TN Department of Military | TEMA

Patrick C. Sheehan
Director

Major General
Jeffrey H. Holmes
The Adjutant General

January 25, 2022

Dear prospective Certified Floodplain Surveyor Training Workshop registrant:

On behalf of the Certified Floodplain Surveyor (CFS) Certification Program's presenters, we look forward to meeting you at the 2022 CFS Training Workshop, which will be held from 8:00 AM – 4:30 PM each day from Wednesday, March 2, 2022 to Friday, March 4, 2022 at the Tennessee Embassy Suites, 1200 Conference Drive, Murfreesboro, TN, in room Cambridge A. This will be immediately followed by the four-hour certification exam from 8:30 AM to 12:30 PM on Saturday March 5, 2022 at the same location.

The main benefit of the CFS program to a surveyor is to equip each participant with a greater understanding of NFIP regulations, reduction of errors within the FEMA Letter of Map Changes (LOMCs) and improved service to property owners and floodplain administrators. Consequently, most surveyors who have earned their CFS certification have come to realize that the real value of these CFS workshops comes from the training itself and open discussions of lessons learned in the field.

Please be advised that the three-day CFS Training Workshop covers an immense amount of information in a limited time. Thus, the course will be taught as if each attendee already has a basic understanding of FEMA's National Flood Insurance Program (NFIP) and their two main methods of presenting flood hazard information: Flood Insurance Study (FIS) reports and Flood Insurance Rate Maps (FIRMs). In order to facilitate your preparation for the class, we have compiled the attached study guide.

In order to ensure that each attendee has prepared himself/herself for the class, each registrant is encouraged to review the materials for preparation of the CFM exam.

Thank you.

Respectfully,

Amy J. Miller

Amy J. Miller, CFM
State NFIP Coordinator

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C F S S t u d y G u i d e 2 0 2 2

1. *Introduction to Tennessee Certified Floodplain Surveyor Training* (attached)

2. How to read a Flood Insurance Rate Map (FIRM) Tutorial:
   https://www.floodmaps.fema.gov/tutorials/ot_firm.swf (For those with a flash player)
   https://www.fema.gov/sites/default/files/2020-07/how-to-read-flood-insurance-rate-map-tutorial.txt (Text equivalent)

3. Understanding a Flood Insurance Study (FIS) Tutorial:
   https://www.floodmaps.fema.gov/tutorials/ot_fis.swf
   https://www.fema.gov/sites/default/files/2020-07/how-to-read-flood-insurance-study-tutorial.txt

4. The following NFIP regulations under 44 CFR
   (http://www.fema.gov/pdf/floodplain/nfip_sg_appendix_e.pdf):

Citation	Pages	Title
§ 59.1	E-1 – E-9	Definitions
§ 60.3	E-16 – E-21	Flood plain management criteria for flood-prone areas
§ 65.1 – .17	E-29 – E-43	IDENTIFICATION AND MAPPING OF SPECIAL HAZARD AREAS

Although the pre-test will not cover the recent NFIP reform legislation, the Home Insurance Affordability Act (HIAA), it would be advisable to understand the basics:

5. NFIP reform legislation:
   a. Risk Rating 2.0, Equity in Action, Fact Sheet

      https://www.fema.gov/sites/default/files/documents/fema_rr-2.0-equity-action_0.pdf

   b. Tennessee Risk Rating 2.0 Fact Sheet

      https://www.fema.gov/sites/default/files/documents/fema_tennessee-state-profile_03-2021.pdf

   c. How April 2015 Program Changes Will Affect Flood Insurance Premiums

      https://www.grandforksgov.com/home/showpublisheddocument?id=8716

Introduction to Tennessee Certified Floodplain Surveyor Training

Introduction to TN CFS Training

- Tennessee Certified Floodplain Surveyor (CFS) Pilot Program is a joint effort between:
  - Federal Emergency Management Agency (FEMA)
  - American Congress on Surveying and Mapping (ACSM)
  - Tennessee Association of Professional Surveyors (TAPS)
  - Tennessee Emergency Management Agency (TEMA)
  - National Society of Professional Surveyors (NSPS)

Introduction to TN CFS Training

- Goal of the CFS Program:
  - Provide training to TN surveyors to enable them to submit FEMA elevation certificates to local communities and Letters of Map Change (LOMCs) requests to FEMA in a complete and proper format.

What is a CFS?

- Any licensed Land Surveyor who has successfully completed CFS training courses and passed a final exam
- Can process “simple” Letters of Map Change (LOMCs) and submit these to FEMA with greater accuracy.

Who is Qualified for CFS?

- Professional Surveyors Licensed in the State Where Certification is Offered
- What is Criteria to Obtain CFS?
  - Any licensed Land Surveyor who has successfully completed CFS training courses and passed a final exam
  - Attend Training Sessions (2 ½ Days)
  - Pass Examination
    - Multiple Choice, 125 Questions
    - 4 Hours, 2 Parts
    - Must receive 75% on Part I and 85% on Part II
  - Fail Either = FAILURE
  - Must be re-examined for entire exam

Why Did This CFS Pilot Program Start?

- The State of Tennessee is a Cooperating Technical Partner (CTP), as designated by FEMA:
  - Tennessee is delegated with collaborating on flood hazard identification activities and maintains accurate flood hazard data.

Why Did This CFS Pilot Program Start?

- Tennessee began a partnership with FEMA for map creation within the State:
  - One step is establishment of statewide program to acquire, process, and disseminate current, accurate, and detailed elevation data, flood hazard studies, and digital FIRMs

Why Did This CFS Pilot Program Start?

- FEMA is interested in working with its Cooperative Technical Partners in map creation. This will facilitate digital FIRM updates and to direct limited resources to other priorities

TN CFS Pilot Program

- CFS Pilot Program may become permanent in Tennessee, and possibly elsewhere, if it proves successful

Expectations

- You must be present for all training courses, quizzes, and labs to get credit for the course
- You must not be more than 15 minutes late for a training course
- You must be on time for the exam
- Exam passing grade
  - 75% for Part I
  - 85% for Part II

NFIP Overview

This Course Will …

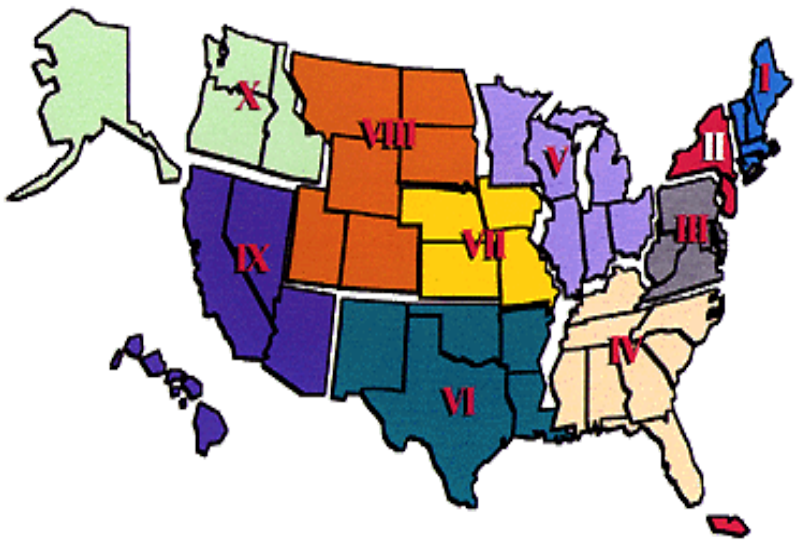
- Explain Certified Floodplain Surveyor (CFS) certification process
- Provide NFIP background information
- Cover commonly used terminology
- Discuss different types of NFIP maps
- Detail differences between map actions vs. letter actions
- Detail differences between various types of letter actions
- Provide background on eLOMA

FEMA

- Part of the Department of Homeland Security
- Functionally organized to mirror life-cycle of emergency management

FEMA

- NFIP is administered by FEMA's Federal Insurance and Mitigation Administration
- Headquartered in Washington, D.C.
- Divided into 10 regional offices



FEMA's Mission

- To support our citizens and first responders to ensure that as a nation we work together to build, sustain, and improve our capability to prepare for, protect against, respond to, recover from, and mitigate all hazards.

Purposes of the NFIP

- Identify and map flood hazard areas
- Provide a framework for floodplain management regulations
- Make flood insurance available in communities that participate in the NFIP

NFIP

- 22,404 participating communities
- 4.8 million in flood insurance policies (2022) for a coverage of $1.29 Trillion
- As of January 11, 2022, since 1978, over $73 billion
- FEMA has mapped more than 100 million acres of flood hazard areas and designated approximately 5 million acres of floodway.

NFIP Background

- Prior to the creation of the NFIP:
  - Flood insurance coverage was not available
  - No national flood mapping program
  - No Federal minimum standards for floodplain management
  - Escalating costs to taxpayers for flood disaster relief

NFIP Goals

- Reduce loss of life and property
- Reduce rising disaster relief costs
- Increase importance of hazard mitigation (flood resistant construction, guide future development, and prohibit development in floodplains that would increase flood levels)
- Restore and protect natural resources and functions of floodplains
- Decrease taxpayer-funded disaster costs
- Make Federally backed insurance coverage available to property owners

Floodplain Management Principles

- Federal government has fundamental interest in floodplain management, but regulating floodplain use lies with State and local authorities
- Floodplain must be considered in context of total community, regional, and national planning and management

Floodplain Management Principles

- Floodplains can be managed to achieve acceptable levels of natural resource protection values and reduction of flood loss potential

Floodplain Management Principles

- Sound floodplain management requires:
  - Setting goals and objectives
  - Sharing decision making across governments
  - Mitigating against flood damages
  - Establishing incentives and disincentives
  - Sustaining a coordination process
  - Evaluating continuously

Community Participation in the NFIP

- To join NFIP, communities must submit:
  - Resolution of intent to "maintain in force…adequate land use and control measures" and to cooperate with FEMA
  - Its adopted floodplain management regulations (often are referenced within zoning ordinances, building codes, subdivision ordinances, sanitary ordinances, or floodplain ordinances)

Role of NFIP Participating Community

- Issuing or denying floodplain development and/or building permits
- Inspecting all development to ensure compliance with local ordinances
- Maintaining records of floodplain development
- Assisting in preparation and revision of floodplain maps
- Helping residents obtain information on flood hazards, floodplain map data, flood insurance, and proper construction measures

Sanctions for Non-Participation

- No Federal grants or loans for development in Special Flood Hazard Areas (SFHAs) under Federal programs
- No Federal disaster assistance to repair insurable buildings located in SFHAs
- No Federal mortgage insurance or loan guarantees in SFHAs
- Federally insured or regulated lenders must notify applicants seeking loans in SFHAs that:
  - There is a flood hazard
  - The property is not eligible for Federal disaster relief

Key Legislation

National Flood Insurance Act of 1968

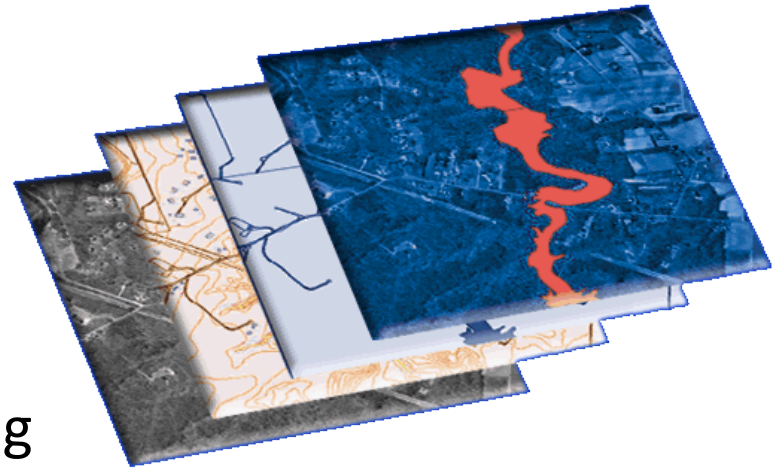
- Established NFIP
- Required mapping of floodprone areas (SFHAs)
- Made flood insurance available in communities that meet floodplain management criteria

Flood Disaster Protection Act of 1973

- Represented significant expansion of provisions and national impact of NFIP
- Required acceleration of Flood Insurance Studies
- Required notification to communities of floodprone identification
- Created mandatory flood insurance purchase requirement relative to Federally backed loans
- Required participation in NFIP as condition for most types of Federal financial assistance

National Flood Insurance Reform Act of 1994

- Strengthened flood insurance requirements, particularly regarding secondary mortgage market
- Required that community's NFIP maps be reviewed and assessed for map update needs every 5 years
- Established Technical Mapping Advisory Council (from 1995 – 2000)



National Flood Insurance Reform Act of 1994

- Created penalties for lender non-compliance
- Created Increased Cost of Compliance coverage (to bring damaged structures up to compliance standards)
- Increased flood insurance coverage limits
- Created Flood Mitigation Assistance (FMA) Program

Tennessee State Law

Floodplain Management

- The provisions of this Part shall not preclude the imposition by responsible local governments of land use controls and other regulations in the interest of floodplain management for the 100- and 500-year floodplain
- Enabling law that allows local communities to regulate floodplains in the state

Tennessee State Law

- TCA § 13-7-101 through 13-7-115 County zoning.
- TCA § 13-7-201 through 13-7-210 Municipal zoning.
- TCA § 6-2-201 Mayor-Aldermanic Charter.
- TCA § 6-19-101 Manager-Commission Charter.
- TCA § 6-33-101 Modified Manager-Council Charter.
- Private Act.
- TCA § 6-58-117 FIRM or FHBM requirement to participate by June 30, 2012. Future FIRMs the community has 24 months to join the NFIP.
- TCA § 13-7-114 Construction of agricultural buildings in a county in the SFHA must be built at the BFE.

NFIP Regulations

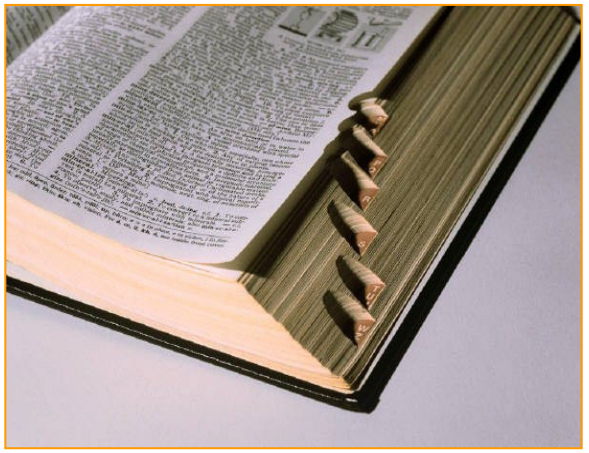
NFIP Regulations

- Communities must adopt and enforce ordinances that meet or exceed NFIP criteria
- NFIP criteria ensures that new buildings will be protected from flood levels shown on digital FIRM
- Over time, stock of pre-FIRM buildings should be replaced with post-FIRM buildings and risk to flooding reduced

NFIP Regulations will be covered separately

Importance of Regulations

- Describe the Program
- Define the terms used to run the Program
- Provide minimum floodplain management criteria for communities to adopt and enforce
- Provide technical criteria and requirements for revising and amending flood hazard areas on maps
- Codify fees charged for reviewing requests for possible map changes



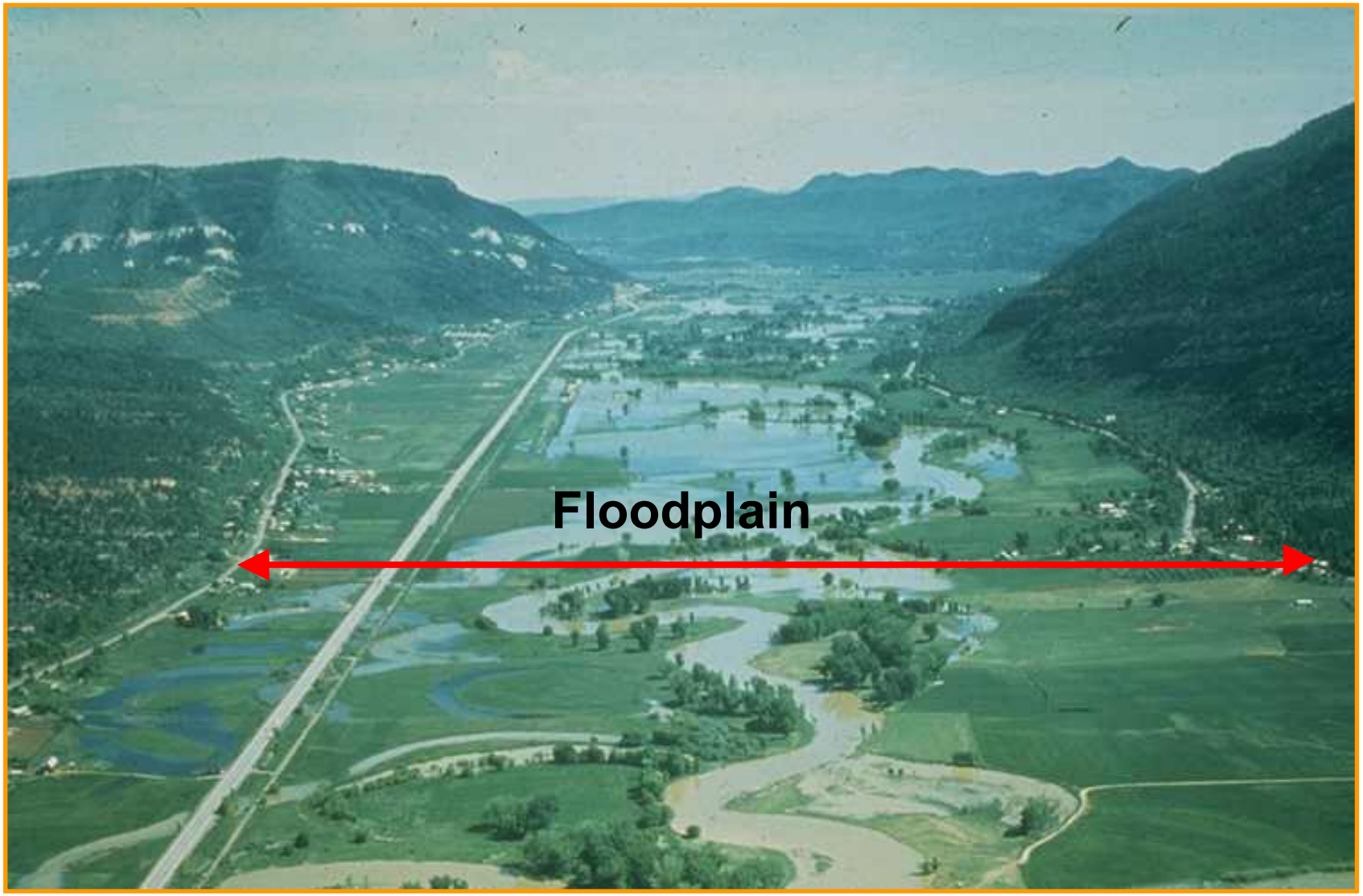
Organization of NFIP Regulations

- NFIP Regulations are contained in Parts 59 through 77 of Title 44 of the Code of Federal Regulations (CFR), under Emergency Management and Assistance
- This training will focus on Parts 59, 60, 65, 67, 70, and 72 during Course 3: NFIP Regulations

Definitions and Acronyms

Definitions

- A “flood” is defined by the NFIP as “a temporary condition of partial or complete inundation of normally dry land areas from:
  - Overflow of inland or tidal waters or
  - Unusual or rapid accumulation or runoff of surface waters from any source”



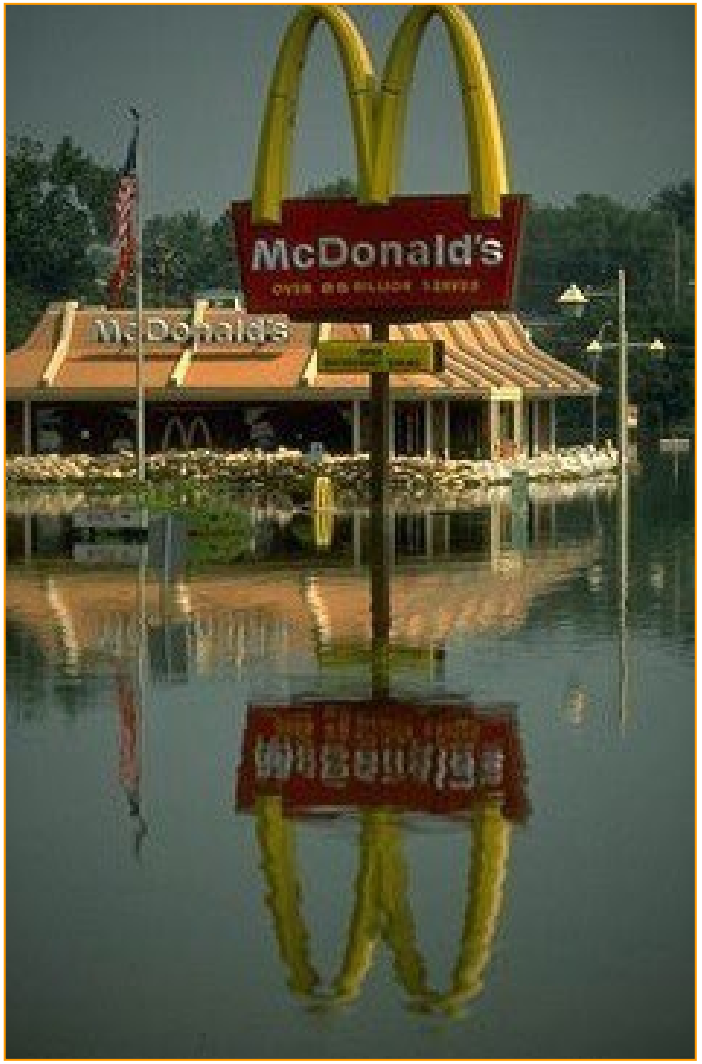
Any land area susceptible to inundation by water from any source

Definition of SFHA

- Shaded area on a digital FIRM which identifies the area that has a 1% annual chance of being flooded in any given year. The digital FIRM identifies these shaded areas as flood zones A, AO, AH, AE, A99, V, and VE.

Base Flood

- A flood that has a 1% annual chance of being equaled or exceeded in any given year
- Formerly referred to as the "100-year" flood



Floodway

- Channel of stream plus any adjacent floodplain areas that must be kept free of encroachment so that 1% annual chance flood discharge can be conveyed without increasing elevation of 1% annual chance flood by more than specified amount (1 foot in most States)

Non-Encroachment Area

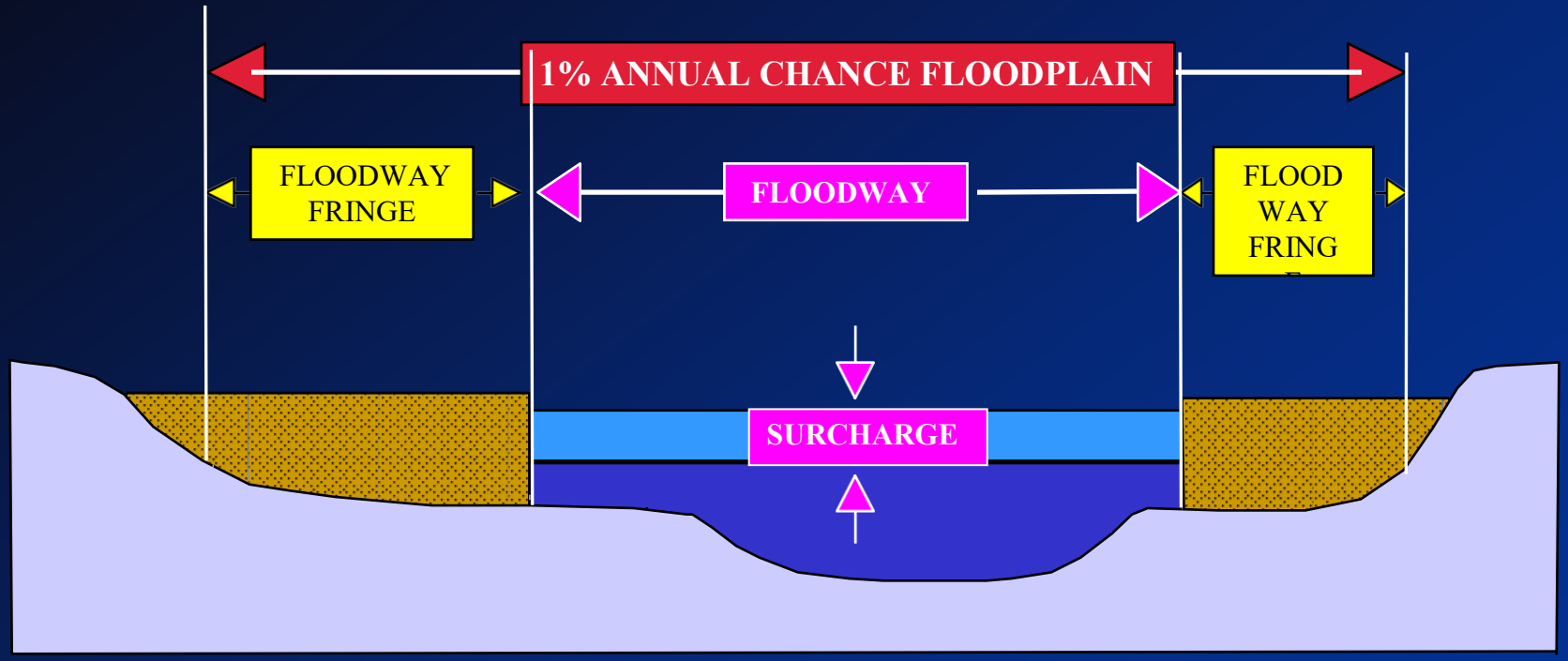
- The channel of a river or other watercourse and the adjacent land areas that must be reserved in order to discharge the base flood without cumulatively increasing the water surface elevation more than a designated height

44 CFR and local ordinance definition

Potential Violation

- May occur with any re-channelization of a stream or development in the floodway, without first obtaining a no-rise certification or Conditional Letter of Map Revision (CLOMR)
- May include a project (bridges, culverts, grading, fill placement) within the floodway

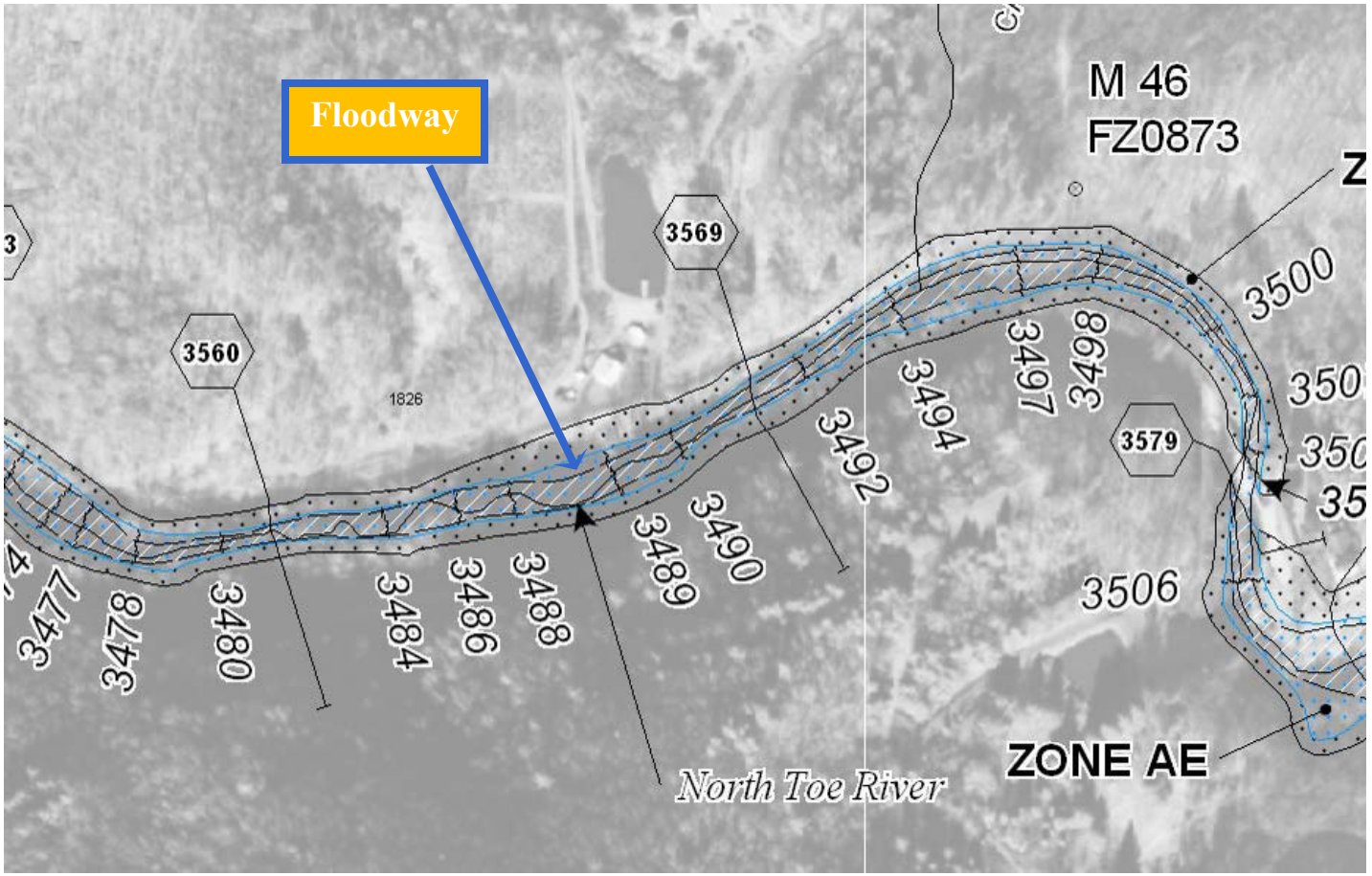
Floodway Schematic



FLOODWAY + FLOODWAY FRINGE = 1% ANNUAL CHANCE FLOODPLAIN
SURCHARGE NOT TO EXCEED 1.0 FEET

Non-encroachment areas are to be regulated equivalently to floodways.

Depiction of a Floodway on the Digital FIRM



Definitions and Acronyms

- Base Flood Elevation (BFE):
  - Elevation associated with base flood (1% annual chance), shown on digital FIRM, and rounded to nearest whole foot
- Base Map:
  - Depicts cultural features (roads, bridges, dams, etc.), drainage features, and corporate limits

Definitions and Acronyms

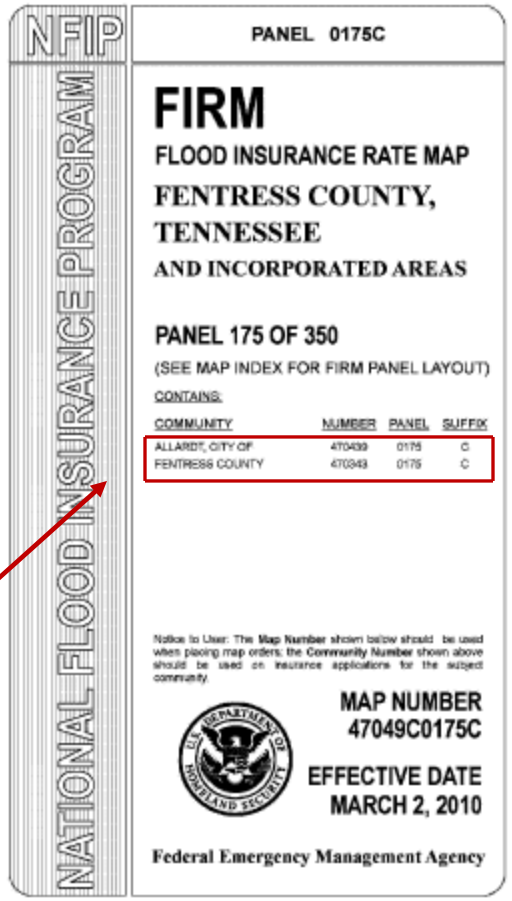
- Coastal Barrier Resource System (CBRS):
  - Units of land consisting of undeveloped coastal barriers and other areas located on the coast of the U.S. that were initially identified under the Coastal Barrier Resources Act of 1982, and later amended by the 1990 Act; flood insurance is not available for structures built after coastal barrier was identified

Definitions and Acronyms

- Coastal High Hazard Area:
  - Subject to coastal wave action hazards most often associated with hurricanes and northeasters; are designated on digital FIRM as Zones V or VE
- Code of Federal Regulations (CFR):
  - Codification of general and permanent rules published in Federal Register by Executive Departments and Federal Agencies

Definitions and Acronyms

- Community Identification Number (CID):
  - Unique 6-digit identification number assigned to each community by FEMA; shown on FIS report and digital FIRM
  - Refer to FEMA's Community Status Book for CID numbers and Map Index dates



Definitions and Acronyms

- Cross Section:
  - Surveyed line developed from topographic information, spanning across floodplain at which computations of flood flow have been made to establish base flood elevations
  - Shown on digital FIRM and Flood Profiles in Flood Insurance Study (FIS) report

Definitions and Acronyms

- Digital Flood Insurance Rate Map (DFIRM):
  - Depicts 1% and 0.2% annual chance floodplains, floodways, BFEs, and zones
  - Includes Flood Hazard Data Table for streams with a floodway
  - Many Zone A areas are updated with Limited Detailed Study
  - Enables insurance agents to issue accurate flood insurance policies to NFIP participating communities

Definitions and Acronyms

- Effective Map:
  - Current NFIP map issued by FEMA that is official as of “EFFECTIVE DATE” or “MAP REVISED” date shown on map Title Block
- Encroachment:
  - Construction, placement of fill, or similar alteration of topography in floodplain that reduces area available to convey flood discharge

Definitions and Acronyms

- Letter of Map Amendment (LOMA):
  - Official determination that a specified structure or property is not within 1% annual chance floodplain
  - Amends effective digital FIRM
  - Removes Federal requirement for mandatory flood insurance

Definitions and Acronyms

- Letter of Map Revision (LOMR):
  - Letter that revises BFEs, flood hazard zones, floodplain boundaries, non-encroachment areas, or floodways as shown on effective digital FIRM
  - A similar action that proposes the above changes is known as a conditional LOMR, or CLOMR.

Definitions and Acronyms

- Map Repository:
  - Location within community for storage of reference copies of FIS report and digital FIRMs
- National Flood Insurance Program (NFIP):
  - Federal regulatory program under which floodprone areas are identified and flood insurance is made available to property owners of participating communities

Definitions and Acronyms

- Preliminary:
  - FIS report and digital FIRMs issued to community for review and comment
- V Zone:
  - Coastal high hazard area

Definitions and Acronyms

- Water-Surface Elevation:
  - Height, in relation to National Geodetic Vertical Datum (NGVD) of 1929 or North American Vertical Datum (NAVD) of 1988, of floods of various magnitudes and frequencies in identified coastal or riverine floodplains areas

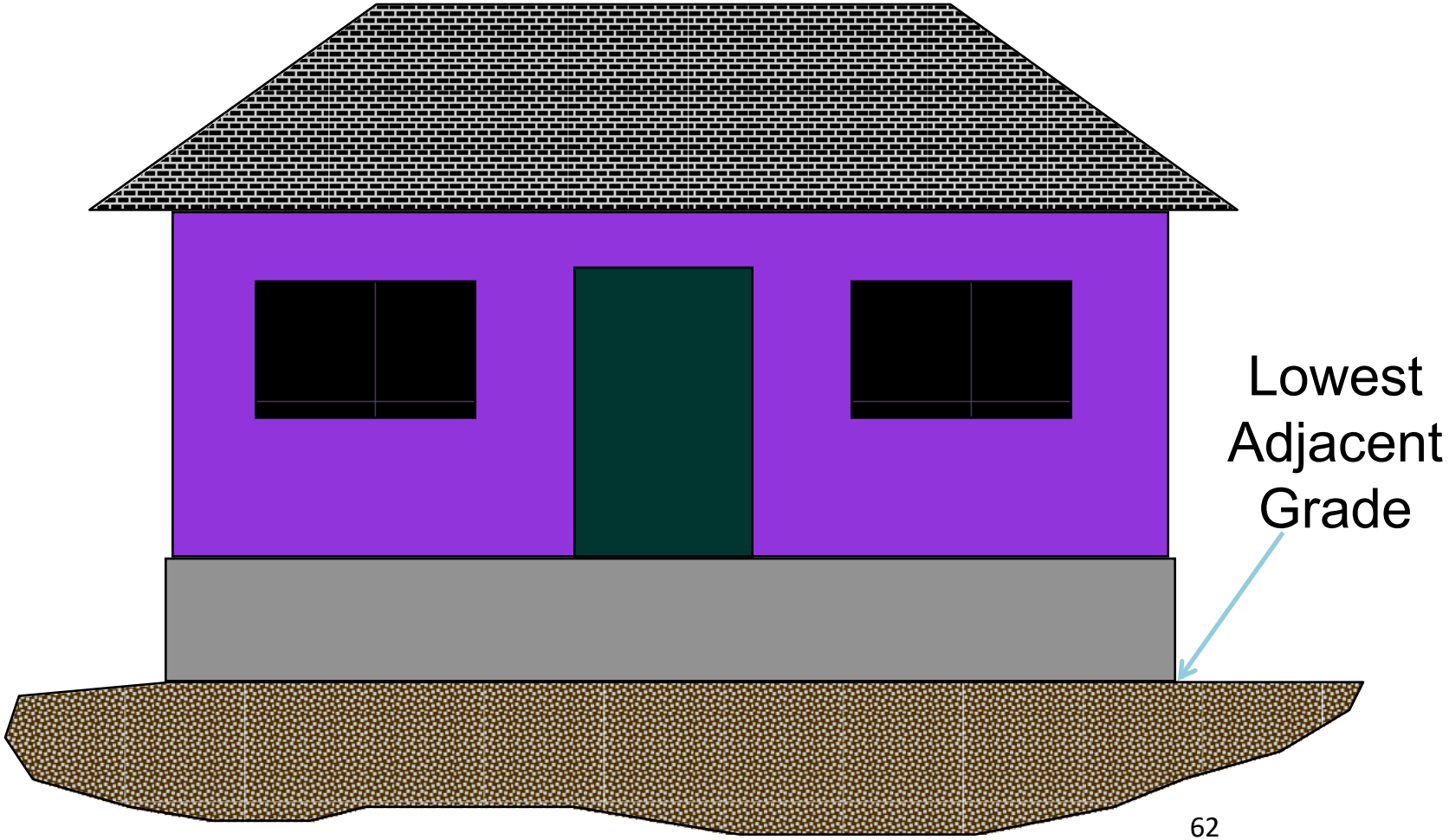
Lowest Adjacent Grade

- Elevation of ground, sidewalk, patio, or deck support immediately next to building
- Lowest ground elevation touching structure or supporting members of structure

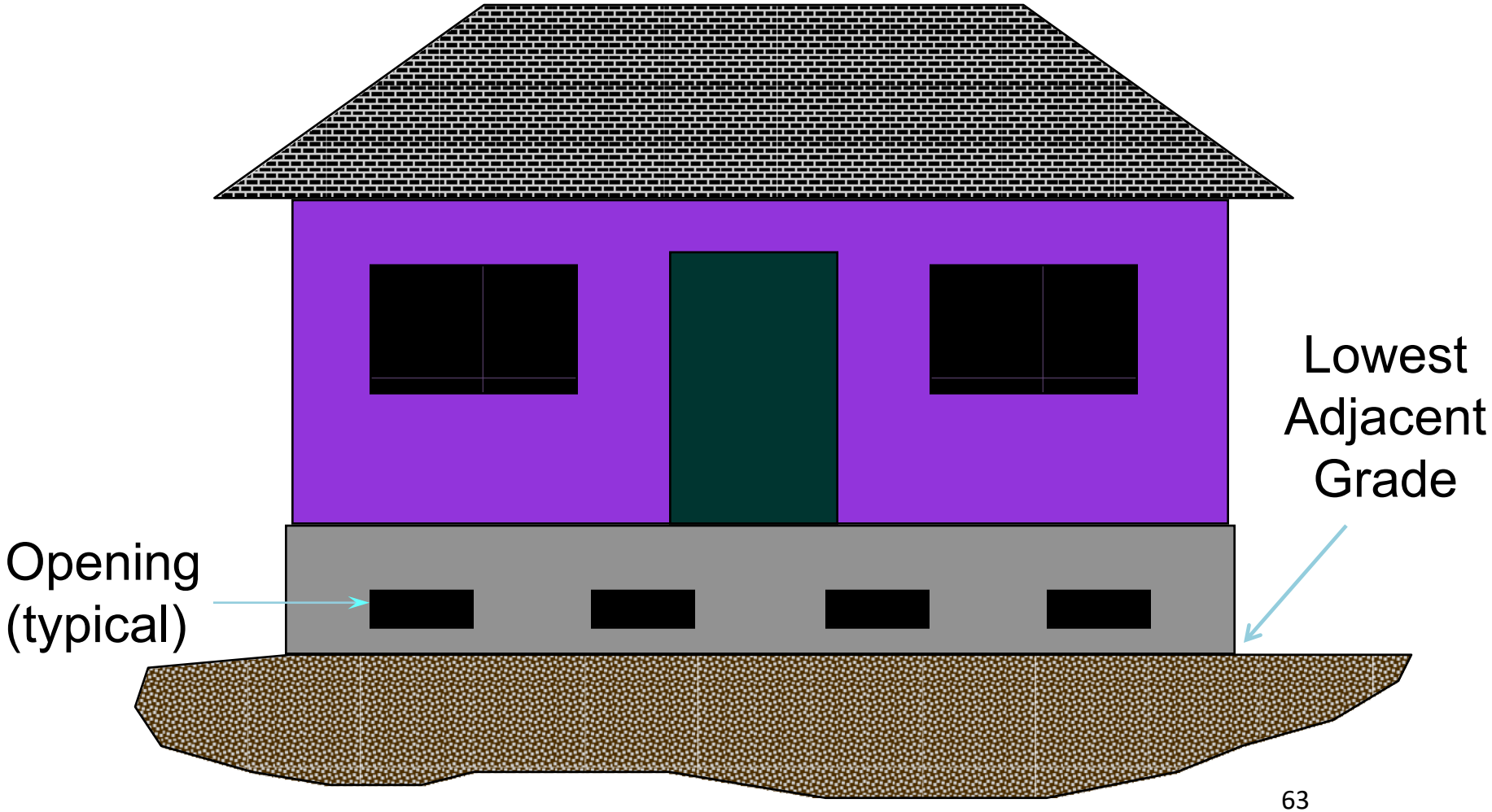
For LOMA submittals, must be certified to nearest tenth of a foot

Lowest Adjacent Grade

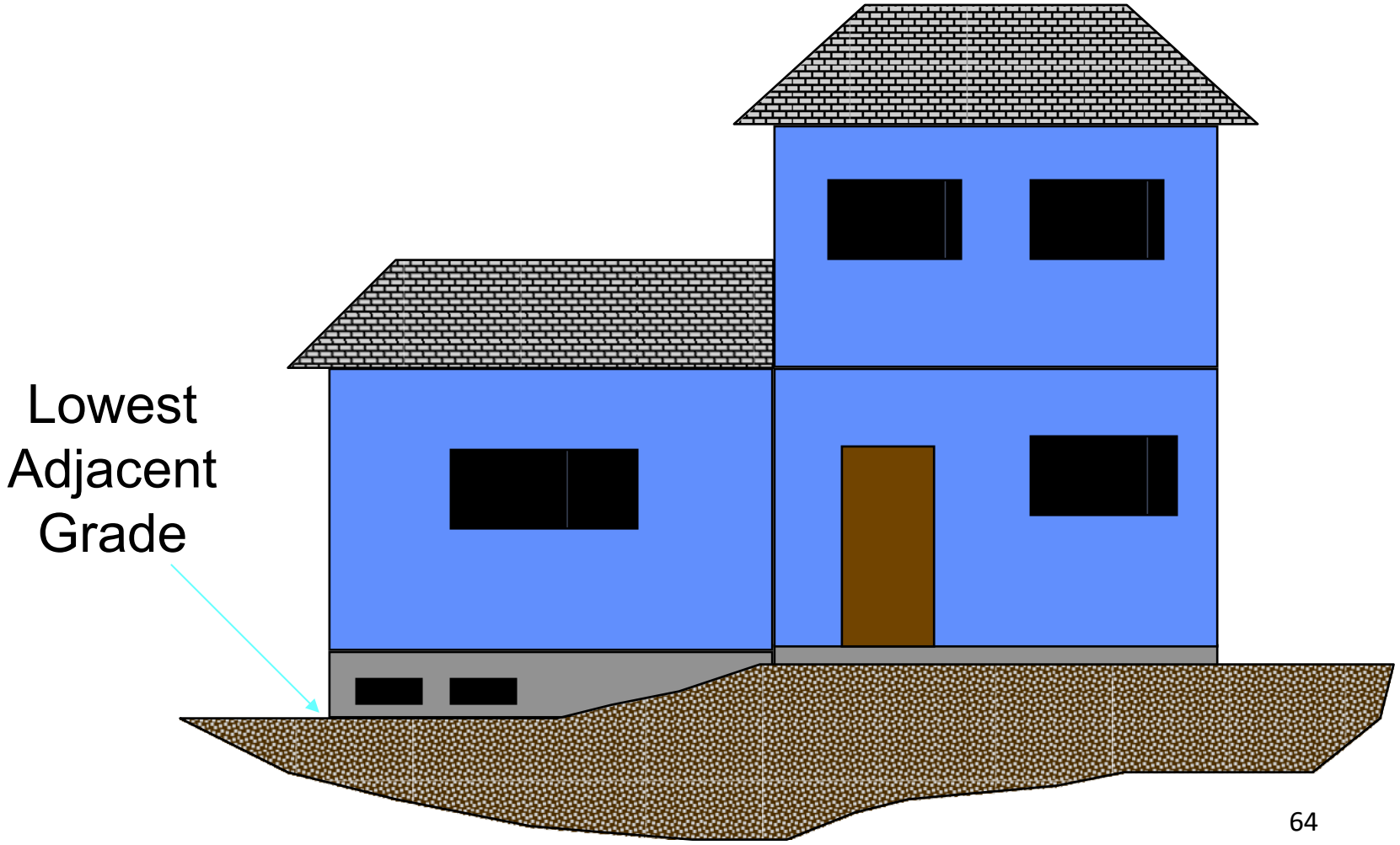
Crawl-space foundation without venting



Lowest Adjacent Grade – Building with Crawl-Space Foundation



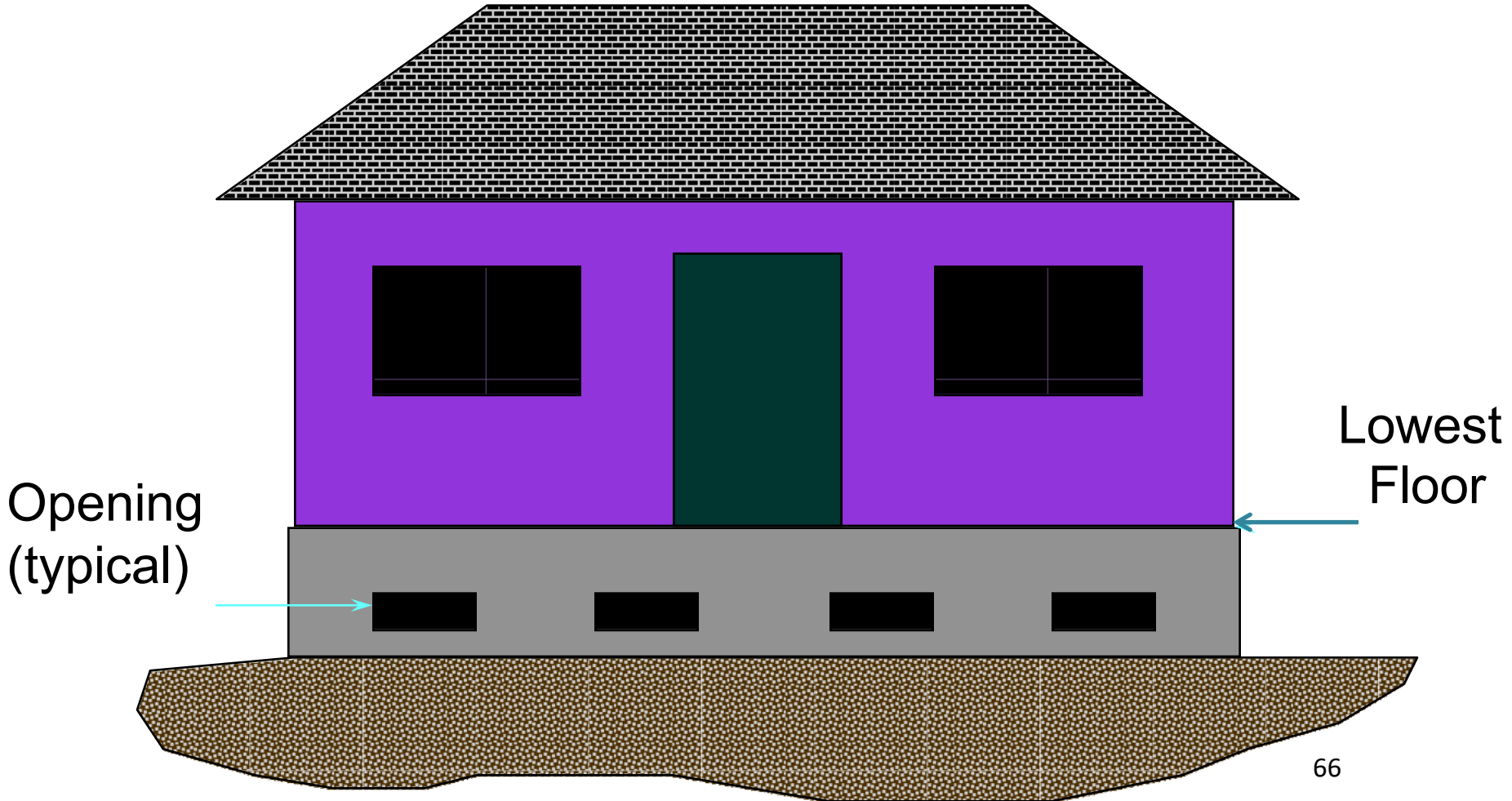
Lowest Adjacent Grade- Split Level Building



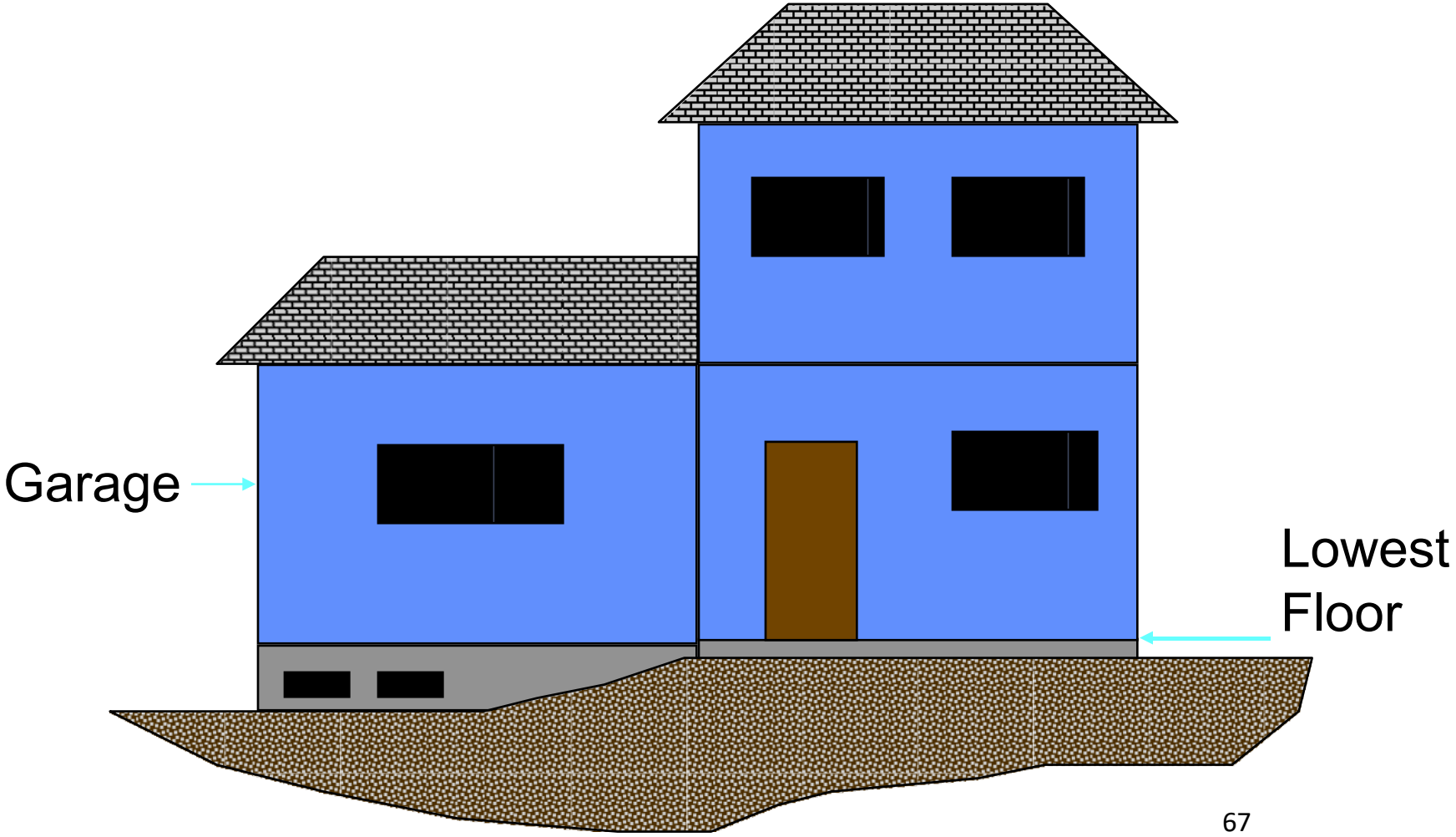
Definition of Lowest Floor

- Lowest floor of lowest enclosed area, including basement
- Unfinished or flood-resistant enclosures, used solely for parking of vehicles, building access, or storage in areas other than basements are not considered lowest floors
  - PROVIDED that such enclosures are not built to render structure to be in violation of applicable non-elevation design requirements of a community's ordinance

Lowest Floor Elevations
Crawl-Space Foundation



Lowest Floor Elevations- Split Level Building



Lowest Floor Elevations- Basement Foundation

Flood Zone Designations

A	Areas of 1% annual chance flood determined by approximate methods; base flood elevations not determined
AE	SFHAs inundated by 1% annual chance flood; base flood elevations are shown
AH	Areas of 1% annual chance shallow flooding (usually ponding) where average depths are between 1 and 3 feet; whole-foot base flood elevations are shown
AO	Areas of 1% annual chance shallow flooding where average depths are between 1 and 3 feet (usually sheet flow on sloping terrain); average whole-foot depths are shown

Flood Zone Designations

AR	SFHAs that result from decertification of previously accredited flood protection system that is in process of being restored to provide 1% annual chance or greater level of flood protection. After restoration is complete, these areas will still experience residual flooding from other flooding sources
A99	SFHAs inundated by 1% annual chance flood to be protected from 1% annual chance flood by a Federal flood protection system under construction; no base flood elevations are determined
V	SFHAs inundated by 1% annual chance flood; coastal floods with velocity hazards (wave action); no base flood elevations are determined
VE	SFHAs inundated by 1% annual chance flood; coastal floods with velocity hazards (wave action); base flood elevations are shown

Flood Zone Designations

X (unshaded)	Areas determined to be outside the 0.2% annual chance floodplain
X (shaded)	Areas of 0.2% annual chance flood; areas subject to 1% annual chance flood with average depths less than 1 foot or with contributing drainage area less than 1 square mile; and areas protected by levees from base flood
X (future)	Zone X (Future Base Flood) is a flood insurance risk zone that corresponds to the 1% annual chance floodplains that are determined based on future-conditions hydrology. No BFEs or base flood depths are shown within this zone.
D	Areas in which flood hazards are undetermined

Flood Insurance Study (FIS) Report and FIRM

FISs Are Used To

- Identify SFHAs
- Identify location of specific property
- Estimate BFE at specific site
- Identify magnitude of flood hazard in specific area
- Determine flood insurance zone at specific location
- Determine location of regulatory floodway or non-encroachment area

FIS

- Appraises a community's flood problems/risk
- Estimates flood flow frequency
- Establishes flood elevation profiles
- Plots floodplain boundaries
- Provides data to delineate floodways and non-encroachment areas
- Establishes insurance risk zones

FIS Components

- DFIRM – Digital representation and spatial distribution of flood hazard areas, flood insurance risk zone, BFEs, floodways, and other flood related data
- FIS Report – written text, Flood Profiles, figures, and tables

FIS Report

- Background, authority, and scope
- Principal flood problems
- Existing and/or proposed flood control projects
- Engineering methods used
- Floodplain management and/or insurance applications

Floodway Data Table

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY (NAVD)	WITHOUT FLOODWAY (NAVD)	WITH FLOODWAY (NAVD)	INCREASE
NORTH FORK OF FORKED DEER RIVER TRIBUTARY ONE								
A	2,300	388	856	3.3	312.7	312.7	313.7	1.0
B	3,050	370	1,009	2.8	317.5	317.5	318.5	1.0
C	4,100	52	575	5.0	321.7	321.7	321.7	1.0
NORTH FORK OF FORKED DEER RIVER TRIBUTARY TWO								
A	2,450	179	488	1.6	311.4	310.4	311.4	1.0
B	3,000	200	362	2.2	313.0	313.0	314.0	1.0
C	4,050	26	134	5.9	317.6	317.6	318.5	0.9
D	5,210	46	235	3.4	324.9	324.9	325.3	0.4
E	6,510	40	194	4.1	333.0	333.0	333.0	0.0
NORTH FORK OF FORKED DEER RIVER TRIBUTARY THREE								
A	1,500	480	1,331	1.3	318.9	318.9	319.7	0.8
B	3,030	670	1,481	1.2	321.4	321.4	322.4	1.0
C	4,870	123	305	5.8	326.5	326.5	326.9	0.4
D	6,770	201	702	2.5	336.7	336.7	337.4	0.7

[1] Feet above confluence with North Fork of Forked Deer River

TABLE 2

FEDERAL EMERGENCY MANAGEMENT AGENCY

GIBSON COUNTY, TN

AND INCORPORATED AREAS

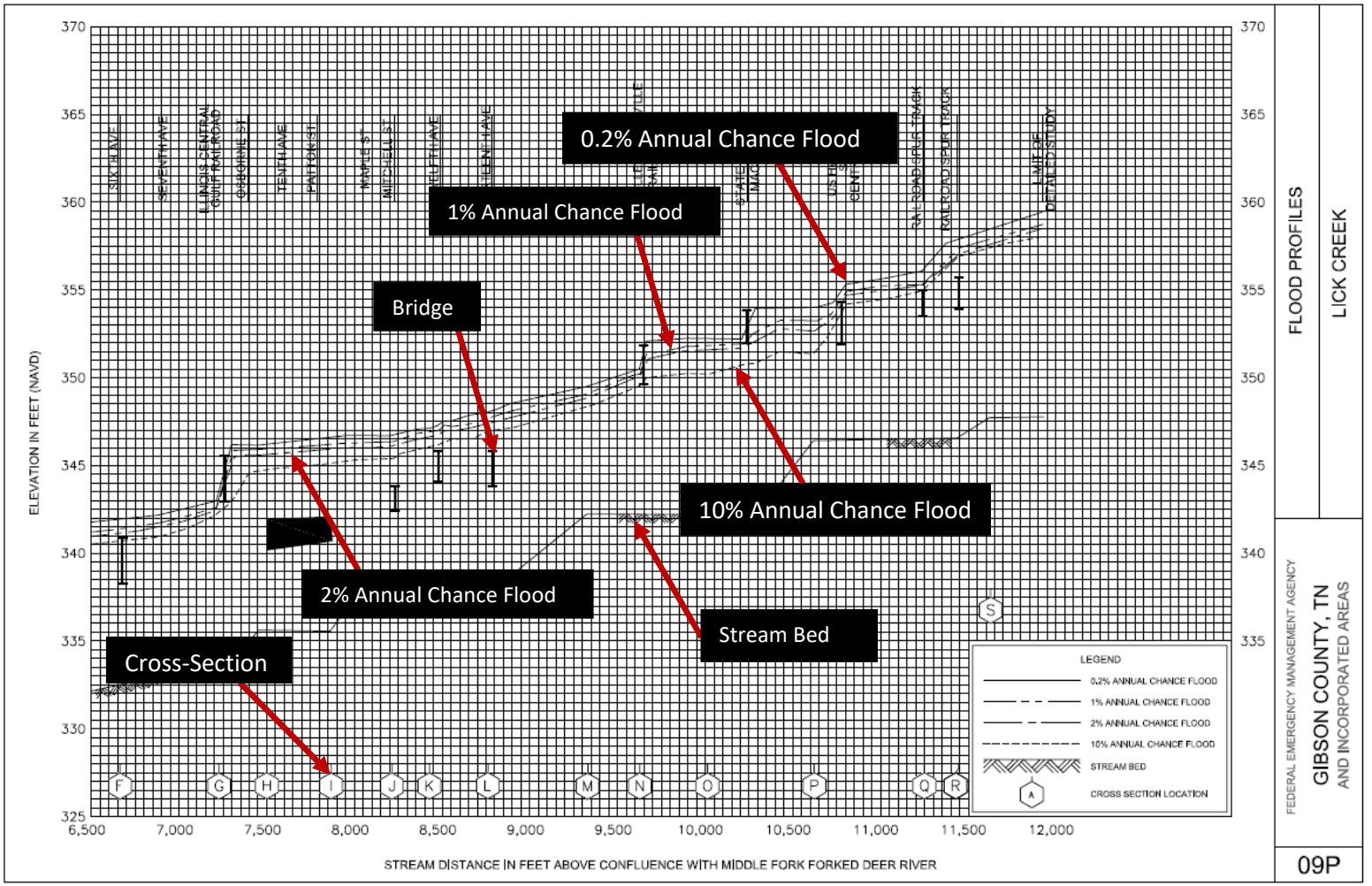
FLOODWAY DATA

NORTH FORK OF FORKED DEER RIVER TRIBUTARY ONE, TWO AND THREE

Floodway Data Table

- Provides data from hydraulic model for each stream studied by detailed H&H methods
- Includes cross section ID, distance from start of model, floodway width, section area, mean velocity, and base flood water-surface elevations
- Included in most FIS reports

Flood Profile



Flood Profile

- Depiction of stream invert elevations, cross section locations, and flood elevations along stream
- Depicts hydraulic structures used in the hydraulic modeling analysis
- Shows the extent of the hydraulic modeling analysis
- Used to determine intermediate/exact BFEs between cross sections

What You Will Find on Flood Maps

- DFIRMs contain variety of information, including:
  - SFHAs
  - Common physical features (highways, railroads, streams, other waterways)
  - Base Flood Elevations (BFEs)
  - Flood insurance risk zones
  - Areas subject to inundation by 0.2% annual chance flood

What You Will Find on Flood Maps

- DFIRMs may also show:
  - Areas subject to inundation by the Zone X (future) flood
  - Areas designated as regulatory floodways
  - Areas designated as Limited Detailed Study
  - Undeveloped coastal barriers
  - Coastal Barrier Resource Systems

Other Types of Maps

- Flood Hazard Boundary Maps (FHBM) - Flat flood map, consisting of one or more 11” x 17” size pages, that includes an index map and legend
- Flood Insurance Rate Map (FIRM) & Flood Boundary and Floodway Map (FBFM) - Z-fold maps, much like a highway map, with more than one panel includes an index

Where to Find Flood Maps

Flood Maps can be downloaded from…

- the FEMA Map Service Center
- www.msc.fema.gov
- Flood maps are in various formats (i.e. .tif, .pdf, .png)

Tennessee Property Viewer

Floodplain determination can be made from…

- http://tnmap.tn.gov/assessment/
- Floodplain information can be determined by choosing the county, selecting a search type, enter specific info, click search.
- Flood determination is made by clicking Show FEMA DIRM Flood Map in the upper left corner

Crockett County - Parcel: 068C B 006.01

July 14, 2017

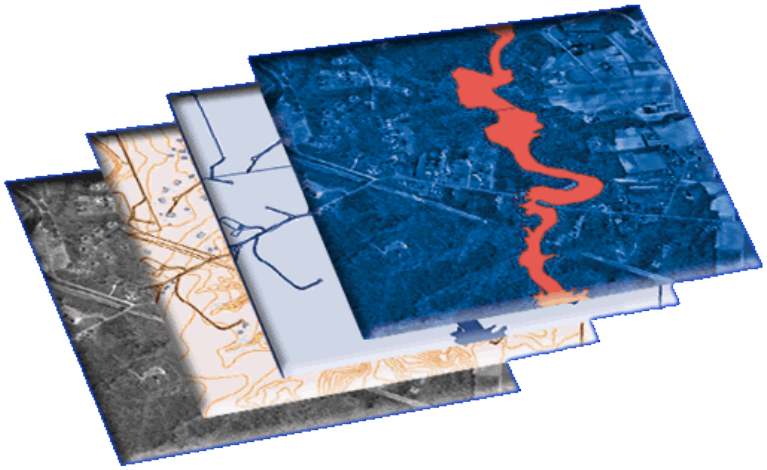
1:1,128

0 0.0075 0.015 0.03 mi

0 0.015 0.03 0.06 km

www.msc.fema.gov

- FEMA Map Service Center (FEMA MSC)
  - Download FIS reports, digital FIRM panels, vector data, imagery, topographic data
  - Digital data provided at preliminary and effective stages



Basic Elements of Flood Maps

- Map Index:
  - Serves as guide to information found on various panels and provides information to map user
- Panel:
  - Each page of the flood map is called a panel; number of panels depends on community size and scale(s) of panels

Basic Elements of Flood Maps

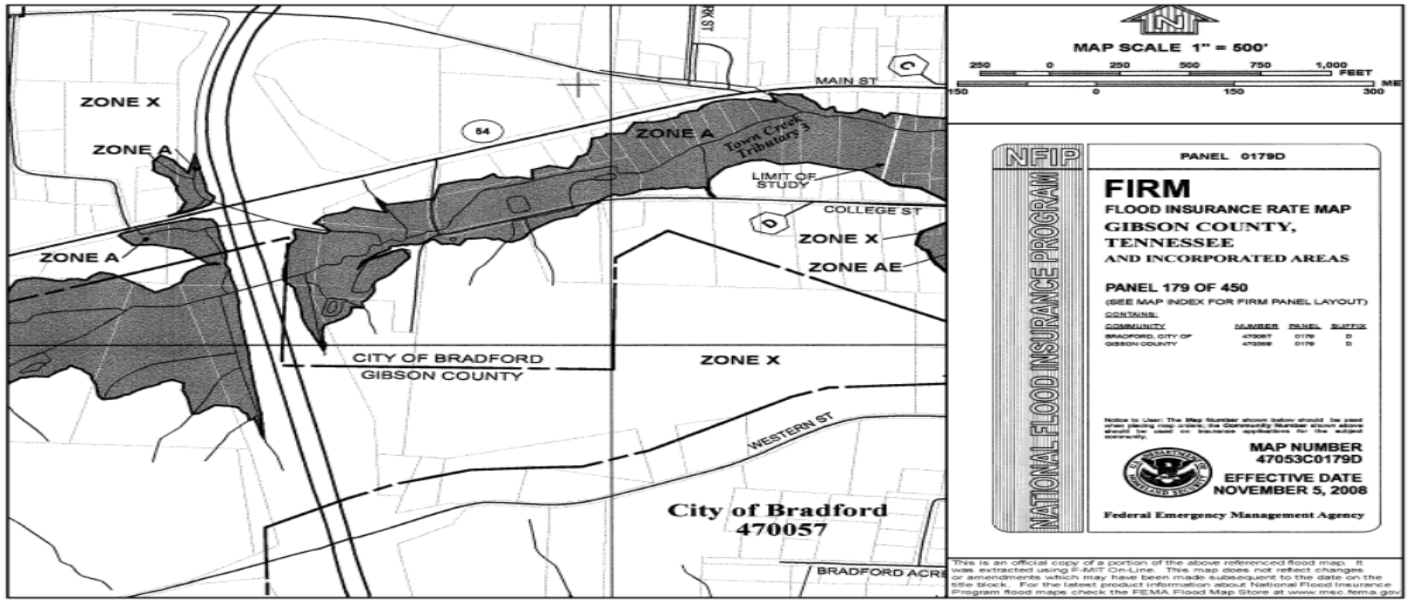
- Legend/Key to Map:
  - Found on Z-fold flood maps
  - Provides additional information, including flood insurance risk zone definitions and notes for users
- Title Block:
  - Found on each panel or page
  - Contains community name, panel/page number, and other information necessary to correctly identify panel

Some Flood Maps Cover Only One Community

- If community is a county, flooding information is only shown for areas under jurisdiction of county government
  - Flooding information for incorporated areas (e.g., towns and cities) will not be found on flood maps
- Separate flood maps are available for incorporated areas

Some Flood Maps Cover Entire Counties

- Flooding information is shown for all geographic areas of county, including towns and cities



Information Shown on All Flood Maps

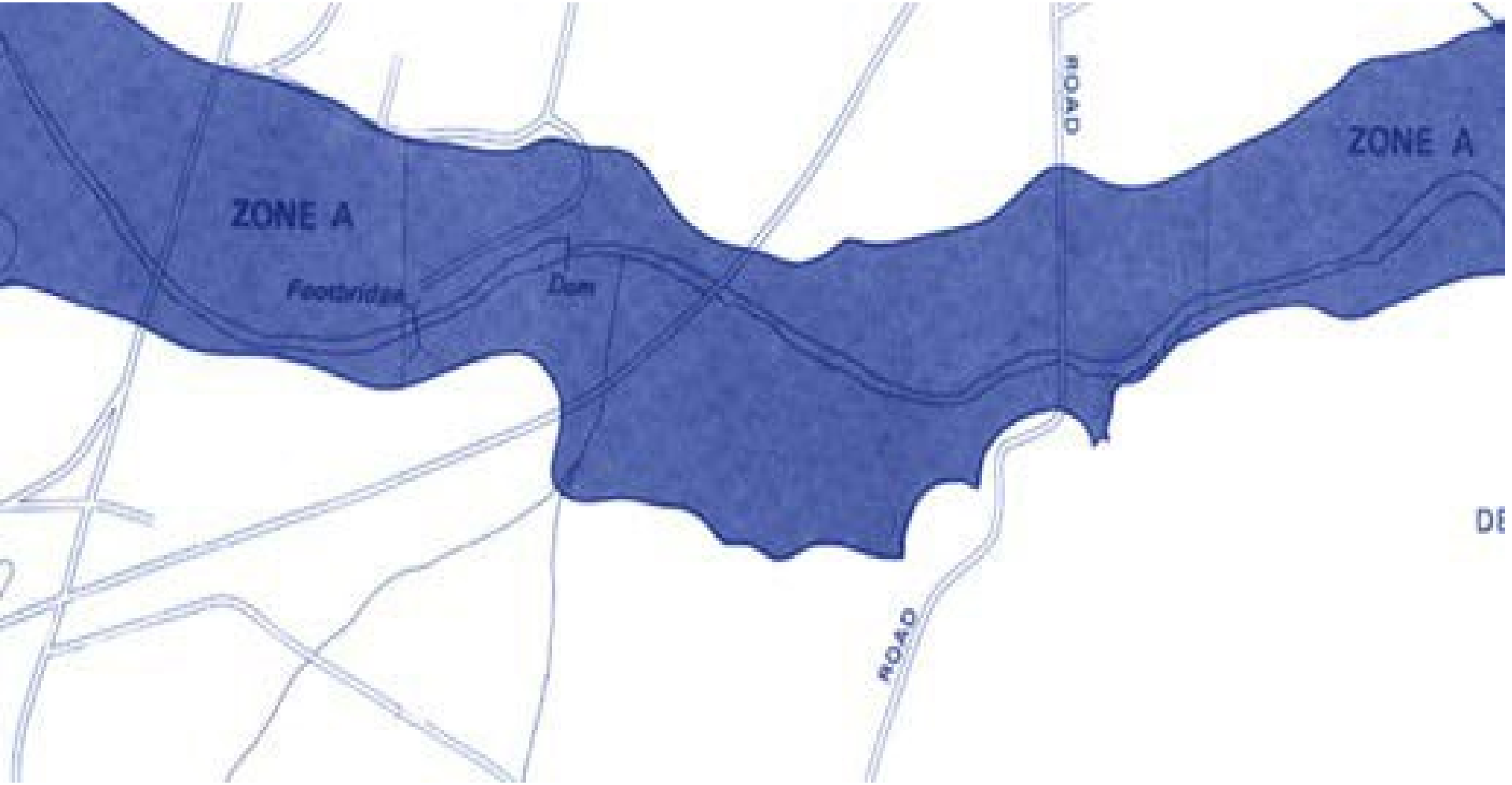
- Community Name:
  - Provides mapped community name, type (e.g., city, county), county, and State
  - When mapped community is a county, it is often referred to as “Unincorporated Areas”; indicates that incorporated areas in county are not included on flood map
  - When mapped community is a county, and the map includes “and Incorporated Areas”, indicates that flood map covers entire geographic area of county

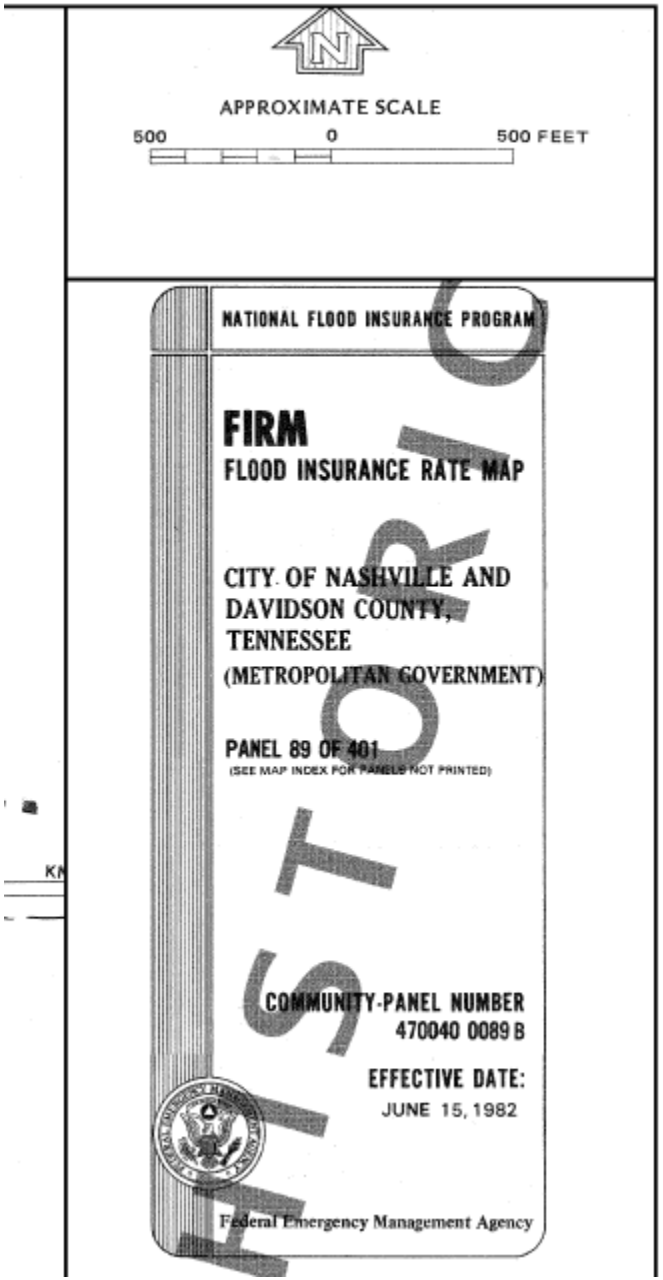
Information Shown on All Flood Maps

- Community Identification Number (CID):
  - Six-digit identification number assigned to mapped community
  - Use CID number when ordering flood maps from FEMA's Map Service Center
- Corporate Limits and County Boundaries:
  - Identify jurisdictional limits
  - May include extraterritorial jurisdictions (ETJs)

Previously Published Types of Flood Maps

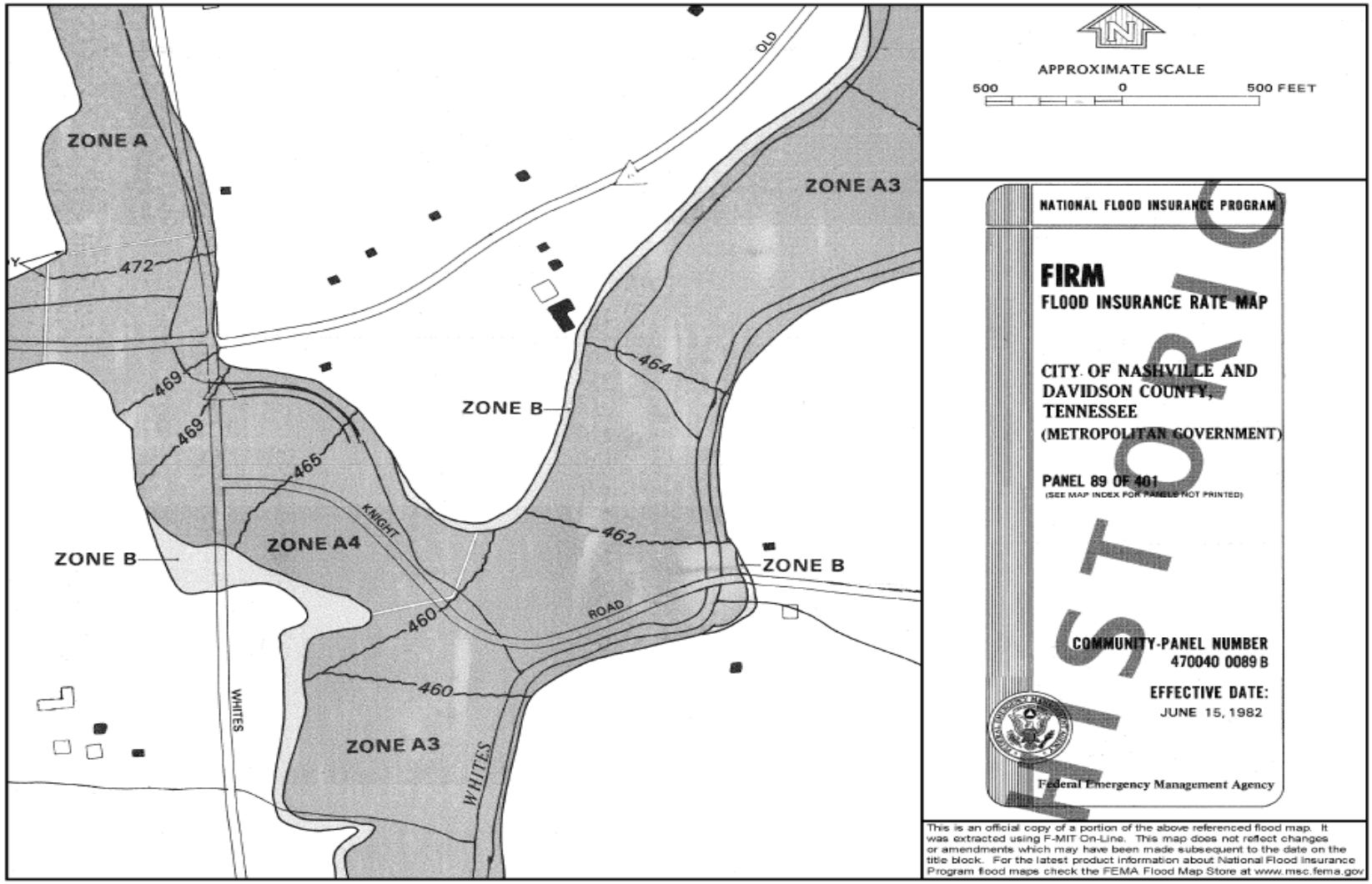
Flood Hazard Boundary Map (FHBM)

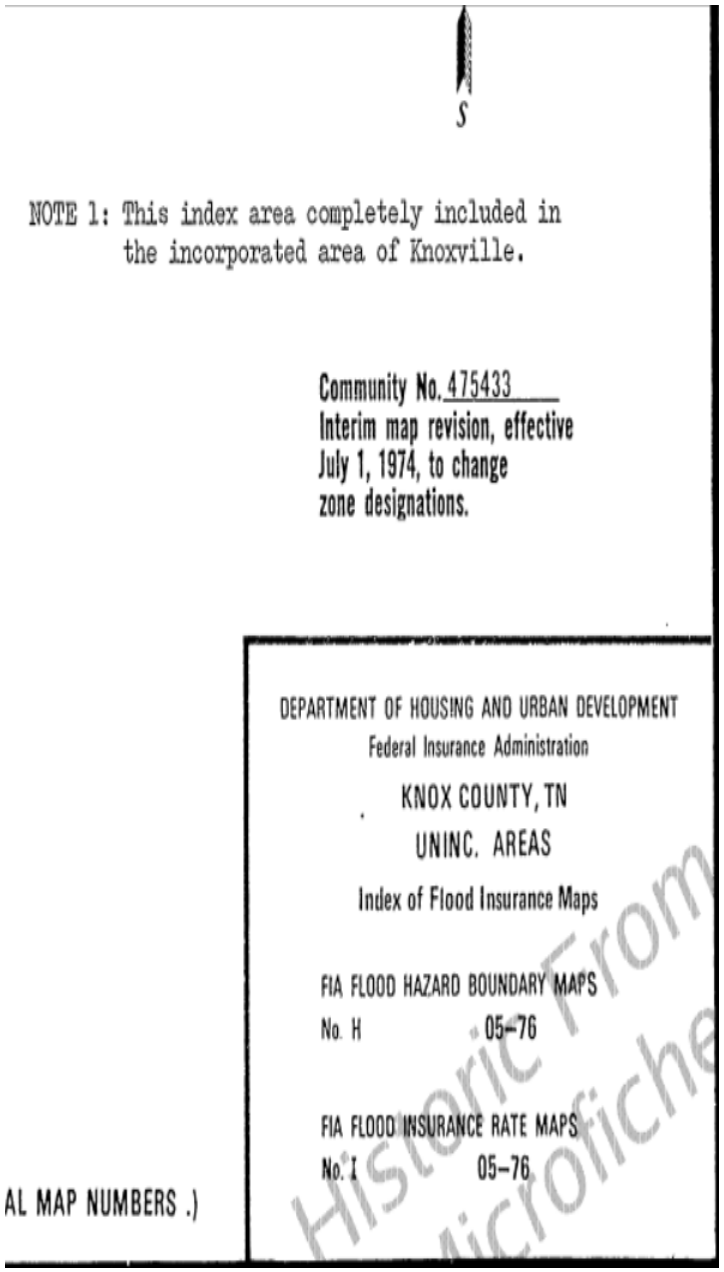




Pre-Map Initiatives FIRM

Pre-Map Initiatives FIRM





S

NOTE 1: This index area completely included in the incorporated area of Knoxville.

Community No. 475433
Interim map revision, effective July 1, 1974, to change zone designations.

DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT
Federal Insurance Administration

KNOX COUNTY, TN
UNINC. AREAS

Index of Flood Insurance Maps

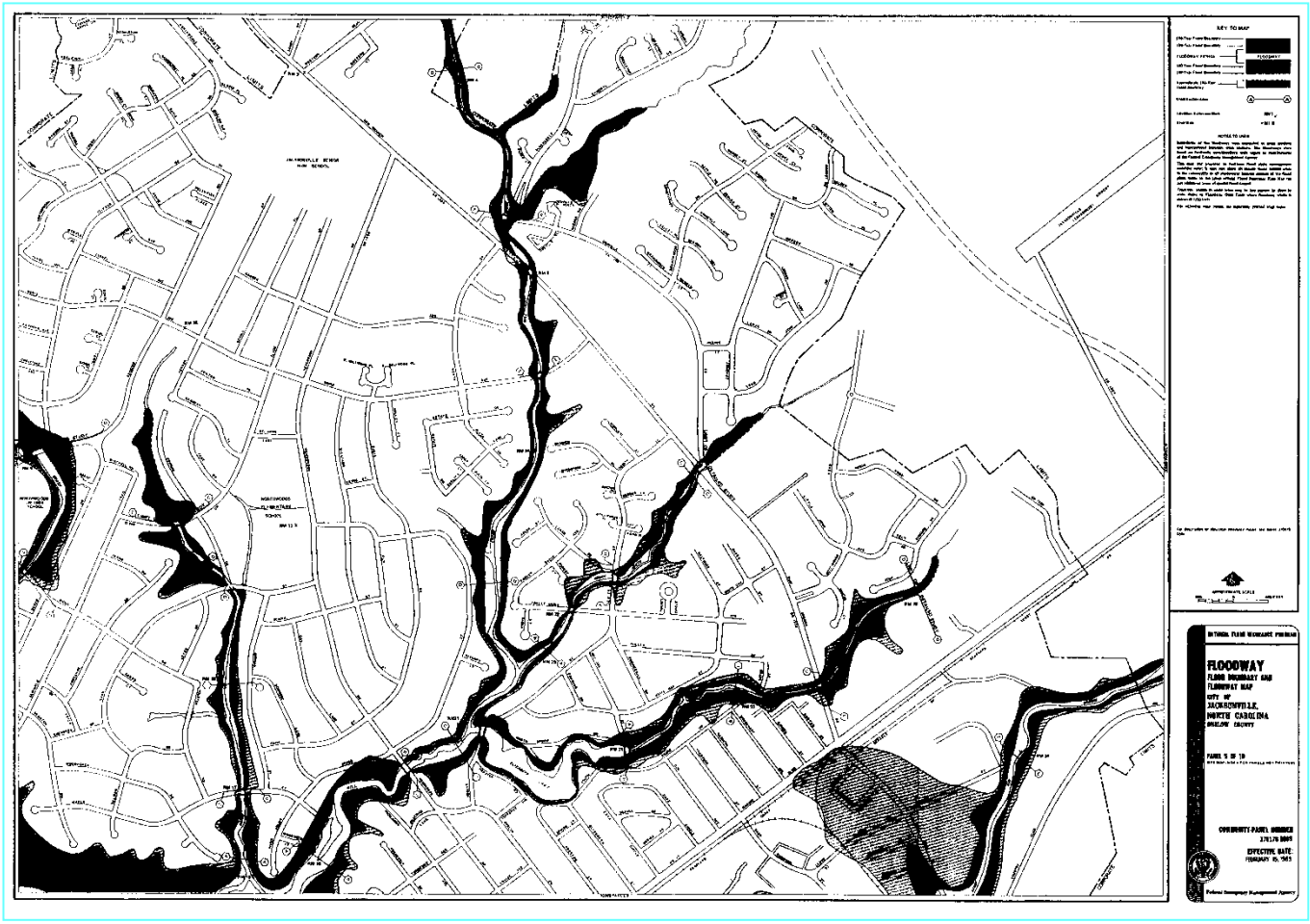
FIA FLOOD HAZARD BOUNDARY MAPS
No. H 05-76

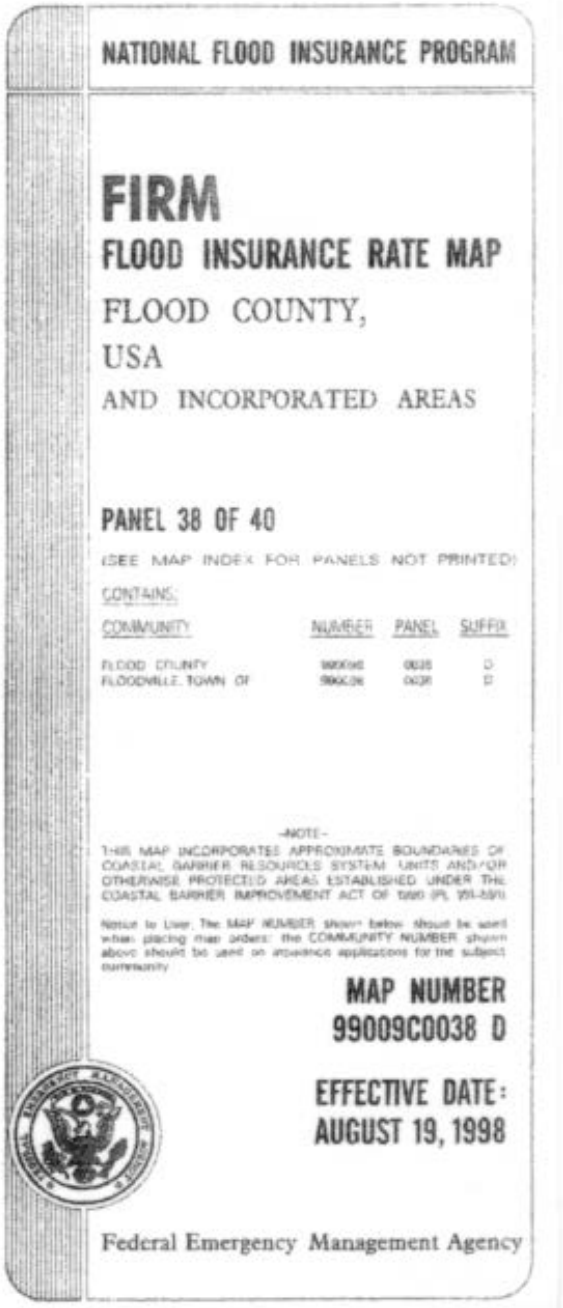
FIA FLOOD INSURANCE RATE MAPS
No. I 05-76

AL MAP NUMBERS .)

Pre-Map Initiatives Flood Boundary and Floodway Map (FBFM)

Pre-Map Initiatives FBFM





NATIONAL FLOOD INSURANCE PROGRAM

FIRM

FLOOD INSURANCE RATE MAP

FLOOD COUNTY,

USA

AND INCORPORATED AREAS

PANEL 38 OF 40

(SEE MAP INDEX FOR PANELS NOT PRINTED)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
FLOOD COUNTY	[illegible]	0038	D
FLOODVILLE, TOWN OF	[illegible]	0038	D

-NOTE-

THIS MAP INCORPORATES APPROXIMATE BOUNDARIES OF COASTAL BARRIER RESOURCES SYSTEM UNITS AND/OR OTHERWISE PROTECTED AREAS ESTABLISHED UNDER THE COASTAL BARRIER IMPROVEMENT ACT OF 1990 (P.L. 101-591)

Notice to User: The MAP NUMBER shown below should be used when placing map orders; the COMMUNITY NUMBER shown above should be used on insurance applications for the subject community.

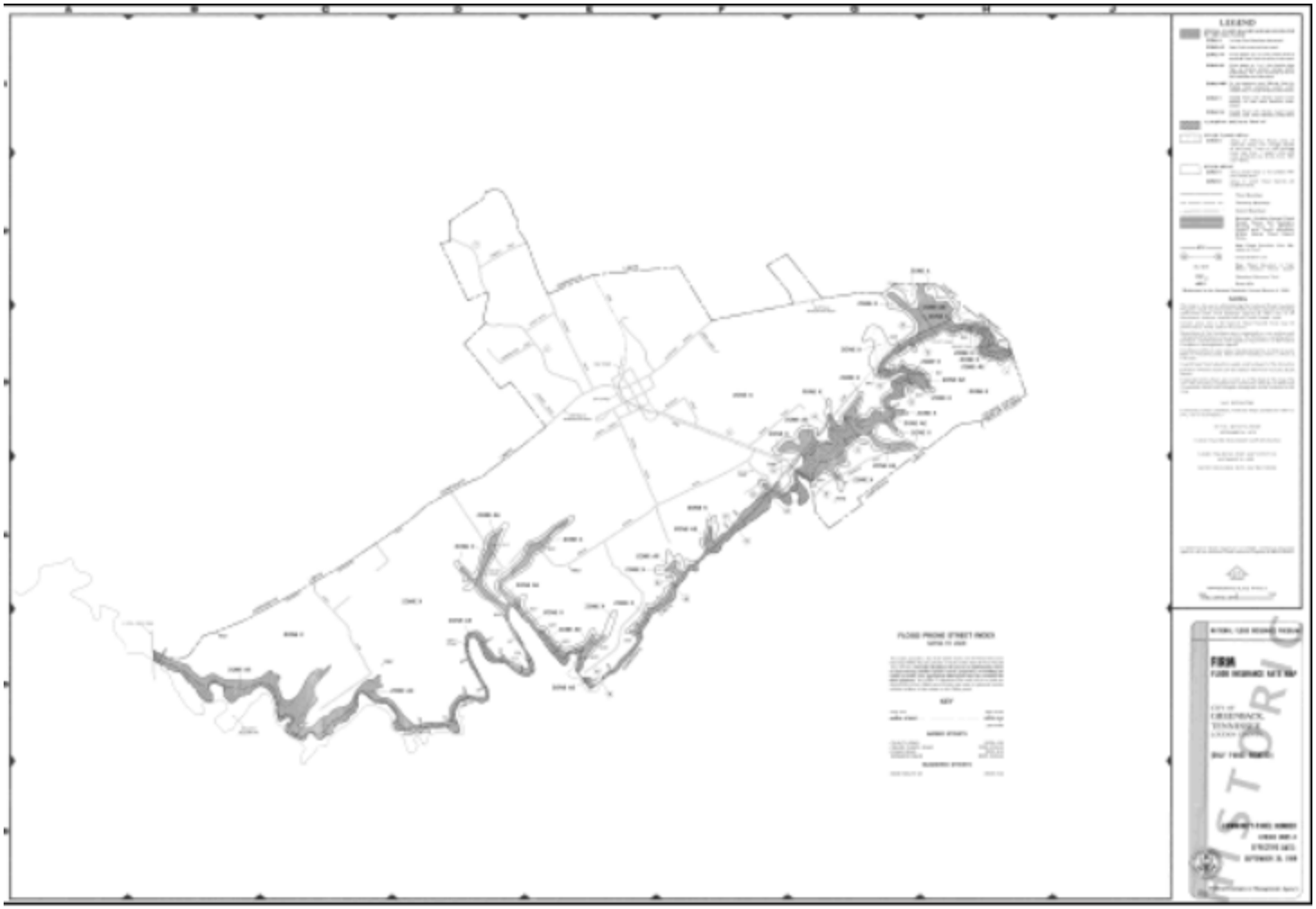
MAP NUMBER
99009C0038 D

EFFECTIVE DATE:
AUGUST 19, 1998

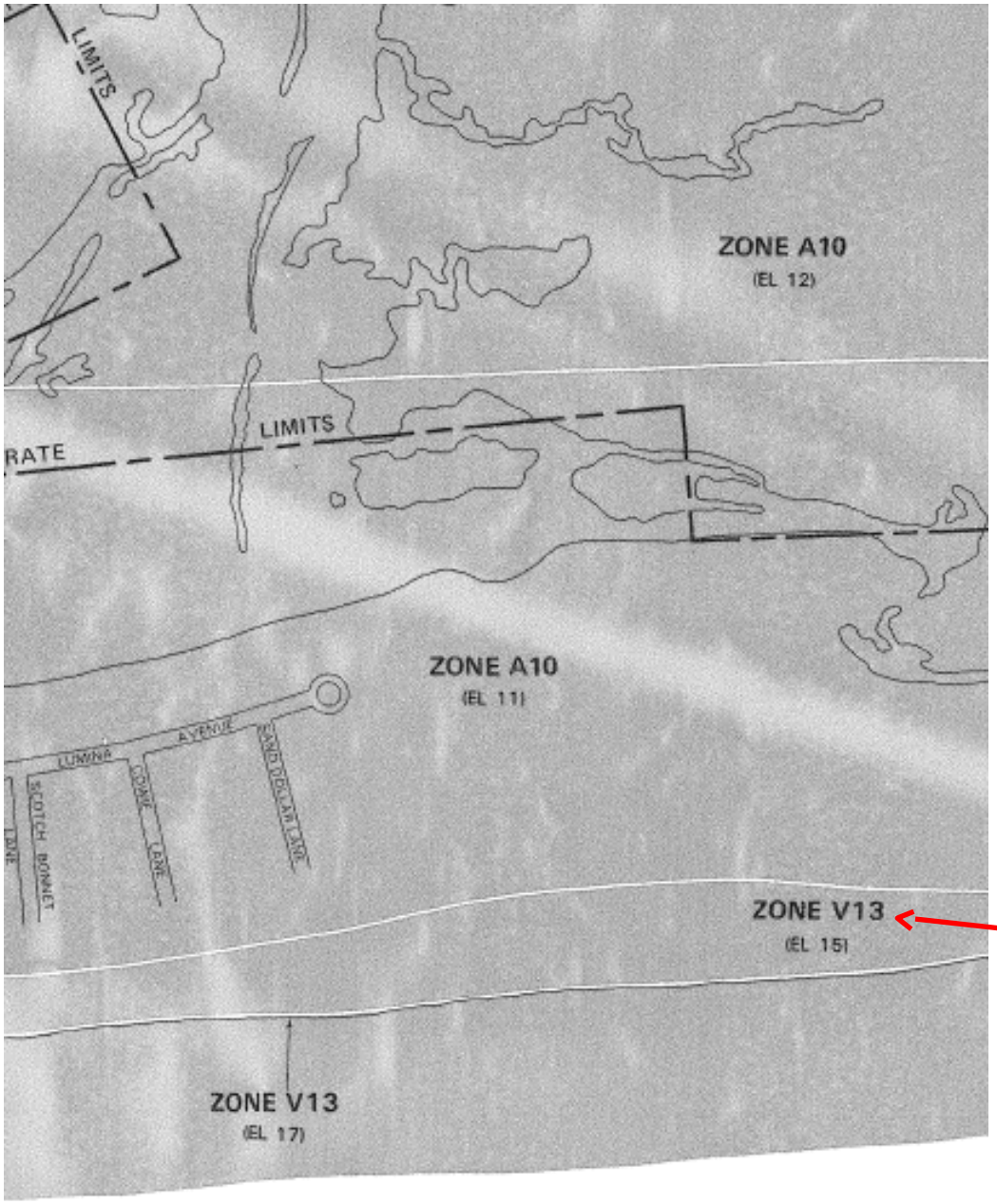
Federal Emergency Management Agency

Map Initiatives
FIRM

Map Initiatives FIRM (dated after 1985)



FIRM with Coastal Flooding



Zone V flooding

How To Read a Map Index

How To Read a Map Index

- Panel Layout:
  - Identifies digital FIRM paneling scheme of community
- North Arrow:
  - Orients the flood map
- Panel Limit Line:
  - Shows extent of area covered by each panel shown on Index

How To Read a Map Index

- Panel-Not-Printed Notes:
  - Identifies panels included in layout that are not printed and explains why they are not printed
    - Example — Panels that do not include any flooding information (entire panel is Zone X)
- Special User Notes

How To Read a Map Index

- Effective or Revised Date:
  - Date that Federal and community requirements for floodplain management regulations for SFHAs take effect
- List of Printed Panels:
  - Identifies those panels that are printed out of total number shown on Index
- Map Repositories

How To Read a Map Index

- List of Communities, including:
  - All floodprone communities covered by flood map
  - CID numbers for each community
  - Panels on which each community is shown
  - Previous map publication history

How To Read
Flood Map Panels

Same Information as Index

- All map panels, regardless of format, include six items that also appear on Index; these are:
  - Community Name
  - CID Number
  - Panel Number
  - Corporate Limit or County Boundary
  - North Arrow
  - Effective or Revised Date

Found on All Panels

- BFE Line and Label:
  - Indicate water-surface elevation of base flood in relation to standard set of data in SFHAs
  - Wavy line intended to represent BFE when flood elevations vary along watercourse
  - Label is used when BFE is uniform across large area
  - Shown in feet

Found on All Panels

- Flood Hazard Area Designations:
  - Appear as dark, light, or color tints
  - Dark shading indicates areas of greater flood hazard; light tints indicate areas of lesser flood hazard
- Floodplain Boundaries:
  - Show limits of 1% and 0.2% annual chance floodplains

Found on All Panels

- Map Scale:
  - Allows you to relate distances measured on flood map to actual distances on ground
  - Scale shown on panel applies only to that panel
- Notes to User:
  - Provide additional information to clarify data

Found on All Panels

- Zone Division Line:
  - Separates SFHAs with different zone designations or similar zone designations but different BFEs
- Zone Labels

Found on Many Panels

- Cross Section Symbol:
  - Shows locations of floodplain cross section used for computing BFEs
- Floodway Boundaries:
  - Show limits of regulatory floodways
- Floodway Designation:
  - Identifies floodway areas

FEMA Maps Online

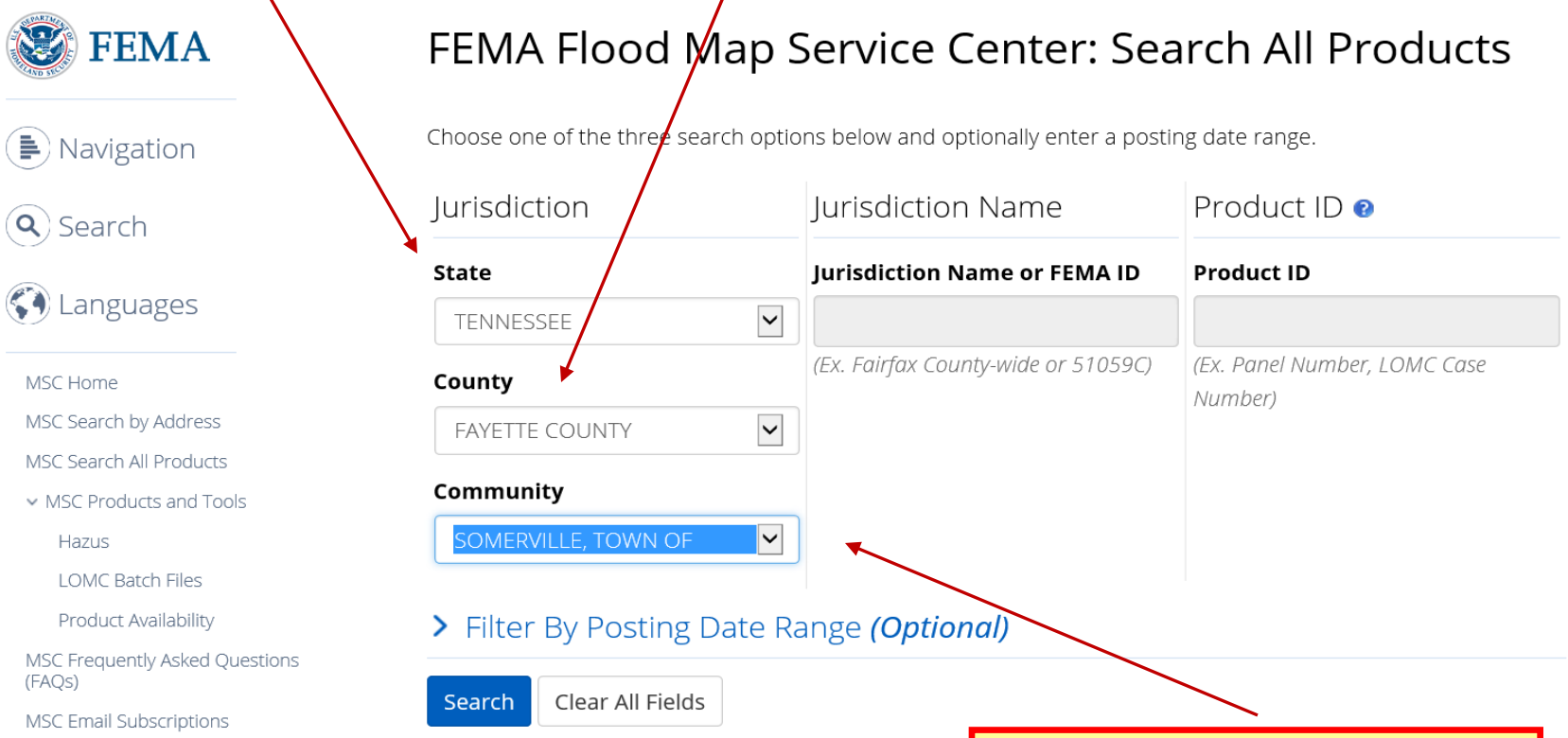
- All Tennessee FEMA-issued digital FIRMs and FIS reports are available for download through FEMA Map Service Center at http://msc.fema.gov/portal

FEMA Maps Online

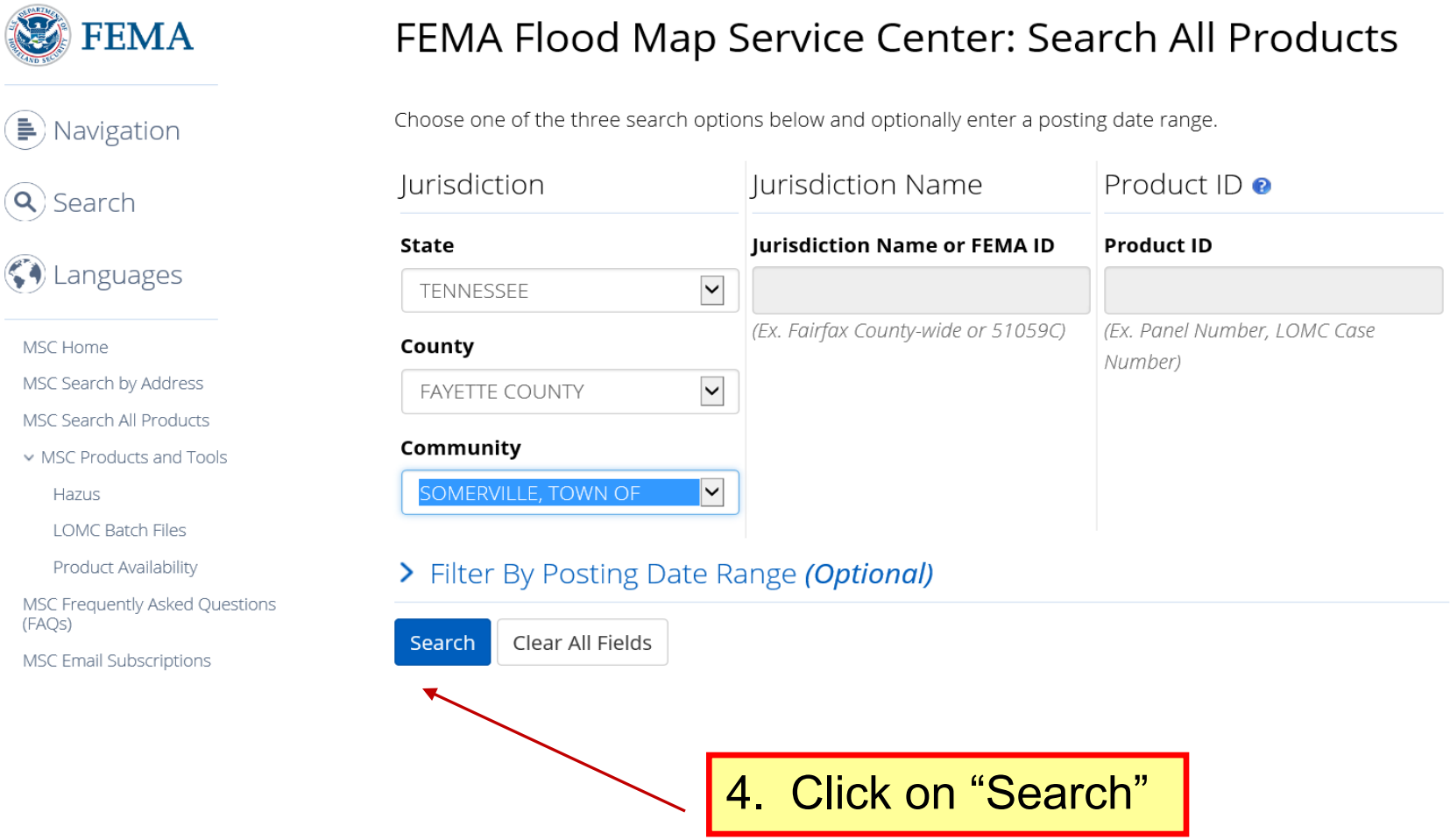
- All FEMA-issued FIRMs, DFIRMs, and FIS reports are available to view online through FEMA's Map Service Center at msc.fema.gov
- Full-scale section of FIRM panel can be printed out using the "FIRMette" tool as described below:
  1. From FEMA.gov -Click on "Search All Products" at the top of the screen; then select 'State', select 'County', next select 'Community' and then hit Search.
  2. Click on the Effective Products Folder to view each FIRM panel within the community, FIS report or to download the National Flood Hazard Layer (NFHL) Data-County for GIS use.

1. Select State of TN

2. Select County



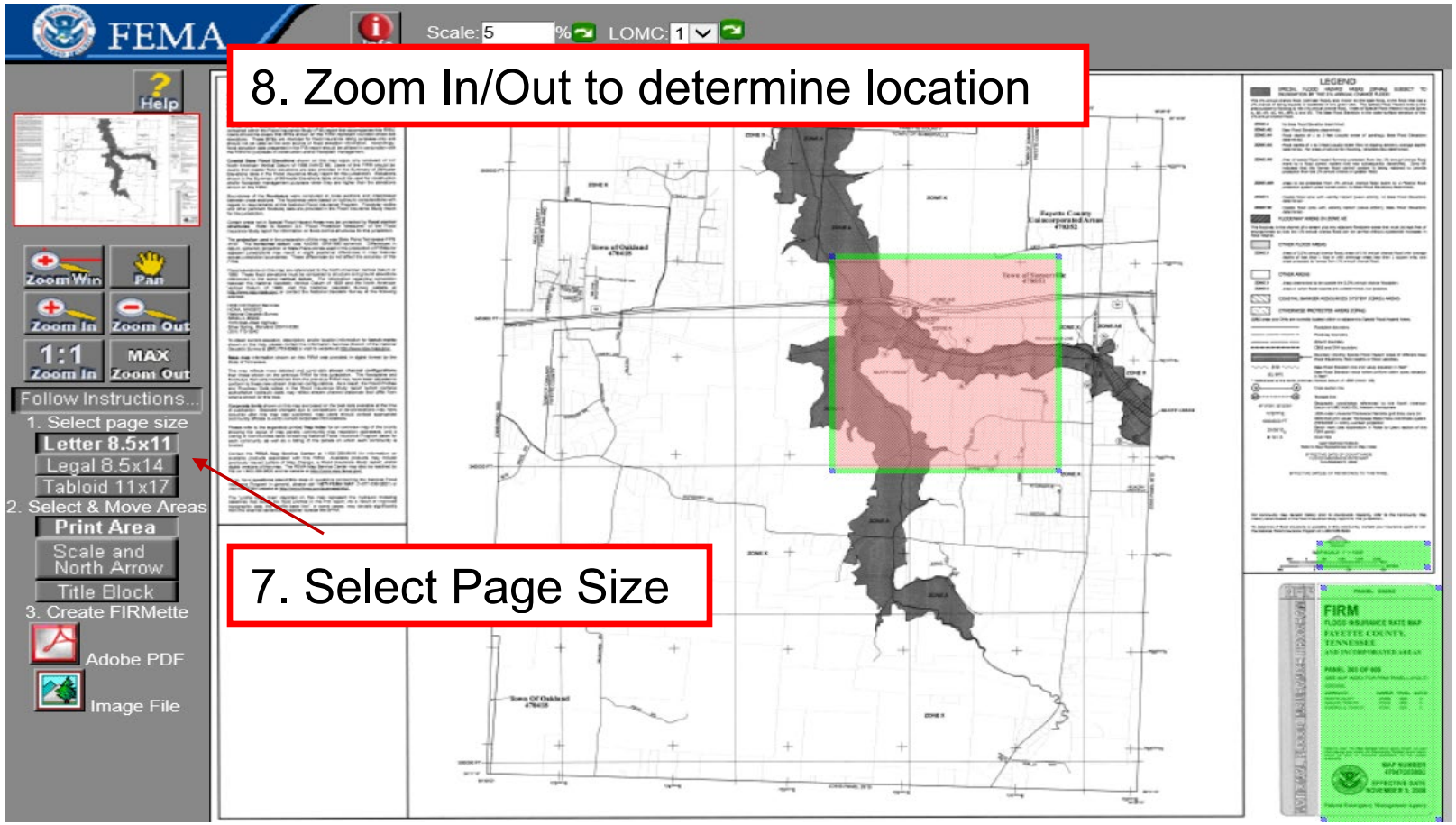
3. Select Community


FEMA
Navigation
Search
Languages
MSC Home
MSC Search by Address
MSC Search All Products
MSC Products and Tools
Hazus
LOMC Batch Files
Product Availability
MSC Frequently Asked Questions (FAQs)
MSC Email Subscriptions
FEMA Flood Map Service Center: Search All Products
Choose one of the three search options below and optionally enter a posting date range.
Jurisdiction
State
TENNESSEE
County
FAYETTE COUNTY
Community
SOMERVILLE, TOWN OF
Jurisdiction Name
Jurisdiction Name or FEMA ID
(Ex. Fairfax County-wide or 51059C)
Product ID
Product ID
(Ex. Panel Number, LOMC Case Number)
Filter By Posting Date Range (Optional)
Search
Clear All Fields
4. Click on “Search”

Creating a FIRMette

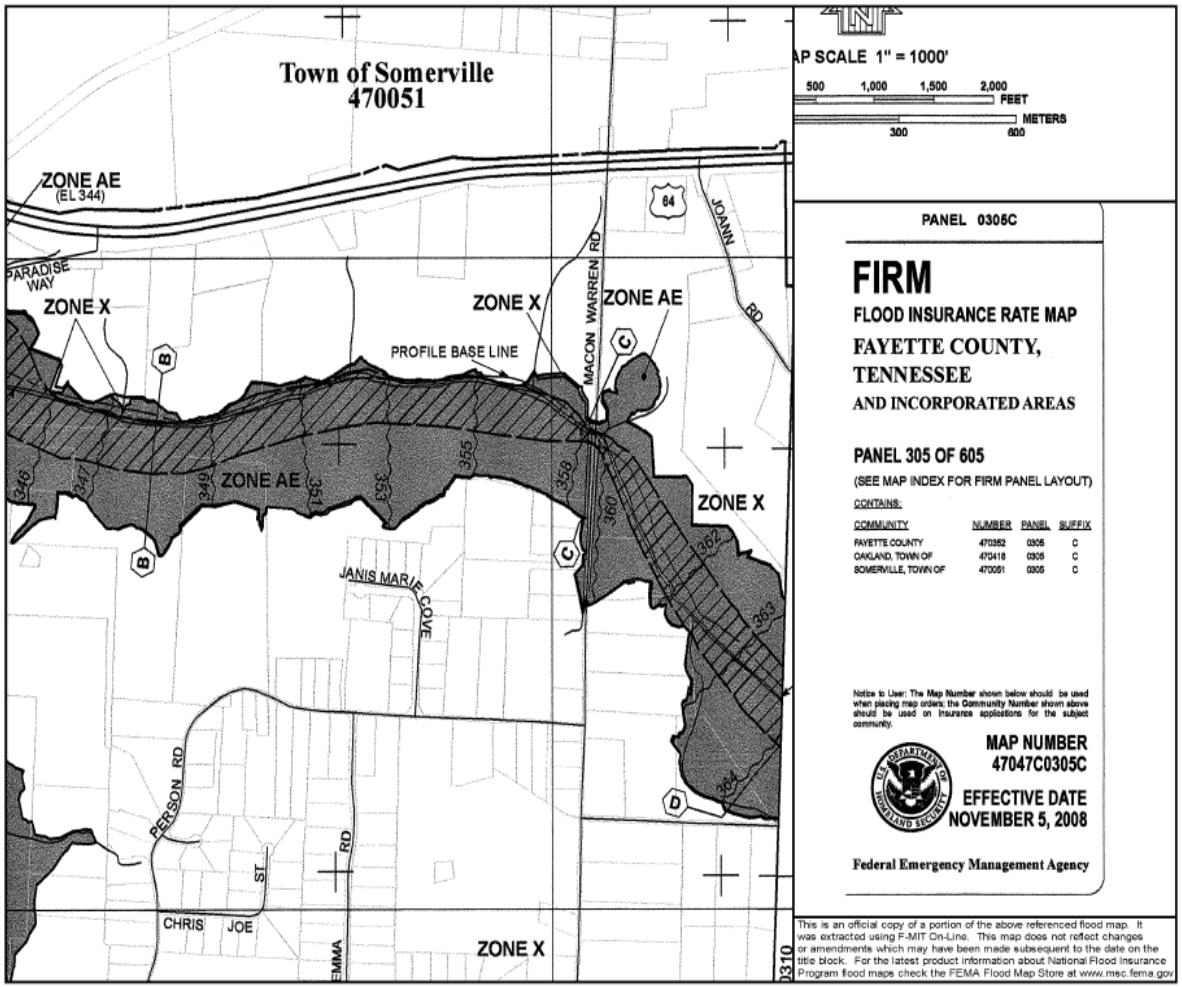
5. A list of FIRM panels for the community selected appear. Click on a “View” link to go to desired map panel
6. When new browser window opens, select “Make a FIRMette” from the left-hand side of the screen

9. Move highlighted box to select area to include in FIRMette



10. Choose FIRMette format – either PDF or TIF

Sample FIRMette - City of Somerville, TN

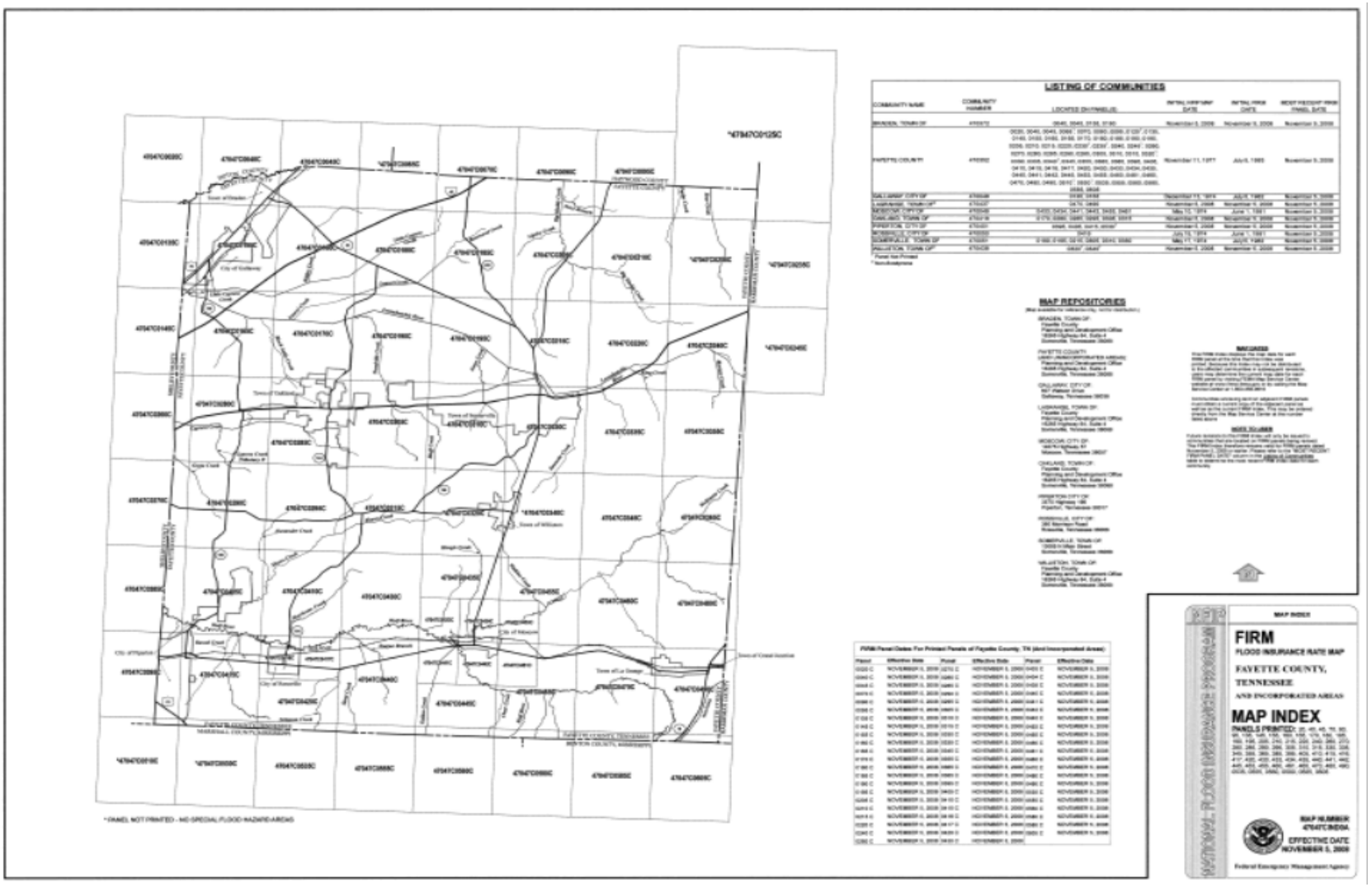


FIRMette image will appear; save image to disk or to hard drive

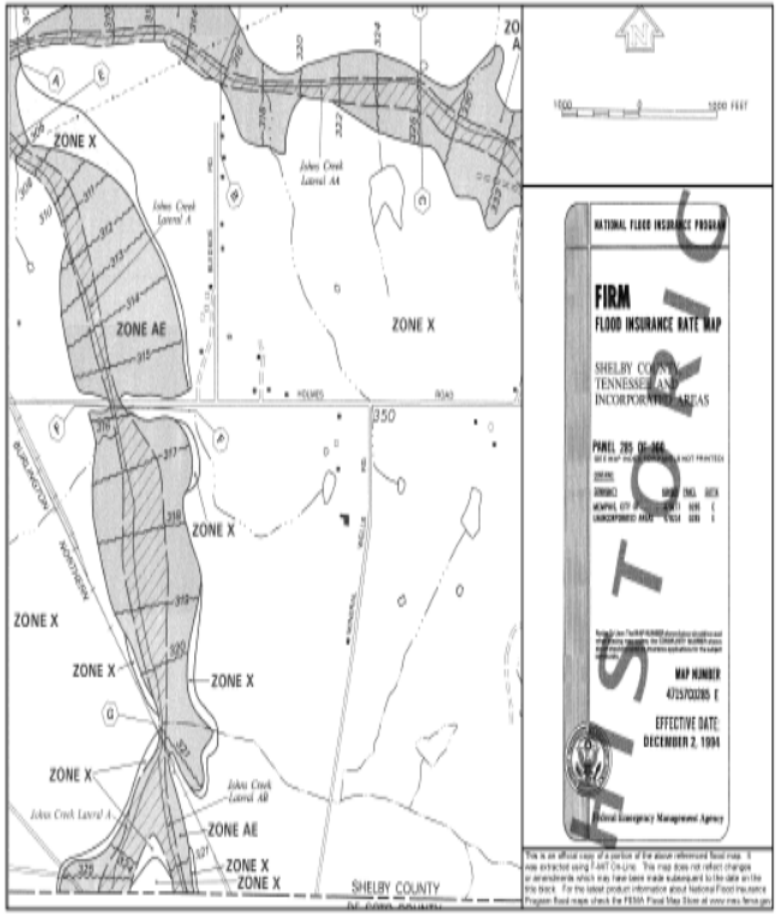
Then, just hit “Print”

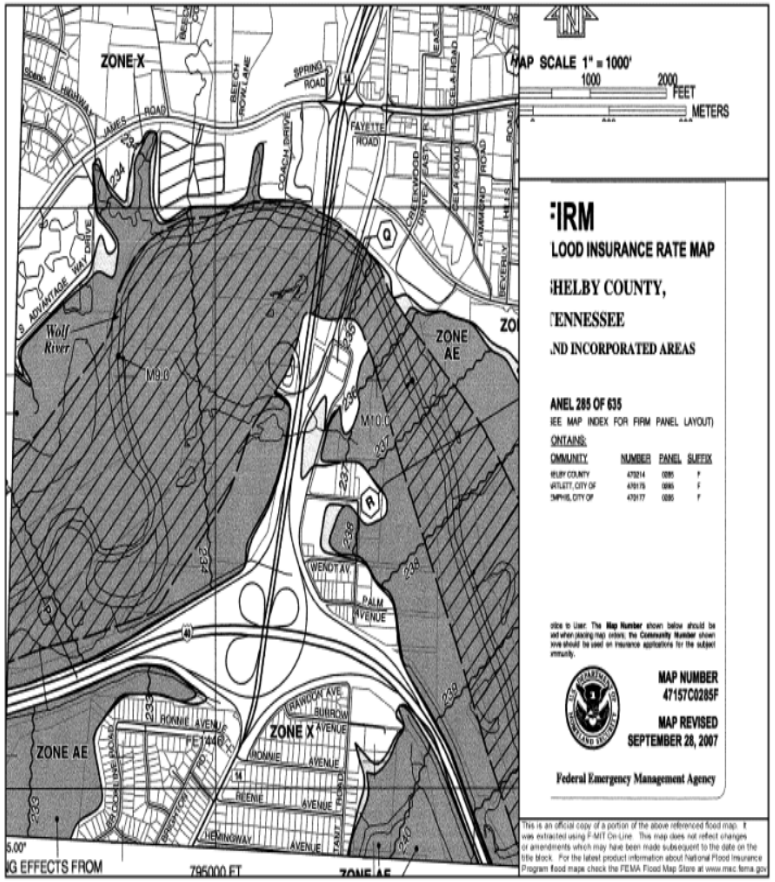
Unique Tennessee Map Features

Digital Map- 2006 TN Statewide DFIRM Panel



Older Map versus Digital Map- Wolf River in Memphis, TN

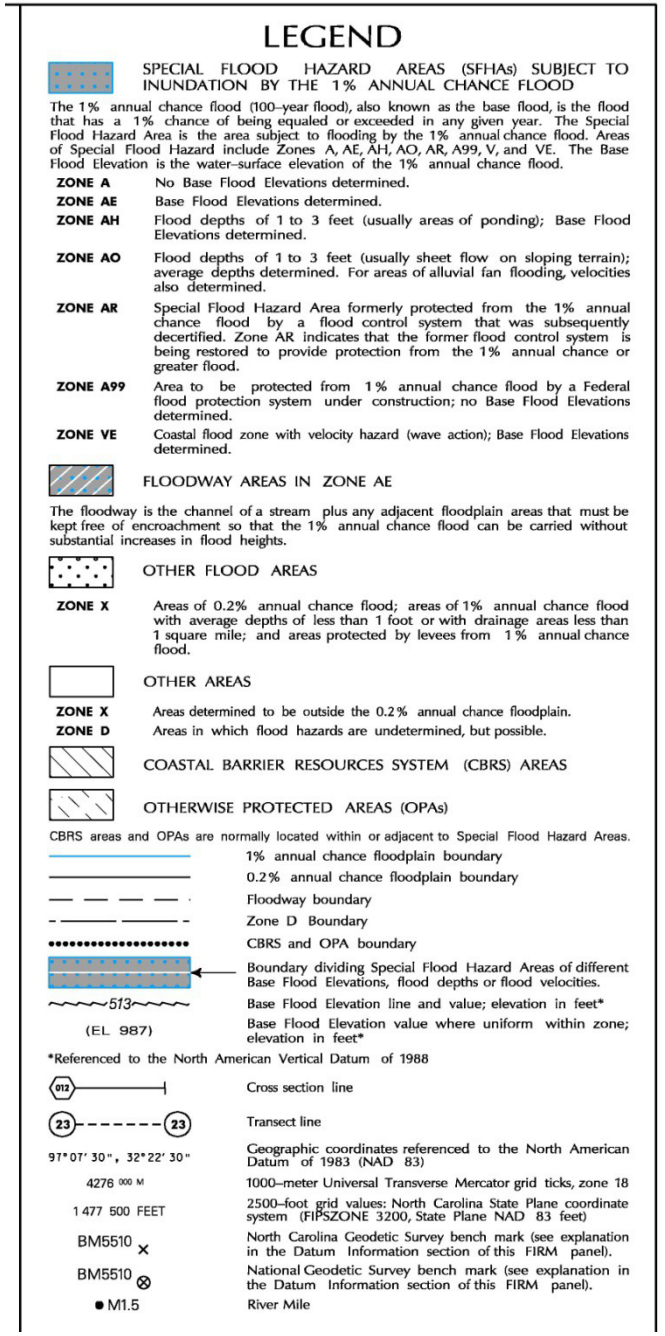




Map Frame and Panel Layout

- Tiling scheme — 10,000’ X 10,000’ squares following State Land Records Management Program system:
  - Matches other local map products
- State Plane Projection
- Grids and Graticules:
  - State Plane Corner Coordinates

Tennessee DFIRM Legend



LEGEND

SPECIAL FLOOD HAZARD AREAS (SFHAs) SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD

The 1% annual chance flood (100-year flood), also known as the base flood, is the flood that has a 1% chance of being equaled or exceeded in any given year. The Special Flood Hazard Area is the area subject to flooding by the 1% annual chance flood. Areas of Special Flood Hazard include Zones A, AE, AH, AO, AR, A99, V, and VE. The Base Flood Elevation is the water-surface elevation of the 1% annual chance flood.

ZONE A No Base Flood Elevations determined.

ZONE AE Base Flood Elevations determined.

ZONE AH Flood depths of 1 to 3 feet (usually areas of ponding); Base Flood Elevations determined.

ZONE AO Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined.

ZONE AR Special Flood Hazard Area formerly protected from the 1% annual chance flood by a flood control system that was subsequently decertified. Zone AR indicates that the former flood control system is being restored to provide protection from the 1% annual chance or greater flood.

ZONE A99 Area to be protected from 1% annual chance flood by a Federal flood protection system under construction; no Base Flood Elevations determined.

ZONE VE Coastal flood zone with velocity hazard (wave action); Base Flood Elevations determined.

FLOODWAY AREAS IN ZONE AE

The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood heights.

OTHER FLOOD AREAS

ZONE X Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.

OTHER AREAS

ZONE X Areas determined to be outside the 0.2% annual chance floodplain.

ZONE D Areas in which flood hazards are undetermined, but possible.

COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS

OTHERWISE PROTECTED AREAS (OPAs)

CBRS areas and OPAs are normally located within or adjacent to Special Flood Hazard Areas.

1% annual chance floodplain boundary

0.2% annual chance floodplain boundary

Floodway boundary

Zone D Boundary

CBRS and OPA boundary

Boundary dividing Special Flood Hazard Areas of different Base Flood Elevations, flood depths or flood velocities.

513 — Base Flood Elevation line and value; elevation in feet*

(EL 987) — Base Flood Elevation value where uniform within zone; elevation in feet*

*Referenced to the North American Vertical Datum of 1988

Cross section line

Transect line

97°07′30″, 32°22′30″ — Geographic coordinates referenced to the North American Datum of 1983 (NAD 83)

4276 000 M — 1000-meter Universal Transverse Mercator grid ticks, zone 18

1 477 500 FEET — 2500-foot grid values: North Carolina State Plane coordinate system (FIPSZONE 3200, State Plane NAD 83 feet)

BM5510 — North Carolina Geodetic Survey bench mark (see explanation in the Datum Information section of this FIRM panel).

BM5510 — National Geodetic Survey bench mark (see explanation in the Datum Information section of this FIRM panel).

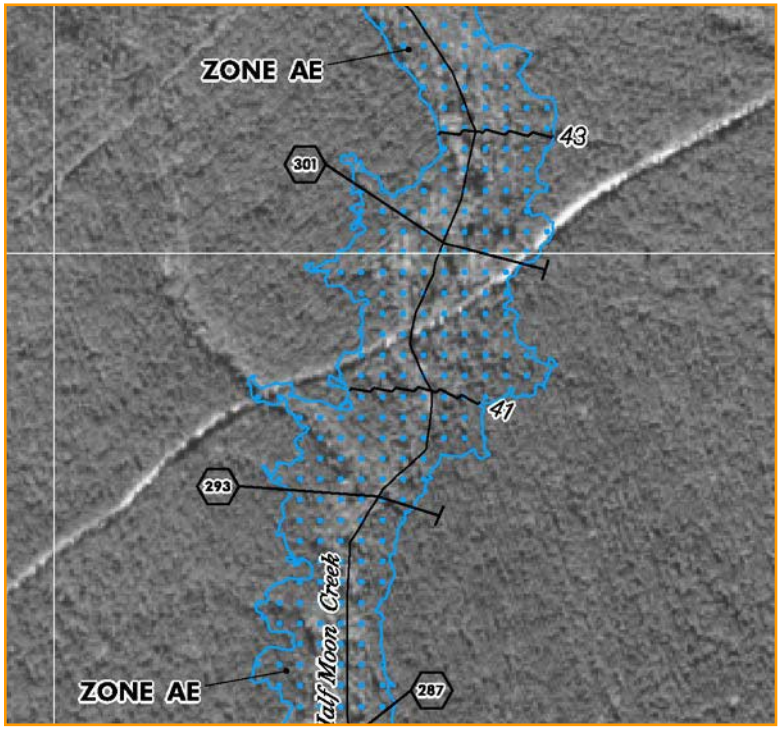
M1.5 — River Mile

Aerial Imagery

- Only aerial imagery can be found on Tennessee Property Viewer by clicking on the Aerial Photography button
- Community floodplain officials can use this site for an existing parcel with structures
- Please visit: http://tnmap.tn.gov/assessment

Limited Detailed Study Area

- BFEs, cross section locations, and 1% annual chance floodplain delineated on DFIRM panels
- Replaces approximate Zone A areas
- Standard H&H study methods used
- FEMA-regulated floodway not depicted on DFIRM
- Non-encroachment widths available in FIS report
- “Buildable” product



FIS Report Components – Limited Detailed Study

Limited Detailed Flood Hazard Data

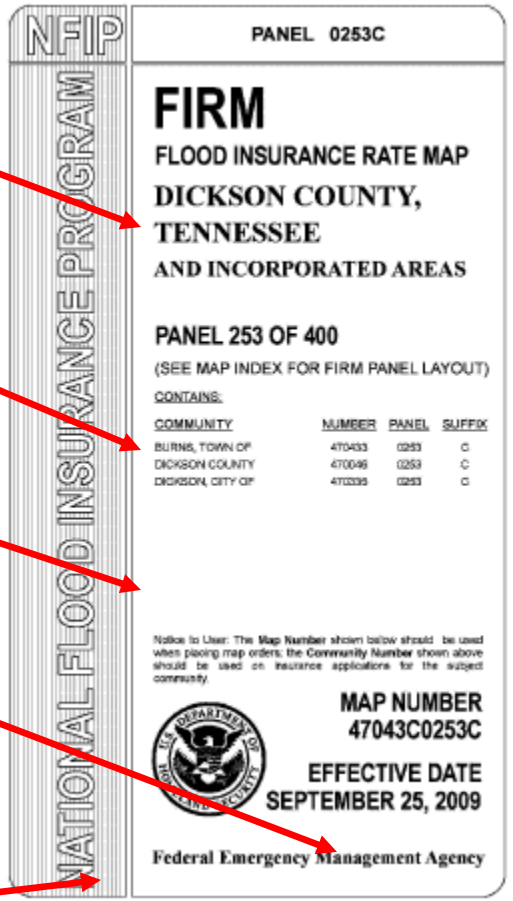
Cross Section	Stream Station[1]	Flood Discharge (cfs)	1% Annual Chance Water-Surface Elevation (feet NAVD 88)	Non-Encroachment Width[2] (feet)
STREAM NAME				
Beaverdam Creek	**1200**	**400**	**100.6**	**25/60**

a. Feet above mouth

b. Left/Right Distance from the Mapped Center of Stream to Encroachment Boundary Based on a 1.0 foot or less surcharge

Title Block

- Statewide DFIRM
- 3-digit panel number
- Community names and 6-digit CID numbers
- 11-digit map numbering system with a suffix of “C” or “D, E, F, G” for newer maps
- FEMA Seal



Map Update Methods

Map Update Methods

- FEMA-Funded Updates:
  - Study/Restudy
  - Limited Map Maintenance Program (LMMP) Revision
  - Existing Data Study (XDS)

Map Update Methods

- Community/Property Owner-Initiated Amendments and Revisions:
  - Letters of Map Change (LOMCs)
    - Letter of Map Amendment (LOMA)
    - Letter of Map Revision – based on Fill (LOMR-F)
    - Letter of Map Revision (LOMR)
  - Physical Map Revisions (PMRs)

Conclusion

- You should:
  - Have an understanding of CFS certification and TN CTP program
  - Understand NFIP background information
  - Be comfortable with commonly used terminology
  - Understand different types of NFIP maps
  - Understand differences between map actions and letter actions
  - Understand differences between different types of letter actions

Conclusion

- You should:
  - Have an understanding of CFS certification and TN CTP program
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Contact Information

Amy Miller, CFM
State NFIP Coordinator
(615) 532-6683
Amy.J.Miller@tn.gov

Federal Emergency Management Agency
1-877-FEMA-MAP
http://www.msc.fema.gov/portal