

Oklahoma's Floodplain Management 101

The Oklahoma Water Resources Board (OWRB) has developed this guidebook with funding from the Community Assistance Program through an agreement between the Federal Emergency Management Agency (FEMA), the Oklahoma Department of Emergency Management, and OWRB.

INTRODUCTION

Chapter 1—National Flood Insurance Program, describes the National Flood Insurance Program (NFIP) by listing its goals and objectives, defining the terms associated with the program, and explaining a community's responsibilities when participating in the NFIP. This chapter also explains the Emergency and Regular Phases of the NFIP.

Chapter 2—Oklahoma Floodplain Management Legislation, explains the Oklahoma Floodplain Management Act (OFA) of 1980 and describes how it affects Oklahoma communities. The duties of the Oklahoma Water Resources Board (OWRB) are listed as they relate to floodplain management. The Landlord and Tenant Act and the Real Estate Condition Disclosure Act are also discussed.

Chapter 3—Local Floodplain Regulations and NFIP Standards, outlines NFIP regulations and development standards. Standards for all floodplain development are described.

Chapter 4—Floodplain Ordinance Administration, explains how a community should administer its floodplain ordinance and keep records.

Chapter 5—Local Enforcement and Monitoring Program Compliance, provides procedures and alternatives on how to enforce floodplain management regulations.

Chapter 6—No Adverse Impact (NAI), today's flood is not tomorrow's flood. NAI is explained and higher standards versus minimum NFIP regulations discussed.

Chapter 7—Flood Mitigation Planning, describes matters beyond the NFIP that a community should consider when implementing a floodplain management program, including disaster preparedness plans and structural and nonstructural flood mitigation measures.

Chapter 8—Professional Development, provides information on the availability of professional development opportunities, both organizational and educational.

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Page last updated: February 05, 2008

Oklahoma's Floodplain Management 101

Introduction

- Why We Need Floodplain Management
- Purpose of this Textbook
- Acronyms



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Why We Need Floodplain Management

Flooding is a natural phenomenon. Periodically, rain and melting snow cause rivers to rise and streams and lakes to overflow their banks onto adjacent land areas. These areas, known as floodplains, have been carved out by floods for the specific purpose of carrying excess floodwaters. Since times of settlement, little regard has been given to the purpose and function of floodplains. Homes, businesses and even entire communities have been built in floodplain areas. The development of these floodplains has resulted in ongoing and often severe social and economic losses.

Traditionally, planning for flood control has focused on protecting existing development through structural approaches, such as dams, piers, or levees. Not only are these approaches expensive, but they also have not been effective in reducing flood damages. Despite considerable expenditure on flood control works, annual damages due to flooding continue to rise.

The root of the problem is the insistence on using and occupying flood hazard areas. The National Flood Insurance Program (NFIP) and the Oklahoma Floodplain Management Act (OFA) provide an alternative, non-structural approach (see [Chapters 1](#) and [2](#)). Rather than attempting to control the flow of water by moving or shifting flooding away from people, these laws recognize and encourage the need to control development in floodplains and focus on relocating people, not floodwaters. Their basic purpose is not to prohibit, but to guide development in floodplain areas in a manner consistent with both a community's land use needs and the need of nature to convey floodwaters.

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Purpose of this Textbook

Floodplain management is a complicated and a very technical profession. It would be impossible for a community official to administer and enforce a flood damage prevention ordinance effectively without any prior floodplain training. Chapters 1-5 of this textbook contain basic information primarily for local floodplain officials in communities that participate in the NFIP. It will help the floodplain administrator

not only learn how to administer and enforce a flood ordinance, but also how to establish and manage an effective floodplain management program. To manage an effective program, the local official must be familiar with the NFIP regulations that are detailed in 44 CFR, specifically parts 59-78, and the Oklahoma Floodplain Management Act.

Chapters 6-8 of this textbook cover topics beyond the basic NFIP requirements. The topics are meant to give the floodplain administrator a better understanding of some of the tools and mechanisms available for developing a more comprehensive, responsible floodplain management program in his community.

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A-Zone

SFHAs found on FBHMs and FIRMs (see below)

ASFPM

Association of State Floodplain Managers

BFE

The OFMA newsletter

BFE

Base Flood Elevation

BOCO

Building Officials Code of America

CAV

Community Assistance Visit

CC

Corporation Commission

CRS

Community Rating System

DOT

Department of Transportation

DRC

Disaster Resistance Community

DSR

Disaster Survey Report

EM

Emergency Manager

EMI

Emergency Management Institute

FBFM

Flood Boundary and Floodway Map

FEMA

Federal Emergency Management Agency

FHA

Federal Highway Administration

FHBM	Flood Hazard Boundary Map
FIA	Federal Insurance Administration
FIRM	Flood Insurance Rate Map
FIS	Flood Insurance Study
FMA	Flood Mitigation Assistance
FPA	Floodplain Administrator
HMGP	Hazard Mitigation Grant Program
IA	Individual Assistance
IBC	International Building Code
ICC	Increased Cost of Compliance
NEMA	National Emergency Managers Association
NETC	National Emergency Training Center (Fire Academy in Emmitsburg, Maryland)
NFIP	National Flood Insurance Program
OCC	Oklahoma Conservation Commission
ODCEM	Oklahoma Department of Civil Emergency Management
ODEQ	Oklahoma Department of Environmental Quality
ODOT	Oklahoma Department of Transportation
ODWC	Oklahoma Department of Wildlife Conservation
OFA	Oklahoma Floodplain Management Act
OFMA	Oklahoma Floodplain Managers Association

OWRB

Oklahoma Water Resources Board

PA

Public Assistance

PI

Project Impact

SFHA

Special Flood Hazard Areas

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Chapter 1: The National Flood Insurance Program

- [Goals and Objectives](#)
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Goals and Objectives

The National Flood Insurance Program (NFIP) was created by Congress in 1968, offering nonstructural approaches to reduce flood damage (see [Appendix 1-1](#)). The program's purpose is to make low-cost flood insurance available to property owners in flood-prone communities in return for each community agreeing to guide future floodplain development. The NFIP requires local governments to adopt and enforce floodplain regulations before flood insurance can be obtained in their community. The local regulations must meet the minimum NFIP requirements established by state and federal government.

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How the NFIP Works

Congress created the program to address the problem of increasing annual losses. For decades, the federal response to food disasters was limited to building flood control works and providing disaster relief to flood victims. The NFIP works on the basis of an agreement between the federal government and flood-prone communities that choose to participate in the program.

EMERGENCY PROGRAM OF THE NFIP

1. The community applies for participation in the NFIP either (a) as a result of interest in eligibility for flood insurance, or (b) as a result of receiving notification from FEMA that it contains one or more Special Flood Hazard Areas (SFHAs). The application includes adopted resolutions or ordinances to regulate new construction minimally in SFHAs.
2. FEMA then authorizes the sale of flood insurance in the community up to the Emergency Program limits. FEMA assesses the community's degree of flood risk and development potential.
3. If appropriate, FEMA arranges for a study of the community to determine base flood elevation and flood risk zones. Consultation with the community occurs at the start of and during the study. Communities with minimal or no flood risk are converted to the Regular Program without a study.
4. FEMA provides the studied community with a Flood Insurance Rate Map delineating base flood risk zones. The community is given six months to adopt base flood elevations in its local zoning ordinances, and to meet other requirements.
5. Then the community adopts more stringent ordinances and FEMA converts the community to the NFIP's Regular Program that allows more flood insurance coverage.

REGULAR PROGRAM OF THE NFIP

1. FEMA authorizes the sale of additional flood insurance in the community up to the Regular Program limits.
2. The community implements adopted floodplain management measures.
3. FEMA and NFIP State Coordinating Agency arranges for periodic community assistance visits with local officials to provide technical assistance in complying with NFIP floodplain management requirements.
4. The local officials may request flood map updates as needed. FEMA evaluates requests, encourages cost sharing, and issues revised maps as priorities dictate.

NFIP DEFINITIONS

A-ZONE

A-Zones are found on all Flood Hazard Boundary Maps (FHBMs) and Flood Insurance Rate Maps (FIRMs). An A-Zone is an area that would be flooded by the Base Flood, and is the same as a SFHA or a 100-year floodplain. These areas may be numbered as A1 to A30, or as A99, or they may be unnumbered as A, AE, AH or AO Zones. Numbered A-Zones indicate an area's risk to flooding.

BASE FLOOD

The Base Flood is referred to as the 100-year flood and is a measure of flood magnitude based on probability. The Base Flood has a one percent chance of occurring or being equaled or exceeded in any given year.

BASE FLOOD ELEVATION (BFE)

The height of floodwater reached during the Base Flood is referred to as the Base Flood Elevation or 100-year flood elevation. The elevation of the water surface is referenced to the National Geodetic Vertical Datum (NGVD) of 1929. In other words, a Base Flood Elevation of 898 feet (NGVD) refers to a water surface elevation of 898 feet above NGVD (other datums may be used and will be specified on the maps). See [Figure 1-1](#) for cross-sectional views of the 100-year floodplain.

DEVELOPMENT

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

ENCROACHMENT

Construction, placement of fill or similar alteration of topography in the floodplain that reduces the area available to convey floodwaters.

EXISTING MANUFACTURED HOME PARK OR SUBDIVISION

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

EXPANSION TO AN EXISTING MANUFACTURED HOME PARK OR SUBDIVISION

Means the preparation of additional sites by the construction of facilities for serving 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).

FEDERAL EMERGENCY MANAGEMENT AGENCY (FEMA)

The federal agency with overall responsibility for the administration of the NFIP. It is part of the U.S. Department of Homeland Security.

FLOOD BOUNDARY FLOODWAY MAP (FBFM)

A floodplain management map issued by FEMA that depicts, based on detailed analyses, the boundaries of the 100-year and 500-year floods and the 100-year floodway.

FLOOD FREQUENCY

This term refers to a flood probability of a certain magnitude being equaled or exceeded in a given year. For example, a 100-year flood has the probability of a one percent chance of reaching or exceeding a certain elevation in any given year. It must be noted that flood frequency is a probability. Thus, it is possible for a 100-year flood to occur three years in a row, or not at all for 500 years.

FLOOD HAZARD BOUNDRY MAP (FHBM)

An official map of a community, issued by the Administrator, where the boundaries of the flood, mudslide, i.e., mudflow and related erosion areas having special hazards have been designated as Zones A, M, and/or E.

FLOOD INSURANCE RATE MAP (FIRM)

An official map of a community, on which the Federal Emergency Management Agency has delineated both the areas of special flood hazards and the risk premium zones applicable to the community (see [Appendix 1-2](#)).

FLOOD INSURANCE STUDY (FIS)

The FIS is the official report prepared by FEMA that is an explanation, evaluation and determination of flood hazards with corresponding water surface elevations, flood profiles and maps for floodplain regulation purposes.

FLOOD PROFILE

A flood profile is a graph that shows the relationship of the water surface elevation of a flood event to locations along a river or a stream. Flood profiles are explained in more detail in [Appendix 1-3](#).

FLOOD ZONES

Zones on the Flood Insurance Rate Map (FIRM) in which the risk premium insurance rates have been established by a Flood Insurance Study.

Zone Symbol

A- Area of special flood hazard without base flood elevations determined.

A1-A30, AE- Area of special flood hazard with base flood elevations determined.

AH- Area of special flood hazard having flood depths of one to three feet (usually area of ponding), and with base flood elevations determined.

AO- Area of special flood hazard having flood depths of one to three feet (usually sheet flow on sloping terrain): average depths determined. For areas of alluvial fan flooding, velocities also determined.

A99- Area of special flood hazard to be protected from 100-year flood by federal flood protection system under construction; no base flood determined.

B,X- Areas of 500-Year flood; areas of 100-year flood with average depths of less than one foot with drainage areas less than one square mile; and areas protected by levees from 100-year flood.

C,X- Areas determined to be outside 500-year floodplain.

D- Areas in which flood hazards are undetermined.

FLOODING

A general and temporary condition of partial or complete inundation of normally dry land areas caused by (1) the overflow of waters, or (2) the unusual and rapid accumulation of runoff of surface waters from any source.

FLOODPLAIN

The area inundated by the 1% chance flood constitutes the 100-year floodplain of a river, creek, ditch, lake or other source of flooding. This floodplain is also referred to as the Special Flood Hazard Area (SFHA). It is the area of a community where development must be regulated through a local ordinance conforming to the standards of the NFIP.

FLOODPLAIN MANAGEMENT

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

FLOODPLAIN MANAGEMENT REGULATIONS

Zoning ordinances, subdivision regulations, building codes, health regulations, special purpose ordinances (such as a floodplain 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.

FLOODPROOF

Designing a structure in a manner that reduces or eliminates flood damage.

FLOODWAY

The river channel plus any adjacent floodplain areas that are needed to carry the waters of the base flood without substantial increases in the flood height. NFIP regulations limit this increase to a maximum of one foot, also known as a surcharge (see [Figure 1-2](#) and [Appendix 1-4](#)).

FLOODWAY FRINGE

Area in the 100-year floodplain outside of the floodway. It is the area of the floodplain that can be developed without causing a substantial increase (more than one foot) in the base flood elevation.

HISTORIC STRUCTURE

Any structure that is:

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

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;

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

Individually listed on a local inventory of historic places in communities with historic preservation programs that have been certified: By a state program approved by the Secretary of the Interior, or directly by the Secretary of the Interior.

LOWEST ADJACENT GRADE ELEVATION

The lowest natural elevation of the ground surface prior to construction next to the proposed walls of a structure.

LOWEST FLOOR ELEVATION

The elevation 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, which is not considered a building's lowest floor, provided that such enclosure is not built so as to render the structure in violation of the applicable non-elevation design requirements of 60.3 of the NFIP regulations.

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 connected to the required utilities. For floodplain management purposes, the term "manufactured home" also includes park trailers, travel trailers and other similar vehicles placed on a site longer than 180 consecutive days.

NEW CONSTRUCTION

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.

OKLAHOMA FLOODPLAIN MANAGEMENT ACT

Contained in 82 OS 1601-1618, as amended (see [Appendix 2-1](#)).

NEW MANUFACTURED HOME PARK OR SUBDIVISION

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 the floodplain management regulations adopted by a community.

RECREATIONAL VEHICLE

A vehicle that is (1) built on a single chassis, (2) 400 square feet or less when measured at the largest horizontal projections, (3) designed to be self-propelled or permanently towable by a light duty truck, and (4) designed primarily as temporary living quarters for recreational, camping, travel or seasonal use.

SPECIAL FLOOD HAZARD AREA (SFHA)

The land in the floodplain within a community subject to a one percent or greater chance of flooding in any given year. A SFHA is the same as an A-Zone.

START OF CONSTRUCTION

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; 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; the installation of streets or walkways; excavation for a basement; footings, foundations or the erection of temporary forms; or the installation of accessory buildings on the property, such as garages or sheds not occupied as dwelling units and 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.

STRUCTURE

For floodplain management purposes, a structure is described as a walled and roofed building or manufactured home, including gas or liquid storage tank that is principally above ground.

SUBSTANTIAL DAMAGE

Any damage sustained by a structure whereby the cost of restoring the structure to its original condition would be equal or exceed 50 percent of the market value of the structure before the damage occurred.

SUBSTANTIAL IMPROVEMENT

Any reconstruction, rehabilitation, addition or 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 repair work performed. The term does not include:

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

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

VARIANCE

A grant of relief by a community from the terms of a floodplain management regulation.

VIOLATION

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

The NFIP definitions can also be found in 44 CFR §59.1 and referenced in 44 CFR §59.21-30.

BASIC COMMUNITY PROGRAM ELEMENTS

The responsibility communities incur when participating in the National Flood Insurance Program is to regulate development in the floodplain. If floodplain development is not regulated, the availability of flood insurance will be jeopardized. Flood insurance facts are listed in [Appendix 1-5](#) and [1-6](#).

To meet this responsibility, cities and counties must adopt and enforce a floodplain ordinance that meets the requirements of the NFIP. The minimum standards the local government must adopt depend on the amount of data Federal Emergency Management Agency has supplied the community-the more detailed the data, the more stringent the regulations required. Data for communities is in one of the four following categories:

Model A Ordinance-Study completed, no special Flood Hazard Areas identified-no map printed;
Model B Ordinance-Floodplain map printed (FIRM or FHBM), study not completed, Base Flood Evaluations (BFEs) not determined;
Model C Ordinance-FIRM printed, study completed, BFEs established, floodway not designated; or
Model D Ordinance-FIRM printed, study completed, BFEs established, floodway established.

These data are determined for the community in the original two phases of the NFIP; the Emergency and Regular Phases.

THE EMERGENCY PHASE

The Emergency Phase is the temporary phase of the NFIP with minimum flood insurance available. In this phase, FEMA provides the community with a Flood Hazard Boundary Map that identifies those general areas in the community that may be flooded in the event of the Base Flood. These areas are marked as Zone A.

The community is required to ensure that new development in the Zone A areas will be protected from the Base Flood and will not increase the flood hazard to other areas.

In certain cases FEMA has not identified flood hazard areas, but the local government has indicated that flood hazards exist by participating in the NFIP. Since FEMA did not provide the community detailed flood hazard information in the Emergency Phase of the NFIP, it was the obligation of the local government to use any available information source to implement its ordinance.

In either case, the local government must adopt and enforce an ordinance that establishes a permit system for development that requires new construction to be safe from flooding if it is located in the flood-prone area.

THE REGULAR PHASE

A community usually becomes eligible to participate in the Regular Phase of the NFIP when FEMA completes a detailed Flood Insurance Study. This study identifies the community's flood hazard area based on hydrologic (amount of water and frequency of flood events) and hydraulic (the floodplain's capacity to carry floodwaters) analyses. This study defines the limits of the floodplain and divides it into flood zones reflecting the risk of flooding. These zones, along with Base Flood Elevations, are indicated on a Flood Insurance Rate Map, or FIRM. (See "Flood Zones" under definitions.)

FEMA may also provide a community with detailed information to designate a regulatory floodway. This information, in the past, was displayed on a Flood Boundary Floodway Map (FBFM). The information found on this map is referenced to the Flood Insurance Study. However, due to a change to a single map system, floodways will now be shown on the new generation FIRMS. Only new studies or complete study revisions will see the one-map system.

Communities participating in the Regular Phase of the NFIP must adopt and enforce an ordinance that requires new structures in flood hazard areas to have the lowest floor, including the basement, elevated to or above the Base Flood Elevation. The ordinance must also limit development in the floodway to passive uses-such as agriculture open space-which will not increase the height of the base flood. Floodway development is permitted if a zero rise can be certified. Communities are encouraged to adopt more stringent standards to restrict floodway development. This is explained more in the No Adverse Impact Chapter.

BIENNIAL REPORTS

Communities participating in the NFIP agree to return a Biennial Report on floodplain activities to FEMA. Every two years FEMA sends a form to the community floodplain administrators requesting information concerning any changes to the community's flood hazard area, development activities that have taken place in the floodplain, and verification of the number of floodplain residents and structures. The Biennial Report should be completed and returned within 30 days. Any information that is not accurate should be corrected on the form. FEMA is in the process of revising the Biennial Report Forms at the time of this guidebook printing.

COMMUNITY ASSISTANCE VISIT (CAV)

FEMA and the OWRB conduct Community Assistance Visits (CAVs) in participating communities to evaluate progress and efforts to comply with the regulations of the NFIP. The primary purpose of CAVs is to identify and help communities solve floodplain management problems.

A CAV is the foundation of FEMA's Community Compliance Program, which outlines procedures for enforcement activities by FEMA under the NFIP. CAVs, performed by FEMA, the Oklahoma Water Resources Board (OWRB), or government contractor, monitor community floodplain management efforts necessary as a condition of community participation in the NFIP. A CAV is the most comprehensive form of FEMA community contact with a floodplain tour and inspection of the floodplain development permit records. Biennial Report information is verified at this time and the community's floodplain management program is evaluated. Any shortcoming FEMA sees in the community's floodplain management program is identified and corrective actions are taken by the community. Enforcement action can be initiated by FEMA for community noncompliance with their own floodplain ordinance, which is based upon NFIP regulations. When noncompliance is cited, FEMA expects the community to identify and take actions necessary to remedy these infractions. Penalties for noncompliance are outlined under "Enforcement" in Chapter 5. The Community Assistance Contact (CAC) is similar to a CAV except with much less detail. The CAC can be a personal visit or just a telephone call.

FLOOD INSURANCE

One of the main reasons communities join the NFIP is to make affordable insurance available to their residents who want to financially protect themselves from flood hazards. Federally guaranteed flood insurance is made available in communities that agree to regulate development in their mapped floodplains. When a community joins the NFIP and remains compliant with provisions of the program, ANY property in that community, whether in or out of a mapped floodplain, is eligible for flood insurance coverage. Property owners should work through their insurance agents to buy the policy and settle claims - the State Floodplain Administrator or FEMA should not be included. Coverage is basically provided for insurable buildings and their contents.

As of December 2003, flood insurance coverage is as follows:

Building Coverage	Emergency Program	Regular Program

Single-family Dwelling	\$35,000	\$250,000
Other Residential	\$35,000	\$250,000
Non-residential Small Business	\$100,000	\$500,000

Contents Coverage (per unit)	Emergency Program	Regular Program
Residential	\$10,000	\$100,000
Non-residential Small Business	\$100,000	\$500,000

The above is listed to provide a general idea on potential coverage amounts. Please refer to FEMA's website or your insurance agent for current coverage.

INCREASED COST OF COMPLIANCE (ICC) COVERAGE

On June 1, 1997, the National Flood Insurance Program (NFIP) modified the Standard Flood Insurance Policy to include coverage that will help reduce the financial burden to elevate, flood proof, demolish or relocate flood damaged homes to bring them into compliance with the community's floodplain management ordinance.

Increased Cost of Compliance (ICC) coverage under the NFIP provides for the payment of a claim to help cover the cost to comply with the community floodplain management ordinance after a flood event in which a building has been declared substantially damaged or repetitively damaged (see [Appendix 1-7](#) and [1-8](#)). When an insured building is damaged by a flood and the community declares the building to be substantially damaged or repetitively damaged, ICC will help pay for the cost to elevate, flood proof, demolish or relocate the building up to a maximum benefit of \$30,000 as of January 2004. (Check the FEMA website for the most current ICC benefit amount.)

In terms of ICC coverage, a repetitive loss structure is any structure covered by a flood insurance policy that has incurred flood related damages on two occasions during a ten year period ending on the date of the event for which the second claim is made, in which the cost of repairing the flood damage, on the average, equals or exceeds 25% of the market value of the structure at the time of each such flood event.

A structure is considered to be substantially damaged when the damage of any origin is sustained by a structure whereby the cost of restoring to its before damaged condition would equal or exceed 50% of the market value of the structure before the damage occurred.

ICC coverage is in addition to the building coverage for the repair of actual physical damages from a flood under the Standard Flood Insurance Policy (SFIP). Regular program policies with building coverage under the SFIP issued or renewed on or after June 1, 1997, will include ICC coverage, except buildings insured under the Group Flood Insurance Policy or insured under the Condominium Unit Owner Policy. Buildings located in emergency NFIP Communities are EXCLUDED from ICC coverage. Standard Flood Insurance Policies will increase from \$4.00 to \$75.00 per policy depending on their flood risk zone and amount of coverage.

The maximum limit of \$30,000 under ICC will help property owners insured under the NFIP pay for a portion or, in some cases, all of the costs of undertaking actions to protect homes and businesses through elevation, floodproofing, demolition or relocation of an insured building. The ICC claim payment must be used toward costs of undertaking any of the above mentioned mitigation measures.

ICC claim payments will be made whether or not there is a Presidential Declaration. In order for flood-damaged structures to be eligible for ICC, the structures must either be a repetitive loss structure or substantially damaged structure. In addition, the community must have a cumulative substantial damage and/or repetitive loss provision in the community's floodplain management law or ordinance already enforced against all structures community.

If flood insurance policyholders have questions on ICC, please refer them to their insurance company, agent, or the FEMA Website.

[Appendix 1-7](#) lists the principal features of ICC coverage and [Appendix 1-8](#) shows the ICC claims process in schematic form.

RIEGLE ACT: MANDATORY PURCHASE REQUIREMENT

Title V of the Riegle Community Development and Regulatory Improvement Act of 1994 (Reform Act) substantially amended the National Flood Insurance Act of 1968 and the Flood Disaster Protection Act of 1973. The Reform Act strengthened the mandatory purchase provisions that originated with the Flood Disaster Protection Act of 1973. Specifically, the Reform Act imposed significant new obligations on lenders and their servicers. The mandatory flood insurance purchase requirement, as specified under the Reform Act, applies to all forms of federal or federally related financial assistance for buildings located in the floodplain. It also applies to disaster assistance and all mortgage loans purchased by Fannie Mae or Freddie Mac in the secondary mortgage market.

Before a person can receive a loan or other financial assistance, the lender must verify the location of the building in the base floodplain by using a Flood Insurance Rate Map (FIRM). The lender has a responsibility to use the FIRM even with community-provided assistance and information concerning the flood zone status of the property. If the building is in a floodplain, the agency or lender is bound by law to require the recipient to purchase a flood insurance policy on the building. While not mandated by law, a lender may require a flood insurance policy as a condition of a loan for a property in any location.

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Chapter 2: Oklahoma Floodplain Management Legislation

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Chapter 2 Appendix

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Oklahoma Floodplain Management Act

The Oklahoma Floodplain Management Act, Title 82, O. S. 2001, §1601-1618, as amended, was passed by the State Legislature in 1980 and revised several times. In approving the Act, the Legislature recognized the need for a united effort between local and state government to combat recurrent flood damages. The Act establishes a state and local partnership to reduce flood damages through sound floodplain management. A copy of the complete text of the Act as it appears in the Oklahoma Statutes is provided in [Appendix 2-1](#).

PURPOSE AND POLICY

The State of Oklahoma recognized the personal and economic hardships caused by flood disasters, and recognized that it had become uneconomical for the private insurance industry to make flood insurance available to those in need of protection. Therefore, the Act paved the way for each community to implement wise floodplain management and thereby participate in the National Flood Insurance Program. This participation allows those citizens who need low-cost flood insurance to purchase it through the federal program. The act also addresses the need for the preservation and restoration of the natural resources and functions of the floodplains. Flood insurance through the NFIP becomes available when floodplain boards adopt floodplain regulations in compliance with certain requirements. The Act provides for the following:

- Authorizes the establishment of floodplain boards;
- Provides for appointment and organization of floodplain boards;
- Authorizes floodplain boards to adopt floodplain regulations and the procedure for such adoption;
- Directs the Oklahoma Water Resources Board to develop and publish criteria for the establishment of floodplains and floodplain regulations;
- Provides for cooperative agreements;
- Provides for redefinition of floodplains;
- Prohibits certain construction and development;
- Provides for the exemption of the use of usual farm buildings for agricultural purposes, the planting of crops or the construction of farm ponds;
- Provides for issuance of permits for construction in the floodplain (development permit);
- Provides exceptions for certain pre-existing uses of floodplains;
- Provides for variances;
- Provides for fees;
- Provides penalties for acts;
- Provides for the needs of industry or agriculture located within a floodplain;
- Provides for appeals;

Preserves boards and regulations already in existence; and
Provides that floodplain boards designate a floodplain administrator accredited by the Oklahoma Water Resources Board.

COMMUNITY PARTICIPATION PROCEDURES

In most cases OWRB staff will meet with community officials and provide a program overview. It is very important for community officials to understand that the program is Quid Pro Quo. That is community officials give their word that they will regulate development in the special flood hazard areas. In turn, FEMA allows the sale of low-cost flood insurance in that community.

Then, the Municipal governing body/Board of County Commissioners meets and adopts resolution to:

Create the Floodplain Board

Appoint members (must meet qualifications established in 82 O.S., §1605)

Set duties of Floodplain Board as provided in statutes (See 82 O.S., §§1601 et seq.)

(OML agenda item must include all 3 points listed above.)

This resolution can be downloaded from the OWRB website at www.owrb.ok.gov. This website contains NFIP enrollment packets for cities, towns or counties as well as model ordinances.

Then, the Floodplain Board publishes notice of public hearing in newspaper of general circulation in city/county at least 30 days prior to hearing. Notice must state time, place and purpose of hearing. Notice should also provide that copies of proposed regulations are available for inspection at certain locations. Floodplain Board shall also notify the OWRB 30 days prior to hearing and include copy of proposed regulations.

Then, the Floodplain Board holds hearing, makes resolution-adopting regulations and files these regulations with OWRB within 15 days. (OML agenda item must mention both hearing and adoption of floodplain regulations.)

Then, the Municipal government body/Board of County Commissioners adopts resolution-approving regulations adopted by Floodplain Board. (OML agenda item required.)

Then, the Floodplain Board completes the NFIP enrollment form. This form is available from the OWRB website. The Floodplain Board then submits two copies of the original resolutions, ordinance and form to FEMA, Region VI, 800 N. Loop 288, Denton, Texas 76201-3606.

In summary, it becomes apparent that joining the NFIP and adopting and approving these regulations and flood damage prevention ordinance is a legal process. Once a community joins the NFIP, it wants to be sure that these resolutions and ordinance were adopted and approved in accordance with the Oklahoma Floodplain Management Act. After all, when a community goes through this procedure it will have the power to enforce and administer its flood damage prevention ordinance (i.e. police power). [Appendices 2-2](#) and [2-3](#) provide further detail on requirements and procedures for joining the NFIP.

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Oklahoma Water Resources Board

The Oklahoma Water Resources Board (OWRB) is the state agency responsible for assisting local communities in Oklahoma in the implementation of the Oklahoma Floodplain Management Act. The Act assigns several duties to the OWRB including the following:

The OWRB is authorized to assist in the establishment of floodplain boards and review ordinances. The Act requires communities wishing to participate in the NFIP to establish floodplain boards as a prerequisite.

The OWRB coordinates floodplain activities between local, state & federal entities. As the state coordinating agency for the NFIP, the OWRB is in a position to ensure FEMA's awareness of local needs when implementing the NFIP. The OWRB is able to provide information on situations unique to the area

or that are significant to local or statewide interests. The OWRB also works closely with other federal agencies involved in floodplain management, including the U.S. Army Corps of Engineers, the U.S. Department of Agriculture, Natural Resources Conservation Service and the U.S. Geological Survey, to encourage adequate participation in the planning and/or selection of flood control or hazard mitigation projects. Also, OWRB reviews local programs to ensure they are enforcing their flood damage preparation. The OWRB has authority to review situations where communities fail to enforce their ordinances. If all efforts by the OWRB to instigate compliance were met with resistance, FEMA would be asked to handle the matter.

The OWRB provides technical assistance to aid the floodplain boards in identifying and delineating the special flood hazard areas within their jurisdiction. The OWRB helps coordinate review of existing flood maps and prioritize needs for map revisions.

The OWRB provides education and training to increase the level of knowledge and awareness that Oklahoma citizens have concerning flooding and floodplain management issues. The Oklahoma Floodplain Management Act, as amended, requires that each floodplain administrator be accredited by the OWRB. OWRB workshops, publications and administrative guidebook about flooding and floodplain management are examples of efforts to meet this responsibility.

Members of OWRB serve on the state floodplain board. The state floodplain board administers and enforces the rules and regulations for construction on state-owned or state-operated property within floodplains, and is composed of the nine members of the OWRB.

The NFIP recognizes that local governments do not always have the expertise or resources needed to develop and administer a floodplain management program that meets the requirements. The OWRB can offer the following types of assistance to local governments:

Advice or recommendations in preparation and adoption of a floodplain ordinance or regulations. Guidance in developing a system to administer the ordinance (i.e. establishment of a development permit system).

Technical assistance in reviewing or interpreting the hydraulic flood hazard data supplied to the community by FEMA.

Technical assistance in interpreting NFIP program requirements.

Advice or assistance in developing other floodplain management tools (besides floodplain regulations) such as the preparation of flood hazard mitigation plans, structural works to alleviate flood problems or acquisition and relocation programs.

Assistance in locating other sources of information.

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Floodplain Management Standards

NFIP regulations contain the minimum standards a community is required to adopt to participate in the NFIP. These standards are discussed fully in [Chapter 3](#), but they are mentioned briefly here to emphasize their importance. A community can adopt more stringent standards and is encouraged to do so, but doing so is strictly voluntary.

No use shall be permitted in the floodway that results in any increase in the Base Flood Elevation (BFE).

Residential structures in the flood fringe must have the lowest floor (including the basement) elevated to, or above, the BFE.

Nonresidential structures must have the lowest floor (including the basement) elevated or floodproofed to, or above, the BFE.

Other forms of development shall not cause the BFE to be exceeded by more than one (1) foot in unnumbered A zones.

If the proposed development could change the BFE, the community must follow the map revision procedures. These procedures are delineated in [Chapter 4](#).

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Community Responsibilities

The Oklahoma Floodplain Management Act directs communities to establish floodplain boards and adopt floodplain management ordinances before applying to participate in the National Flood Insurance Program. The Act also directs communities to submit to OWRB the floodplain management ordinances for review before adoption. By reviewing the ordinances, the OWRB can determine if they comply with the intent, purposes and provisions of the state's Act, thus allowing the communities to make any necessary changes. Once communities are participants in the NFIP, they must ensure compliance with the ordinances.

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Enforcement

Local communities that have never participated in or have been suspended from the NFIP are not eligible to receive some forms of disaster assistance from the federal government in the event of a flood disaster. Neither are individuals in nonparticipating communities eligible to receive Federal Disaster Assistance or loans for flood losses. The Oklahoma Water Resources Board works with communities to achieve a compliance that demonstrates a good faith effort before asking FEMA to step into the picture. Public assistance for road, bridge and various types of infrastructure repair will be available to nonparticipating and participating communities. Hazard Mitigation, Flood Mitigation and Pre Disaster Mitigation Funds will only be approved for NFIP participating communities. Communities with public buildings in the one hundred year floodplain are encouraged to join the NFIP and purchase flood insurance for that building. If the building is not covered by a flood policy the disaster benefit will be reduced proportionately.

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State-Owned or -Operated Property

As authorized by Title 82, Oklahoma Statutes 1980, Sections 1601-1619, the rules and regulations have been promulgated and adopted for any type of development on state-owned or state-operated property within floodplains. The purpose of these rules and regulations ". . . is to conform with the requirements necessary to establish eligibility and maintain participation in the National Flood Insurance Program, as well as to protect the public health, safety and general welfare by restricting vulnerable floodplain improvements and uses which increase flood damage potential elsewhere." A copy of the OWRB Rules can be found and downloaded at <http://www.owrb.ok.gov/util/rules/rules.php>.

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Landlord and Seller Responsibility

Landlords in Oklahoma have a responsibility to their tenants to disclose flood information on their rental property. This responsibility became a law in 1986 and is known as Title 41, Residential Landlord and Tenant Act, Sec. 113a (see [Appendix 2-4](#)). A seller of property in Oklahoma has the responsibility to present to the buyer, a written disclosure of known defects to the property that includes disclosure of the property's flood zone status. This law, which became effective July 1, 1995, is the Oklahoma Residential Property Condition Disclosure Act, Title 60, O.S., Section 831 et. seq. (see [Appendix 2-5](#)).

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Oklahoma's Floodplain Management 101

Chapter 3: Local Floodplain Regulations and NFIP Standards

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- Floodplain Regulation
- General Standards
- Specific Standards
- More Stringent Standards

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Introduction

The participation of a community in the NFIP is made possible by its adoption of floodplain management regulations. These regulations must meet the revised standards of the National Flood Insurance Program and the Oklahoma Floodplain Management Act. Check with FEMA or the OWRB before adopting an ordinance to ensure that the most recent and effective requirements are adopted. A community may comply with this requirement by adopting appropriate changes in existing zoning, subdivision, and building ordinances or by adopting a specific floodplain ordinance. [Appendix 3-1](#) contains a copy of the most current Model D ordinance effective December 8, 2004. This example only contains the minimum NFIP standards.

This chapter describes the method of adopting a specific floodplain ordinance. Communities that amend existing ordinances must be sure that all the standards detailed in the second part of this chapter are incorporated into the amendments. (See [Appendix 3-2](#).)

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Floodplain Regulation

Communities that wish to make flood insurance available to their residents must regulate development in floodplains. This can be done by adopting land use regulations (ordinances) that set forth construction standards and establish a permit system that allows the community to enforce those standards. Local regulations for flood loss reduction receive their authority from the police power granted to municipalities by the States. Inherent in the right to enact such regulations is the duty and authority to administer and enforce them.

Floodplain regulations (ordinances) are the foundation of all efforts to prevent flood damage and minimize the impact floods cause within a community. Floodplain regulations are land use controls, the results of which can be measured over the long term. Through the permitting system set forth by ordinance, community development can be compatible with the identified flood hazard.

The standards of the NFIP are the minimum floodplain management efforts required for participation in the NFIP. These standards can differ since they are based on the degree of information provided to the community by FEMA. The comprehensiveness of a community's floodplain ordinance is directly related to information known about the flood hazard. NFIP regulations on which local ordinances are based are progressive, again related to FEMA's published floodplain information. If necessary, communities may strengthen their floodplain management ordinances to be more restrictive than NFIP standards. A floodplain ordinance is designed to be used with a community map identifying flood-prone areas. When the mapping of the flood hazard is absent or deficient, the ordinance becomes more reliant on

community judgment and local flooding conditions.

[Appendix 3-3](#) contains an overview of local floodplain management program guidelines. The floodplain ordinance is comprehensive in what it regulates:

1. Placement of structures, methods of construction, types of structures, and alterations to structures (including manufactured homes);
2. Subdivisions (no structures in the floodway);
3. Installations of water and sewer utilities;
4. Fence construction;
5. Filling, grading, chenalization, and excavating within the floodplain;
6. Installation and replacement of roads and bridges;
7. Storage of materials and equipment; and,
8. Any related activities that may affect the level of the 100-year flood event.

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General Standards

To reduce potential flood damages effectively, the NFIP has established standards for new or substantially improved construction projects and other developments in identified Special Flood Hazard Areas. Under NFIP Regulations, Part 44 C.F.R. 61.13, the following general standards are outlined which are required of all communities participating in the NFIP. In a community with a Flood Insurance Study or where Base Flood Elevations have been established, specific standards apply along with the general standards. The more specific the flood information provided, the more stringent the standards.

ANCHORING

Regulations require that all structures be properly anchored to prevent hydrodynamic and hydrostatic loads from moving them from their foundations during a flood. If a structure is elevated on compacted fill above the known or projected Base Flood Elevation, the anchoring requirement is satisfied. In Oklahoma, anchoring requirements are generally met for most permanent structures through common construction practices. Mobile homes, now termed "manufactured homes," are treated like conventional homes. Manufactured homes placed within Zone A on a community's FHBM or FIRM must be installed using methods and practices that minimize flood damage, which means they must have their lowest floor elevated to or above the BFE on a permanent foundation. The manufactured home must be anchored by the use of over the top or frame ties to ground anchors connecting to the permanent foundation. Manufactured homes are best protected by elevating their compacted fill pads to or above the BFE, which is the preferred method in satisfying anchoring requirements. Specific anchoring standards and compaction standards are set forth in the building codes adopted by each community. These codes are either the UBC (Uniform Building Code), the International Building Code (IBC) or the BOCA (Building Officials Code of America). These anchoring standards must be applied to buildings, manufactured homes, storage sheds, accessory buildings and fuel storage tanks. For manufactured homes in Oklahoma a licensed installer is required.

CONSTRUCTION MATERIALS AND METHODS

Buildings can suffer damages in many ways during a flood: hydrostatic pressure can push in foundation walls, hydrodynamic pressure from waves can destroy walls, uplift can cause structure buoyancy problems, and contact with water can warp or damage walls and floors. Because of this susceptibility, the NFIP requires new buildings in flood hazard areas be constructed with materials and by methods to resist or minimize flood damage.

The best and most common method for the reduction of flood damage in Oklahoma is to elevate the structure on compacted earthen fill. Since BFE information is not always available, the structure should have its lowest floor elevated above the historical high water mark. If that level is not known, then the building should be elevated so that sufficient drainage is provided or at least three feet above the highest adjacent grade of the construction site. The fill must be placed in layers and compacted to provide the necessary permeability and resistance to erosion, scouring, and settling, as set forth in NFIP regulations and documentation accordingly. Where feasible, the fill should extend at least 15 feet

on all sides of the building and should be no steeper than one foot vertical to 2 feet horizontal. This provides a buffer zone to reduce the effects of flooding.

Structures can also be elevated by means of columns, posts, piers, or foundation walls. With proper design, buildings will have adequate support with minimum obstruction to the floodwaters. Flood damage to a structure can be minimized if the structure is built by a method that creates the least amount of obstruction to flood flows. An example would be to align a house parallel to flood flows. At the building site, consideration should be given to the additional hazards of water borne debris.

When a residential structure is constructed, it must be elevated so its lowest floor is above known flood levels. The FEMA Elevation Certificate is recommended to certify the lowest floor elevation (see Appendix 3-4). Basements are considered the lowest floor and are not allowed in the floodplain where they are subject to the direct and indirect effects of flooding. Prohibiting basements is a prime example of a way to reduce flood damages to residential structures.

Allowable construction methods differ between residential and nonresidential structures. NFIP regulations are more stringent with residential structures. Floodproofing is routinely allowed for non-residential structures and not for residential structures. If the lowest floor is constructed below the BFE, a floodproofing certificate is required (see [Appendix 3-5](#)).

UTILITIES

Utilities servicing flood-prone structures should also be floodproofed and secured to prevent damage. Control panels located above flood levels will allow for access during periods of flooding. Controls for lower floors and basements could be installed separately to allow them to be disconnected independently. Heating, air conditioning, and ventilating equipment should be placed above the BFE.

NFIP regulations require that new and replacement water supply systems, sanitary sewer systems, and on-site waste disposal systems be designed to minimize or eliminate infiltration of floodwaters into the systems. To meet this requirement, local officials must be confident that community systems are designed to preclude infiltration. For example, manhole covers should be located above the Base Flood Elevation or otherwise designed to minimize flood damage. Waste treatment facilities, including pumping stations, lift stations, lagoons, and treatment plants must be floodproofed. Ring levees may have to be used to protect facilities located below the BFE. At a minimum, it is recommended that new water supply and sanitary sewers be constructed so they remain fully accessible and operational during a 25-year flood event, and that they suffer no physical damage from the 1% chance flood event.

On site waste disposal and treatment systems such as septic tanks must also be designed to minimize flood damage. This requirement may be especially difficult to attain since on site facilities may be located substantially below the first floor level of the structure that they serve. Generally, any inlets to the septic tank or outlets from the tank should be equipped with automatic and/or manual check valves to prevent floodwaters from returning through the pipes. A mound system of waste disposal may have to be used to provide adequate sub surface drainage during flooding.

SUBDIVISIONS

The NFIP requires new subdivisions to be designed to minimize flood damage. Specifically, the regulations address the need to protect utilities and the need to ensure adequate drainage. For example, electrical, gas, water and sewer facilities should be protected from flood damage. Electrical facilities should be located above the BFE. Gas, water and sewer systems should be designed to withstand infiltration or rupture during flooding. To provide adequate drainage, building sites should be located at least two feet above the street elevation, and streets should drain promptly without ponding unless designed to temporarily hold stormwater surges.

For large subdivisions (50 lots or 5 acres or more), it is the responsibility of the developer to produce the BFE and delineate the boundary of the floodplain on the subdivision proposal. A grading plan showing the proposed elevation of streets and building sites should be included in the proposal. Portions of the grading plan located below the BFE may be used for streets, recreation, and other uses that are least harmed by temporary flooding. All structures must be located above the BFE.

ENCROACHMENTS

All development permits must be reviewed to see if the proposed action will significantly obstruct floodwaters, thereby increasing flood stages. For communities without BFE data, if development is suspected of increasing flood height, additional justification is needed and the developer should detail to the community how his project will minimize adverse impacts.

For communities with BFEs but without a designated floodway, proposed actions (when combined with other existing and anticipated development) may not increase base flood heights more than one foot anywhere in the identified floodplain. The community must safeguard existing development from possible increased flood heights. To meet this standard, local administrators must, on a case-by-case basis, ensure developers provide them with a hydraulic analysis of the project's impact on flood heights. Before the development can go forward, the analysis must indicate that the project will not significantly increase (more than one foot) the Base Flood Elevation. The one-foot limitation is required by the NFIP and the Oklahoma Floodplain Management Act. Communities can adopt a more stringent requirement. For example, the State of Minnesota restricts any development that will cause more than a one-half foot six-inch rise in the BFE.

Communities that have BFEs established and a floodway delineated should not have to worry about this encroachment section because the FBFM or FIRM (if printed after January 1986) shows the area of the floodplain (the flood fringe) that can be fully developed without causing more than a one-foot increase in the BFE. This has been factored in the computer program that modeled and helped designate the community floodway boundaries during the Flood Insurance Study. Communities must, however, be aware of the regulations governing encroachments into the floodway.

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Specific Standards

Specific standards are required by the NFIP in addition to the general standards in communities where the BFE has been established. Allowable construction methods differ between residential and nonresidential structures. NFIP regulations are more restrictive in dealing with residential than nonresidential structures.

RESIDENTIAL STRUCTURES

For new or substantially improved homes, apartments and other residential structures, the lowest floor, including the basement, must be elevated to or above the BFE. The lowest floor concept is illustrated in [Figure 3-1](#).

In Oklahoma, the most common method of elevating structures is to build upon fill. However, under specific situations, it is possible to elevate structures by increasing the height of the foundation and making it floodproof. In all cases, the lowest floor must be above the BFE. Requests for letter of Map Amendment (LOMA) must demonstrate for structures that both the lowest floor (including basement) and the lowest adjacent grade to the structure have been elevated by fill to or above the BFE. [Appendix 3-6](#) explains what the lowest floor is.

Recently revised NFIP regulations require new construction or substantial improvements that have fully enclosed areas below the lowest floor (e.g., a single story house on a foundation with no basement) be designed to allow the automatic entry and exit of floodwaters. This is to equalize hydrostatic and hydrodynamic pressure exerted by floodwaters on the exterior walls. Since this practice has many disadvantages in Oklahoma, building on compacted earthen fill is a more desirable alternative.

NONRESIDENTIAL STRUCTURES

For all nonresidential structures, such as office buildings or stores, the lowest floor, including the basement, must be either elevated or floodproofed to or above the BFE. The floodproofing method used must ensure the structure is watertight and can resist water pressure in flooding situations. The community must have the assurances of a registered professional engineer that the floodproofing method is effective. Wet floodproofing (allowing water to enter and exit, and not causing damage) for nonresidential structures is not recognized for reduced flood insurance premiums under the NFIP.

MANUFACTURED HOMES

Manufactured homes are now treated like any other residence. The lowest floor must be elevated on fill or a permanent foundation so the lowest floor is at or above the BFE. The only exception to this is in pre-FIRM manufactured home parks where substantial flood damage has not occurred.

Many communities in Oklahoma have adopted a Federal Emergency Management Agency model ordinance. The Model D ordinance gives communities an option of placing the manufactured home in the regulatory floodplain either at or above the base flood elevation or 36 inches above the ground. Community officials should select one or the other in this model ordinance or adopt more stringent requirements.

Each model ordinance requires the new placement of the manufactured homes in SFHA to be placed on a permanent foundation so the structure is securely anchored to resist flotation, collapse and lateral movement. Wind forces also need to be considered in the anchoring. In non-hurricane areas the lateral design load is 15 pounds per square foot and the net uplift design load is nine psf. It is important to consider these loads when the manufactured home is installed. Other factors that may affect the installation procedure includes the nature of the soil and the wind load and the specific state regulations. A soils engineer may need to be consulted.

Each manufactured home siting situation will be unique and needs to be evaluated as such. In general, spacing of supporting members should not exceed 10 feet and additional intermediate supports may be required. If a manufactured home is placed parallel to the flow, as shown in [Figure 3-2](#), the drag forces are reduced due to the smaller area being exposed to flow, thereby reducing the tendency for the manufactured home to overturn. Compare this concept to [Figure 3-3](#) where the home is placed perpendicular to the flow, thus increasing the tendency for the manufactured home to overturn. Also, when skirting is installed around the bottom of a manufactured home, construction standards for an enclosure should be followed.

Remember that in Oklahoma it is a state law that a licensed manufactured home installer install manufactured homes. For a list of licensed installers contact the Manufactured Housing Association of Oklahoma.

ENCLOSURES

An enclosure is an area below the lowest floor. Enclosures can only be used for storage, parking and building access. An enclosure is required to have a minimum of two openings having a total net area of not less than one square inch for every square foot of the enclosed space. Also, the bottom of these openings shall be no higher than one foot above grade. The openings can have screens or other coverings placed over them provided they allow for the entrance and exit of flood waters.

FUEL STORAGE TANKS

Fuel storage tanks are now considered to be a structure, so elevating and anchoring on a permanent foundation are required (see [Figure 3-4](#)). In Oklahoma, especially in rural areas, typical fuel for a residential structure and manufactured home is propane. Propane is typically supplied from a fuel storage tank. Placement of these tanks in SFHAs requires a floodplain development permit and they should comply with anchoring and elevation requirements. Underground fuel storage tanks such as gasoline or diesel need to be floodproofed and anchored accordingly. A professional engineer may need to be consulted and a floodproofing certificate obtained ensuring such requirements have been met. When in doubt about the placement of these items contact the NFIP State Coordinator at the OWRB.

STORM CELLAR

In Oklahoma, local floodplain administrators no doubt will have to deal with the construction of storm cellars in the SFHA. The construction of a storm cellar does not qualify for a variance. However, if constructed properly, there should be no problems. Storm cellars constructed in a SFHA should be required to be anchored sufficiently so that flood waters do not buoy up the structure. They should also be constructed so the entrance is constructed so it is at a minimum of one foot above the BFE, as well as any ventilation ducts. If the storm cellar is equipped with electricity it should be floodproofed, as well as any attendant utilities such as sanitary sewer or plumbed for drinking water. When the permit is issued a floodproofing certificate should be required.

RECREATIONAL VEHICLES

Recreational vehicles are allowed on flood-prone sites without full elevation if licensed, highway ready, and in no place for more than 180 days. Recreational vehicles that are placed on a site for more than 180 days are not "ready for highway use" must meet the same flood protection requirements as manufactured homes and/or buildings. A recreational vehicle is ready for highway use if it fully licensed, 400 square feet or less, self propelled or can be towed by a light duty truck, sitting on its wheels or jacking system, attached to the sites only by quick disconnect type utilities and security devices, and is not used as a permanent dwelling.

FLOODWAYS

Communities that have a designated floodway (on a FBFM or a post-1986 FIRM) have additional floodplain management responsibilities. The floodway is the conveyance area within the floodplain in which most development is to be avoided if at all possible. Consequently, NFIP regulations prohibit encroachments, including fill, new construction or other development in the floodways, unless it can be shown that the development would result in no increase in flood heights. Floodways are a compromise of community desires to develop the floodplain. Limited development may be permitted in the flood fringe based upon hydrologic and hydraulic data and computer modeling to determine the amount of encroachment allowed below the lowest floor (i.e., as a single story house on a foundation with no basement) be designed to allow the automatic entry and exit of floodwaters. This is to equalize hydrostatic and hydrodynamic pressures exerted by flood waters on the exterior walls. Since this practice has many disadvantages in Oklahoma, building on compacted earthen fill is a more desirable alternative.

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More Stringent Standards

Communities can and have adopted more stringent floodplain ordinance requirements than the basic minimum NFIP standards. Some communities have joined the Community Rating System. Some communities simply do not allow any development in the regulatory floodway. Many Oklahoma communities have adopted freeboard requirements. [Chapter 6](#) contains additional details regarding the potential benefits of adopting more stringent standards.

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Chapter 4 Appendix

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Introduction

So far, this guidebook has provided information on the National Flood Insurance Program and the Oklahoma Floodplain Management Act, included floodplain information provided by FEMA, and detailed the regulatory standards communities must meet to maintain participation in the program. But how do the floodplain management aspects of the NFIP actually work? What steps must a community take to ensure development in the floodplain is not flood-prone?

Chapter 4 describes the development permit system essential to communities to guide and manage floodplain development and discusses the permit record keeping system, the local administrator, enforcement, and variances.

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Development Permit System

The regulations of the NFIP, 44 C.F.R., 60.3, outlining floodplain management criteria for flood-prone areas, state that the community shall "require permits for all proposed construction and other developments including the placement of manufactured homes" within Special Flood Hazard Areas. More importantly, when a community joins the NFIP, then that community's flood ordinance requires the same thing. At this point it is not the NFIP, OWRB, FEMA requirement, it is your requirement. In other words, no construction or development is allowed in a "flood-prone" or an identified "flood hazard" area without a permit from the community. The community may issue a permit after ensuring the proposed development meets its flood damage prevention ordinance as outlined in [Chapter 3](#).

The concept of "development" goes beyond the traditional building permit. Whereas the building permit is concerned with buildings, the development permit's broad scope includes buildings and alterations to landscape (such as excavation or the use of fill) that would affect drainage patterns or the flood-carrying capacity of the watercourse.

GETTING THE WORD OUT

The administrator must first ensure that citizens apply for floodplain development permits. Citizens need to know the community has a flood ordinance and that development in the regulatory floodplain requires a permit. To get the word out, the floodplain administrator should start a public awareness campaign, including press releases in the local paper, a booth at the county fair, flood-awareness month proclamations, etc.

In Oklahoma most counties do not require building permits for construction and development. If this is the case, citizens in these communities should complete a notice of intent (NOI) form (see [Appendix 4-1](#)) if they plan to develop or construct anything in the community. The NOI is submitted to the floodplain administrator so he/she can determine if the proposed development will fall in or outside the regulatory floodplain. If the proposed development will fall in the floodplain, the floodplain administrator requires the developer to complete the remainder of the permit application. If the proposed development is outside the floodplain, no further action is required. The floodplain administrator should keep a record of all NOIs. This is a very important part of the local floodplain management program.

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When a Permit is Required

A permit is required when building or enlarging a structure, placing a manufactured home, mining, dredging, filling, grading, drilling, excavating, landscaping, building, storing supplies and/or equipment, or repairing roads and bridges within flood hazard areas. In other words, any development, structural or nonstructural, that may affect flooding characteristics or flood damages is required to be permitted.

Specifically, all structural projects (buildings, manufactured homes, storage facilities, dams, dikes, etc.) need a permit. Removal, as well as placement activities, needs a permit depending on their type, magnitude, and location. For example, a street paving project at grade still may alter flood flows or increase flood heights and will require a permit. In addition, a fence may affect flooding and would also require a permit. The storage of large, round hay bales (bridge plugs) should be stored away from the main water channels. Installing a fiber optic cable across a floodplain or directional boring under a creek will require a permit. In summary, any development in the regulatory floodplain requires a floodplain development permit.

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The Permit Application

Anyone wishing to develop in the floodplain must obtain a permit application from the floodplain administrator, fill it out, pay appropriate fees, and submit it for approval before beginning any development activities. Instructions and a development permit application form are provided in [Appendix 4-2](#). This sample building permit could be adopted by the community as a floodplain development permit. Communities may instead adapt their existing permit systems to comply with their flood damage prevention ordinance. Regardless of the form used, the following information must be supplied on a permit application for floodplain development:

A complete description of the proposed activity. Enough information must be included so the floodplain administrator can determine whether or not the proposed activity will be safe from flooding and whether it will increase flood hazards elsewhere. At a minimum, there should be plans drawn to scale showing the nature, location, dimensions, and elevations of the area in question; existing or proposed structures, fill, storage of materials, drainage facilities, or any other landscape alterations.

The National Geodetic Vertical Datum (NGVD) elevation of the lowest floor (including the basement) of all proposed structures.

The NGVD elevation to which any proposed nonresidential structures will be floodproofed.

Certification by a registered professional engineer or architect that any floodproofing method to be used meets the community's floodproofing criteria.

Base Flood Elevation data for subdivision plats of 50 lots or 5 acres.

A description of the extent to which any watercourse (stream, river or drainage ditch) will be altered or relocated.

All other required local, state, and federal permits have been obtained.

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Reviewing the Permit Application

Reviewing a permit application is the most important responsibility of the floodplain administrator. A permit review checklist is provided in [Appendix 4-3](#). Floodplain administrators may use the checklist to help them determine if the proposed project meets the criteria of the floodplain ordinance. Several factors that apply to all situations must be taken into consideration when reviewing permit applications. In addition, depending on the type or location of a project, special consideration must be included in the review procedure. The items a local administrator must consider for all approved development and for special considerations are outlined below.

LOCATE THE DEVELOPMENT

The initial item the floodplain administrator must determine is whether or not the proposed development is in the Special Flood Hazard Area. If this is not obvious, the administrator should obtain the distance in the field between the proposed development site and one or more identifiable points (centerline of a street, a bridge, river channel, etc.). Then, using the map scale, the distance from the identifiable point on the map to where the site is located can be determined.

An example is shown in [Figure 4-1](#). The proposed structure is 200 feet north of where the railroad intersects Lake Avenue and 25 feet east of Second Street. Therefore, it will be located in the Special Flood Hazard Area and must meet the requirements of the floodplain ordinance.

DETERMINE IF THE APPLICATION IS COMPLETE

A floodplain administrator cannot properly review an application if it is not complete. The application must have an adequate description of the proposed development, including the elevation of structures, certification of floodproofing methods, and BFE data for subdivision plats. If there is not enough data to determine if the development will be safe from flooding, the applicant must provide more information.

ADDITIONAL PERMITS

The floodplain administrator must request that additional state, local, or federal permits for the proposed project be acquired, if applicable. Besides the floodplain development permit, these permits may include:

Oklahoma State Department of Health - The OSDH issues permits for controlled industrial and solid waste disposal sites; public water supply facilities, including source development; treatment and distribution systems (water supply); and sewage collection and treatment, including land disposal systems.

Oklahoma Water Resources Board - The OWRB issues permits for water well drillers, dam construction, and floodplain development on state owned or operated property.

Oklahoma Corporation Commission - The OCC issues permits for oil and gas drilling activities.

Oklahoma Department of Environmental Quality - The DEQ issues permits for stormwater management for any development of one acre or more.

Oklahoma State Historical Preservation Officer - The SHIPO reviews development to ensure no significant archaeological site is disturbed.

Oklahoma Department of Mines - The ODOM issues permits for various types of mining.

U.S. Army Corps of Engineers - A Section 404 permit is needed to discharge dredged or fill materials into rivers and adjacent wetlands. A Section 10 (River and Harbor Act of 1989) permit is required for any project that may affect the course, location or condition of the navigable capacity of a water body. (Section 10 relates only to the Red, Arkansas, Verdigris, Illinois and Canadian Rivers.)

Federal Emergency Management Agency (FEMA) - If a developer is going to change the base flood elevation up or down, a map revision is required.

In summary, when an individual proposes any type of development in a Special Flood Hazard Area

(SFHA), a variety of permits may be required. As an example, a sewage lagoon is proposed to be built in a SFHA by Community A. Community A would then need to obtain a permit from the State Health Department, satisfy the requirements of the local flood ordinance and possibly the USACE. For any development in the floodplain, an individual should check with local, state, and federal officials for any permits that may be required.

DETERMINE THE BASE FLOOD ELEVATION (BFE)

In order to review a permit application, the floodplain administrator must know what the flood hazard or (BFE) is at the development site. If the floodplain administrator has a Flood Insurance Study with accompanying FIRM or FBFM, BFE data for the development site is readily available. If FEMA has not supplied the community with detailed technical data on the flood hazard, the properly adopted regulations allow the floodplain administrator to use the best available information to determine flood heights to ensure the new development is reasonably safe from flooding. This information may be available from several sources, including but not limited to: Flood Hazard Analyses from the Natural Resource Conservation Service; floodplain information and other reports from the U.S. Army Corps of Engineers (USACE) and U.S. Geological Survey (USGS); or studies done by the Oklahoma Department of Transportation (ODOT) or the Oklahoma Water Resources Board (OWRB). If there are no technical data available, the floodplain administrator must use the best judgment and be guided by existing flood maps and historical flood accounts described by newspaper articles and photographs, or by high water marks on buildings, telephone poles, bridges, or other structures. Also refer to the FEMA website for additional procedures on estimating BFE.

Once the floodplain administrator has the flood hazard data available, by reviewing the description of the proposed project in relation to the flood hazard, measures to make it safe from flooding can be determined. For example, if a FIRM or FBFM shows a BFE of 930 ft NGVD, the proposed structure must have its lowest floor built to an elevation of at least 930 ft NGVD. The floodplain administrator would then recommend that the floodplain board issue a development permit for the development on the condition it is elevated to or above the BFE. In the case of a nonresidential structure in an unstudied community where the lowest floor is proposed below known flood heights, floodproofing measures must be identified in order for the development to proceed. These measures must be certified to or above the estimated BFE by a registered architect or professional engineer.

OTHER CONSIDERATIONS

The floodplain administrator must make sure the proposed activity complies with flood ordinances and meets the standards of the NFIP listed in the previous chapter. The standards address anchoring requirements, construction materials and methods, utilities, subdivisions, encroachments, elevation of the lowest floor, and floodways. In reviewing an application, the key to remember is that the proposed activity itself must be safe from flooding and it must not increase the flood hazard or otherwise negatively impact nearby existing development.

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Special Considerations on Permit Review

FLOODWAYS

If a community has a regulatory floodway delineated on an FBFM or a FIRM and the floodplain administrator determines that the proposed development is located in the floodway, then a permit may not be issued unless the applicant can demonstrate, through detailed technical analysis, that the proposed development will not increase flood heights. Usually, floodway developments are limited to passive open space uses, such as recreation or agriculture. Examples of allowable floodway uses are described in [Figure 4-2](#).

Structures existing in a floodway prior to the floodway identification and designation are grandfathered in and can remain as long as they serve a useful purpose. Minimum requirements for substantial improvement (50 percent of the market value or more) to such structures, however, must be elevated to comply with the floodplain ordinance.

When reviewing applications for development in the floodway, the floodplain administrator's first

assumption must be that it will cause some rise in the BFE. The developer is required to prove that the proposed development, along with similar future development assumed by the equal degree of encroachment rule, will not cause any increase in BFEs. The developer provides this proof by hiring a registered professional engineer to analyze the development plans and ascertain if the BFEs will be affected. The developer should use an engineering firm experienced in analyzing and modeling hydrologic and hydraulic data.

Unless the analysis establishes that no rise in the BFE would result, the permit must be denied. Deviation from the no-rise analysis is in violation of the local ordinance and NFIP regulations. The community must retain on file certifications that establish the development in the floodway will not increase the BFE. A copy of the engineer's supporting documentation must be kept with that particular permit record. Any development allowed in the floodway must satisfy the remaining program regulations. For example, structures must be protected to the BFE. Information required of proposed floodway development is listed in [Appendix 4-4](#). An example of permissible floodway development would be a second story addition on a house where the external dimensions of the original house are not altered and the addition's cost is less than 50 percent of pre-construction market value. A floodway development checklist for use by the local floodplain administrator is located in [Appendix 4-5](#).

ENCROACHMENTS

NFIP regulations permit development in the floodplain within an acceptable limit. This limit allows encroachment in Zone AE with no floodway identified until there is no more than a maximum one-foot rise in the BFE at any point in the community. If a community has not been supplied an FBFM or FIRM that outlines a floodway, the community must review each permit application individually for its compliance with this encroachment standard.

In order to do so, the floodplain administrator must require the permit applicant to provide an engineering analysis of the proposed project's impact (along with all existing and any reasonably anticipated development) on flood heights. The analysis must certify that the cumulative effects of the project's impacts are within the acceptable limit. If it does not, the permit must be denied.

The floodplain administrator must maintain certifying documentation of the project's impact on file. By doing so, the administrator will begin a cumulative collection of hydraulic data for the community's flood-prone area that can be used to review future permit applications.

The floodplain administrator should also be concerned with how the depth and velocity of floodwaters will affect proposed development. It is recommended that flood velocities not exceed two or three feet per second in residential areas. Another standard frequently used is that the safety index achieved by multiplying the depth of water by the velocity (feet x feet/second) not exceed a factor of seven. In nonresidential areas, higher velocities may be acceptable.

WATERCOURSE ALTERATIONS

When a floodplain administrator reviews a development permit that includes a watercourse alteration (for example realignment or diversion of a stream, ditch or river), the flow carrying capacity of the watercourse must not be diminished (see [Figure 4-3](#)). The permit applicant must supply a thorough description (a set of plans and calculations) of the proposed alteration and its effect on flows.

Generally, an applicant should provide a topographic map of the area in question, a comparison of the existing and proposed channel capacities, a description of the proposed alteration, land use of adjacent properties, identification of the project's features and an assessment of the changes it will cause.

An administrator who does not have the technical background to review such descriptions must rely on the community's engineering staff or seek outside professional assistance.

Local floodplain regulations require the floodplain administrator to notify adjacent affected communities and the OWRB of any proposed watercourse alterations. Neighboring local governments and the OWRB have an interest in water resources and activities that affect them. A sample watercourse notification letter is provided in [Appendix 4-6](#).

If the watercourse alteration could change the BFE and footprint of the floodplain a Conditional Letter of

Map Change is required (CLOMA). Map changes are addressed later in this chapter.

INTERPRETATION OF MAP BOUNDARIES

When there appears to be a conflict between the boundary on the flood map issued by FEMA and actual field conditions, the floodplain administrator must interpret the boundaries of the flood hazard area. The floodplain administrator does not, however, have to determine a particular structure's location on the map for flood insurance purchase requirements for lending institutions. That decision rests with the lender.

NONRESIDENTIAL STRUCTURES

NFIP regulations allow nonresidential buildings (commercial structures, garages, warehouses, etc.) the option to floodproof, rather than elevate, as a means of protection from the Base Flood (see [Figure 4-4](#)). Floodproofing consists of designing a structure in a way that all parts of the structure located below the BFE are watertight and resistant to flood damage. One method of floodproofing is known as dry floodproofing. This method is described below and illustrated in [Figure 4-5](#).

Dry floodproofing consists of the actual design of a structure providing protection from the Base Flood. The structure must be designed to prevent seepage, collapse or cracking of basement walls, buckling of basement floors, and back-up of water from sewer lines. Walls and floors must be capable of withstanding hydrostatic pressure, and all openings must be located one foot above the BFE. Walls and floors must be made watertight with waterproof seals and coverings used on exterior surfaces. The building must have sufficient weight to resist flotation. Features of dry floodproofing must operate automatically without human intervention. Floodproofing measures on nonresidential structures must be certified by a qualified engineer or architect. The FEMA floodproofing certificate for this purpose is found in [Chapter 3](#).

Another method of floodproofing nonresidential structures under the NFIP is reliant on human intervention. This involves the use of door and window shields as temporary protection from the Base Flood. This method should be used only where adequate flood warning time or devices are present. Extreme caution must be used in designing this floodproofing measure. Generally, door and window shields are not effective for flood depths in excess of three feet and may cause more damage to older structures than they prevent. For instance, boards placed over window openings may prevent rising floodwaters from entering the windows, but rainwater can get behind the shields if the space between it and the wall is not closed or sealed.

Wet floodproofing allows floodwaters to enter the structure by design and to equalize the water pressure on the inside to the water pressure on the outside. The concept here is to have utilities raised above flood levels so that after a flood, only minimal cleanup and repair are necessary.

Any time a nonresidential structure is floodproofed, the design of the structure must be certified by a registered professional engineer or architect, stating that it will provide protection against the Base Flood. A floodproofing certificate must be submitted before the permit application process can be completed (see [Appendix 4-7](#)).

Dry floodproofing measures are recognized by the NFIP for flood insurance purposes (lower premium rates), but other types of floodproofing, such as wet floodproofing, are not recognized. [Appendix 4-8](#) lists minimum floodproofing standards.

RESIDENTIAL STRUCTURES

NFIP regulations usually do not accept floodproofing of residential structures. The lowest floor, including basement, must be elevated to or above the BFE on fill, foundation, or on piers and columns.

Because Oklahoma is located in an area that experiences severe storms (tornadoes, strong winds, hail, etc.), a community may pursue an exception to the "No Basement Rule" from FEMA. Such exceptions are granted from the FEMA National Office upon application and fulfillment of strict requirements. A community receiving an exception to the "no basement" rule must supply sufficient technical data and adopt a floodproofing code before FEMA will consider the exception. The preferred procedure for constructing a storm shelter in the 1% chance floodplain is to require the structure to be floodproofed and obtain a floodproofing certificate. The air vent and entrance must be elevated 1 to 2 feet above the

BFE, and the structure must be anchored in the ground so it will not bouy up during the 1% chance flood.

NFIP regulations require a community to obtain and maintain a record of the elevation of the lowest floor of all new or substantially improved structures in the flood hazard area. To comply with this regulation, communities must require the owner or developer of such structures to provide an "Elevation Certification" assuring the structure has been built above the BFE (see [Appendix 4-9](#)).

SUBDIVISIONS

Where the BFE is not known and a subdivision of 50 lots or five acres (whichever is less) is planned, NFIP regulations state that the developer must determine a BFE for each lot and delineate it on the subdivision plat.

For some Oklahoma communities, floodplains make up a significant portion of the land available for subdivision development. Floodplains are attractive for subdivision development because of their location; however, if these subdivisions are improperly developed, they can become a costly burden to the community.

Local governments that approve subdivisions in the floodplain must be careful that flood levels are not increased when these subdivisions are developed. Local governments may be liable where attempts to control flooding are ineffective or aggravate an existing situation.

MANUFACTURED HOMES

NFIP regulations have changed the treatment of mobile homes. The term "mobile home" is no longer used; it has been replaced by the term "manufactured home". Manufactured homes are now treated as conventional homes, and as such, must be elevated above the BFE when located in the identified floodplain.

Manufactured homes, for floodplain management purposes, include park and travel trailers and similar vehicles that are placed on a site for a period of more than 180 days. Past provisions that allowed replacement, new placement or substantial improvements of manufactured homes in existing manufactured home parks or subdivisions without elevation are now eliminated. New or replacement manufactured homes on lots in the floodplain must be elevated above the BFE and anchored to permanent foundations. For further information regarding placement and anchoring, see [Chapter 3](#).

Manufactured homes that have been continually located in the same floodplain location are affected by this rule change only if they are moved or replaced. This NFIP change will enable community officials to work closer with manufactured home parks and subdivisions located within their community's floodplain.

Only licensed installers can install manufactured homes in Oklahoma.

AO- AND AH-ZONES

AO-Zones are areas subject to shallow flooding (one to three feet) resulting from sheet flow conditions. Because no BFE is provided for AO-Zones, NFIP regulations require that residential structures in these areas must have the lowest floor (including the basement) elevated above the highest adjacent grade, at least as high as the depth number specified on the FIRM. If no depth number is indicated, a two-foot flood protection level is required. Nonresidential structures must be elevated or floodproofed above the highest adjacent grade to the depth number specified on the FIRM.

The highest adjacent grade means the highest natural elevation of the ground surface prior to construction next to the proposed walls of a structure. [Figure 4-6](#) illustrates how a structure would need to be elevated in a Zone AO, Depth 2.

AH-Zones are those areas having shallow and/or unpredictable flow paths between one and three feet. These are usually areas subject to ponding. When AH- and AO-Zones are designated, adequate drainage paths around structures are required to guide floodwaters away from these structures. Only a small number of communities in Oklahoma have AO- or AH-Zones mapped.

BOARD ACTION ON THE PERMIT APPLICATION

If the permit application is complete and accurately describes the development, the floodplain administrator should then recommend the floodplain board approve the permit. If the floodplain board finds the development will be built in compliance with the floodplain ordinance, the floodplain board should approve it by simply signing the permit application. The floodplain administrator would then provide a copy to the applicant. Also the floodplain administrator should provide the applicant a bright colored card stock permit card to post at the development site. An example is provided in [Appendix 4-10](#).

If a permit application is incomplete, it should not be approved. Additional information should be requested from the applicant. It is recommended that no permit application go before the floodplain board for approval until the floodplain administrator has thoroughly reviewed it and is absolutely certain it complies with the flood damage prevention ordinance.

Some floodplain administrators may choose to review and approve the permit application without any floodplain board intervention. Caution should be exercised if this is the case. It is highly recommended that some form of check and balance system be implemented in the application review and approval process. The floodplain board is an essential part of a community's floodplain management program.

If the applicant chooses to blatantly violate the floodplain ordinance and not work with the floodplain administrator, the floodplain board may have to deny the permit and explain to the applicant why it was denied. A sample denial letter is found in [Appendix 4-11](#).

APPLICANT'S OPTIONS UPON DENIAL OF PERMIT

An applicant who is denied a permit has three options:

1. Redesign the development so that it meets the standards of the NFIP;
2. Appeal the decision to the appropriate governing body (if the applicant believes the floodplain board is in error); or
3. Request a variance to the ordinance (if the applicant believes the ordinance places an undue hardship on the property)

If a developer has already commenced construction and chooses not to work with the floodplain administrator, the administrator may then issue a cease and desist letter and post a notice of violation at the development site. [Appendix 4-12](#) provides an example of a violation notice poster.

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Variances

A variance, as defined by the Federal Emergency Management Agency, is a granting of relief from the requirements of a community's floodplain ordinance, permitting construction in a manner that would otherwise be prohibited by the ordinance. Section 60.6(a) of National Flood Insurance Program regulations contains provisions for variance" allowed as a part of community floodplain management. If a floodplain management study has been completed for a community, its floodplain ordinance may contain a section allowing variances. The Variance Guide found in [Appendix 4-13](#) explains in detail what type of development constitutes a legal variance. A legal variance is dependent on the physical site characteristics of the development property.

Important points to remember about variances:

Variances must meet the objectives of sound floodplain management ([Appendix 4-14](#) contains a variance checklist).

If a pattern of variance exists (obtained from the biennial report sent to FEMA by the floodplain administrator), FEMA will investigate the circumstance under which the variances were granted.

Variance should be granted only in unique physical hardship situations.

Variance should never be granted for structure to be built below the identified Base Flood Elevation.

It appears the only time variances could be safely used is prior to an impending map change. The map change would remove the development area from the floodplain. The variance, in this instance, would buy time for the structure, which under the new map, would be allowable development.

It should be noted that the granting of a variance in the floodplain is a floodplain board decision. The best advice concerning variances is DON'T USE THEM! While the impact of a single variance on flood hazards may not be significant, the cumulative impact of several variances may be severe.

If a developer, however, requests a variance, the floodplain board should have a consistent and fair policy to deal with such requests. Variances can be handled through a board of adjustment or the governing body of the county or municipality where no board of adjustment exists.

VARIANCE DOCUMENTATION

Regarding variances, NFIP regulations list two important documentation requirements regarding variances:

First, the granting of a variance does not lessen or waive any insurance premium rates. Consequently, when a variance is granted, the floodplain administrator must provide written notification to the applicant that a project granted a variance is not exempt from insurance requirements. In some instances, a variance may result in increased insurance premium rates that could go as high as \$25 per \$100 of coverage. A sample "Variance" notification letter is found in [Appendix 4-15](#).

Secondly, any floodplain board granting a variance must maintain a record of all variance actions. This would include the justification for granting the variance, a record of the appeals proceedings and copy of the written notification referred to above. These records are reviewed during CAC and CAV visits.

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Record Keeping

Record keeping is an extremely important part of a floodplain board's and floodplain administrator's responsibility when participating in the NFIP. The following records must be kept on file and open for public inspections:

A complete and up-to-date copy of the floodplain ordinance, the flood map (FBFM or FIRM) and the Flood Insurance Study should be on hand. If a study has not been completed, the community should obtain and maintain the best flood hazard data available for the area and use it in guiding floodplain development.

NFIP regulations specifically require that communities obtain and maintain the elevation of the lowest floor (including the basement) of all new or substantially improved structures in the Special Flood Hazard Area. For floodproofed structures, the elevation to which they have been floodproofed must be obtained and recorded. Floodplain administrators must require developers to provide elevation and flood proofing certifications to meet this NFIP requirement.

A project file containing the following items should be kept for each development permit application:

- A copy of the permit application;
- A copy of the permit review checklist;
- A copy of all the engineering data (i.e., plans and specifications and hydraulic and hydrologic analyses used to document a development's compliance with the NFIP floodway and encroachment standards.
- A copy of the engineering analyses submitted for watercourse alteration projects;
- Copies of all pertinent correspondence relating to the project;
- Any variance or appeals proceedings;
- Documentation of inspections of the development;
- Base Flood Elevation data for subdivisions of five acres, 50 lots or larger;
- Elevation for floodproofing certifications indicating the lowest floodproof floor elevation; and
- Elevation certificate indicating the lowest floor elevation and lowest adjacent ground elevation.

A file should be kept for the Biennial Reports that are submitted to FEMA. The floodplain administrator may want to keep the following information in this file:

- Elevation certificates indicating the lowest floor elevation and lowest adjacent ground elevation.
- Copies of previous years' annual and biennial reports;
- A running total of permits and/or variances granted in the flood hazard area;
- Maps of new annexations or other boundary changes;
- Census data; and
- Records of any major natural or man-made changes affecting flooding patterns.

The Biennial Report will be easy to complete if this information is readily available.

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Amendments and Revisions to Flood Insurance Rate Maps

Although FEMA uses the most accurate flood hazard information available, limitations of scale or topographic definition of the source maps used to prepare the FIRM, as well as changes in flood conditions and dynamics in general, may cause small areas that are at or above the flood elevation to be inadvertently shown within the SFHA boundaries. Also, the placement of fill may elevate small areas within the SFHA boundaries to an elevation at or above the flood elevation. When this happens, structures or parcels of land may be inadvertently included in the SFHA on the FIRM. When fill is added to Zone A or AE, a certificate of fill is required (see [Appendix 4-16](#)).

For such situations, the property owner and/or community may apply for a Letter of Map Amendment (LOMA) or a Letter of Map Revision based on fill (LOMR-F). LOMAs and LOMR-Fs are documents issued by FEMA that officially remove a property and/or structure from the SFHA. Such amendments or revisions cannot adversely impact the existing floodway or floodway delineations of the 100-year flood.

Letter of Map Amendment (LOMA): The map can be changed if the building is shown to be on ground higher than the 100-year flood elevation. The lowest adjacent grade is compared to the 100-year flood elevation for buildings built before the first FIRM was published (pre-FIRM buildings). For newer structures (post-FIRM buildings), the lowest floor (including basement) is also compared to the 100-year flood elevation. For vacant lots, it must be shown that the lowest elevation within the boundaries of the property is above the 100-year flood elevation. Otherwise, a Conditional Letter of Map Amendment or CLOMA can be requested. To make a FIRMette using Catalog Search, see [Appendix 4-17](#).

Letter of Map Revision Based on Fill (LOMR-F): A LOMR-F removes a structure or property from 100-year floodplain based on the placement and proper compaction of fill outside the floodway. For buildings: the lowest adjacent grade and the lowest floor (including basement) must be above the 100-year flood elevation. For undeveloped properties: the lowest lot elevation must be above 100-year flood elevation. The participating community must also determine that the land and any existing or proposed structures to be removed from the SFHA are "reasonably safe from flooding".

A Letter of Map Revision (LOMR) may be requested based on scientific challenges to the flood elevations, to incorporate new data that became effective after the construction of a flood control project, to change the floodplain or floodway boundaries and to include other new flood data (see [Figure 4-8](#)).

Letter of Map Revision (LOMR): A LOMR (see [Figure 4-9](#)) is normally based on revised hydraulic modeling and usually will not involve specific lots, properties or structures. Because it will revise official regulatory elevations or floodways, a request for a LOMR must have the approval of the community.

NFIP maps are not changed based on proposed projects. However, an applicant may request a Conditional Letter of Map Revision (CLOMR) or a Conditional Letter of Map Revision based on Fill (CLOMR-F) based on proposed plans. A Conditional Letter of Map Amendment (CLOMA) can be requested for a vacant lot. Property owners are cautioned that these conditional letters merely provide comment on the proposed plan and do not amend the map. A LOMR, LOMR-F, or LOMA will still be required to officially change the NFIP map.

It should be noted that the FIRM will not be reprinted when a LOMA, LOMR or LORM-F is granted. Because such letters of change officially amend or revise the effective NFIP map, it is a public record that the community must maintain. Any letters of map changes should be noted on the community's master flood maps and filed by panel number in an accessible location. This will help ensure that changes are not forgotten or overlooked.

The following packages containing forms and instructions for requesting the respectively listed letters of change and information on associated fees can be found on FEMA's website:

MT-1: LOMA, CLOMA, LOMR-F, CLOMR-F

MT-2: LOMR, CLOMR, Physical Map Revision

MT-EZ: LOMA for a single lot, LOMR-F for a single lot for a homeowner

The MT-EZ is the shortest and simplest of the forms to complete, but a land surveyor, professional engineer, or landscape architect is still needed to certify elevation data. The MT-EZ form is available on the FEMA Web site. The MT-EZ contains detailed information regarding how to get a LOMA and how to determine the status of a map change request, as well as other map change issues.

Next Chapter

Visit www.ok.gov, the Oklahoma State Portal

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Page last updated: February 05, 2008

Oklahoma's Floodplain Management 101

Chapter 5: Local Enforcement and Monitoring Program Compliance

- Introduction
- Enforcing Local Ordinances
- Addressing a Violation
- Program Compliance
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- Denial of Flood Insurance and Disaster Assistance



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Introduction

To this point, this floodplain text has established the basis for what a floodplain management program must include and the state and local requirements necessary to meet the National Flood Insurance program (NFIP) requirements and the local flood ordinance. Now that your community is participating in the NFIP, how do you set up your program and make it work? Besides the development permit, what tools are available to enforce local program regulations and to monitor compliance.

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Enforcing Local Ordinances

A floodplain ordinance cannot effectively reduce the severity of flood damages unless it is properly enforced. Adequate, uniform and fair enforcement requires that:

All new development or improvements to existing development must have a permit.
All development must adhere to the standards of the NFIP.

Communities need to establish a procedure to ensure these two requirements are met. For example, the best way to ensure the first requirement is to have a PERMIT certificate displayed at the development site in full view. Such a certificate should be brightly colored so it is easily seen. It should be printed on durable material to withstand the weather during the construction period. If construction is taking place without a permit, it can be readily observed.

Communities can ensure the development is built to NFIP standards by having the local administrator make inspections during the construction period. Such inspections should be documented in the project file.

After a structure is built, the NFIP regulations require a community to "obtain and maintain the elevation of the lowest floor or the floodproofed elevation of all new or substantially improved structures". The burden of providing this requirement is on the permit applicant though proper submittal of elevation certificates.

THE LEGAL BASIS

There are important reasons why your community must enforce its floodplain management ordinance. First and foremost is the need to protect the lives and property of the community's residents, both present and future. Second is the need to meet state and federal requirements agreed to when the

community applied to participate in the NFIP, Your community has the same responsibilities and enforcement powers for floodplain management as it does for other code-related violations (such as Fire/Building/Electrical and Plumbing).

Although one violation may not cause a measurable increase in risk or damage, the cumulative effects can be devastating. By allowing violations to go unabated, the community creates an atmosphere and establishes precedent that may make future enforcement much more difficult. It is imperative that the communities actively enforce its floodplain management ordinance to insure that all new development is compliant and to protect existing development from the increased risk of flooding.

The basis for enforcement of any ordinance/code is the Penalty Section, which prescribes the action local officials can take to enforce the community's ordinance/code.

The authority for state, county, or municipal floodplain boards to enforce floodplain management regulations is provided in 82 OS 2001, §1604.

There are other statutes available to community officials that can be used to assist in the enforcement of floodplain management. These other statutes include Titles 11, 19, 50 and 74 of the Oklahoma Statutes. Titles 11 and 74 are for cities and towns, Titles 19 and 74 are for counties and Title 50 is for dealing with public nuisances. Planning, zoning and land use can be regulated through these authorities. More specifically, general authority may be found in Article 22 of Title 11 of the Oklahoma Statutes, which provides for abatement safety hazards, dilapidated buildings, weeds, trash, junk cars and unsanitary conditions. In summary, communities in Oklahoma have the basic legislative tools to deal with situations that may jeopardize their floodplain safety.

IMPACTS OF ORDINANCE VIOLATIONS

Over 370 communities, counties and tribes in Oklahoma have adopted floodplain management ordinances that regulate development and establish special conditions for development in the floodplains.

Development in the floodplain falls into six categories, construction (including mining, dredging, excavating and drilling operations), filling, grading, excavating, paving, and storage. It is important for the enforcement official to know what constitutes each of these activities and the impact of those activities that do not meet the requirements of the community's ordinance.

1. **CONSTRUCTION.** Construction is the act by which land is changed by the intervention of man or any man-made change to improved or unimproved real estate. Construction is commonly applied to the erection of buildings and other structures; however, it also includes any action that results in a man-made change to the existing character of a parcel of land.

Floodplain construction may take several forms:

- Construction, reconstruction, repair, replacement, rehabilitation, or any addition to a building;
 - Installing a manufactured home on a site or installing a travel trailer or recreational vehicle on a site (for more than 180 days);
 - Construction or erection of levees, dikes, walls, and fences; or
 - Mining, dredging, drilling operations, construction of roads, bridges, jetties, or similar projects.
2. **FILLING.** Filling is the act by which a parcel of land is built-up by the placement of earth, gravel, or man-made substance (i.e., concrete, rubble, trash, etc.). Placing fill in a floodplain reduces its capacity to store water and can result in higher flood elevations or increased velocities elsewhere in the community, thereby causing new or increased damages.
 3. **GRADING.** Grading or regrading is the act of sloping or shaping the earth's surface. It may be for creating hills or berms or sloping to provide for positive drainage. While grading may not affect storage, it can block conveyance. In addition, grading to remove meanders from a stream or clearing out a channel bottom may cause the velocity of the stream to increase. Increased velocities can increase the danger to lives, increase damages to buildings and structures, and cause erosion.

4. **EXCAVATING.** Excavating is the act of removing a portion of the floodplain. Excavation may involve the removal of soil completely from the floodplain or depositing it in another portion of the floodplain. If the borrow material is placed in another part of the floodplain, conveyance could be affected. In addition, excavation could seriously affect stream or water quality or downstream erosion.
5. **PAVING.** Paving is the act of hardening the surface of a parcel or part of a parcel of land, most often with man-made materials. While paving may not directly affect the flood elevation at the site, it can increase the run off and velocity which can create downstream erosion and increased flood heights.
6. **STORAGE.** Storage includes placing supplies, materials or equipment below the base flood elevation in a floodplain. The community should pay particular attention to the storage of toxic, flammable and buoyant materials since they pose a threat to human life and safety.

Buoyant materials pose a threat since they can be washed into a downstream structure causing a damming effect and additional damage to other structures. The community should also pay attention to the means of elevating stored materials to assure that the means are structurally sound and secure. Structural failure could lead to the loss of life and property. Anchoring is one of the more important forms of securing structures both in and out of a floodplain.

Preventing increased damage is the primary objective of floodplain management. To accomplish that objective, any type of activity that could block or divert water, increase velocities, or send floodwater onto properties that would not otherwise be flooded must be regulated. It is the community's responsibility to review and evaluate the impact of all floodplain development and to approve and permit only the activities that meet the requirements of the local floodplain management regulations. The community is responsible to prevent the negative effects of unwise and/or improper development in the floodplain and ensure no adverse impact.

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Addressing a Violation

The ways to resolve a violation are as varied as the types of violations that may occur. There are, however, two common threads that hold all violations together: either the violator did not obtain a permit prior to construction or the violator did not follow the requirements of the approved permit application. In either case it is the community's responsibility (normally the Floodplain Administrator) to ensure that the regulation requirements are met.

DISCOVERY, NOTIFICATION, AND INSPECTION

Once a community has discovered or received notification of a possible violation, an inspection should be scheduled. This action may be as simple as stopping and talking to the violator and receiving his/her assurance that the violation (dumping trash or fill in a drainage ditch or failing to post his permit) can and will be corrected.

If the violation cannot be resolved on the spot, the inspector may need to check the code and site information before visiting the site. Essential information includes:

1. Legal description of the property;
2. Property owners name and address along with any property identification numbers;
3. Flood Insurance Rate Map (FIRM), Flood Boundary Floodway Map (FBFM) and/or Flood Hazard Boundary Map (FHBM);
4. The base flood elevation; and
5. The lowest floor elevation of the structure.

If there is an active permit, the inspector may enter the property. However, if there is not an active permit, permission from the owners or occupants must be received prior to entering private property.

If the property owner is willing to talk to the inspector, the inspector may wish to hold an informal

meeting and register the community's concern or determine that no violation has occurred. If the inspector is able to resolve the violation through this type of meeting and discussion, the community is ahead of the game and the public has been well served. However, the inspector must keep a record of the conversation and meeting because they could be used later in court.

If permission to enter the property is not obtained, the inspector should make a note in the record and leave the property. The inspector may inspect the property from any site accessible to the general public, such as roads, bridges, or parks. The inspector may also inspect the site from adjacent property if the adjacent owner gives permission.

Under no circumstances should the inspector force his/her way onto the property or gain access through intimidation. If access is denied, discuss the next means of action with the appropriate supervisors or the municipal/district attorney.

Once assured that a violation may be taking place, consult and get guidance from the municipal/district attorney before taking the next step. Posting the notice and sending the stop work order could be risky and questionable unless they are authorized in the state law.

1. Post a notice of violation and stop work order in a prominent place on the property, clearly visible to anyone who enters the property or the structure; and
2. Send a certified (return receipt requested) violation notice letter and stop work order to the owner of the property notifying him/her of the violation and the applicable part of the community's regulations that is violated as well as the remedies required to abate the violation and remove the stop work order.

Violation notices should always be sent by certified mail, with a copy of the receipt and the letter placed in the file. Often, violations have been dismissed in court because the community could not prove that the violator had been notified. If the violator refuses to sign the receipt, then it may be necessary to have the notice delivered by a law officer or two staff members (one to serve as witness). When the order is served to the developer, it is recommended a photograph is taken and that accurate identification is verified with a photo ID. The notice should also specify a date by which the owner must respond to the notice. The period of time must be reasonable and should be based on the potential threat to life/property. This date establishes the timing for additional action.

VIOLATION MEETING AND ENFORCEMENT OPTIONS

Assuming that the property owner wishes to clear up the violation (no-action will be discussed later under litigation), a violation meeting should be scheduled as soon as possible. The stop work order should remain effective until the violation is resolved.

The enforcement official should be prepared for all eventualities, from voluntary removal of the violation through the worst-case scenario, litigation. Explaining the possible ramifications of the violation may go a long way in convincing the violator to remove the violation without the need for litigation. Again, it is very important to keep a record of what was said at the meeting(s) because this information could be used later for a court record.

REMEMBER-Litigation is the most time-consuming and costly method of abating a violation. It may be the only way that a violation can be abated but **SHOULD BE USED ONLY WHEN ALL OTHER EFFORTS FAIL**.

Here are several violation scenarios and how you might deal with them:

EXAMPLE A

Violation: Fill in floodway - No Permit

Too much fill put into floodway to repair erosion damage.

Possible Abatement Options:

OPTION 1: REMOVE FILL

This 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, you will have to determine (as near as possible) the original elevations and slope. Then, you must require that the violator remove the fill only to that elevation and slope.

OPTION 2: LEAVE FILL

Have the violator apply for a permit and get a Letter Of Map Revision (LOMR). Then, you must give the violator copies of all pertinent application forms and establish a specific date by which you must receive all applications and data. You then need to coordinate your response with all other applicable agencies and inform the Oklahoma Water Resources Board and FEMA in writing of your actions. You must monitor the situation and be ready to fall back to Option 1 if the violator fails to meet his/her part of the agreement.

If you do not receive the permit application and LOMR data as agreed, then the violation must be considered active and all violation notices should remain in effect until the LOMR and the permit application are received. You should inform the violator that the violation is still active, provide a second due date for the submission of the data, and inform him/her that if the information is not received that the community will initiate litigation.

EXAMPLE B

Violation: Fill in floodplain - No Permit

Fill for low water crossing into a property on the other side of a designated floodplain is being placed without a permit and with no drainage openings.

Possible Abatement Options:

OPTION 1: REMOVE FILL

Although removal of the fill would abate the violation, it could cause considerable inconvenience (not a hardship) to the property owner and only delays the final decision regarding an otherwise valid land use, when properly permitted. Additional factors, such as the effect of removal, possible replacement, and the potential for damage from the existing fill on the water quality of the stream, must be evaluated before the meeting with the property owner.

OPTION 2: LEAVE FILL

The fill will have to be removed until its effect on the base flood elevation is determined and construction plans approved by the community and a permit issued. At the meeting, the violator proposes to breach the illegal fill but not remove all of it. If the permit is not approved, he will remove the remaining fill. If the permit is approved, he would not have to bear the cost of returning that portion of the fill that he proposes to leave in place temporarily. As the enforcement official, you determine breaching the fill would relieve the threat of flooding to adjacent properties and not increase the base flood elevation, and accept his proposal based on his providing construction plans and applying for a development permit within 10 working days. It is very important to keep a record of what was said at the meeting, because this information may have to be entered as part of a court record. Also make sure that the property owner is aware that the violation will be pursued if the conditions of the agreement reached at the meeting are not met.

EXAMPLE C

Violation: Single-family dwelling was not constructed to required elevation.

A single-family dwelling was built with its lowest floor (including basement) three feet below the elevation required by the local ordinance and is now one foot below the Base Flood Elevation (in violation of both the local ordinance and FEMA regulations).

Possible Abatement Actions:

OPTION 1: ELEVATE STRUCTURE

If the structure was built over a basement or crawl space, elevation may not be a viable option. If the structure was built on slab, elevation may be an option but probably more expensive. Special care must be taken to ensure that the new elevation meets the elevation requirements of the ordinance.

If the structure is built over a basement, then the first floor may be at or above the ordinance elevation, which may be more than the minimum FEMA requirement. If this is the case, you may wish to require that the basement be abandoned and filled. This option could be accomplished by moving all heating, plumbing and utilities and utility equipment to the first floor or higher and back-fill the basement.

OPTION 2: ALLOW STRUCTURE TO REMAIN

If you agree that the structure should remain on the site as is, then several actions should be taken:

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 to the community and to the State Coordinator's office.

The violator should file a notice with the County Clerk notifying any future purchasers that the property does not conform to the floodplain development 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 the requirements of the ordinance cannot be met.

The community should request a 1316 action under the provisions of Part 73 of the National Flood Insurance Program regulations if the structure cannot be brought into compliance after all legal avenues have been exhausted.

OPTION 3: DEMOLISH STRUCTURE

Although demolition would not normally be required for a structure with the lowest floor (including basement) one foot below the base flood elevation outside of a designated floodway, this is an option that must be considered. If the structure were in a floodway or more than one foot below the base flood elevation, demolition becomes a more appropriate option.

When determining what action your community should take in abating violations, you should remember that normally the agency does not have the authority to enter someone's property to correct a violation or to order another agency or contractor to perform the work. Always discuss the community's options with the community's legal counsel prior to taking or agreeing to any action. Remember, if the structure remains, the community will eventually be providing emergency community services and possibly other financial assistance to the residents.

The scenarios mentioned above are only three of many types of floodplain violations that a community may discover. The particular response should be tailored to each situation, but two things must always be kept in mind: violations of the community's floodplain management ordinance will eventually lead to increased damages and possible loss of life; **ENFORCEMENT OF THE ORDINANCE IS YOUR RESPONSIBILITY.**

Several communities have begun using the citation or "ticket" approach to enforce zoning and floodplain development requirements. If the floodplain ordinance permit requirement falls under the zoning or building code requirements, then the "ticket" approach is feasible. If violations of the floodplain ordinance are declared to be public nuisances, the "ticket" approach is also feasible. This system should mirror local zoning and nuisance enforcement techniques that already exist in most communities.

If the community has a floodplain board or has assigned those duties to a planning or zoning board or uses a board of adjustment, it can use that system and procedure to hear appeals from and review any order, requirement, decision, or determination made by any official charged with enforcing the

floodplain requirements.

As for procedural questions, once the citation (ticket) is issued, the person charged may appeal the citation through the system adopted by the community.

There are limits on the types of penalties that can be imposed. A misdemeanor offense is punishable by imprisonment in a county jail not exceeding one year or by a fine not exceeding \$500, or both fine and imprisonment. Where punishment is not prescribed, local counsel should be obtained if such actions are seriously considered or become the action of last resort.

Another option that a community may use to gain compliance is recording the violation notice in the County Clerk's Office. This recordation has the effect of clouding the deed to the property, so that the Title Insurers may not be willing to insure the title until the violation is removed. Typically, a Title Insurer may require the property owners to certify that certain conditions are met prior to transfer of title. One typical condition is that, "No notice of any structural code violations for the premises issued by any governmental agency has been received by the grantor within the past 10 years."

In determining whether to use this option, the enforcement official should determine whether the action will have the desired effect of encouraging the removal or abatement of the violation. The best way to record the violation should be discussed with legal counsel. This option should not be used if in the opinion of the enforcement official there will not be a transfer of the property in the near future (three years or less is recommended). This option should not be used unless a violation letter is recorded.

LITIGATION

IF ALL OTHER MEANS OF OBTAINING COOPERATION IN REMOVING OR ABATING A VIOLATION FAIL, then the final step is to request the Municipal Attorney or the District Attorney to initiate legal action against the violator.

Prior to taking the case to the attorney, the enforcement officer should make sure that the chronology and the documentation of past action is in order and easily discernible including significant dates, actions taken, and matters discussed. An inspection and meeting record should be attached, outlining the course of action taken up to this point.

When taking the case to the attorney, the enforcement official should have a clear idea of the type of resolution being requested. This organization will assist the attorney in determining the course of action to be pursued, such as demolition, restoration, or another type of violation resolution.

Prior to actually filing a complaint, the attorney may wish to send a letter to the potential defendant outlining the charges and giving the defendant 30 days to respond. If successful, this will gain compliance without going through the long, tedious, and costly effort of a court case.

If the attorney's actions fail to gain compliance, the enforcement official must be ready for a trial. This means either being ready to give testimony and/or lining up "expert witnesses" to give testimony. In these efforts, the enforcement official should follow the lead of the attorney who will actually prepare and present the case in court. The enforcement official is the best witness in any floodplain violation case because the enforcement official has:

1. The best working knowledge of the ordinance; First-hand knowledge of the case;
2. Documents needed for witness corroboration (photos, eye witness accounts in writing, ordinances, etc.); and
3. Knowledge of the chain of custody of evidence (can verify that evidence has not been contaminated, altered, or changed).

The community may also wish to obtain "expert witnesses" to further clarify the community's position and the effects of non-compliance. Expert witnesses may be paid consultants with knowledge regarding violations of this type or officials from other communities with experience in these matters. It is important to explain to the court how the witnesses relate to this case and their area and field of expertise.

STATE ROLE IN LOCAL ENFORCEMENT EFFORTS

The NFIP regulations state that it is the community's responsibility to enforce the requirements of its floodplain management ordinance and any other more restrictive regulations of the state. However, at the request of FEMA, each Governor has designated an agency of State or territorial government to coordinate that State's or territory's NFIP activities. These agencies often assist communities in developing and adopting necessary floodplain management measures. As the designated state coordinator, the OWRB will provide consultation in dealing with a violation and a violator. Staff will work with the local officials to determine the best way to deal with the violation problem. However, it is ultimately the community's responsibility to pursue the appropriate course of action.

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Program Compliance

Conscientious enforcement of the floodplain ordinance must be undertaken. Communities that do not strictly maintain a permit system, do not keep adequate records, or have developed a pattern of granting variances, have violated their agreement with FEMA. Communities must practice floodplain management as set forth in their floodplain ordinance. Failure to adequately do so could trigger a visit from OWRB or FEMA representatives. This visit is called a Community Assistance Visit (CAV). The nature of a CAV will vary according to the circumstances of each community. If OWRB and FEMA find deficiencies in a community's management of their floodplain ordinance, OWRB and FEMA may request corrective actions be initiated by the community.

COMMUNITY ASSISTANCE VISITS

Community Assistance Visits (CAVs) are FEMA's most comprehensive form of contact with NFIP communities. A number of communities are selected and visited annually because of development pressure, flood history, high or repetitive insurance claims, known problems, or other indicators of difficulty (i.e., variances) with NFIP requirements.

An on-site visit by FEMA and/or OWRB personnel consists of:

- meeting with community officials;
- a tour of the floodplain;
- an inspection of records, concentrating on development permits and as-built elevation and floodproofing certifications as required in NFIP regulations part 59.22(9)(iii); and
- evaluation of the floodplain ordinance and administrative procedures used in floodplain management.

Following the on-site visit, a follow-up letter will be sent by FEMA or OWRB to the community outlining:

- assessment findings;
- specific deficiencies and violations;
- history of such deficiencies and violations;
- required corrective actions, protective measures and procedures to be changed by the community; and
- assistance provided or promised.

FEMA GUIDELINES ON PROGRAM DEFICIENCIES

When a community has failed to enforce its floodplain management program in compliance with NFIP criteria, and the FEMA regional office has identified one or more program deficiencies or violations, FEMA may initiate an enforcement action against the community in order to obtain compliance. A substantial program deficiency violation is one that has resulted or could result in increased flood damage potential or higher flood stages.

EXAMPLES OF SUBSTANTIAL PROGRAM DEFICIENCIES:

- Failure to require permits for proposed construction or other development within flood-prone areas and to review such permit applications and subdivision proposals to assure that all such construction and development is adequately designed, located, constructed and anchored to minimize flood damage.
- Failure to obtain and reasonably utilize available flood data as criteria for setting local elevation and

floodproofing requirements.

Ordinances not compliant with NFIP floodplain management criteria.

Ordinances that do not contain adequate enforcement provisions or that cannot be enforced through other mechanisms.

Administrative procedures or practices that are not workable or cannot reasonably ensure compliance with the local ordinance.

Variance procedures not consistent with NFIP variance criteria.

Failure to operate and maintain flood protection projects credited by FEMA as providing 100-year flood protection.

EXAMPLES OF SUBSTANTIAL VIOLATIONS:

obstruction of floodways or stream channels that increase flood stages;

in A-Zones, applying to new construction and substantial improvements;

residential structures that are located with their lowest floor (including basement) below the BFE;

residential structures that are not adequately anchored to resist flotation, collapse or lateral movement;

nonresidential structures that are not elevated and anchored or floodproofed;

structures without required elevation certificates or floodproofing certificates; and

structures with enclosures below the BFE used for purposes other than parking, access, or storage.

Although all participating communities are required to enforce compliant NFIP ordinances, not all communities have the same capabilities and the seriousness of deficiencies and violations will vary.

Because of this, various mitigating and aggravating factors are taken into consideration by FEMA, and all enforcement actions are handled on a case-by-case basis. Mitigating factors do not relieve a community of its obligation to correct all deficiencies and remedy violations.

EXAMPLES OF MITIGATING FACTORS:

The community has demonstrated willingness to take positive actions to resolve past problems.

Due to a lack of adequate local resources, including professional staff, the community has had to rely on the availability of technical assistance from state, regional, or private sources.

Deficiencies in the local program have not resulted in increased exposure to flood losses.

There is no history of prior violations identified by FEMA and OWRB.

FEMA has had no prior contact with the community.

Newly elected officials or recently hired staff have demonstrated a new attitude toward NFIP compliance on the part of the community.

The violation occurred a number of years in the past.

There are only isolated instances of violations or a single program deficiency rather than a pattern of widespread program deficiencies or violations.

A particular remedial measure would undermine the credibility of local officials or their efforts to achieve compliance.

The present owner of a property in violation was not the owner at the time the structure became noncompliant.

EXAMPLES OF AGGRAVATING FACTORS:

The community has not demonstrated willingness to take positive actions to resolve past problems.

The community has adequate resources available to it, including professional staff or other sources of technical assistance, which have not been utilized.

Deficiencies in the local program have resulted in increased exposure to flood losses.

There is a history of prior violations or program deficiencies identified and brought to the community's attention by FEMA and OWRB.

FEMA and OWRB have had prior contact with the community.

FEMA and OWRB have provided technical assistance to the community.

The violations occurred recently.

There is a pattern of widespread program deficiencies or violations as opposed to an isolated instance to noncompliance.

The present owner of a property in violation also was the owner at the time the structure became

noncompliant applies when determining appropriate remedial measures.

EXAMPLES OF WAYS TO CORRECT PROGRAM DEFICIENCIES:

Amend ordinances to close loopholes or correct other program deficiencies that allowed the violations to occur.

Amend ordinances to include more effective enforcement provisions or add penalty provisions.

Change administrative procedures to improve the permitting and inspection process. This could include revisions of permit, certification or inspection forms, changes in inspection procedures, or changes in procedural instructions given to the building inspector and other staff.

Pass a resolution of intent to fully comply with NFIP requirements.

Change or increase staff or resources used to enforce the local ordinances. (FEMA generally does not mandate this remedial measure.)

Provide missing elevations or floodproofing certificates.

EXAMPLES OF WAYS TO REMEDY VIOLATIONS:

Demonstrate that the structure is not in violation by providing missing elevation or floodproofing certificates.

Submit engineering data showing that floodway fill results in "no increase" in flood stage.

Rescind permits for structures not yet built or in early stages of construction.

Tear down or modify the noncompliant structure or remove fill in the floodway.

Develop and implement a master drainage plan or construct flood control works to protect noncompliant structures.

Seek civil/criminal penalties as provided for in the local ordinance or community code. In the case of a judgment against the community, the community is expected to appeal the decision.

Initiate licensing actions against architects, engineers, builders or developers responsible for the violations.

Submit survey data/documentation required to verify insurance rates for existing policies.

Issue declarations and submit them for Section 1316 denial of insurance.

Submit evidence that the structure cannot be cited (legal constraints in state or local legislation, deficiencies in the ordinance, etc.).

Submit sufficient data to verify the information submitted by the property owner of an uninsured building so that FEMA can ensure the building is properly rated if a flood insurance policy is applied for in the future.

PROBATION

Communities that fail to adequately enforce floodplain management regulations can be placed on probation by FEMA. Probation allows a period of time for the community and FEMA to work out identified problems, deficiencies or violations. Probation can be imposed and terminated by FEMA's Regional Director in Denton, Texas, and can be continued for up to a year after the community corrects all program deficiencies. FEMA specifies what corrective actions or remedial measures need to be taken by the community in order to have probation lifted.

During probation, an additional premium charge of \$50 per policy will be levied on all new and renewed flood insurance policies. This surcharge is based on a one-year time period beginning with the imposition of probation and will be in effect this first year and during successive one-year periods during which the community remains on probation. If the probation period lasts three months, the surcharge is still in effect for the remainder of the year; if probation lasts 13 months, the surcharge is in effect for 24 months.

Probation is lifted or extended at the discretion of the FEMA Regional Director.

SUSPENSION

When efforts to resolve identified community deficiencies do not meet FEMA's conditions or otherwise fail under probation, the community may be removed from the program. Suspension authority lies with the FEMA Washington office. The effects of being suspended from the NFIP are:

Flood insurance will no longer be available. No resident will be able to purchase a flood insurance policy.

No federal grants or loans for buildings may be made in identified flood hazard areas. This includes all federal agencies such as the Department of Housing and Urban Development (HUD), Small Business Administration (SBA), Federal Housing Authority (FHA) and Farmers Home Administration (FmHA).

No federal disaster assistance may be provided in identified flood hazard areas.

No federal mortgage insurance may be provided in identified flood hazard areas. This includes FHA, Veterans Administration (VA) and FmHA.

Mortgages requiring the purchase of flood insurance may be foreclosed.

Liability of local government for denying citizens the right to purchase flood insurance or by not taking positive steps to reduce exposure of life and property from a known natural hazard.

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Subrogation

Subrogation is an action brought when flood damages have occurred, flood insurance claims have been paid, and all or part of the damage can be attributed to acts or omissions of a community. FEMA then sues a third party to recover flood insurance claims it has paid.

Before subrogation can take place

The community must be in the Regular Phase of the NFIP;

Flood damages occur to property carrying flood insurance;

Flood insurance claims are paid by FEMA based on the property damage caused by flooding.

In seeking subrogation:

FEMA believes negligence by a third party has contributed to the flood damages occurring as covered by flood insurance policies; and

FEMA sues to recover the money paid out in claims due to damage attributable to a third party. This third party is believed to have caused, contributed to, or aggravated the documented flood damages. This third party could be a community, a political entity, a developer or an engineer.

FEMA determines the community in which the damages have occurred is delinquent in its floodplain management efforts. Extensive investigation and documentation would precede any subrogation efforts by FEMA.

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Denial of Flood Insurance and Disaster Assistance

Denial of Flood Insurance and Disaster Assistance

Under Section 1316 of the National Flood Insurance Act, as amended, flood insurance can be denied to properties in violation of state or local floodplain regulations. FEMA will not allow new flood insurance coverage for any property declared in violation of floodplain regulations by the state or local entity in which the violation exists. 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 of 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.

Denial of flood insurance coverage makes commercial financing for unauthorized floodplain structures difficult to obtain. If the property has a 1316 and the owner corrects the deficiency, the 1316 can be lifted.

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Page last updated: February 05, 2008

Oklahoma's Floodplain Management 101

Chapter 6: No Adverse Impact

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Introduction

Flooding has been a pervasive problem throughout history. The NFIP has had an impact on the problem. New buildings are better protected from damage and there is greater awareness of the consequences of infringing on floodplains. However, while the NFIP and participating communities have helped mitigate flood damage, flooding has certainly not stopped. The reason is that most communities adopt and enforce only the minimum national and state floodplain management requirements, which focus on protecting new buildings, not what the impact of that construction will do to others.

The "No Adverse Impact" (NAI) floodplain management approach is a concept developed by the Association of State Floodplain Managers (ASFPM) to address the shortcomings of the typical local floodplain management program.

Rather than looking at the minimum requirements of federal or state programs, NAI focuses on what communities can do that will actually protect property and prevent increased flooding, now and in the future. The NAI approach focuses on planning for and lessening flood impacts resulting from land use changes (see [Figure 6-1](#)). It is essentially a "do no harm" policy that will significantly decrease the creation of new flood damages. In essence, NAI means that your neighbor should build in such a way that does not increase the risk of flooding to your property or others. Examples of this "wise use" or the "most beneficial use" would be using the floodplain as dedicated open space for flood storage and low impact uses such as recreation.

In Oklahoma, the OWRB supports the concept of NAI, and although adopting higher standard ordinances is strictly voluntary, communities should be aware of the benefits of doing so. The following article from the Missouri State Emergency Management Agency Newsletter (vol. 49(4)) gives an overview of why communities should adopt and consider higher standard ordinances. Adopting a freeboard above the 1% flood event will provide more protection from flood damage and provide a cost savings for people that wish to purchase flood insurance.

Two Feet or Not Two Feet? What is the Answer? — L. Scott Samuels, P.E., Certified Floodplain Manager

By now, hopefully everybody knows that, the National Flood Insurance Program (NFIP) standard for new residential structures is that the lowest floor must be elevated "at or above the Base Flood Elevation (BFE)" - 44 Code of Federal Regulations (CFR) Part 60. But what most people don't realize is, that by adopting this minimum standard, one day there could legally be one foot of water above the lowest floor elevation or the current BFE.

How can that be? Simple, it's a direct result of how floodways are defined for NFIP purposes. After a detailed study has been performed on a stream reach and the floodplain boundaries and BFE have been determined, a floodway can be defined on that particular stream reach.

A floodway is determined, by "squeezing" the boundaries of the floodplain together (reducing the cross-sectional flow area) until the calculated water surface elevations increase up to one (1) foot (see Figure 1) while still passing the base flood event. This floodway is referred to as a "1 foot surcharged floodway." There are other factors that are considered when determining a floodway. One factor is that the reduction in conveyance must be equal on both sides of the centerline of the stream. Hydraulically speaking, this means one side of the creek is not having more of a reduction in the conveyance of flows, than the other side. Also, the "squeezing" shall not go beyond the current stream banks and into the creek's channel, thus ensuring that the entire stream channel will always be preserved as an "open area" to pass the base flood. That is why it is so very important to regulate development in regulatory floodways. The higher development standards that apply to regulatory floodways ensure that any additional development in the regulatory floodway will not cause water surface elevations to rise during the base flood.

So why define a floodway in the first place if it allows the water surface elevations to increase by a foot? Because the positives results of defining a floodway far outweigh any negatives. Let me explain. The main positive features of having a floodway is that the floodway, when properly administered, reserves an area to pass the base flood that will be free from future obstructions, thus reducing future flood damages. It also allows for development in the floodway fringe without requiring every single project that is proposed, no matter how small, to perform a hydraulic analysis of the stream to determine the impacts of the project on the current flooding conditions. Not having a floodway designated would create a tracking nightmare for the local community and would substantially increase the cost of new single-family structures. The community would be responsible for tracking all development in the floodplain, deciding when the floodplain was "fully developed," and prohibiting any further development at that point in time. Developers or individual homeowners would bear the cost of engineering studies to determine these floodplain impacts.

So what can your community do? To fully realize the benefits of having a regulatory floodway defined, your community needs to adopt building standards greater than the NFIP minimum standards to truly provide some additional measure of protection, and I am not just talking about adopting a standard that requires the lowest floor to be "one foot above the BFE." If your community only adopts a "one foot above BFE" standard, then it is setting up the situation where homeowners think they have one foot of freeboard above the base flood, but if the floodway fringe is ever completely filled, then their lowest floor could be the same elevation as the base flood someday. People who have experienced flooding firsthand know that it doesn't take a great depth of water in a home to do a lot of damage. For these reason I recommend that communities adopt a standard requiring the lowest floor to be a minimum of two (2) feet above the BFE in Special Flood Hazard Areas (SFHA).

There are several great reasons for adopting the "two (2) feet above the BFE" standard in your community. First this standard takes into account the future rise due to development in the floodway fringe. Therefore, sometime in the future, when water surface elevations have legally raised one foot, the structure should hopefully still have that one foot of protection against the base flood. Another reason, even though detailed studies are based on sound engineering principles and practices, is that there is still an art in making floodplain and floodway analyses. Since floods don't read flood maps, the "two feet above the BFE" standard takes into account some of the uncertainty associated with floodplain calculations. This also might help mitigate any unforeseen circumstance that might occur during a flooding event such as floating flood debris blocking culverts, channels or bridge openings. These obstructions could cause a temporary rise in the base flood that the additional freeboard requirements could help mitigate since the FIRM does not identify these areas of temporary obstructions. And finally, by building the lowest "floor two feet above the BFE", the structure would be eligible for a lower insurance rate. This could add up to a substantial savings on a homeowner's annual insurance premium over the life of the loan.

Hopefully this article has given you a better understanding, of what the squiggly lines and

floodway boundaries represent on your community's FIRM. Even if you can't convince your governing body to adopt a higher standard, hopefully you will be able to explain to the developer or homeowner as the Floodplain Administrator, the advantages of elevating higher than your community ordinance requires. If you would like to talk about these issues with me, please feel free to contact me at 573.526.9119. Or if you like, comments can be sent to me via e-mail, at ssamuels@mail.state.mo.us

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Community Rating System

The NFIP has an incentive program called the Community Rating System (CRS) that reduces flood insurance premiums for communities that perform activities that exceed the minimum NFIP standards. The CRS has three goals: reducing losses due to floods, helping communities achieve an accurate insurance rating, and increasing the awareness of flood insurance.

ELIGIBILITY

For a community to be eligible, the community must be in full compliance with the NFIP and be in the Regular phase of the program. Communities in the Emergency phase of the program are not eligible.

CLASSIFICATIONS AND DISCOUNTS

All communities start out with a Class 10 rating (which provides no discount). There are 10 CRS classes: Class 1 requires the most credit points and gives the greatest premium reductions; Class 10 identifies a community that does not apply for the CRS, or does not obtain a minimum number of credit points and receives no discount. There are 18 activities recognized as measures for eliminating exposure to floods. Credit points are assigned to each activity. The activities are organized under four main categories: Public Information, Mapping and Regulation, Flood Damage Reduction, and Flood Preparedness. Once a community applies to the appropriate FEMA region for the CRS program and its implementation is verified, FIA sets the CRS classification based upon the credit points. This classification determines the premium discount for policyholders. Premium discounts ranging from 5 percent to a maximum of 45 percent will be applied to every policy written in a community as recognition of the floodplain management activities instituted. The following table demonstrates how the CRS premium discount is reflected on the application.

CRS PREMIUM DISCOUNTS

CRS PREMIUM DISCOUNTS	
CLASS	DISCOUNT
1	45%
2	40%
3	35%
4	30%
5	25%
6	20%
7	15%
8	10%
9	5%
10	

HOW TO APPLY

Participation in the CRS is voluntary. If your community is in full compliance with the rules and regulations of the NFIP, you may apply. There's no application fee, and all CRS publications are free.

Your community's chief executive officer (that is, your mayor, city manager, or other top official) must appoint a CRS coordinator to handle the application work and serve as the liaison between the community and FEMA. The coordinator should know the operations of all departments that deal with floodplain management and public information. And the coordinator should be able to speak for your community's chief executive officer.

The first step in the application process is to get a copy of the CRS Coordinator's Manual, which describes the program and gives details on the eligible activities. The manual includes application worksheets and the formulas for calculating credit points. Computer software for completing the application is available at no charge. In addition, the CRS has a Short Form Application that may be more appropriate for your community. The Short Form is easier to complete than the regular worksheets, but it does not cover some of the more complicated activities you may be doing. Your designated CRS coordinator should fill out and submit your application. The CRS will verify the information and arrange for flood insurance premium discounts.

If you are interested in the CRS, and would like to visit with a community already participating, you are encouraged to contact one of the communities. For a current list of Oklahoma communities participating in CRS, please contact the OWRB. Additional information is also readily available on FEMA's website. FEMA provides a variety of tools to help make the application process go as smoothly as possible.

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Page last updated: February 05, 2008

Oklahoma's Floodplain Management 101

Chapter 7: Flood Mitigation Planning

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- Defining the Problem
- Available Tools
- Selecting Alternatives
- Hazard Mitigation Implementation: Making it Work
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Introduction

Flooding cannot be totally eliminated, but the damages resulting from floods can be reduced. In order to do so, communities should develop a comprehensive plan for flood hazard mitigation that considers both structural and nonstructural measures.

Flood hazard mitigation is defined as a management strategy that reduces the severity of the effects of a flood disaster. The strategy involves actions that reduce exposure to flooding, susceptibility to flood damages and the impact of damages when a flood does occur. Flood hazard mitigation is a comprehensive approach to solving flooding problems.

This chapter provides a brief review of the process a community can follow to develop and implement a flood hazard mitigation plan by following the five steps shown in [Figure 7-1](#).

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Defining the Problem

Any approach to flood hazard mitigation planning should begin with an evaluation of flood hazards and how they affect the community. The evaluation should address the physical aspects of both the floodplain and the flood take into account the economic and social issues associated with flooding, as well as the environmental values of flooding and floodplains.

PHYSICAL ASPECTS

It is important to obtain as much information as possible on flooding, relative to its source and cause; its area and depth of inundation; and such characteristics as frequency, speed of onset and duration. Information on physical aspects of a flood is sometimes available from a federal agency in the form of a floodplain study, which delineates floodplain boundaries and lists flood elevations. When detailed technical data on flooding aren't available, flood problems can be described by historical news accounts or by long-time residents. The best available data can then be used to define flood problems in an area.

Information on the floodplain can be obtained locally by conducting a survey of floodplain areas. Zoning maps and land-use plans can also be a good source of information for determining floodplain use. In order to have a good understanding of flooding problems communities should have complete data

regarding the type, condition, and extent of floodplain development; the potential for future development; and the status of any existing flood control structure, such as dams or levees.

ECONOMIC AND SOCIAL ISSUES

Two issues to be considered in defining flood problems and developing a flood hazard mitigation plan are the economic role of floodplain lands and the social effects of flooding. Generally, floodplains are used for many purposes: agriculture, open space and recreation, and residential, commercial, or industrial development. Some of these purposes may be more compatible with existing flooding problems than others and may be of more value to the community through taxes or increased property values. Any analysis of a community flood problem must include an estimate of the costs and benefits of existing or proposed land use. The nature and extent of economic issues can be understood by gathering information such as property tax bases, market values, and building costs in floodplain areas. This type of information can be compared against the cost of providing services and utilities, such as streets and water/sewer systems, and the cost of replacing or repairing those facilities if damaged by flooding.

The same kind of analysis should be made of the social impacts associated with flooding problems. For example, housing located in the floodplain may be for low-income families. At the same time, however, that housing may require protection during flooding or replacement if flood damage is severe. Flooding may also present employment problems in two ways: (1) Floodplain sites may not be suitable for businesses, thus restricting employment opportunities, and (2) flooding or flood damage can force businesses to close, causing unemployment hardships.

ENVIRONMENTAL ISSUES

One of the main reasons the nation continues to see flood damages increase annually is that the natural functions of the floodplain are undervalued (see [Figure 7-2](#)). By understanding the value of these functions we can begin to realize reduced flood damages. The No Adverse Impact approach to floodplain management realizes the importance of the natural floodplain functions.

ESTABLISHING LOCAL OBJECTIVES

Once a flooding problem is well defined with good technical data regarding the flood hazard and with consideration given to the related economic, social, and environmental issues, a community can establish objectives—the next step in developing a flood hazard mitigation plan.

The general goal of any flood hazard mitigation program is to reduce future flood damages. This goal can be broken down into several objectives:

- Protecting a new development from flood damage.
- Protecting existing developments from flood damage.
- Reducing the impact of damage where flooding problems cannot be eliminated.
- Preserving or protecting natural floodplain value.
- Combining flood loss reduction efforts with other community needs, such as water supply or recreation facilities.

These general objectives must be further refined to a community's particular situation. For example, a community with a fully developed floodplain might want to tailor its flood hazard mitigation objectives to protect existing development by extending a levee system. Or, it might want to regain some of the lost environmental values of the floodplain through an aggressive acquisition/relocation program. On the other hand, communities with open floodplains may consider protection of new development as a priority for the flood hazard mitigation plan.

Before a flood hazard mitigation program is implemented, a community should look at alternative scenarios for programs with varying degrees of flood control. The scenarios can match community goals with community economic situations to establish the type and degree of floodplain control needed. A community should review both the advantages and disadvantages of an approach to floodplain management and carefully weigh the benefits of reduced flood damages against the costs of providing flood protection. At the same time, the community must keep in mind nature's need to use floodplain areas to carry excess flood waters.

While it is important that public involvement extend throughout the hazard mitigation planning process, it is particularly critical during the stage of setting objectives. The objectives should be carefully scrutinized, debated, and revised as necessary because they form the basis for a plan that will guide the implementation of flood hazard reduction measures. Care should be given to ensure that all affected interests have had an opportunity to be heard, and that any conflicts between flood mitigation objectives and those of other authorities or community programs are reconciled.

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Available Tools

With objectives firmly established, a community's next step in the hazard mitigation planning process is to review the tools or methods available to meet those objectives. Essentially, structural and nonstructural are the two major approaches a community can use to reduce or prevent future flood damages (see [Figure 7-3](#)).

STRUCTURAL MEASURES

Traditional response to flooding problems has been through structural flood control projects such as dams or levees. These types of structural works attempt to control floodwaters. While they can be effective, structural measures often are very expensive, provide a false sense of security, and encourage, rather than discourage, development in flood-prone areas. For these reasons, structural methods of reducing flood damages can be only a partial solution to flooding problems.

Dams and Reservoirs. Flood protection can be achieved by providing reservoirs to retard or delay excessive runoff for the purpose of reducing flood heights. The function of reservoirs is to store water when stream flow is excessive and to release it gradually after the threat of flooding has passed. Detention basins are smaller impoundments that have uncontrolled or fixed outlets. Small impoundments are designed to retain and retard floodwaters. They may also improve infiltration for recharge of aquifers. Detention basins may reduce flood damage at a low cost, but beneficial effects do not extend far below the impoundment.

Levees and Floodwalls. Levees and floodwalls are structures built to prevent floodwaters from overflowing onto the floodplain by confining the streamflow. Floodwalls are usually built of reinforced concrete while levees are usually constructed of earthen materials. A false sense of security can be associated with levees and floodwalls: they have a limited design life (improper design could cause the system to fail) and these structures could be overtopped by a flood larger than the design flood.

Channel Improvements. Flood stages can be reduced by improving flow conditions within a channel and by increasing a stream's carrying capacity. Methods used to improve channels include:

- Straightening to remove undesirable bendways;
- Deepening or widening to increase size of waterway;
- Clearing to remove brush, trees, and other obstructions; and
- Lining with concrete to increase efficiency.

Channel modification may be necessary or useful when used with other structural methods of flood control, such as below storage reservoirs where changes have occurred in the flow of water. Adverse effects of channel modification could occur at or downstream of the site, with unstable channel banks and a possible increase of flood impacts downstream. Modified channels must also be properly maintained to assure sufficient capacity to carry the 100-year flood.

Watershed Treatment: Watershed treatment, generally applied to small areas, involves the treatment of land to render the soil more capable of absorbing and retaining excessive rainfall until flood heights in swollen streams have receded. These measures include improving or preserving vegetative cover, regrading and terracing to increase infiltration or delay runoff to the stream channel. Watershed improvements may also reduce erosion, maintain or improve groundwater levels, and recharge aquifers.

NONSTRUCTURAL MEASURES

Nonstructural approaches to reduce flood damages are those that do not depend on controlling floodwaters. Rather, they concentrate on controlling activities that take place in flood-prone areas. These approaches fall into two general categories: reducing susceptibility to flooding and reducing the impact of floods.

Reducing Susceptibility

The methods available to reduce susceptibility to flood damage are the development of regulations and policies that prohibit dangerous, uneconomical or unwise floodplain development. Flood damages can be greatly reduced if activities along floodplains can be made more compatible with the natural flooding process. These regulatory programs and policy guidelines consist of a variety of land use management techniques. Methods to reduce susceptibility to flood damage may also include programs that reduce existing development vulnerability to damage.

Floodplain Regulation. Floodplain regulations do not attempt to reduce or eliminate flooding, but are designed to mold floodplain development in such a manner as to lessen the damaging effects of floods. In Oklahoma, communities adopt floodplain management ordinances to participate in the National Flood Insurance Program.

Zoning. A community's zoning authority can be used to discourage development in the floodplain. For example, flood-prone areas could be zoned "agricultural," "open space," or "recreation."

Building Codes/Subdivision Regulations. Building codes regulate building design and construction materials. Generally, these codes apply uniformly to buildings throughout a locality; however, certain provisions are also included that relate to natural hazards.

Stormwater Management. Many times, development occurring outside floodplain areas causes increased runoff in downstream areas, resulting in increased stormwater runoff, which can produce larger and more frequent floods. A good stormwater management program is designed to reduce existing runoff problems and prevent new runoff from developing.

Acquisition and Relocation. The acquisition of structures located within the floodplain can decrease hazards associated with flooding. In areas where structures have been acquired and relocated, the land can be used for functions less susceptible to flood damage. While acquisition and relocation of flood-prone property can be expensive, in the long run it can be a very common sense approach to reducing flood damages.

Development Policy. Communities making wise decisions or policies to prevent construction of public facilities, such as streets, water and sewer, in undesirable areas (such as floodplains), will deter floodplain development.

Tax Incentives. Tax adjustments for land dedicated to agriculture, recreation, conservation or other open-space uses may be effective in preserving existing floodplains.

Floodproofing. Floodproofing consists of modifications to buildings, their sites or contents to keep water out or to reduce the effects of flooding. Although it is more simply and economically applied to new construction, floodproofing can be applicable to existing facilities. There are many different floodproofing measures: elevation, utility adjustments, wet floodproofing (deliberate flooding of basement areas to offset floodwater pressures), anchoring, protective covering, ring dikes or permanent closures.

Reducing the Impact

The second nonstructural approach to reducing flood hazards includes those activities that attempt to reduce the impact of flooding when it occurs.

Information and Education. A good information and education program is a prerequisite for successful flood hazard mitigation plans. Local residents who are knowledgeable about flooding and flood hazards are more likely to make wise decisions when it comes to protecting themselves and their property from flood damage.

Flood Forecasting and Warning. Reliable and accurate forecasts and warnings of floods can be coupled with timely evacuation to save lives and reduce property losses. While the federal government (through the national weather service) is generally responsible for disaster prediction, it is the local government that must be sure the general public is warned in sufficient time to take protective action.

Emergency Preparedness. When a flood is imminent, a community can do much to reduce or prevent damages by having an effective emergency operation plan ready for implementation. Emergency flood fighting can involve a variety of activities, including evacuation of floodplain residents, installation of temporary pumping stations for interior drainage behind levees, and sandbag closures for openings in levees or low areas. (See [Appendix 7-1.](#))

Flood Insurance. Flood insurance, while not able to prevent flood damage, can repay most of the costs associated with flood damages. Flood insurance is available only in communities who agree to establish floodplain management programs. As such, its benefits are two-fold: property owners can buy reasonably priced flood insurance, and new construction will be safe from future flood damages.

Post Flood Recovery. Post-flood recovery activities include the restoration of public and private services and a normal lifestyle to individuals who have been affected by the flood. Although these activities do not reduce the amount of direct flood damage, they do reduce the overall impact of the flood by shortening the time of disruption within the community. (See [Appendix 7-2.](#))

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Selecting Alternatives

Throughout the planning process, the community has established objectives to eliminate or reduce its flood problem and reviewed the tools available to meet these objectives. Now is the time to put those items together and select the alternative. This section discusses the considerations in matching solutions to problems, suggests implementing short and long-term strategies, and lists sources of assistance.

MATCHING SOLUTIONS TO PROBLEMS

Before it will work, a plan must be feasible, economical, and acceptable. In other words, the plan must be capable of being accomplished, benefits received should equal or exceed the cost of implementation, and the measures implemented must satisfy the objectives set out early in the planning process. In matching solutions to flooding problems, a community must be keenly aware of these conditions and proceed accordingly.

In developing a flood hazard mitigation program, professional personnel are very important to assist communities in determining feasibility of projects. Communities do not need full-time staff for this purpose; rather, they can rely on assistance from state or federal government or part-time experts. Ideally, a community would have input from a civil engineer, hydrologist, land-use planner, economist, and attorney.

Sometimes, flood hazard reduction measures are feasible and economical but may not be publicly acceptable. For example, suppose the levees previously mentioned were feasible and affordable but unacceptable to neighborhood residents. In this case, land rights could be impossible to acquire, and therefore, make the project unattainable.

Communities can avoid this problem of unacceptability if they have been careful about acquiring the necessary public input and comment throughout the planning process. One of the best ways to do this is to have a "Flood Hazard Mitigation Committee." This committee should be comprised of the experts listed earlier and of citizens with broad representation in the community.

The Flood Hazard Committee should be established early in the planning process and take an active part every step along the way: identifying problems, establishing objectives, reviewing flood hazard reduction measures and matching solutions to problems. The committee can also be the driving force behind implementing the program that is discussed later in this document.

The process of matching problems and solutions is a complex one, requiring careful evaluation of all alternatives on the “feasibility, affordability, and acceptability” criteria. Compromises may be necessary, and in nearly all cases, a combination of approaches will work best. The decision on how to make the compromises can be recommended by the Flood Hazard Mitigation Committee.

SHORT- AND LONG-TERM STRATEGIES

Once alternatives for reducing flood damage are selected, a community should plan for their implementation by developing short- and long-term strategies. Short-term measures are those that could be put into effect in a relatively short time period, while long-term measures are those requiring more extensive analysis and preparation before implementation. Each measure in both the short- and long-term strategies should be well described. The plan should identify the person or agency responsible for carrying out the measure, indicate the time frame for implementation, and explain how the project will be financed.

SHORT-TERM STRATEGIES

Measures such as floodplain regulations, emergency preparedness plans, and public information programs can be easily implemented if a reliable delineation of the floodplain has been made. Careful analysis, however, is required before any of these measures will prove effective in reducing damage.

Floodplain regulations are restricted to the amount of technical data available. The less data available, the less stringent the regulations and the less effective the program. Emergency preparedness plans must be coordinated with county and state programs. Public information programs should be a part of short-term strategies. Creating a greater public awareness of the flood hazard and providing even minimal information about potential flooding enables people to take flood risk into account in making decisions on future development. It also helps create public interest in participating in the study of longer-term measures and support for their planning and implementation.

Other measures may also be suitable for short-range plans. When severe flooding occurs, an opportunity may exist for acquiring damaged properties. Careful consideration should be given to all types of measures to ensure identifying all reasonable opportunities.

LONG-TERM STRATEGIES

Long-term measures generally have to be implemented in phases over a period of years. For example, a measure that calls for a major flood control work to be constructed by the Corps would take several years to accomplish, or an acquisition/relocation program may first require a community to restructure its capital improvements program to raise the necessary funds to finance a project.

The formulation and implementation of long-term flood hazard reduction measures usually requires a reevaluation of the selected alternatives (or combination of alternatives). This evaluation should eliminate impractical or uneconomical measures and develop cost-effective designs for others. The process must address key issues:

- Potential for funding, including assistance from state and federal sources.
- Whether the measure can be successfully used with the physical, legal, financial, and other existing restraints.
- Extent to which the measure will achieve established objectives.
- Acceptance by the public.
- Compatibility of the measure with community goals other than floodplain management.

Determining which measure to include in a flood hazard mitigation program can be approached by developing and comparing alternative programs. It may be necessary to consider as few as two or more than a dozen alternatives to evaluate the most effective combinations of possible measures.

Comparing the alternatives may make it apparent that some combinations of measures are clearly inferior to others and should be dropped from further consideration. Others may be reasonably satisfactory or even superior, except for some particular problem that can be corrected through a minor adjustment.

The OWRB is a good starting point when seeking flood mitigation and planning assistance.

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Hazard Mitigation Implementation: Making it Work

No flood hazard mitigation plan will work unless the community is truly committed to its implementation. This requires allocation of both financial resources and manpower to ensure that selected alternatives recommended by the Flood Hazard Mitigation Committee are carried through. It also requires follow-up to ensure that measures are properly operated and maintained once they are implemented.

The first step in implementing a flood hazard mitigation plan is to have it formally adopted by the local governing body, such as the City Council. The plan, as recommended by the Flood Hazard Mitigation Committee, is presented for final review to local officials. Formal adoption should not be a problem if adequate coordination and public participation have been part of the planning process.

How the mitigation plan is implemented varies for the different measures identified.

REGULATORY/POLICY MEASURES

Measures involving policy changes or new regulations are largely a matter of formally adopting ordinances or incorporating flood hazard considerations into policy procedures. For example, a community that has selected an alternative requiring more restrictive building standards in floodplains must prepare an ordinance incorporating those standards, develop an administrative procedure to carry out and enforce the new regulations, and have the ordinance formally adopted.

If the recommended alternative is a policy change to restrict floodplain areas to open space uses, it will likely be necessary for a community to change its zoning ordinance and add this new objective to its comprehensive plan.

Maintenance of regulatory measures is usually done on a daily basis through the enforcement procedures established (permits and inspections). Annual review of the overall program should be conducted, however, to identify areas where improvements are needed.

FLOOD WARNING AND PREPAREDNESS

Measures designed to help a community prepare for, fight and recover from a flood are primarily organizational in nature. The major step in preparing for the implementation of these measures is to develop detailed plans of action describing what is to be done in each measure and assign responsibility for its accomplishment. Developing detailed plans of action requires technical skills and experience not always available in the community. These plans can be developed through a joint effort with state and federal agencies. Once that is accomplished, the plans of action (flood warning, flood fighting and recovery) can be formally adopted by a community and the necessary equipment and supplies stockpiled or prepared for use.

PUBLIC WORKS

Projects involving major public works, such as the construction of dams or levees, acquisition of flood-prone property or floodproofing public buildings, are normally part of a long-term strategy and can be costly and complex. Such projects are often carried out in cooperation with state or federal agencies.

Construction of a large flood control structure requires acquiring the necessary lands, arranging for financing, contracting for construction and planning for operation and maintenance. Floodplain acquisition projects may require both purchasing lands and structures and modifying the site to facilitate the long-term use of acquired lands. Relocation projects involve acquiring the area to be cleared, acquiring and preparing the area to which any structures are to be moved, moving or demolishing structures, and cleaning up the site.

PRIVATE MEASURES

Several measures identified in a flood hazard mitigation plan may have to be implemented by

individuals or private firms. These might include measures for floodproofing residential structures, applying good soil conservation practices or paying flood insurance premiums. A community's major responsibility in the implementation of these measures is to maintain a good public education/awareness program.

The public participation program put in place at the beginning of the planning effort can be modified to carry out informational programs that encourage private sector action and advertise available assistance.

OPTIONAL MEASURES

Additional planning considerations are outlined for communities in FEMA's NFIP regulations, 44 CFR, Section 60.22, considerations for flood-prone areas.

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Sources of Assistance

Communities interested in developing and implementing hazard mitigation plans can receive advice and assistance from several local, state and federal agencies and institutions. The Oklahoma Department of Emergency Management (ODEM) provides technical assistance and is the primary state contact for FEMA's three current mitigation programs (described below). As such, this agency provides a good starting point when seeking mitigation planning assistance.

Communities may also contact other sources for assistance, such as: regional planning councils, local colleges or universities, professional organizations, and/or civic groups. All have an interest in flooding and are willing to work to develop a mitigation program.

HAZARD MITIGATION GRANT PROGRAM

Authorized under Section 404 of the Stafford Act, the Hazard Mitigation Grant Program (HMGP) provides grants to States and local governments to implement long-term hazard mitigation measures after a major disaster declaration (see Appendix 7-3). 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 the immediate recovery from a disaster. Hazard Mitigation Grant Program funding is only available in States following a Presidential disaster declaration. Eligible applicants are:

- State and local governments
- Indian tribes or other tribal organizations
- Certain private non-profit organization

Individual homeowners and businesses may not apply directly to the program; however a community may apply on their behalf. HMGP funds may be used to fund projects that will reduce or eliminate the losses from future disasters. Projects must provide a long-term solution to a problem, for example, elevation of a home to reduce the risk of flood damages as opposed to buying sandbags and pumps to fight the flood. In addition, a project's potential savings must be more than the cost of implementing the project. Funds may be used to protect either public or private property or to purchase property that has been subjected to, or is in danger of, repetitive damage.

FLOOD MITIGATION ASSISTANCE (FMA) PROGRAM

FMA provides funding to assist States and communities in implementing measures to reduce or eliminate the long-term risk of flood damage to buildings, manufactured homes, and other structures insurable under the National Flood Insurance Program (NFIP). There are three types of grants available under FMA: Planning, Project, and Technical Assistance Grants. FMA Planning Grants are available to States and communities to prepare Flood Mitigation Plans. NFIP-participating communities with approved Flood Mitigation Plans can apply for FMA Project Grants. FMA Project Grants are available to States and NFIP participating communities to implement measures to reduce flood losses. States are encouraged to prioritize FMA project grant applications that include repetitive loss properties. (See [Appendix 7-4](#).)

PRE-DISASTER MITIGATION PROGRAM

Pre-disaster mitigation (PDM) is a new initiative that FEMA is promoting to build disaster resistant communities. FEMA has taken a very strong stand to try and reduce the cycle of disaster losses and subsequent repair. The Pre-Disaster Mitigation (PDM) program provides technical and financial assistance to States and 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. FEMA provides grants to States and Federally recognized Indian tribal governments that, in turn, provide sub-grants to local governments (to include Indian Tribal governments) for mitigation activities such as planning and the implementation of projects identified through the evaluation of natural hazards.

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Page last updated: February 05, 2008

Oklahoma's Floodplain Management 101

Chapter 8: Professional Development

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- Organizational Development
- Educational Development

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Introduction

As evidenced by a review of the materials in this study guide, acquiring a thorough knowledge and understanding of all of the elements involved in implementing a successful floodplain management program could be a daunting experience for the community official. Floodplain management obviously involves some complicated and technical issues, covering many disciplines.

One of the best ways, and perhaps the only way, to become a successful and confident floodplain administrator is by acquiring the necessary training and expertise needed to make informed and difficult decisions in a way that maintains the integrity of the communities floodplain management program. The state legislature acknowledged the importance of adequate training by passing legislation that requires designated floodplain administrators to be accredited by the OWRB.

Luckily, there are many opportunities for Oklahoma floodplain administrators (as well as other local officials and interested citizens) to gain an in-depth and up-to-date knowledge of their program requirements and to obtain the necessary education for continuing accreditation. However, professional development does not have to stop with training. A good way to become a well-rounded floodplain administrator and manager is to become an active member in one or more of the professional associations catering to education, consensus building and information exchange among colleagues and peers.

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Organizational Development

ASSOCIATION OF STATE FLOODPLAIN MANAGERS, INC. (ASFPM)

The Association of State Floodplain Managers was founded in 1997 by professionals in state government. It has evolved into a national organization of professionals concerned with floodplain management, flood hazard mitigation, the National Flood Insurance Program, and flood preparedness, warning and recovery. With more than 6,500 members the group has become a respected voice in floodplain management practice and policy in the United States. It represents the flood hazard specialists of local, state and federal government, the research community, the insurance industry, and the fields of engineering, hydrologic forecasting, emergency response, water resources, and others.

The Association of State Floodplain Administrators supports comprehensive nonstructural and structural

management of the nation's floodplains and related water resources. The ASFPM believes that, through coordinated, well-informed efforts, the public and private sectors can:

- Reduce loss of human life and property damage resulting from flooding
- Preserve the natural and cultural values of floodplains.
- Promote flood mitigation for the prevention of loss and the use of flood plains.
- Avoid actions that exacerbate flooding.

To help reach these goals, the ASFPM fosters communication among those responsible for flood hazard activities, provides technical advice to governments and other entities about proposed actions or policies that will affect flood hazards, and encourages flood hazard research, education and training.

The Association's conferences, newsletters, training, publications, and the nationally based efforts of their committees and officers enhance work toward mitigating flood losses in the nation and furthering the profession of floodplain management. Among its many other benefits, the Association of State Floodplain Managers has established a national program for professional certification of floodplain managers. The program recognizes continuing education and professional development that enhance the knowledge and performance of local, state, federal, and private-sector floodplain managers.

OKLAHOMA FLOODPLAIN MANAGER'S ASSOCIATION (OFMA)

The OFMA, organized in 1990, is Oklahoma's state floodplain managers association and is a Chapter member of ASFPM. The OFMA brings together people with a common interest in floodplain management. Membership includes floodplain administrators, concerned citizens, public employees and elected officials, engineers, surveyors, planners, contractors, lenders, insurance agents, real estate professionals, students, corporate partners and local, state and federal agencies.

The Association's objectives include promoting interest in flood damage abatement, improving cooperation among government agencies, and encouraging innovative approaches to managing Oklahoma's floodplains. In addition, the organization provides a unified membership capable of presenting one strong voice to communicate with the state legislature on flood-related issues. Other benefits of OFMA membership include monthly newsletters ("The B.F.E."), spring conferences and an annual fall conference, an annual legislative reception at the state capitol, and other training and educational publications and opportunities.

In September 1997, the Oklahoma Floodplain Management Association (OFMA) adopted a program for the certification of floodplain managers and others interested in floodplain management activities. The program is designed to certify competency with the basic principals of sound floodplain management as mandated by the National Flood Insurance Program. Professional development through this program allows floodplain management officials to gain greater credibility and integrity in their fields. The OFMA certification program is accredited by ASFPM.

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Educational Development

Both OFMA and ASFPM offer opportunities for professional education/training at their conferences and provide additional training information through links to their websites. Other opportunities include, but are not limited to, those provided by the OWRB, FEMA and ODEM.

OKLAHOMA WATER RESOURCES BOARD SPONSORED TRAINING

Each year the Oklahoma Water Resources Board staff, with assistance from the ODEM, FEMA and the Corps of Engineers, host five or more one-day floodplain management workshops. The basics of floodplain management are presented to local officials to help them understand the principles of floodplain management and how new development can be constructed so it is reasonably safe from flooding. These workshops are generally given during the month of May to coincide with "Spring Flood Awareness Month." Traditionally the Governor of Oklahoma proclaims May "Flood Awareness Month" to alert state residents to the dangers of flooding and the availability of low-cost government subsidized flood insurance. The OWRB will conduct additional one-half to one-day workshops and specialty training

as staffing allows and as requested or needed.

The Board also hosts at least one intensive 5-day floodplain management course in January, which is typically held at the College of Continuing Education at the University of Oklahoma. This course, "Managing Floodplain Development Through the NFIP," is the sanctioned FEMA-EMI course and gives floodplain administrators another opportunity to gain valuable training and education for CECs. This course is strongly recommended for any practicing floodplain administrator as well as surveyors, civil engineers and others.

These OWRB floodplain management workshops allow workshop participants to earn continuing education credits (CECs) that can be applied towards certification in the CFM Program and state floodplain administrator accreditation requirements.

For information about registering for OWRB floodplain management workshops, go to http://www.owrb.ok.gov/hazard/fp/fp_workshops.php

FEDERAL EMERGENCY MANAGEMENT AGENCY (FEMA)—DEPARTMENT OF HOMELAND SECURITY

The Federal Emergency Management Agency, National Emergency Training Center (NETC) in Emmitsburg, Maryland, offers the finest in educational resources. The 107-acre campus is shared by the Emergency Management Institute (EMI), the National Fire Academy (NFA), and the United States Fire Administration.

The EMI offers a variety of professional level courses for the floodplain administrator. Resident courses are offered each year from October through September. The cost is minimal for state and local community floodplain officials. United States residents with substantial involvement in emergency operations are eligible to apply for Institute courses. Applicants must meet the specific selection criteria outlined with each course described in the catalog. Selection also may be based on the impact the applicant would have on emergency preparedness in the local community, the utilization potential for skills acquired, and the representative distribution of applicants from the total emergency management community. Additional information can be obtained on the FEMA/EMI website.

OKLAHOMA DEPARTMENT OF EMERGENCY MANAGEMENT (ODEM)

Other avenues to gain professional development for the local floodplain administrator are through training opportunities with the ODEM. Many of the courses offered by this office originated from the NETC and EMI. EMI offers a nationwide program of non-resident courses of instruction through the Federal Emergency Management Agency (FEMA) regional offices. Most of this training is conducted in partnership with state emergency management offices. ODEM also offers other training and educational opportunities, such as hazard mitigation planning, which would be of value to the floodplain administrator.

ANNUAL ACCREDITATION

With the passage of HB 2284 in 2004, local floodplain administrators in Oklahoma are now required to be accredited by the OWRB, codified under 82 O.S. 1620 & 1620.1. This law expands the duties of the Oklahoma Water Resources Board and amends the Oklahoma Floodplain Management Act. Statutes add definitions, expand the authority of floodplain boards, and establish accreditation standards for floodplain administrators. They furthermore call for the hiring and employment of accredited floodplain administrators.

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Oklahoma's Floodplain Management 101

Chapter 1 Appendix

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- 1-2: Reading the Flood Insurance Rate Map (FIRM)
- 1-3: Reading a Flood Profile
- 1-4: The Floodway
- 1-5: Questions and Answers about Flood Insurance
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- 1-7: Principle Features of Increased Cost of Compliance (ICC) Coverage
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Appendix 1-1: National Flood Insurance Program

Created by Congress in 1968, the National Flood insurance Program (NFIP) is a nonstructural approach for the prevention of flood damage. The Federal Emergency Management Agency (FEMA), an agency part of the U.S. Department of Homeland Security, administers the NFIP. FEMA's regional offices are responsible for much of the contact with local communities.

The NFIP has two main objectives:

1. To enable property owners in flood-prone areas to purchase reasonably priced flood insurance; and
2. To reduce future property loss and loss of life from floods.

In order to accomplish these goals, the NFIP requires the local community to adopt floodplain management regulations before flood insurance is available. The local regulations must meet the minimum federal requirements in order for the community to participate in the Program. In short, the NFIP provides insurance to people living in flood-prone areas to cover future flood damages, while regulating future development in the floodplain that might require further expenditures for disaster relief (see [Figure 1-3](#)).

Community participation in the NFIP is voluntary. Each identified flood-prone Community must assess its flood hazard and determine whether flood insurance and floodplain management would benefit the community's residents and economy. However, if a community chooses not to participate after the flood hazard has been identified, there are several ramifications, in addition to the availability of flood insurance, that affect property owners. By law, if a flood disaster occurs in a nonparticipating flood-prone community, no federal disaster assistance will be provided. Also, grants, loans, or guarantees made by federal agencies, such as the Small Business Administration, Federal Housing Administration, and Veterans Administration, are prohibited for acquisition or construction in identified areas.

When a community enters the first phase of the program (the emergency phase), it agrees to adopt and enforce a floodplain ordinance that meets the minimum regulatory requirements. These ordinances require the community to

review all building permits for new construction and determine the flood zone
 using the best available information, require that new construction
 have the lowest floor elevated to the 100-year flood level (nonresidential structures have the option to floodproof to the same level) under the minimum regulations;

Apply some requirements to existing structures if substantial improvement is made (any repairs, reconstruction or improvement which equals or exceeds 50 percent of the market value of the structure);

Require all manufactured homes in a flood zone to be elevated and anchored to resist flotation, collapse or lateral movement; and

Review all subdivision proposals and require any necessary revisions to minimize the flood damage potential.

For additional requirements and explanations, refer to your local ordinances. In this phase, a limited amount of federally subsidized insurance is available for all structures in the community regardless of their flood risk.

A community is eligible to enter the regular phase of the program when FEMA completes a detailed engineering study, which defines the flood hazard areas based on hydrologic, geologic, and topographic data, and produces a Flood Insurance Rate Map (FIRM). The community must adopt more stringent floodplain ordinances to enter this phase. When a community enrolls in the regular phase, more flood insurance coverage becomes available to property owners.

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Appendix 1-2: Reading the Flood Insurance Rate Map (FIRM)

A Flood Insurance Rate Map (FIRM) (see [Figure 1-4](#)) shows the floodway special flood hazard areas inundated by 100-year flood in dark gray, floodway areas in Zone AE in dark gray with black stripes, other flood areas (Zone X) in lighter gray and other areas (Zone X) in white.

To locate a site on the map, measure the actual distance on the ground between the site of concern and an identifiable point (bridge, river channel, reference mark or other landmark). Using the map scale, convert these figures to map units and plot the site on the map. For example, the point labeled My Project is 100 feet upstream from the landmark. It is located in the Special Flood Hazard Area.

Cutting across the floodplain are a series of lines, tagged with letters, called cross sections. Flood elevations are developed for each of the cross sections and displayed on flood profiles (see [Appendix 1-3](#)).

Communities use the information from the FIRM and flood profiles to regulate development in the floodplain to meet standards of the NFIP.

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Appendix 1-3: Reading a Flood Profile

A flood profile (see [Figure 1-5](#)) is a chart showing the elevation of the water surface during a flood event at particular locations along a river or stream. Flood insurance studies determine the elevation at the cross section marks for the 10-, 50-, 100- and 500-year events. The cross section locations can be more easily seen on the Flood Insurance Rate Map (FIRM).

1. First, check the gridscales on the profile. On the example above, each line on the horizontal axis represents 50 feet along the stream. The vertical axis lines each represent a 0.5 foot change in elevation, NGVD (National Geodetic Vertical Datum).
2. Next, locate the point of concern on the horizontal axis. This will be the distance from the reference point on the ground, measured in [Appendix 1-2](#). On the example above, the point of concern is about 100 feet upstream (toward the "H" cross section location marker) from the identified landmark. The point of concern is the same point referred to as "My Project" on the above example and on the Flood Insurance Rate Map (FIRM) in [Appendix 1-2](#).
3. Now draw a line vertically from the point located on the horizontal axis (labeled "stream distance above mouth") until it intersects the line that represents the FLOOD EVENT of concern. The example shows this line intersecting the 100-year flood line. The 100-year flood elevation is the

protection level of the NFIP.

4. Finally, to determine the elevation, draw a line horizontally from the point on the 100-year flood line to the scale on the left, which represents the ELEVATION in feet, NGVD. In the example above the point of concern, based on the 100-year flood event, is 1,134.7 feet, NGVD. The 10-year flood elevation is 133.3 ft. NGVD and the 500-year flood elevation is 1,135.25 ft. NGVD.

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Appendix 1-4: The Floodway

Review all development proposals to determine if they are located within a designated floodway. Ensure any development or encroachment (filling, etc.) within a designated floodway area that would cause no increase in the base flood elevation.

Communities participating in the Regular Phase of the National Flood Insurance Program (NFIP) may have a detailed Flood Insurance Study completed for them by the Federal Emergency Management Agency (FEMA). This study describes flood hazards in the community and, if done in enough detail, designates a regulatory floodway.

For purposes of the NFIP, a floodway is defined as the channel of a stream, plus adjacent overbank areas, that must be kept free of encroachment so that the 1% chance flood may be carried without substantial increases (one foot or less) in flood heights. A floodway divides the floodplain into two parts: the floodway and the flood fringe. The floodway is the area of the floodplain that must be removed to carry floodwaters so that flood damages are not increased in the remainder of the 100-year floodplain flood fringe.

The purpose of this requirement is to ensure that new development does not aggravate existing flooding conditions in the community. This objective is achieved through stringent control of development within a defined portion of the floodplain called the floodway. Within designated floodways, the community must not permit any development, new construction, substantial reconstruction, use, activity or encroachment which would cause an increase in the heights of the 100-year (base) flood.

While the floodway requirement does not automatically exclude all forms of development, it does mandate that the flooding effects of new development be calculated beforehand so that adverse effects can be avoided. In general, when confronted with an application proposing new development within a designated floodway, local permit officials should assume that the development will increase flood heights unless the applicant can demonstrate otherwise. Development proposals that are found by engineering analysis to have no effect on (or to lower) flood heights are acceptable. Such developments could include a "one-for-one" replacement of an existing structure by a building of equal dimensions and displacement; projects where a new floodway encroachment is satisfactorily offset by removal of an existing obstruction or by a compensatory excavation; or proposals where an improvement in channel flow will compensate for the adverse effect of the new encroachment. Also, depending upon the hydraulic characteristics of a particular floodway at a given site, it may be possible to design a new development project that does not increase flood heights; however, once again the burden of proof must be assumed by the applicant to document the contention of "no effect on flooding".

WHY A FLOODWAY?

A community that is participating in the NFIP must make sure new development in the floodplain meets the standards of the program. Essentially, these standards require that new structures be protected from the 100-year flood event or 1% chance flood. The level this flood reaches is called the Base Flood (or 100-year) Elevation (BFE). If a new structure is built with its lowest floor at or above the BFE, it should be safe from flood damage. But, what happens if the BFE is increased?

BFEs can be increased by obstructions in the floodplain. For example, if dikes are constructed on both sides of a river channel, they constrict the river's floodplain, causing floodwaters to rise and back up, increasing flood heights upstream. To avoid the possibility of raising the BFE, the NFIP asks a community to reserve a portion of the floodplain (the floodway) nearest the channel to pass floodwater

without causing a significant increase.

A significant increase has been determined by FEMA to mean a maximum one-foot rise in the BFE. This means that if all areas outside the floodway are obstructed or filled in, the BFE will not be raised by more than one foot. Any obstructions placed in the floodway then would exceed the maximum one-foot rise allowed by the NFIP regulations.

THE CONCEPT OF THE FLOODWAY

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

DETERMINING A FLOODWAY

The floodway is determined by "squeezing in" a community's floodplain boundary (done by a computer hydraulic model) until the Base Flood is raised one foot. Sometimes the rise will be less than one foot at certain points in order to keep the increase from exceeding one foot at other points within the study area or to avoid excessive velocity. This "squeezing in" simulates building a wall from both sides of the floodplain toward the center of the channel.

The "wall" could be fill, structures, a levee or physical obstruction. When the imaginary obstruction has constricted flood flow enough to raise the Base Flood Elevation one foot, the limits of the obstruction define the boundary of the floodway.

In the past, these boundaries were placed on a Flood Boundary Floodway Map (FBFM). Since FBFMs are no longer printed, they are now placed on the Flood Insurance Rate Map (FIRM) provided to the community along with the Flood Insurance Study.

Normally, floodway boundaries are determined by computer model applying the equal degree of encroachment rule. The rule requires that the quantity of floodwaters conveyed on both sides of the watercourse be reduced by an equal percentage when developing the encroached floodway boundary.

This rule is based on the legal need to treat similarly situated property owners in a similar manner. In practice, the rule is not always followed due to many factors, including property ownership, topography, existing development patterns and comprehensive land use plans. Any of these factors may justify modifications to the equal degree of encroachment rule. As such, FEMA generally works closely with a community in identifying boundaries to make sure the floodway that is defined meets NFIP standards and community needs.

COMMUNITY RESPONSIBILITIES

Communities that have an identified floodway on an FBFM or FIRM must not allow any development in the floodway unless it can be shown that the development will not cause an increase in flood heights. Communities do this through their development permit system.

When reviewing permit applications in the floodway, the floodplain administrator must determine the extent of development. In some cases, it is apparent that the proposed development will cause no change in the existing topography (for example, a playground). However, in most cases, the administrator will NOT be able to determine whether the development will cause a rise in base flood elevations.

When the floodplain administrator is uncertain, the permit applicant must prove to the community that the proposed floodway development, along with similar future development assumed by the equal degree of encroachment rule will cause no increase in the BFEs. The applicant must use a registered

professional engineer to analyze the development plans and assess how the BFEs will be affected. Unless this analysis proves the development will cause no rise in the BFE the permit application must be denied.

Structures existing in a floodway prior to the floodway identifications are “grandfathered in” but are subject to NFIP regulations. Any substantial improvements to such structures, however, must be in compliance with the standards.

ALLOWABLE FLOODWAY USES

Floodway areas can be utilized. There are several development activities that will not cause an increase in the BFE, yet can sustain flood damage without great economic loss. These might include agricultural uses that do not involve structures, parking lots, loading areas or landing strips; recreational uses, such as picnic grounds, golf courses, or swimming areas; and lawns, gardens or other uses incidental to residential structures. Additions to existing structures, which do not add to ground flood area, may be allowed if they do not exceed substantial improvement criteria. An engineering analysis is the final determinant in all cases.

ADVANTAGES

Having an identified floodway on a FBFM or FIRM eases a community's task of administering its floodplain ordinance. When the floodway is identified, the floodplain administrator can determine if a proposed floodplain development is in the floodway. If it is in the floodway, it will cause a rise. Without the floodway, floodplain administrators should always question whether or not proposed developments will affect existing BFEs.

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Appendix 1-5: Questions and Answers about Flood Insurance

What is Flood Insurance?

The National Flood Insurance Program (NFIP) was created to provide affordable flood insurance to property owners in flood-prone areas and promote good floodplain management so future developments will not suffer damage from flooding. The NFIP is administered by the Federal Emergency Management Agency (FEMA) and carried out by local community administrators.

Who Can Buy Flood Insurance?

Flood Insurance can be purchased by anyone in a community participating in the NFIP, whether or not their property is in the floodplain. Flood insurance is voluntary unless required as a condition of a mortgage.

Where Can I Buy Flood Insurance?

Any licensed property or casualty insurance agent can sell flood insurance.

What Does It Cover?

Any walled and roofed structure can be insured from direct loss caused by the general condition of flooding. Flooding is defined as a general and temporary condition of partial or complete inundation of normally dry land by the overflow of water, or; the unusual and rapid accumulation of runoff of surface waters from any source .

What About Basements?

For flood insurance purposes, a basement is defined as having its floor subgraded on all sides. The NFIP limits flood insurance coverage in basements and in areas below the lowest elevated floor or an elevated building. Items covered include:

Stairways and staircases attached to buildings, not separated by elevated walkways.

Sump pumps.
Well water tanks and pumps.
Oil tanks (and oil in them).
Cisterns.
Gas tanks.
Electric junction circuit boxes.
Furnaces and hot water heaters.
Clothes washers and dryers.
Food freezers.
Air conditioners.
Heat pumps, and
Pumps and/or tanks used in conjunction with solar energy systems.

Items not covered include:

Finished basement walls, floors, ceilings and other improvements to a basement except those needed for fire proofing.
Enclosures below lowest elevated floor of elevated buildings.
Contents, machinery and equipment in basements, other than those specifically listed as being covered, and Contents below lowest elevated floor of elevated buildings.

How much does it cost?

Depending on if your community is in the Emergency or Regular Phase of the program, each policy premium differs.

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Appendix 1-6: FEMA Fact Sheet

FACT: Most homeowners insurance policies do not offer protection against flood damage.

FACT: Ninety percent of all disasters in the U.S. are flood related.

FACT: You are four times more likely to experience a flood than a fire if you live in a high risk flood zone, or Special Flood Hazard Area (SFHA).

FACT: Flood insurance is available through the federal government's National Flood Insurance Program (NFIP), which is administered by the Federal Insurance and Mitigation Administration, a part of the Federal Emergency Management Agency. Flood insurance can be purchased through any licensed property/casualty insurance agent or through many private insurance companies that are now writing flood insurance under arrangements with the FIMA.

FACT: Flood insurance is required by law. Congress passed the Flood Disaster Protection Act of 1973, and the National Flood Insurance Reform Act of 1994 mandating at all federally insured or regulated lenders require flood insurance for mortgages and other loans on buildings and manufactured (mobile) homes located in SFHAs.

FACT: Almost any building with at least two walls and a roof may be insured if it is principally above ground and located in a community participating in the NFIP. Coverage is also available for buildings under construction.

FACT: The average premium for an NFIP flood insurance policy is \$300 per year for approximately \$85,000 worth of coverage. For those not in an SFHA, but still exposed to a risk, there is a low cost policy referred to as the Preferred Risk Policy, available for as little as \$106 per year. Nearly one-third of our claims come from these lower risk areas.

FACT: Flood insurance is available for buildings in communities that have agreed to adopt and enforce sound floodplain management practices. Currently, there are over 18, 000 communities participating in

the NFIP throughout the United States and our overseas territories.

FACT: While there are more than 3 million flood insurance policyholders, estimates are that of flooding.

FACT: Businesses may also be insured through the NFIP.

FACT: Contents of insurable, fully enclosed buildings may be covered by a separate policy, making flood insurance available to renters, too.

FACT: There is normally a 30-day waiting period between the time flood insurance is purchased and the time coverage is in force.

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Appendix 1-7: Principle Features of Increased Cost of Compliance (ICC) Coverage

The following are the principal features of Increased Cost of Compliance (ICC) coverage: Note all references are to the Standard Flood Insurance Policy Endorsement Number One.

ICC coverage responds to the enforcement of a State or local land use requirement to bring a flood-damaged structure into compliance with certain floodplain management standards during the rebuilding process.

The limit for increased cost of compliance (ICC) coverage is \$30,000.

Only Standard Flood Insurance Policies (SFIPs) with Building coverage will have ICC coverage.

Appurtenant structures are not eligible for ICC coverage. (See Exclusion 10.)

The maximum amount collectible under the SFIP for both building coverage and Coverage A) and ICC (Coverage D) cannot exceed the maximum amount permitted under the Act, e.g., \$250,000 for a single family dwelling.

ICC coverage will be available for new or renewal policies effective on or after June 1, 1997.

Only structures in Regular Program communities are eligible for [CC coverage. Structures insured under a Group Flood Insurance Policy or a condominium unit owner's policy are NOT eligible for [CC coverage. (See Exclusions II and 12.)

Policies issued or renewed for structures while the community was in the Emergency Program are NOT eligible for [CC coverage. Once a community is converted to the Regular Program, these policies will be eligible for ICC coverage upon renewal with the payment of the ICC surcharge. (See Exclusion 1.)

No separate deductible applies to ICC coverage.

Only flood-damaged structures are eligible for the coverage.

Only those structures where flood damage meets the NFIP substantial or repetitive loss thresholds are eligible for ICC payments.

Activities eligible for ICC payments are: elevation, floodproofing, demolition, relocation, or any combination thereof.

ICC payments will be made to bring a structure into compliance with State or local elevation or floodproofing requirements for freeboard, i.e., an elevation above the base flood elevation. (See Eligibility, exception b.)

ICC payments will be made to bring a structure into compliance with State or local elevation requirements based on FEMA-issued advisory or preliminary base flood elevations which increase BFEs or change risk zones that add base flood elevations so long as such elevations are adopted by the State or community. (See Eligibility, exception a.)

ICC payments will be made to comply with NFIP requirements to elevate a structure in an unnumbered A zone to an elevation based on the best available elevation data. (See first paragraph after exception b of Eligibility.)

ICC payments will be limited to ONLY the cost to elevate a structure from the base flood elevation—applicable at the time of construction—to the current higher BFE IF the structure was NOT originally built in compliance AND IF no variance was obtained for the original construction.

ICC payments will be made to elevate a structure to the current BFE EVEN THOUGH the structure was not originally built in compliance so long as a variance was obtained for the original construction.

ICC payments will be made for demolition and any incremental costs to comply with elevation requirements for the structure during rebuilding at the same or another site.

All nonresidential structures are eligible for [CC payments in connection with floodproofing. Only residential structures with basements in communities that have been approved by the NFIP to floodproof basements in accordance with NFIP regulations at 44 CFR 60.6 (b) or (c) are eligible for ICC payments in connection with the floodproofing option. (See first paragraph.) Repetitive loss structures are eligible for [CC payments when two conditions are met: (a) The community has adopted and is enforcing a cumulative substantial damage provision or repetitive loss provision in its floodplain management ordinance that requires action by the property owner; and (b) The property has a history of flood claims under the NFIP that satisfies the statutory definition of repetitive loss structure, i.e., two paid flood losses where the flood damage in a ten year period averages 25% of the structure's value at the time of loss.

TASK: To adjust ICC claim for a policy rated post-FIRM with a negative elevation different when the structure was NOT built to the BFE in force at the time for construction.		
IF	AND	THEN
A variance WAS issued.	There HAS been an increase in BFE.	ICC claim WILL BE ADJUSTED as usual. ICC payments will be made to elevate the structure to the new BFE.
A variance WAS issued.	There has been NO increase in BFE.	ICC claim WILL BE ADJUSTED as usual. ICC payments will be made to elevate the structure to the BFE.
A variance was NOT issued.	There HAS been an increase in BFE.	ICC claim WILL BE LIMITED to the cost of compliance to elevate the structure from the BFE at the time of construction to the current BFE.
A variance was NOT issued.	There has been NO increase in BFE.	ICC claim DENIED.
NOTE: If a structure WAS built to the BFE in force at the time of construction even though there is a negative elevation difference at the time of the ICC claim, the ICC claim will be paid to elevate to the CURRENT BFE.		

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Appendix 1-8: ICC Claims Process



[click for larger view](#)

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Figure 1-1

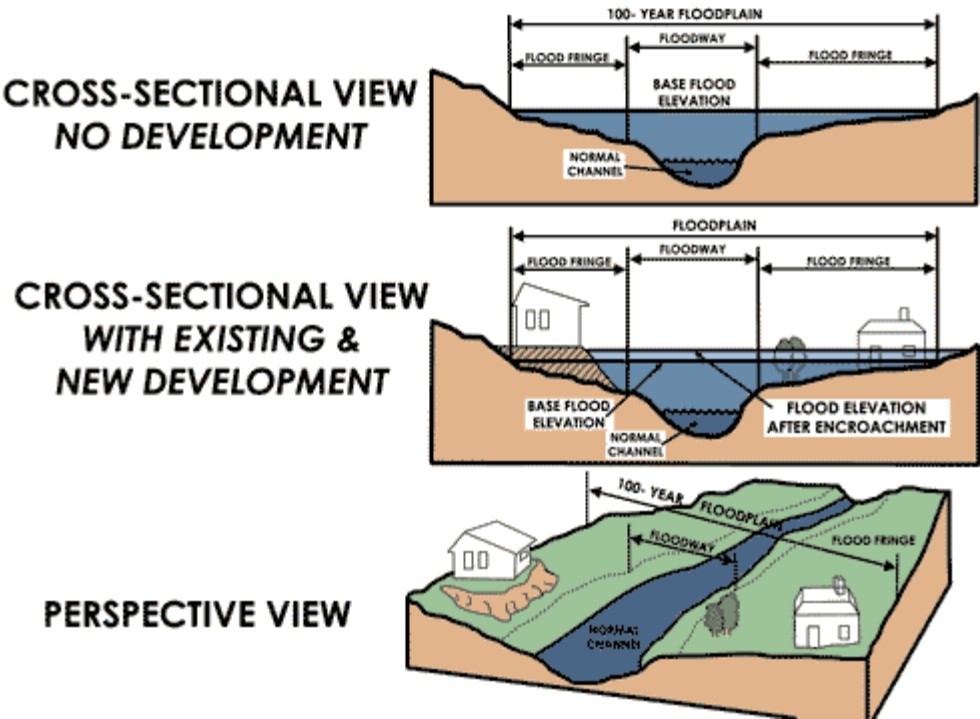


Figure 1-1. The illustration above shows three views of a hypothetical 100-year floodplain along a channel and the effects of encroachment. The three views include a cross-sectional view with no development, a cross-sectional view with existing and new development (causing the flood elevation to rise), and a perspective view of the encroachment with increased chance of flooding in the flood fringe.

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Figure 1-2

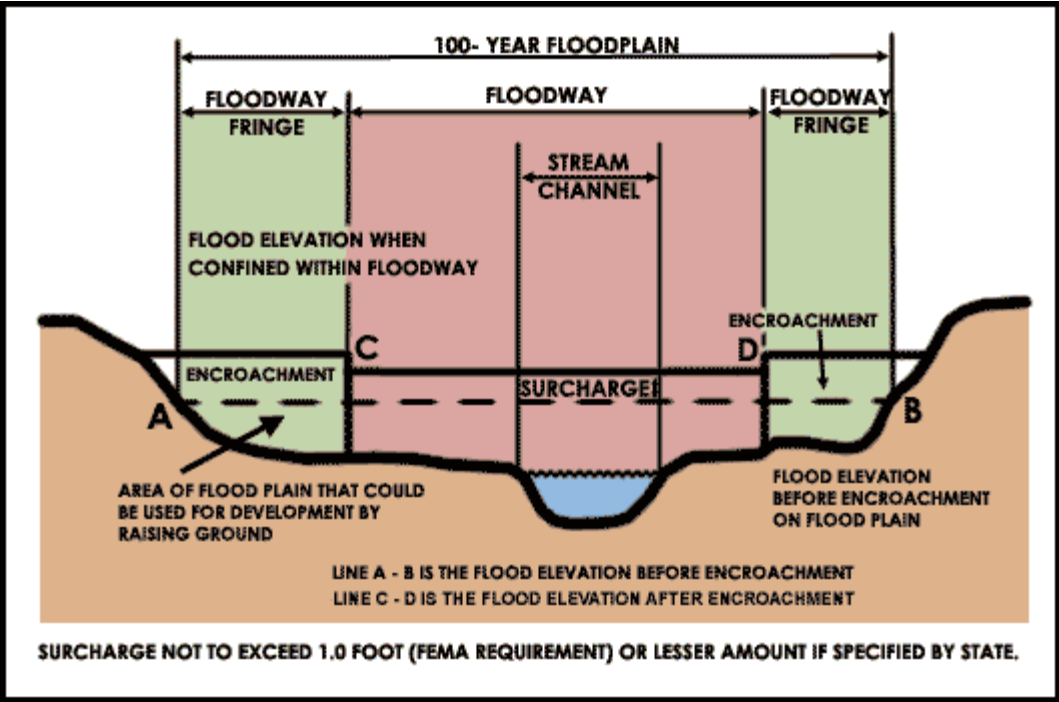


Figure 1-2. The illustration above shows a cross section of a stream with undulating land on either side. Water is shown at normal level, with lines drawn from bank to bank demarcating the one hundred year floodplain, the floodway, and the floodway fringe. Hypothetical development on the fringe area is illustrated to show the resulting water level at a higher elevation for the 100-year flood. This increase in water level elevation is called surcharge.

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Oklahoma's Floodplain Management 101

Chapter 2 Appendix

- 2-1: The Oklahoma Floodplain Management Act
- 2-2: Procedures for a Community to Enroll in the NFIP
- 2-3: Minimum Federal and State NFIP Requirements
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Appendix 2-1: The Oklahoma Floodplain Management Act

[Download the Oklahoma Floodplain Management Act \(Chapter 23\)](#)

For MORE information about the Oklahoma Floodplain Management Act, see Bulletin No. 1 published by the Oklahoma Water Resources Board.

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Appendix 2-2: Procedures for a Community to Enroll in the NFIP

When a community (i.e. county or municipality) wishes to enter the National Flood Insurance Program (NFIP), it must take several initial steps to meet both federal eligibility requirements and to insure proper compliance with the Oklahoma Floodplain Management Act. The following is a step-by-step procedure that should be followed by any city, town or county in Oklahoma when applying to enter the NFIP. Substate agencies may use the procedures below as a guideline when assisting municipal and county officials in getting communities into the Emergency or Regular Program of the NFIP. Tribal governments are not required to follow Title 82; however to help tribes administer their program effectively OWRB has recommended that tribes establish tribal floodplain boards.

PROCEDURES FOR COUNTIES

1. The Board of County Commissioners shall by resolution establish a Floodplain Board, which has the authority to adopt, administer and enforce floodplain management regulations.
 - The County Floodplain Board shall be composed of five members appointed by the Board of County Commissioners, all of which must be residents of the county and must own or operate real property within the unincorporated area of the county. Terms of appointment to the County Floodplain Board shall vary from two to six years, and service shall be without Compensation. Removals shall be made by the Board of County Commissioners for cause only after a public hearing. Any vacancies shall be filled by appointment for the expired term only.
 - The Board of County Commissioners may designate members of an existing County Planning Commission to serve as a County Floodplain Board if those members meet the qualifications set forth above.
2. The County Floodplain Board shall draft rules and regulations governing land use, building of structures, and construction in floodplains in unincorporated county areas. The Oklahoma Water Resources Board will provide guidelines to aid the County Floodplain Board in developing its rules and regulations. These guidelines will address the important aspects of (1) building and construction in floodplains, and (2) methodologies for determining 100-year floodplains.
 - Such rules and regulations shall include definitions of specific floodplain terms as used in the rules

and regulations.

- The County Floodplain Board shall also be responsible for determining the 100-year flood boundaries and elevations in the county's floodplains by either adopting federal, state or local maps (when available) or by developing such maps and information.
- 3. Once the rules and regulations have been drafted, the Floodplain Board shall hold a public hearing within the county so that county residents and other interested citizens may comment on the proposed rules and regulations.
 - The County Floodplain Board shall, at least thirty (30) days prior to the date of the hearing, publish a Notice of Hearing in a newspaper of general circulation in the county. The notice shall specify the purpose, time, and place of the hearing.
 - Also, the County Floodplain Board shall, at least thirty (30) days prior to the date of the hearing, provide the Oklahoma Water Resources Board with written notification that such a hearing is forthcoming, accompanied by a copy of the proposed rules and regulations.
 - After the hearing, the County Floodplain Board resolves to adopt the floodplain regulations. The Floodplain Board must file a copy of the adopted regulations with the Oklahoma Water Resources Board within fifteen (15) days.
- 4. After the County Floodplain Board adopts the regulations, the Board of County Commissioners must approve the rules and regulations by an appropriate resolution.

PROCEDURES FOR MUNICIPALITIES, CITIES OR TOWNS

1. The municipal governing body (city council, town council, board of trustees) shall by resolution establish a Floodplain Board which has the authority to adopt, administer and enforce floodplain management regulations.
 - The Municipal Floodplain Board shall be composed of five members appointed by the municipal governing body. All the members must be residents of the municipality. Terms of appointment to the Municipal Floodplain Board shall vary from two to six years, and service shall be without compensation. Removals shall be made by the municipal governing body only after a public hearing. Any vacancies shall be filled by appointment for the unexpired term only.
 - The municipal governing body may designate members of an existing Planning Commission of the municipality to serve as the Municipal Floodplain Board if those members meet the qualifications set forth above.
2. The Municipal Floodplain Board shall draft rules and regulations governing land use, building of structures, and construction in floodplains in the incorporated area of the municipality. The Oklahoma Water Resources Board will provide guidelines to aid the Floodplain Board in developing its rules and regulations. These guidelines will address the important aspects of (1) building and development in the floodplain, and (2) methodologies for determining 100-year floodplain.
 - Such rules and regulations shall include definitions of specific floodplain terms as used in the rules and regulations.
 - The Municipal Floodplain Board shall also be responsible for determining the 100-year flood elevations in the municipality's floodplain by either adopting federal, state or local maps (when available) or by developing such maps and information.
3. Once the rules and regulations have been drafted, the Floodplain Board shall hold a public hearing within the municipality so that residents and other interested citizens may voice their opinions and views regarding the proposed rules and regulations.
 - The Municipal Floodplain Board shall, at least thirty days prior to the date of the hearing, publish a Notice of Hearing in a newspaper of general circulation in the municipality. The notice shall specify the purpose, time, and place of the hearing.
 - The Municipal Floodplain Board shall, at least thirty days prior to the date of the hearing, provide the Oklahoma Water Resources Board with written notification that such a hearing is forthcoming, accompanied by a copy of the proposed rules and regulations.
 - After the hearing, the Municipal Floodplain Board resolves to adopt the floodplain regulations. The Floodplain Board must file a copy of the adopted regulations with the Oklahoma Water Resources Board within fifteen days.
4. After the Floodplain Board the regulations, the municipal governing body must approve the rules and regulations by an appropriate resolution.

FEMA AND STATE REQUIREMENTS

Finally, the Floodplain Board (for either municipality or county) must submit two completed copies of FEMA **Form 81-64, Application for Participation in the National Flood Insurance Program** [pdf], two certified copies of each resolution requesting participation in the National Flood Insurance Program, and two certified copies of the adopted floodplain regulations to:

FEDERAL EMERGENCY MANAGEMENT AGENCY
Mitigation pision
Federal Center, Region VI
800 North Loop 288
Denton, Texas 76201-3606

and one set of the above documents to:

OKLAHOMA WATER RESOURCES BOARD
Attention: Planning and Management
3800 North Classen Boulevard
Oklahoma City, Oklahoma 73118

The Federal Emergency Management Agency (FEMA) regional office will send a copy of the materials received from the community (county or municipality) to FEMA Headquarters in Washington, D. C. FEMA Headquarters reviews the community's floodplain regulations, and if approved, notifies the community's Floodplain Board, OWRB, and the FEMA regional office of the community's eligibility for flood insurance and the effective date that flood insurance can first be purchased by eligible residents in that community. If the application is not approved in Washington, the FEMA regional office will work with the community's Floodplain Board to resolve any problems causing such disapproval.

ENROLLING IN THE NATIONAL FLOOD INSURANCE PROGRAM (NFIP)

1. Complete the Application for Participation in the National Flood Insurance Program.
2. Adopt and certify the attached Orders concerning participation in the National Flood Insurance Program and the adoption of a map delineating the flood areas to be used if an official FEMA Flood Insurance Rate Map or Flood Hazard Boundary map has not been published.
3. Adopt and certify legally enforceable regulations which meet or exceed the criteria stated in Part 60.3 of the National Flood Insurance Program Regulations. The Flood Model Damage Prevention Regulations can be adopted, without changes, to fulfill this requirement.
4. Mail One Copy of All Documents and Maps to:
OKLAHOMA WATER RESOURCES BOARD
Attention: Planning and Management pision
3800 N. Classen Boulevard
Oklahoma City, Oklahoma 73118
5. Mail Two Copies of All Completed Documents and Maps to:
FEDERAL EMERGENCY MANAGEMENT AGENCY
Mitigation pision
Federal Center, Region VI
800 North Loop 288
Denton, Texas 76209-3606
6. Maintain one copy of the completed application, orders, regulations and maps for your official records.

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Appendix 2-3: Minimum Federal and State NFIP Requirements

MINIMUM FEDERAL AND STATE REQUIREMENTS	LEGAL REFERENCE

Maintaining for public inspection all flood permit records (floodproofing and elevation certificates)	NFIP Regulations Section 59.22 (a)(9)(iii)
Notifying FEMA in writing of community boundary changes (annexations, incorporations, deannexations etc.)	NFIP Regulations Sections 59.22 (a)(9)(v) 64.4 (b)
Using the Biennial Report to notify FEMA of variances granted	NFIP Regulations Sections 59.22 (b)(2) and 60.6 (a)(6)(ii)
Using other reliable flood elevation data (preliminary, draft, or final)	NFIP Regulations Section 60.3 (b)(4)
Updating floodplain management regulations within six months after FEMA revises NFIP regulations	NFIP Regulations Section 60.7
Notifying FEMA of physical changes to the floodplain	NFIP Regulations Section 65.3
Notifying state and adjacent communities on watercourse alterations or relocations	NFIP Regulations Section 60.3 (b)(6)(7)
More restrictive regulations of state or local governments take precedence over NFIP regulations	NFIP Regulations Section 60.1 (d)
Local Floodplain Boards	OS Title 82, Sections 1604 & 1605
Floodplain Map	OS Title 82, Section 1607
Development on state-owned or operated property within floodplains	OS Title 82, Sections 1612 & 1617 and OWRB Rules and Regulations, Chapter 55

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Appendix 2-4: Landlord and Tenant

[Click here to download the Oklahoma Residential Landlord and Tenant Act](#)

Appendix 2-5: Oklahoma Residential Property Condition Disclosure Act

[Click here to download the Oklahoma Residential Property Condition Disclosure Act \[pdf\]](#)

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Page last updated: June 26, 2009

Oklahoma's Floodplain Management 101

Chapter 3 Appendix

- 3-1: State of Oklahoma Model D Ordinance
- 3-2: Flood Ordinance Evaluation
- 3-3: Local Floodplain Management Program Guidelines
- 3-4: Elevation Certificate
- 3-5: Floodproofing Certificate for Non-Residential Structures
- 3-6: The Lowest Floor

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Appendix 3-1: State of Oklahoma Model D Ordinance

Updated December 8, 2004

FLOODPLAIN MANAGEMENT REGULATIONS

ARTICLE I STATUTORY AUTHORIZATION, FINDINGS OF FACT, PURPOSE AND METHODS

SECTION A. STATUTORY AUTHORIZATION

The Legislature of the State of Oklahoma has in (statutes) 82 O.S. §1601-1618, as amended, Chapter 23 delegated the responsibility of local governmental units to adopt regulations designed to minimize flood losses. Therefore, the (name of community goes here), Oklahoma, does ordain as follows:

SECTION B. FINDINGS OF FACT

1. The flood hazard areas of (Name of community goes here) are subject to periodic inundation, which results in loss of life and property, health and safety hazards, disruption of commerce and governmental services, and extraordinary public expenditures for flood protection and relief, all of which adversely affect the public health, safety and general welfare.
2. These flood losses are created by the cumulative effect of obstructions in floodplains which cause an increase in flood heights and velocities, and by the occupancy of flood hazards areas by uses vulnerable to floods and hazardous to other lands because they are inadequately elevated, floodproofed or otherwise protected from flood damage.

SECTION C. STATEMENT OF PURPOSE

It is the purpose of this ordinance to promote the public health, safety and general welfare and to minimize public and private losses due to flood conditions in specific areas by provisions designed to:

1. Protect human life and health;
2. Minimize expenditure of public money for costly flood control projects;
3. Minimize the need for rescue and relief efforts associated with flooding and generally undertaken at the expense of the general public;
4. Minimize prolonged business interruptions;
5. Minimize damage to public facilities and utilities such as water and gas mains, electric, telephone and sewer lines, streets and bridges located in floodplains;
6. Help maintain a stable tax base by providing for the sound use and development of flood-prone

- areas in such a manner as to minimize future flood blight areas; and
7. Insure that potential buyers are notified that property is in a flood area.

SECTION D. METHODS OF REDUCING FLOOD LOSSES

In order to accomplish its purposes, this ordinance uses the following methods:

1. Restrict or prohibit uses that are dangerous to health, safety or property in times of flood, or cause excessive increases in flood heights or velocities;
2. Require that uses vulnerable to floods, including facilities which serve such uses, be protected against flood damage at the time of initial construction;
3. Control the alteration of natural floodplains, stream channels, and natural protective barriers, which are involved in the accommodation of flood waters;
4. Control filling, grading, dredging and other development which may increase flood damage;
5. Prevent or regulate the construction of flood barriers which will unnaturally divert floodwaters or which may increase flood hazards to other lands.

ARTICLE II DEFINITIONS

Unless specifically defined below, words or phrases used in this ordinance shall be interpreted to give them the meaning they have in common usage and to give this ordinance its most reasonable application.

ALLUVIAL FAN FLOODING

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

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.

AREA OF SHALLOW FLOODING

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

AREA OF SPECIAL FLOOD HAZARD

Land in the floodplain within a community subject to a one percent or greater chance of flooding in any given year. The area may be designated as Zone A on the Flood Hazard Boundary Map (FHBM). After detailed ratemaking has been completed in preparation for publication of the FIRM, Zone A usually is refined into Zones A, AE, AH, AO, A1-99, VO, V1-30, VE or V.

BASE FLOOD

The flood having a one percent chance of being equaled or exceeded in any given year.

BASEMENT

Any area of the building having its floor sub-grade (below ground level) on all sides.

BOARD

Oklahoma Water Resources Board.

CRITICAL FEATURE

An integral and readily identifiable part of a flood protection system, without which the flood protection provided by the entire system would be compromised. DEVELOPMENT - means any man-made change in improved and 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.

ELEVATED BUILDING

A non-basement building (i) built, in the case of a building in Zones A1-30, AE, A, A99, AO, AH, B, C, X, and D, to have the top of the elevated floor, or in the case of a building in Zones V1-30, VE, or V, to have the bottom of the lowest horizontal structure member of the elevated floor elevated above the ground level by means of pilings, columns (posts and piers), or shear walls parallel to the floor of the water and (ii) adequately anchored so as not to impair the structural integrity of the building during a flood of up to the magnitude of the base flood. In the case of Zones A1-30, AE, A, A99, AO, AH, B, C, X, and D, "elevated building" also includes a building elevated by means of fill or solid foundation perimeter walls with openings sufficient to facilitate the unimpeded movement of flood waters. In the case of Zones V1-30, VE, or V, "elevated building" also includes a building otherwise meeting the definition of "elevated building," even though the lower area is enclosed by means of breakaway walls if the breakaway walls met the standards of Section 60.3(e)(5) of the National Flood Insurance Program regulations.

EXISTING CONSTRUCTION

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

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

EXPANSION TO AN EXISTING MANUFACTURED HOME PARK OR SUBDIVISION

The preparation of additional sites by the construction of facilities for servicing the lots on which the manufactured homes are to be affixed (including the installation of utilities, the construction of streets, and either final site grading or the pouring of concrete pads).

FLOOD OR FLOODING

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.

FLOOD INSURANCE RATE MAP (FIRM)

An official map of a community, on which the Federal Emergency Management Agency has delineated both the areas of special flood hazards and the risk premium zones applicable to the community.

FLOOD INSURANCE STUDY

The official report provided by the Federal Emergency Management Agency. The report contains flood profiles, water surface elevation of the base flood, as well as the Flood Boundary-Floodway Map.

FLOODPLAIN OR FLOOD-PRONE AREA

Any land area susceptible to being inundated by water from any source (see definition of flooding).

FLOODPLAIN ADMINISTRATOR

A person accredited by the Board and designated by a floodplain board, to administer and implement laws and regulations relating to the management of the floodplains.

FLOODPLAIN MANAGEMENT

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

FLOODPLAIN MANAGEMENT REGULATIONS

Zoning ordinances, subdivision regulations, building codes, health regulations, special purpose ordinances (such as a floodplain 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

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 areas 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

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

FLOODWAY (REGULATORY FLOODWAY)

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

FUNCTIONALLY DEPENDENT USE

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

HIGHEST ADJACENT GRADE

The highest natural elevation of the ground surface prior to construction next to the proposed walls of a structure.

HISTORIC STRUCTURE

Any structure that is: 1. Listed individually in the National Register of Historic Places (a listing maintained by the Department of Interior) or preliminarily determined by the Secretary of the Interior as meeting the requirements for individual listing on the National Register; 2. Certified or preliminarily determined by the Secretary of the Interior as contributing to the historical significance of a registered historic district or a district preliminarily determined by the Secretary to qualify as a registered historic district; 3. Individually listed on a state inventory of historic places in states with historic preservation programs which have been approved by the Secretary of Interior; or 4. Individually listed on a local inventory or historic places in communities with historic preservation programs that have been certified either: a. By an approved state program as determined by the Secretary of the Interior or; b. Directly by the Secretary of the Interior in states without approved programs.

LEVEE

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

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

The lowest floor of the lowest enclosed area (including basement). An unfinished or flood resistant enclosure, usable solely for parking or 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 requirement of Section 60.3 of the National Flood Insurance Program regulations.

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 connected to the required utilities. The term "manufactured home" does not include a "recreational vehicle".

MANUFACTURED HOME PARK OR SUBDIVISION

A parcel (or contiguous parcels) of land divided into two or more manufactured home lots for rent or sale.

MEAN SEA LEVEL

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

NEW CONSTRUCTION

For the purpose 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

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.

REGIONAL FLOOD

A flood that is equal to the 1 % chance flood or the one hundred year flood event. Usually the regional flood is used synonymously as the regulatory flood.

RECREATIONAL VEHICLE

A vehicle which is: 1. Built on a single chassis; 2. 400 square feet or less when measured at the largest horizontal projections; 3. Designed to be self-propelled or permanently towable by a light duty truck; and 4. Designed primarily not for use as a permanent dwelling but as temporary living quarters for recreational, camping, travel, or seasonal use

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 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.

STRUCTURE

A walled and roofed building, including a gas or liquid storage tank, that is principally above ground, as well as a manufactured home.

SUBSTANTIAL DAMAGE

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

SUBSTANTIAL IMPROVEMENT

Any reconstruction, rehabilitation, addition, or other improvement of a structure, the cost of which equals or exceeds 50 percent of the market value of the structure before "start of construction" of the improvement. This 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 conditions or 2. Any alteration of a "historic structure" provided that the alteration would not preclude the structure's continued designation as a "historic structure."

VARIANCE

A grant of relief to a person from the requirement of this ordinance when specific enforcement would result in unnecessary hardship. A variance, therefore, permits construction or development in a manner otherwise prohibited by this ordinance. (For full requirements see Section 60.6 of the National Flood Insurance Program regulations.)

VIOLATION

The failure of a structure or other development to be fully compliant with the community's floodplain management regulations. A structure or other development without the elevation certificate, other certifications, or other evidence of compliance required in Section 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

The height, in relation to the National Geodetic Vertical Datum (NGVD) of 1929 (or other datum, where specified), of floods of various magnitudes and frequencies in the floodplains of coastal or riverine areas.

ARTICLE III GENERAL PROVISIONS

SECTION A. LANDS TO WHICH THIS ORDINANCE APPLIES

The ordinance shall apply to all areas of special flood hazard within the jurisdiction of (name of community).

SECTION B. BASIS FOR ESTABLISHING THE AREAS OF SPECIAL FLOOD HAZARD

The areas of special flood hazard identified by the Federal Emergency Management Agency in a scientific and engineering report entitled, "The Flood Insurance Study for (name of community) and Incorporated Areas," dated (date of map and FIS), with accompanying Flood Insurance Rate Maps (FIRM) are hereby adopted by reference and declared to be a part of this ordinance.

SECTION C. ESTABLISHMENT OF DEVELOPMENT PERMIT

A Development Permit shall be required to ensure conformance with the provisions of this ordinance.

SECTION D. COMPLIANCE

No structure or land shall hereafter be located, altered, or have its use changed without full compliance with the terms of this ordinance and other applicable regulations.

SECTION E. ABROGATION AND GREATER RESTRICTIONS

This ordinance is not intended to repeal, abrogate, or impair any existing easements, covenants, or deed restrictions. However, where this ordinance and another ordinance, easement, covenant, or deed restriction conflict or overlap, whichever imposes the more stringent restrictions shall prevail.

SECTION F. INTERPRETATION

In the interpretation and application of this ordinance, all provisions shall be:

1. Considered as minimum requirements;
2. Liberally construed in favor of the governing body; and
3. Deemed neither to limit nor repeal any other powers granted under State statutes.

SECTION G. WARNING AND DISCLAIMER OR LIABILITY

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.

ARTICLE IV ADMINISTRATION

SECTION A. DESIGNATION OF THE FLOODPLAIN ADMINISTRATOR

The (name of community official or title) is hereby appointed the Floodplain Administrator to administer and implement the provisions of this ordinance and other appropriate sections of 44 CFR (National Flood Insurance Program Regulations) pertaining to floodplain management.

SECTION B. DUTIES AND RESPONSIBILITIES OF THE FLOODPLAIN ADMINISTRATOR

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

1. Maintain and hold open for public inspection all records pertaining to the provisions of this ordinance.
2. Review permit application to determine whether proposed building site, including the placement of manufactured homes, will be reasonably safe from flooding.
3. Review, approve or deny all applications for development permits required by adoption of this ordinance.
4. Review permits for proposed development to assure that all necessary permits have been obtained from those Federal, State or local governmental agencies (including Section 404 of the Federal Water Pollution Control Act Amendments of 1972, 33 U.S.C. 1334) from which prior approval are required.
5. Where interpretation is needed as to the exact location of the boundaries of the areas of special flood hazards (for example, where there appears to be a conflict between a mapped boundary and actual field conditions) the Floodplain Administrator shall make the necessary interpretation.
6. Notify, in riverine situations, adjacent communities and the State Coordinating Agency, which is the Oklahoma Water Resources Board, prior to any alteration or relocation of a watercourse, and submit evidence of such notification to the Federal Emergency Management Agency.
7. Assure that the flood carrying capacity within the altered or relocated portion of any watercourse is maintained.
8. When base flood elevation data has not been provided in accordance with Article 3, Section B, the Floodplain Administrator shall obtain, review and reasonably utilize any base flood elevation data and floodway data available from a Federal, State or other source, in order to administer the provisions of Article 5.
9. When a regulatory floodway has not been designated, the Floodplain Administrator must require that no new construction, substantial improvements, or other development (including fill) shall be permitted within Zones A1-30 and AE on the community's FIRM, unless it is demonstrated that the cumulative effect of the proposed development, when combined with all other existing and

anticipated development, will not increase the water surface elevation of the base flood more than one foot at any point within the community.

10. Under the provisions of 44 CFR Chapter 1, Section 65.12, of the National Flood Insurance Program regulations, a community may approve certain development in Zones A1-30, AE, AH, on the community's FIRM which increases the water surface elevation of the base flood by more than one foot, provided that the community first applies for a conditional FIRM revision through FEMA (Conditional Letter of Map Revision).
11. After a major flood event, fire or other type of disaster that damages one or more residential or non-residential structures determine which structures are substantially damaged.
12. Become accredited by the Board in accordance with Title 82 O.S. § 1601-1618, as amended.

SECTION C. PERMIT PROCEDURES

Application for a Development Permit shall be presented to the Floodplain Administrator on forms furnished by him/her and may include, but not be limited to, plans in duplicate drawn to scale showing the location, dimensions, and elevation of proposed landscape alterations, existing and proposed structures, including the placement of manufactured homes, and the location of the foregoing in relation to areas of special flood hazard. Additionally, the following information is required:

1. Elevation (in relation to mean sea level), of the lowest floor (including basement) of all new and substantially improved structures;
2. Elevation in relation to mean sea level to which any nonresidential structure shall be floodproofed;
3. A certificate from a registered professional engineer or architect that the nonresidential floodproofed structure shall meet the floodproofing criteria of Article 5, Section B (2);
4. Description of the extent to which any watercourse or natural drainage will be altered or relocated as a result of proposed development.
5. Maintain a record of all such information in accordance with Article 4, Section (B)(1). Approval or denial of a Development Permit by the Floodplain Administrator shall be based on all of the provisions of this ordinance and the following relevant factors: (1) The danger to life and property due to flooding or erosion damage; (2) The susceptibility of the proposed facility and its contents to flood damage and the effect of such damage on the individual owner; (3) The danger that materials may be swept onto other lands to the injury of others; (4) The compatibility of the proposed use with existing and anticipated development; (5) The safety of access to the property in times of flood for ordinary and emergency vehicles; (6) The costs of providing governmental services during and after flood conditions including maintenance and repair of streets and bridges, and public utilities and facilities such as sewer, gas, electrical and water systems; (7) The expected heights, velocity, duration, rate of rise and sediment transport of the flood waters and the effects of wave action, if applicable, expected at the site; (8) The necessity to the facility of a waterfront location, where applicable; (9) The availability of alternative locations, not subject to flooding or erosion damage, for the proposed use; (10) The relationship of the proposed use to the comprehensive plan for that area.

SECTION D. VARIANCE PROCEDURES

1. The appeal Board as established by the community shall hear and render judgment on requests for variances from the requirements of this ordinance.
2. The Appeal Board shall hear and render judgment on an appeal only when it is alleged there is an error in any requirement, decision, or determination made by the Floodplain Administrator in the enforcement or administration of this ordinance.
3. Any person or persons aggrieved by the decision of the Appeal Board may appeal such decision in the courts of competent jurisdiction.
4. The Floodplain Administrator shall maintain a record of all actions involving an appeal and shall report variances to the Federal Emergency Management Agency upon request.
5. Variances may be issued for the reconstruction, rehabilitation or restoration of structures listed on the National Register of Historic Places or the State Inventory of Historic Places, without regard to the procedures set forth in the remainder of this ordinance.
6. Variances may be issued 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, providing the relevant factors in Section C (2) of this Article have been fully considered. As the lot size increases beyond the one-half acre, the technical justification required for issuing the variance increases.

7. Upon consideration of the factors noted above and the intent of this ordinance, the Appeal Board may attach such conditions to the granting of variances as it deems necessary to further the purpose and objectives of this ordinance (Article 1, Section C).
8. Variances shall not be issued within any designated floodway if any increase in flood levels during the base flood discharge would result.
9. 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.
10. Prerequisites for granting variances: (a) Variances shall only be issued upon a determination that the variance is the minimum necessary, considering the flood hazard, to afford relief. (b) Variances shall only be issued upon: (1) Showing a good and sufficient cause; (2) A determination that failure to grant the variance would result in exceptional hardship to the applicant, and (3) A determination that the granting of a variance will not result in increased flood heights, additional threats to public safety, extraordinary public expense, create nuisances, cause fraud on or victimization of the public, or conflict with existing local laws or ordinances. (c) Any applicant that is issued a variance shall be given written notice that the cost of flood insurance will be commensurate with the increased risk resulting from the lowest floor elevation built with the lowest floor elevation below the base flood elevation.
11. 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: (a) The criteria outlined in Article 4, Section D (1)-(9) are met, and (b) 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.
12. Any person seeking a variance shall file a petition with the local floodplain board, accompanied by a filing fee of at least a minimum of \$25.
13. In no case shall a variance be effective for a period longer than 25 years.
14. The Floodplain Administrator shall provide a copy of any variance issued to the OWRB within fifteen days of its issuance.

ARTICLE V PROVISIONS FOR FLOOD HAZARD REDUCTION

SECTION A. GENERAL STANDARDS

In all areas of special flood hazards the following provisions are required for all new construction and substantial improvements:

1. All new construction or substantial improvements shall be designed (or modified) and adequately anchored to prevent flotation, collapse or lateral movement of the structure resulting from hydrodynamic and hydrostatic loads, including the effects of buoyancy;
2. All new construction or substantial improvements shall be constructed by methods and practices that minimize flood damage;
3. All new construction or substantial improvements shall be constructed with materials resistant to flood damage;
4. All new construction or substantial improvements shall 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.
5. All new and replacement water supply systems shall be designed to minimize or eliminate infiltration of flood waters into the system;
6. New and replacement sanitary sewage systems shall be designed to minimize or eliminate infiltration of flood waters into the system and discharge from the systems into flood waters; and,
7. On-site waste disposal systems shall be located to avoid impairment to them or contamination from them during flooding.

SECTION B. SPECIFIC STANDARDS

In all areas of special flood hazards where base flood elevation data has been provided as set forth in (i) Article 3, Section B, (ii) Article 4, Section B (8), or (iii) Article 5, Section C (3), the following provisions are required:

1. Residential Construction - new construction and substantial improvement of any residential structure shall have the lowest floor (including basement), elevated to the base flood elevation. A registered professional engineer, architect, or land surveyor shall submit a certification to the Floodplain Administrator that the standard of this subsection as proposed in Article 4, Section C (1) a., is satisfied.
2. Nonresidential Construction - new construction and substantial improvements of any commercial, industrial or other nonresidential structure shall either have the lowest floor (including basement) elevated to the base flood level or 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. 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 as outlined in this subsection of such certification. Also, the Floodplain Administrator shall maintain a record of the specific elevation (in relation to mean sea level) to which such structures are floodproofed.
3. Enclosures - new construction and substantial improvements, with 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) 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. (b) The bottom of all openings shall be no higher than one foot above grade. (c) Openings may be equipped with screens, louvers, valves, or other coverings or devices provided that they permit the automatic entry and exit of floodwaters.
4. Manufactured Homes—(a) 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 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. (b) 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 a 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 flotation, collapse, and lateral movement. (c) Require that manufactured homes be placed or substantially improved on sites in an existing manufactured home park or subdivision with Zones A1-30, AH and AE on the community's FIRM that are not subject to the provisions of paragraph four of this section be elevated so that either: (1) The lowest floor of the manufactured home is at the base flood elevation, or (2) Reinforced piers or other foundation elements of at least equivalent strength that are no less than 36 inches in height above grade and are securely anchored to an adequately anchored foundation system to resist flotation, collapse, and lateral movement support the manufactured home chassis.
5. Recreational Vehicles—Require that recreational vehicles placed on sites within Zones A1-30, AH, and AE on the community's FIRM either: (a) Be on the site for fewer than 180 consecutive days, (b) Be fully licensed and ready for highway use, or (c) Meet the permit requirements of Article 4,

Section C (1), and the elevation and anchoring requirements for “manufactured homes” in paragraph four 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.

SECTION C. STANDARDS FOR SUBDIVISION PROPOSALS

1. All subdivision proposals including the placement of manufactured home parks and subdivisions shall be consistent with Article 1, Sections B, C, and D of this ordinance.
2. All proposals for the development of subdivisions including the placement of manufactured home parks and subdivisions shall meet Development Permit requirements of Article 3, Section C; Article 4, Section C; and the provisions of Article 5 of this ordinance.
3. Base flood elevation data shall be generated for subdivision proposals and other proposed development including the placement of manufactured home parks and subdivisions which is greater than 50 lots or 5 acres, whichever is lesser, if not otherwise provided pursuant to Article 3, Section B or Article 4, Section B (8) of this ordinance.
4. All subdivision proposals including the placement of manufactured home parks and subdivisions shall have adequate drainage provided to reduce exposure to flood hazards.
5. All subdivision proposals including the placement of manufactured home parks and subdivisions shall have public utilities and facilities such as sewer, gas, electrical and water systems located and constructed to minimize or eliminate flood damage.

SECTION D. STANDARDS FOR AREAS OF SHALLOW FLOODING (AO/AH ZONES)

Located within the areas of special flood hazard established in Article 3, Section B, are areas designated as shallow flooding. These areas have special flood hazards associated with base flood depths of 1 to 3 feet where a clearly defined channel does not exist and where the path of flooding is unpredictable and where velocity flows may be evident. Such flooding is characterized by ponding or sheet flow; therefore, the following provisions apply:

1. 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).
2. All new construction and substantial improvements of non-residential structures; (a) 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; (b) 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 of effects of buoyancy.
3. A registered professional engineer or architect shall submit a certification to the Floodplain Administrator that the standards of this Section, as proposed in Article 4, Section C (1) a., are satisfied.
4. Require within Zones AH or AO adequate drainage paths around structures on slopes, to guide floodwaters around and away from proposed structures.

SECTION E. FLOODWAYS

Floodways located within areas of special flood hazard established in Article 3, Section B, are areas designated as floodways. Since the floodway is an extremely hazardous area due to the velocity of floodwaters, which carry debris, potential projectiles and erosion potential, the following provisions shall apply:

1. Encroachments are prohibited, 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.
2. If Article 5, Section E (1) above is satisfied, all new construction and substantial improvements shall comply with all applicable flood hazard reduction provisions of Article 5.
 3. Under the provisions of 44 CFR Chapter 1, Section 65.12, of the National Flood Insurance Regulations, 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 through FEMA.

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 goes here) from taking such other lawful action as is necessary to prevent or remedy any violation.

CERTIFICATION

It is hereby found and declared by (name of community goes here) that severe flooding has occurred in the past within its jurisdiction and will certainly occur within the future; that flooding is likely to result in infliction of serious personal injury or death, and is likely to result in substantial injury or destruction of property within its jurisdiction; in order to effectively comply with minimum standards for coverage under the National Flood Insurance Program; and in order to effectively remedy the situation described herein, it is necessary that this ordinance become effective immediately. Therefore, an emergency is hereby declared to exist, and this ordinance, being necessary for the immediate preservation of the public peace, health and safety, shall be in full force and effect from and after its passage and approval.

APPROVED; _____ (Community official)

PASSED: _____ (Date) I, the undersigned,
_____, do hereby certify that the above is a true and correct
copy of an ordinance duly adopted by _____, at a regular meeting duly convened on
_____. (Date)

_____. (Secretary or responsible person) (SEAL)
For your information regarding the penalty clause, the penalty clause was inserted in the ordinance above in accordance with Section 59.2(b) of CFR 44, Chapter 1, of the National Flood Insurance Program (NFIP) regulation, to qualify for the sale of federally-subsidized flood insurance, a community must adopt floodplain management regulations that meet or exceed the minimum standards of Section 60. "These regulations must include effective enforcement provisions." In accordance with Section 60.1(b) of CFR 44, Chapter 1, of the NFIP regulations, "These regulations must be legally-enforceable, applied uniformly throughout the community to all privately and publicly owned land within flood-prone (i.e. mudflow) or flood-related erosion areas, and the community must provide that the regulations take precedence over less restrictive conflicting local laws, ordinances or codes." The penalty clause that has been inserted in this ordinance should be modified as necessary to reflect the city, town or county and State of Oklahoma statutory provisions.

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Appendix 3-2: Flood Ordinance Evaluation

What are the minimum requirements for your local community to participate in the National Flood Insurance Program?

Requirements are based on the Special Flood Hazard Area Mapping in your community. Determine what level of flood ordinance (minimum requirements) your community will need the following. The requirements are accumulative in nature and requirements listed in 60.3(a) are also required in 60.3(b), 60.3(c) also includes 60.3(a) and (b), and 60.3(d) also includes 60.3(a), (b), and (c).

Read the following explanation and decide which requirements meet your local community.

60.3(a) Applies to communities where Special Flood Hazard Areas have not yet been defined by FEMA. The community may apply and participate in the NFIP if it agrees to development permits, other federal and state permits, review of permit applications, review of subdivision proposals, minimize water system infiltration and prevent sewage system contamination or impairment.

60.3(b) Applies to communities where FEMA has provided a Flood Hazard Boundary Map (FHBM) or Flood Insurance Rate Map (FIRM) that identifies special flood hazard areas (A Zones), but has not provided base flood elevation (BFE) data or identified a floodway.

60.3(c) Applies to communities where FEMA has provided final flood elevations (BFE) for one or more special flood hazard areas of the community's FIRM, but has not identified a regulatory floodway.

60.3(d) Applies to communities where FEMA has provided the final base flood elevations (BFE) within zones A1-30 and/or AE on the FIRM, and has provided information to designate a regulatory floodway.

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Appendix 3-3: Local Floodplain Management Program Guidelines

The primary objectives of an effective local floodplain management program are (1) the mitigation of flood damage to real and personal property, and (2) the reduction of risk to human lives from floodwaters. These objectives can be accomplished through the implementation and enforcement of local floodplain management regulations designed to reduce flooding risks.

The National Flood Insurance Program (NFIP) was created to make available flood insurance coverage to communities who choose to adopt and agree to enforce an effective local floodplain management program. The NFIP regulations at 44 CFR 60.3 establish minimum floodplain management requirements which, if adopted, will enable community participation in the Program and serve as the basis for an effective local floodplain management program.

- A. The NFIP minimum requirements are designed to reduce flooding risks and are based in part on the following criteria:
- B. The community must have an adopted and enforceable floodplain management ordinance that meets or exceeds the minimum requirements of the NFIP.
- C. There must be an individual who is assigned floodplain management responsibilities or coordination of the community's floodplain management program.
The community must have a development permit application process that will do the following:
(1) Assist the community with the early identification of proposed activities that meet the NFIP definition of development; (2) Allow for identification of the flood status or flood zone for the property on which the development is proposed; (3) Result in advising the property owner, developer and/or other individuals of any floodplain management requirements that may apply to the property and the proposed development within the special flood hazard area (SFHs), including as appropriate: (a) lowest floor elevation requirements; (b) requirements for breakaway walls (V-Zone); (c) hydrostatic equalization requirements; (d) certification that the pile or column foundation and structure attached there to is anchored to resist flotation, collapse, and lateral movement; (e) prohibition of man-made alterations of sand dunes; (f) substantial improvement

- permit requirements; (g) the need for review, permits and/or approval of other federal or state agencies; (h) floodway encroachment restrictions and data needs; (i) the design and installation of water supply and sanitary sewage systems; (j) certification requirements for floodproofing of nonresidential structures; and (k) requirement to elevate mechanical and utility equipment. (4) Assure the community that development which is permitted within the identified SFHA will be in compliance with minimum NFIP requirements and requirements of its local ordinance.
- D. The community must maintain a file with specific information on all development that takes place within the SFHA.
 - E. The community must have a system or process for periodic field survey of the SFHA to (1) assure that permitted development is being carried out in a compliant manner, (2) detect unpermitted development, and (3) assure continued compliance of permitted and compliant development.
 - F. When a comprehensive plan exists, the plan and floodplain management objectives must be consistent. A community shall assure that when a comprehensive plan exists, the floodplain management objectives are consistent.
 - G. The community must notify adjacent communities of proposed development that may impact areas outside their jurisdictional boundaries.
 - H. The community must require that existing floodplain-related data be identified on subdivisions of 50 lots or five acres, whichever is smaller, before they are approved. This should include the 100-year flood boundaries, floodway boundaries (if established), velocity zones (if appropriate), required elevations and other necessary floodplain management data.
 - I. Communities should also be concerned with: (1) The improvement of local drainage to control increased runoff that might increase the danger of flooding to other properties; (2) State regulations and Executive Orders; (3) Flood warning and emergency preparedness planning; (4) The provision for alternative routes when normal routes are blocked or destroyed by flooding; and (5) The establishment of minimum floodproofing and access requirements for critical facilities, such as schools, hospitals, nursing homes, orphanages, penal institutions, fire stations, police station communications centers, water and -sewerage pumping stations and other public or quasi-public facilities already located in the flood-prone area, to enable them to withstand flood damage and to facilitate emergency operations.

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Appendix 3-4: Elevation Certificate

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Appendix 3-5: Floodproofing Certificate for Non-Residential Structures

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Appendix 3-6: The Lowest Floor

One of the most critical performance standards found in the National Flood Insurance Program (NFIP) regulations is to flood protect structures to or above the 100-year (base flood) elevation. Section 60.3(c)(2) of the NFIP regulations states that the lowest floor of a residential structure must be elevated to or above the 100-year flood elevation. Section 60.3(c)(3) adds that nonresidential or commercial structures can be either elevated or dry floodproofed to or above the 100-year flood elevation. The remainder of this article focuses on elevating structures; dry floodproofing may be an option for nonresidential structures.

Although the term “first floor” is commonly used, it has no place in a community's floodplain management program. NFIP standards and your community floodplain management regulations use the term lowest floor. As defined in the NFIP regulations, the lowest floor is: 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 built in accordance with the applicable design requirements specified in this ordinance for enclosures below the lowest floor. A lowest floor may be the concrete slab when the structure has a "slab-on-grade" foundation, it may be the basement floor when the structure has a basement, or it may be the first floor when the structure is built on an enclosed area such as a crawl space.

Recall that the definition of the lowest floor of a structure includes the "basement" floor. So, basement must be defined. The NFIP regulations define a basement as: any area of a building having its floor subgrade (below ground level) on all sides.

Of course, this definition includes buildings with standard 8-10 foot deep basements. However, the definition is also inclusive of any enclosed area in which the interior grade is lower than the exterior grade of the enclosed area on all sides. This is extremely important to local floodplain permitting officials since any enclosure defined as a "basement" must have its "basement" floor elevated to or above the 100-year flood elevation.

The final term that must be defined is that of an enclosure below the lowest floor. It is found within the definition of lowest floor:

... 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 built in accordance with the applicable design requirements specified in this ordinance for enclosures below the lowest floor.

Three requirements are given here. First, the only uses recognized for an enclosure below the lowest floor are parking, building access and storage. In other words, enclosures below the lowest floor are not meant to be finished and certainly not to be used as living space. Second, enclosures below the lowest floor must not fall under the definition of a basement. For example, backfilling around the enclosed area could make it a basement if the grade on all sides of a structure outside of the enclosed area is higher than the grade inside the enclosed area. Finally, enclosures below the lowest floor must be designed to equalize the flood forces on the enclosure. The design requirements are found in community floodplain regulations under "Specific Standards".

A crawl space is not specifically defined in a community's floodplain regulations. If the local floodplain administrator receives a Special Flood Hazard Area Development (SFHA) permit application, it should be carefully evaluated with plans showing a structure built on a crawl space. There have been several instances throughout the state where an applicant has proposed a structure with a crawl space and the local floodplain official allowed the development to proceed without applying any design or elevation standards. Once the structure was built, and flood insurance was required, the homeowner discovered that flood insurance was very expensive. Why? Because the enclosed area, initially called a crawl space, was actually a basement according to the community's floodplain regulations and flood insurance rating criteria.

Many communities have building and zoning codes in addition to their floodplain regulations. Each code may have a slightly different definition of basements, first floor, lowest floor, crawl space, etc. When a structural development is proposed in an identified SFHA, the development must be evaluated against the criteria found in the community's floodplain regulations. In doing so, terms such as "first floor" and "crawl space" have no relevance. Local floodplain officials should be thinking in terms of lowest floor, basement, and enclosures below the lowest floor.

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Figure 3-1

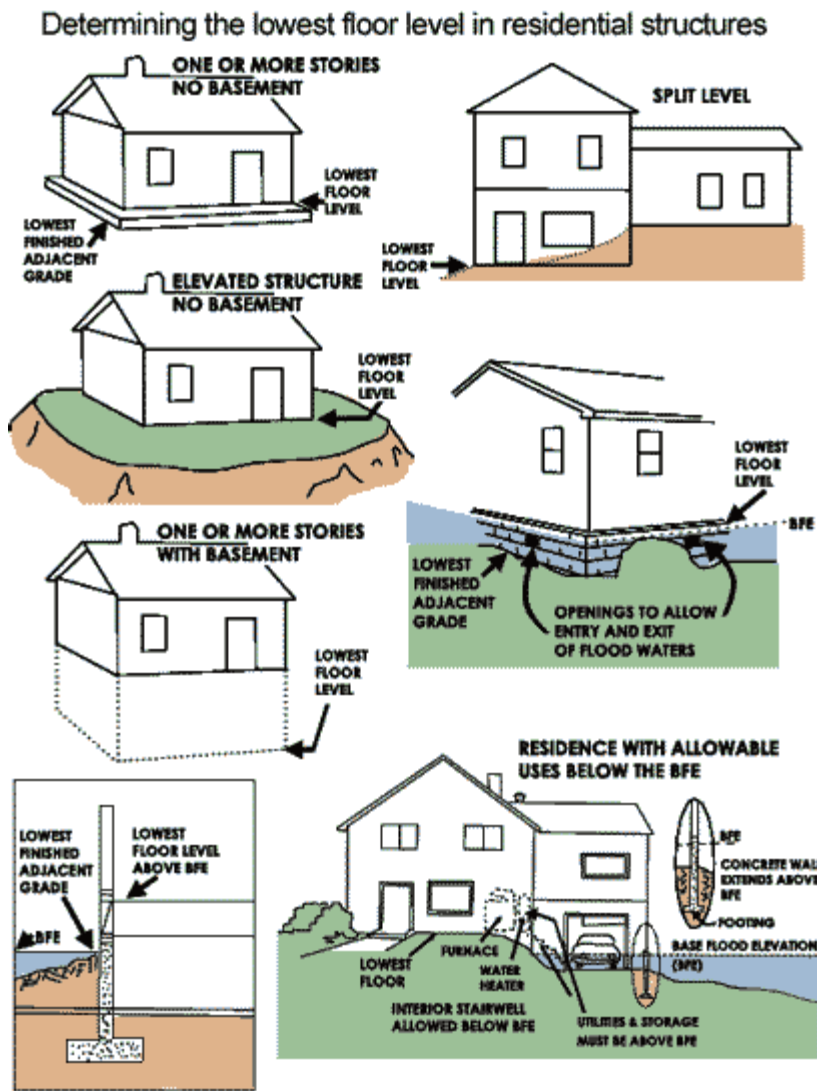


Figure 3-1. The above illustration is a graphical representation of how to determine the lowest floor level in residential structures, including split-level structures and structures with basements.

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Correct placement of a manufactured home
parallel to flow reduces the drag force.

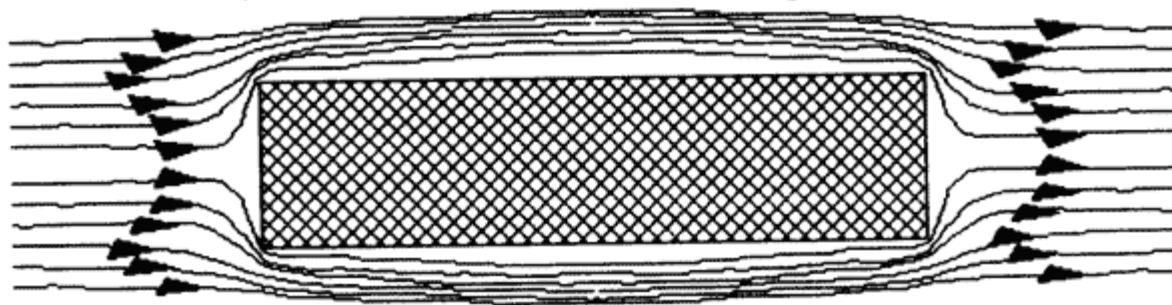


Figure 3-2. The illustration above shows the correct placement of a manufactured home parallel to the flow of water to reduce the drag force.

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Figure 3-3

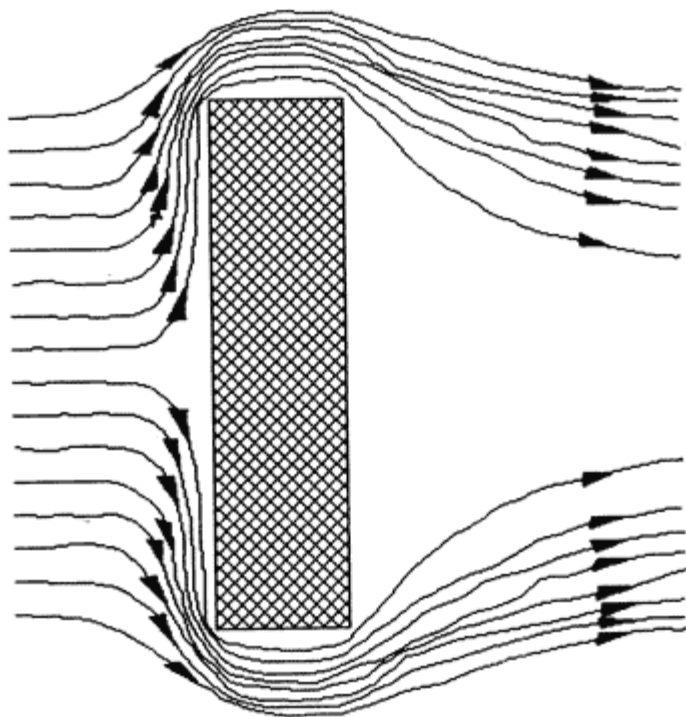
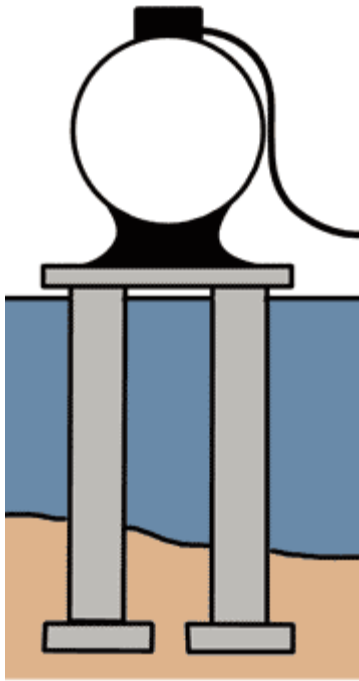


Figure 3-3. The illustration above shows how the incorrect placement of a mobile home perpendicular to the flow will increase drag force.

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Figure 3-4



Example of properly elevated and anchored fuel storage tank. This also applies to heating, air conditioning and ventilation equipment.

Figure 3-4. The above illustration shows how to properly elevate and anchor a fuel storage tank above ground level on concrete piers. This type of anchoring is also appropriate for heating, air conditioning, and ventilation equipment.

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Chapter 4 Appendix

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Appendix 4-1: Notice of Intent for Proposed Development on State Owned or Operated Property Within Floodplains

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Appendix 4-2: Development Permit Application for Proposed Development on Lands Located in a Community with Floodplain Areas

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Appendix 4-3: Permit Review Checklist

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Appendix 4-4: Information Required for Proposed Floodway Development

GENERAL

All hydraulic analyses must be prepared by a Registered Professional Engineer.

There shall be zero increase in the water surface profile for the entire length of the floodway.

The applicant's engineer will verify his/her findings with a seal and signature.

INFORMATION REQUIRED

The applicant shall supplement the existing data with additional cross sections across the entire floodplain, prepared from field survey measurements. The number of additional cross sections required shall be determined by the community representative, and the minimum shall include one additional cross section at the site.

The applicant shall prepare and submit for review a 100-year flood water surface profile analysis of the entire length of the floodway within the community. The analysis shall utilize the original FEMA Flood Insurance Study (FIS) data and analysis method, for the community. The analysis shall be developed without the imposition of any development that has occurred since the original study and also with floodway development which has occurred, or which has been approved but not constructed, since the original FIS. If a Step Backwater Model (HEC-2) was used to determine the floodway, the same model must be used for any revision analysis. The applicant can use community-furnished data for the proposed development in addition to data from the original study.

There shall be zero increase in the water surface profile for the entire length of the floodway when compared to the existing conditions.

In the event the applicant's project is in close proximity to the corporate boundary or unincorporated boundary, the analysis shall extend into the adjoining political entity a sufficient distance, as determined by the analysis results, to demonstrate there are no impacts beyond the analysis limits.

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Appendix 4-5: Floodway Development Checklist

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Appendix 4-6: Sample Letter—Notification of Watercourse Alteration

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Appendix 4-7: Floodproofing Certificate

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Appendix 4-8: Floodproofing Standards

Available Flood Data	Minimum Standards for the Community
A. No or little flood data (i.e., no Flood Boundary	The community must (for all new and substantially improved construction within a flood prone area): (1) Be constructed with materials and utility equipment resistant to flood damage; (2) Be constructed by methods and practices that minimize flood damage; (3) Require new and replacement water system utilities designed to minimize or eliminate the infiltration of flood waters; (4) Require new and replacement sanitary sewage

Maps, no water surface elevations, and no floodway or coastal high hazard area delineations). Basically no FEMA flood maps.	systems designed to minimize or eliminate the infiltration of floodwaters and discharges from the systems floodwaters; and (5) Require on site waste disposal systems to be located to avoid impairment to them or contamination from them during flooding.
B. Flood Hazard Boundary Maps available but no surface water elevation data or data sufficient to identify the floodway.	The community must: (1) Meet the requirements for an area with no or little flood data (see requirements above) for development within Zone A on the community's FHBM; (2) For all new or substantially improved nonresidential structures with the lowest floor elevated below the base flood level; (3) Require a signed and dated FEMA Flood Proofing Certificate that contains the elevation to which the structure was floodproofed and maintain the information with the official designated by the community.
C. Flood Insurance Rate Maps available and water surface elevation for the 100-year flood but insufficient data to identify the floodway or coastal high hazard area.	The community must (within all AI-30 zones, AE zones, unnumbered A zones and AO zones on the community's FIRM): (1) Meet the requirements for an area with Flood Hazard Boundary Maps (see requirements above); (2) Require that if not elevated to or above the base flood level then all new and substantially improved nonresidential structures along with attendant utility and sanitary facilities be designed so that below the base flood level the structure is watertight with: a. Walls substantially impermeable to the passage of water; and b. Structural components having the capability of resisting hydrostatic and hydrodynamic loads and effects of buoyancy. 3) Require where floodproofing is used. Then a registered professional engineer or architect shall certify that the floodproofing methods are adequate to withstand the flood depths, pressures, velocities, impact and uplift forces, and other factors associated with the base flood, and a record of such certificates indicating the specific elevation to which such structures are floodproofed shall be maintained with the official designated by the community.
D. Flood Insurance Rate Maps with water surface elevations for the 100 year flood and floodway data available.	The community must (within all AI-30 zones, AE zones, unnumbered zones, AO zones, and A99 zones on the community's FIRM) meet the requirements for an area with Flood Hazard Boundary Maps (see requirements above) and an area with Flood Insurance Rate Maps but no floodway (see requirements above).

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Appendix 4-9: Elevation Certificate

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Appendix 4-10: Permit Poster



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Appendix 4-11: Sample Letter—Permit Denial

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Appendix 4-12: Violation Poster



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Appendix 4-13: Variance Guide

Below is part of the 44 CFR that provides the main variance regulation. Then following that regulation is a discussion on variances. It is intended to provide community floodplain administrators and elected officials who must in granting a variance comply with CFR 44 Part 59-60, Section 60.6, with information upon which the local decision to grant or not to grant a variance should be based.

Title 44—Emergency Management and Assistance

§60.6 Variances and exceptions.

(a) The Associate Director does not set forth absolute criteria for granting variances from the criteria set forth in Sections 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 Associate Director may review a community's findings

justifying the granting of variances, and if that review indicates a pattern inconsistent with the objectives of sound floodplain management, the Associate Director may take appropriate action under Section 59.24(b) of this subchapter. Variances may be issued by a community for the reconstruction, rehabilitation or restoration of structures listed on the National Register of Historic Places or a State Inventory of Historic Places, without regard to the procedures set forth in this section. Procedures for the granting of variances by a community are as follows:

- (1) Variances shall not be issued by a community within any designated regulatory floodway if any increase in flood levels during the base flood discharge would result:
- (2) Variances may be issued by a community for new construction and substantial improvements to be erected on a lot of one-half acre or less in size contiguous to and surrounded by lots with existing structures constructed below the base flood level, in conformance with the 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 report submitted to the Associate Director.

Nature of Variances

The NFIP variance criteria are based on the general principle of zoning law that variances pertain to a piece of property, and are not personal in nature. Though standards vary from state to state, in general, a properly issued variance is granted for a parcel of property with physical characteristics so unusual that complying with the ordinance would create an exceptional hardship to the applicant or the surrounding property owners. Those characteristics must be unique to that property and not be shared by adjacent parcels. The unique characteristic must pertain to the land itself, not to the structure, its inhabitants, or the property owners.

Examples of the kinds of characteristics that might give rise to a hardship that might justify a variance to certain other building or zoning ordinances would include an irregularly shaped lot, a parcel with unstable soils, or a parcel with an unusual geologic condition below the ground surface. It is difficult, however, to imagine any physical characteristic that would give rise to a hardship sufficient to justify a variance to a flood elevation requirement. A frequently encountered example is the case of a very small undeveloped lot completely surrounded by lots on which buildings have been constructed at grade, and an ordinance that requires that new buildings be constructed at a level several feet above grade. If the owner were to elevate the house on fill the lot might drain onto the neighbors' property. In this case, the size of the lot and its status as the only undeveloped one in the vicinity are the characteristics that could result in a hardship. However, this situation still probably would not warrant a variance because, as discussed below, the owner does not face an exceptional hardship, since there are many other ways to alleviate the drainage problem (elevation on pilings or a crawl space, grading the fill to drain away from adjoining properties, etc.).

Individual Hardship vs. Community Goals

In determining whether or not an applicant has established an exceptional hardship sufficient to justify a variance, the applicant's hardship must be weighed against the purpose of the ordinance. In the case of variances from a flood elevation requirement, this would mean asking which is more serious: the hardship that this individual applicant would face or the community's need for strictly enforced regulations that protect its citizens from the dangers and damages of flooding? Only a truly exceptional, unique hardship on the part of an individual would persuade local officials to set aside provisions of an ordinance designed with the whole community's safety in mind. The hardship might not have to be so severe if the applicant were seeking a variance to a setback ordinance, for instance, which was intended merely to simplify street repair and modifications. In the course of considering variances to flood protection ordinances, however, communities continually must face the more difficult task of frequently having to deny requests from applicants whose personal circumstances evoke compassion, but whose hardships are simply not sufficient to justify deviation from community-wide flood damage prevention requirements.

Hardship (Section 60.6(a)(3)(ii))

The hardship that would result from failure to grant a requested variance must be exceptional, unusual, and peculiar to the property involved. Mere economic or financial hardship alone is not exceptional. Inconvenience, aesthetic considerations, physical handicaps, personal preferences, or the disapproval of one's neighbors likewise cannot, as a rule, qualify as exceptional hardships. All of these problems can be resolved through other means, without granting a variance. This is so even if the alternative means 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 his or her home elsewhere.

For example, a situation in which it would cost a property owner several thousand dollars more to elevate a house to comply with the ordinance and an additional several thousand to build a wheelchair ramp or an elevator to provide access to that house for a handicapped member of the family might at first glance seem like the sort of problem that could be relieved by a variance. However, while financial considerations are always important to property owners and the needs of the handicapped person certainly must be accommodated, these difficulties do not put this situation in the category of exceptional hardships as they relate to variances. This is because, first, the characteristics that result in the hardship are personal (the physical condition and financial situation of the people who propose to live on the property) rather than pertaining to the property itself. Second, the problem of day-to-day access to the building can be alleviated in any one of a number of ways (going to the additional expense of building a ramp or an elevator), without granting a variance. Third, the situation of handicapped persons occupying flood-prone housing raises a critical public safety concern. If a variance is granted and the building is constructed at grade, it will be absolutely critical that the handicapped or infirm person evacuate when flood waters begin to rise, yet this individual may be helpless to do so alone. Not only does this pose an unnecessary danger to handicapped persons but also it places an extra demand on the community's emergency services personnel who may be called upon during the early stages of the flood to rescue them. In contrast, if the building is properly elevated, the handicapped person can still be evacuated if there is sufficient warning and assistance available but if there is not, that person can, in all likelihood, survive the flood simply by remaining at home safely above the level of the flood waters.

More simply, the property owner's difficulties would not really be relieved by the variance, but likely only postponed and perhaps ultimately increased. It would be more prudent over the long run both for the property owner and the community if the variance were denied and the home built at the proper elevation, with handicapped access. This will ensure the safety of all family members when flood waters rise and also protect individual and community investment in the property, as discussed below.

Public safety and nuisances (§60.6(a)(3)(iii))

Variances must not result in additional threats to public safety or create nuisances. As mentioned above, local flood damage prevention ordinances (including elevation requirements) are intended to help protect the health, safety, well-being and property of the local citizens. This is a long-range

community effort usually made up of a combination of approaches such as adequate drainage systems, warning and evacuation plans, keeping new property — especially homes — above the flood levels, and participating in an insurance program. These long-term goals can only be met if exceptions to the laws are kept to an absolute minimum.

Fraud and victimization (§60.6(a)(3)(iii))

Properly granted variances must not cause fraud on or victimization of the public. In examining this requirement, local boards should consider the fact that every newly constructed building adds to local government responsibilities and remains a part of the community for fifty to one-hundred years. Buildings that are permitted to be constructed below the base flood elevation are subject to increased risk of damage from floods during all those years, while future owners of the property and the community as a whole are subject to all the costs, inconvenience, danger and suffering that those increased flood damages bring. In addition, future owners may purchase the property unaware that it is subject to potential flood damages and can be insured only at very high flood insurance rates.

Minimum necessary to afford relief (§60.6(a)(4))

The variance that is granted should be for the minimum deviation from the local requirements that will still alleviate the hardship. In the case of variances to an elevation requirement this means the board need not grant permission for the applicant to build at grade, for example, or even to whatever elevation the applicant proposes, but only to that level that the board believes will both provide relief and preserve the integrity of the local ordinance.

Insurance Rates

While the building standards in a local ordinance may be altered by means of a variance, the flood insurance purchase requirement, which must be enforced by lending institutions, cannot be waived and thus may create severe financial consequences for the property owners. Insurance rates for structures built below BFE can be substantially higher than those for elevated structures. In many instances the rates will be so high as to make the structure essentially uninsurable because the owners cannot afford the premium. This may not matter to the original owner who applied for the variance in the first place, but it may matter a great deal to subsequent potential owners who cannot find buyers because of the high insurance rates, or to the community that finds itself with large numbers of unsalable houses. In addition, if the property is not insured and cannot be insured due to high actuarial rates, there may be no funds available to build the structure or to repair the structure if it is seriously damaged by a flood. Even disaster loans may not be obtainable if the flood insurance coverage required as a condition of the loan was available only at very high rates. The result may be that the present owner or a future owner may choose to abandon the damaged house rather than repair it since the damages may exceed the equity in the house. The local government and/or the holder of the mortgage are left with the problem of one or more vacant, flood-damaged, and essentially uninsurable houses.

Summary

Because the duty and need of local governments to help protect their citizens from flooding is so compelling, and the implications of the cost of insuring a structure built below flood level are so serious, variances from the flood elevation or from other requirements in the flood ordinance should be quite rare. This is why the NFIP variance guidelines at Section 60.6 are so detailed and contain multiple provisions that must be met before a variance can be properly granted. The criteria are designed to screen out those situations in which alternatives other than a variance are more appropriate. It is not surprising that, when these guidelines are followed, very few situations qualify for a variance.

The comments presented above reflect the principles and ideas upon which the NFIP variance criteria are based. These concepts are also kept in mind when the Federal Emergency Management Agency conducts routine monitoring of a community's compliance with NFIP requirements. A community that grants variances in accordance with these standards generally can maintain good standing with the NFIP. In addition, these are only general guidelines and states and/or local communities may have more restrictive standards.

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Appendix 4-14: Floodplain Management Variance Checklist

	Yes	No
1. If property for which variance is requested is located within the floodway, has sufficient technical data been provided which substantiates that there will be no increase in flood levels during the base flood (100-year discharge)?	_____	_____
2. Is size of lot on which new construction or substantial improvements will be built one-half acre or less contiguous to and surrounded by lots with existing structures constructed below the base flood level? (Note: Variances generally are limited to lot sizes of less than one-half acre. Deviations from this limitation may occur only if the technical justification increases as the lot size increases beyond one-half acre.)	_____	_____
3. Has good and sufficient cause been shown?	_____	_____
4. Has it been determined that failure to grant the variance would result in exceptional hardship to applicant?	_____	_____
5. Has it been determined 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?	_____	_____
6. If a variance is issued, has it been determined that the variance is the minimum necessary considering the flood hazard, to afford relief?	_____	_____
7. If a variance is granted, has applicant been notified in writing that issuance of a variance to construct a structure below the base flood will result in increased flood insurance premium rates?	_____	_____
8. If a variance is granted, has applicant been notified in writing that construction below the base flood level increases risks to life and property?	_____	_____

With the exception of number 2, if the answer to any of the other above questions is "no" the request for variance should be denied.

FEMA may review a community's findings justifying the granting of variances, and if that review indicates a pattern inconsistent with the objectives of sound floodplain management, may take appropriate action.

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Appendix 4-15: Sample Letter Granting of Variance

[Click to download letter \[pdf\]](#)

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Appendix 4-16: Certificate of Fill Placement

[Click to download form \[pdf\]](#)

Appendix 4-17: How to Make a FIRMette Using Catalog Search

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

A FIRMette is a paper copy of a user-defined portion of a Flood Insurance Rate Map (FIRM) created from your computer. Viewing and creating FIRMettes are free of charge to all customers. Follow the steps below to create a FIRMette:

Step 1: Click the "Catalog."

Step 2: Select the product you wish to view.
("FEMA issued Flood Maps" for this example)

Step 3: Sequentially select the State, County or Parish, and Community name. Click on "Find FEMA issued Flood Maps!"

Step 4: Choose the panel that you wish to view, and click on the green button next to it. (If there is no green button, the FIRM is not available for viewing.)

Step 5: A new window will appear displaying the image. Click on the "Make a FIRMette!" button*

Step 6: Choose your paper size. (The default size is 8.5" X 11".)

Step 7: Move the pink box to cover the area you want included in your FIRMette.

Step 8: If you wish to reposition the title block or north arrow, click the appropriate button to the left and then drag the pink box to cover the area you want included. (They will be centered by default.)

Step 9: Choose either Adobe PDF or TIFF.

Step 10: You will see your FIRMette on the screen. Click the "Save Your FIRMette" button to save to your computer. (Saving allows you to go back any time and print more copies without going through all of the steps again.)

Step 11: Once saved to your PC you can double click on the file name of the FIRMette to open it in your local viewer. Print your FIRMette!

* Note: If you have used the Zoom In feature, then click the MAX Zoom Out button before you click "Make a FIRMette" button.

(Remember to set the layout of your printer to landscape.)

If you are having trouble creating your FIRMette, click the help button.

You can use our online help or call the Map Service Center at (MSC) at 1-800-358-9616.

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Visit www.ok.gov, the Oklahoma State Portal

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Page last updated: February 05, 2008

Figure 4-1

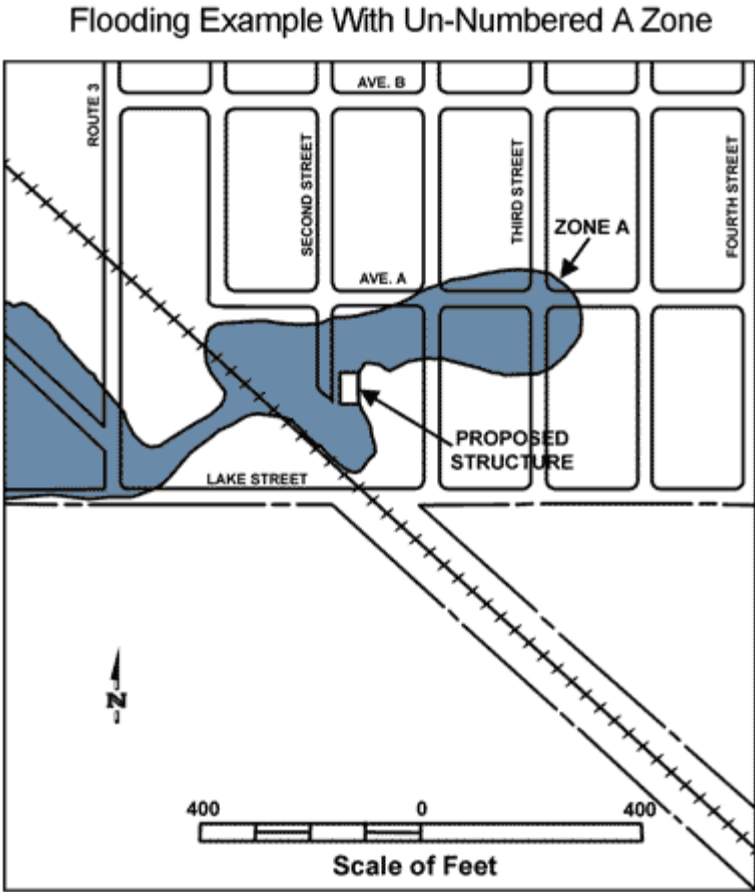


Figure 4-1. The map above shows a hypothetical community with an Un-Numbered A Zone (Special Flood Hazard Area). An amorphous shaped blue area indicates an estimate of the inundation area. By determining the actual distance from an identifiable point on the map to the proposed building site, and then converting it, using the scale, it can be determined that the proposed structure will be in Zone A and will therefore require a permit.

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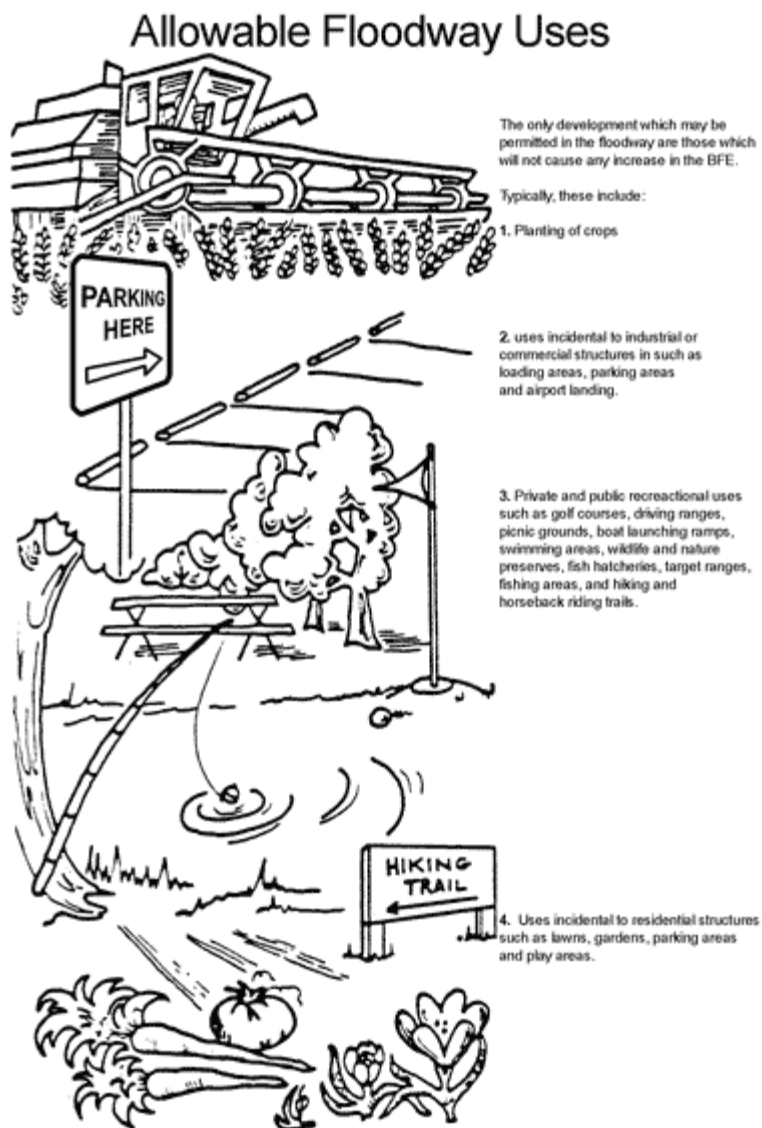


Figure 4-2. The above illustration shows allowable floodway uses that will not cause any increase in the BFE, including planting of crops; uses incidental to industrial or commercial structures, such as loading areas, parking areas, and airport landing; private and public recreational uses, such as golf courses, driving ranges, picnic grounds, boat launching ramps, swimming areas, wildlife and nature preserves, fish hatcheries, target ranges, fishing areas, and hiking and horseback riding trails; and uses incidental to residential structures, such as lawns, gardens, parking areas, and play areas

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Watercourse Alteration Through A Roadbed

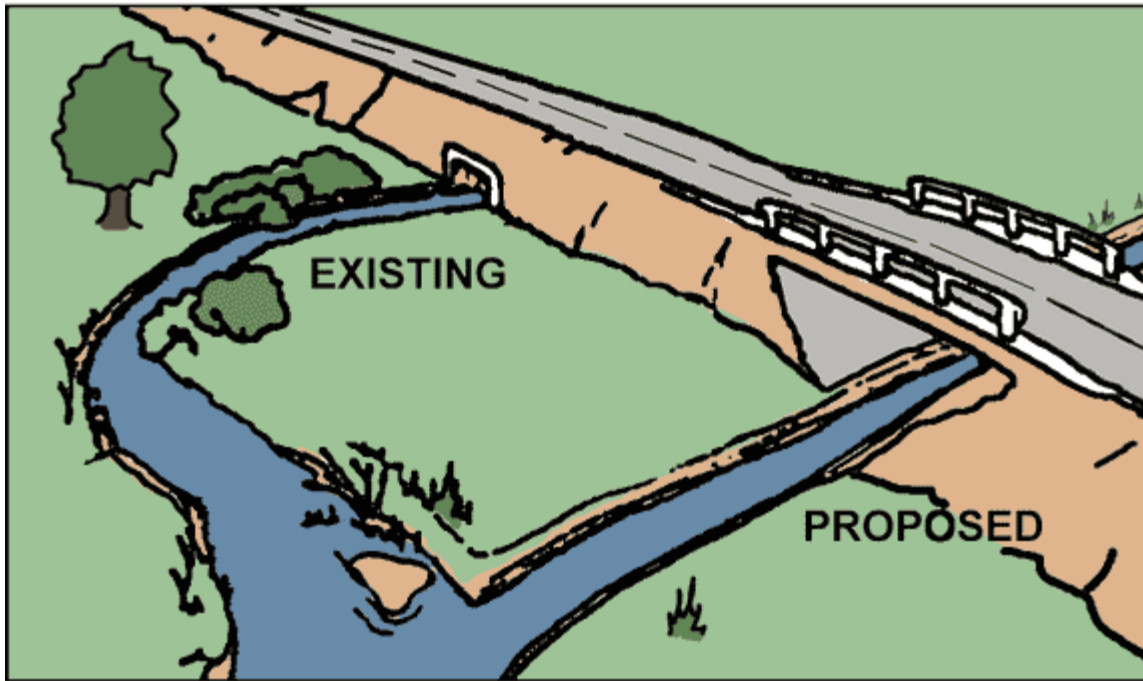


Figure 4-3. The above illustration shows a road with a perpendicular stream. The existing stream is shown going through the roadbed at one location and the proposed watercourse alteration through the roadbed is shown at another location.

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Figure 4-4

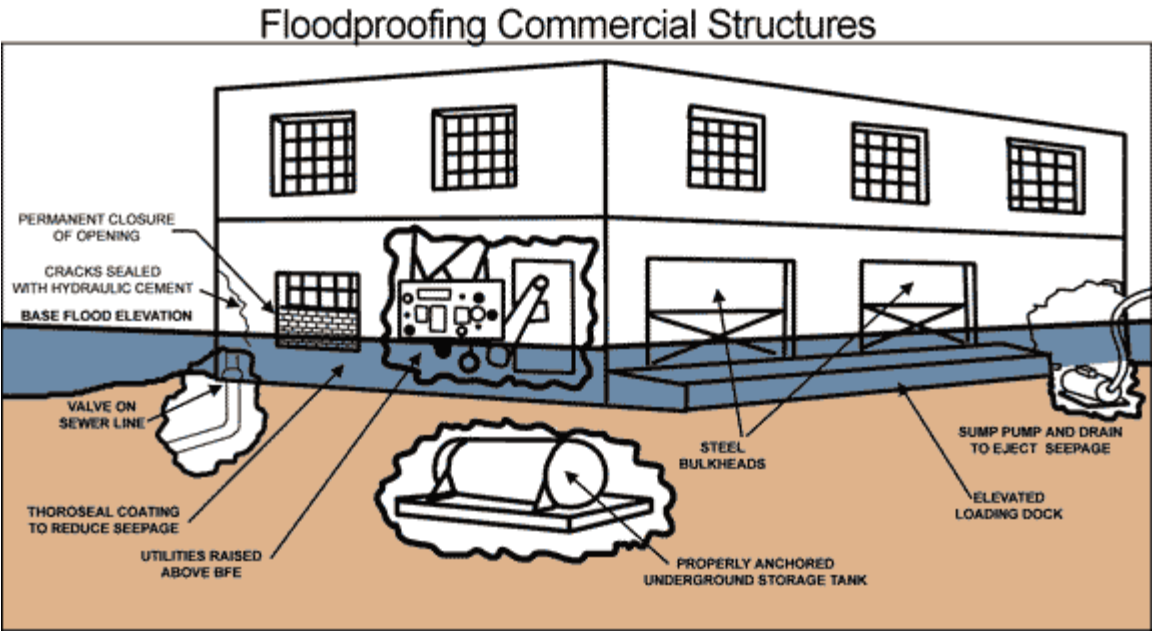


Figure 4-4. The illustration above shows methods of floodproofing commercial structures (primarily affecting the lower level), including permanent closure of openings, sealing of cracks with hydraulic cement, placing a valve on the sewer line, thoroseal coating to reduce seepage through the structure's walls, raising utilities above the BFE, properly anchoring underground storage tanks, using steel bulkheads, elevating the loading dock, and using a sump pump and drain to eject seepage.

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Figure 4-5

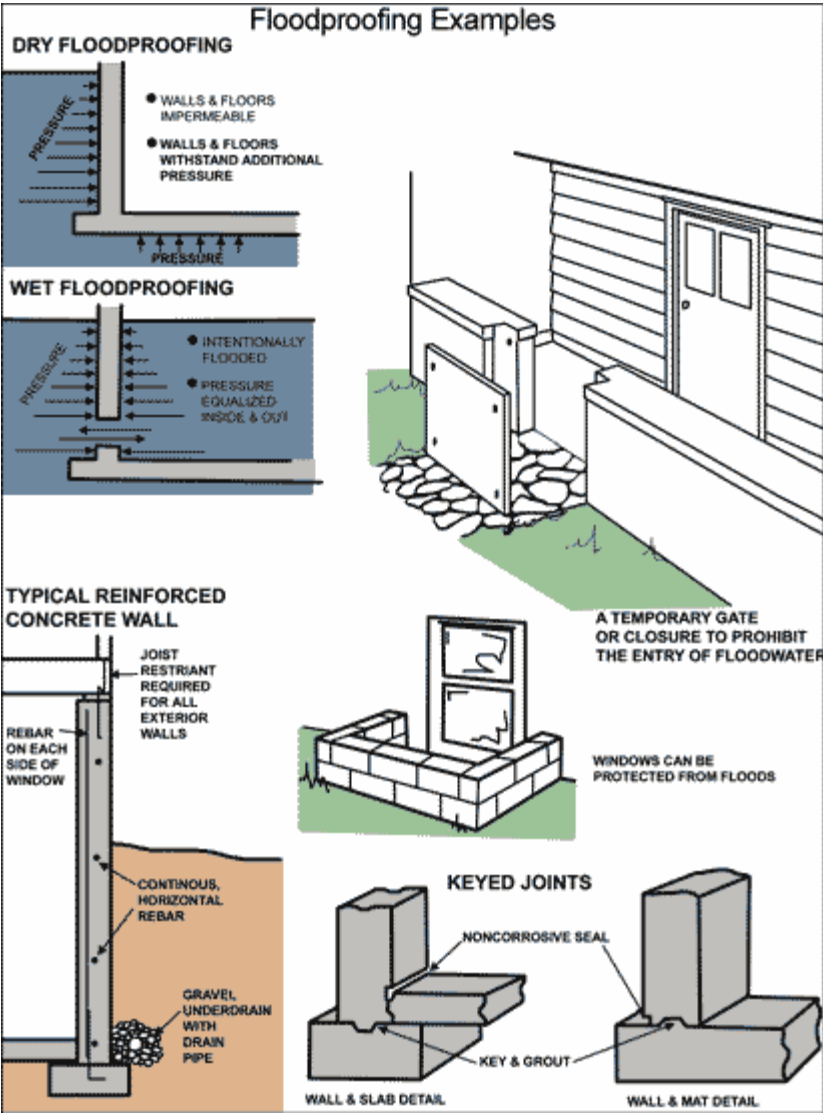


Figure 4-5. The illustration above shows various floodproofing methods, including the following: dry floodproofing by using impermeable walls that withstand additional pressure; wet floodproofing by allowing the wall to be intentionally flooded so the pressure inside and outside can be equalized; building a temporary gate or closure to prohibit the entry of water; building a low wall around ground-level windows to protect them from the force of floodwaters; reinforcing concrete walls with joist restraints, continuous horizontal rebar, and underlain gravel with a drain pipes; and using noncorrosive seal on keyed joints.

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Figure 4-6

Two feet of fill was added to ground to meet elevation requirements for a structure in Zone AO, Depth 2.

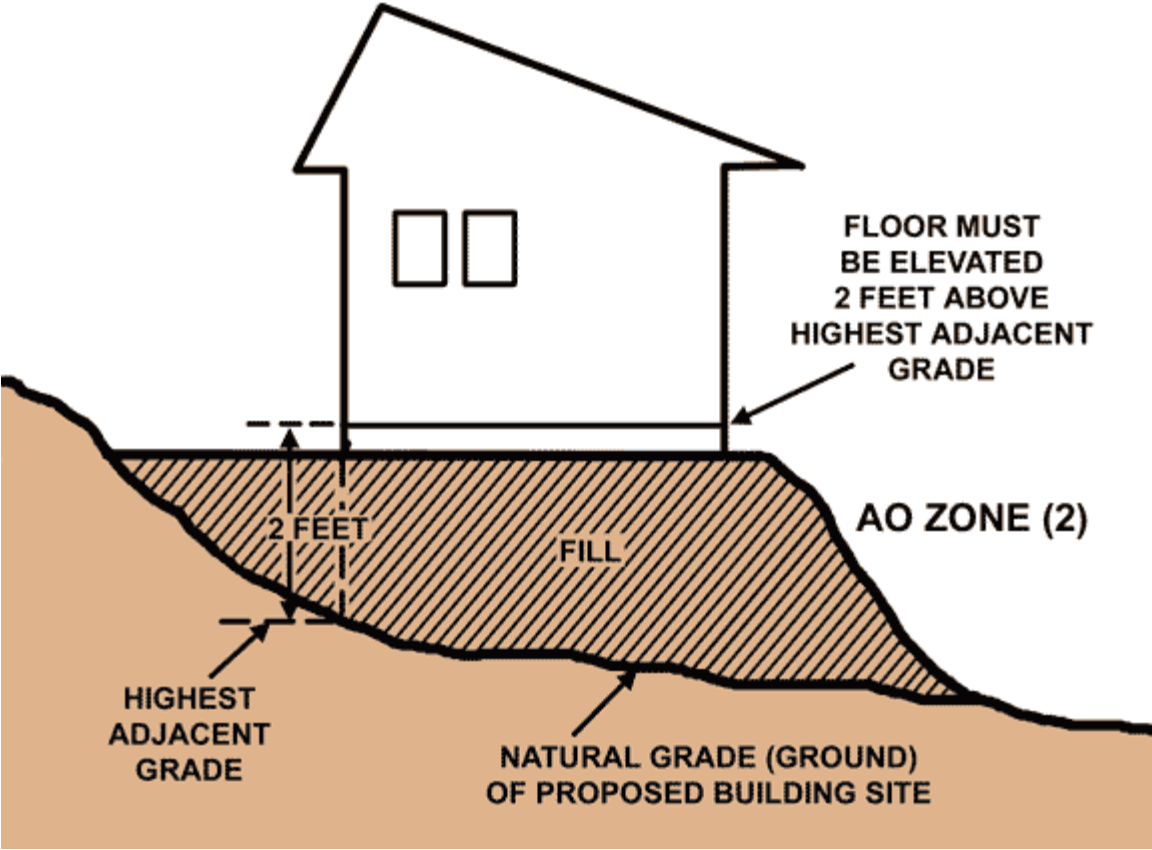


Figure 4-6. The illustration above shows two feet of fill being added to the highest adjacent grade at a proposed building site to allow the structure to meet elevation requirements for a structure in Zone AO, Depth 2.

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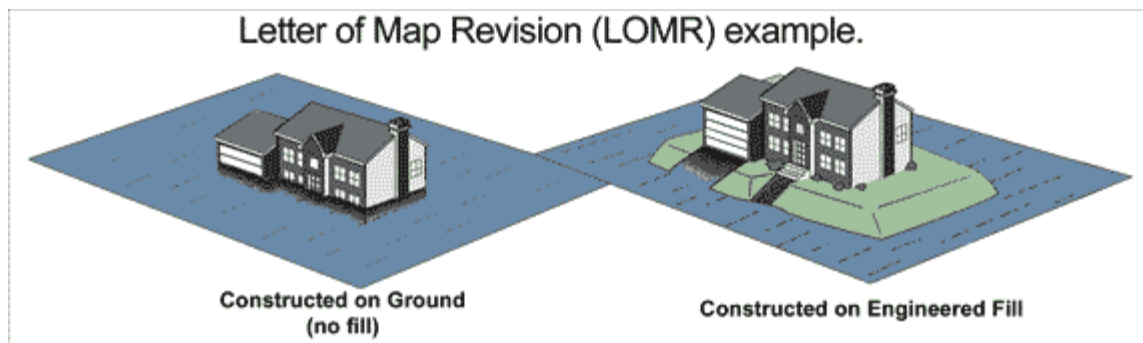


Figure 4-8. The above illustration shows a house constructed two ways: on the ground with no fill, and on engineered fill, which is an example of a situation requiring LOMR.

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Figure 4-7

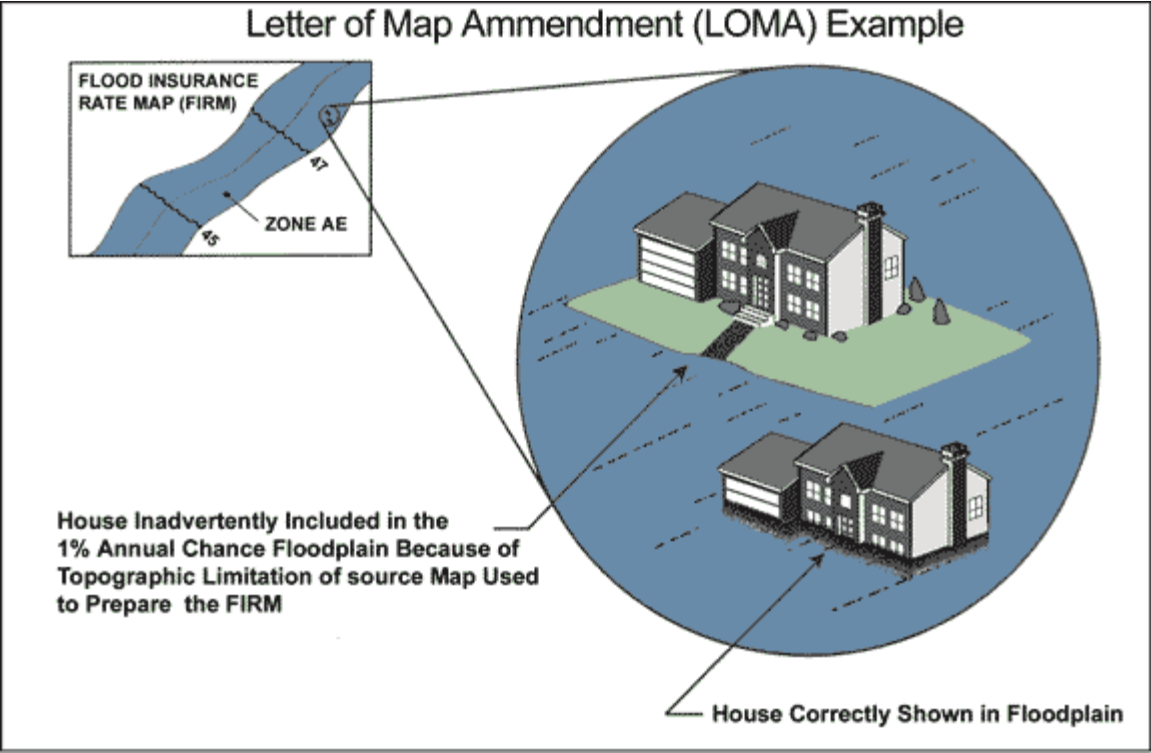


Figure 4-7. The above illustration shows a portion of a Flood Insurance Rate Map (FIRM), which includes a house site and stream segment in Zone AE with demarcated base flood elevations. The house site is also shown enlarged to demonstrate how a house elevated on fill dirt might be incorrectly shown in a 1% chance floodplain due to the limitation of topographic information on the source map used to prepare the FIRM. A Letter of Map Amendment (LOMA) would be needed to correct the FIRM.

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Figure 6-1

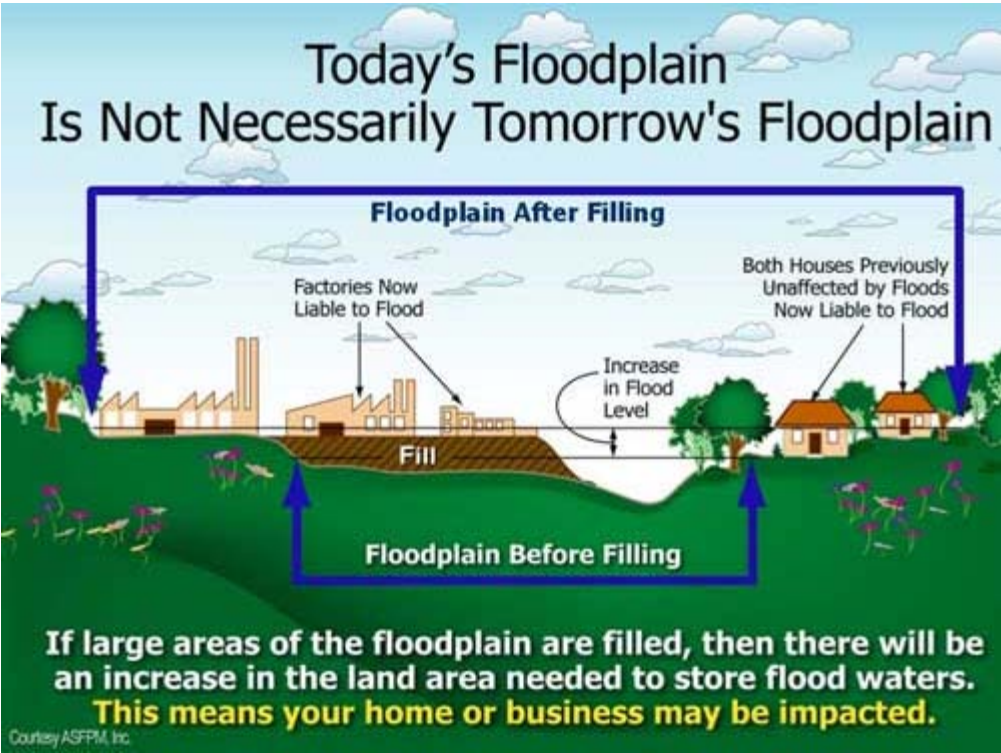


Figure 6-1: The above illustration shows how today's floodplain is not necessarily tomorrow's floodplain. If large areas of the floodplain are filled, then there will be an increase in the land area needed to store flood waters, which may impact homes and businesses outside the floodplain.

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Oklahoma's Floodplain Management 101

Chapter 7 Appendix

- 7-1: Preparing for Floods
- 7-2: Flood Recovery Plan
- 7-3: Hazard Mitigation Grant Program
- 7-4: Flood Mitigation Assistance

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Appendix 7-1: Preparing for Floods

1. Get to know the flood warning system in your community. When you are advised to evacuate, be prepared to leave immediately.
2. Make emergency plans now, involve your entire family. Have an evacuation route for leaving your house. When charting your evacuation route, be aware of low road elevations that may be subject to inundation by flood waters. Remember, the worst case in your community may involve your evacuating in the middle of the night with little flood warning. Plan now!!
3. If you receive an emergency warning, listen to the radio for the latest local information. Have a battery powered radio and an extra set of fresh batteries.
4. When advised to evacuate, do so immediately! Take personal necessities with you; including such items as medication, eye glasses and suitable clothing.
5. Know your flood insurance policy. Make sure it fully covers your structure(s) and their contents.
6. If there is time, move important items to higher elevations - food, furniture, valuables, legal papers and insurance policies, rugs, appliances, clothing, books and electric motors and controls.
7. Consider keeping basement windows open to keep the indoor and outdoor water levels equal. This will help prevent basements from collapsing. If possible, flood the basement with clean water. This will keep out the mud and silt and keep the basement from collapsing.

(NOTE: Certain expenditures for flood fighting activities (e.g. removal of damageable items, protecting structure against structural damage, etc.) may be reimbursable under your flood insurance policy if the action is taken after you have been instructed by competent local officials to take action to protect your property. Keep good records, and take photos to document actions you have taken. If you have any questions about reimbursable flood fighting activities, contact your insurance agent or call the National Flood Insurance Program (NFIP) toll-free number, (1-800-638-6620).

8. Shut off all utilities at the main switches and valves - water, gas, oil, and electric. Remove switch plates and cover electrical boxes with rubberized tape. Use caution if area is already inundated with water.
9. Take special precautions with domestic water systems. If you have a well, seal it to keep out silt and debris.

DURING THE FLOOD

1. Be sure everyone is safe from the fast flowing flood waters. Flowing water that an adult can walk through may sweep children away. Arrange for shelter (if possible with friends or relatives), food, clothing, transportation and medical care.
2. Cooperate fully with local officials. Keep informed of local conditions. Obey all health regulations for protection against epidemics. Report all violations.
3. Wait until officials assure you that the flood danger is over before reentering any area. Cooperate

fully with local officials.

AFTER THE FLOOD

1. 1. Test the plumbing by flushing system with buckets of water. Have your individual sanitary disposal systems inspected by health officials.
2. Have your water supply tested by health officials. Boil or chlorinate emergency drinking water.
3. Destroy all fresh or frozen food that has been in contact with flood water or has thawed. Do not use it!!
4. Start clean up as soon as flood water recedes. Scrub and disinfect walls and floors, household items and appliances. Use flashlights, not matches when entering buildings. Do not use electrical system until it has been checked by a qualified electrician. Have any electrical appliances that were inundated by flood water checked by a serviceman before using them.
5. Document all flood related damage, including debris removal and clean-up costs. Photographs are extremely helpful in documenting flood damage for insurance proposes. Under the debris removal clause of a flood insurance polity, certain expenditures for debris removal from the structure and cleaning of the structure (both inside and outside) are reimbursable. Keep good records, including how much of your personal time was spent on debris removal and clean-up. If you have any questions about reimbursable items under the debris removal provisions of a flood insurance policy, call you agent or the above referenced NFIP toll-free number.
6. Wait until surrounding flood waters are well below the basement floor level before draining your basement. The additional pressure of saturated soil may cause your basement walls to collapse. Begin pumping in stages — about 1/2 of the water per day.
7. Use stoves and heating systems as soon as possible to hasten drying. Clean, dry and recondition heaters and flues and be sure electric motors are dry before using them.
8. Clean, dry and air clothing, bedding and mattresses, furniture and rugs as soon as possible. Disinfect, if necessary.
9. Delay all permanent repairs until buildings are thoroughly dry. Check with local building contractors and local officials on methods of repairs and check with local officials to determine what building permits may be required to do the work.

* All references relate to a standard flood insurance policy purchased through the National Flood Insurance Program (NFIP). If you have any questions about the NFIP, contact your insurance agent or call the NFIP toll-free number 1-800-427-4661.

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Appendix 7-2: Flood Recovery Plan

"An ounce of prevention is worth a pound of cure."

The proverb's age-old meaning is clear. It's less expensive to protect your home and property before they are damaged than to repair them afterwards. Why spend time, energy, and money replacing your damaged items only to have them damaged in a future flood? If you are repairing your home or replacing its contents, take that extra step now to protect your home, property, and family for the future.

Every homeowner and renter can determine what preventive measures can be taken to reduce or minimize damage to their property. Taking action to reduce the risk of future damage is called hazard mitigation. Mitigating your risk to future flooding is an important step in recovering from the losses you faced this time.

This specially-developed Flood Recovery Plan will help you evaluate your home and property. Whether you own or rent, whether your home was damaged or not, it will be an invaluable tool in helping you during the weeks and months ahead.

Your personalized plan will assist you in talking with contractors, lenders, insurers, or government representatives about your individual needs.

Flood recovery specialists from the Oklahoma Water Resources Board, the Federal Emergency Management Agency (FEMA), or local floodplain administrators are available now and in the future to provide basic guidance on your flood risks, flood damage reduction techniques, and flood insurance. Right now, one of the flood recovery specialists can assist you in getting started by helping you complete your Flood Recovery Plan.

It's important to remember that this plan is intended only as a guide. You are encouraged to work with your local building permit officials to ensure that your plans meet all local building code requirements.

Those of you who have suffered flood losses are encouraged to seek out licensed contractors, architects, and engineers to ensure compliance with the law.

Protect your home, property and family now. Before the next flood.

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Appendix 7-3: Hazard Mitigation Grant Program

The Hazard Mitigation Grant Program (HMGP) was created in November 1988 by Section 404 of the Robert T. Stafford Disaster Relief and Emergency Assistance Act. The HMGP assists States and local communities in implementing long-term mitigation measures following a Presidential disaster declaration. The objectives of the HMGP are:

- To prevent future losses of lives and property due to disasters;
- To implement State or local mitigation plans;
- To enable mitigation measures to be implemented during a State's or community's immediate recovery from a disaster; and
- To provide funding for previously identified mitigation measures that benefit the disaster area.

To meet these objectives, FEMA can fund up to 75 percent of the eligible costs of each project. The State or local cost-share match does not need to be cash; in kind services or materials may also be used.

The HMGP can be used to fund projects to protect either public or private property, so long as the projects in question fit within the State and local government's overall mitigation strategy for the disaster area, and comply with program guidelines. Examples of projects that may be funded include the acquisition or relocation of structures from hazard-prone areas, the retrofitting of existing structures to protect them from future damages; and the development of State or local standards designed to protect buildings from future damages.

Eligibility for funding under the HMGP is limited to State and local governments, certain private non-profit organizations or institutions that serve a public function, Indian tribes or authorized tribal organizations, and Alaska Native villages or organizations.

In order to apply for HMGP project funding, applicants must work through their State, since the State is responsible for setting priorities for funding and administering the program.

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Appendix 7-4: Flood Mitigation Assistance

FEMA's Flood Mitigation Assistance (FMA) provides funding to assist States and communities in implementing measures to reduce or eliminate the long-term risk of flood damage to buildings, manufactured homes, and other structures insurable under the National Flood Insurance Program (NFIP). FMA was created as part of the National Flood Insurance Reform Act of 1994 (42 U.S.C. 4101) with the goal of reducing or eliminating claims under the NFIP. FMA is a pre-disaster grant program.

Getting Started Planning is the foundation of FMA. FEMA encourages communities to identify ways to

reduce their risk of flood damage by preparing Flood Mitigation Plans. Communities that have Flood Mitigation Plans can request approval of their plans from their FMA State Point of Contact (POC) and FEMA. Approved plans make a community eligible to apply for FMA project grants.

Plans must assess flood risk and identify actions to reduce that risk. Two types of grants to communities include Planning Grants—grants to states and communities to develop or update Flood Mitigation Plans—and Project Grants—grants to states and communities to implement measures to reduce flood losses. Projects that reduce the risk of flood damage to structures insurable under the National Flood Insurance Program (NFIP) are eligible.

Such activities include the following:

- Elevation of insured structures;
- Acquisition of insured structures and real property;
- Relocation or demolition of insured structures;
- Dry floodproofing of insured structures;
- Minor, localized structural projects that are not fundable by State or other Federal programs.; or
- Beach nourishment activities such as planting of dune grass.

Any State agency, participating NFIP community or qualified local organization is eligible to participate in FMA. However, communities that are suspended or on probation from the NFIP are not eligible. Individuals wishing to participate in FMA should contact their community officials.

A project must at a minimum be cost effective, cost beneficial to the National Flood Insurance Fund, technically feasible, physically located in a participating NFIP community, or must reduce future flood damages in an NFIP community.

A project must also conform with the minimum standards of the NFIP Floodplain Management regulations, the applicant's Flood Mitigation Plan, all applicable laws and regulations, such as Federal and State environmental standards or local building codes.

FEMA distributes FMA funds to States, which in turn provide funds to communities. The state serves as the grantee and program administrator for the FMA. The State sets mitigation priorities, provides technical assistance to communities applying for FMA funds, evaluates grant applications based on minimum eligibility criteria and state priorities, awards planning grants, works with FEMA to approve projects and awards funds to communities, ensures that all community applicants are aware of their grant management responsibilities.

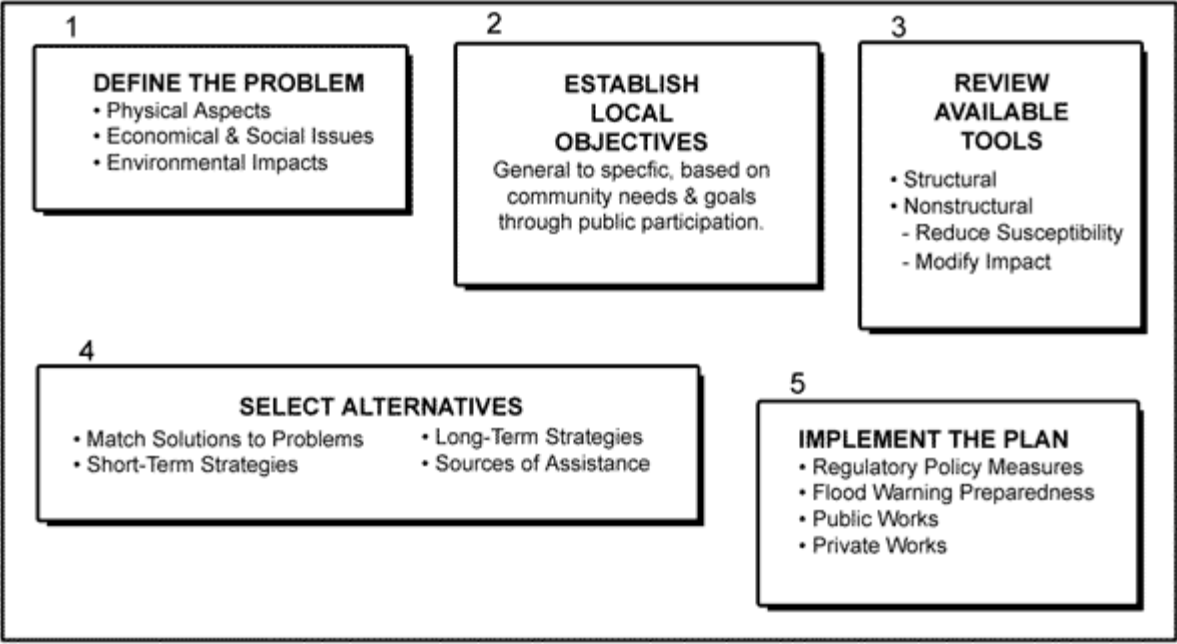
FEMA may contribute up to 75 percent of the total eligible costs. At least 25 percent of the total eligible costs must be provided by a nonfederal source. Of this 25 percent, no more than half can be provided as in-kind contributions from third parties. There are limits on the frequency of grants and the amount of funding that can be allocated to a state or community in any five-year period.

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Page last updated: February 05, 2008

Figure 7-1



Implementing a flood hazard mitigation plan.

Figure 7-1. The flowchart above illustrates steps for implementing a flood hazard mitigation plan. Step 1: define the problem, including physical aspects, economical and social issues, and environmental impacts. Step 2: establish local objectives through public participation that are general to specific based on community needs and goals. Step 3: review available tools, both structural and nonstructural, which will reduce susceptibility and/or modify impact. Step 4: select alternatives by matching solutions to problems, developing both long- and short-term strategies, using appropriate sources of assistance. Step 5: implement the plan, which should include regulatory policy measures and flood warning preparedness for both public works and private works.

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Figure 7-2



Figure 7-2. The above illustration lists the benefits of a natural floodplain, including flood water storage, enhanced stormwater management, reduced flood damages, improved water quality, recreational opportunities and aesthetics, preservation of wildlife and natural habitats, sustained biological productivity, enhanced erosion control, opportunities for scientific study and outdoor education, increased property values, preservation of cultural resources, sustained economic prosperity, and maintenance of natural products

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Structural and nonstructural approaches a community can use to reduce or prevent future flood damages.

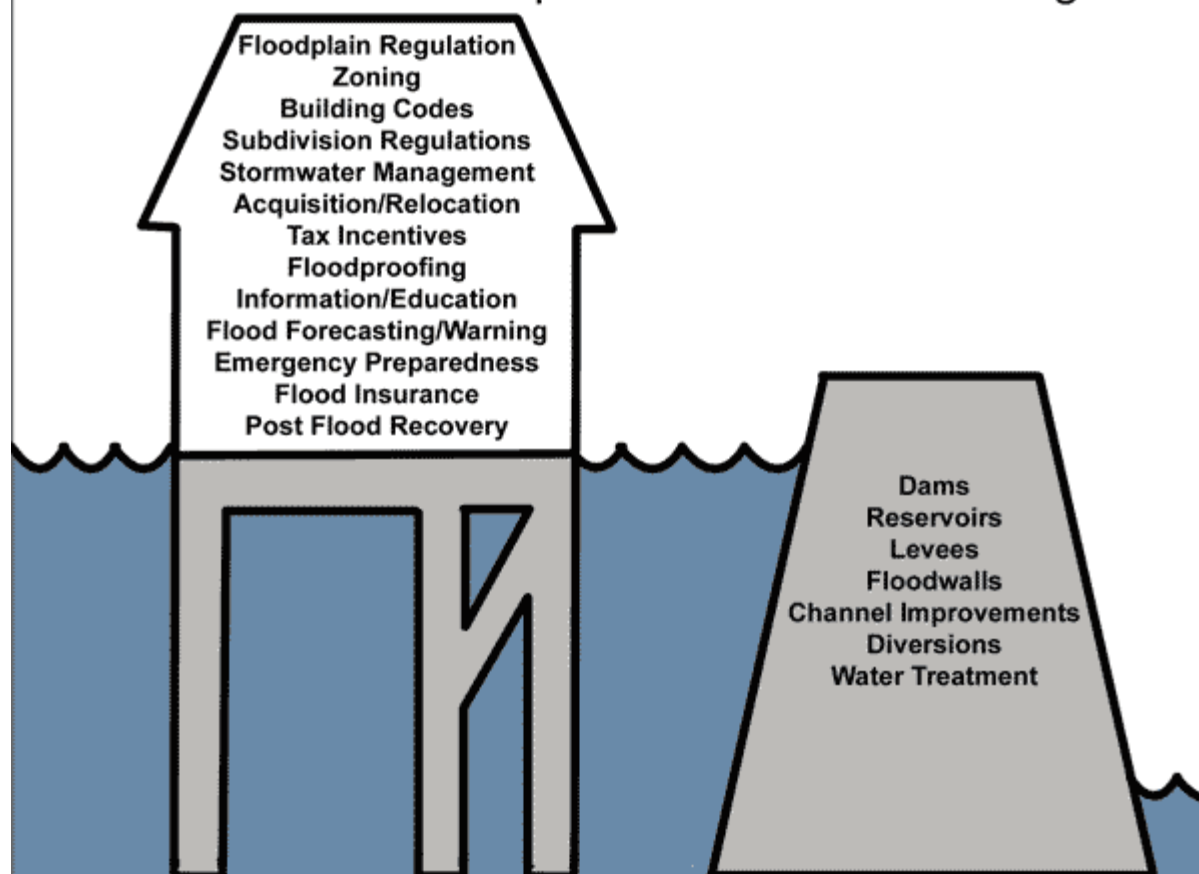


Figure 7-3. The illustration above lists structural and nonstructural approaches a community can use to reduce or prevent future flood damages. Structural approaches include dams, reservoirs, levees, floodwalls, channel improvements, diversions, and water treatment. Nonstructural approaches include floodplain regulation, zoning, building codes, subdivision regulations, stormwater management, acquisition/relocation, tax incentives, floodproofing, information/education, floodforecasting/warning, emergency preparedness, flood insurance, and post flood recovery.

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