

# RIVERINE FLOODPLAINS, DEVELOPMENT, AND MAPS

South Carolina Department of Natural Resources

Flood Mitigation Programs

<http://www.dnr.sc.gov>

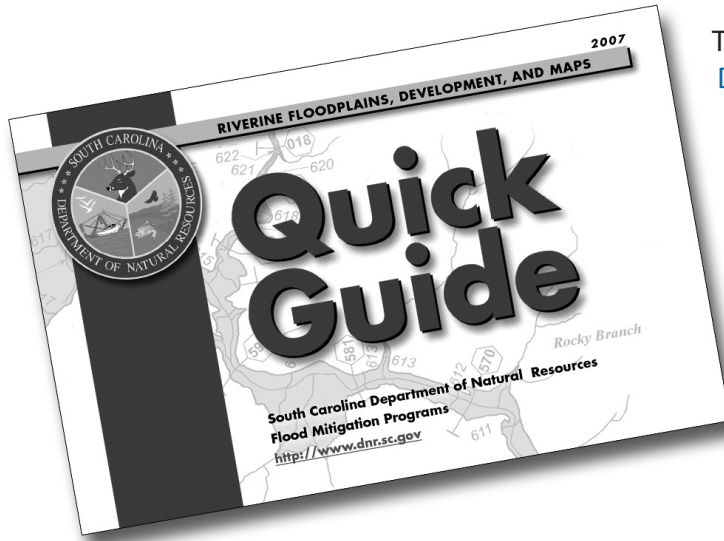


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## About This Quick Guide



This **Quick Guide for Riverine Floodplains, Development, and Maps** is intended to help you understand the basics about watersheds and the floodplains that are found along all of South Carolina's rivers, streams and creeks. You will learn about methods used to develop and maintain flood maps, and factors that are considered when development is proposed in floodplains. Coastal floodplains are not covered by this guide.

Questions and comments can be directed to the South Carolina Department of Natural Resources, Flood Mitigation Programs, at (803) 734-9103.

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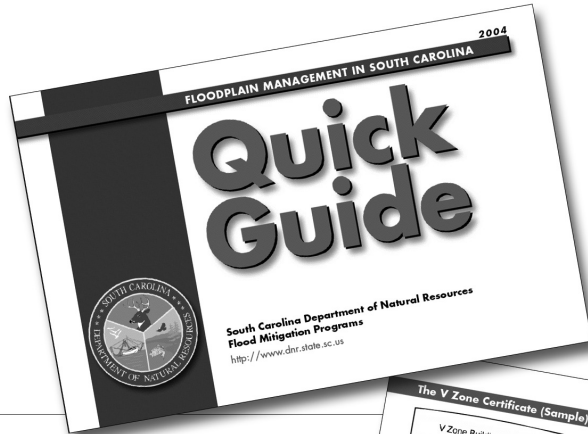
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# Learn More About Floodplain Management



The South Carolina Department of Natural Resources, Flood Mitigation Programs, prepared a [Quick Guide for Floodplain Management](http://www.dnr.sc.gov/water/envaff/flood/scnfigp.html) to help explain why and how communities manage floodplains to protect people and property. Access it online at <http://www.dnr.sc.gov/water/envaff/flood/scnfigp.html>

The National Flood Insurance Program (NFIP) is administered by the Federal Emergency

Management Agency (FEMA).

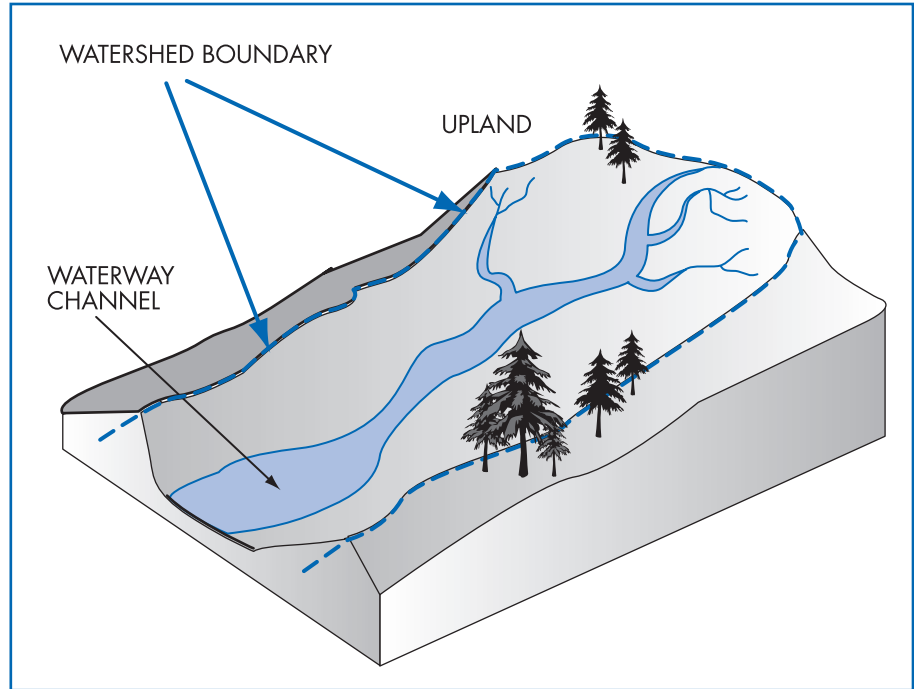
Communities that participate in the NFIP adopt and administer ordinances that detail the rules and regulations. If you have questions, be sure to talk with your community's planning, permit, engineering or floodplain management office.

This block contains three overlapping documents. The top-left document is titled "Understanding the Floodway" and includes a diagram of a floodway with labels for Flood Hazard Area, Flood Fringe, Floodway, Stream Channel, Simulated Encroachment, and Area of Floodplain that could be used for development by raising ground. It also defines lines A, B, and C. The top-right document is titled "The V Zone Certificate (Sample)" and is a form for "V Zone Building Design and Performance Certificate (optional)". It contains fields for elevation information, foundation type, and other technical details. The bottom document is titled "CANTILEVERED UTILITY PLATFORM" and shows a diagram of a structure on stilts with numbered callouts 1 through 6. A note on this document states that a Registered Professional Engineer or Architect must review and sign the design.

## Introduction to Riverine Watersheds

A watershed is the area of land that drains runoff to a point on a waterway. Sometimes it is called the drainage basin. The size and shape of a watershed depends on the shape of the land, the underlying geology, the steepness of the slopes, and how many smaller waterways, or tributaries, join the larger waterway.

Every river, creek, stream and ditch has a watershed. Many small watersheds, or subwatersheds, combine to make large watersheds.

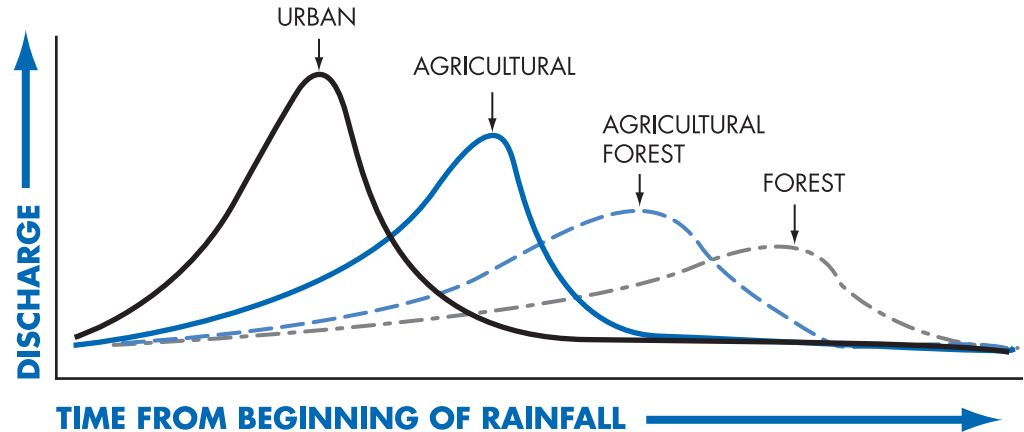


## Hydrology and Land Use

How people use the land and change a watershed are significant factors in the surface water hydrology of a waterway. This involves identifying factors that influence the distribution and circulation of water, including surface water (runoff from rainfall) and groundwater.

The volume of runoff that flows past a given point on a waterway is called “discharge.” Discharges change as land is developed, generally increasing as more impervious areas are created.

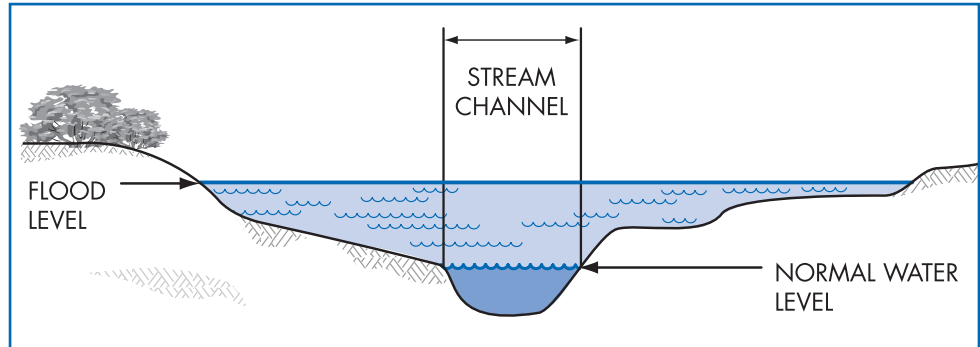
Heavily developed urbanized watersheds, with large areas covered by buildings, parking lots, and roads, generally have higher discharges which usually occur very quickly because of drainage modifications. Forested and less developed watersheds absorb more rainfall and thus have lower discharges.



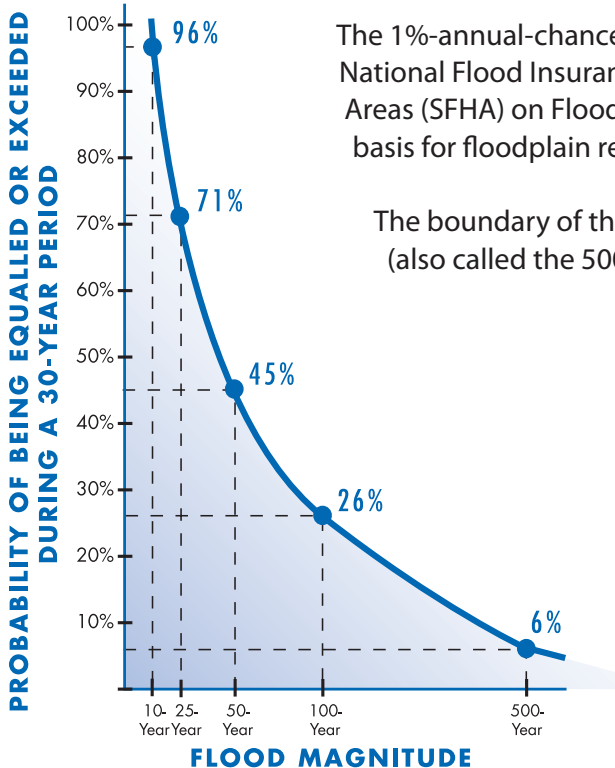
## River Hydraulics

After hydrology methods are used to determine flood discharges, hydraulic studies are performed to show how that discharge flows through the system of streams, creeks and rivers. Hydraulic studies are performed to understand how fast the water will flow and how high it will rise for a given discharge. The studies use computer models that account for many factors that influence flooding:

- Steepness of the stream as it flows from the upper watershed to lower areas
- Size and shape of the stream channels
- Type of vegetation that grows on the land adjacent to the channel
- Presence of bridges and culverts that block flow
- Whether there are buildings or other structures in the floodplain that obstruct flow



## The 1%-Annual-Chance Flood and 500-Year Flood



The 1%-annual-chance flood, also called the Base Flood, has been selected by the National Flood Insurance Program as the basis for delineation of Special Flood Hazard Areas (SFHA) on Flood Insurance Rate Maps (FIRMs). The Special Flood Hazard Area is the basis for floodplain regulations administered by South Carolina's communities.

The boundary of the floodplain delineated for the 0.2%-annual-chance flood (also called the 500-year flood) sometimes is shown on the NFIP flood maps.



### Terms and Definitions

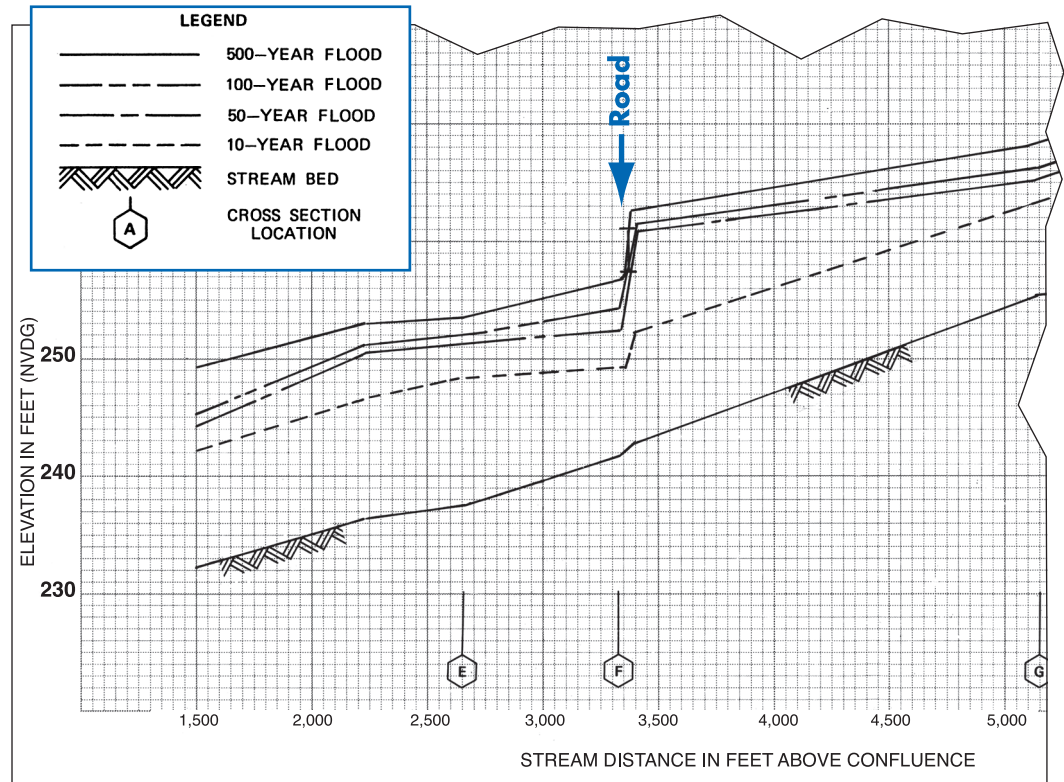
The **Base Flood** is the 1%-annual-chance flood (commonly called the 100-year flood). The 100-year flood has a 26% chance of occurring during a 30 year period.

The **500-Year Flood** (or 0.2%-annual-chance flood) has a 6% chance of occurring during a 30-year period.

## Flood Profiles

One product of the hydraulic studies is a profile of the waterway, a graphical representation of the slope of the waterway channel and water surface elevations for different frequency floods.

The profile shows the locations of surveyed cross sections and road crossings used in the model. The most accurate determination of the Base Flood Elevation (BFE) is found by reading the profile.



## Natural and Beneficial Floodplain Functions

Undeveloped floodplains can serve natural and beneficial functions:

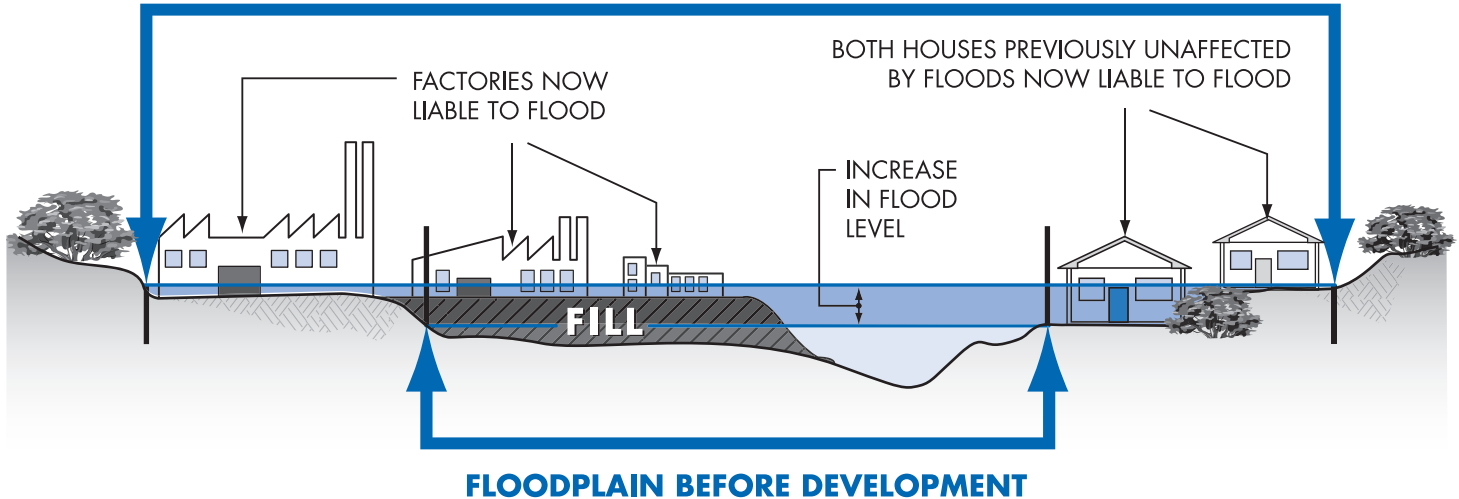
- Store flood water and stormwater
- Enhance water quality by filtering runoff through wetlands
- Offer habitats for plants and animals
- Sustain biological productivity
- Reduce erosion and sediment runoff
- Offer recreation opportunities

“No Adverse Impact” floodplain management is essentially a “do-no-harm” policy based on the concept that the actions of any community or property owner should not adversely affect others. It calls for identifying the potential direct and indirect adverse impacts of any development action on people, property and the environment. Adverse impacts must be avoided or mitigated.



The Association of State Floodplain Managers, Inc. developed the NAI concept in response to rising flood damages, even though communities administer floodplain management ordinances. At <http://www.floods.org>, click on the NAI tab to download publications, the NAI Took Kit, a PowerPoint, and several documents about legal issues.

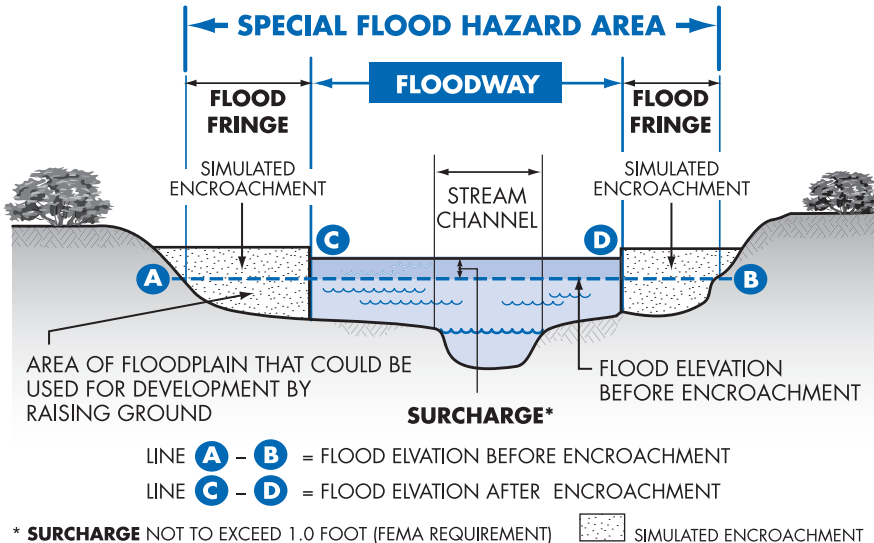
## FLOODPLAIN AFTER FILLING OR WATERSHED DEVELOPMENT



Today's Floodplain is not Tomorrow's Floodplain

Floodplain development, construction of roads across waterways, and development in the upper watershed can increase flood depths and alter flow patterns.

## Defining the Floodway and Flood Fringe



### Terms and Definitions

The **Special Flood Hazard Area (SFHA)** is that portion of the floodplain subject to inundation by the base flood (1%-annual-chance or 100-year flood). Riverine SFHAs are shown on flood maps as Zone A and Zone AE.

The **Floodway** is the channel of a river or other watercourse and the adjacent land areas that must be reserved in order to pass the base flood discharge without increasing flood depths.

Computer models of waterways are used to simulate “encroachment” or fill in the flood fringe in order to predict where and how much the Base Flood Elevation would increase if the floodplain is allowed to be filled. Floodway Data Tables are included in the Flood Insurance Study reports (see page 12).

## The Flood Fringe

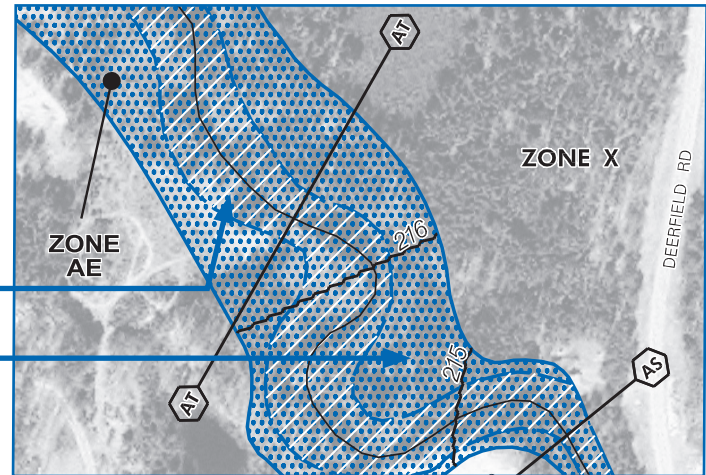
The Flood Fringe is the portion of the SFHA that is outside of the Floodway. Floodwaters are shallower and usually flow velocities are slower than in the Floodway. Velocities can be estimated by referring to the Floodway Data Table, (see page 12) or by applying simple engineering methods.

The NFIP maps are prepared assuming the Flood Fringe is “filled” and the floodplain regulations do not require an engineering analysis of development in the Flood Fringe. This simplified approach does not fully account for other adverse impacts which may result from development, such as:

- Alteration of local drainage patterns
- Increases in impervious area that reduce natural infiltration and increase runoff
- Filling of wetlands

The **Floodway** is the cross-hatched area. 1

The **Flood Fringe** is the stippled area. 2



## Floodway Data Tables

The Floodway delineates that portion of the SFHA that must be reserved to convey the Base Flood without increasing the water surface elevation more than the amount specified in the Floodway Table.

Floodway			Base Flood Water Surface Elevation			
WIDTH (FT.)	SECTION AREA (SQ. FT.)	MEAN VELOCITY (FT. PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
450	4,013	4.2	459.0	459.0	456.0	1.0
507	2,536	6.7	459.4	459.4	460.3	0.9
560	2,453	7.0	460.6	460.6	460.9	0.3
570	2,579	6.6	461.9	461.9	462.3	0.4
645	2,262	7.5	464.4	464.4	465.3	0.9
520	2,434	7.0	466.7	466.7	467.3	0.6

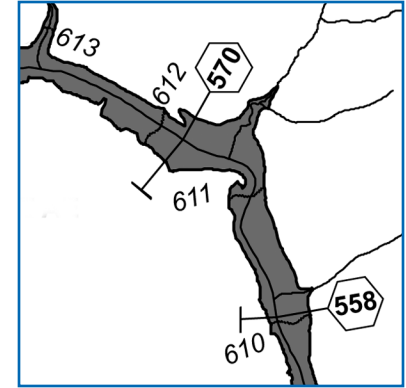
The Flood Insurance Study (FIS) has a Floodway Table for every waterway that was studied by detailed methods for which floodways were delineated.

- 1 This is the only readily available velocity data to use in computations of hydrodynamic loads
- 2 Computed BFE (rounded values are shown on the FIRM)
- 3 Amount of allowable increase – not more than 1-foot at any location

## Limited Detailed Study

Limited Detailed Study (LDS) is the term given to a method of calculating Base Flood Elevations using cross-section information from available topography (with limited or no surveyed field data). Limited Detailed Studies are performed to improve flood hazard information in areas that may have been originally mapped as Approximate A Zones (without BFEs). Waterways for which Limited Detailed Study methods are used have:

- BFEs, SFHA boundaries, and cross-section locations shown on the FIRM
- Flood Hazard Data Table in the Flood Insurance Study or on the FIRM
- Floodways not shown on the FIRM



Floodways are not shown when LDS methods are used. When the FIRM shows BFEs but not Floodways, the NFIP regulations require communities to ensure that no new construction, substantial improvement, or other development (including fill), is permitted “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.” [44 CFR §60.3(c)(10)]

To avoid requiring analyses for every proposal, communities can establish a “non-encroachment zone”, setback, or buffer on both sides of a waterway (see page 26).

## Evaluating Proposed Development:

### Selected Community Responsibilities

Community responsibilities include:

- Require permits for all development (subdivision, structures, buildings, and other activities) that are proposed in mapped Special Flood Hazard Areas.
- Review proposed development to assure that necessary permits have been received from all regulatory authorities.
- Review all proposed development to determine whether subdivisions and building sites will be reasonably safe from flooding.
- Require development proposals to provide adequate drainage to reduce exposure to flood hazards.
- Require that all development proposals with more than 50 lots or 5 acres, whichever is the lesser, include Base Flood Elevation data.
- Obtain, review and use Base Flood Elevation and Floodway data available from a Federal, State, or other source, when not provided on FIRMs.

For a complete list of responsibilities assumed by communities that participate in the NFIP, see the regulations at 44 CFR §59.22 and Part 60 (Subpart A).

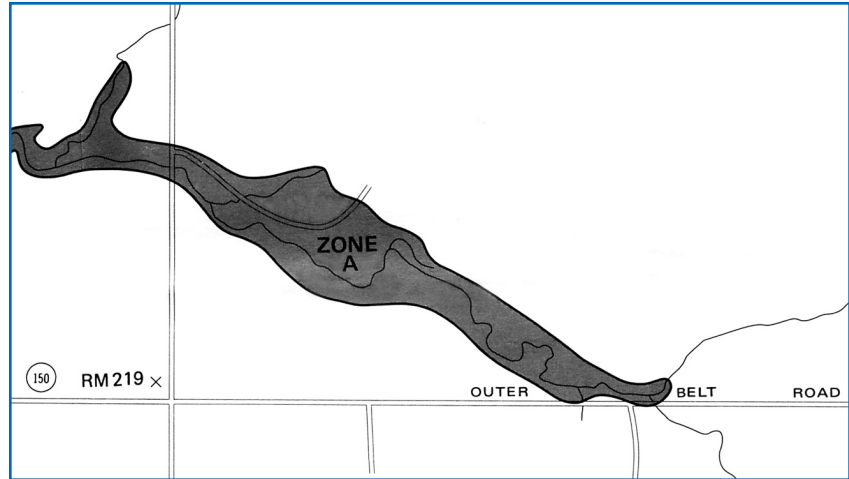
## Development in Approximate A Zones

Proposals in Approximate A Zones are required to have Base Flood Elevations (BFEs) determined by the applicant if the proposal is for:

- Subdivision with 50 or more lots
- Subdivision of more than 5 acres
- Single lot development of more than 5 acres

Applicants are required to obtain and reasonably utilize floodplain data from a Federal, State, or other source.

Simplified methods can be used to develop BFE data for single lot proposals.



Simplified procedures are outlined in *Managing Development in Approximate A Zone Areas: A Guide for Obtaining and Developing Base (100-Year) Flood Elevations (FEMA 265)*.

See page 16 for an introduction to the QUICK-2 computer program.

## Introduction to QUICK-2

QUICK-2 is a simplified hydraulic analysis computer program designed to help community officials, engineers, developers, and others who need to determine Base Flood Elevations for Approximate A Zones. To download the QUICK-2 software, user's manual, sample data sets, and to view a tutorial, go to

<http://www.fema.gov/plan/prevent/fhm>



QUICK-2 computes:

- Critical depth
- Cross section capacity (rating curves)
- Normal depth
- Step-backwater analysis



QUICK-2 Data Requirements:

- Cross-sectional geometry
- Channel slope
- Estimate of Manning's "n"
- Discharge



QUICK-2 should not be used in areas with:

- Rapidly varying flow
- Two-dimensional Flow
- Supercritical flow
- Hydraulic jumps
- Alluvial fans
- Coastal influences

## Buildings in the Flood Fringe

Permits are required for all development in the Flood Fringe. Communities review development proposals to determine if they are reasonably safe from flooding. The level of protection is the Base Flood Elevation (plus additional height, if required by local ordinance).

**Residential buildings** must be elevated on columns, crawlspaces, or fill. Crawlspaces, garages, and accessory structures are allowed below the BFE provided they meet the requirements (limited uses, flood openings to allow free inflow and outflow of floodwaters, and flood-damage resistant materials).

**Nonresidential buildings** must be elevated or dry floodproofed (designs must be certified by a registered design professional).

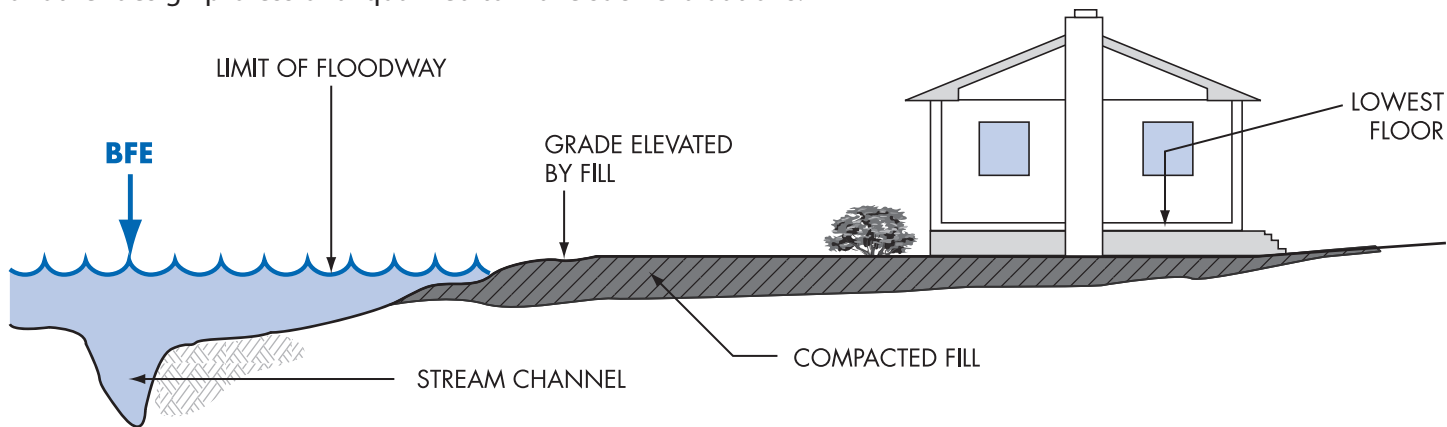
See the [Quick Guide for Floodplain Management](#) to learn more about floodplain management requirements (see page 2).

### Requirements for Floodplain Fill Placed to Elevate Individual Buildings

- Meet the requirements of the building code
- Placed in lifts and compacted to resist slumping
- Sloped and protected to minimize erosion
- Graded to avoid directing drainage onto other properties

## Buildings on Fill

Local officials are required to determine if development proposed to be elevated on fill will be reasonably safe from flooding. This can be done by requiring a certification by a qualified design professional that indicates the land or structures to be removed from the SFHA are reasonably safe from flooding. The certification can be prepared by a professional engineer, professional geologist, professional soil scientist, or other design professional qualified to make such evaluations.



Resource: NFIP Technical Bulletin #10, Ensuring That Structures Built on Fill In or Near Special Flood Hazard Areas Are Reasonably Safe From Flooding.

## Large Filled Areas

Developers sometimes propose placement of large quantities of earthen fill to raise a site above the BFE with the intention of “removing” the site from the mapped Special Flood Hazard Area.

Communities should require that the developer prepare detailed engineering analyses in accordance with the FEMA’s requirements and submit the materials to FEMA for a Conditional Letter of Map Revision (see pages 30 and 36). Adjacent communities are to be notified prior to approval of substantial commercial developments and large subdivisions in SFHAs. [44 CFR §60.26(c)]

A community shall withhold its permit until the CLOMR is issued by FEMA. Certificates of Occupancy should not be issued until the developer submits the “as-built” certifications necessary for FEMA to issue the final Letter of Map Revision. [44 CFR §60.3(c)(13)]

Certification of “as-built” plans shall be provided to FEMA not later than six months after project completion for issuance of the final Letter of Map Revision. [44 CFR §65.12(c)]

FEMA requires submission of a certification by a qualified design professional that the fill pads for buildings have been compacted and that all fill slopes are adequately protected for the anticipated flood velocities. [44 CFR §65.5(a)(6)]

## NFIP Requirements in Floodways

The NFIP regulations require that:

A community shall prohibit encroachments, including fill, new construction, substantial improvements, and other development within the adopted regulatory floodway unless it has been demonstrated through hydrologic and hydraulic analyses performed in accordance with standard engineering practice that the proposed encroachment would not result in any increase in flood levels within the community during the occurrence of the base flood discharge.  
[44 CFR §60.3(d)(3)]

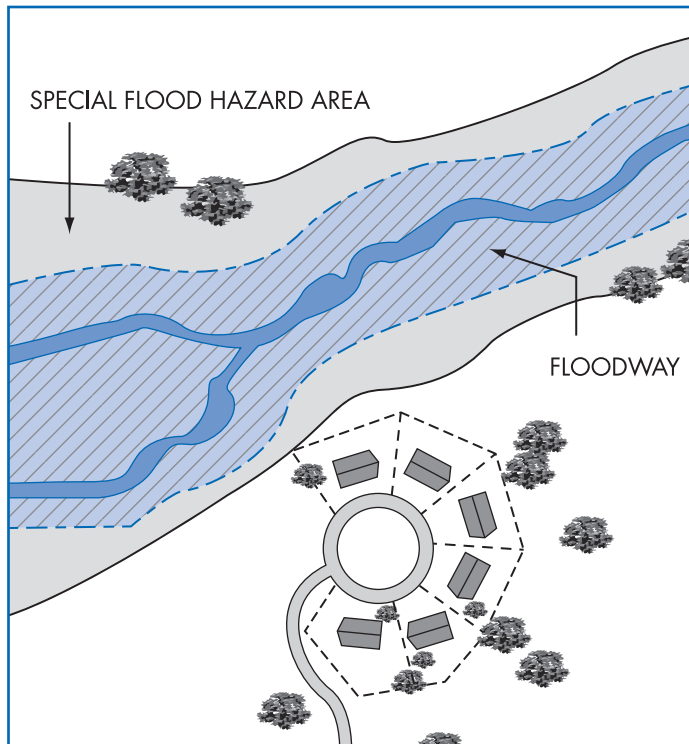
A development proposal that will encroach into the Floodway must be accompanied by an engineering analysis that uses FEMA's original hydraulic model (called the effective model) as the starting point. Contact FEMA's Map Assistance Center at (877) 336-2627 or [FEMAMapSpecialist@mapmodteam.com](mailto:FEMAMapSpecialist@mapmodteam.com) to learn how to obtain the model.

## Floodways — Uses Encouraged

Land uses that allow the Floodway to convey the passage of floodwaters without obstruction are encouraged:

- Set aside and preserved as natural open space
- Passive recreational areas (no buildings)
- Athletic fields
- Hiker-biker trails
- Parking areas (with gravel or pervious surfaces)
- Tree farms and plant nurseries
- Pasture and croplands

Learn more about subdivision layout and design by obtaining a copy of the American Planning Association's PAS #473, Subdivision Design in Flood Hazard Areas (<http://www.planning.org>).



## Floodways — Uses Discouraged

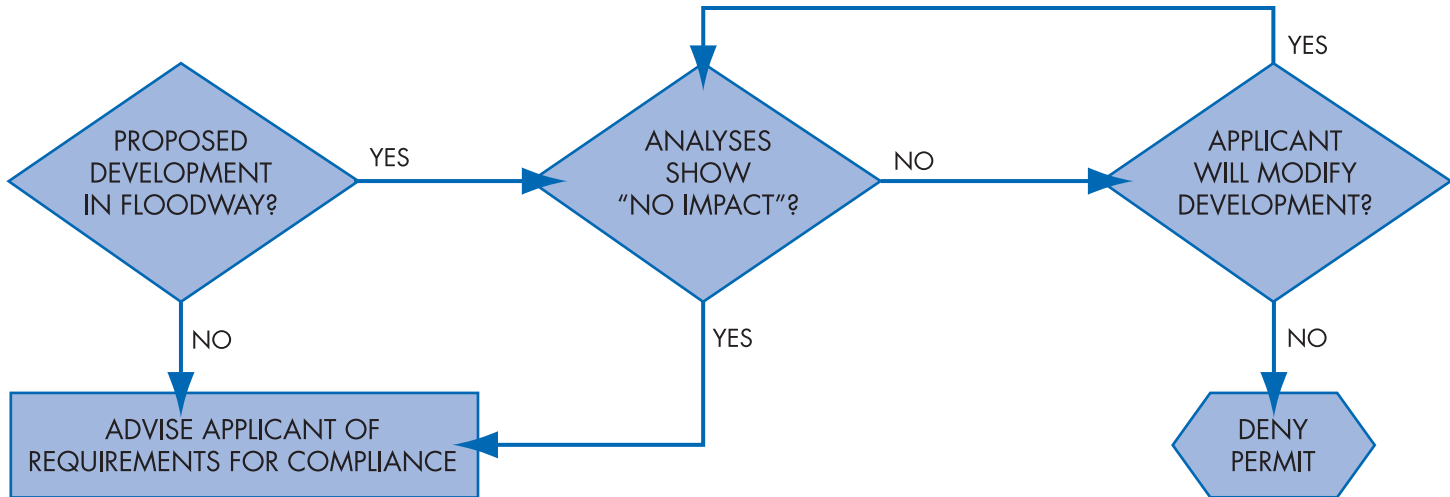
Floodwater velocities generally are higher in the Floodway than in the Flood Fringe. Moving water exerts additional pressure (called hydrodynamic loads) on buildings and above-ground storage tanks. Impacts from debris carried by fast moving water, such as trees and materials from damaged buildings, can damage foundations under elevated buildings.

Development and land uses that obstruct flow through the Floodway are discouraged:

- Channel modifications that straighten out streams
- Large volumes of fill
- Storage of sand, gravel, topsoil
- Buildings that obstruct flow
- Above-ground tanks

The planning best practices described on page 26 can be used to preserve Floodways. The uses listed above and other development in Floodways can be allowed if engineering analyses (see page 24) demonstrate the water surface elevation will not increase more than the amount specified in the Floodway Data Table (see page 12). Avoiding the Floodway is the safest approach.

## Floodway Decision Process




Analyses of Floodway development proposals may show increases in flood elevations or applicants may propose changing Floodway boundaries. For compliance in these cases, applicants must submit technical data, certifications, and fees to FEMA to seek a Conditional Letter of Map Revision (see page 30).

## Floodway Proposals – No Rise/No Impact

Analyses of the impact of Floodway development proposals are required to be:

- Based on the current effective hydraulic model used to develop the Floodway (see page 38)
- Supported by technical data:
  - Hydraulic model modified to show impact of proposed development
  - Submit hydraulic model, information about changes to the model to reflect proposed development, and results
  - Submit annotated maps and modified Floodway Data Table
- Certified by a registered professional engineer

ENGINEERING “NO IMPACT” CERTIFICATION (*example*)



This is to certify that I am a duly qualified engineer licensed to practice in the State of South Carolina. It is to further certify that the attached technical data supports the fact that the proposed **(Name of Development)** will not impact the Base Flood Elevations (100-year flood), floodway elevations and the floodway widths on **(Name of Stream)**.

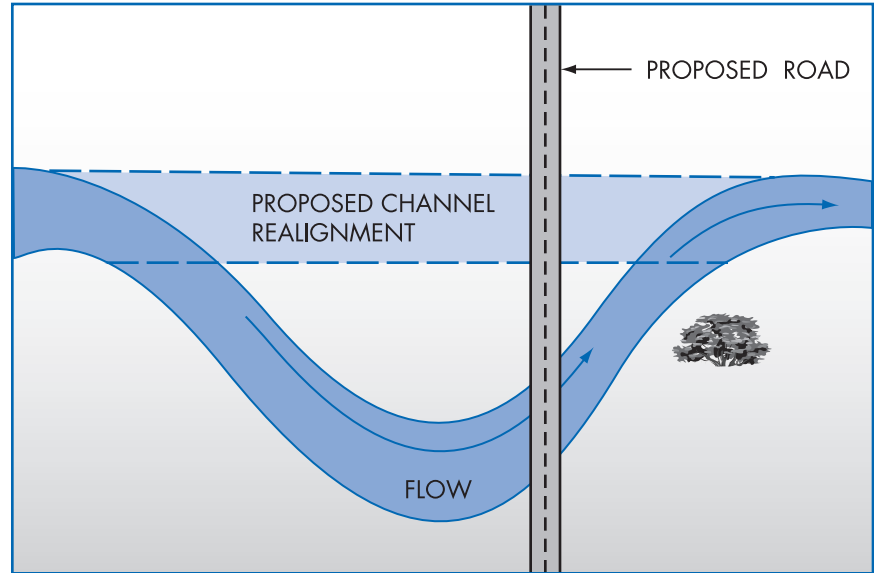
Signature \_\_\_\_\_ Seal \_\_\_\_\_

Even if an analysis indicates no impact, communities may require the applicant to submit the analysis for review by FEMA (following the CLOMR process, see page 31).

If an analysis indicates an increase in Base Flood Elevations or the applicant proposes changing the delineated boundaries of a Floodway, the analyses must be approved by FEMA through issuance of a CLOMR.

## Waterway Alterations

The greatest potential for erosion of streambanks occurs on the outside of meander bends. Riverine erosion can undermine bridges and damage roadway embankments. Whether to address an existing problem or as part of a new road project or other type of development, communities may be faced with proposals to change the alignment of a waterway/channel.



Prior to any alteration or relocation of a waterway, communities must notify adjacent communities and the SC Department of Natural Resources. Copies of the notifications are to be submitted to FEMA. [44 CFR §60.3(c)(6)]

Effective use of planning tools can guide development away from Special Flood Hazard Areas:

- **Conservation Zoning** limits development to certain low-impact activities or requires that undeveloped areas subject to flooding remain undeveloped.
- **Density Zoning** limits the number of units, minimizing impacts on the floodplain as well as reducing potential future damage.
- **Setbacks and Buffers** assign a fixed distance, measured from the waterway, which is usually left in natural vegetation. This is a particularly useful approach along waterways that do not have mapped Special Flood Hazard Areas or designated Floodways.
- **Open space set-asides** require developers to set aside areas for public open space, sometimes for passive recreation such as greenways and bike paths.

You can learn more about best practices to reduce flood damage:

- Download the “No Adverse Impact” toolkit from <http://www.floods.org>
- Click on “Resources” at <http://training.fema.gov/EMIWeb/CRS>

## Cumulative Effects on Floodplains

Upper watershed development and changes in land use can increase runoff and flood flows (see page 4). Development that encroaches into the floodplain can increase flood depths (see page 9).

Future flood damage can be minimized by accounting for these long-term cumulative effects — management tools include:

- **Freeboard** is added to the BFE as a factor of safety. The most common approach is to add 1-foot or 2-feet of freeboard. Not only are buildings elevated higher and better protected, but flood insurance rates will be lower. Freeboard is the least expensive and most effective way to reduce damage.
- **Compensatory Storage** requires detailed engineering analyses to determine whether the effects of obstruction such as fill can adequately be offset (compensated) by excavated storage. Compensatory storage has limited application, usually because of site constraints.

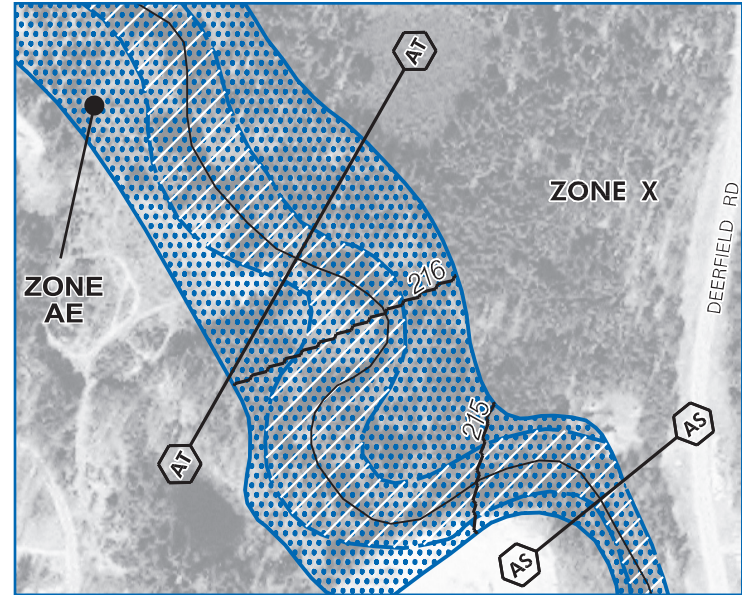
Extra care should be taken when considering how future increases in flooding may affect areas where homes and businesses are already subject to flooding. Requiring freeboard is the most effective way to minimize future risks to new development, redevelopment, and substantial improvement of and additions to existing buildings

## Maintaining Flood Maps: FEMA's Map Modernization

Flood Map Modernization (Map Mod) is the Federal Emergency Management Agency's approach to updating the Nation's flood hazard maps. Map Mod will transform flood maps into a more reliable, easier-to-use, and readily available digital product.

Map Mod intends to:

- Create a premier system to support flood risk management
- Share responsibilities with cooperating partners (states and communities)
- Foster community ownership of the maps
- Improve online access to flood hazard data for floodplain management and mitigation



To learn more about FEMA maps and map revisions, go to <http://www.fema.gov> and search on "map modernization."

## Submitting New Data and Correcting Errors

If a community approves a development proposal that changes the SFHA or BFEs, communities are required to submit (or have the developer submit) information to FEMA not later than six months after the data become available. [44 CFR §65.3]

Communities have the right to submit new technical data, such as community boundary changes (annexations), new roads, and other map details. [44 CFR §65.4]

Anyone can submit data such as topographic maps to revise the SFHA boundaries if there will be no change to the BFEs. [44 CFR §65.5]

Anyone can submit technical analyses and data to correct map errors and errors in flood studies and analyses. [44 CFR §65.6]

The address and instructions for submitting data to FEMA are found in the forms (see page 32).

The following pages briefly summarize how these submissions can be accomplished using FEMA's forms and certifications (signed by qualified design professionals).

## Map Revisions Issued by FEMA

FEMA uses the most accurate information available to make flood maps, including topographic base maps and detailed engineering methods or method of approximation.

FEMA issues map revisions if technical data are submitted to support changes when:

- Small areas of high ground inadvertently are shown as within the SFHA boundaries
- Fill is used to raise a building site or larger area so that the site is higher than the BFE (and the fill is certified as meeting other requirements)
- More detailed topographic maps are provided and result in changes in boundaries
- Detailed hydraulic modeling is submitted to support a proposed change in the floodplain, such as construction of a bridge, culvert, levee or channel change

- **LOMA** and **eLOMA**  
(Letter of Map Amendment)
- **CLOMR** and **LOMR**  
(Conditional and Final Letter of Map Revision)
- **LOMR-F** (Letter of Map Revision Based on Fill)
- **PMR** (Physical Map Revision)

Check online at <http://www.fema.gov/plan/prevent/fhm/> for more information about map revisions for different user groups, including homeowners, surveyors, engineers, and insurance professionals.

## Community Actions Related to Maps

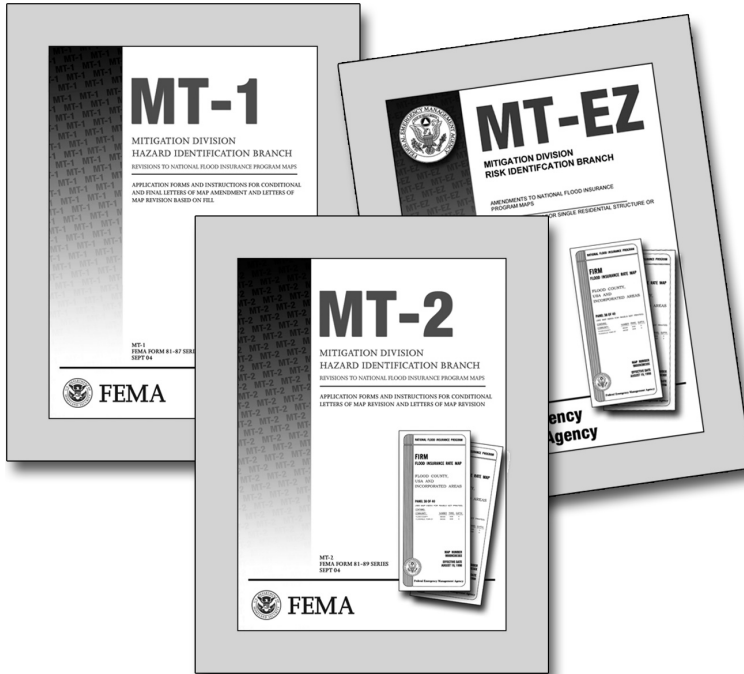
In order to use the most current information, to keep the FIRMs up-to-date, and as part of reviewing development proposals that require floodplain analyses, communities must:

- Process as a variance, any proposal that will result in any increase in BFE or alteration of the Floodway or SHFA boundaries
- Advise applicants submitting CLOMRs that the community's signature on FEMA's acknowledgement form is not an approval or endorsement of the proposal
- Require applicants that have received CLOMRs to submit certified "as-builts" to FEMA within 6 months of project completion in order to receive a final LOMR that changes the FIRM
- Keep copies of Letters of Map Change, especially those that modify BFEs and floodplain boundaries

Depending on the type of map revision, FEMA may publish a public notice and require the community to modify its ordinance for formally adopt the revised FIRM.

The NFIP regulations for "Identification and Mapping of Special Flood Hazard Areas" (including revisions) are found at 44 CFR Part 65.

## Forms to Submit Map Revisions

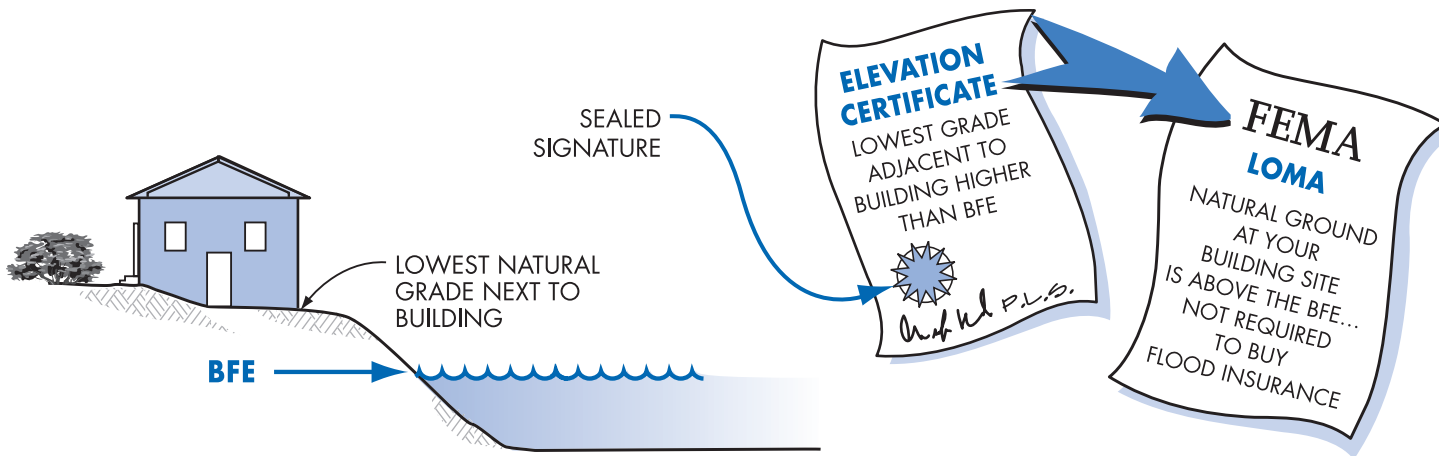


- **MT-EZ:** Application form for simple Letters of Map Amendment (LOMAs)
- **MT-1:** Application forms for Conditional and final LOMAs and Letters of Map Revision Based on Fill (CLOMR-Fs and LOMR-Fs)
- **MT-2:** Application forms for Conditional Letters of Map Revision (CLOMR) and Letters of Map Revision (LOMR), and Physical Map Revision (PMR) requests

To download these forms, go to <http://www.fema.gov/library>, click on "Search by Resource Title," and search on "MT-EZ," "MT-1" and "MT-2".

## Letter of Map Amendment – Single Lot

**Letter of Map Amendment (LOMA)** is an official amendment to an effective FIRM that may be issued when a property owner provides additional technical information from a surveyor, such as natural ground elevation relative to the Base Flood Elevation. Lenders may waive the flood insurance requirement if the LOMA documents indicate that a building is on natural ground above the mapped flood elevation.



Refer to the MT-EZ package to learn more about the data required and how to submit the information to obtain a LOMA. Some LOMAs can be submitted online (see next page).

**Electronic Letter of Map Amendment (eLOMA)** is a web-based application that allows submission of simple, single residential structures or properties, provided no fill has been placed to raise the site or the building. Professional land surveyors and professional engineers who are licensed by the State of South Carolina to perform land surveys can create an account by completing the “Request for MIP eLOMA Access” available on FEMA’s Map Information Platform at <http://hazards.fema.gov>.

The eLOMA tool makes a determination based on certified data and creates the eLOMA document within minutes. Once registered, surveyors and engineers can submit eLOMAs by entering and certifying property-specific information, including:

- Property identification
- Surveyed Lowest Lot Elevation (LLE)
- Surveyed Lowest Adjacent Grade (LAG)
- BFE data from the FIS and FIRM

A fee is not charged to process eLOMAs.

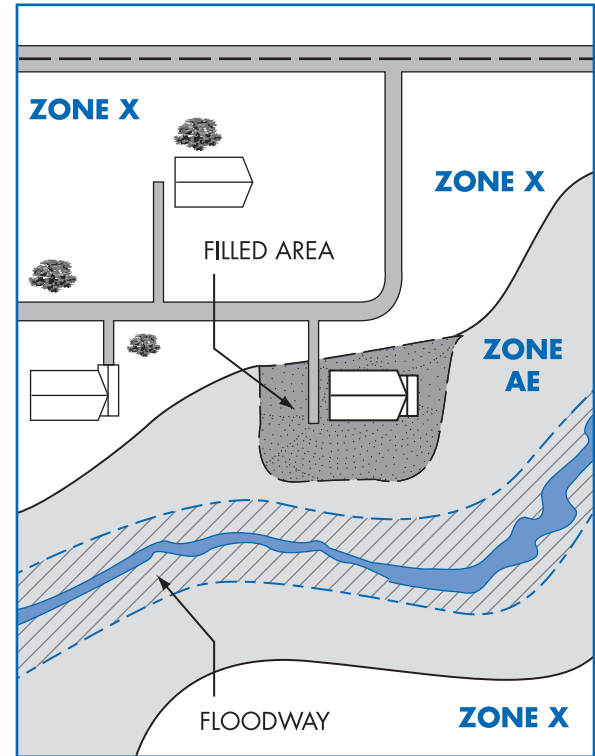
The eLOMA process does not replace the traditional LOMA processing for other situations (see following pages).

## LOMR-Fill – Single Lot

Letter of Map Revision Based on Fill (LOMR-F) is an official revision to an effective FIRM that is issued to document FEMA's determination that a structure or parcel of land is no longer in the SFHA because it has been elevated by fill. Lenders may waive the insurance requirement if the LOMR-F shows that a building on fill is above the BFE.

The following are to be submitted with a completed MT-1 application:

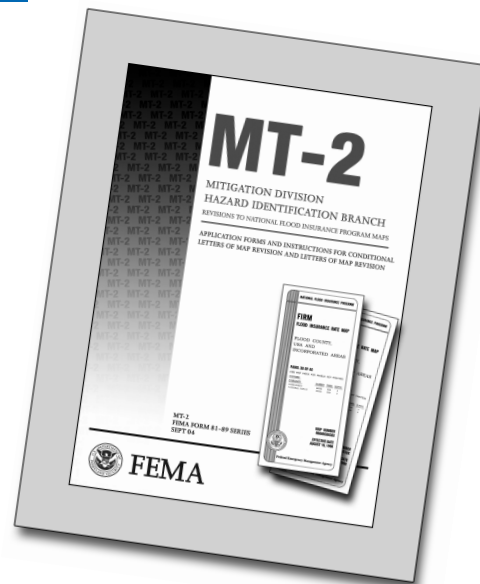
- Copy of a recorded Plat Map, or a copy of the recorded deed and a copy of the local tax assessor's map of the neighborhood
- Certified Elevation Information Form or a topographic map showing existing ground elevations and the date the fill was placed
- Signed community acknowledgement of fill placement form, which provides written assurance by the participating community that the applicant has complied with the appropriate floodplain management requirements (see page 18)



## Letter of Map Revision

**Conditional Letter of Map Revision (CLOMR)** is a letter from FEMA commenting on whether a proposed project, if built as shown on submitted documentation, would meet the standards for a map revision. Communities may require this evidence prior to issuing a permit; such permits should require the submission of the final LOMR based on as-built documentation and certification.

**Letter of Map Revision (LOMR)** is an official revision to an effective FIRM that may be issued to change flood insurance risk zones, floodplain and floodway boundary delineations, BFEs, and/or other map features. Lenders may waive the insurance requirement if the approved map revision shows buildings to be outside of the SFHA



The requester is responsible for preparing and certifying the CLOMR/LOMR submission according to the instructions in MT-2. Based on that material, the community official is to sign the request to indicate an understanding of the impacts of the revision on flood conditions. If the community disagrees with the revision, a signed statement of explanation is to be attached to the request.

## Physical Map Revision

**Physical Map Revisions (PMRs)** are issued when the scope of changes justify republication of the Flood Insurance Rate Map. PMRs may be issued for major floodplain changes that require engineering analyses, such as bridges, culverts, channel changes, levees, floodwalls, and large fills that change the BFE or Floodway and SFHA boundaries. If a new study indicates that physical changes in watershed development has increased flood discharges, FEMA may republish the FIRM using new BFEs and Floodway and SFHA boundaries.

PMR submissions are to be prepared and certified according to the instructions in MT-2. The certification statement must be signed by professional land surveyor or professional engineer who is licensed by the State of South Carolina. It is evidence that the data and methodologies used to evaluate the proposed project or change to the FIRM meet FEMA's standards.

As with CLOMRs, the community official is to sign the PMR request to indicate an understanding of the impacts on flood conditions. If the community disagrees with the revision, a signed statement of explanation is to be attached to the request.

If FEMA issues a FIRM revision, a notice will be published in the local newspaper to provide a period of public comment. The community will be required to adopt the revised FIRM, and modification of the floodplain management ordinance may be necessary.

FEMA charges fees to process CLOMRs and PMRs.

The eLOMA process does not replace the traditional LOMA processing for other situations (see following pages).

## FIS Data Requests

FEMA's External Data Request procedures require that requestors print out and mail or FAX request forms to the Project Library (repository of Flood Insurance Studies and backup data and models). Download the forms and learn more at <http://www.fema.gov/plan/prevent/fhm/>. A fee is charged for processing data requests for the following:

- Hydrologic and hydraulic data (paper copies, diskettes, microfiche)
- Topographic maps developed for the FIS (paper or Mylar)
- Survey notes (paper copies or microfiche)
- Letters of Map Change (paper copies)
- Preliminary map panels (paper copies)
- Digital FIRM or Digital Line Graph files (CD-ROM)

For questions about data requests, contact the Map Assistance Center at [FEMAMapSpecialist@mapmodteam.com](mailto:FEMAMapSpecialist@mapmodteam.com) or by calling 1-877-336-2627.

## Federal and State Development: EO 11988

The President's Executive Order 11988 requires Federal agencies to avoid, to the extent possible, long and short-term adverse impacts associated with the occupying and modifying floodplains. Where there are practical alternatives, agencies are to avoid investment and support of floodplain development that may result from:

- Acquiring, constructing, managing, and disposing of federal lands and facilities
- Providing federal funding for construction and improvements (including transportation projects)
- Conducting federal activities and programs affecting land use, including but not limited to water and related land resources planning, regulation, and licensing

EO 11988 implementation guidelines outline an eight-step process for Federal agencies to undertake as part of decision-making on projects that have potential impacts to or within the floodplain. Importantly, practical alternatives must be identified and evaluated, including undertaking activities on sites outside of the floodplain. Unavoidable impacts must be minimized and mitigated. Learn more at

<http://www.fema.gov/plan/ehp/ehplaws/eo11988.shtm>.

Every Federal agency that provides funding for State and local projects has EO 11988 guidelines, including the Department of Housing and Urban Development, Department of Transportation, Department of Agriculture, and the Small Business Administration.

## Resources

Find FEMA publications online at the Information Resource Library at <http://www.fema.gov/library>. You can search by publication name or number, or by key words. Publications referenced in this [Quick Guide](#) and others of interest include:

- FEMA 265: Managing Development in Approximate A Zone Areas: A Guide for Obtaining and Developing Base (100-Year) Flood Elevations.
- NFIP Technical Bulletins (guidance on specific aspects of floodplain development)
- NFIP Regulations: 44 CFR §59.22 and Part 60 (Subpart A)
- Map Revision Forms: MT-EZ, MT-1 and MT-2
- Map Revision Fee Schedule
- FEMA 467-1: Bulletin on the Elevation Certificate
- FEMA 81-31: Elevation Certificate
- F-056: Floodproofing Certificate
- NFIP Flood Insurance: <http://www.floodsmart.gov>
- Frequently Asked Questions: <http://www.fema.gov>