets, switches, meters, or fuse or breaker boxes
	__		Outlets, switches, breakers, lights or other fixtures need to be replaced
		__	Meter or service box need to be repaired or replaced by a professional
			Plumbing
__			Drains and sewers need to be cleared
__			Sump pump needs to be repaired or replaced
	__		Water heater needs to be replaced
	__		Water softener needs to be replaced
			Kitchen and bath
__			Kitchen and bath(s) only need to be cleaned up
__			Built-in appliances, ovens, etc. need cleaning by a professional
	__		Built-in appliances, ovens, etc. need to be replaced
	__		Cabinets/counters warped or otherwise need to be replaced
	__		Plumbing fixtures cracked, broken or need to be replaced
__	__	__	Number of checks in each column
			Completed by: _____.

If all checks are in column 1, no building permit is needed. If there are any checks in columns 2 or 3, a substantial damage determination must be conducted and a building permit must be applied for.

Except where professional cleaning is necessary, any items checked in columns 1 or 2 can be performed by the owner.

A licensed contractor may charge for the repair/reconstruction estimate, especially if the owner intends to do the work.

Any item checked in column 3 and any alteration to the electrical or plumbing systems must be performed by a licensed contractor.

The owner should read *Repairing Your Flooded Home*, pages 15-29, for clean-up and repair guidance and pages 39-41 for mitigation suggestions to incorporate into the repairs.

For further information, please contact the Permit Office at _____.

Figure 27-4. Second page of sample building inspection checklist.

Only a representative of the permit office may remove or replace a sign after permits have been issued and repairs are made. The "safe for occupancy" signs may be removed by the owners in accordance with instructions issued by the community (for example, the permit office may want all signs posted until all inspections have been completed).

27.2.5. Follow up

Here are some things to help with enforcement:

- As procedures are developed, check with utility companies and appropriate community utility departments. Advise them of the enforcement procedures.
- If not in place, establish a policy that utilities may not turn service back on unless there is an "Approved to Connect" sign posted on the building. This will help people to comply with the regulations after a disaster.
- Instruct police and other departments about the permit requirements and ask them to report any construction projects under way without posted permit signs.
- Within a week of issuing the notices to the owners, visit the notified properties to ensure that the owners are abiding by the requirements.
- Keep a master list or map to track the survey, inspection, and permit application findings.
- The DHS/FEMA's *Residential Substantial Damage Estimator* software can be very helpful (Section 14.1.3).

27.2.6. Flooded buildings

Flooded buildings are harder to inspect than those damaged by other means. Much of the damage is hidden behind walls or under floors, so the owner may not recognize the long-term effects of water, moisture, and mold.

The community should require wallboard/plaster and insulation to be removed from a flooded building. Once the owner says the framing members are dry, conduct an inspection. Check the cleanliness and moisture content before allowing the walls to be recovered. If the studs are too wet, tell the owner to allow them to dry more before they are covered over.

The best way to measure the level of moisture in wood is with a moisture meter. A moisture meter can be purchased through woodworking specialty companies. It should have a probe that can be stuck into the wood.

If the wood's moisture content exceeds normal levels for the area (usually 10% to 15%), it is too wet to be covered by paint or wallboard. Reinspect it later after it is allowed to dry some more. If the owner is anxious to rebuild, make sure he or she has a copy of *Repairing Your Flooded Home.* Step 4 of that book reviews how to speed up the drying process.

27.2.7. Contractor quality control

After a disaster, not-so-honest or unqualified contractors offer to help disaster victims, sometimes offering cut rates or special deals. Each community should control this by requiring certain construction and reconstruction work to be done by qualified and licensed people.

If the community does license contractors, advise property owners of this requirement through the news media. It also helps to have handouts on dealing with contractors and what to do in case of a dispute (for some good language, see pages 41-43 in *Repairing Your Flooded Home*).

If the community receives a sufficient number of complaints, the permit office should relieve the contractor of his or her license to do business. Bad home improvement and construction contractors can also be reported to the Attorney General's Consumer Protection Section through the Consumer Protection Hotline: 800/351-4889 or www.ag.Louisiana.gov.

The community's work does not have to be a series of confrontations with contractors. Contractors can be the floodplain administrator's best ally when explaining to a property owner why things have to be done a certain way. They also can help encourage property owners to retrofit and take additional steps to protect themselves from the next flood.

The community may want to conduct workshops for contractors on flood repairs, mitigation measures, funding opportunities, etc.

27.3. Administration

27.3.1. Permit forms

If a permit is required, the property owner should be given the necessary forms and told what repairs, if any, can proceed before the permit is issued. The following forms should be kept in the property's file:

- Notice to the owner (Figure 27-2)
- Initial inspection checklist (Figures 27-3 and 27-4)
- Permit application
- Repair/reconstruction estimate
- Substantial damage worksheets or the data files from the *Residential Substantial Damage Estimator* software
- Inspection records
- DHS/FEMA Elevation or Floodproofing Certificate, if the building is required to be elevated or floodproofed
- Certificate of occupancy

27.3.2. Public information

The floodplain administrator should inform residents about the regulatory requirements and the need to carefully clean and rebuild. The community should issue news releases and/or distribute materials to advise property owners on:

- Activities that require a permit.
- Activities that do not require a permit (language in Figure 27-2 could form the basis for a news release).
- The substantial damage rule (Section 14.1).
- The benefits of Increased Cost of Compliance flood insurance coverage (Section 14.3).
- The need for licensed contractors, if licensing is required by the community.
- The information provided in steps 2, 3, and 4 in *Repairing Your Flooded Home*, such as taking pictures for insurance and disaster assistance claims, before throwing things away, and health and safety precautions.
- The need to include property protection measures as part of repairing homes or businesses. People need to recognize that "returning to normal" means returning to a building that will be damaged by another flood.
- The wealth of information on flood protection that is available at LSU's website, www.LouisianaFloods.org.

27.3.3. Technical assistance

Many technical issues can arise during post-disaster permit operations, but the floodplain administrator has many sources of assistance:

- Call LADOTD and the DHS/FEMA Regional Office first. If there was a disaster declaration, they may be able to provide technical assistance staff or workshops to clarify things.
- Ask the parish health department or emergency manager for site-specific guidance on how to ensure that a building is fit for reoccupancy, well water is drinkable, etc.
- The LSU Extension Service has post-disaster materials on many topics and can provide advice on technical matters. Check its website for the latest materials (Section 31).

Some communities require contractors to certify that a building has been properly cleaned. This should be allowed only if the contractor is qualified to do so. Two organizations certify repair contractors: the International Institute for Cleaning and Restoration Certification (IICRC) and the Association of Specialists in Cleaning and Restoration (ASCR). See Section 31 for contact information. These organizations can tell which contractors in the area are certified and what their qualifications are.

27.3.4. Staff assistance

If the disaster affected many properties, the floodplain administrator probably will need more people to perform survey and inspection work. Staff assistance can come from:

- A mutual aid agreement with neighboring communities. There already may be some agreements with neighbors on sharing staff from other offices. The emergency manager can help with procedures and agreement language.
- Other communities willing to offer help; check with LADOTD.
- The Building Officials Association of Louisiana, which may know of members available to help.

If there was a disaster declaration, check with the emergency manager. The permit office may be able to get temporary hires, with part of the cost reimbursed through disaster assistance.

Disaster assistance may also reimburse the community for inspectors to conduct habitability inspections and to determine if buildings are substantially damaged.

Section 28. Hazard Mitigation

Contents

28.1. Mitigation Measures

While this Desk Reference has focused on regulations directed toward new construction in the floodplain, most communities are more concerned about existing flood problems. This section tackles the bigger issue—reducing flood losses and making sure other activities do not make things worse.

Hazard mitigation is the responsibility of the Louisiana Office of Homeland Security and Emergency Preparedness (LOHSEP). LOHSEP has a mitigation section that can provide advice and assistance. It is responsible for the funding programs reviewed in Section 28.3. Other State offices, especially the Department of Transportation and Development (LADOTD) and the LSU Extension Service, can provide help on specific mitigation measures.

LOHSEP has published a Hazard Profile for the State and is preparing a State mitigation plan. Contacts and status of their activities can be found on the agency's website, listed in Section 31, Contacts.

28.1.1. Hazard mitigation

Many communities deal with flooding using only one or two activities. Every community in the National Flood Insurance Program (NFIP) regulates new development to make sure things do not get worse. Many communities tackle their local drainage problems with storm sewer or drainage construction projects. Coastal communities usually have warning and evacuation programs.

However, many communities do not realize how many other flood protection activities they could implement. Nor do they know of all the other federal, state, local, and private agencies or organizations that can help them with a flood problem. Each community should consider all possible measures for mitigating flood hazards and each community should seek support from as many programs and agencies as possible.

While flooding cannot always be stopped—and in many cases, should not be prevented—flood hazards can be reduced. As they are defined, the words "hazard mitigation" mean taking measures that minimize or reduce the impacts of flooding on human development.

"Hazard mitigation" does not mean that flooding is stopped or prevented. It does not suggest complete elimination of the damage or disruption caused by floodwaters. Natural forces are powerful and most natural hazards are well beyond our ability to control. Mitigation does not mean quick fixes. It is a long-term approach to reduce hazard vulnerability.

> *"Hazard mitigation"* is defined as any action or measure that either prevents the occurrence of a disaster or reduces the severity of its effects. —LOHSEP

Each mitigation measure is appropriate in different situations. Structural flood control projects can be the most efficient way to protect an existing critical facility or a concentration of damage-prone buildings. But in developing areas, regulations and acquisition make more sense because they are inexpensive ways to prevent creation of flood problems.

The Community Rating System (CRS) categorizes flood hazard mitigation measures under six basic strategies. A good local mitigation program includes all of them:

- Prevention
- Emergency services
- Property protection
- Structural projects
- Natural resource protection
- Public information

28.1.2. Prevention

Preventive measures are designed to keep the problem from occurring or getting worse. They ensure that future development is protected from flooding and that it will not increase flood damage. Preventive measures are usually administered by building, zoning, planning, and/or code enforcement offices. They include:

- Planning and zoning
- Open space preservation
- Building codes
- Floodplain development regulations (Figure 28-1)
- Subdivision regulations
- Dune and beach maintenance
- Stormwater management

Figure 28-1. Preventive measures, like elevating new buildings on fill, seek to protect new development.

28.1.3. Property protection

Property protection measures are used to modify buildings subject to flood damage rather than to keep floodwaters away. Communities find that these are inexpensive measures because they are often implemented by or cost-shared with property owners. These measures include:

- Acquisition
- Relocation
- Building elevation (Figure 28-2)
- Floodproofing
- Sewer back-up protection
- Insurance

Figure 28-2. This Louisiana home was elevated with DHS/FEMA funds.

LSU's website, www.LouisianaFloods.org, has a great deal of information on these measures

28.1.4. Natural resource protection

Water quality and natural habitats can be improved, and flood losses can be reduced, by preserving or restoring natural areas or the natural functions of floodplain and watershed areas. These activities usually are implemented by environmental, code enforcement, or coastal management agencies. In addition to these measures, zoning or preserving open space also can protect natural resources:

- Wetland protection
- Erosion and sediment control
- Coastal barrier protection
- "Best management practices" for stormwater runoff

28.1.5. Emergency services

Emergency services protect people during and after a flood. Most parishes and many cities have emergency management offices to coordinate warning, response, and recovery during a disaster. Emergency services measures include:

- Flood warning
- Flood response
- Evacuation and sheltering (Figure 28-3)
- Critical facilities protection
- Health and safety maintenance

Figure 28-3. Evacuation is a key emergency services measure.

28.1.6. Structural projects

Structural flood control projects are used to prevent floodwaters from reaching properties. These measures are "structural" because they involve construction of man-made structures to control water flows. There are seven common types of projects:

- Reservoirs/detention basins
- Levees/floodwalls/seawalls
- Channel modifications
- Enlarging culverts or bridge openings
- Diversions
- Beach nourishment
- Drainage system maintenance (Figure 28-4)

Figure 28-4. Good drainage maintenance allowed this ditch to do its job during Tropical Storm Isidore in 2002.

Structural projects can be very expensive and they have other shortcomings that must be considered before they are implemented. These include:

- Disturbing the land, disrupting natural water flows, destroying habitats
- Requiring regular maintenance
- Being built to a flood protection level that larger floods can exceed
- Creating a false sense of security, because people protected by a project often believe that no flood will ever reach them

28.1.7. Public information

Public information activities advise property owners, potential property owners, and visitors about the hazards, ways to protect people and property from the hazards, and the natural and beneficial functions of floodplains. Usually implemented by a public information office, they can include:

- Map information
- Outreach projects (Figure 28-5)
- Real estate disclosure
- Libraries
- Websites
- Technical assistance
- Environmental education

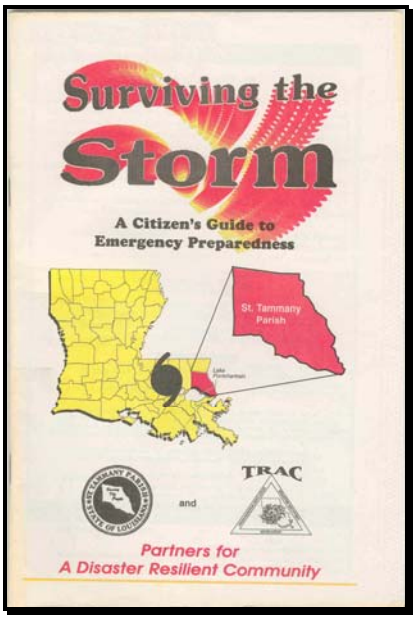


Figure 28-5. Example outreach project.

28.2. Mitigation Planning

Different departments in a community may implement activities that are not coordinated or that may even conflict with one another. Some examples:

- The street department extends or improves streets into the floodplain—while the planning and zoning office is discouraging development there.
- The public works department straightens ditches and lines them with concrete to make them more efficient—while the parks department or neighborhood groups promote greenways and natural vegetative approaches to bank stabilization.
- The engineering office collects valuable data on rainfall and stream levels—but does not give the emergency manager information to predict the timing or crest of a flood.
- Property owners view a swamp as a place to be filled in so it can be farmed or built on—without realizing the wetland's role in absorbing floodwaters and providing habitat.

28.2.1. Benefits of planning

Floodplain residents and property owners are not always aware of things that are being done to protect them from flooding, nor are they aware of things they can do to protect themselves or how they can contribute to community efforts. Developing a flood hazard mitigation plan is one of the best ways to correct these shortcomings.

The objective of planning is to produce a program of activities that will tackle the community's flood problem and meet other community needs. A well-prepared plan will:

- Ensure that all possible activities are reviewed and implemented so that the most appropriate solutions are used to address the flood problem.
- Link floodplain management policies to specific activities.
- Ensure that activities are coordinated with each other and with other community goals, objectives, and activities to prevent conflicts and reduce the costs of implementing individual activities.
- Educate residents about the flood hazard, flood loss reduction measures, and the natural and beneficial functions of floodplains.
- Fulfill planning requirements for federal assistance (Sections 28.3.3, 28.3.4, and 28.3.6).
- Guide development away from hazardous areas.
- Build public and political support for projects that prevent new flood problems, reduce flood losses, and protect the natural and beneficial functions of floodplains.
- Facilitate implementation of floodplain management activities through an action plan that has specific tasks, staff assignments, and deadlines.

A well-prepared plan guides the community's flood, stormwater, and related activities so that they are implemented more economically and in ways more attuned to the needs and objectives of the community and its residents.

A well-prepared plan will also reduce flood losses and improve protection of the floodplain's natural and beneficial functions, which benefits both the community and the NFIP.

28.2.2. DHS/FEMA requirements

The Disaster Mitigation Act of 2000 (also known as "DMA 2000" or "DMA 2K") set new planning requirements for DHS/FEMA programs:

- Effective November 1, 2003, if a community wants funding from DHS/FEMA's Pre-Disaster Mitigation (PDM) grant program, it must have adopted a multi-hazard mitigation plan. PDM funds are available on a competitive basis each year.
- Effective November 1, 2004, if a community wants funding from DHS/FEMA's Hazard Mitigation Grant Program (HMGP), it has to have a multi-hazard mitigation plan. HMGP funds are provided following a Presidential disaster declaration.
- If a community wants funding from DHS/FEMA's Flood Mitigation Assistance (FMA) program, it must have a flood hazard mitigation plan.

If a community wants to join the Community Rating System and it has 10 or more repetitive loss properties, it must prepare a floodplain management plan for its repetitive loss areas. The community may expand such a plan to include all of its floodprone areas to receive full credit under Activity 510–Floodplain Management Planning. Additional credit is provided if the plan is an all-hazards mitigation plan.

28.2.3. The planning process

The planning process includes getting input from everyone who has relevant information, who is affected by flooding, and who will participate in implementing the plan. It works for all types of plans, including those for land use plans, capital improvement, neighborhood redevelopment, and hazard mitigation.

A hazard mitigation plan can take many forms, using a variety of formats and organizational styles. The format and organization of a plan are not what is important. As Dwight D. Eisenhower said, "Planning is essential." This simple phrase says it all: The paper document is not as important as the *process* of planning. Because every community is different, each floodplain management plan will be different. However, the process they follow should be similar.

DHS/FEMA regulations pursuant to DMA 2K recommend a four-part planning process: establish the process, assess the risk, review mitigation alternatives, and implement.

The CRS recommends a 10-step planning process that expands on the DMA 2K guidelines. Both are summarized in Figure 28-6. In both cases, the process provides a framework for local officials, residents, engineers, technical experts, and others to work out the details and reach agreement on what should be done to mitigate the flood hazard.

There are some relatively new references on mitigation and floodplain management planning. The CRS guide, *Example Plans*, covers all DHS/FEMA programs and focuses on flood mitigation. There is also a series of DHS/FEMA *State and Local Mitigation Planning How-to Guides* for multi-hazard planning. See Section 29 for ordering information.

DMA 2K (44 CFR 201.6)	CRS Steps	How-To Guides *
Planning process		*Getting Organized*
201.6(c)(1)	1. Organize	
201.6(b)(1)	2. Involve the public	
201.6(b)(2) & (3)	3. Coordinate	
Risk assessment		*Understanding Your Risks*
201.6(c)(2)(i)	4. Assess the hazard	
201.6(c)(2)(ii) & (iii)	5. Assess the problem	
Mitigation strategy		*Developing a Mitigation Plan*
201.6(c)(3)(i)	6. Set goals	
201.6(c)(3)(ii)	7. Review possible activities	
201.6(c)(3)(iii)	8. Draft an action plan	
Plan maintenance		*Bringing the Plan to Life*
201.6(c)(5)	9. Adopt the plan	
201.6(c)(4)	10. Implement, evaluate, revise	

Figure 28-6. DHS/FEMA planning guidance.

* The "How-to Guides" are a new series of mitigation planning notebooks published as *State and Local Mitigation Planning how-to guides,* FEMA 386-1, -2, etc. See Section 29 for downloading and ordering.

Flood Mitigation Planning—The First Steps, Association of State Floodplain Managers, 2001. This floodplain management planning kit consists of reference materials, masters for handouts, and a two-part video that explains the 10-step process to the general public. It is designed to be shown at the first meeting of a planning committee. Order through the ASFPM website, www.floods.org, or call (608) 274-0123.

28.3. Mitigation Assistance Programs

A variety of federal, state, local, and private sources offer assistance in mitigation activities. Help is limited only by the community's imagination and initiative. This section reviews the more common programs.

28.3.1. Technical assistance

Help with mitigation planning may be available from a local, regional, or state planning division or private organization. For example, the National Park Service's Rivers, Trails and Conservation Assistance Program provides staff support for local planning under certain conditions. If they cannot help with the whole project, they may be able to help with some tricky parts, such as providing a facilitator for an all-day community input workshop.

Private consultants are another source of assistance. Planning and engineering firms usually have personnel skilled in various flood loss reduction measures and the planning process.

These flood-related agencies and organizations may help by providing technical assistance or in implementing mitigation activities:

- Louisiana Office of Homeland Security and Emergency Preparedness
- The soil and water conservation district
- Agencies of the U.S. Department of Agriculture that work with watershed property owners, such as the Natural Resources Conservation and Cooperative Extension services
- River basin commissions
- Regional or metropolitan water, sewer, or levee districts
- Parish emergency management agencies
- DHS/FEMA Regional Office
- The district office of the U.S. Army Corps of Engineers

More references and contacts in floodplain management agencies and programs can be obtained through the Association of State Floodplain Managers' website, www.floods.org.

See also *Federal Programs Offering Non-Structural Flood Recovery and Floodplain Management Alternatives* in Section 29. It is located on DHS/FEMA's website at www.fema.gov/hazards/floods/non_fema1.shtm.

Assistance on wetlands issues can be obtained by calling the EPA Wetlands Information Hotline at 800-832-7828.

28.3.2. Property owners

Many times, a community does not have to look beyond the beneficiaries of hazard mitigation to find help for a mitigation activity.

For an activity that directly affects a property, such as a retrofitting project, the owner should be asked to contribute. One way is to use the owner's insurance claim to help pay for a project related to repairing a damaged building. The Increased Cost of Compliance coverage in the flood insurance policy was specifically created for mitigation purposes. It is discussed in more detail in Section 14.3.

Figure 28-7. Owners as funders: This is one of five structures in Denham Springs that were elevated in 1995. The owners paid approximately 52% of the cost, up to $40,000 each. They all escaped damage

Owners who recognize that they have a real flood problem are willing to pay a large part of the cost. In the last few years, owners have paid the non-federal 25% cost-share for most DHS/FEMA mitigation grants for raising houses in Louisiana (Figure 28-7).

For more information on these and other local funding sources, see the U.S. Army Corps of Engineer's *Local Flood Proofing Programs*.

28.3.3. Flood Mitigation Assistance program

The National Flood Insurance Reform Act of 1994 authorized FEMA to provide grants to states and communities for planning assistance and for mitigation projects that reduce the risk of flood damage to structures covered by flood insurance. The overall goal of the Flood Mitigation Assistance (FMA) program is to fund cost-effective measures that reduce or eliminate the long-term risk of flood damage to buildings, manufactured homes, and other insurable structures.

The FMA will pay 75% of the cost of these measures under its planning grants, project grants, and technical assistance grants. Each state receives annual funding for planning and project grants. The Louisiana Office of Homeland Security and Emergency Preparedness administers the program. All funding applications must go through the State to be accepted by DHS/FEMA (Section 31). *Note: As this Desk Reference is going to press, Congress enacted the Flood Insurance Reform Act of 2004 which amends the Flood Mitigation Assistance program. This section will be revised when DHS/FEMA issues revised regulations in response to the new law.*

> The rules and procedures for financial assistance programs change each year. Get the latest information from LOHSEP. See Section 31 for contact information.

Planning grants: The purpose of a planning grant is to develop or update a Flood Mitigation Plan. To be eligible for an FMA project grant, an eligible applicant must develop, and have approved by the DHS/FEMA Regional Director, a flood mitigation plan that "will articulate a comprehensive strategy for implementing technically feasible flood mitigation activities for the area affected by the plan." Sections 28.2.2 and 28.2.3 discuss mitigation planning.

Project grants: The following types of projects are eligible for funding through FMA, provided they meet all other eligibility criteria:

- Acquisition of insured structures and underlying real property with an easement restricting the property to open space use
- Relocation of insured structures from acquired or restricted real property to non-hazard-prone sites
- Demolition and removal of insured structures from acquired or restricted real property
- Elevation of insured residential structures in accordance with NFIP standards
- Elevation or dry floodproofing of insured nonresidential structures in accordance with NFIP standards
- Other activities that bring an insured structure into compliance with NFIP floodplain management requirements
- Minor physical flood mitigation projects that reduce localized flooding problems and do not duplicate the flood prevention activities of other federal agencies

To be eligible for a project grant, a project must be:

- In conformance with the Flood Mitigation Plan. The type of project being proposed must be identified in the plan.
- Cost-effective, not costing more than the anticipated value of the reduction in both direct damages and subsequent negative impacts to the area if future floods were to occur. Both costs and benefits are computed using net-present value.
- In conformance with federal regulations on floodplain management, protection of wetlands, seismic safety, and applicable environmental laws and regulations
- Technically feasible.
- In conformance with the minimum standards of the NFIP
- Located physically in a participating NFIP community that is not on probation

28.3.4. Pre-Disaster Mitigation program

The Pre-Disaster Mitigation (PDM) program "provides technical and financial assistance to local governments for cost-effective pre-disaster hazard mitigation activities that complement a comprehensive mitigation program, and reduce injuries, loss of life, and damage and destruction of property." Funding first became available in 2003 so there is not much experience in the use of these funds.

In 2003, funds were available for planning grants and project grants on a 75/25 federal/non-federal cost share. There was no list of eligible activities, but they are assumed to be similar to those for FMA grants (Section 28.3.3). Ineligible activities included major flood control projects, flood warning systems, drainage studies, communication equipment, and floodplain mapping.

A natural hazards mitigation plan is a prerequisite for a PDM project grant. All applicants must be in good standing in the National Flood Insurance Program if they have a mapped Special Flood Hazard Area (SFHA).

> The rules and procedures for financial assistance programs change each year. Get the latest information from LOHSEP. See Section 31 for contact information.

28.3.5. Disaster assistance

If a community is hit by a disaster and the area subsequently receives a Presidential disaster declaration, a variety of programs can provide mitigation assistance. Most of them are authorized by the Robert T. Stafford Disaster Relief and Emergency Act, known as the Stafford Act.

First, a disaster field office will be established under the guidance of both a state and federal coordinating officer. They will be supported by mitigation staff and directed by a deputy Federal coordinating officer for mitigation and a state hazard mitigation officer.

Two types of help will be provided: technical and financial assistance. The federal-state team will distribute up-to-date materials about these programs; this section provides a brief overview of them. Note that they may be slightly different when implemented in the future.

Technical assistance: The disaster assistance staff will spend time with the community's mitigation planners to review mitigation measures, techniques, and funding sources.

One of their prime concerns will be proper regulation during reconstruction (Section 27.2). They can also help analyze damage to identify areas prime for acquisition and clearance and help to develop mitigation plans.

The disaster team may also provide technical assistance to property owners. Information on repairing and retrofitting is provided through public meetings, handouts, and news releases. Sometimes mitigation tables are set up in disaster recovery centers, or separate Reconstruction Information Centers are opened. These centers house architects, engineers, and other specialists who can work closely with owners to help design appropriate flood protection measures.

Financial assistance: DHS/FEMA will widely publicize the assistance programs that become available after a disaster declaration. There are three main types of assistance, each of which can fund mitigation measures: the Hazard Mitigation Grant Program, Public/Infrastructure Assistance, and human services programs.

28.3.6. Hazard Mitigation Grant Program

The Hazard Mitigation Grant Program (HMGP) provides grants to local governments to implement long-term hazard mitigation measures after a major disaster declaration. The purpose of the program is to reduce the loss of life and property due to natural disasters and to enable mitigation measures to be implemented during immediate recovery from a disaster.

Section 404 of the Stafford Act makes money available to assist eligible applicants after a Presidential disaster declaration. Section 404's Hazard Mitigation Grant Program will pay up to 75% of the cost of such mitigation projects.

As of November 1, 2004, to be eligible, the community must have an accepted hazard mitigation plan (see discussion in Section 28.2.2). Projects should be consistent with the recommendations of the plan and the State's mitigation plans and strategies. Projects must be shown to be cost-effective and they may mitigate hazards other than the one that caused the disaster.

Eligible projects include acquisition of floodprone properties and reversion to open space, elevation of floodprone buildings, and minor drainage improvements (Figure 28-8). Traditionally, the program has most often been used to acquire floodplain properties. In some communities, the property owners volunteered to help pay the non-Federal share of the cost.

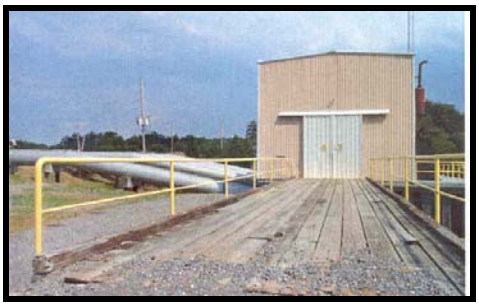


Figure 28-8. HMGP project. St. Charles Parish used HMGP funds to help pay for this new pump station. It is estimated to have prevented up to $7 million in damage when Tropical Storm Allison hit in 2001.

Even if a community did not receive a disaster declaration, it may be able to receive a Hazard Mitigation Grant. In 1997, FEMA ruled that the funds could be spent on appropriate projects throughout a state that received a disaster declaration. However, priority funding is usually given to communities in the declared parishes.

28.3.7. Repetitive Flood Claims (RFC) Grant Program

This program provides funding to reduce or eliminate the long-term risk of flood damage to structures insured under the National Flood Insurance Program (NFIP) that have had one or more claim payment(s) for flood damages (See Section 2844). RFC funds may be used only to mitigate structures that are located within a state or community that cannot meet the requirements of the Flood Mitigation Assistance (FMA) program. Eligible applicants include state emergency management agencies or a similar office.

28.3.8. Public/Infrastructure Assistance

Formerly known as the Public Assistance Program, this program can provide 75% of the cost of repairing or restoring facilities owned by public agencies and certain private nonprofit organizations. If an applicant prefers to relocate a facility out of the floodplain rather than replace it, DHS/FEMA will still provide funds, but at a reduced share.

> ***Insurance Note:*** Public/Infrastructure Assistance grants for public buildings are subject to a "deductible." Under the Stafford Act, Federal disaster assistance for a flooded public building will be reduced by the amount of flood insurance coverage the community should have on that building.
>
> It does not matter whether the building is insured; DHS/FEMA still will only provide assistance for damage that exceeded the level of available insurance (structural and contents). See Section 25.4.3.

DHS/FEMA takes the first step in obtaining Public/Infrastructure Assistance funding by completing a Project Worksheet (PW) for each facility. The community should have a representative on each PW team provide local input into the repair or replacement design for damaged facilities.

The local PW representative should know that this program provides an opportunity to incorporate hazard mitigation features while replacing some damaged property. DHS/FEMA can provide funding beyond the cost of repairing or replacing a public facility, if it can be demonstrated that the proposed mitigation measure is technically feasible, cost-effective, and required by a state or local regulation.

> **Mitigation Example:** A flood washes out a culvert that used to back up every time there was a 2-inch rain. DHS/FEMA and the State will estimate the cost to repair or replace it as it was. If someone points out that (1) a larger culvert can save more money than it costs by reducing flood damage to other properties, and (2) the larger culvert will not create a new flood problem, DHS/FEMA may then share the expense of replacing the lost culvert with a larger one.

Similarly, funds from this program can be used to protect or relocate damaged water and sewer lines, floodproof pumping stations, or replace bridges with clear spans.

28.3.9. Human services programs

Human services programs provide resources to assist residents and business owners with services such as temporary housing, unemployment aid, food stamps, and grants and loans. Assistance to Individuals and Households can provide temporary housing.

The Assistance for Individuals and Households program provides cash grants of up to $25,000 per household. It is a grant to individuals, usually people who cannot qualify for a loan or cannot get a loan to cover all of their expenses.

The housing assistance component can be used for temporary lodging expense reimbursement, rental assistance, home repair and home replacement, permanent housing construction (in rare circumstances), and other approved disaster-related needs. This can be particularly helpful for people waiting to find out if their homes can be reoccupied, or if they will be acquired and cleared.

The housing assistance component has been used by recipients for small mitigation projects, such as elevating an air conditioning unit, water heater, washer, or electrical service box above the flood level. These grants can be especially useful in areas in which lower-income or fixed-income families are subject to shallow flooding.

However, these grants generally are insufficient to retrofit an entire building. Furthermore, they are federal funds and cannot be used toward the non-federal cost-share required for larger mitigation grants.

28.4. Repetitive Loss Properties

Repetitive loss properties are those properties for which two or more claims of more than $1,000 have been paid by the NFIP within any 10-year period since 1978 (e.g., two claims during the periods 1978–1987, 1979–1988, etc.). These 115,000 properties represent only 1% of all the NFIP's insurance policies, but they have accounted for nearly one-third of the claim payments These properties cost the NFIP an estimated $200 million per year in flood insurance claim payments (over $4.5 billion to date). NFIP actuaries have reported that repetitive loss is the single most important factor that affects the stability of the National Flood Insurance Fund.

To focus resources on those properties that represent the best opportunities for mitigation, Congress defined a subset called "Severe Repetitive Loss Properties" when it passed the Flood Insurance Reform Act of 2004. Severe Repetitive Loss Properties are those 1–4 family properties that have had four or more claims of more than $5,000 or two to three claims that cumulatively exceed the building's value. FEMA is directed by the Act to define Severe Repetitive Loss Property for multifamily buildings. The flood insurance policies on these properties are serviced by a separate Special Direct Facility and not by individual Write Your Own insurance companies.

The Flood Insurance Reform Act creates new funding mechanisms to help mitigate flood damage to these properties and to other repetitive loss properties (see Section 28.3). A list of both categories of properties can be obtained from the FEMA Regional Office.

Federal, state and local officials are working with communities to eliminate or reduce the damage to property and the disruption to life caused by repeated flooding of these properties.

Depending on individual circumstances, appropriate mitigation measures commonly include elevating buildings above the level of the base flood, demolishing buildings and removing buildings from the Special Flood Hazard Area (SFHA) as part of a flood control project. Sometimes, mitigation takes the form of a local drainage-improvement project that meets NFIP standards and removes a property or properties from repetitive loss (RL) or Repetitive Loss Target Group (RLTG) status.

Most flood insurance policies include increased cost of compliance coverage. The coverage provides for the payment of claims up to $30,000 toward the costs to comply with state or community floodplain management laws or ordinances after a flood event in which the structure has been declared substantially damaged in accordance with the locally enforceable regulation (see Section 14.3).

Increased Cost of Compliance (ICC) coverage can complement other resources by providing a portion of the non-federal cost share for HMGP grants. Flood insurance policyholders are allowed to assign the ICC claim payments over to the community so

that ICC claims can be efficiently combined with mitigation grant funds for acquisition, relocation or similar beneficial projects.

FEMA produces a list of repetitive loss properties within each NFIP community that has one or more of these properties. This list must be obtained through the FEMA Regional Office by any community considering applying for the Community Rating System (CRS). As part of its application and cycle verification, the community must review the list for accuracy, correct addresses, whether the properties are actually in the community's corporate limits, and whether the insured buildings have been removed, retrofitted, or otherwise protected from the cause of the repetitive flooding.

28.5. Sustainable Communities

Hazard mitigation means reducing a community's exposure to the danger and damage caused by natural hazards. It is one of many activities that receive the attention of community leaders, staff, stakeholders, and the public. If hazard mitigation is incorporated into the broader realm of community improvement, it will be more effective in the long run. One way to do this is to encourage the sustainable community approach.

The following is paraphrased from DHS/FEMA's *Planning for a Sustainable Future* (FEMA 364, 2000).

In its broadest context, "sustainable" development "meets the needs of the present without compromising the ability of future generations to meet their own needs." Essentially, sustainability means that decisions made by the present generation will not reduce the options of future generations, but will pass on to them a natural, economic, and social environment that will provide a high quality of life.

The extent to which a community manages to achieve a sustainable future largely depends upon how well it integrates the concepts and principles of sustainable development, including disaster resistance, into its decision-making process. Time and again, community leaders have indicated that the fundamental component of successful disaster recovery efforts is community participation in the process—having people come together to identify a community's needs and work toward collaborative solutions.

What makes a community sustainable? From experience, we know that sustainable communities make more efficient use of their land. Such land-use decisions tend to emphasize open space planning by promoting greenways, parks, and landscaping. Additionally, the effective use of open space can prevent development from encroaching upon floodplains, active fault zones, and other hazard areas. Sustainable communities also take advantage of underutilized urban areas and encourage infill and "brownfield" development. Energy and resource conservation are high priorities and a greater emphasis is placed on public transit and creating mixed-use environments that are less dependent on autos.

Traditional indicators of a sustainable community are social, economic, and environmental health. The degree to which a community achieves sustainability is directly related to the extent to which the values underlying these indicators are satisfied. However, another fundamental component must now be added: disaster resistance. Disaster resistance focuses community attention on issues related to sustainable development and livability because it is an issue that cuts across social, economic, and environmental lines.

In considering **social viability**, a community has to balance the competing needs of its citizens. Following a disaster, for example, efforts may focus on citizens who are most likely to live in high hazard zones and may be less able to rebuild following a disaster. In

other disasters, community efforts may focus on homeowners who have been allowed to build in environmentally sensitive areas that may not be in the public interest. In either case, housing and access to basic public services and facilities are critical social needs in the aftermath of a disaster. Disasters can have other social consequences that may undermine community sustainability, including loss of security, severe stress and anxiety, diminished trust in government, and disruption of familiar environments and daily routines.

Economic vitality is essential to sustainability. In economic recovery from a disaster, a community has three key objectives: retain existing businesses, promote continued or new economic development, and ensure that businesses are built back safer, smarter, and stronger. Keeping local businesses and economic infrastructure out of high-risk areas, or disaster proofing them if there is no practicable alternative for their relocation, is an important approach to promoting a more sustainable economy.

Preserving the integrity of biological and physical systems is the most important environmental indicator of sustainability. This involves limiting degradation of the environment and preserving natural systems—such as wetlands, floodplains, dunes, and active fault or landslide zones—that increase a community's resilience to natural hazards.

The **environmental component** of sustainability is clearly evident in the recommendations of an Interagency Task Force Congress formed in 1994 to investigate the natural and beneficial functions of floodplains in relation to flood loss reduction. The Task Force's recommendations included the following:

- Encourage a proactive and long-term approach to floodplain management, including the development of pre- and post-disaster plans for flood damage reduction and preservation/restoration of natural and beneficial functions.
- Focus restoration and protection efforts on those floodplains or portions of floodplains identified as having the greatest flood risks and significant natural and beneficial functions.
- Encourage natural, non-structural solutions to reducing flood damages.

This section has provided an overview of the traditional approaches to sustainable development and livability. In addition, it has shown that disaster resistance is also an essential key to sustainability.

For more information on sustainable communities, and how to incorporate the concept into planning and disaster recovery, see *Planning for a Sustainable Future, Rebuilding for a More Sustainable Future: An Operational Framework,* and *Holistic Disaster Recovery—Ideas for Building Local Sustainability after a Natural Disaste*r. See Section 29 on how to obtain these references.

28.6. No Adverse Impact

No Adverse Impact (NAI) is a concept developed and encouraged by the Association of State Floodplain Managers. NAI is an explanation and rationale for local actions to ensure that flood problems are not increased. More information can be found at the Association's website, www.floods.org.

28.6.1. The approach

For local governments, No Adverse Impact (NAI) floodplain management represents a more effective way to tackle their flood problems. The concept offers communities a framework to design programs and standards that meet their true needs, not just the requirements of a federal or state governmental agency.

The NAI floodplain management initiative empowers communities (and their citizens) to work with stakeholders and build a program that is effective in reducing and preventing flood problems. NAI floodplain management is about communities being proactive—understanding potential impacts and implementing prevention and mitigation activities before the impacts occur.

NAI has many benefits. By developing activities that really address the local situation and that do not harm others, a community can:

- Prevent flooding from increasing or damaging others
- See a reduction in flood losses over time
- Avoid challenges and lawsuits over causing or aggravating a flood problem
- Receive recognition for the efforts through the Community Rating System

28.6.2. The *Toolkit*

NAI can provide a framework and rationale for hazard mitigation activities. The Association has published *No Adverse Impact*: *A Toolkit for Common Sense Floodplain Management* to provide ideas on how this can be done. The *Toolkit* is available free through downloading from the Association's website.

No Adverse Impact is a principle, not a specific set of standards, requirements or practices. The objective is to incorporate the NAI concept into all ongoing local community activities. There are many ways a community can do this. It can incorporate the approaches into community plans, adopt specific regulatory or policy language, initiate individual projects, start or revise entire programs or prepare a master plan that addresses all activities that impact flooding.

The *Toolkit* is designed to help local officials or concerned citizens incorporate the NAI principle into their community's ongoing programs. The tools consist of a variety of

activities that can improve a floodplain management program. They are organized under seven “building blocks:

1. Hazard identification and floodplain mapping
2. Education and outreach
3. Planning
4. Regulations and development standards
5. Mitigation
6. Infrastructure
7. Emergency services

28.6.3. Mitigation planning

At the NAI level, all planning that involves flooding should identify *all* the impacts of the hazard *and all* of the alternative measures to address the impacts. What happens and who really pays should be specifically identified and discussed so the planners and decision makers are aware of all the ramifications.

Often floodplain management or mitigation plans focus on the hazard—something to avoid or get away from. Such plans can help prevent or reduce flood losses, but if they have only one concern, it is difficult to build broad support for them. To be really effective, plans need to address many concerns and to be proactive toward building a more viable and sustainable community.

All plans that address flooding can benefit from the **multi-objective management** approach or “**M-O-M**.” This approach promotes public involvement and coordination of floodplain management with other community concerns, such as economic development, housing, water quality, habitat protection, and recreation.

For example, while those managing the floodplain see the floodplain as a hazardous area that reduces flood damage if it is cleared, the environmental organization sees it as a habitat that needs to be preserved, the schools see it as a teaching resource, and the parks and street department may want a greenway to keep pedestrians and bikes away from traffic.

The M-O-M approach has proven to gain a larger constituency to support the plans and longer-term interest in seeing them implemented. It also helps when an agency or organization can fund only part of a project, but other agencies can support other elements. Often, they favor those projects that have other sources of funding. In other words, they prefer to support multi-objective projects, and this is where coordination with other community goals and objectives can pay off.

Section 29. References

Most of the documents listed here are available for free. **Those shown in bold are included on the compact disk (CD) version of this *Desk Reference*.** Others are available for download from websites are noted. Those with a ".pdf" extension require Adobe Acrobat Reader, which is free software available from Adobe Acrobat at www.adobe.com/products/acrobat/readermain. html.

Order a **DHS/FEMA** publication by:

- Downloading from DHS/FEMA's website. Many of the publications have a direct site listed. These can change over time so www.FEMA.gov should be searched if a DHS/FEMA publication's link does not work.
- Calling 800-480-2520
- Faxing an order to 301-497-6378.

Order a **Community Rating System** publication by:

- Downloading from the CRS website resource center at http://training.FEMA.gov/emiweb/crs
- Calling 317-848-2898
- E-mailing an order to NFIPCRS@iso.com

The noted **U.S. Army Corps of Engineers** floodproofing publications can be found on the following website: www.usace.army.mil/inet/functions/cw/cecwp/NFPC/nfpc.htm. Hard copies can be ordered from the Corps' Tulsa District office, which is the national repository for floodplain management publications:

U.S. Army Corps of Engineers
Tulsa District
Flood Plain Management Services
1645 South 101st East Avenue
Tulsa, Oklahoma 74128

918-669-7197
fax: 918-669-7546

carolyn.schultz@usace.army.mil

Other publications can be ordered as noted.

***Addressing Your Community's Flood Problems: A Guide for Elected Officials*.** ASFPM, joint project with the Federal Interagency Floodplain Management Task Force. 1996. Order from the Association by calling 608/374-0123.

Answers to Questions about the National Flood Insurance Program. FEMA. F-387. August 2004. www.fema.gov/nfip/qanda.shtm

Below-Grade Parking Requirements for Buildings Located in Special Flood Hazard Areas in Accordance with the NFIP. FEMA. Technical Bulletin 6-93, IF-TB-6. 1993. www.fema.gov/fima/techbul.shtm

Building Performance Assessment Report: Hurricane Georges in the Gulf Coast. FEMA. March 1999. FEMA 338.

Building Public Support For Floodplain Management: A Catalog of Good Practices. ASFPM. 2007. Order from the Association by calling 608/374-0123.

Coastal Construction Manual: Principles and Practices of Planning, Siting, Designing, Constructing, and Maintaining Residential Buildings in Coastal Areas. FEMA. FEMA 55. 2000. www.fema.gov/hazards/floods/lib55.shtm

Code of Federal Regulations: Title 44—Emergency Management and Assistance. Chapter 1. FEMA. www.fema.gov/nfip/laws1.shtm

Corrosion Protection for Metal Connectors in Coastal Areas. FEMA. Technical Bulletin 8-96. 1996. www.fema.gov/fima/techbul.shtm

Crawlspace Construction for Buildings Located in Special Flood Hazard Areas, FEMA. FIA-TB-11, 2001. www.fema.gov/fima/techbul.shtm

CRS Publications can be downloaded from http://training.fema.gov/EMIWeb/CRS/ or ordered by e-mailing NFIPCRS@iso.com

CRS Application, FEMA. NFIP.CRS. 2007.

CRS Coordinator's Manual, FEMA. NFIP/CRS. 2007.

CRS Credit for Dam Safety. FEMA. NFIP/CRS. 2006.

CRS Credit for Drainage System Maintenance. FEMA. NFIP/CRS. 2007.

CRS Credit for Higher Regulatory Standards. FEMA. NFIP/CRS. 2007.

CRS Credit for Management of Coastal Erosion Hazards. FEMA. NFIP/CRS. 2007.

CRS Credit for Outreach Projects. FEMA. NFIP/CRS. 2007.

CRS Credit for Stormwater Management. FEMA. NFIP.CRS. 2007.

Example Plans. FEMA. NFIP/CRS. 2007

Design and Construction Guidance for Breakaway Walls Below Elevated Coastal Buildings. FEMA. Technical Bulletin 9, 1999. www.fema.gov/fima/techbul.shtm

Design Guidelines for Flood Damage Reduction. FEMA. FEMA 15. 1981. www.fema.gov/hazards/floods/lib15.shtm

Design Manual for Retrofitting Flood-prone Residential Structures. FEMA. FEMA 114. 1986.

Elevated Residential Structures. FEMA. FEMA 54. 1984. www.fema.gov/hazards/floods/lib54.shtm

Elevation Certificate, Floodplain Management Bulletin. FEMA, 2006. www.fema.gov/fima/fpmbul.shtm

Elevator Installation for Buildings Located in Special Flood Hazard Areas in Accordance with the NFIP. FEMA. Technical Bulletin 4-93, IF-TB-4. 1993. www.fema.gov/fima/techbul.shtm

Engineering Principles and Practices for Retrofitting Flood Prone Residential Buildings. FEMA. FEMA 259. 1995. www.fema.gov/hazards/floods/lib259.shtm

Ensuring That Structures Built on Fill In or Near Special Flood Hazard Areas Are Reasonably Safe From Flooding. FEMA. FIA-TB-10. 2001. www.fema.gov/fima/techbul.shtm

Federal Programs Offering Non-Structural Flood Recovery and Floodplain Management Alternatives. Executive Office of the President. 1998. www.fema.gov/hazards/floods/non_fema1.shtm

Flood Insurance Agent's Manual. FEMA. 2007. www.fema.gov/nfip/manual.shtm

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- **Understanding Your Risks: Identifying Hazards and Estimating Losses** (FEMA 386-2)
- **Developing a Mitigation Plan: Identifying Mitigation Actions and Implementation Strategies** (FEMA 386-3)
- **Bringing the Plan to Life: Implementing the Hazard Mitigation Plan** (FEMA 386-4)
- **Using Benefit-Cost Analysis in Mitigation Planning** (FEMA 386-5)
- **Incorporating Historic Resources into Mitigation Planning** (FEMA 386-6)
- **Integrating Human-Caused Hazards into Mitigation Planning** (FEMA 386-7)
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Section 30. Glossary

Some of the technical terms and acronyms are described in more detail in the section noted. Note that the local flood damage prevention ordinance has its own definitions section. The definitions in the legal ordinance take precedence over those in this section.

404 Permit: A permit required by Section 404 of the Clean Water Act to protect rivers and adjacent wetlands from being filled. This permit program is administered by the U.S. Army Corps of Engineers. 20.4.4

A Zone: See Zone A.

Accrete: To build up a shoreline by depositing sand, either by nature or human actions. Section 1.2.2

Amendment: A change to a DHS/FEMA floodplain map that removes an area that was shown to be included in the Special Flood Hazard Area. Section 10.3

Anchoring: Special connections made to ensure that a building will not float off or be pushed off its foundation during a flood. Section 12.2.2

Appeal: A request to higher authority such as a Board of Appeals or a City Council to overrule a permit denial because the applicant claims that the ordinance has been incorrectly interpreted. Section 21.1.1

Approximate study: Flood mapping that shows the *approximate* outline of the base floodplain. An approximate study does not produce a base flood elevation. Section 6.4.2

B Zone: See Zone B.

Base flood depth: A measurement of the base flood in feet above ground, used for shallow flooding. Section 9.1.3

Base flood elevation (BFE): The elevation (in relation to sea level or other datum) of the crest of the base flood. Section 5.3.2

Base flood: The flood having a 1% chance of being equaled or exceeded in any given year. It also known as the 1% chance or 100-year flood. It has been adopted by the NFIP as the basis for mapping, insurance rating, and regulating new construction. Section 5.3.1

Basement: any area of a building having its floor subgrade (below ground level) on all sides. Section 12.2.4

Basin: See watershed.

Bathymetry: The measurement of depths of water in the ocean or lakes. Section 7.1.3

Benchmarks: Monuments on the ground that show the elevation of the spot above sea level. Section 5.3.5

BFE: See base flood elevation.

Building condition survey: A windshield survey conducted to obtain a preliminary evaluation of the extent and severity of damage to buildings after a disaster. Section 27.1.3

Building: A walled and roofed structure that is principally above ground. The term also includes manufactured homes, mobile homes, and gas or liquid storage tanks. In this reference, the term is the same as the term "structure" in the Federal Regulations (44 CFR 59.1). Section 11.1.1

Building footprint: The outline of the total area of a lot or site that is surrounded by the exterior walls of a building or portion of a building, exclusive of courtyards.

C Zone: See Zone C.

CAC: See Community Assistance Contact.

Catchment area: See watershed.

CAV: See Community Assistance Visit.

CBRA: The Coastal Barrier Resources Act, which identified undeveloped portions of coastal barriers. Section 7.3.1

CFR: See Code of Federal Regulations.

cfs: Cubic feet per second, the term of measure for discharges (a cubic foot of water is about 7.5 gallons). Section 6.1.2

Channel: Defined landforms that carry water. Section 1.1.2

Chenier: Abandoned beach ridges now isolated from the Gulf of Mexico by marsh and mudflats. Section 1.2.1

CLOMA: See Conditional Letter of Map Amendment.

CLOMR: See Conditional Letter of Map Revision.

CMD: See Coastal Management Division.

Coastal high hazard area: that part of the SFHA that extends from offshore to the inland limit of a primary frontal dune along an open coast and any other area subject to high velocity wave action from storms or seismic sources. Section 7.1.6

Coastal Management Division: The Office in the Louisiana Department of Natural Resources responsible for managing development in the State's coastal zone. Section 20.2.2 and Section 31

Coastal zone: An area along the Louisiana coast subject to special development regulations. Section 20.2.1

Code of Federal Regulations: A master coding system to identify the federal agency regulations that have been published in the Federal Register. 44 CFR includes all of the regulations published by DHS/FEMA. Section 4.2

Community Assistance Contact: A short visit or telephone contact with the community conducted by DHS/FEMA or LADOTD to determine if the local floodplain management program would benefit from additional assistance. Section 3.5.1

Community Assistance Visit: A visit to the community conducted by DHS/FEMA or LADOTD to determine if the local floodplain management program would benefit from additional assistance. Section 3.5.1

Community Rating System: A program that provides a flood insurance premium rate reduction based on a community's floodplain management activities. Section 26

Community: A city, village, town, or parish with the statutory authority to enact floodplain regulations and participate in the National Flood Insurance Program. Section 3.3.1

Compensatory storage: A practice that offset the loss of flood storage that results from filling by excavating an additional equivalent part of the floodplain. Section 17.5.2

Conditional Letter of Map Amendment: A statement that if a project is constructed as planned, a Letter of Map Amendment can be issued later. Section 10.3.2

Conditional Letter of Map Revision: A statement that if a project is constructed as planned, a Letter of Map Revision can be issued later. Section 10.4.1

Contour map: A map that shows points with the same elevation as connected by a contour line. Section 6.2.2

Contour: A line of equal elevation on a topographic (contour) map. Section 6.2.2

Cooperating Technical Partner: A DHS/FEMA program that seeks to combine federal, state, and local resources to improve floodplain mapping. Section 5.1.4

Cross section: Surveyed information that describes the stream and the floodplain at a particular point along the stream. Section 6.1.3

CRS: See Community Rating System.

CTP: See Cooperating Technical Partner.

Datum: A common vertical elevation reference point, usually in relation to sea level. Section 5.3.4

Detailed study: Flood mapping that produces base flood elevations, floodways, and other pertinent flood data. Section 6

Development: Any man-made change to improved or unimproved real estate, including but not limited to buildings or other structures, mining, dredging, filling, grading, paving, excavation or drilling operations or storage of equipment or materials. Section 19.1.1

DFIRM: Digital Flood Insurance Rate Map. Section 8.4.2

DHS: The U.S. Department of Homeland Security.

DHS/FEMA: See FEMA.

Discharge: The amount of water that passes a point in a given period of time. The rate of discharge is measured in cubic feet per second (cfs). Section 6.1.2

DMA 2K or DMA 2000: The Disaster Mitigation Act of 2000. Section 28.2.2 Dry floodproofing: Measures designed to keep water out of a building. Section 12.1.1

Elevation Certificate: An administrative tool of the NFIP used to determine the proper flood insurance premium rate; it can be used to document elevation information necessary to ensure compliance with community floodplain management regulations; and it may be used to support a request for a Letter of Map Amendment (LOMA). Section 24.2

Elevation reference marks: Markings or monuments on the ground that show the elevation of the spot above sea level. Section 5.3.5

Emergency Operations Center: A facility that houses communications equipment that is used to coordinate the response to a disaster or emergency. Section 27.1.2

Encroachment review: An analysis to determine if a project will increase flood heights or cause increased flooding downstream. Section 15.2.2

EO 11988: See Executive Order 11988.

EOC: See Emergency Operations Center.

Erosion: The gradual wearing away of land masses, as in riverine erosion (Section 1.1.5) and coastal erosion (Section 1.2.2).

Executive Order 11988 Floodplain Management: A directive by the President that sets procedures federal agencies must follow before they take or fund an action in the floodplain. Section 20.4.2

FBFM: See Flood Boundary Floodway Map.

FDPO: See flood damage prevention ordinance.

Federal Insurance Administration: The original agency that administered the National Flood Insurance Program. Its duties have been assumed by the DHS/FEMA.

Federal Register: A daily publication of the federal government used to publicize federal agencies' rules. See also Code of Federal Regulations.

FEMA: The Federal Emergency Management Agency, now located in the U.S. Department of Homeland Security and referred to as DHS/FEMA. Most of the National Flood Insurance Program field work and community coordination for Louisiana are done by DHS/FEMA's Region VI Office. Section 3.3.3

FHBM: Flood Hazard Boundary Map. The map published by DHS/FEMA that delineates the approximate boundary of the floodplain. Section 5.2

FIA: See Federal Insurance Administration.

FIRM: See Flood Insurance Rate Map.

First shot EC: An elevation certificate that is shot before construction begins in order to clearly show how high a building must be elevated. Section 22.2

Flash flood: A flood in hilly areas that may come just minutes after a heavy rain. One can also occur in urban areas where pavements and drainage improvements speed runoff to a stream. Section 1.1.4

Flood: The NFIP definition is "a general and temporary condition of partial or complete inundation of normally dry land areas from (1) The overflow of inland or tidal waters or (2) The unusual and rapid accumulation or runoff of surface waters from any source." A flood can also be "the collapse or subsidence of land along the shore of a lake or other body of water as a result of erosion or undermining caused by waves or currents of water…." Section 3.2.2

Flood Boundary Floodway Map: An official map of a community, on which DHS/FEMA has delineated the regulatory floodway. Section 8.2.2

Flood damage prevention ordinance: The ordinance enacted by a parish or municipality to manage development in the floodplain. It must meet the requirements of the National Flood Insurance Program and be approved by the DHS/FEMA Regional Office. Changes and amendments to the ordinance also need approval. Section 4.1.2

Flood fringe: See fringe.

Flood Insurance Rate Map: An official map of a community, on which DHS/FEMA has delineated both the Special Flood Hazard Areas and the flood zones applicable to the community. Section 8

Flood Insurance Study: A report published by DHS/FEMA for a community in conjunction with the community's Flood Insurance Rate Map. Section 5

Flood Mitigation Assistance: A grant program funded by the National Flood Insurance Program. Section 28.3.3

Flood of record: The highest known flood level for the area, as recorded in historical documents.

Floodplain: Any land area susceptible to being inundated by flood waters from any source. Sections 1.1 and 1.2

Floodproofing: any combination of structural and non-structural additions, changes, or adjustments to structures which reduce or eliminate flood damage to real estate or improved real property. Section 12.1.1. See also "dry floodproofing" and "wet flood-proofing."

Floodproofing Certificate: An administrative tool of the NFIP used to determine the proper flood insurance premium rate for floodproofed buildings; it can be used to document elevation information necessary to ensure compliance with community floodplain management regulations.

Floodway Data Table: The table provided in the flood insurance study which provides detailed information for each cross section on streams studied in detail. Section 5.4.4

Floodway: The stream channel and that portion of the adjacent floodplain which must remain open to permit passage of the base flood. Section 6.3

Floodway Map: See Flood Boundary Floodway Map.

FMA: See Flood Mitigation Assistance.

Footprint: See Building Footprint.

Freeboard: A margin of safety added to the base flood elevation to account for waves, debris, miscalculations, or lack of data. Section 17.1.1

Fringe: The portion of the floodplain lying on either side of the floodway. Section 6.3.1

Functionally dependent use: A use which cannot perform its intended purpose unless it is located or carried out in close proximity to water, such as a docking or port facility. Section 21.3.3

Geographic Information System: Computer-based map systems that allow the user to keep a map updated easily and to correlate geographic information with other data, such as tax records on properties.

GIS: See Geographic Information System.

Groin: A barrier constructed perpendicular to the flow of the current in order to catch sediment. Section 2.3.3

Hazard Mitigation Grant Program: A DHS/FEMA disaster assistance grant that funds mitigation projects. Section 28.3.6

Hazard mitigation: Actions that can be taken to reduce property damage and the threat to life and public health from flooding and other hazards. Section 28

HEC-1: A computer model used to conduct a hydrologic study, which produces a flood discharge. Section 6.1.2

HEC-2: A computer model used to conduct a hydraulic study, which produces flood elevations, velocities, and floodplain widths. Section 6.1.5

HEC-RAS: A computer model used to conduct a hydraulic study, which produces flood elevations, velocities, and floodplain widths. Section 6.1.5

Historic structure: A building or other structure that has been declared worthy of preservation by a recognized agency. Section 13.3.2

HMGP: See Hazard Mitigation Grant Program.

Human intervention: Actions that must be taken by one or more persons in order for a building to be floodproofed before floodwaters arrive. Section 12.1.2

Hydraulics: The study of moving water. A hydraulic analysis in a Flood Insurance Study calculates how high and how fast a flood discharge flows. Section 6.1.5

Hydrodynamic force: The force of moving water, including the impact of debris and high velocities. Section 2.2.1

Hydrologic cycle: The natural cycle that circulates water throughout the environment to maintain an overall balance between water in the air, on the surface, and in the ground. Section 1.1.1

Hydrology: The science dealing with the waters of the earth. A flood discharge is developed by a hydrologic study. Section 6.1.1

Hydrostatic pressure: The pressure put on a structure by the weight of standing water. The deeper the water, the more it weighs and the greater the hydrostatic pressure. Section 2.2.2

ICC: See Increased Cost of Compliance.

Increased Cost of Compliance: An additional claim payment made to a flood insurance policy holder to help cover the cost of bringing a flooded building that was substantially or repetitively damaged into compliance with the NFIP construction standards for new buildings. Section 14.3

Insurance Services Office, Inc.: An insurance organization that administers the Community Rating System for DHS/FEMA. Section 26.1.3

ISO: See Insurance Services Office, Inc.

LADOTD: The Louisiana Department of Transportation and Development, the State coordinating agency for the National Flood Insurance Program.

LAG: See lowest adjacent grade.

Lateral pressure: The amount of pressure imposed sideways by standing water. Deeper water exerts more lateral pressure than shallow water. Section 2.2.2

Letter of Determination Review: A letter issued by DHS/FEMA after a review of a flood hazard determination made by a lender. Section 9.5.2

Letter of Map Amendment: An official revision to a DHS/FEMA map done by describing the property affected. Section 10.3

Letter of Map Change: A Letter of Map Amendment or a Letter of Map Revision. Section 10.1.2

Letter of Map Revision based on Fill: An official revision to a DHS/FEMA map, based on the placement of new fill, done by describing the property affected. Section 10.5

Letter of Map Revision: An official revision to a DHS/FEMA map done by describing the property affected. Section 10.4

LOHSEP: The Louisiana Office of Homeland Security and Emergency Preparedness. Section 28.1

LODR: See Letter of Determination Review.

LOMA: See Letter of Map Amendment.

LOMR: See Letter of Map Revision.

LOMR-F: See Letter of Map Revision based on Fill.

Lowest adjacent grade: The lowest point where the ground touches the outside part of a structure. Section 10.3.1

Lowest Floor: The lowest floor of the lowest enclosed area (including basement) of a building. An unfinished or flood resistant enclosure, usable solely for parking of vehicles, building access or storage in an area other than a basement area is not considered a building's lowest floor; provided that such enclosure is not built so as to render the structure in violation of the applicable non-elevation design requirements of 44 CFR Section 60.3. Section 11.1.3

Manufactured home: A structure, transportable in one or more sections, which is built on a permanent chassis and is designed for use with or without a permanent foundation when attached to the required utilities. The term includes mobile homes and “double wides,” but not recreational vehicles. Section 12.4

Manufactured home park: A parcel or contiguous parcels of land divided into two or more manufactured home lots for rent or sale. Section 12.4.2

Market value: The price a willing buyer and seller agree upon. Section 13.1.7

Meander: A curve in a river. Section 1.1.5

NAI: See No Adverse Impact.

National Geodetic Vertical Datum of 1929: The national datum used by the National Flood Insurance Program. NGVD is based on mean sea level. It was known formerly as the "Mean Sea Level Datum of 1929 (MSL)." Section 5.3.4

NAVD: See North American Vertical Datum. The national elevation datum that is replacing NGVD. See NGVD.

NGVD: See National Geodetic Vertical Datum.

No Adverse Impact: An approach to floodplain management which assures that the action of one property owner or a community does not adversely affect the properties and rights of other property owners. Sections 17.6 and 28.5

Nonconversion agreement: A contract signed by a property owner agreeing to not modify an enclosure so as to increase the potential for flood damage. Sections 11.3.5 and 16.3.2.

No-rise Certification: A certification by an engineer that a project will not cause any increase in flood heights. Section 15.2.3

North American Vertical Datum: The national elevation datum that is replacing NGVD. Section 5.3.4

NSFHA: A community that has no Special Flood Hazard Areas. Section 5.2.2

Ordinance: The generic term for a law passed by a local government.

Overbank flooding: Flooding that occurs when downstream channels receive more rain from their watershed than normal, or a channel is blocked by debris. The term is the same as “riverine flooding” as used in Section 1.1.3.

PDM: See Pre-Disaster Mitigation program.

Planned Unit Development: A regulatory approach that allows a developer to design the entire area while individual requirements are relaxed to allow for open space, mixed land uses, and other variances to traditional zoning rules. Section 17.4.2

Ponding: Runoff that collects in depressions and cannot drain out, creating a temporary pond. Section 1.3.2

Post-FIRM building: For insurance rating purposes, a post-FIRM building was constructed or substantially improved after December 31, 1974, or after the effective date of the initial Flood Insurance Rate Map of a community, whichever is later. A post-FIRM building is required to meet the National Flood Insurance Program's minimum Regular Program flood protection standards. Section 3.2.2

Pre-Disaster Mitigation program: A DHS/FEMA grant program. Section 28.3.4

Pre-FIRM building: For insurance rating purposes, a pre-FIRM building was constructed or substantially improved on or before December 31, 1974, or before the effective date of the initial Flood Insurance Rate Map of the community, whichever is later. Most pre-FIRM buildings were constructed without taking the flood hazard into account. Section 3.2.2

Probability: A statistical term having to do with the size of a flood and the odds of that size of flood occurring in any year.

Probation: A NFIP compliance tool that increases the cost of flood insurance in a community that has been found to not be properly managing floodplain development. Section 3.5.3

Profile: A graph that shows elevations of various flood events. Section 5.5

Public/Infrastructure Assistance: A disaster assistance grant that helps public agencies and nonprofit organizations finance repairs and reconstruction. Section 28.3.7

PUD: See Planned Unit Development.

Q: An abbreviation used by engineers to stand for discharge.

Q3 flood data product: A digital picture of some of the features shown on a Flood Insurance Rate Map. Section 8.4.3

Recreational vehicle: A vehicle which is (a) built on a single chassis, (b) 400 square feet or less when measured at the largest horizontal projection, (c) designed to be self-propelled or permanently towable by a light duty truck, and (d) designed primarily not for use as a permanent dwelling but as temporary living quarters for recreational, camping, travel, or seasonal use. Section 12.4.5

Red tagging: A term used to denote issuing a stop work order on a structure that is not in compliance with the community's regulations. Section 27.2.4

Regular Program: Also called the Regular Phase. The phase of community participation in the National Flood Insurance Program that begins on the date of the Flood Insurance Rate Map, December 31, 1974, or the date the community adopts an ordinance that meets the minimum requirements of the NFIP and adopts the technical data provided with the FIRM, whichever is latest. Section 3.4.3

Rehabilitation: An improvement made to an existing structure which does not affect its external dimensions. Section 13.2.1

Resolution: A formal legal action taken by a community's governing board. Section 3.4.1

Retrofitting: Retrofitting techniques include floodproofing, elevation, construction of small levees, and other modifications made to an existing building or its yard to protect it from flood damage.

Revision: A change to a floodplain map based on new data submitted to DHS/FEMA. Section 10.2

Riverine: Relating to, formed by, or resembling a river (including tributaries), stream, brook, etc.. Riverine floodplains have readily identifiable channels. Floodway maps can only be prepared for riverine floodplains. Section 1.1.3

Roughness: A measure related to ground surface conditions that reflects changes in floodwater velocity due to ground friction. Section 6.1.4

Runoff: Rainfall and snowmelt that does not evaporate or percolate into the ground. Runoff is that portion of precipitation that reaches a channel or other body of surface water. Sections 1.1 and 1.3

Sanctions: The insurance, lending, and financial assistance consequences that result when a community is not in the National Flood Insurance Program. Section 3.5.5

Scour: Erosion of soil around a structure caused by moving water. Section 2.2.1

Sea-level rise: The long-term increase in the level of the oceans. Also used in combination with sinking coastland to describe the relative increase in sea level. Section 1.2.3

Section 1316: A section in the National Flood Insurance Act of 1968 that authorizes local officials to request that DHS/FEMA deny flood insurance coverage on a building built contrary to a local ordinance. Section 23.3

Setback: A required minimum distance that a structure must be positioned from a lot line, river channel, or other feature. Section 17.4.3

SFHA: See Special Flood Hazard Area.

Sheet flow: Floodwater that spreads out over a large area at a somewhat uniform depth and that does not have defined channels. Section 1.3.1

SOMA: See Summary of Map Actions.

Special conversion: A process that converts a community from the Emergency Phase to the Regular Phase of the National Flood Insurance Program without a detailed Flood Insurance Study. Section 5.2.2

Special Flood Hazard Area: The base floodplain displayed on DHS/FEMA maps. It includes the A and V Zones. Section 5.3.3

Stafford Act: The Robert T. Stafford Disaster Relief and Emergency Assistance Act of 1988, which authorizes DHS/FEMA's current disaster assistance programs and the Hazard Mitigation Grant Program. Section 28.3.5

Stationing: Determining the distance along a stream. Section 9.1.2

Stillwater flood elevations: The elevations of various lake or coastal floods, not counting waves. Section 7.1.1

Storm surge: Water that is pushed toward shore by persistent high wind and changes in air pressure. The level of a large body of water can rise by several feet. Section 1.2.1

Stormwater detention: Storing stormwater runoff for release at a restricted rate after the storm subsides. Section 17.5.3

Stormwater management: Efforts to reduce the impact of increased runoff that results from new development. Section 17.5.3

Stormwater retention: Storing stormwater runoff for later use in irrigation or groundwater recharge, or to reduce pollution. Section 17.5.3

Structural flood control: Measures that control floodwaters by construction of barriers or storage areas, or by modifying or redirecting channels. Section 28.1.6

Structure: For floodplain management purposes, a walled and roofed building, including a gas or liquid storage tank, that is principally above ground, as well as a manufactured home. "Structure" for insurance coverage purposes, means a walled and roofed building, other than a gas or liquid storage tank which is principally above ground and affixed to a permanent site, as well as a manufactured home on a permanent foundation. For the latter purpose, the term includes a building while in the course of construction, alteration or repair, but does not include building materials or supplies intended for use in such construction, alteration or repair, unless such materials or supplies are within an enclosed building on the premises. Section 11.1.1

Subdivision: The division of land into three or more parcels. Section 12.3

Submit-for-rate: A process used when an insurance agent cannot complete the rate calculation for a flood insurance policy. Building and flood information must be sent to the insurance company or DHS/FEMA to calculate the premium. Section 25.3.2

Subsidence: The long-term sinking of land level due to withdrawal of groundwater, draining of organic soils, or other reason. Section 1.2.3

Substantial damage: Damage of any origin sustained by a structure whereby the cost of restoring the structure to its undamaged condition would equal or exceed 50% of the market value of the structure before the damage occurred. Section 14

Substantial improvement: Any reconstruction, rehabilitation, addition, or other improvement to a structure, the total cost of which equals or exceeds 50% of the market value of the structure before the start of construction of the improvement. The definition of “substantial improvement” includes structures which have incurred "substantial damage," regardless of the actual repair work performed. Section 13

Summary of Map Actions: A report issued when a Flood Insurance Rate Map is revised that lists the status of previous map changes after the new map becomes effective. Section 10.6.3

Suspension: Removal of a community from the National Flood Insurance Program because its floodplain management program does not meet the Program's requirements. Section 3.5.4

Topographic map: See contour map.

Transect: a survey of topographic conditions used in coastal flood studies. Section 7.1.3

V Zone: See "Zone V."

Variance: A grant of relief by a community from the terms of a land use, zoning, building code regulation, or flood damage prevention ordinance. Section 21.2

Velocity: The speed of moving water, a force that is measured in feet per second. Section 1.1.3

Watershed: An area that drains into a lake, stream, or other body of water. Section 1.1.2

Wave crest elevation: The elevation of the crest of a wave, referenced to the National Geodetic Vertical Datum of 1929 (NGVD) or other datum. Section 7.1.2

Wave runup: An action of waves when they hit the shore and water is moving with such force that it keeps traveling inland. Section 7.1.2

Wave runup elevation: The elevation reached by wave runup, referenced to the National Geodetic Vertical Datum of 1929 (NGVD) or other datum. Section 7.1.5

Wet floodproofing: Protecting a building from flood damage by using flood-resistant materials below the flood level and elevating things subject to flood damage above the flood level. Section 12.5.1

Write Your Own: An insurance company that has agreed to sell flood insurance policies on behalf of the NFIP. Section 25.1.2

WYO: See Write Your Own.

X Zone: See Zone X.

Zone A: The Special Flood Hazard Area (except coastal V Zones) shown on a community's Flood Insurance Rate Map. Section 8.1.8. There are seven types of A Zones:

A: SFHA where no base flood elevation is provided.

A1 – A30: Numbered A Zones (e.g., A7 or A14), SFHA where the FIRM shows a base flood elevation in relation to NGVD.

AE: SFHA where base flood elevations are provided. AE Zone delineations are now used on new FIRMs instead of A# Zones.

AO: SFHA with sheet flow, ponding, or shallow flooding. Base flood depths (feet above grade) are provided. Section 6.4.1

AH: Shallow flooding SFHA. Base flood elevations in relation to NGVD are provided. Section 6.4.1

AR: SFHA resulting from decertifying a previously accredited flood protection system that is in the process of being restored to provide protection from the base flood. An AR Zone is expected to be a temporary designation.

A99: A SFHA where a flood control project under construction will soon protect the area from the base flood. Section 10.4.5

Zone B: Area of moderate flood hazard, usually depicted on Flood Insurance Rate Maps as between the limits of the base and 500-year floods. B Zones are also used to designate base floodplains of little hazard, such as those with average depths of less than 1 foot. Section 8.1.8

Zone C: Area of minimal flood hazard, usually depicted on Flood Insurance Rate Maps as above the 500-year flood level. B and C Zones may have flooding that does not meet the criteria to be mapped as a Special Flood Hazard Area, especially ponding and local drainage problems. Section 8.1.8

Zone D: Area of undetermined but possible flood hazard. Section 8.1.8

Zone V: The Special Flood Hazard Area subject to coastal high hazard flooding. There are three types of V Zones: V, V#, and VE, and they correspond to the A Zone designations. Section 8.1.8, 16.1

Zone X: Newer Flood Insurance Rate Maps show Zones B and C (see above) as Zone X. Section 8.1.8

Zoning: A regulatory program that sets and enforces development standards for different zones or districts of a community. Section 17.4.4

Index

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The following documents are included on this compact disk. Just click on the title to open a document in a new window:

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- **Developing a Mitigation Plan: Identifying Mitigation Actions and Implementation Strategies** (FEMA 386-3)
- **Bringing the Plan to Life: Implementing the Hazard Mitigation Plan** (FEMA 386-4)
- **Using Benefit-Cost Analysis in Mitigation Planning** (FEMA 386-5)
- **Incorporating Historic Resources into Mitigation Planning** (FEMA 386-6)
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