Floodplains: The Basics

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Floodplains: The Basics

Presentation Overview

National Flood Insurance Program (NFIP)

Types of Floodplain Studies

Flood Insurance Rate Maps (FIRM/DFIRM)

Flood Insurance Study (FIS)

Floodplains: The Basics

Introduction

This presentation is intended to provide a basic understanding of the National Insurance Flood Program at the Federal, State, and Local level.

The information provided will form the building blocks for the concepts that will be introduced in later presentations.

Many of the topics discuss will be expanded upon in later presentations.

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National Flood Insurance Program (NFIP)

BFE - Base Flood Elevation

CLOMR - Conditional Letter of Map Revision

DFIRM - Digital Flood Insurance Rate Map

FEMA - Federal Emergency Management Agency

FIRM - Flood Insurance Rate Map

FIS - Flood Insurance Study

LOMA - Letter Of Map Amendment

LOMR - Letter of Map Revision

NATIONAL FLOOD
INSURANCE PROGRAM
(NFIP)

National Flood Insurance Program (NFIP)

Base Flood - The flood having a 1% chance of being equaled or exceeded in any given year = Regulatory Standard.

N (years)	1	5	10	25	50	100	500
1	100.00	20.00	**10.00**	**4.00**	**2.00**	**1.00**	**0.20**
5	100.00	67.23	40.95	18.46	9.61	**4.90**	1.00
10	100.00	89.26	65.13	33.52	18.29	**9.56**	1.98
25	100.00	99.62	92.82	63.96	39.65	**22.22**	4.88
50	100.00	100.00	99.48	87.01	63.58	**39.50**	9.53
100	100.00	100.00	100.00	98.31	86.74	**63.40**	18.14
500	100.00	100.00	100.00	100.00	100.00	**99.34**	63.25

Courtesy David T. Williams, Ph.D., PE

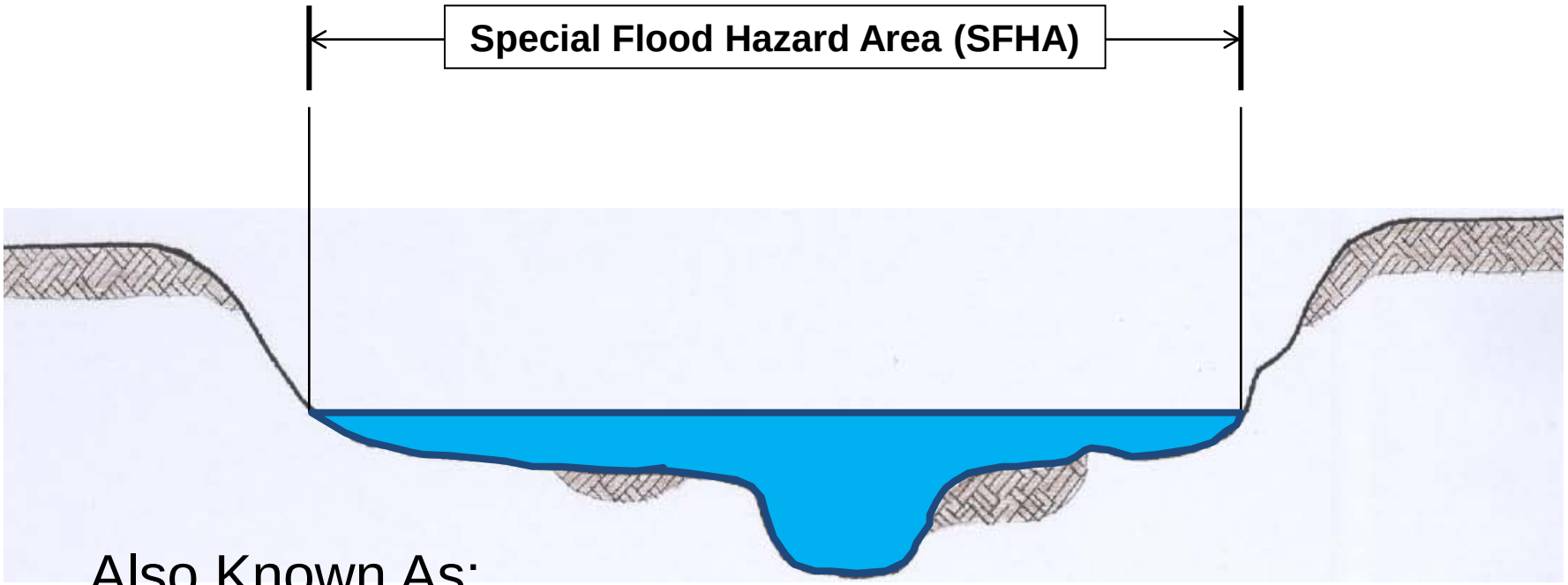
National Flood Insurance Program (NFIP)

Special Flood Hazard Area (SFHA):

- The area inundated by floodwaters of the Base Flood.
- The area where the NFIP regulations must be enforced and where flood insurance is mandatory.

Risk Zones	Description
A	Approx. Methods, no BFEs or flood depths are shown
AE, A1-30	Detailed and Limited Detail methods, with BFEs.
AH	Shallow Flooding (ponding), 1-3 ft depths with BFEs, detailed methods
AO	Shallow Flooding (sheet flow), 1-3’ depths, detailed methods, designated by 1’, 2’, or 3’ depth

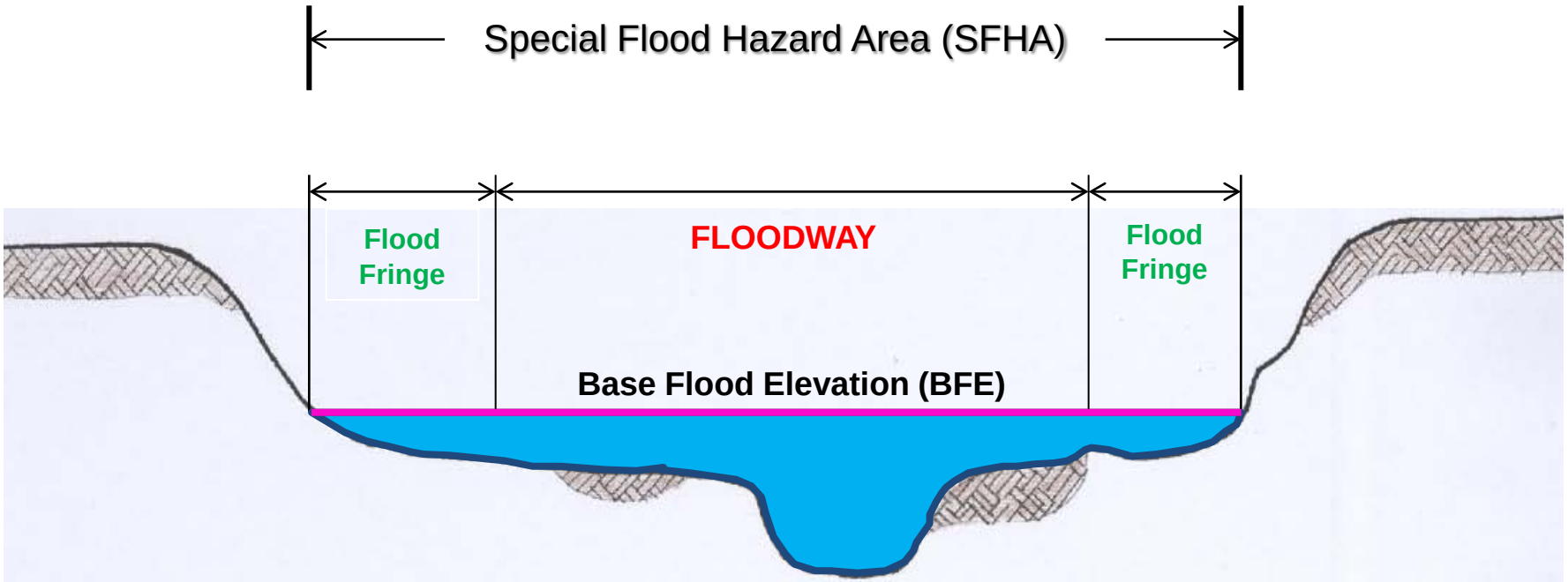
National Flood Insurance Program (NFIP)



Also Known As:

- FEMA 100 yr. Floodplain
- The Area that has a 1% chance of flooding on any given year.
- The point where the BFE intersects the ground.

National Flood Insurance Program (NFIP)



Flood Fringe - Area of the Floodplain that could be encroached upon and used for development by raising the ground.

Encroachment cannot cause more than 0.5 ft. rise.

FLOODWAY – Regulatory Area Only - Limited Development and no Encroachment allowed – Not a Physical Feature.

National Flood Insurance Program (NFIP)

Encroachment – Development within the floodplain including fill, new construction, substantial improvements, bridges, channel crossings, and channel modifications that increases BFE's.

Floodway or Regulatory Floodway:

- The Floodway is a regulatory measure to assist communities with protecting the river corridor where flows are most sensitive to encroachment. It is not a physical feature.
- The channel of a river or 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 (= 0.5 ft in MT).
- The Floodway is the river channel and that portion of the floodplain that must remain open to permit passage of the base flood. Floodwater are generally deepest and swiftest in the floodway.

National Flood Insurance Program (NFIP)

The U.S. Congress established the NFIP on August 1, 1968, with the passage of the National Flood Insurance Act of 1968.

The NFIP was broadened and modified with the passage of the Flood Disaster Protection Act of 1973 and other legislative measures. It was further modified by the National Flood Insurance Reform Act of 1994 , signed into law on September 23, 1994.

The NFIP is administered by the Federal Emergency Management Agency (FEMA), coordinated by the State of Montana, regulated and enforced by the Community.

National Flood Insurance Program (NFIP)

The Federal Role

Administer the NFIP through FEMA Regional Offices.

Provide assistance to State NFIP coordinating agencies.

Assess community compliance with the NFIP criteria.

Advise local officials responsible for administering floodplain development regulations.

Help review and adopt new maps and data.

National Flood Insurance Program (NFIP)

National Flood Insurance Program (NFIP)

The State's Role

Ensure that communities have the legal authority necessary to adopt and enforce floodplain management regulations.

Establish minimum State regulatory requirements that meet or exceed the NFIP requirements.

Provide technical and specialized assistance to local governments.

Coordinate activities of various State agencies that effect the NFIP.

National Flood Insurance Program (NFIP)

The Community's Role

Ensure that they establish the legal authority necessary to adopt and enforce floodplain management regulations.

Establish minimum Community regulatory requirements that meet or exceed the State floodplain regulations and the NFIP requirements.

Establish a floodplain permitting process for issuing or denying floodplain development permits.

Require additional Federal/State/local permits when applicable.

National Flood Insurance Program (NFIP)

The Community's Role

Inspect all development within the regulatory floodplain to assure compliance with the local regulations.

Assist in the preparation and revision of flood maps.

Maintain records of floodplain development.

Assist residents in obtaining information on flood hazards, map data, flood insurance, and proper construction measures.

Answer questions from design professionals and the public.

National Flood Insurance Program (NFIP)

There are 3 basic parts to the NFIP

Regulations

Insurance

Mapping

NFIP Federal Regulations

In order to participate in the NFIP, the State, and Communities must adopt and enforce floodplain management regulations that meet of exceed the requirements specified under Section 60.3, Title 44, of the Code of Federal Regulations (CFR).

The cumulative requirements are applied as follows;

1. *60.3(a) Community has no maps or data.*
2. *60.3(b) Community has maps with approximate A zones only.*
3. *60.3(c) Community has a FIRM with base flood elevations (BFE's).*
4. *60.3(d) Community has a FIRM with a floodway.*

State of Montana Regulations

The State of Montana has established regulations to direct floodplain management that meet or exceeds the requirements specified under Section 44 CFR 60.3.

Montana Floodplain and Floodway Management Act, MCA Title 76, Chapter 5. Effective 9/4/75

DNRC Floodplain Management Engineering Bureau adopted ARM Rule 36, Chapter 15 on 12/31/1989.

State of Montana Regulations

Standard	Montana Administrative Rules	NFIP Minimum Requirements
Freeboard*	2 Feet	No freeboard required
Floodway Standards	1/2 foot Surcharge	1 Foot Surcharge
Floodway Uses	Prohibits habitable structures with/in the floodway	Allows structures in Floodway with documentation of zero-rise
Mobile Home Applications	Requires all mobile homes to be elevated to the freeboard protection level.	Allows for mobile homes placed in and existing mobile home park to be elevated to 36” above the adjacent grade.

*Freeboard - A margin of safety added to the base flood elevation to account for waves, debris, miscalculations, impacts from new development, or lack of data.

Community Regulations

The State established a model floodplain ordinance, based upon the CFR's, MCA's, and ARM's that is available to provide guidance for the Communities in the adoption of their local regulations.

The majority of the local Community Floodplain Management programs within the State adopted the model ordinance.

Some Communities have also adopted ordinances that exceed both NFIP and State regulations.

- Ravalli County does not allow new residential structures to be placed within the 100 yr. floodplain.
- Missoula County only allows rip rap to be used for the protection of infrastructure and structures existing before 2001.

Floodplains: The Basics

Presentation Overview

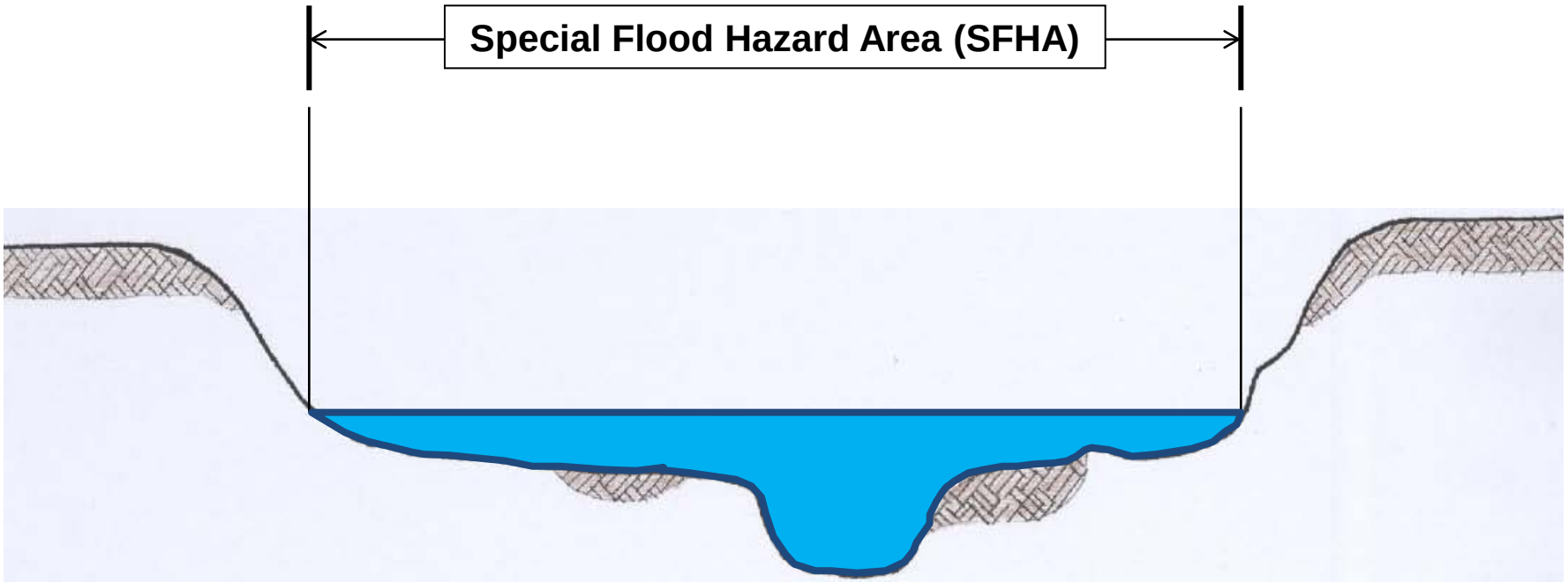
National Floodplain Insurance Program (NFIP)

Types of Floodplain Studies

Flood Insurance Rate Maps (FIRM/DFIRM)

Flood Insurance Study (FIS)

Types of Floodplain Studies



Three different types of floodplain studies can be used to identify the SFHA:

- Approximate Study
- Limited Detail Study
- Detailed Study

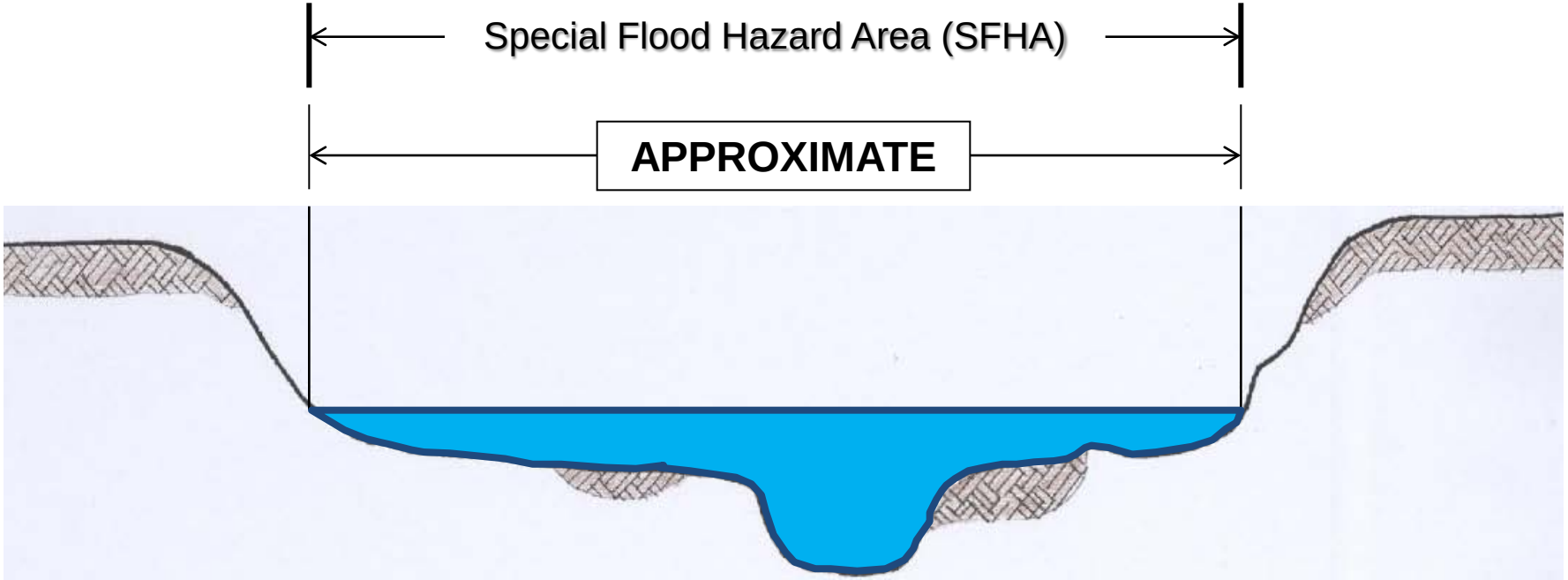
Types of Floodplain Studies

Approximate Study (Zone A) - the SFHA is defined, but no BFEs or flood profiles.

Limited Detailed Study (AE) - SFHA defined and may include BFEs. Profiles and BFEs published in FIS. Study parameters may vary based on available data, budget, etc.

Detailed Study (AE) - the SFHA & 500-yr floodplains are defined, and BFEs are published in FIS. The 10-, 2-, 1-, & 0.2 % annual-chance flood discharges are estimated, and profiles are provided in FIS. Structure geometry from detailed field surveys. Floodway analysis typically performed.

Types of Floodplain Studies



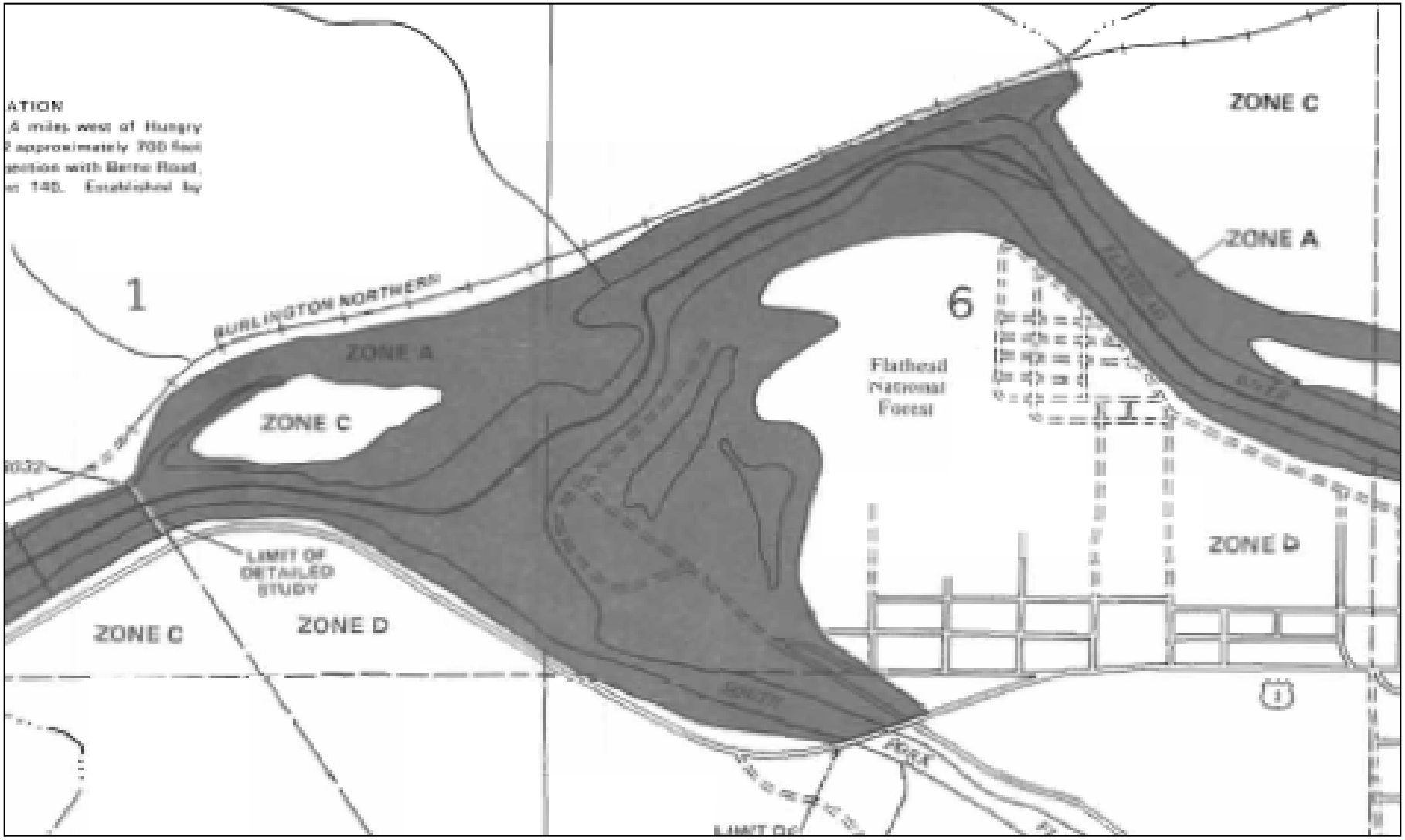
No Base Flood Elevations

No Hydrology

No Hydraulic Modeling

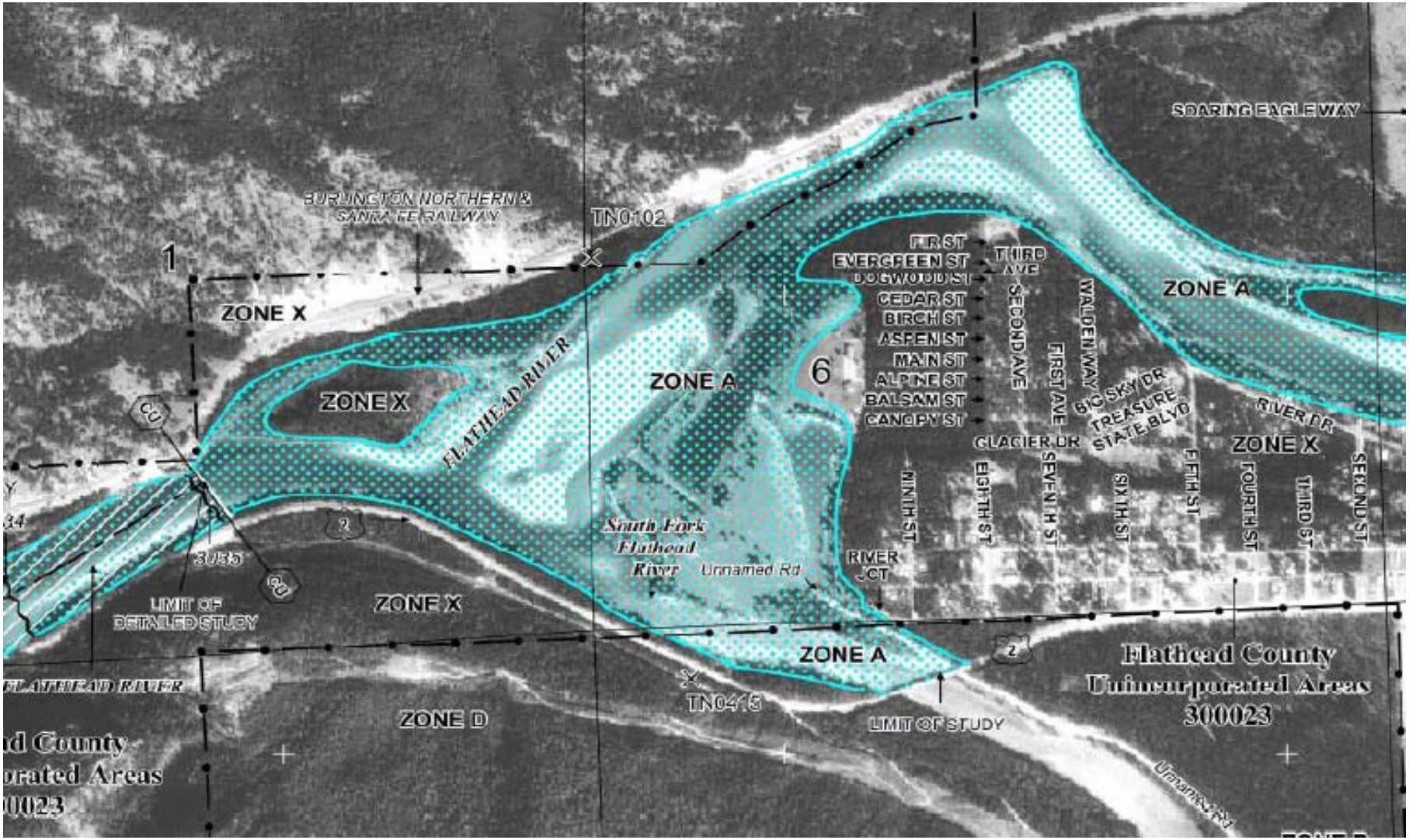
No Flood Profiles

Types of Floodplain Maps



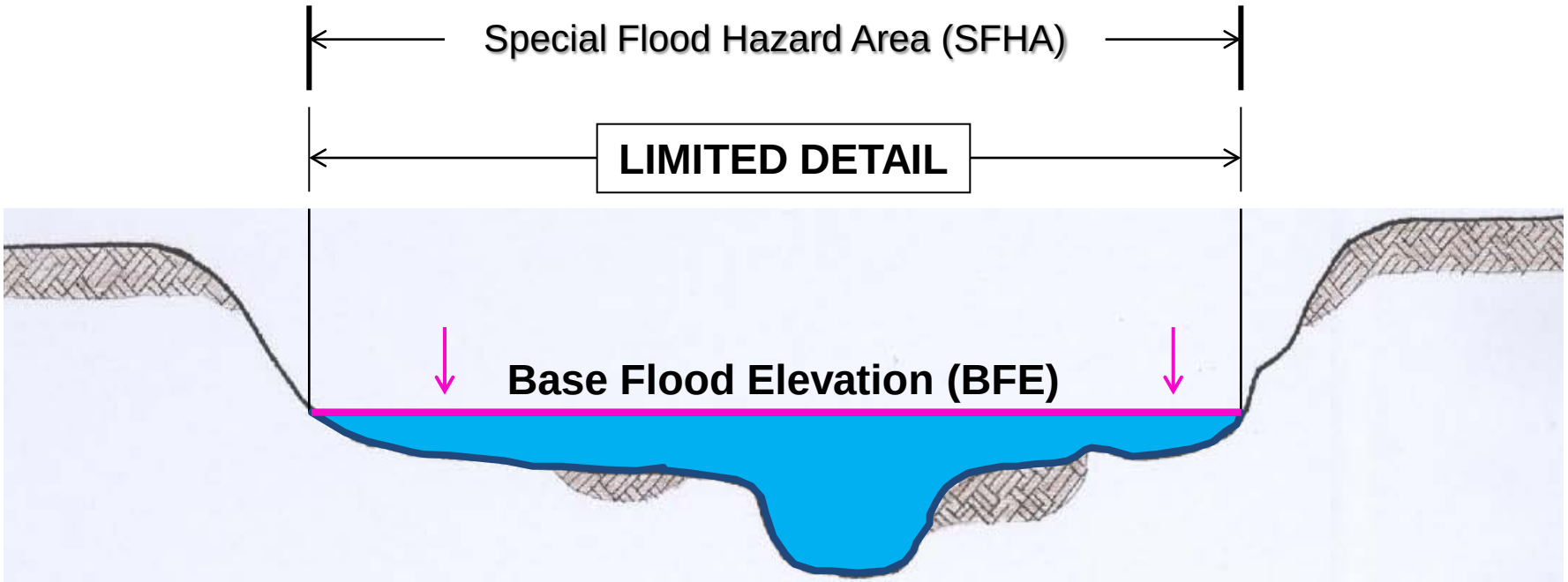
FEMA Flood Insurance Rate Map (FIRM) - **Approximate Study**
Flathead River – Flathead County

Types of Floodplain Maps



FEMA Digital Flood Insurance Rate Map (DFIRM) - **Approximate Study**
Flathead River – Flathead County

Types of Floodplain Studies

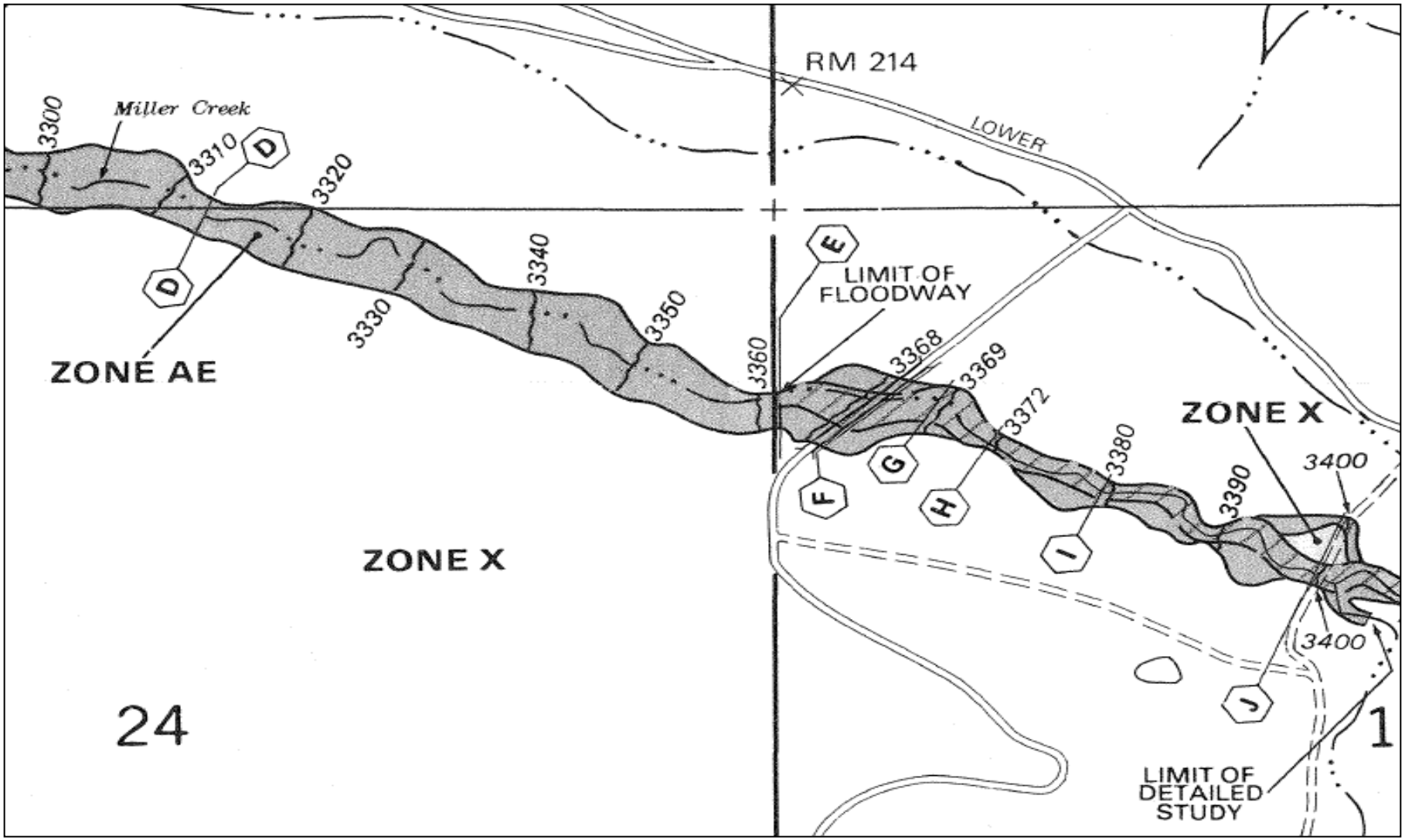


Flood Profiles and BFEs published in FIS.

Has limited Hydrology and Topographic Data

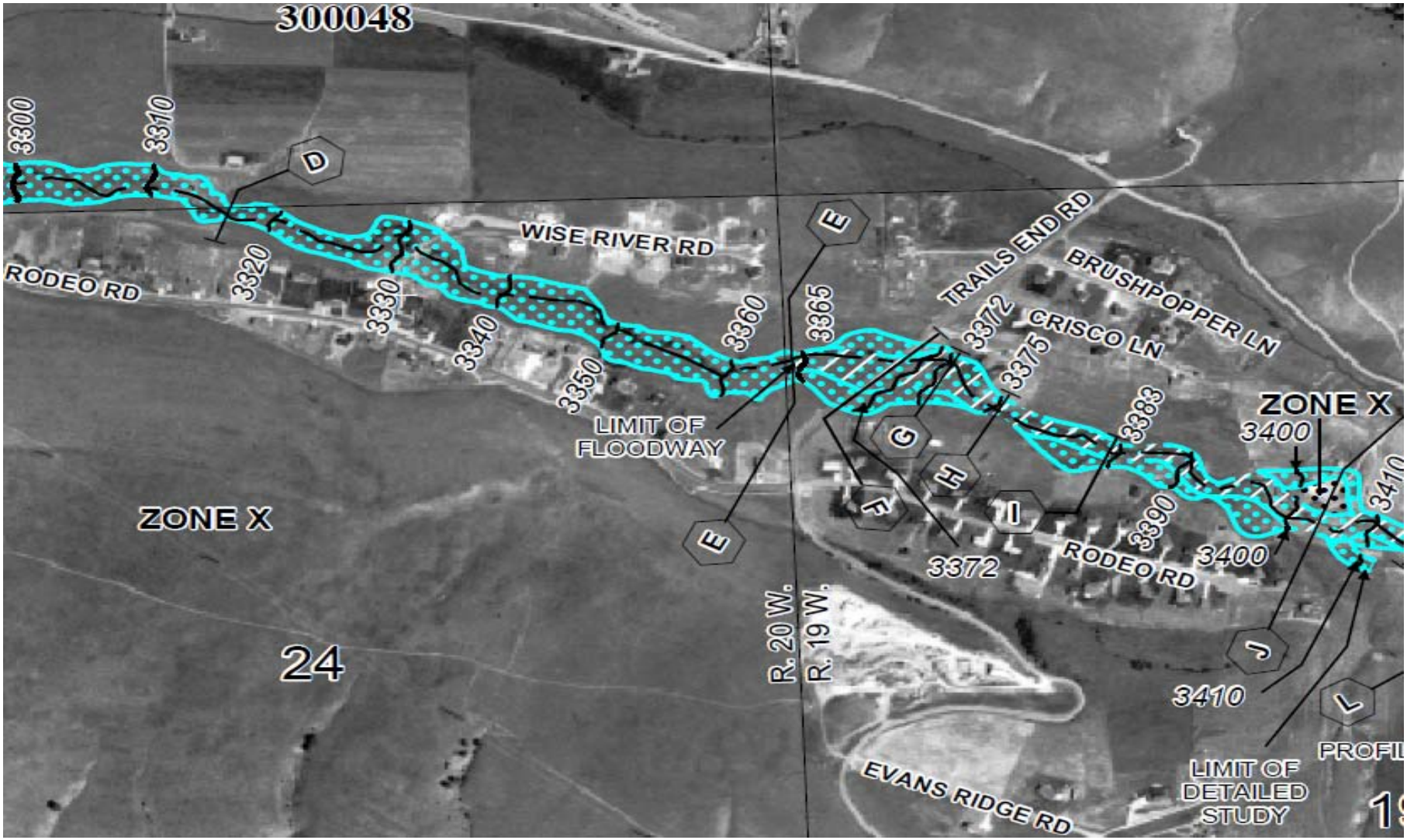
Has Limited Hydraulic Modeling at Bridges and Crossings

Types of Floodplain Maps



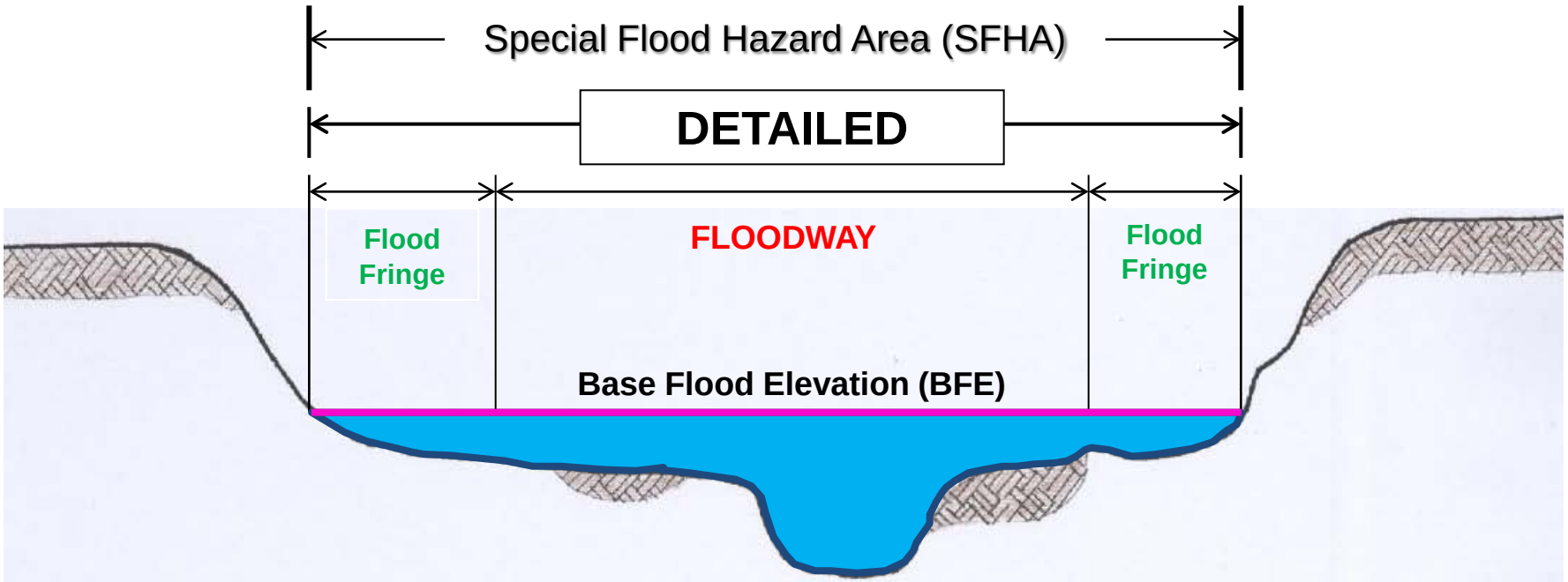
FEMA Flood Insurance Rate Map (FIRM) – **Limited Detail Study**
Miller Creek - Missoula County

Types of Floodplain Maps



FEMA Digital Flood Insurance Rate Map (DFIRM) – **Limited Detail Study**
Miller Creek - Missoula County

Types of Floodplain Studies



Flood Profiles and BFEs are published in FIS.

Based Upon Detailed Hydrology and Topographic data.

Based Upon Detailed Hydraulic Modeling.

Floodway Data Tables are published in the FIS.

Types of Floodplain Studies

How is a Floodway determined?

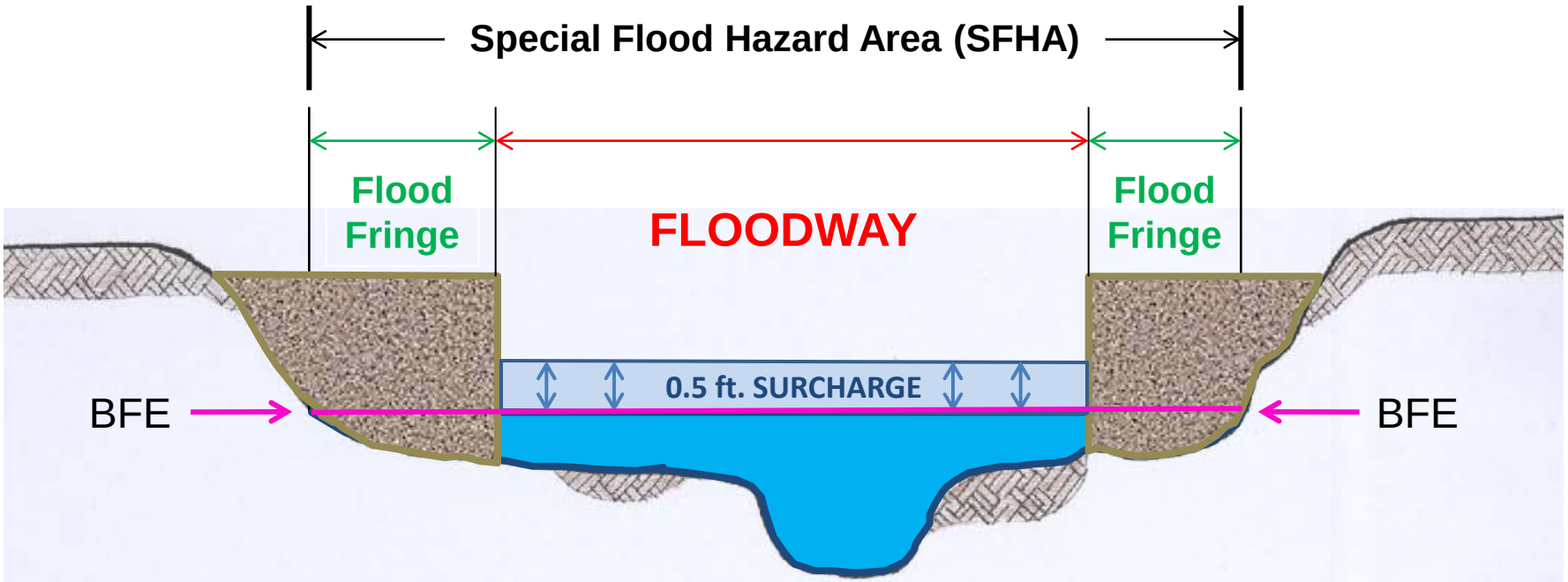
From a “Floodway/Encroachment Analysis”, involving:

- *Hydraulic Modeling*
- *Equal Conveyance Reduction*
- *Establish Encroachment Stations*
- *Surcharge: ≤ 0.5 ft in MT*
- *Results in FIS – Floodway Data Table*

Encroachment – Development within the floodplain including fill, new construction, substantial improvements, bridges, channel crossings, and channel modifications that increase BFE’s.

More details about the floodway will be covered later in the presentation.

Types of Floodplain Studies

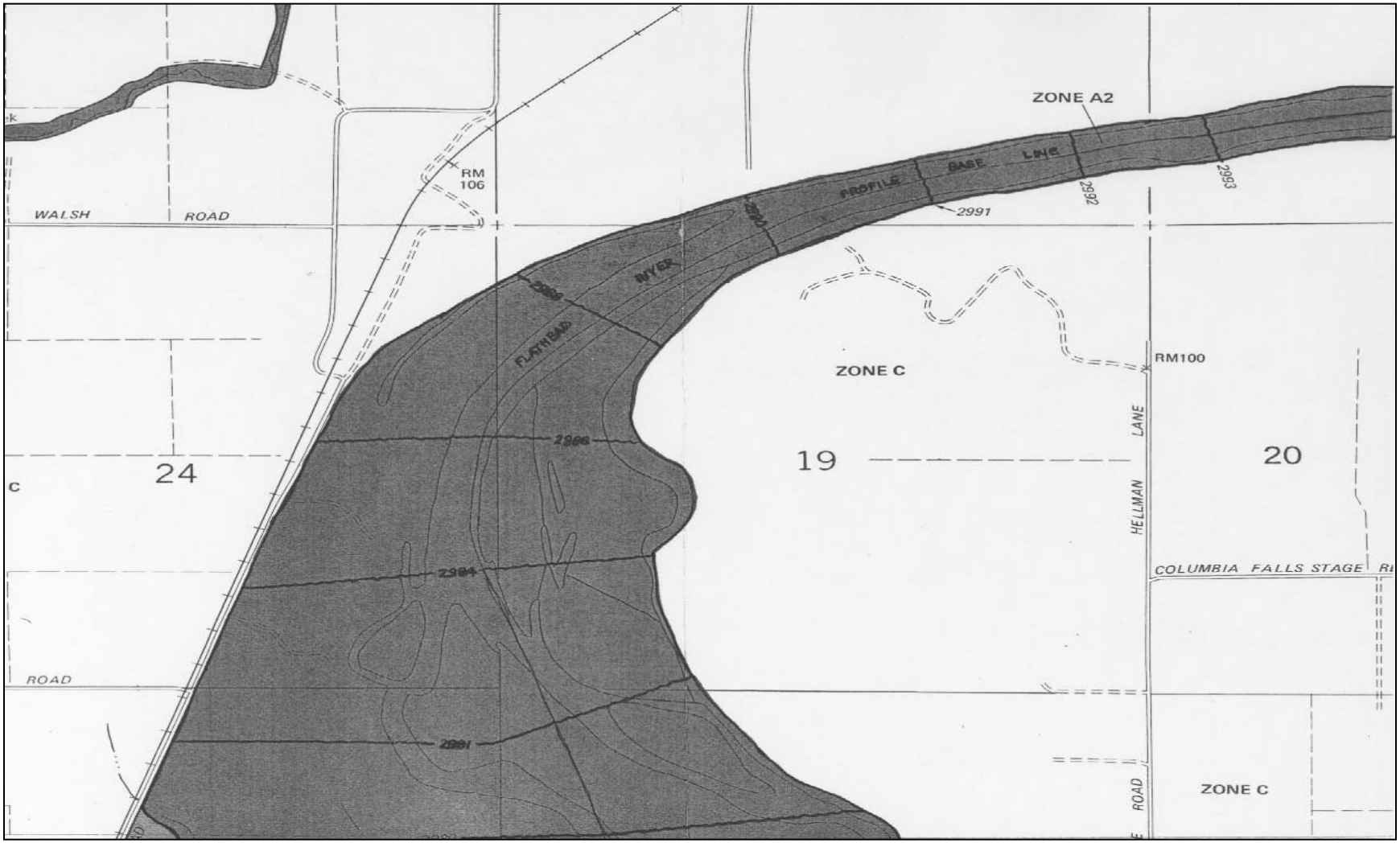


Flood Fringe – Encroachment Area or Area of the Floodplain that could be used for development by raising the ground

Encroachment cannot cause more than 0.5 ft. rise

FLOODWAY – Regulatory Area Only - Limited Development and no Encroachment allowed – Not a Physical Feature.

Types of Floodplain Maps



FEMA Flood Insurance Rate Map (FIRM) - **Detail Study**
Flathead River – Flathead County

Types of Floodplain Maps

FEMA Floodway Boundary Map - **Detail Study**
Flathead River – Flathead County

Types of Floodplain Maps

FEMA Digital Flood Insurance Rate Map (DFIRM) - **Detailed Study**
Flathead River – Flathead County

DFIRM Map Legend

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 Areas 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 V	Coastal flood zone with velocity hazard (wave action); no Base Flood Elevations determined.
ZONE VE	Coastal flood zone with velocity hazard (wave action); Base Flood Elevations determined.

FLOODWAY AREAS IN ZONE AE

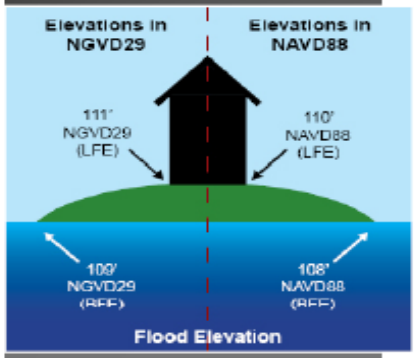
The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood heights.

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.

DFIRM Map Legend

DFIRM Legend



	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

A — A	Cross section line
23 - - - - - 23	Transect line
45° 02' 08", 93° 02' 12"	Geographic coordinates referenced to the North American Datum of 1983 (NAD 83) Western Hemisphere
$^{49}89^{000m}$ N	1000-meter Universal Transverse Mercator grid values, zone 11
4989000 FT	5000-foot grid ticks: Montana State Plane coordinate system, (FIPS Zone 2500), Transverse Mercator
DX5510 ×	Bench mark (see explanation in Notes to Users section of this FIRM panel)
• M1.5	River Mile

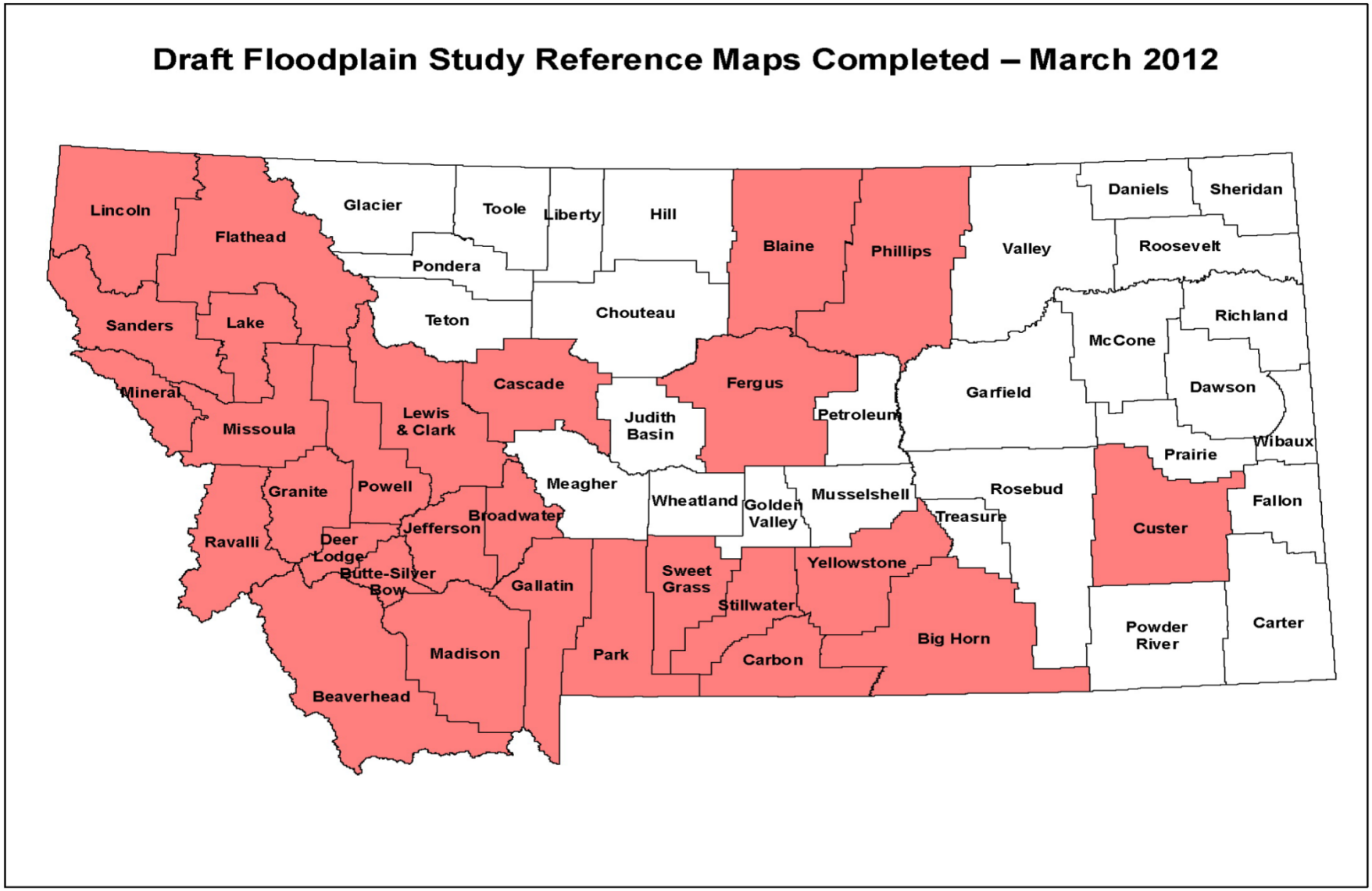
DATUM CONVERSION – NOAA"s VERTCON http://www.ngs.noaa.gov/PC_PROD/VERTCON/

Types of Floodplain Maps

Completed DRAFT Floodplain Study Reference Maps: Statistics (Mar, 2012)

	County	STREAM LENGTH (miles)			LAKE SHORELINE (mi)
		Approximate	Limited Detail	Detailed	Approximate
1	Anaconda Deerlodge	170	0	25	10
2	Beaverhead	30	0	25	0
3	Big Horn	225	20	0	38
4	Blaine	450	0	115	17
5	Broadwater	70	0	0	80
6	Carbon	350	0	50	10
7	Cascade	76	0	89	0
8	Custer	140	0	5	10
9	Fergus	50	0	35	0
10	Flathead	205	0	95	135
11	Gallatin	64	0	70	0
12	Granite	120	0	36	0
13	Jefferson	155	0	3	20
14	Lake	175	0	25	300
15	Lewis & Clark	82	0	50	1
16	Lincoln	450	0	115	17
17	Madison	2	0	3	0
18	Missoula	85	20	110	0
19	Mineral	150	0	0	0
20	Park	400	0	0	65
21	Phillips	455	0	12	145
22	Powell	90	0	20	0
23	Ravalli	0	0	65	0
24	Sanders	320	0	0	10
25	Silver Bow	90	0	34	0
26	Stillwater	113	0	110	0
27	Sweet Grass	98	0	15	0
28	Yellowstone	45	0	93	0
	TOTAL:	**4660**	**40**	**1200**	**858**
	TOTAL ALL:	**6,758**			

Types of Floodplain Maps



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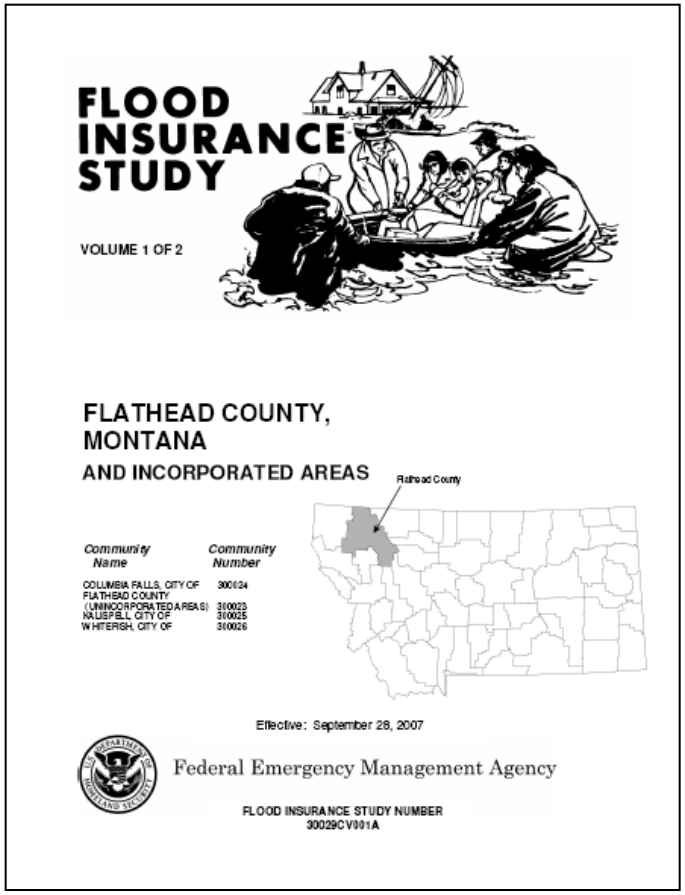
Flood Insurance Study (FIS)

The FIS is a compilation and presentation of flood risk data for specific watercourses and lakes within a community.

The FIS report and associated maps delineate the SFHA, designate flood risk zones and establish BFE's.

The FIS serves as the basis for rating flood insurance, regulating floodplain development and carrying out floodplain management measures.



FLOOD INSURANCE STUDY

VOLUME 1 OF 2

FLATHEAD COUNTY, MONTANA

AND INCORPORATED AREAS

Flathead County

Community Name	Community Number
COLUMBIA FALLS, CITY OF	300024
FLATHEAD COUNTY (UNINCORPORATED AREAS)	300023
KALISPELL, CITY OF	300025
WHITEFISH, CITY OF	300026

Effective: September 28, 2007

Federal Emergency Management Agency

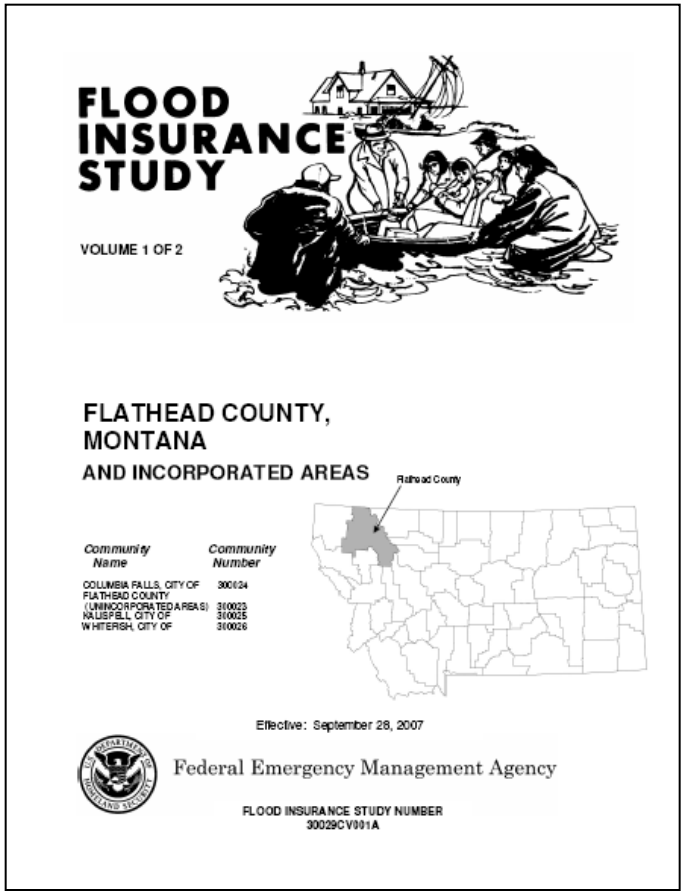
FLOOD INSURANCE STUDY NUMBER 30029CV001A

Floodplains: The Basics

Flood Insurance Study (FIS)

The FIS report has three components:

- *The Flood Insurance Study Report*
- *The FIRM or DFIRM's*
- *Prior to 1986, a separate Flood Boundary and Floodway Map (FBFM) was issued as a component of the FIS*



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Floodplains: The Basics

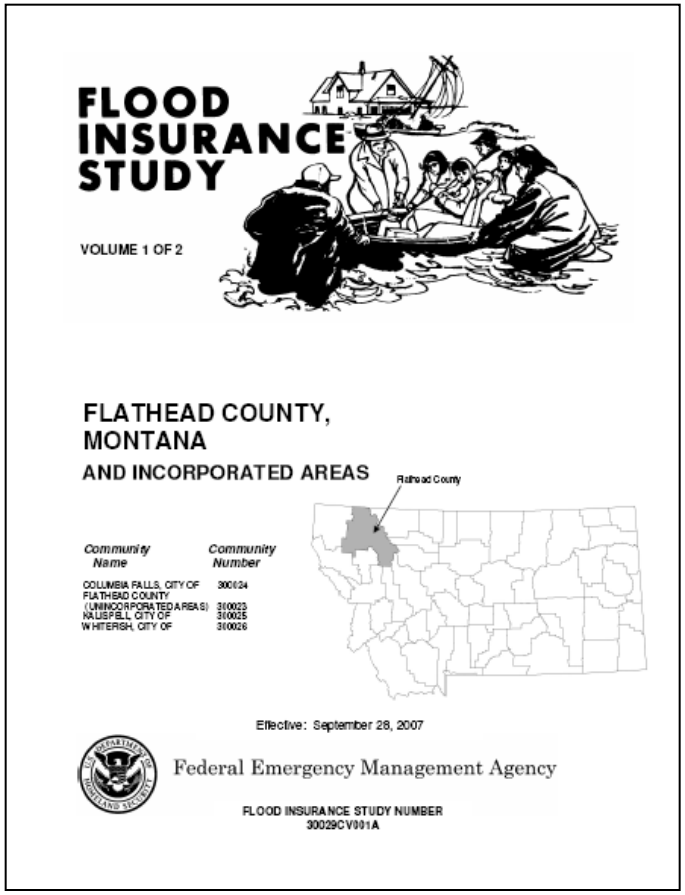
Flood Insurance Study (FIS)

The FIS report is an appraisal of the Community's flood hazards in a narrative that describes:

- *The purpose of the study*
- *Historic floods*
- *The area and flooding sources studied*
- *The engineering methods used*

Contains tables summarizing various flood hazard data.

Contains computed flood profiles.



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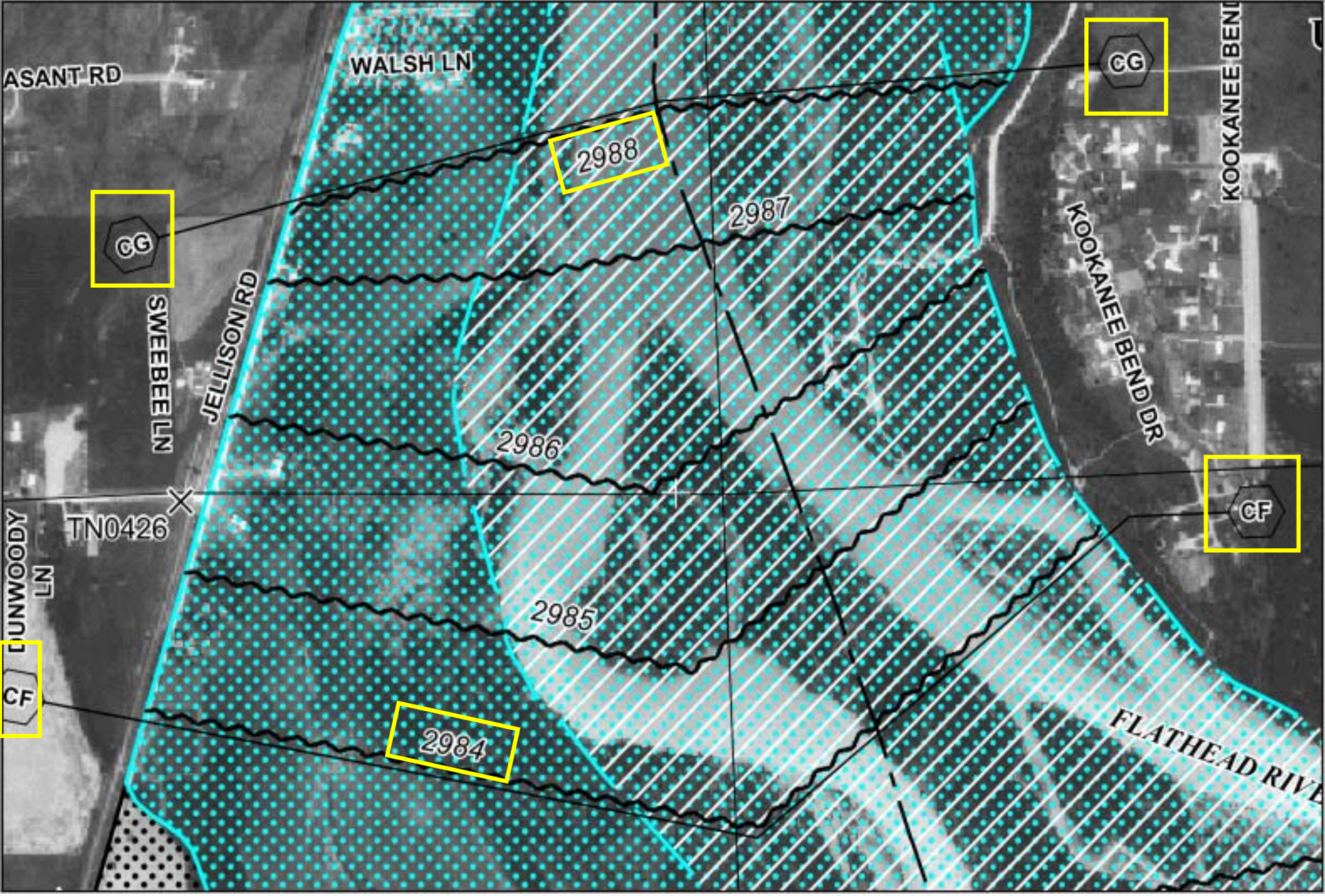

Example – DFIRM

FLOODING SOURCE		FLOODWAY			1-PERCENT ANNUAL CHANCE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY (FEET NAVD)	WITHOUT FLOODWAY (FEET NAVD)	WITH FLOODWAY (FEET NAVD)	INCREASE (FEET)
FLATHEAD RIVER (cont.)								
BO	145,150	3,251	18,754	4.5	2,933.7	2,933.7	2,934.0	0.3
BP	147,050	2,925	15,369	5.4	2,935.5	2,935.5	2,935.8	0.3
BQ	148,550	3,657	20,632	4.0	2,937.2	2,937.2	2,937.6	0.4
BR	151,050	3,931	9,143	9.1	2,940.7	2,940.7	2,940.7	0.0
BS	153,950	3,194	12,346	6.8	2,945.1	2,945.1	2,945.1	0.0
BT	156,550	2,604	18,187	4.6	2,947.3	2,947.3	2,947.3	0.0
BU	158,650	2,002	7,356	11.4	2,949.5	2,949.5	2,949.5	0.0
BV	160,350	1,252	10,087	8.3	2,953.2	2,953.2	2,953.2	0.0
BW	162,150	971	7,894	10.6	2,956.3	2,956.3	2,956.3	0.0
BX	163,700	1,750	14,184	5.9	2,957.9	2,957.9	2,957.9	0.0
BY	165,550	1,850	7,621	11.0	2,960.2	2,960.2	2,960.2	0.0
BZ	167,300	1,608	12,297	6.8	2,962.7	2,962.7	2,962.7	0.0
CA	170,100	2,013	12,744	6.5	2,966.7	2,966.7	2,966.7	0.0
CB	172,400	1,280	12,883	6.5	2,969.8	2,969.8	2,970.3	0.5
CC	174,500	1,377	12,545	6.6	2,972.7	2,972.7	2,973.2	0.5
CD	178,000	2,506	20,757	4.0	2,977.6	2,977.6	2,978.1	0.5
CE	180,700	2,416	17,097	4.9	2,980.9	2,980.9	2,981.4	0.5
CF	183,600	2,775	19,317	4.4	2,984.0	2,984.0	2,984.3	0.3
CG	186,700	2,125	15,714	5.4	2,988.0	2,988.0	2,988.5	0.5
CH	191,400	730	9,788	8.6	2,993.7	2,993.7	2,994.2	0.5
CI	197,900	469	8,694	9.7	2,997.8	2,997.8	2,998.3	0.5
CJ	200,070	1,181	12,310	7.7	3,004.1	3,004.1	3,004.3	0.2

[1]Feet above confluence with Flathead Lake

TABLE 6

FEDERAL EMERGENCY MANAGEMENT AGENCY

FLATHEAD COUNTY, MT
AND INCORPORATED AREAS

FLOODWAY DATA

FLATHEAD RIVER

Example – Floodway Data Table

FLOODING SOURCE		FLOODWAY			1-PERCENT ANNUAL CHANCE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY (FEET NAVD)	WITHOUT FLOODWAY (FEET NAVD)	WITH FLOODWAY (FEET NAVD)	INCREASE (FEET)
FLATHEAD RIVER (cont.)								
BO								
BP								
BQ								
BR								
BS								
BT								
BU	158,650	2						
BV	160,350	1						
BW	162,150	971	7,894	10.6				
BX	163,700	1,750	14,184	5.9				
BY	165,550	1,850	7,621	11.0				
BZ	167,300	1,608	12,297	6.8	2,962.7	2,962.7	2,962.7	0.0
CA	170,100	2,013	12,744	6.5	2,966.7	2,966.7	2,966.7	0.0
CB	172,400	1,280	12,883	6.5	2,969.8	2,969.8	2,970.3	0.5
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CI	197,900	469	8,694	9.7	2,997.8	2,997.8	2,998.3	0.5
CJ	200,070	1,181	12,310	7.7	3,004.1	3,004.1	3,004.3	0.2

[1]Feet above confluence with Flathead Lake

Cross
to Sta

Distance from t
of the detailed s
profile.

Floodway Data - Important data needed for determining floodway boundarys.

TABLE 6

FEDERAL EMERGENCY MANAGEMENT AGENCY

FLATHEAD COUNTY, MT
AND INCORPORATED AREAS

FLOODWAY DATA

FLATHEAD RIVER

Example – Floodway Data Table

FLOODING SOURCE	FLOODWAY	1-PERCENT ANNUAL CHANCE FLOOD WATER SURFACE ELEVATION

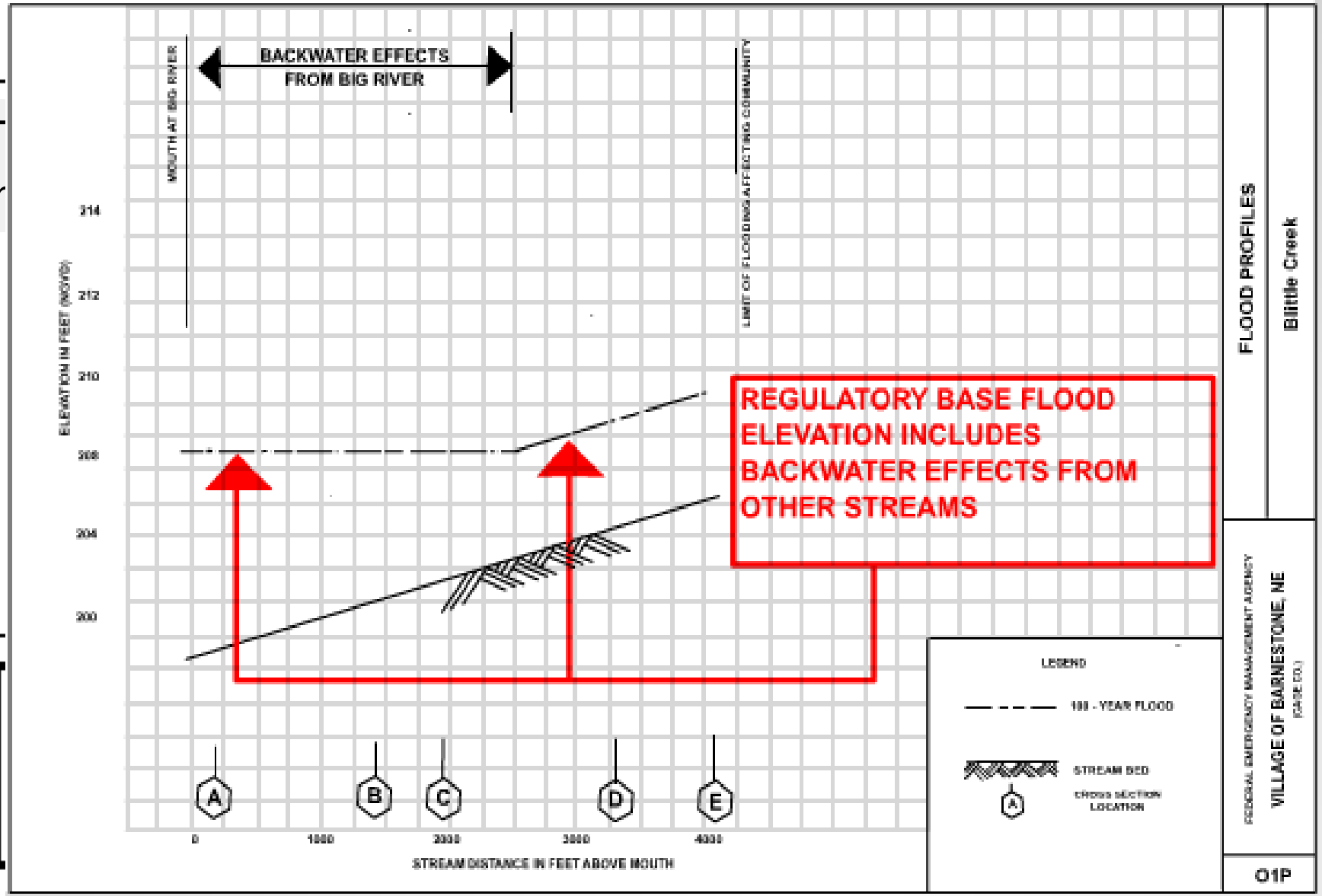
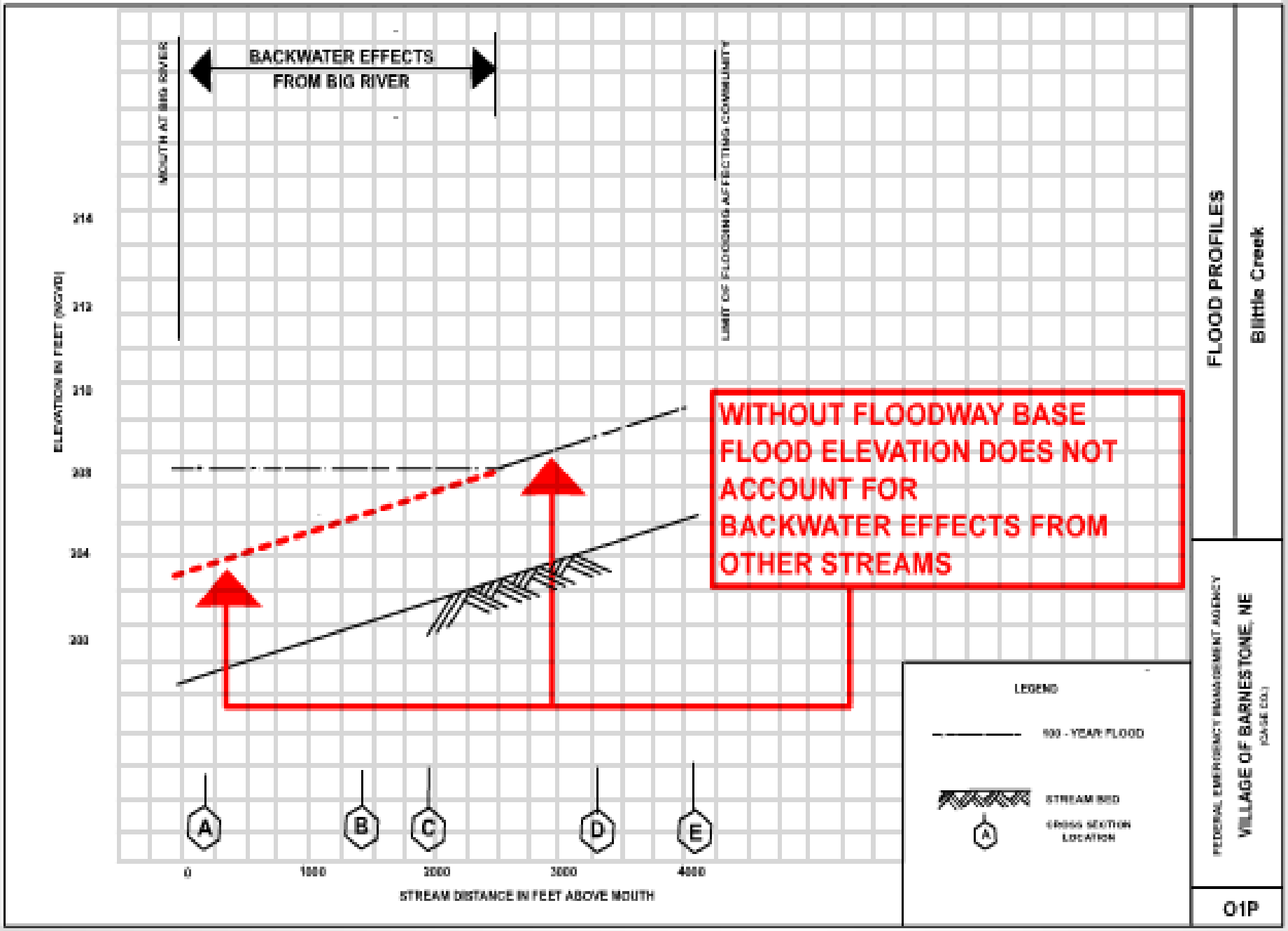


TABLE 6

Example – Floodway Data Table


BACKWATER EFFECTS FROM BIG RIVER
MOUTH AT BIG RIVER
LIMIT OF FLOODING AFFECTING COMMUNITY
ELEVATION IN FEET (NGVD)
214
212
210
208
204
202
WITHOUT FLOODWAY BASE FLOOD ELEVATION DOES NOT ACCOUNT FOR BACKWATER EFFECTS FROM OTHER STREAMS
A
B
C
D
E
0
1000
2000
3000
4000
STREAM DISTANCE IN FEET ABOVE MOUTH
LEGEND
100 - YEAR FLOOD
STREAM BED
CROSS SECTION LOCATION
FLOOD PROFILES
Blittle Creek
FEDERAL EMERGENCY MANAGEMENT AGENCY
VILLAGE OF BARNESTONE, NE
(LANCE CO.)
01P

Flood Insurance Study (FIS)

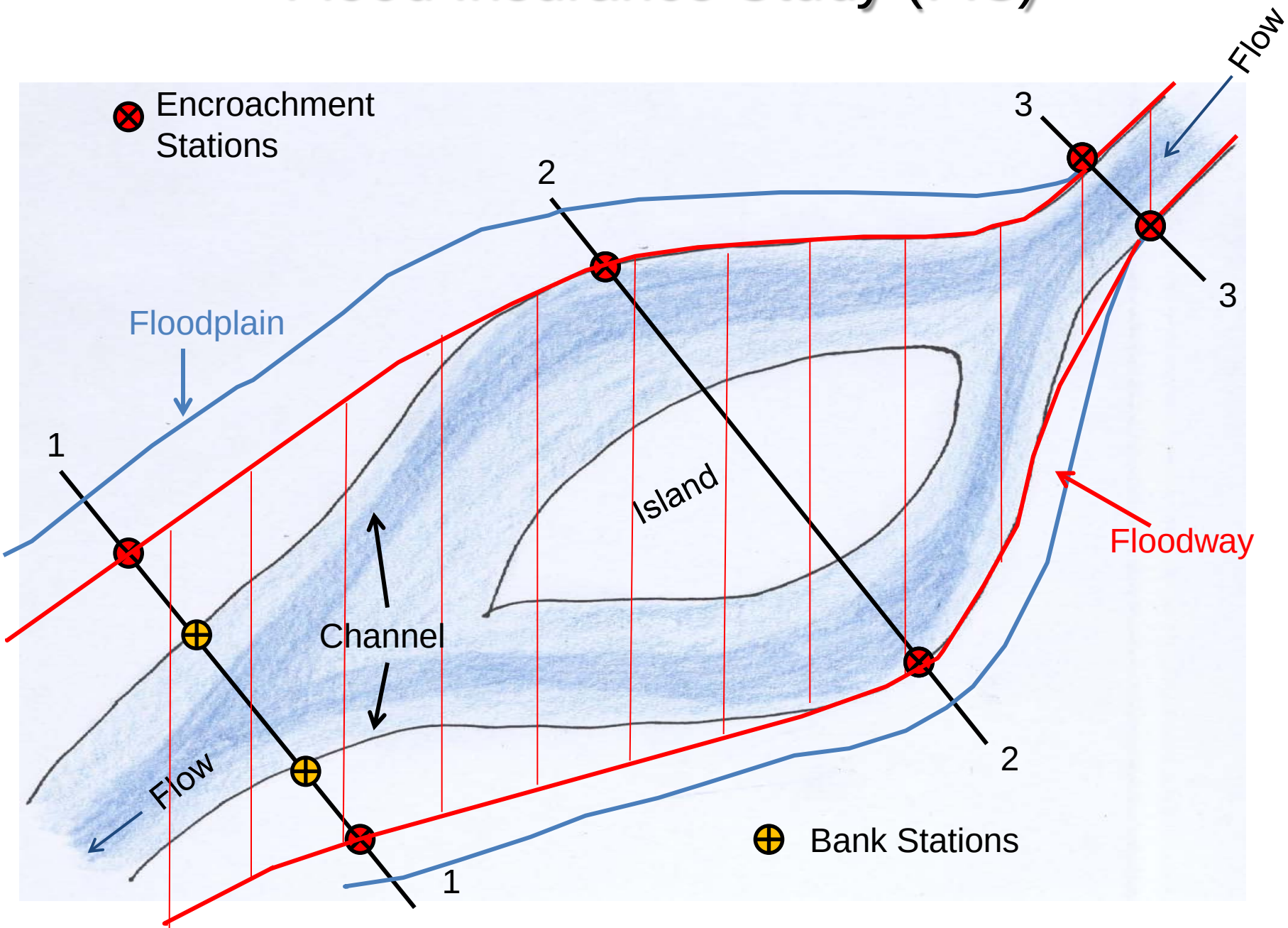
How is a Floodway determined?

A floodway analysis determines the boundaries of the floodway in order to account for continued development in the floodplain that will obstruct flood flows, which will back water up or divert it to other properties.

A floodway analysis is done with a computer program that can make the necessary calculations of the effects of further development.

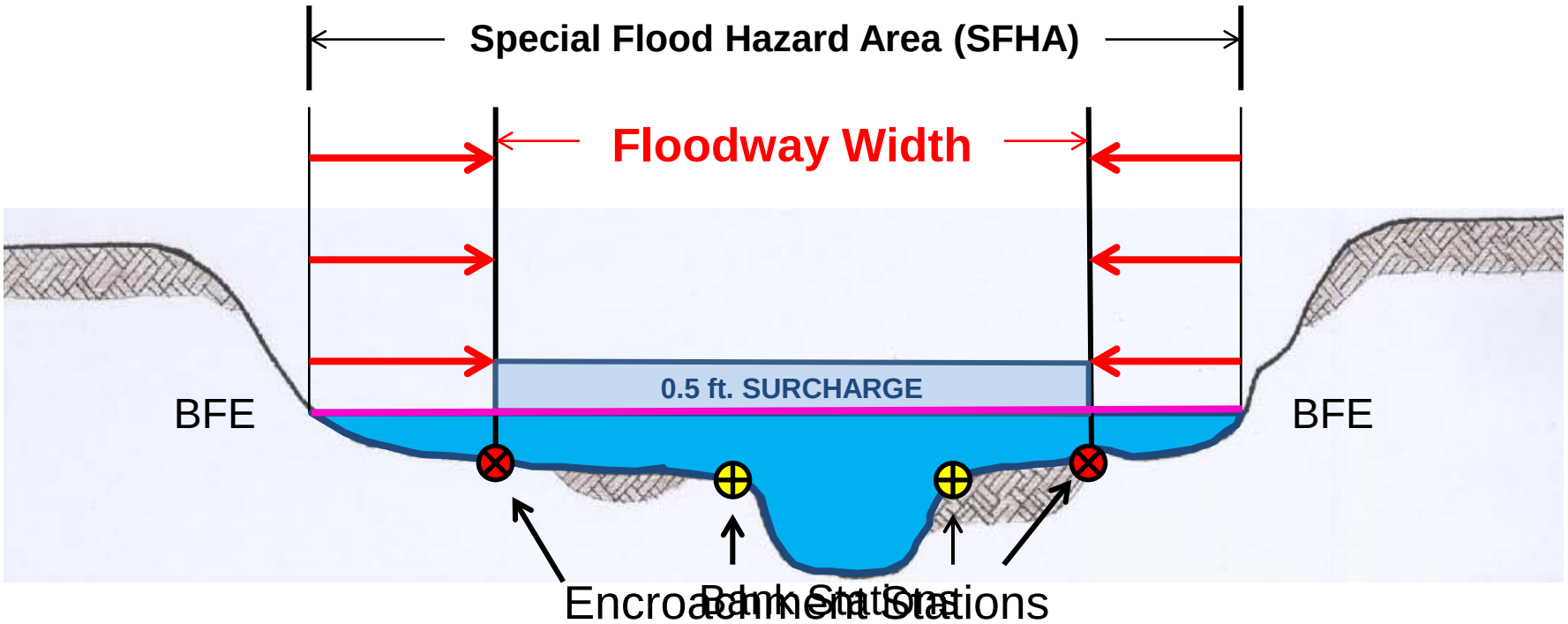
The encroachment causes a 0.5 foot rise, encroachment stations are set and the floodway boundaries are drawn.

Flood Insurance Study (FIS)



Flood Insurance Study (FIS)

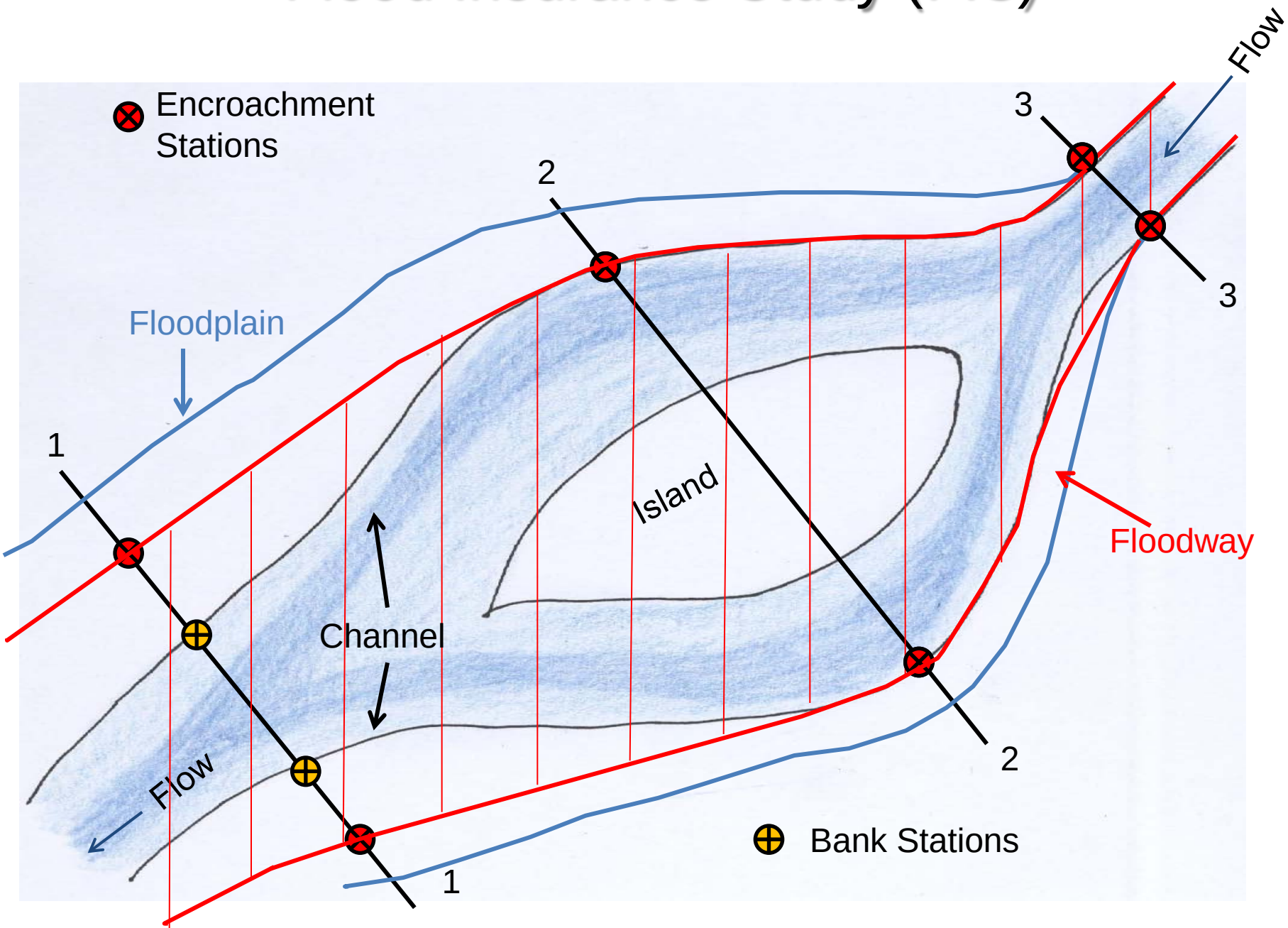
Cross Section 1



Beginning at both edges of the floodplain, the computer model starts "filling" the floodplain.

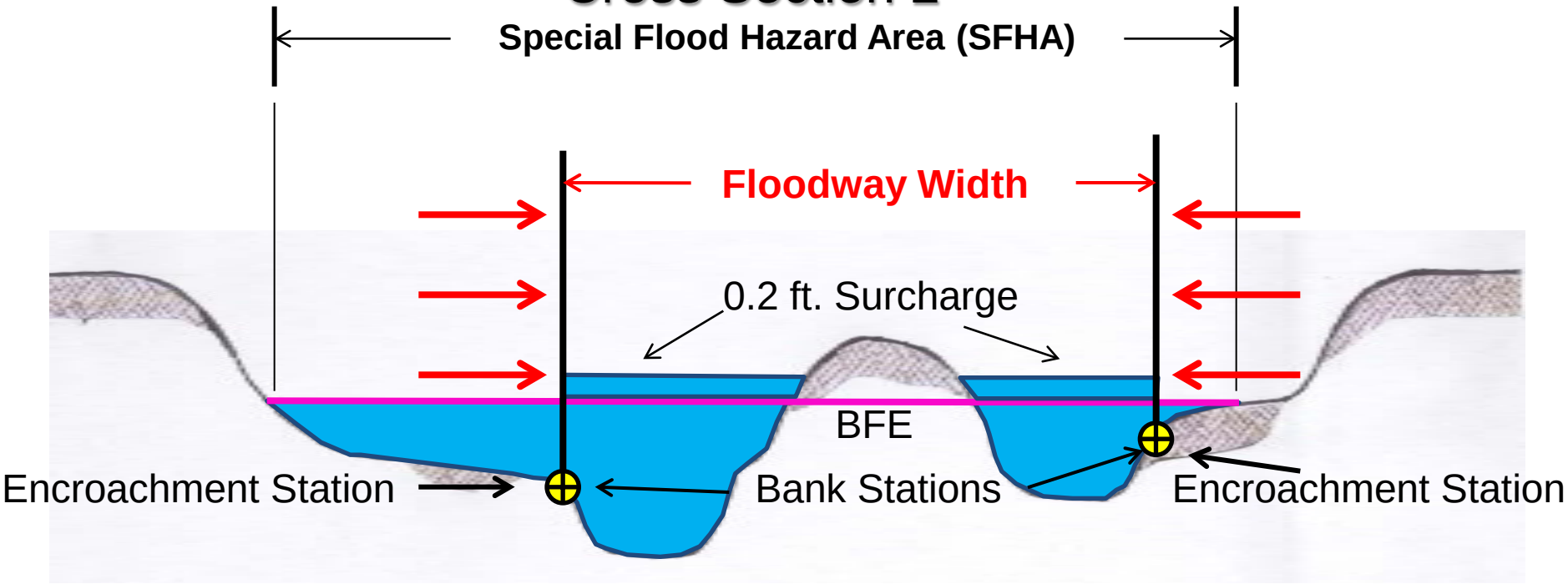
This "squeezes" the floodwater toward the channel and causes the flood level to rise up to 0.5 ft..

Flood Insurance Study (FIS)



Flood Insurance Study (FIS)

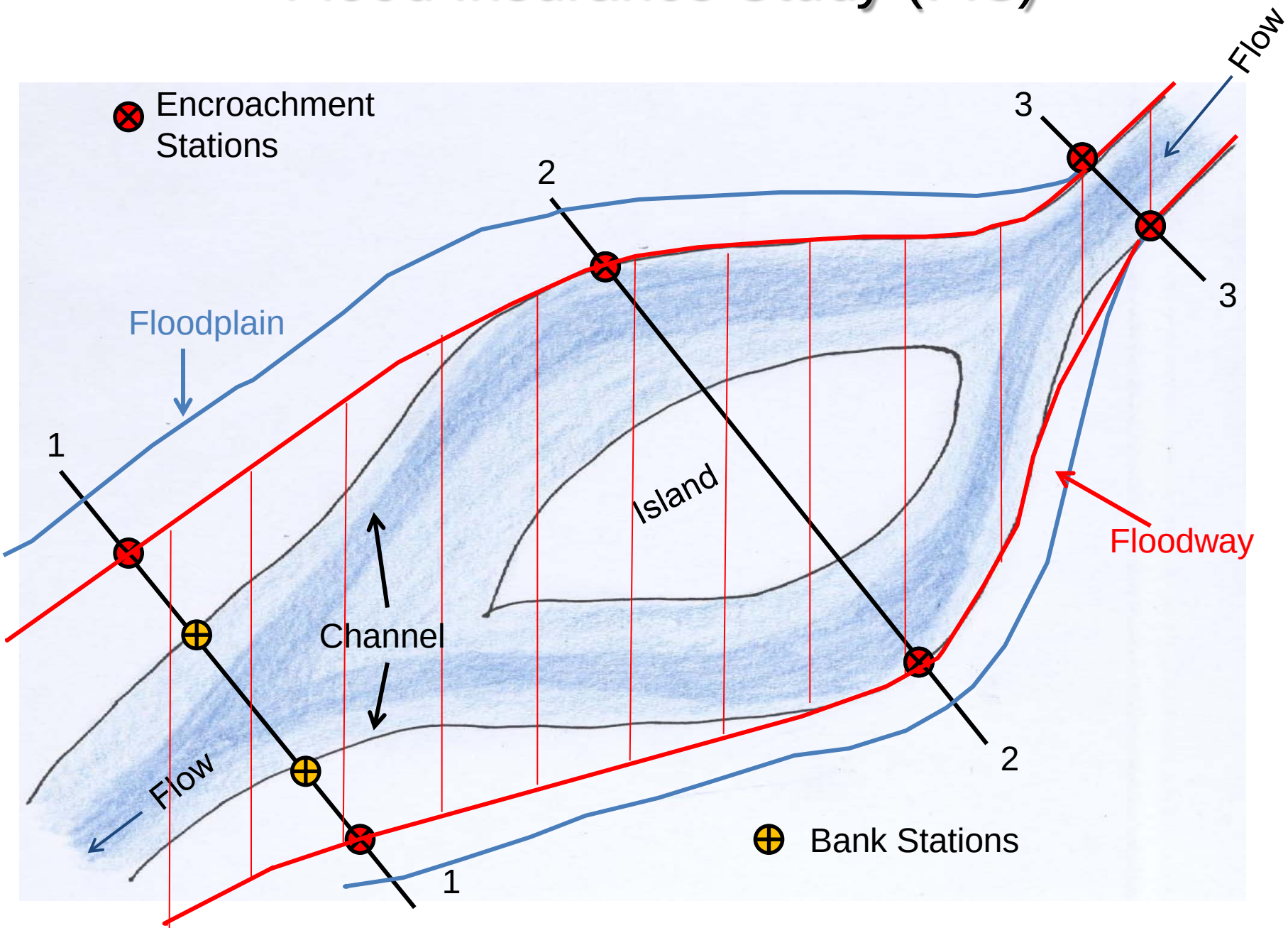
Cross Section 2



The Encroachment Stations can never be allowed to be squeezed in past the Bank Stations.

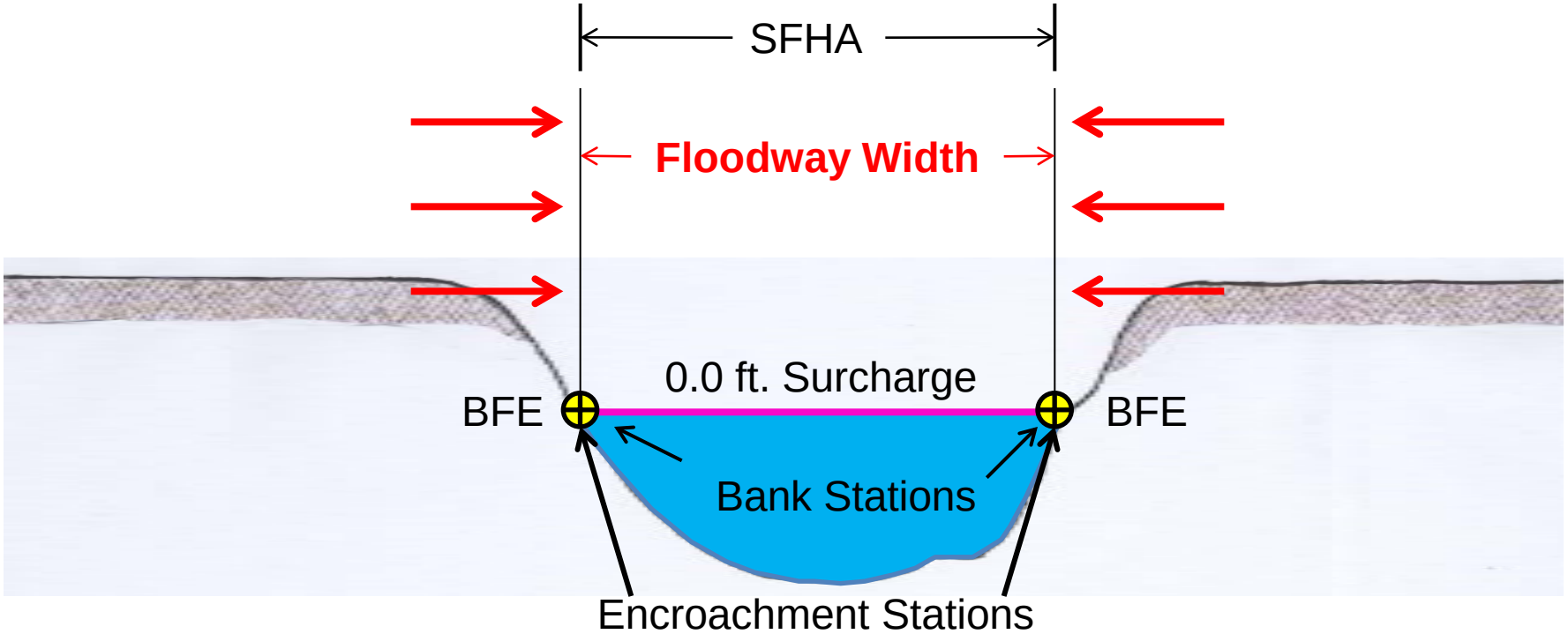
Topographic conditions and the need to “smooth out” the floodway line will result in some cross sections having increases of less than 0.5 ft..

Flood Insurance Study (FIS)



Flood Insurance Study (FIS)

Cross Section 3



Not every cross section will show a 0.5 ft. rise, some may show less, some may have none, depending upon channel shape.

Floodway and floodplain boundaries may appear identical for an incised channel with steep banks because the encroachment makes very little difference in the horizontal distance between the bank stations and the encroachment stations.

Flood Insurance Study (FIS)

Flood Profiles

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

- A plot of the stream bed elevation,
- The locations of the cross sections used in the FIS and shown on the FIRM (a letter within a hexagon),
- The locations of roads,
- Culverts and bridges (usually depicted as a large “I”).

By reading the flood profile, you can determine the flood elevation at any point along the stream.

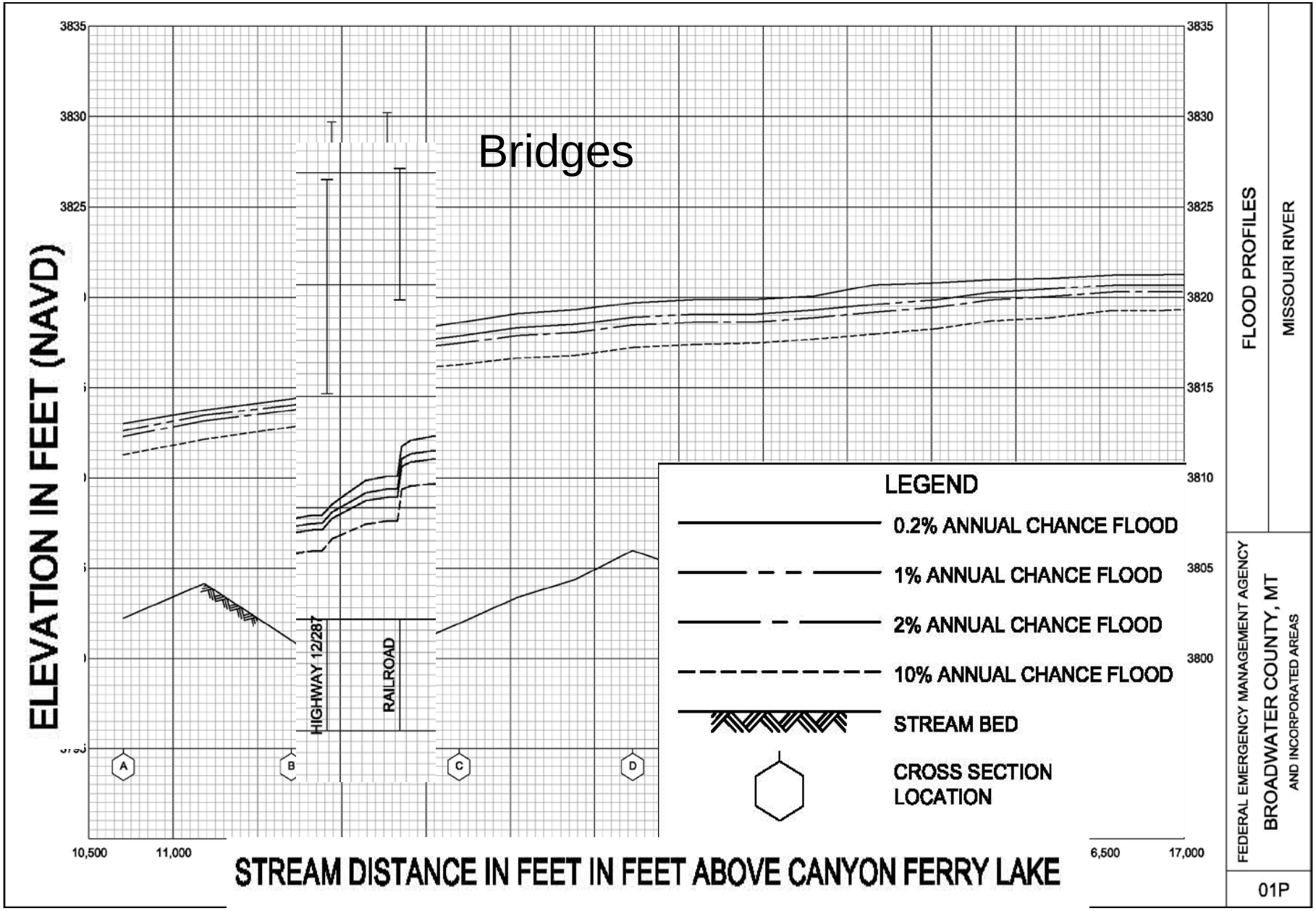
Flood Insurance Study (FIS)

Flood Profiles

The legend at the bottom right corner shows the symbol for each flood profile plotted and various features.

The bottom of the graph (the horizontal axis or x-axis) shows the distance along the stream, which is commonly called stationing. For stationing, you start at the mouth of a stream and work upstream.

The left and right vertical sides, or y-axis, shows the elevation in feet NAVD 88, or a different datum depending upon the effective date of the FIS.



Example – Flood Profile

Flood Insurance Study (FIS)

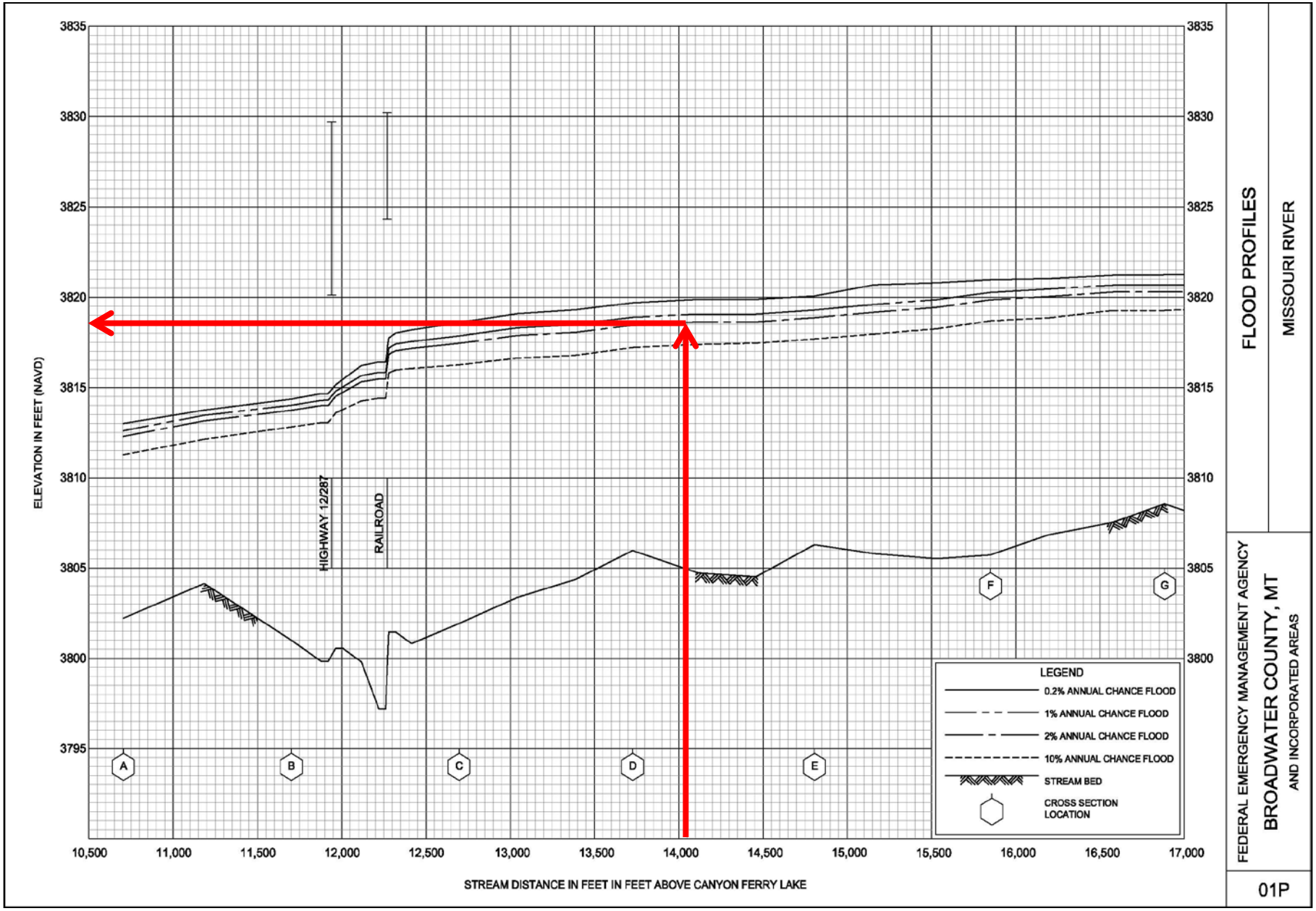
Flood Profiles

In order to identify the BFE at a development site, the stream stationing for the site must be determined.

Determine the site's distance from a cross section or other feature that appears on the profile.

Find the feature's stationing on the horizontal, or x-axis, and draw a vertical line upward until it intersects the appropriate flood profile.

Draw a horizontal straight line to the left or right edge of the graph and read the elevation on the y-axis.



Example – Flood Profile

Floodplains: The Basics

Questions?

DNRC Website

http://www.dnrc.mt.gov/wrd/water_op/floodplain/default.asp

FEMA Map Store

https://msc.fema.gov/webapp/wcs/stores/servlet/FemaWelcomeView?storeId=10001&catalogId=10001&langId=-1