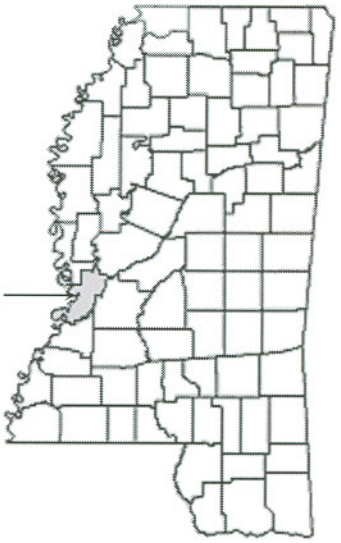
FLOOD INSURANCE STUDY

WARREN COUNTY, MISSISSIPPI
AND INCORPORATED AREAS



COMMUNITY NAME	COMMUNITY NUMBER
VICKSBURG, CITY OF	280176
WARREN COUNTY (UNINCORPORATED AREAS)	280198

EFFECTIVE:

Federal Emergency Management Agency

FLOOD INSURANCE STUDY NUMBER
28149CV000

NOTICE TO
FLOOD INSURANCE STUDY USERS

Communities participating in the National Flood Insurance Program (NFIP) have established repositories of flood hazard data for floodplain management and flood insurance purposes. This Flood Insurance Study (FIS) may not contain all data available within the repository. It is advisable to contact the community repository for any additional data.

Part or all of this FIS may be revised and republished at any time. In addition, part of this FIS may be revised by the Letter of Map Revision process, which does not involve republication or redistribution of the FIS. It is, therefore, the responsibility of the user to consult with community officials and to check the community repository to obtain the most current FIS components.

Initial Coutywide FIS Effective Date:

Revised Coutywide FIS Dates:

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FLOOD INSURANCE STUDY
WARREN COUNTY, MISSISSIPPI AND INCORPORATED AREAS

1.0 INTRODUCTION

1.1 Purpose of Study

This Flood Insurance Study (FIS) revises and supersedes the FIS reports and/or Flood Insurance Rate Maps (FIRMs) in the geographic area of Warren County, Mississippi, including the City of Vicksburg and unincorporated areas of Warren County (hereinafter referred to collectively as Warren County).

This FIS aids in the administration of the National Flood Insurance Act of 1968 and the Flood Disaster Protection Act of 1973. This study has developed flood risk data for various areas of the community that will be used to establish actuarial flood insurance rates. This information will also be used by Warren County to update existing floodplain regulations as part of the Regular Phase of the National Flood Insurance Program (NFIP), and by local and regional planners to further promote sound land use and floodplain development. Minimum floodplain management requirements for participation in the NFIP are set forth in the Code of Federal Regulations at 44 CFR, 60.3.

In some States or communities, floodplain management criteria or regulations may exist that are more restrictive or comprehensive than the minimum Federal requirements. In such cases, the more restrictive criteria take precedence and the State (or other jurisdictional agency) will be able to explain them.

1.2 Authority and Acknowledgments

The sources of authority for this FIS report are the National Flood Insurance Act of 1968 and the Flood Disaster Protection Act of 1973.

For the initial Warren County (Unincorporated Areas) FIS, the hydrologic and hydraulic analyses were performed by the U.S. Army Corps of Engineers (USACE), Vicksburg District, for the Federal Emergency Management Agency (FEMA) in May 1977 (U.S. Dept. of Housing and Urban Development, 1979).

For the April 17, 1987 Warren County (Unincorporated Areas) FIS revision, the additional hydrologic and hydraulic analysis for Bliss Creekwas performed by the USACE, Vicksburg District (the Study Contractor) for FEMA, under Inter-Agency Agreement No. IAA-H-16-75, Project Order No. 20, and Inter-Agency Agreement No. IAA-H-7-76, Project Order No. 1. The study was completed in January 1985 (FEMA, 1987).

For the initial City of Vicksburg FIS, the hydrologic and hydraulic analyses for Durden Creek, Durden Creek Tributary 3, Stouts Bayou, and Stouts Bayou Tributary were performed by the U.S. Department of the Interior, Geological Survey (USGS), Water Resources Division, (the Study Contractor) for FEMA, under Inter-Agency Agreement

No. EMW-85-E-1823, Project Order No. 16. The study was completed September 1986 (FEMA, 1989).

Additional hydrologic and hydraulic information for portions of Durden Creek, Durden Creek Tributary 1, Durden Creek Tributary 2, Hatcher Bayou, Hatcher Bayou Tributary 1, Hatcher Bayou Tributary 2, and the Mississippi River was obtained from a floodplain information report developed by the USACE for the City of Vicksburg and Warren County and from a FIS for Warren County, Mississippi (FEMA, 1987).

The hydrologic and hydraulic analyses for this countywide FIS were performed by the State of Mississippi for the Federal Emergency Management Agency (FEMA), under Contract No. EMA-2004-CA-5028. This study was completed in September 2006.

The digital base map information files were provided by the Warren County GIS/IS office. This data included digital orthophotography flown and processed by GRW Aerial Surveys Inc. in February 2002, with a resolution of 2 feet and are in NAD 83 Mississippi State Plane West, feet projection.

The digital FIRM was produced using the Mississippi State Plane Coordinate System, West Zone, FIPSZONE 2302. The horizontal datum was the North American Datum of 1983, GRS 80 spheroid. Distance units were measured in U.S. feet.

1.3 Coordination

An initial Consultation Coordination Officer's (CCO) meeting is held with representatives from FEMA, the community, and the study contractor to explain the nature and purpose of a FIS, and to identify the streams to be studied by detailed methods. A final CCO meeting is held with representatives from FEMA, the community, and the study contractor to review the results of the study.

For the April 17, 1987, Warren County (Unincorporated Areas) FIS revision, a meeting was held on September 23, 1976, with representatives of FEMA, the Study Contractor, the Warren County Board of Supervisors, and interested citizens. A search for basic data was made at all levels of government. The Central Mississippi Planning and Development District, the Jackson Area Office of the U.S. Department of Housing and Urban Development, the Mississippi Employment Security Commission, the U.S. Weather Service, the Mississippi Research and Development Center, the U.S. Geological Survey (USGS), the " Vicksburg Evening Post," the Vicksburg Civil Defense Office, and various local officials and private citizens supplied useful data for the preparation of this FIS report. On May 8, 1986, the results of this FIS were reviewed and accepted at a final coordination meeting attended by representatives of the Study Contractor, FEMA, and the community.

For the September 29, 1989, City of Vicksburg FIS, on November 1, 1988, the results of the City of Vicksburg FIS were reviewed and accepted at a final coordination meeting attended by representatives of the Study Contractor, FEMA, and the community.

For this countywide FIS, an initial Pre-Scoping Meeting was held on May 4, 2004. A Project Scoping Meeting was held on July 7, 2004, followed by a Post-Scoping

Meeting on July 21, 2004. Attendees for these meetings included representatives from the Mississippi Department of Environmental Quality, Mississippi Emergency Management Agency, FEMA National Service Provider, Warren County, the City of Vicksburg, the State, and the Study Contractor. Coordination with county officials and Federal, State, and regional agencies produced a variety of information pertaining to floodplain regulations, available community maps, flood history, and other hydrologic data. All problems raised in the meetings have been addressed.

2.0 AREA STUDIED

2.1 Scope of Study

This FIS covers the geographic area of Warren County, Mississippi.

For the April 17, 1987 Warren County (Unincorporated Areas) FIS, the following flooding sources were studied by detailed methods: Bliss Creek, Hatcher Bayou and its tributaries, Stouts Bayou, Durden Creek, Yazoo River, Steele Bayou, Collins Creek, and the Mississippi River. As directed by FEMA, floodway delineation for the Yazoo River was not required.

For the September 29, 1989, City of Vicksburg FIS, the following flooding sources were studied by detailed methods: Durden Creek, Durden Creek Tributary 1, Durden Creek Tributary 2, Durden Creek Tributary 3, Stouts Bayou, Stouts Bayou Tributary 1, Hatcher Bayou, Hatcher Bayou Tributary 1, Hatcher Bayou Tributary 2, and the Mississippi River. The Yazoo River Diversion Channel was found to be under the influence of the Mississippi River overflow.

For this countywide FIS, certain streams were studied by limited detailed methods. This study type entails collecting basic field measurements of hydraulic structures and channel geometry. Vertical control for the measurements is established using Real Time Kinematics Global Positioning System instrumentation. Generalized roughness values are estimated from land-use data, aerial photography, and photographs collected during survey. Channel and overbank reach lengths are computed using GIS methods. Model results are calibrated to known stage values, as they are available and deemed reliable. The following table lists the flooding sources, which were newly studied by limited detailed methods:

TABLE 1. STREAMS STUDIED BY LIMITED DETAILED METHODS

Stream	Limits of New Detailed Study
Clear Creek	From a point approximately 1,080 feet upstream of Interstate 20 West to a point approximately 5,430 feet upstream of the confluence of Muddy Creek.
Clear Creek Tributary 1	From the confluence with Clear Creek to a point approximately 2,700 feet upstream from the confluence with Clear Creek.

TABLE 1. STREAMS STUDIED BY LIMITED DETAILED METHODS - continued

Stream	Limits of New Detailed Study
Crouches Creek	From a point approximately 1,265 feet downstream of the confluence of Crouches Creek Tributary 2 to a point approximately 2,965 feet upstream of the confluence of Crouches Creek Tributary 3.
Crouches Creek Tributary 2	From the confluence with Crouches Creek to a point approximately 2,800 feet upstream of the confluence with Crouches Creek.
Crouches Creek Tributary 3	From the confluence with Crouches Creek to a point approximately 3000 feet upstream of the confluence with Crouches Creek.
Glass Bayou	From the confluence with the Yazoo River to a point approximately 350 feet upstream of Evergreen Drive.
Muddy Creek	From the confluence with Clear Creek to a point approximately 5,000 feet upstream of the confluence with Clear Creek.
Muddy Creek Tributary 1	From the confluence with Muddy Creek to a point approximately 6,036 feet upstream of the confluence with Muddy Creek.
Paces Bayou	From a point approximately 3,060 feet upstream from the confluence with Hennesseys Bayou to a point approximately 200 feet upstream from the confluence of Paces Bayou Tributary 3.
Paces Bayou Tributary 1	From the confluence with Paces Bayou to a point approximately 660 feet upstream from the confluence of Paces Bayou Tributary 1.1.
Paces Bayou Tributary 3	From the confluence with Paces Bayou to a point approximately 2000 feet upstream of Redbone Road.
Silver Creek	From a point approximately 4,440 feet upstream from the confluence of Silver Creek Tributary 1 to a point approximately 5,360 feet upstream from the confluence of Silver Creek Tributary 4.
Stouts Bayou	From a point approximately 400 feet upstream from the confluence of Stouts Bayou Tributary to a point approximately 80 upstream of Spring Street.

TABLE 1. STREAMS STUDIED BY LIMITED DETAILED METHODS - continued

Stream	Limits of New Detailed Study
Silver Creek Tributary 2	From the confluence with Silver Creek to a point approximately 4,900 feet upstream from the confluence with Silver Creek.
Silver Creek Tributary 3	From the confluence with Silver Creek to a point approximately 5,000 feet upstream from the confluence with Silver Creek.

2.2 Community Description

Warren County is in southwestern Mississippi and is bordered by Issaquena County, Mississippi, and Sharkey County, Mississippi, on the north; Hinds County, Mississippi, on the east; Claiborne County, Mississippi, on the south; and by the Mississippi River and the State of Louisiana on the west. The county covers approximately 587 square miles, and has 1 strong municipality. The county is served by Interstate Routes 20, U.S. Highways 80 and 61, and State Highways 3, 27, and 465. The county is also served by the Kansas City Southern and Illinois Central Railroads.

The 2005 population of Warren County was reported to be 49,131 (U.S. Census Bureau, 2006).

The economy of Warren County is diverse with manufacturing and retail trade being the largest industries (U.S. Census Bureau, 2006).

The topography of Warren County consists of rolling hills with large flat areas in creek and river bottoms. The climate of the county is generally mild and humid, with abundant rainfall that averages 52.2 inches annually (National Weather Service, Vicksburg, 2006). Temperatures range from monthly averages of 47 degrees Fahrenheit (°F) in January to 82°F in July (National Weather Service, Vicksburg, 2006).

2.3 Principal Flood Problems

The low-lying areas of Warren County are subject to periodic large-scale flooding caused by overflow from the Mississippi, Big Black, and Yazoo Rivers. Localized small-scale flooding also can occur along tributary streams in the county, and within the corporate limits of City of Vicksburg. Flooding may result from intense localized rainfall of short duration or from accumulated water due to lack of drainage because of extended periods of high stages on the Yazoo and Mississippi Rivers.

The Mississippi River has exceeded its bankfull stage of 42 feet at Vicksburg 54 times since 1901, with the highest stage being 58.4 feet recorded in May 1927. A stage of 53.1 feet was reached on May 14, 1973. On the Big Black River at Bovina, 61.7 miles above its confluence with the Mississippi River, the bankfull stage of 28 feet has been exceeded approximately 97 times since the gage was established in 1936. The highest

recorded stage was 40.8 feet on May 24, 1983. The most damaging of the flash floods occurred south of Vicksburg where residents have repeatedly fled the floodwaters of Hatcher Bayou and it tributaries. Within the City of Vicksburg, flooding has occurred in lower lying areas along Stouts Bayou (City of Vicksburg, 2006).

2.4 Flood Protection Measures

The northern portion of Warren County that lies within the Delta region is protected from the 1-percent-annual-chance flood of the Mississippi River by the Mississippi mainline levee and the Yazoo Backwater levees. Control structures exist along the Yazoo Backwater levees at Steele Bayou, Collins Creek, and Little Sunflower River. A pumping plant is proposed at Steele Bayou to alleviate interior flooding while the control structure is closed. These levees were built and are maintained and certified by the USACE—Vicksburg District. The criteria used to evaluate protection against the 100-year flood are 1) adequate design, including 3 feet of freeboard, 2) structural stability, and 3) proper operation and maintenance.

3.0 ENGINEERING METHODS

For the flooding sources studied by detailed methods in the communities, standard hydrologic and hydraulic study methods were used to determine the flood hazard data required for this study. Flood events of a magnitude that are expected to be equaled or exceeded once on the average during any 10-, 50-, 100-, or 500-year period (recurrence interval) have been selected as having special significance for floodplain management and for flood insurance rates. These events, commonly termed the 10-, 50-, 100-, and 500-year floods, have a 10-, 2-, 1-, and 0.2-percent chance, respectively, of being equaled or exceeded during any year. Although the recurrence interval represents the long-term, average period between floods of a specific magnitude, rare floods could occur at short intervals or even within the same year. The risk of experiencing a rare flood increases when periods greater than 1 year are considered. For example, the risk of having a flood that equals or exceeds the 1-percent-annual-chance flood in any 50-year period is approximately 40 percent (4 in 10); for any 90-year period, the risk increases to approximately 60 percent (6 in 10). The analyses reported herein reflect flooding potentials based on conditions existing in the community at the time of completion of this study. Maps and flood elevations will be amended periodically to reflect future changes.

3.1 Hydrologic Analyses

Hydrologic analyses were carried out to establish peak discharge-frequency relationships for each flooding source studied by detailed methods affecting the community.

April 17, 1987, Warren County (Unincorporated) FIS Analyses

For the Mississippi River, discharge values for the 10-, 2-, 1-, and 0.2-pecent-annual chance floods were developed based on statistical analysis of discharge records covering a 76-year period at Vicksburg gaging station No. GS07289000. This analysis followed the standard log-Pearson Type III method as outlined in the Bulletin No. 17B (Committee on Water Data, 1981).

For the detailed studies of Bliss Creek, Durden Creek, Stouts Bayou, and Hatcher Bayou and its tributaries, the hydrologic analyses utilized Snyder's Unit Hydrograph computed program (EM 1110-2-1405, 1959). This frequency rainfall analysis utilized basin runoff-producing characteristics of area, length, slope friction, and shape to predict the 10-, 2-, and 1-percent–annual-chance peak flood discharges. The 0.2-percent-annual-chance peak discharges were determined by straight-line extrapolation of a log-probability graph of flood discharges computed by the Snyder's Unit Hydrograph method.

Peak flood discharges for the Yazoo River were not computed because the Mississippi River overbank flow or backwater encompasses nearly 80 miles of the Yazoo River. Thus, the Yazoo River reach that flows through Warren County was determined to be completely contained by the Mississippi River 1-percent-annual-chance flood plain. Also, peak discharges for tributaries to the Yazoo River, Steele Bayou, and Collins Creek were not computed because of the ponding characteristics caused by the presence of floodgates that regulate the outflow rate from these tributaries.

September 29, 1989, City of Vicksburg FIS Analyses

Separate and independent hydrologic analyses for Durden Creek, Durden Creek Tributary 3, Stouts Bayou, and Stouts Bayou Tributary 1 were carried out to verify that the 1- percent-annual-chance peaks used by the USACE were in reasonable agreement with those computed by USGS methods. The magnitude of the 1-percent-annual-chance peaks, as given in the USACE report, was developed from synthetic analyses of stream flow and precipitation records and runoff characteristics for the streams under study. At each location, the magnitude of the 1-percent-annual-chance peak was estimated for comparison to the USACE estimates by one or more USGS regional methods and adjusted for basin urbanization (Dept. of Interior, 1983). For Durden Creek at Vicksburg, the gaging station record was also compared with both the USGS and the USACE estimates.

For the Mississippi River, discharge values for the 10-, 2-, 1-, and 0.2-percent-annual-chance floods were developed based on statistical analysis of discharge records covering a 76-year period at Vicksburg gaging station No. GS07289000. This analysis followed the standard log-Pearson Type III method as outlined in the Bulletin No. 17B (FEMA, 1987).

The comparisons show that the USACE 1-percent-annual-chance peak flow estimates are generally within ±35 percent of the USGS estimates. Most of the comparisons were within ±20 percent. On this basis, the USACE estimates were adopted for use in this study.

This Countywide FIS Analysis

Hydrologic analyses were carried out to establish peak discharge-frequency relationships for each flooding source studied by limited detail methods affecting the communities. Peak discharges were calculated based on USGS regional regression equations (U.S. Department of the Interior, 1991). For the discharges calculated based

on regional regression equations, the rural regression values were modified to reflect stream gage weighting and/or urbanization as necessary.

A summary of the drainage area-peak discharge relationships for all the streams is shown in Table 2, "Summ ary of Discharges."

TABLE 2. SUMMARY OF DISCHARGES

FLOODING SOURCE AND LOCATION	DRAINAGE AREA (sq. mi.)	PEAK DISCHARGES (cfs) 10-percent	2-percent	1-percent	0.2-percent
BLISS CREEK					
At Highway 61	9.7	6,100	10,320	11,490	14,375
CLEAR CREEK					
Approximately 1.3 miles upstream of the confluence with the Big Black River	39.4	*	*	20,543	*
Approximately 880 feet downstream of Tiffentown Road	32.1	*	*	19,835	*
At the confluence with Muddy Creek	15.4	*	*	6332	*
CLEAR CREEK TRIBUTARY 1					
Approximately 865 feet downstream of Tiffentown Road	3.7	*	*	2,047	*
CROUCHES CREEK					
At the confluence with the Big Black River	5.1	*	*	2,227	*
A point approximately 170 feet upstream from the confluence of Crouches Creek Tributary 2	0.9	*	*	758	*
CROUCHES CREEK TRIBUTARY 2					
Approximately 85 feet upstream of the confluence with Crouches Creek	1.4	*	*	1,610	*
CROUCHES CREEK TRIBUTARY 3					
Approximately 50 feet upstream of the confluence with Crouches Creek	1.9	*	*	2033	*
Approximately 386 feet upstream from the confluence of Crouches Creek Tributary 3	0.4	*	*	468	*
DURDEN CREEK					
At mouth	4.87	*	*	7,000	*
1.81 miles upstream of mouth	3.37	*	*	5,425	*

* Data not available

TABLE 2. SUMMARY OF DISCHARGES - continued

FLOODING SOURCE AND LOCATION	DRAINAGE AREA (sq. mi.)	PEAK DISCHARGES (cfs)			
		10-percent	2-percent	1-percent	0.2-percent
DURDEN CREEK TRIBUTARY 3					
At mouth	0.60	*	*	1,425	*
Approximately 1,060 feet upstream of mouth	0.51	*	*	725	*
GLASS BAYOU					
At the confluence with the Yazoo River	2.3	*	*	2,774	*
At a point approximately 275 feet upstream from Sky Farm Avenue.	1.6	*	*	2,155	*
At a point approximately 170 feet upstream from Meadowvale Drive	1.2	*	*	1,811	*
HATCHER BAYOU					
Just downstream of confluence of Stouts Bayou	39.3	15,800	28,200	33,600	42,870
Just upstream of confluence of Durden Creek	29.2	13,500	24,200	28,600	36,460
Approximately 750 feet downstream of confluence of Hatcher Bayou Tributary 3	22.1	10,750	19,000	22,400	28,830
At Lee Road	7.6	5,050	8,900	10,550	12,920
At Mississippi Highway 27	3.84	3,110	6,260	6,990	8,520
HATCHER BAYOU TRIBUTARY 1					
At mouth	0.92	860	1,750	2,050	2,800
HATCHER BAYOU TRIBUTARY 3					
At mouth	7.85	4,870	8,930	10,300	13,600
At Halls Ferry Road	2.00	1,630	3,200	3,800	5,100
HATCHER BAYOU TRIBUTARY 3A					
At mouth	0.83	790	1,600	1,830	2,600
HATCHER BAYOU TRIBUTARY 3B					
At mouth	0.96	890	1,800	2,150	2,900
HATCHER BAYOU TRIBUTARY 3C					
At mouth	1.88	1,550	3,050	3,725	4,800
HATCHER BAYOU TRIBUTARY 4					
At mouth	3.40	2,180	4,300	4,780	5,870

* Data not available

TABLE 2. SUMMARY OF DISCHARGES - continued

FLOODING SOURCE AND LOCATION	DRAINAGE AREA (sq. mi.)	PEAK DISCHARGES (cfs)			
		10-percent	2-percent	1-percent	0.2-percent
HATCHER BAYOU TRIBUTARY 4A					
At mouth	1.82	1,520	3,000	3,500	4,700
HATCHER BAYOU TRIBUTARY 5					
At mouth	0.42	435	920	1,090	1,480
HATCHER BAYOU TRIBUTARY 6					
At mouth	0.34	360	770	920	1,220
HATCHER BAYOU TRIBUTARY 7					
At mouth	1.21	1,080	2,150	2,600	3,490
HATCHER BAYOU TRIBUTARY 8					
At mouth	1.29	1,130	2,250	2,700	3,600
MISSISSIPPI RIVER					
At Interstate Highway 20 bridge	1,144,400	1,600,000	2,050,000	2,250,000	2,720,000#
MUDDY CREEK					
Approximately 40 feet upstream from the confluence with Clear Creek	16.5	*	*	7,416	*
Approximately 210 feet upstream of the confluence of Muddy Creek Tributary 1	15.9	*	*	7,103	*
MUDDY CREEK TRIBUTARY 1					
Approximately 420 feet upstream from the confluence with Muddy Creek	0.5	*	*	525	*
Approximately 0.35 miles upstream from the confluence with Muddy Creek	0.3	*	*	448	*
Approximately 1.06 miles upstream from the confluence with Muddy Creek	0.2	*	*	379	*
PACES BAYOU					
Approximately 0.35 miles upstream from the confluence with Hennesseys Bayou	10.0	*	*	5,168	*
Approximately 0.4 miles upstream of Highway 61	7.9	*	*	4,529	*
At the confluence of Paces Bayou Tributary 3	4.5	*	*	2,638	*

Mississippi River Project Flood

* Data not available

TABLE 2. SUMMARY OF DISCHARGES - continued

FLOODING SOURCE AND LOCATION	DRAINAGE AREA (sq. mi.)	PEAK DISCHARGES (cfs)			
		10-percent	2-percent	1-percent	0.2-percent
PACES BAYOU TRIBUTARY 1					
Approximately 60 feet upstream of the confluence with Paces Bayou	0.3	*	*	445	*
Approximately 100 feet upstream of the confluence of Paces Bayou Tributary 1.1	0.1	*	*	267	*
PACES BAYOU TRIBUTARY 3					
At mouth	3.2	*	*	2,249	*
SILVER CREEK					
At the confluence of Silver Creek Tributary 1	3.3	*	*	2,070	*
Approximately 120 feet upstream of the confluence of Silver Creek Tributary 2	2.4	*	*	1,762	*
Approximately 150 feet upstream of the confluence of Silver Creek Tributary 4	0.54	*	*	692	*
Approximately 0.85 miles upstream of m the confluence of Silver Creek Tributary 4	0.15	*	*	336	*
SILVER CREEK TRIBUTARY 2					
Approximately 140 feet upstream of the confluence with Silver Creek	0.5	*	*	661	*
Approximately 0.75 miles upstream of the confluence with Silver Creek	0.2	*	*	375	*
SILVER CREEK TRIBUTARY 3					
Approximately 222 feet upstream of the confluence of Silver Creek	0.5	*	*	598	*
Approximately 0.9 miles upstream from the confluence of Silver Creek Tributary 4	0.3	*	*	589	*
STOUTS BAYOU					
At mouth	5.5	2,860	5,460	6,575	7,860
At the confluence of Stouts Bayou Tributary 1	3.9	*	*	2232	*
Approximately 0.25 miles upstream of North Frontage Road (Old Highway 80)	3.4	*	*	4,414	*
Approximately 360 feet downstream of Chambers Street	1.6	*	*	2,329	*
Approximately 600 feet upstream of Second North Street	0.6	*	*	910	*

* Data not available

TABLE 2. SUMMARY OF DISCHARGES - continued

FLOODING SOURCE AND LOCATION	DRAINAGE AREA (sq. mi.)	PEAK DISCHARGES (cfs)			
		10-percent	2-percent	1-percent	0.2-percent
STOUTS BAYOU TRIBUTARY 1					
Just upstream of Rifle Range Road	1.3	*	*	2,220	*
Just downstream of U.S. Highway 80	1.1	*	*	2,150	*
YAZOO RIVER					
At Redwood, Mississippi, at U.S. Route 61	12,603	Peak discharges influenced by Mississippi River backwater			

3.2 Hydraulic Analyses

Analyses of the hydraulic characteristics of flooding from the sources studied were carried out to provide estimates of the elevations of floods of the selected recurrence intervals. Users should be aware that flood elevations shown on the FIRM represent rounded whole-foot elevations and may not exactly reflect the elevations shown on the Flood Profiles or in the Floodway Data table in the FIS report. Flood elevations shown on the FIRM are primarily intended for flood insurance rating purposes. For construction and/or floodplain management purposes, users are cautioned to use the flood elevation data presented in this FIS report in conjunction with the data shown on the FIRM.

Analyses of the hydraulic characteristics of flooding from the sources studied were carried out to provide estimates of the elevations of floods of the selected recurrence intervals.

April 17, 1987, Warren County (Unincorporated Areas) FIS Analyses

Cross sections for the flooding sources studied in detail, where a step-backwater model was used to compute water-surface elevations, were obtained by field survey in 1973. The cross sections were located at close intervals at bridges and culverts in order to compute the significant backwater effects of these structures in developed areas.

Locations of selected cross sections used in the hydraulic analyses are shown on the Flood Profiles. For stream segments for which a floodway was computed (Section 4.2), selected cross-section locations are also shown on the Flood Boundary and Floodway Info Map.

Channel roughness factors (Manning's "n") used in the hydraulic computations were chosen by engineering judgment and were based on field observations of the streams and flood plain areas. Roughness values for the main channel of Durden Creek, Stouts Bayou, and Hatcher Bayou and its tributaries range from 0.02 to 0.08 with flood plain roughness values ranging from 0.05 to 0.12 for all floods. The acceptability of all

assumed hydraulic factors, cross sections, and hydraulic structure data was checked by computations that duplicated the 1973 historic floodwater profile.

Water-surface elevations of the floods of the selected recurrence intervals for Bliss Creek, Durden Creek, Stouts Bayou, and Hatcher Bayou and its tributaries were computed through use of the USACE HEC-2 step-backwater computer program (USACE Hydrologic Engineering Center, 1976). Since Durden Creek, Stouts Bayou, and the ephemeral streams of Hatcher Bayou are tributaries to Hatcher Bayou, the starting water-suface elevations for these tributaries were obtained from the Hatcher Bayou profile. The starting water-surface elevations for Hatcher Bayou and Bliss Creek were calculated using the slope-area method (normal depth analysis).

Water-surface elevations of the floods of selected recurrence intervals for the Mississippi River were based on flood elevation data developed by the USACE using the Mississippi River basin model (unpublished data). Model tests were run on this model located in Clinton, Mississippi. Based on these data, flood profiles were drawn showing the water-surface elevations for floods of the selected recurrence intervals.

Flooding from the Yazoo River was determined by a stage frequency analysis of gaging records. However, after examination of flood data, it was determined that the entire reach of the Yazoo River within the community falls within the 0.5 % annual chance flood plain of the Mississippi River. Therefore, flood profiles for the Yazoo River have not been included in this study.

The water-surface elevations for Steele Bayou and Collins Creek were derived from hydrologic routings of interior runoff though the ponding areas and floodgates, taking into consideration Mississippi River and Yazoo River stages. These areas are controlled by floodgates that regulate inflow and outflow, creating a ponding situation, since the topography is typical of low-lying and sump areas. Flood profiles for Steele Bayou and Collins Creek have not been included in this study. Stage elevations for Steele Bayou and Collins Creek were determined using historical flood records data.

Flood profiles were drawn showing the computed water-surface elevations for floods of the selected frequency. In cases where the 2% annual chance and 1% annual chance flood elevations are close together, due to limitations of the profile scale, only the 1% annual chance profile has been drawn.

Table 3, Summary of Elevations, shows the elevations for Steele Bayou and Collins Creek for the different frequencies as controlled by the floodgates in these sump areas.

TABLE 3. SUMMARY OF ELEVATIONS

	PEAK STAGE (NAVD*)			
FLOODING SOURCE	10-percent	2-percent	1-percent	0.2-percent
STEELE BAYOU	94.4	98.7	100.2	114.4
COLLINS CREEK	90.9	92.2	92.9	114.4

*North American Vertical Datum of 1988

September 29, 1989 City of Vicksburg FIS Analyses

The 1975 USACE report is the source of estimates of the elevation of the 1% annual chance flood for the study. Based on that report and verbal communication with the USACE, step-backwater analyses and historic flood data were used for the study.

Roughness coefficients (Manning's "n") used were chosen by engineering judgment and based on field observation of the channel and the floodplain areas. Roughness values for Durden Creek, Stouts Bayou, and their tributaries range from 0.02 to 0.08. Floodplain roughness values range from 0.05 to 0.12.

Flood profiles were drawn showing the computed water-surface elevations for floods of the selected recurrence intervals.

Water-surface elevations of the floods of selected recurrence intervals for the Mississippi River were based on flood elevation data developed by the USACE using the Mississippi River basin model (unpublished data). Model tests were run on this model located in Clinton, Mississippi.

This Countywide FIS Analysis

Cross section geometries were obtained from a combination of terrain data and field surveys. Bridges and culverts located within the limited detailed study limits were field surveyed to obtain elevation data and structural geometry.

Downstream boundary conditions for the hydraulic models were set to normal depth using a starting slope calculated from values taken from topographic data, or where applicable, derived from the water-surface elevations. Water-surface profiles were computed through the use of the USACE HEC-RAS version 3.1.2 computer program (USACE, 2002). The model was run for the 1-percent annual chance storm for the limited detail and approximate studies.

Channel roughness factors (Manning's " n") values used in the hydraulic computations for both channel and overbank areas were based on recent digital orthophotography and field investigations.

Table 3, "Summary of Roughness coefficients," shows the ranges of the channel and overbank roughness factors used in the computations for all of the streams studied by the limited detailed method.

TABLE 4. SUMMARY OF ROUGHNESS COEFFICIENTS

FLOODING SOURCE	CHANNEL "N"	OVERBANK "N"
CLEAR CREEK	0.05	0.12
CLEAR CREEK TRIBUTARY 1	0.05	0.12
CROUCHES CREEK	0.045	0.12
CROUCHES CREEK TRIBUTARY 2	0.045	0.12

TABLE 4. SUMMARY OF ROUGHNESS COEFFICIENTS - continued

FLOODING SOURCE	CHANNEL "N"	OVERBANK "N"
CROUCHES CREEK TRIBUTARY 3	0.05	0.13
MUDDY CREEK	0.05	0.15
MUDDY CREEK TRIBUTARY 1	0.06	0.16
PACES BAYOU	0.04	0.11
PACES BAYOU TRIBUTARY 1	0.04	0.15
PACES BAYOU TRIBUTARY 3	0.04	0.15
SILVER CREEK	0.055	0.16
SILVER CREEK TRIBUTARY 2	0.045	0.16
SILVER CREEK TRIBUTARY 3	0.05	0.16
STOUTS BAYOU	0.045	0.12
GLASS BAYOU	0.05	0.16

Locations of selected cross sections used in the hydraulic analyses are shown on the Flood Profiles (Exhibit 1) and on the FIRM (Exhibit 2).

The hydraulic analyses for this countywide FIS were based on unobstructed flow. The flood elevations shown on the Flood Profiles (Exhibit 1) are thus considered valid only if hydraulic structures remain unobstructed, operate properly, and do not fail.

Qualifying bench marks within a given jurisdiction that are cataloged by the National Geodetic Survey (NGS) and entered into the National Spatial Reference System (NSRS) as First or Second Order Vertical and have a vertical stability classification of A, B, or C are shown and labeled on the FIRM with their 6-character NSRS Permanent Identifier.

Benchmarks cataloged by the NGS and entered into the NSRS vary widely in vertical stability classification. NSRS vertical stability classifications are as follows:

Stability A: Monuments of the most reliable nature, expected to hold position/elevation well (e.g., mounted in bedrock)

Stability B: Monuments which generally hold their position/elevation well (e.g., concrete bridge abutment)

Stability C: Monuments which may be affected by surface ground movements (e.g., concrete monuments below frost line)

Stability D: Mark of questionable or unknown vertical stability (e.g., concrete monument above frost line, or steel witness post)

In addition to NSRS benchmarks, the FIRM may also show vertical control monument established by a local jurisdiction; these monuments will be shown on the FIRM with the appropriate designations. Local monuments will only be placed on the FIRM if the

community has requested that they be included, and if the monuments meet the aforementioned NSRS inclusion criteria.

To obtain current elevation, description, and/or location information for benchmarks shown on the FIRM for this jurisdiction, please contact the Information Services Branch of the NGS at (301) 713-3242, or visit its website at http://www.ngs.noaa.gov.

Temporary vertical monuments are often established during the preparation of a flood hazard analysis for the purpose of establishing local vertical control. Although these monuments are not shown on the FIRM, they may be found in the Technical Support Data Notebook associated with the FIS report and FIRM. Interested individuals may contact FEMA to access this data.

3.3 Vertical Datum

All FIS reports and FIRMs are referenced to a specific vertical datum. The vertical datum provides a starting point against which flood, ground, and structure elevations can be referenced and compared. Until recently, the standard vertical datum in use for newly created or revised FIS reports and FIRMs was the National Geodetic Vertical Datum of 1929 (NGVD29). With the finalization of the North American Vertical Datum of 1988 (NAVD88), many FIS reports and FIRMs are being prepared using NAVD88 as the referenced vertical datum.

All flood elevations shown in this FIS report and on the FIRM are referenced to NAVD88. Structure and ground elevations in the community must, therefore, be referenced to NAVD88. It is important to note that adjacent communities may be referenced to NGVD29. This may result in differences in Base Flood Elevations (BFEs) across the corporate limits between the communities. The elevations shown in the FIS report and on the FIRM for Warren County are referenced to NAVD88.

Ground, structure, and flood elevations may be compared and/or referenced to NGVD29 by applying a conversion factor. To convert elevations from NAVD88 to NGVD29, add 0.13 feet to the NAVD88 elevation. The 0.13 feet value is an average for the entire county. The adjustment value was determined using the USACE Corpscon 6.0.1 computer program (USACE, 2004) and topographic maps (U.S. Department of the Interior, 1964). The BFEs shown on the FIRM represent whole-foot rounded values. For example, a BFE of 12.4 feet will appear as 12 feet on the FIRM, and 12.6 feet as 13 feet. Users who wish to convert the elevations in this FIS report to NGVD29 should apply the stated conversion factor to elevations shown on the Flood Profiles and supporting data tables in the FIS report, which are shown at a minimum to the nearest 0.1-foot.

For more information regarding conversion between the NGVD and the NAVD, see the FEMA publication entitled *Converting the National Flood Insurance Program to the North American Vertical Datum of 1988* or contact the Vertical Network Branch, National Geodetic Survey, Coast and Geodetic Survey, National Oceanic and Atmospheric Administration, Rockville, Maryland 20910 (Internet address http://www.ngs.noaa.gov).

4.0 FLOODPLAIN MANAGEMENT APPLICATIONS

The NFIP encourages State and local governments to adopt sound floodplain management programs. Therefore, each FIS provides 1-percent-annual-chance flood elevations and delineations of the 1- and 0.2-percent-annual-chance floodplain boundaries and 1-percent-annual-chance floodway to assist communities in developing floodplain management measures. This information is presented on the FIRM and in many components of the FIS report, including Flood Profiles, Floodway Data Table and Summary of Stillwater Elevations Table. Users should reference the data presented in the FIS report as well as additional information that may be available at the local map repository before making flood elevation and/or floodplain boundary determinations.

4.1 Floodplain Boundaries

To provide a national standard without regional discrimination, the 1-percent-annual-chance flood has been adopted by FEMA as the base flood for floodplain management purposes. The 0.2-percent-annual-chance flood is employed to indicate additional areas of flood risk in the community. For each stream studied by detailed methods, the 1- and 0.2-annual-chance floodplain boundaries have been delineated using the flood elevations determined at each cross section.

The 1- and 0.2-percent-annual-chance floodplain boundaries are shown on the FIRM (Exhibit 2), On this map, the 1-percent-annual-chance floodplain boundary corresponds to the boundary of the areas of special flood hazards (Zones A and AE), and the 0.2-percent-annual-chance floodplain boundary corresponds to the boundary of areas of moderate flood hazards. In cases where the 1- and 0.2-percent-annual-chance floodplain boundaries are close together, only the 1-percent-annual-chance floodplain boundary has been shown. Small areas within the floodplain boundaries may lie above the flood elevations but cannot be shown due to limitations of the map scale and/or lack of detailed topographic data.

For the streams studied by limited detailed and approximate methods, only the 1-percent-annual-chance floodplain boundary is shown on the FIRM (Exhibit 2). Floodplain boundaries for these streams, as well as those streams that have been previously studied by detailed methods, were generated using USGS 10-meter Digital Elevation Models (USGS,) then refined using detailed hydrographic data (Warren County, 2005).

4.2 Floodways

Encroachment on floodplains, such as structures and fill, reduces flood-carrying capacity, increases flood heights and velocities, and increases flood hazards in areas beyond the encroachment itself. One aspect of floodplain management involves balancing the economic gain from floodplain development against the resulting increase in flood hazard. For purposes of the NFIP, a floodway is used as a tool to assist local communities in this aspect of floodplain management. Under this concept, the area of the 1-percent-annual-chance floodplain is divided into a floodway and a floodway fringe. The floodway is the channel of a stream, plus any adjacent floodplain areas,

that must be kept free of encroachment so that the 1-percent-annual-chance flood can be carried without substantial increases in flood heights. Minimum Federal standards limit such increases to 1.0 foot, provided that hazardous velocities are not produced. The floodways in this study are presented to local agencies as minimum standards that can be adopted directly or that can be used as a basis for additional floodway studies.

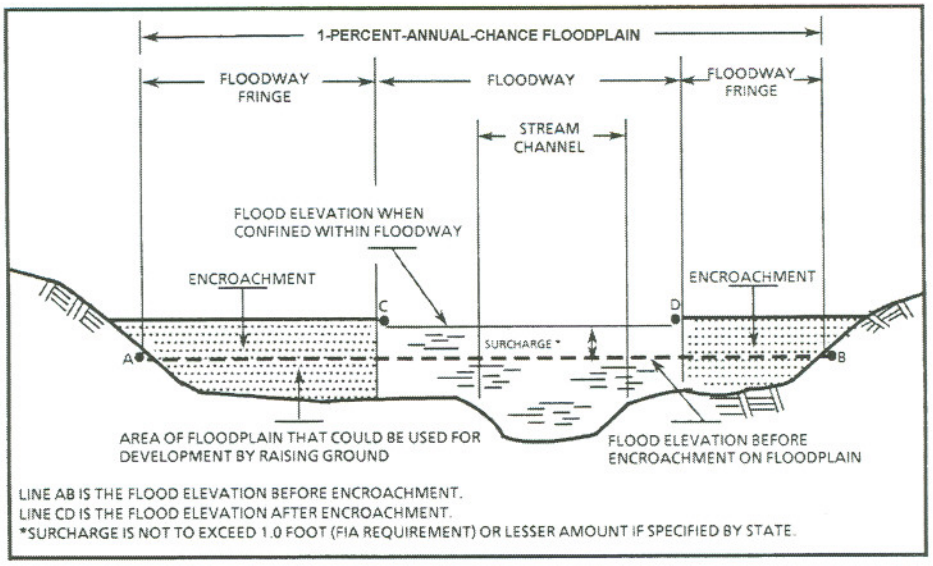
The floodway presented in this FIS report and on the FIRM was computed for certain stream segments on the basis of equal-conveyance reduction from each side of the floodplain. Floodway widths were computed at cross sections. Between cross sections, the floodway boundaries were interpolated. The results of the floodway computations have been tabulated for selected cross sections of detailed study streams (Table 4). For detailed study streams, in cases where the floodway and 1-percent-annual-chance floodplain boundaries are either close together or collinear, only the floodway boundary is shown.

Near the mouths of streams studied in detail, floodway computations are made without regard to flood elevations on the receiving water body. Therefore, " Without Floodway" elevations presented in Table 5, "Flood way Data," for certain downstream cross sections are lower than the regulatory flood elevations in that area, which must take into account the 1-percent-annual-chance flooding due to backwater from other sources.

Encroachment into areas subject to inundation by floodwaters having hazardous velocities aggravates the risk of flood damage, and heightens potential flood hazards by further increasing velocities. For detailed study streams, a listing of stream velocities at selected cross sections is provided in Table 5. In order to reduce the risk of property damage in areas where the stream velocities are high, the county may wish to restrict development in areas outside the floodway.

The area between the floodway and 1-percent-annual-chance floodplain boundaries is termed the floodway fringe. The floodway fringe encompasses the portion of the floodplain that could be completely obstructed without increasing the water-surface elevation of the 1-percent-annual-chance flood more than 1.0 foot at any point. Typical relationships between the floodway and the floodway fringe and their significance to floodplain development are shown in Figure 1.

The floodways recommended for Bliss Creek, Stouts Bayou, and Hatcher Bayou were computed on the basis of equal conveyance reduction from each side of the flood plain. No floodway is designated for the Mississippi River since the river is already effectively confined. Any proposed new landfill construction within the Mississippi River 1-percent-annual-chance flood plain should be coordinated with the USACE Vicksburg District.



FLOODWAY SCHEMATIC

Figure 1

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER-SURFACE ELEVATION (FEET NAVD 88)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
HATCHER BAYOU								
A	45,883	876	12,954	2.6	106.3	106.3	106.7	0.4
B	49,579	814	10,537	2.8	109.0	109.0	109.8	0.8
C	51,638	650	9,985	2.9	113.1	113.1	114.1	1.0
D	52,642	1,640	21,739	1.4	115.5	115.5	116.1	0.6
E	54,754	550	5,296	5.4	116.2	116.2	116.8	0.6
F	55,651	573	7,120	4.0	118.7	118.7	119.4	0.7
G	57,499	930	10,815	2.6	121.0	121.0	121.9	0.9
H	58,450	922	8,361	2.8	122.6	122.6	123.5	0.9
I	58,872	843	7,642	3.0	123.7	123.7	124.7	1.0
J	59,189	695	7,898	2.9	124.6	124.6	125.6	1.0
K	60,245	790	9,156	2.5	126.4	126.4	126.4	0.0
L	61,195	332	4,405	5.2	128.0	128.0	128.4	0.4
M	61,829	599	7,324	3.2	128.9	128.9	129.7	0.8
N	62,568	389	4,324	5.2	130.4	130.4	131.3	0.9
O	63,994	725	9,837	2.3	132.4	132.4	133.4	1.0
P	65,261	607	7,127	3.1	133.3	133.3	134.3	1.0
Q	67,320	463	5,517	2.7	135.6	135.6	136.2	0.6
R	70,488	429	3,859	3.6	139.2	139.2	140.1	0.9
S	75,029	426	3,730	3.7	145.0	145.0	146.0	1.0
T	76,824	647	4,948	2.2	148.3	148.3	149.3	1.0

[1] FEET ABOVE CONFLUENCE WITH MISSISSIPPI RIVER

TABLE 5

FEDERAL EMERGENCY MANAGEMENT AGENCY

WARREN COUNTY, MS AND INCORPORATED AREAS

FLOODWAY DATA

HATCHER BAYOU

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER-SURFACE ELEVATION (FEET NAVD 88)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
HATCHER BAYOU (cont.)								
U	79,886	334	3,342	3.3	154.7	154.7	155.7	1.0
V	80,837	512	4,955	2.2	156.6	156.6	157.5	0.9
W	84,850	327	3,409	3.1	163.7	163.7	164.2	0.5
X	88,229	405[2]	2,861	3.7	167.6	167.6	168.6	1.0
Y	88,810	315[2]	2,075	4.3	168.6	168.6	169.6	1.0
Z	93,034	335	2,191	4.1	177.1	177.1	177.5	0.4
AA	93,562	400[3]	2,246	3.3	178.2	178.2	178.9	0.7
AB	94,354	463	2,309	3.2	180.0	180.0	180.9	0.9
AC	96,149	291	2,055	3.6	189.0	189.0	189.0	0.0
AD	98,261	236	4,065	1.7	201.3	201.3	202.1	0.8
AE	102,274	220	1,678	2.5	204.1	204.1	204.7	0.6

[1] FEET ABOVE CONFLUENCE WITH MISSISSIPPI RIVER
[2] COMBINED HATCHER BAYOU TRIBUTARY 7/HATCHER BAYOU FLOODWAY
[3] COMBINED HATCHER BAYOU TRIBUTARY 8/HATCHER BAYOU FLOODWAY

TABLE 5

FEDERAL EMERGENCY MANAGEMENT AGENCY

WARREN COUNTY, MS AND INCORPORATED AREAS

FLOODWAY DATA

HATCHER BAYOU

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER-SURFACE ELEVATION (FEET NAVD 88)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
HATCHER BAYOU TRIBUTARY 1								
A	5,174	109	496	2.3	140.5	140.5	141.5	1.0
HATCHER BAYOU TRIBUTARY 3								
A	700	940	4,968	2.1	133.4	130.6[2]	131.6	1.0
B	1,637	391	3,351	3.1	133.4	132.8[2]	133.8	1.0
C	2,746	453	3,306	2.9	134.5	134.5	135.5	1.0
D	5,333	700	4,068	2.3	137.7	137.7	138.7	1.0
E	5,597	250	1,340	6.5	138.6	138.6	139.1	0.5
F	8,131	370	1,374	5.7	144.4	144.4	144.9	0.5
G	11,510	279	2,481	3.1	155.6	155.6	156.6	1.0
H	14,203	260	2,044	3.5	160.8	160.8	161.5	0.7
I	16,104	420	1,632	2.5	165.2	165.2	166.2	1.0
J	19,853	300	769	3.3	175.4	175.4	175.4	0.0
K	22,598	50	391	5.1	194.9	194.9	195.7	0.8

[1] FEET ABOVE CONFLUENCE WITH HATCHER BAYOU
[2] ELEVATIONS COMPUTED WITHOUT CONSIDERATION OF BACKWATER EFFECTS FROM HATCHER BAYOU

TABLE 5

FEDERAL EMERGENCY MANAGEMENT AGENCY

WARREN COUNTY, MS AND INCORPORATED AREAS

FLOODWAY DATA

HATCHER BAYOU TRIBUTARIES 1 & 3

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER-SURFACE ELEVATION (FEET NAVD 88)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
HATCHER BAYOU TRIBUTARY 3A								
A	634	68	376	1.9	133.4	133.1[2]	134.1	1.0
B	2,059	51	303	6.0	141.9	141.9	142.1	0.2
HATCHER BAYOU TRIBUTARY 3B								
A	422	217	1,060	2.2	138.1	138.1	139.1	1.0
B	2,218	148	717	3.1	144.7	144.7	145.7	1.0
HATCHER BAYOU TRIBUTARY 3C								
A	686	134	974	3.8	161.4	160.9[2]	161.9	1.0
B	2,851	153	996	3.7	169.5	169.5	170.5	1.0

[1] FEET ABOVE CONFLUENCE WITH HATCHER BAYOU TRIBUTARY 3
[2] ELEVATIONS COMPUTED WITHOUT CONSIDERATION OF BACKWATER EFFECTS FROM HATCHER BAYOU TRIBUTARY 3

TABLE 5

FEDERAL EMERGENCY MANAGEMENT AGENCY

WARREN COUNTY, MS AND INCORPORATED AREAS

FLOODWAY DATA

HATCHER BAYOU TRIBUTARIES 3A, 3B, & 3C

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER-SURFACE ELEVATION (FEET NAVD 88)			
CROSS SECTION	DISTANCE	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
HATCHER BAYOU TRIBUTARY 4								
A	211[1]	518	2,906	1.6	145.5	143.3[2]	144.3	1.0
B	2,904[1]	280	1,928	2.5	151.1	151.1	152.1	1.0
C	7,550[1]	105	853	5.3	162.1	162.1	162.2	0.1
D	12,830[1]	195	1,122	4.0	180.2	180.2	181.2	1.0
E	14,045[1]	68	679	6.6	184.5	184.5	185.5	1.0
F	14,362[1]	280	1,560	1.5	185.9	185.9	186.9	1.0
G	16,262[1]	23	74	10.2	205.6	205.6	205.9	0.3
HATCHER BAYOU TRIBUTARY 4A								
A	2,059[3]	53	536	5.7	192.4	192.4	192.9	0.5
B	3,168[3]	52	767	4.0	205.9	205.9	206.2	0.3
HATCHER BAYOU TRIBUTARY 5								
A	3,749[1]	31	190	4.9	153.1	153.1	154.0	0.9
B	6,917[1]	30	122	3.7	191.6	191.6	191.8	0.2

[1] FEET ABOVE CONFLUENCE WITH HATCHER BAYOU
[2] ELEVATIONS COMPUTED WITHOUT CONSIDERATION OF BACKWATER EFFECTS FROM HATCHER BAYOU
[3] FEET ABOVE CONFLUENCE WITH HATCHER BAYOU TRIBUTARY 4

TABLE 5

FEDERAL EMERGENCY MANAGEMENT AGENCY

WARREN COUNTY, MS AND INCORPORATED AREAS

FLOODWAY DATA

HATCHER BAYOU TRIBUTARIES 4, 4A, & 5

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER-SURFACE ELEVATION (FEET NAVD 88)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
HATCHER BAYOU TRIBUTARY 6								
A	4,013	27	103	6.3	171.4	171.4	172.4	1.0
B	6,230	20	51	8.8	201.7	201.7	202.3	0.6
HATCHER BAYOU TRIBUTARY 7								
A	3,590	110	592	3.8	179.3	179.3	180.3	1.0
HATCHER BAYOU TRIBUTARY 8								
A	634	214[3]	908	2.2	177.9	175.4[2]	176.4	1.0
B	1,690	106[3]	766	2.6	178.1	177.5[2]	178.5	1.0
C	3,221	125	1,551	1.2	194.6	194.6	194.6	0.0

[1] FEET ABOVE CONFLUENCE WITH HATCHER BAYOU
[2] ELEVATIONS COMPUTED WITHOUT CONSIDERATION OF BACKWATER EFFECTS FROM HATCHER BAYOU
[3] FLOODWAY CONTAINED WITHIN HATCHER BAYOU FLOODWAY
*NO FLOODWAY COMPUTED

TABLE 5

FEDERAL EMERGENCY MANAGEMENT AGENCY

WARREN COUNTY, MS AND INCORPORATED AREAS

FLOODWAY DATA

HATCHER BAYOU TRIBUTARIES 6, 7, & 8

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER-SURFACE ELEVATION (FEET NAVD 88)			
CROSS SECTION	DISTANCE	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
DURDEN CREEK								
A	16,127[1]	235	1,643	2.6	160.4	160.4	161.3	0.9
B	19,210[1]	141	1,009	4.0	170.1	170.1	171.0	0.9
C	19,689[1]	152	1,079	2.9	170.1	170.1	171.0	0.9
D	20,314[1]	53	611	5.2	172.2	172.2	173.0	0.8
E	25,153[1]	70	672	4.6	194.8	194.8	195.4	0.6
BLISS CREEK								
A	10,771[3]	480	4,655	2.4	122.7	122.7	123.2	0.5
B	13,939[3]	644	3,222	2.4	124.9	124.9	125.9	1.0
C	15,946[3]	98	1,038	7.5	128.5	128.5	128.7	0.2
STOUTS BAYOU								
A	950[1]	90	772	8.5	109.9	102.8[2]	103.3	0.5
B	3,815[1]	62	675	8.9	110.1	110.1	110.9	0.8
C	3,934[1]	100	623	6.7	114.1	114.1	114.9	0.8
D-N*								

[1] FEET ABOVE CONFLUENCE WITH HATCHER BAYOU
[2] ELEVATIONS COMPUTED WITHOUT CONSIDERATION OF BACKWATER EFFECTS FROM HATCHER BAYOU
[3] FEET ABOVE CONFLUENCE WITH GOOSE LAKE
* NO FLOODWAY COMPUTED

TABLE 5

FEDERAL EMERGENCY MANAGEMENT AGENCY

WARREN COUNTY, MS AND INCORPORATED AREAS

FLOODWAY DATA

DURDEN CREEK – BLISS CREEK – STOUTS BAYOU

5.0 INSURANCE APPLICATION

For flood insurance rating purposes, flood insurance zone designations are assigned to a community based on the results of the engineering analyses. These zones are as follows:

Zone A

Zone A is the flood insurance risk zone that corresponds to the 1-percent annual chance floodplains that are determined in the FIS by approximate methods. Because detailed hydraulic analyses are not performed for such areas, no base (1-percent annual chance) flood elevations (BFEs), or base flood depths are shown within this zone.

Zone AE

Zone AE is the flood insurance risk zone that corresponds to the 1-percent annual chance floodplains that are determined in the FIS by detailed methods. In most instances, whole-foot BFEs derived from the detailed hydraulic analyses are shown at selected intervals within this zone.

Zone AH

Zone AH is the flood insurance rate zone that corresponds to the areas of 1-percent annual chance shallow flooding (usually areas of ponding) where average depths are between 1 and 3 feet. Whole-foot base flood elevations derived from the detailed hydraulic analyses are shown at selected intervals within the zone.

Zone AO

Zone AO is the flood insurance rate zone that corresponds to the areas of 1-percent annual chance shallow flooding (usually sheet flow on sloping terrain) where the average depths are between 1 and 3 feet. Average whole-foot depths derived from the detailed hydraulic analyses are shown within the zone.

Zone A99

Zone A99 is the flood insurance rate zone that corresponds to areas of the 1-percent floodplain that will be protected by a Federal flood protection system where construction has reached specified statutory milestones. No base flood elevations or depths are shown within this zone.

Zone V

Zone V is the flood insurance rate zone that corresponds to the 1-percent coastal floodplains that have additional hazards associated with storm waves. Because approximate hydraulic analyses are performed for such areas, no base flood elevations are shown within this zone.

Zone VE

Zone VE is the flood insurance rate zone that corresponds to the 1-percent coastal floodplains that have additional hazards associated with storm waves. Whole-foot base flood elevations derived from the detailed hydraulic analyses are shown at selected intervals within this zone.

Zone X

Zone X is the flood insurance risk zone that corresponds to areas outside the 0.2-percent annual chance floodplain, areas within the 0.2-percent annual chance floodplain, areas of 1-percent annual chance flooding where average depths are less than 1 foot, areas of 1-percent annual chance flooding where the contributing drainage area is less than 1 square mile, and areas protected from the base flood by levees. No BFEs or depths are shown within this zone.

Zone D

Zone D is the flood insurance rate zone that corresponds to unstudied areas where flood hazards are undetermined, but possible.

6.0 FLOOD INSURANCE RATE MAP

The FIRM is designed for flood insurance and floodplain management applications.

For flood insurance applications, the map designates flood insurance risk zones as described in Section 5.0 and, in the 1-percent-annual-chance floodplains that were studied by detailed methods, shows selected whole-foot BFEs or average depths. Insurance agents use the zones and BFEs in conjunction with information on structures and their contents to assign premium rates for flood insurance policies.

For floodplain management applications, the map shows by tints, screens, and symbols, the 1- and 0.2-percent-annual-chance floodplains, floodways, and the locations of selected cross sections used in the hydraulic analyses and floodway computations.

The countywide FIRM presents flooding information for the entire geographic area of Warren County. Previously, FIRMs were prepared for each incorporated community and the unincorporated areas of the County identified as flood-prone. This countywide FIRM also includes flood-hazard information that was presented separately on Flood Boundary and Floodway Maps (FBFMs), where applicable. Historical data relating to the maps prepared for each community, up to and including this countywide FIS are presented in Table 5, "Commu nity Map History."

COMMUNITY NAME	INITIAL IDENTIFICATION	FLOOD HAZARD BOUNDARY MAP REVISIONS DATE	FIRM EFFECTIVE DATE	FIRM REVISIONS DATE
Vicksburg, City of	January 18, 1974	August 27, 1976 December 10, 1982	September 29, 1989	none
Warren County (Unincorporated Areas)	May 5, 1978	none	November 15, 1979	April 17, 1987

TABLE 6

FEDERAL EMERGENCY MANAGEMENT AGENCY

WARREN COUNTY, MS

AND INCORPORATED AREAS

COMMUNITY MAP HISTORY

7.0 OTHER STUDIES

Information pertaining to revised and unrevised flood hazards for each jurisdiction within Warren County has been compiled into this FIS. Therefore, this FIS supersedes all previously printed FIS reports, FIRMs, and/or FBFMs for all of the incorporated and unincorporated jurisdictions within Warren County.

8.0 LOCATION OF DATA

Information concerning the pertinent data used in the preparation of this study can be obtained by contacting Federal Insurance and Mitigation Division, FEMA Region IV, Koger-Center — Rutgers Building, 3003 Chamblee Tucker Road, Atlanta, GA 30341.

9.0 BIBLIOGRAPHY AND REFERENCES

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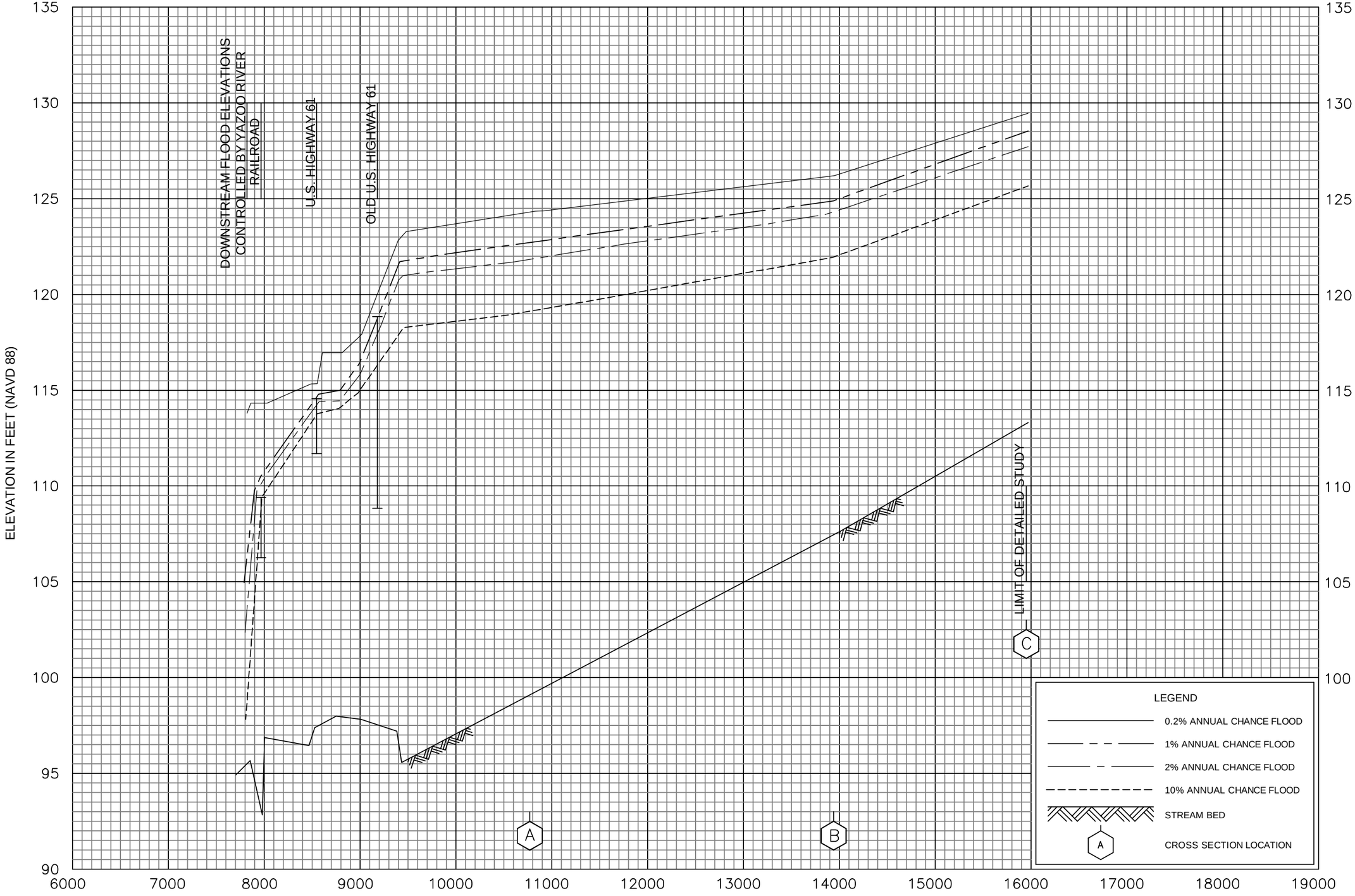
Warren County (2005), Mississippi, Board of Supervisors, geospatial data themes.



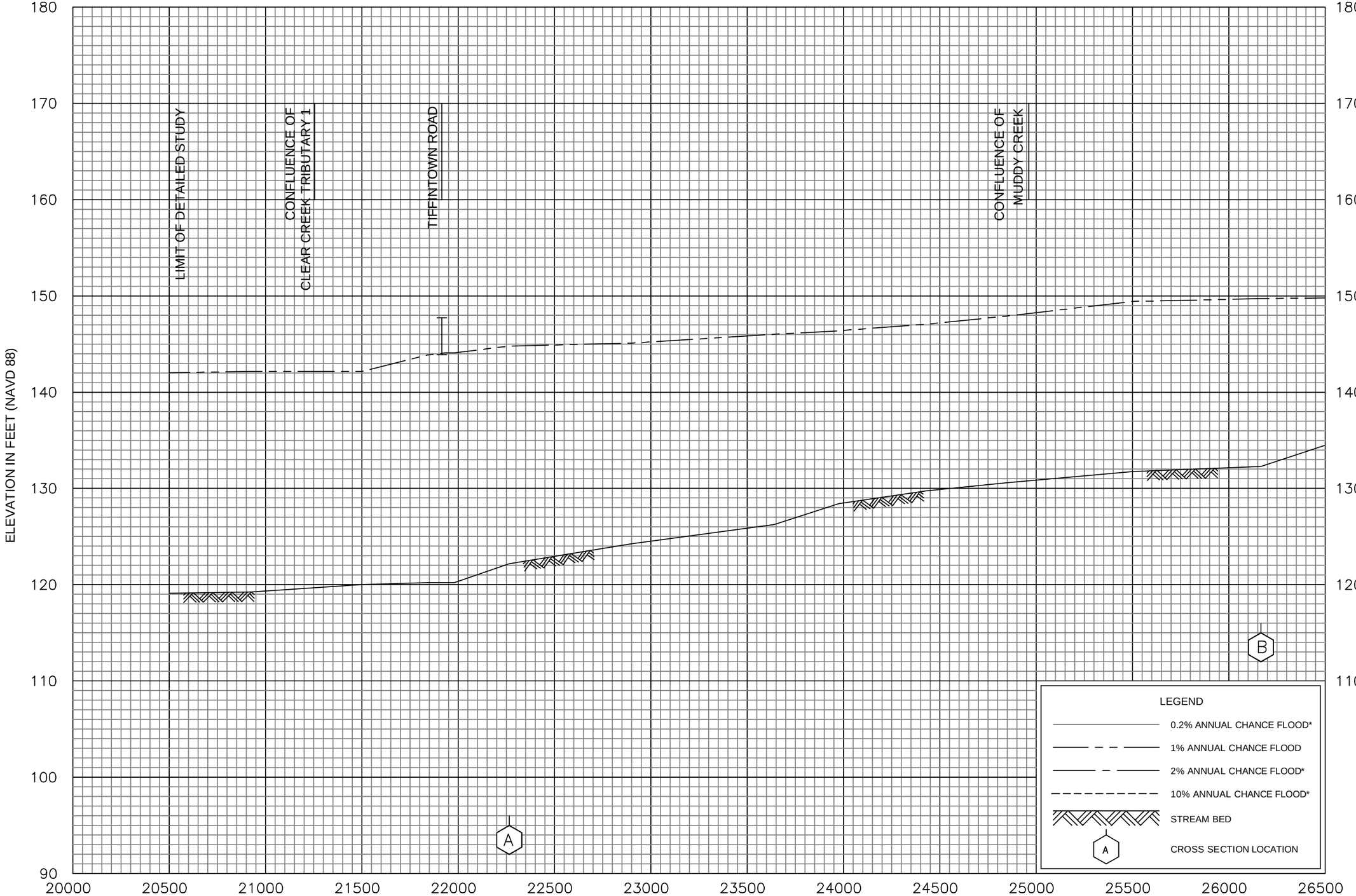
FLOOD PROFILES

BLISS CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

WARREN COUNTY, MS
AND INCORPORATED AREAS

01P



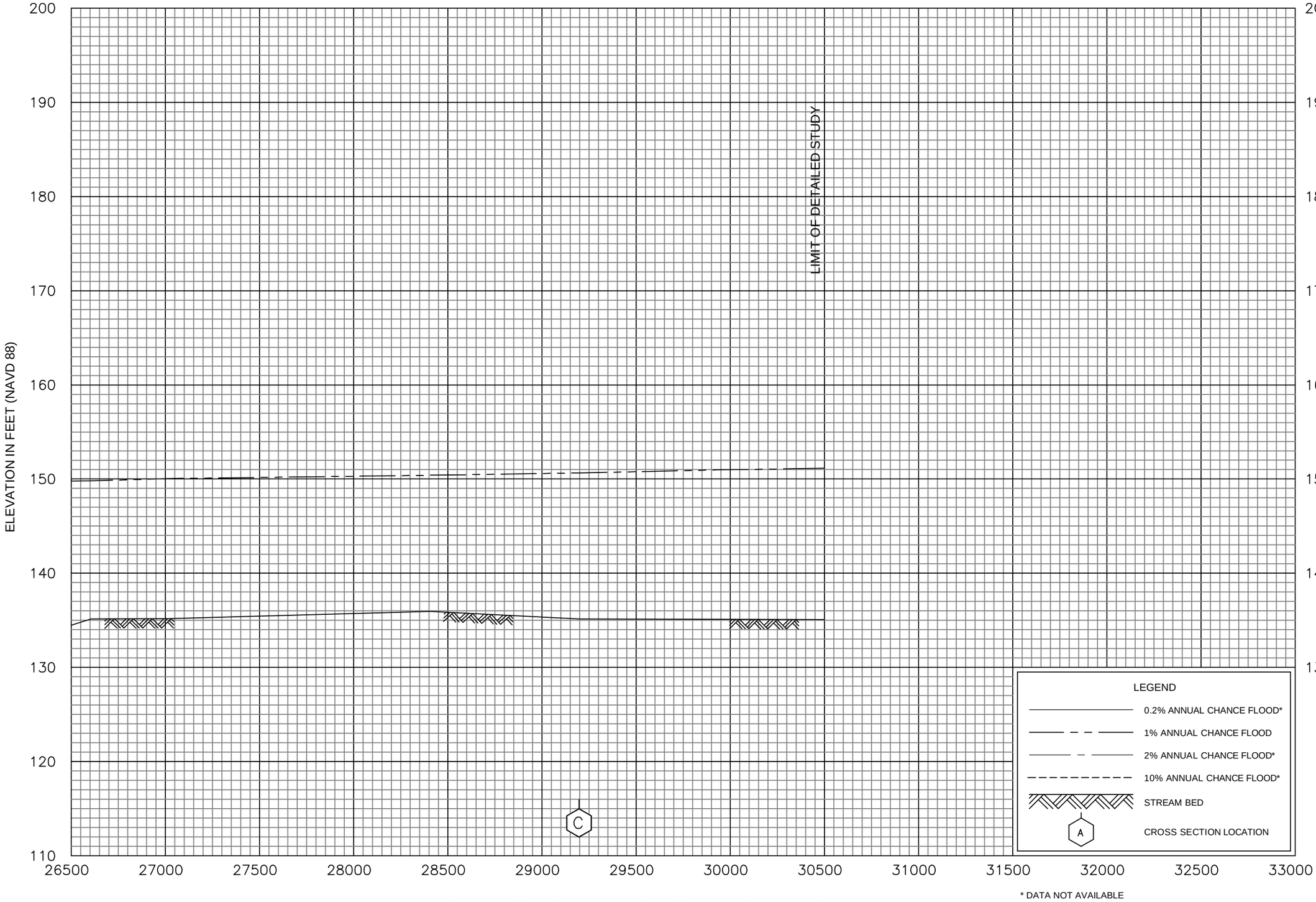
FLOOD PROFILES

CLEAR CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

WARREN COUNTY, MS
AND INCORPORATED AREAS

02P



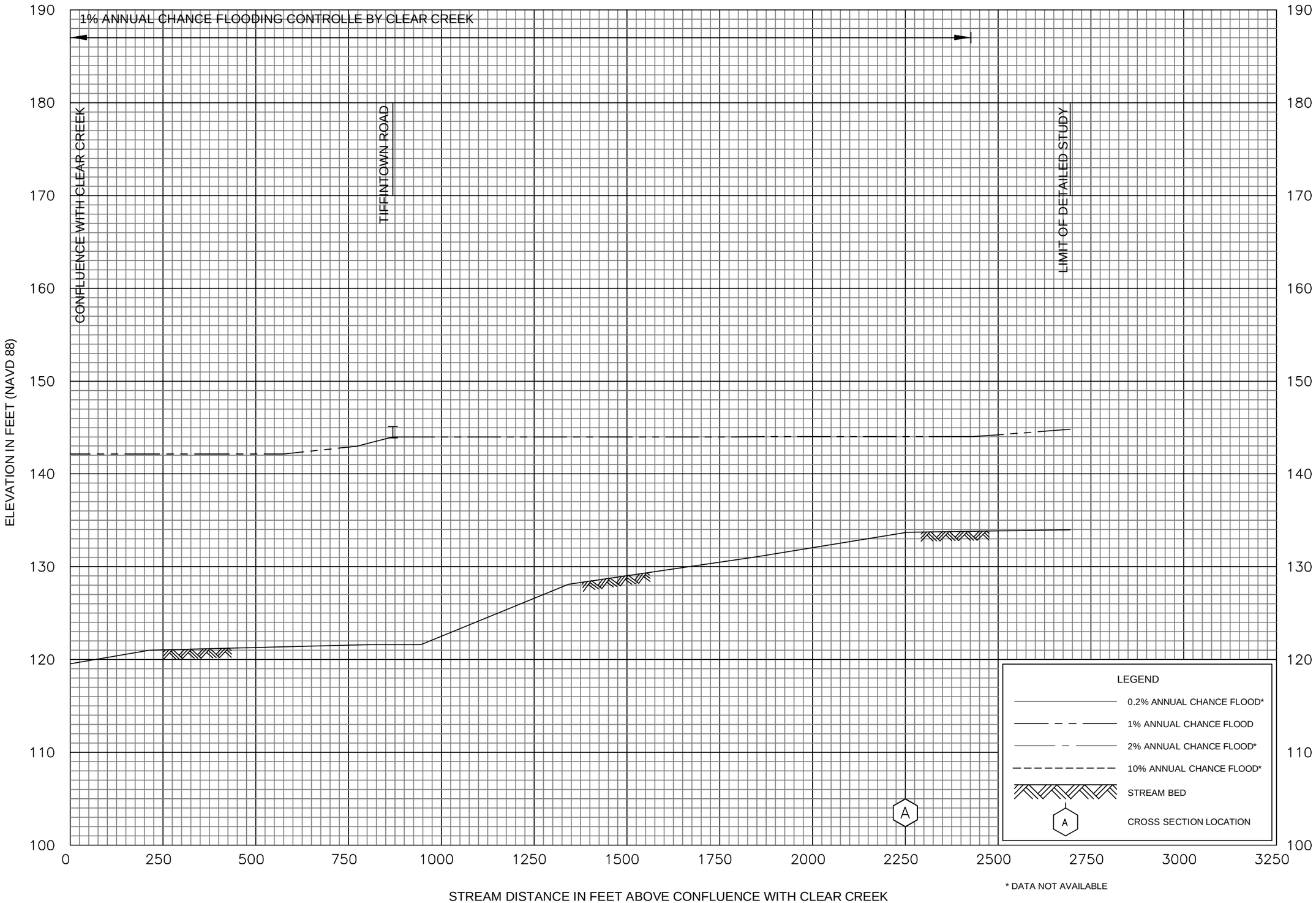
FLOOD PROFILES

CLEAR CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

WARREN COUNTY, MS
AND INCORPORATED AREAS

03P



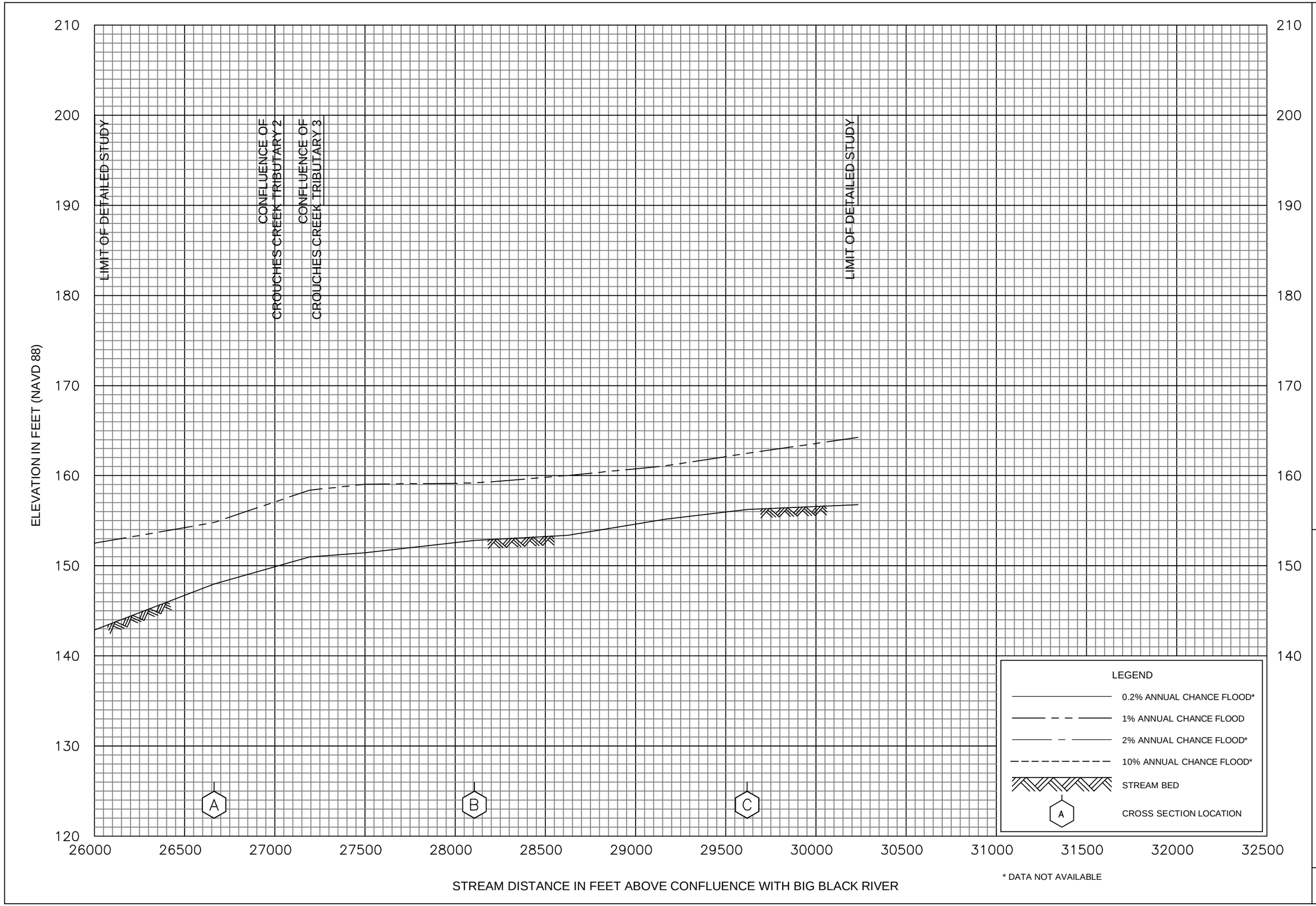
FLOOD PROFILES

CLEAR CREEK TRIBUTARY 1

FEDERAL EMERGENCY MANAGEMENT AGENCY

WARREN COUNTY, MS
AND INCORPORATED AREAS

04P



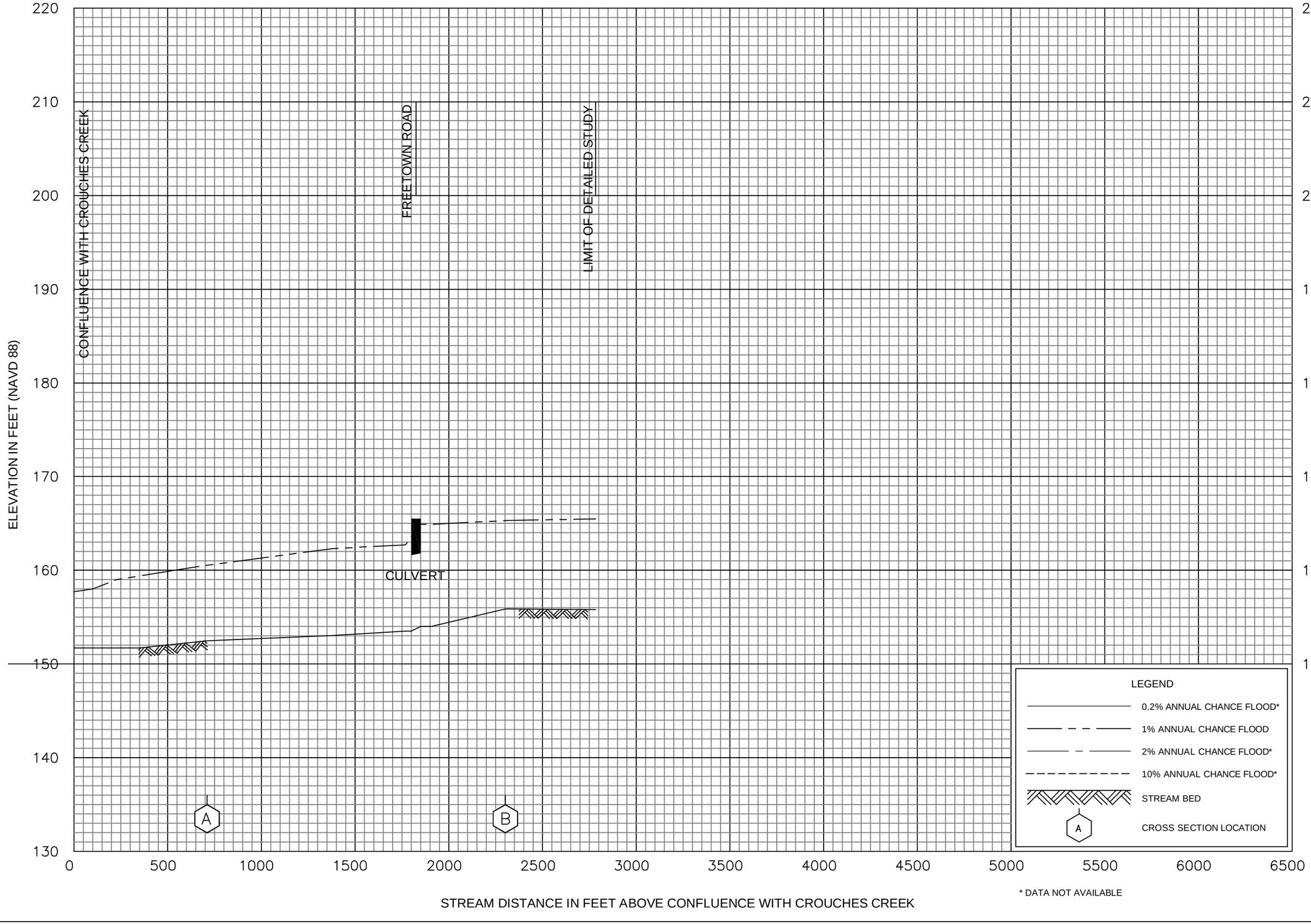
FLOOD PROFILES

CROUCHES CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

WARREN COUNTY, MS
AND INCORPORATED AREAS

05P



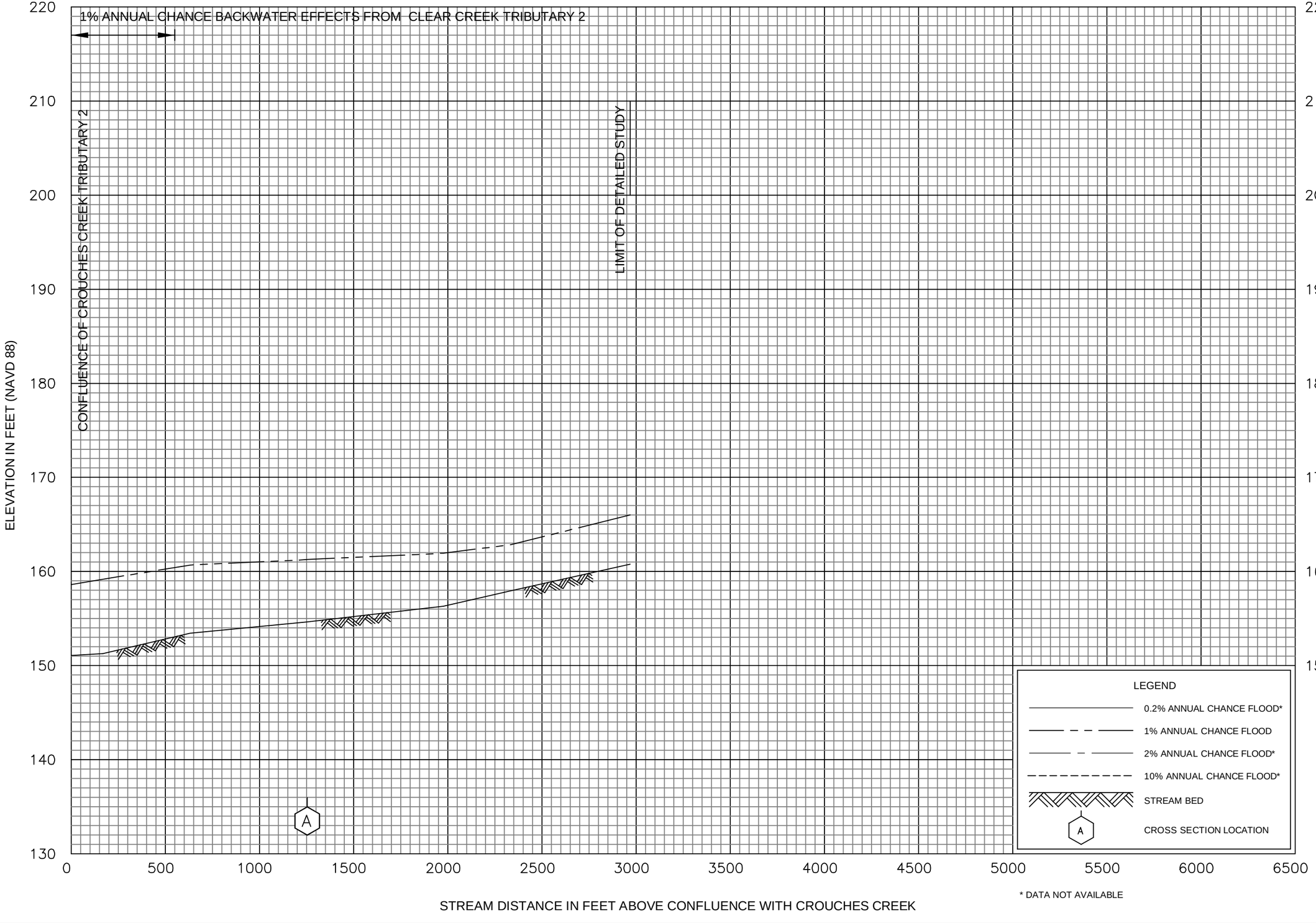
FLOOD PROFILES

CROUCHES CREEK TRIBUTARY 2

FEDERAL EMERGENCY MANAGEMENT AGENCY

WARREN COUNTY, MS
AND INCORPORATED AREAS

06P



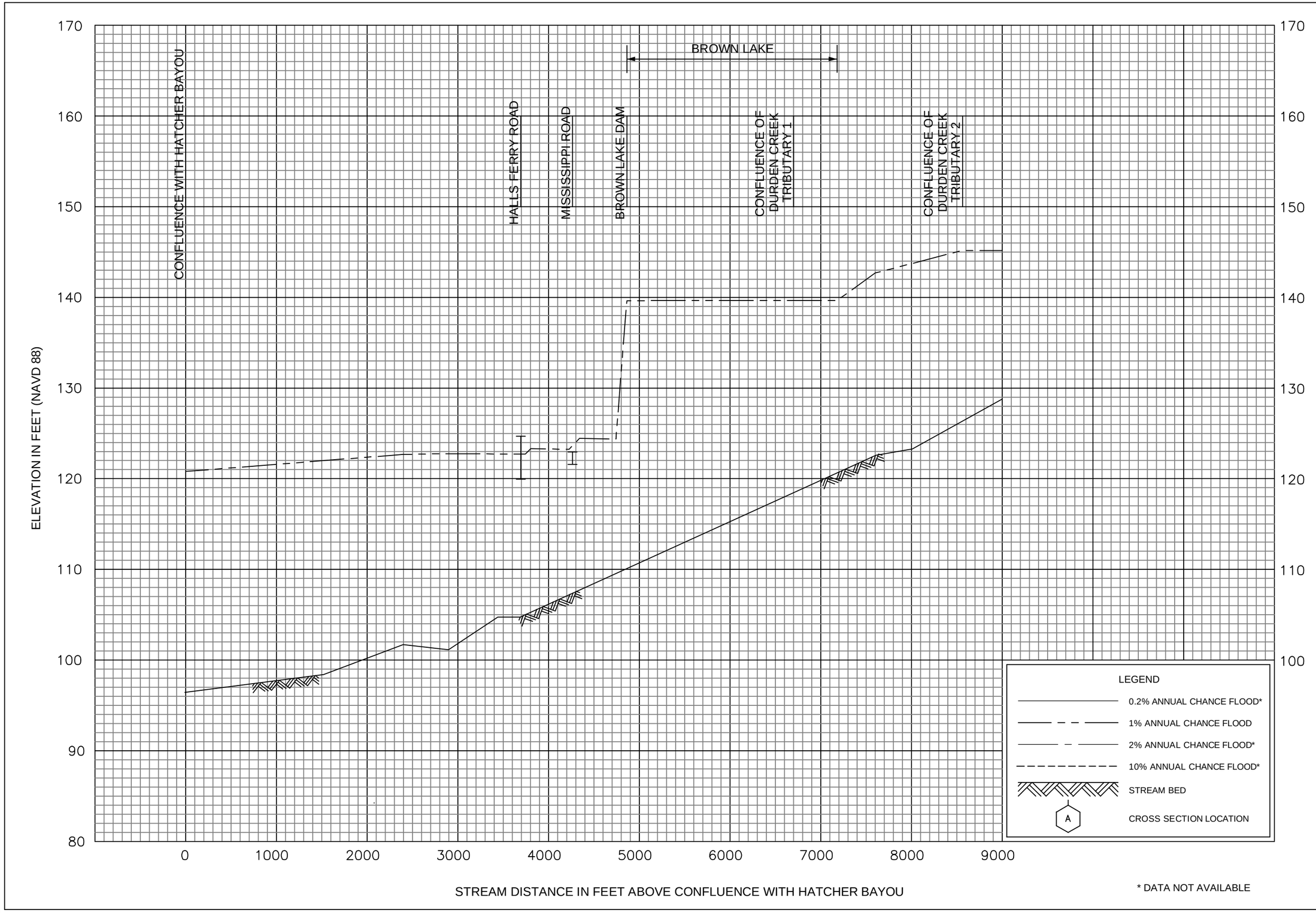
FLOOD PROFILES

CROUCHES CREEK TRIBUTARY 3

FEDERAL EMERGENCY MANAGEMENT AGENCY

WARREN COUNTY, MS
AND INCORPORATED AREAS

07P



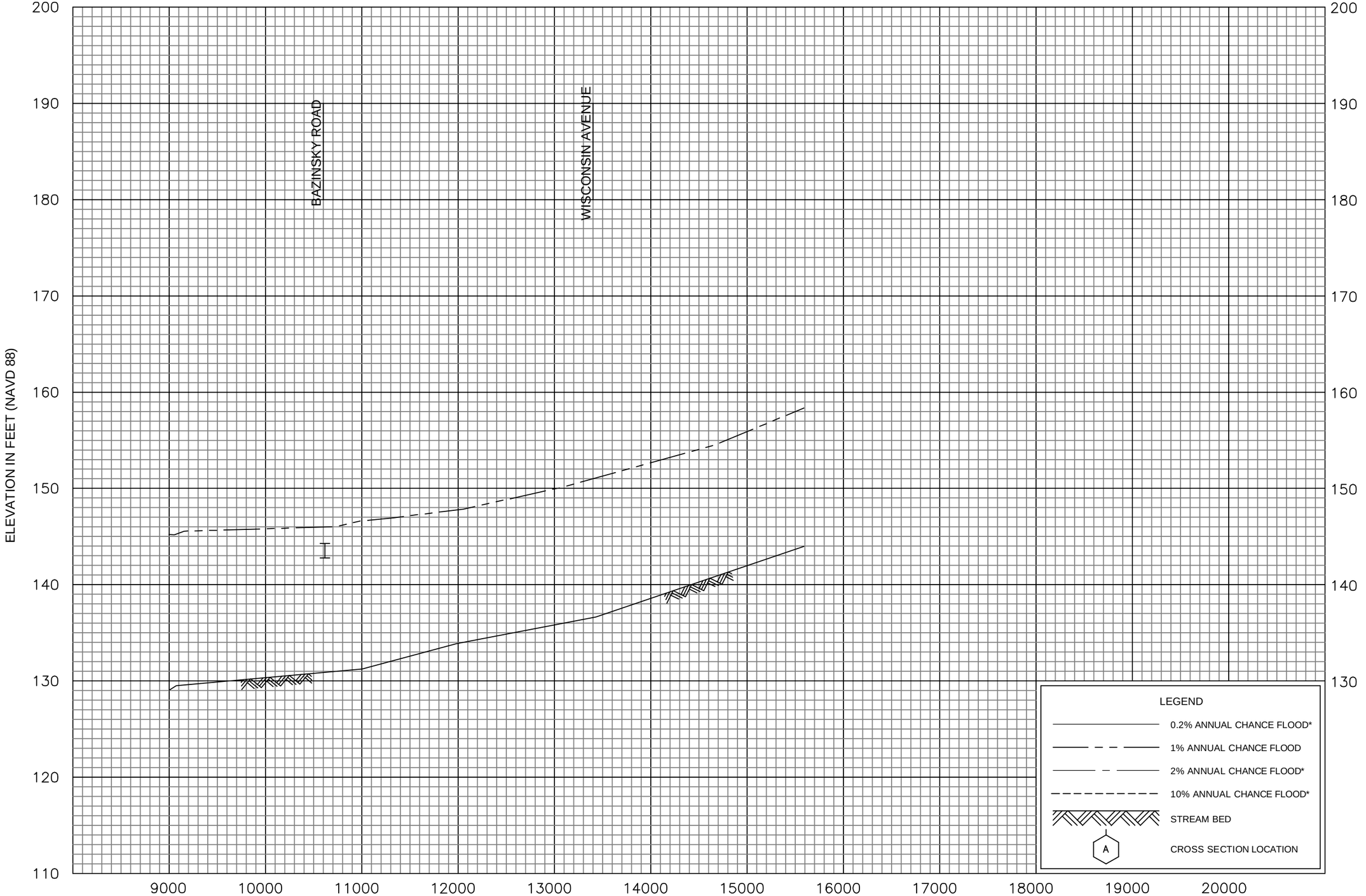
FLOOD PROFILES

DURDEN CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

WARREN COUNTY, MS
AND INCORPORATED AREAS

08P



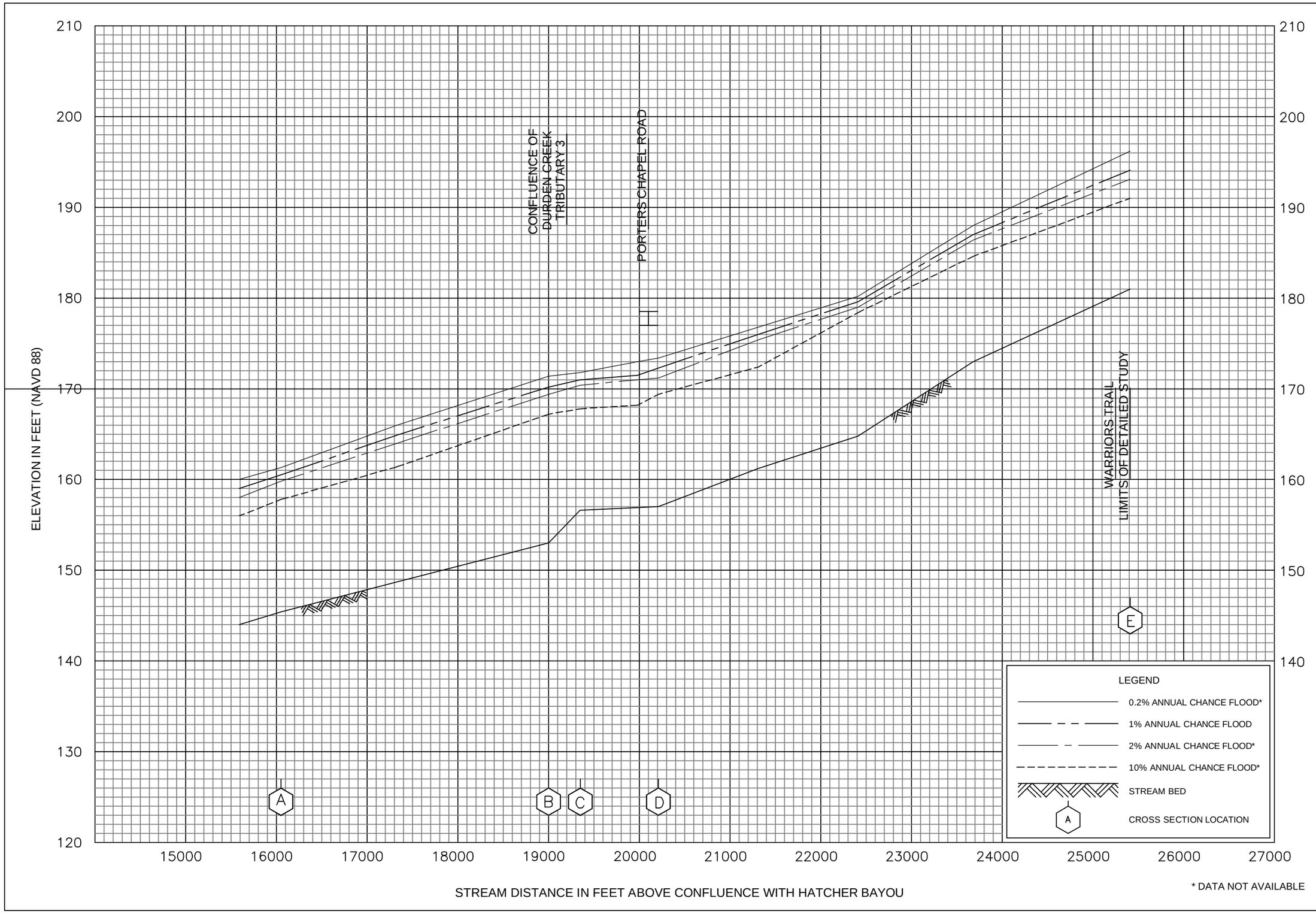
FLOOD PROFILES

DURDEN CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

WARREN COUNTY, MS
AND INCORPORATED AREAS

09P



FLOOD PROFILES

DURDEN CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

WARREN COUNTY, MS
AND INCORPORATED AREAS

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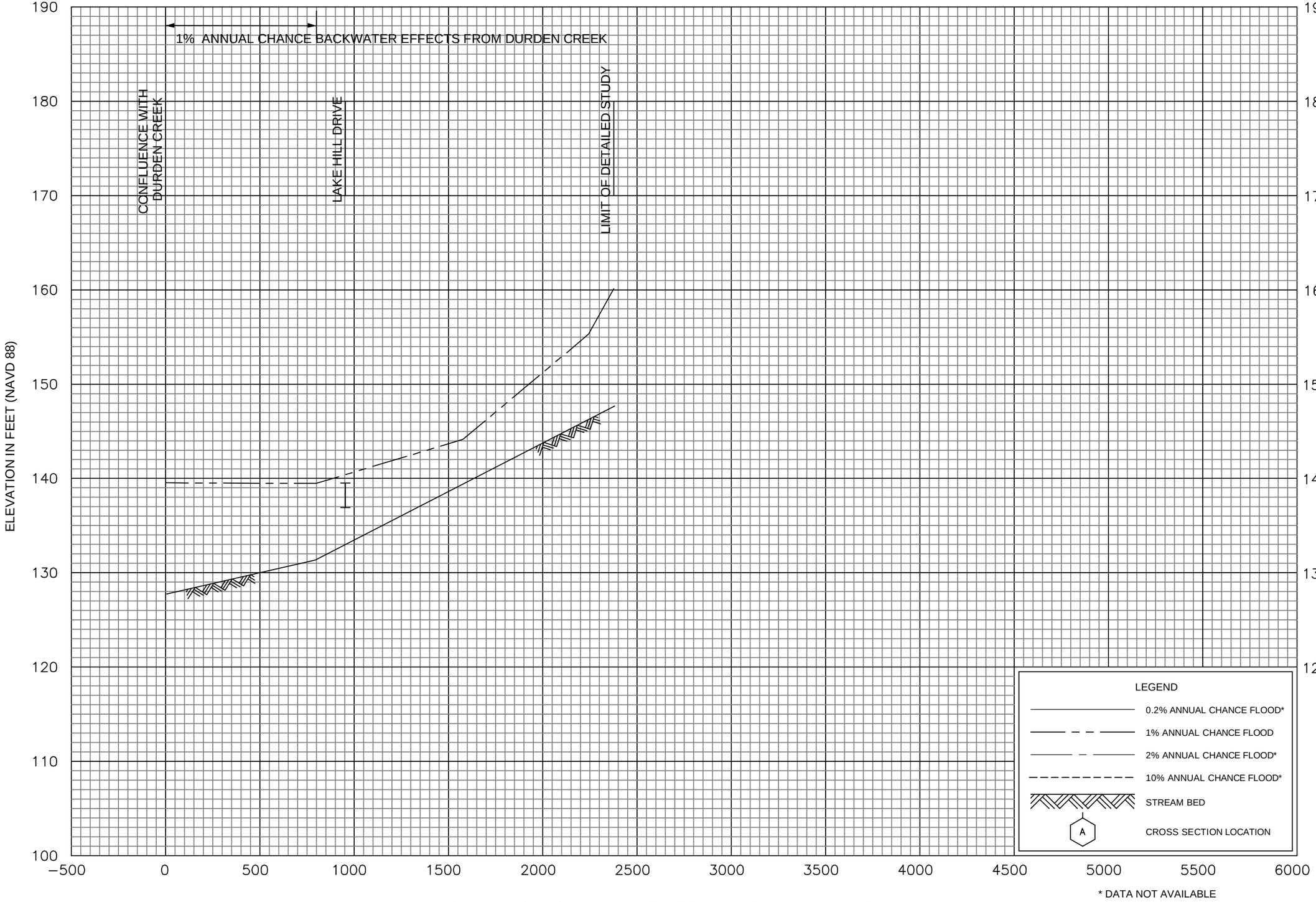


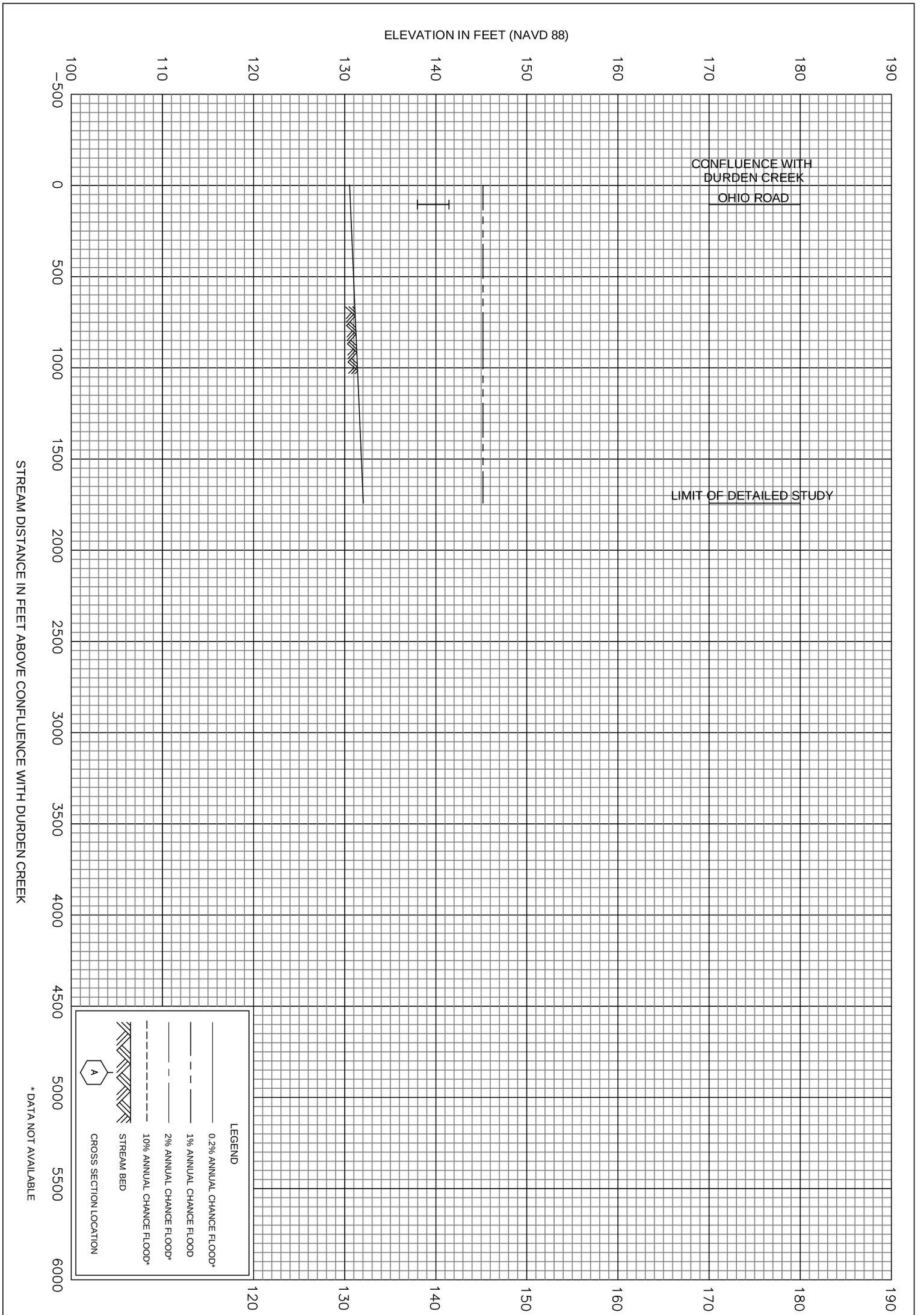
FLOOD PROFILES

DURDEN CREEK TRIBUTARY 1

FEDERAL EMERGENCY MANAGEMENT AGENCY

WARREN COUNTY, MS
AND INCORPORATED AREAS

11P



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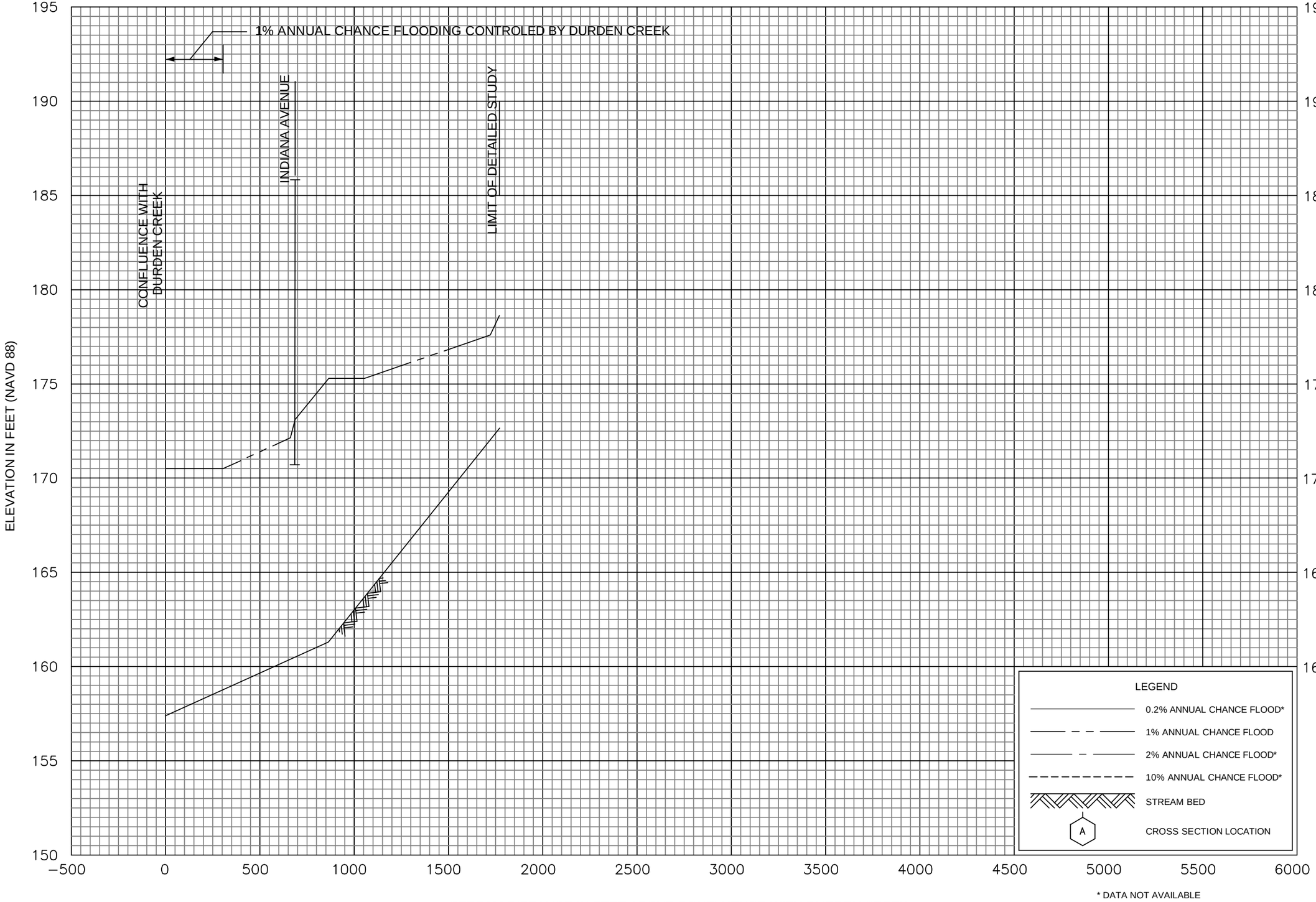
FEDERAL EMERGENCY MANAGEMENT AGENCY

WARREN COUNTY, MS
AND INCORPORATED AREAS

FLOOD PROFILES

DURDEN CREEK TRIBUTARY 2



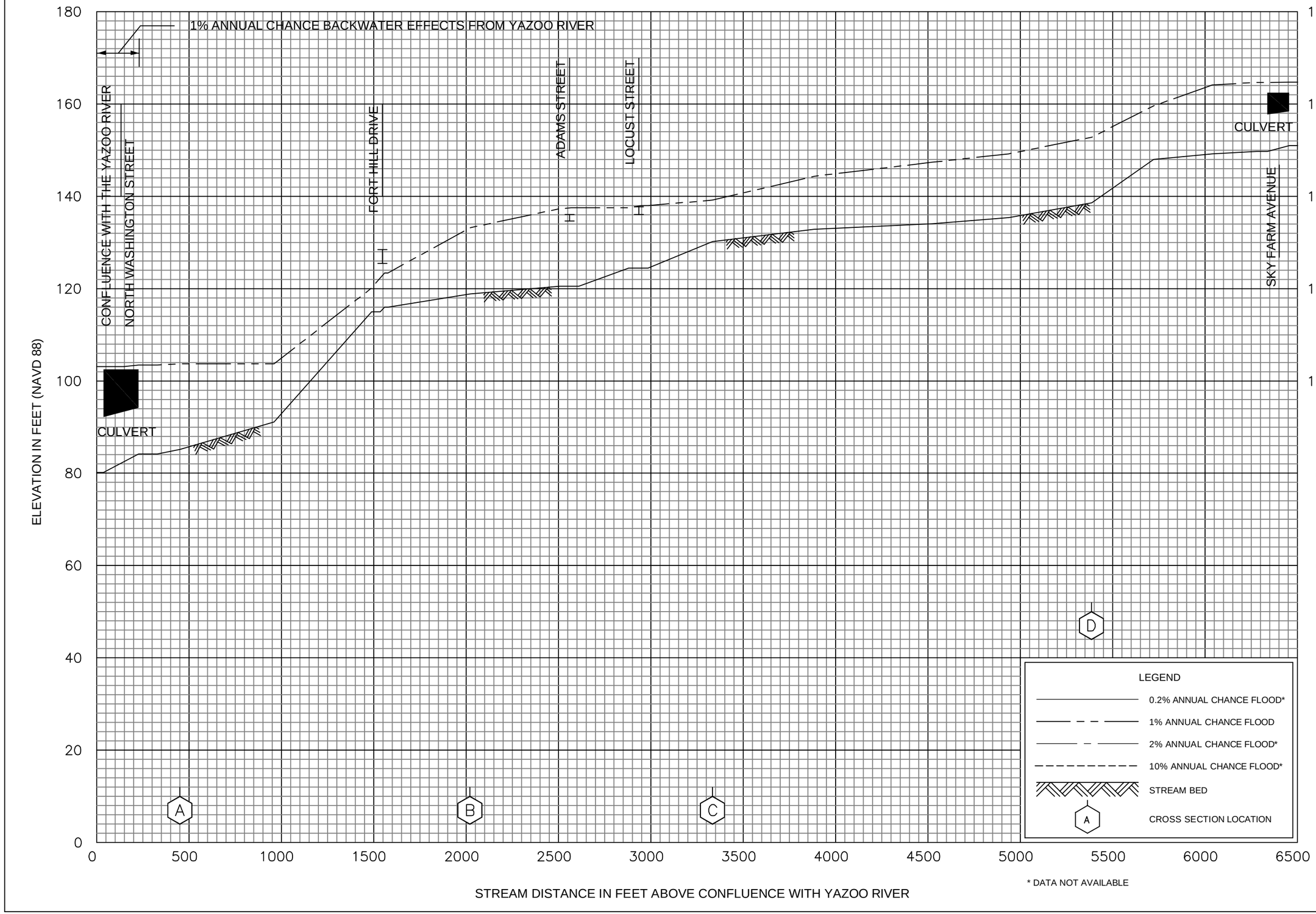
FLOOD PROFILES

DURDEN CREEK TRIBUTARY 3

FEDERAL EMERGENCY MANAGEMENT AGENCY

WARREN COUNTY, MS
AND INCORPORATED AREAS

13P



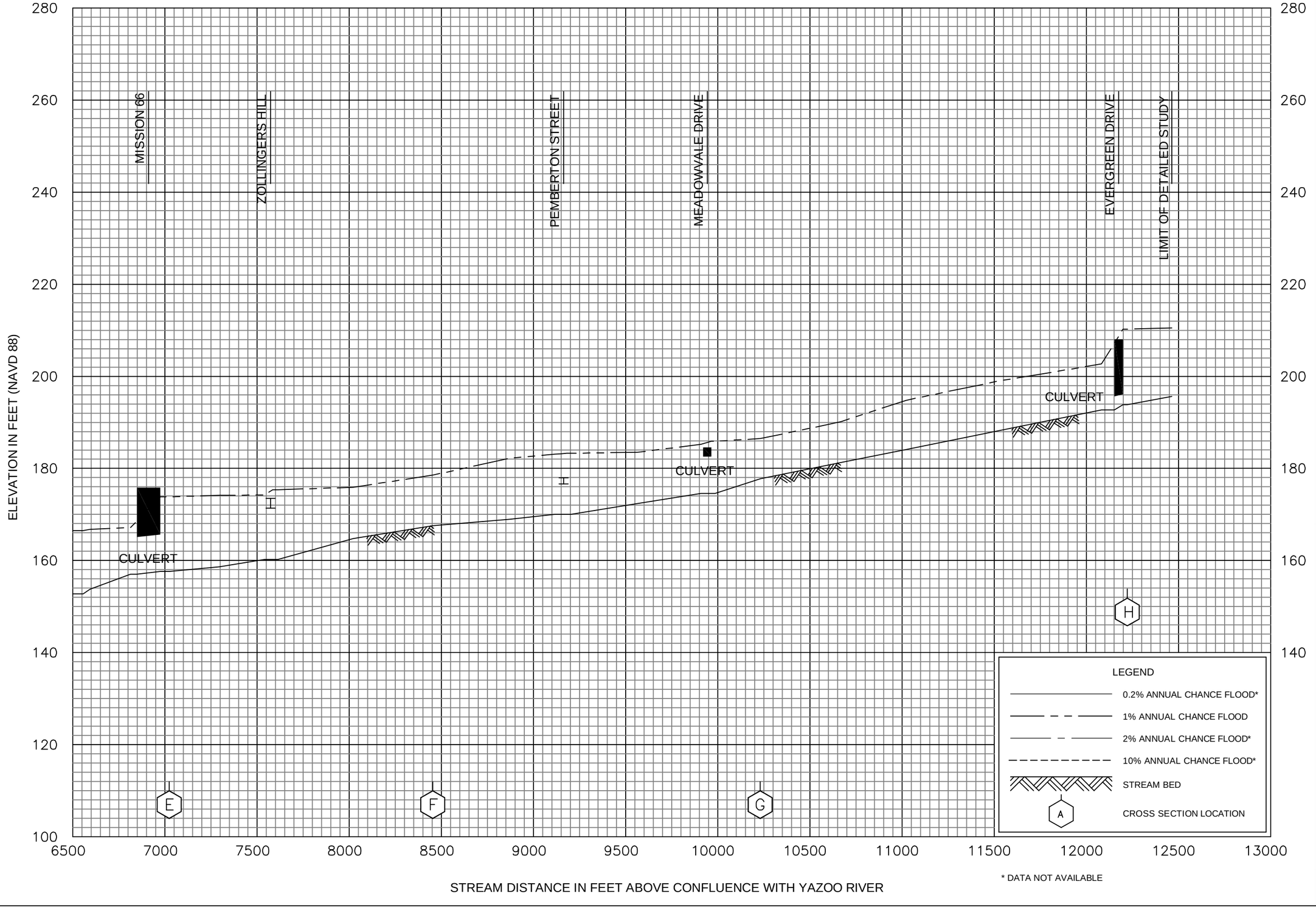
FLOOD PROFILES

GLASS BAYOU

FEDERAL EMERGENCY MANAGEMENT AGENCY

WARREN COUNTY, MS
AND INCORPORATED AREAS

14P



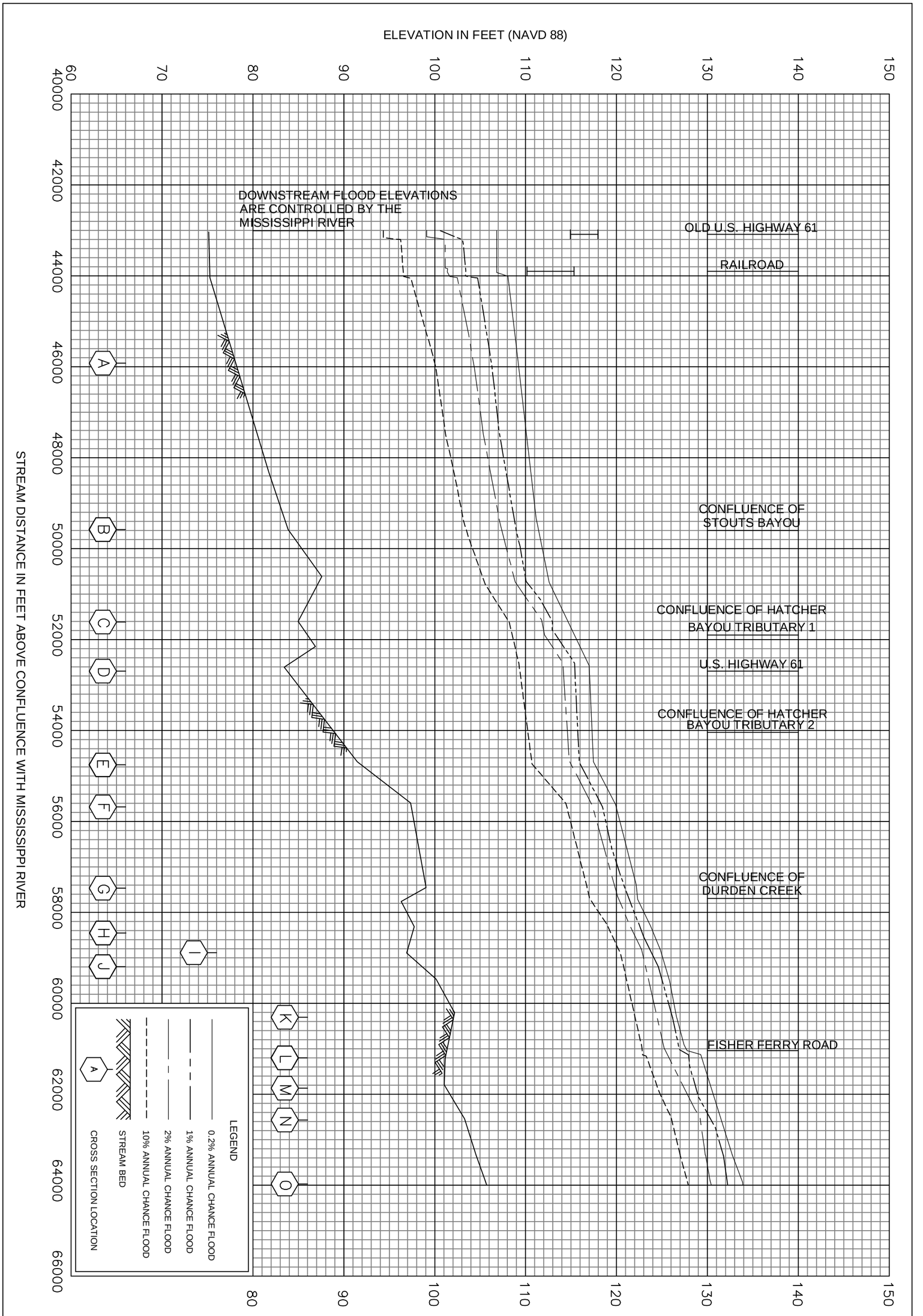
FLOOD PROFILES

GLASS BAYOU

FEDERAL EMERGENCY MANAGEMENT AGENCY

WARREN COUNTY, MS
AND INCORPORATED AREAS

15P



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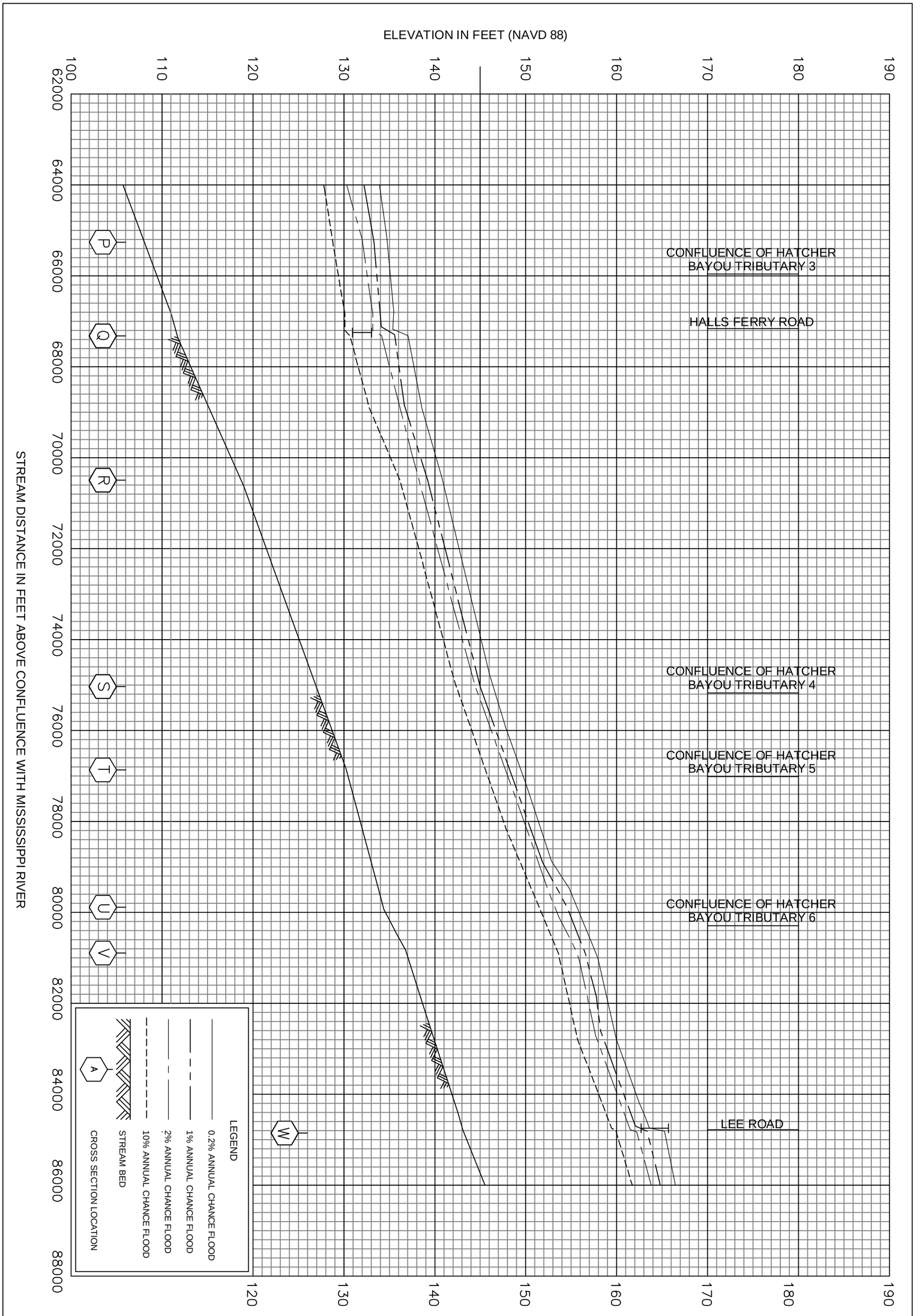
FEDERAL EMERGENCY MANAGEMENT AGENCY

WARREN COUNTY, MS
AND INCORPORATED AREAS

FLOOD PROFILES

HATCHER BAYOU



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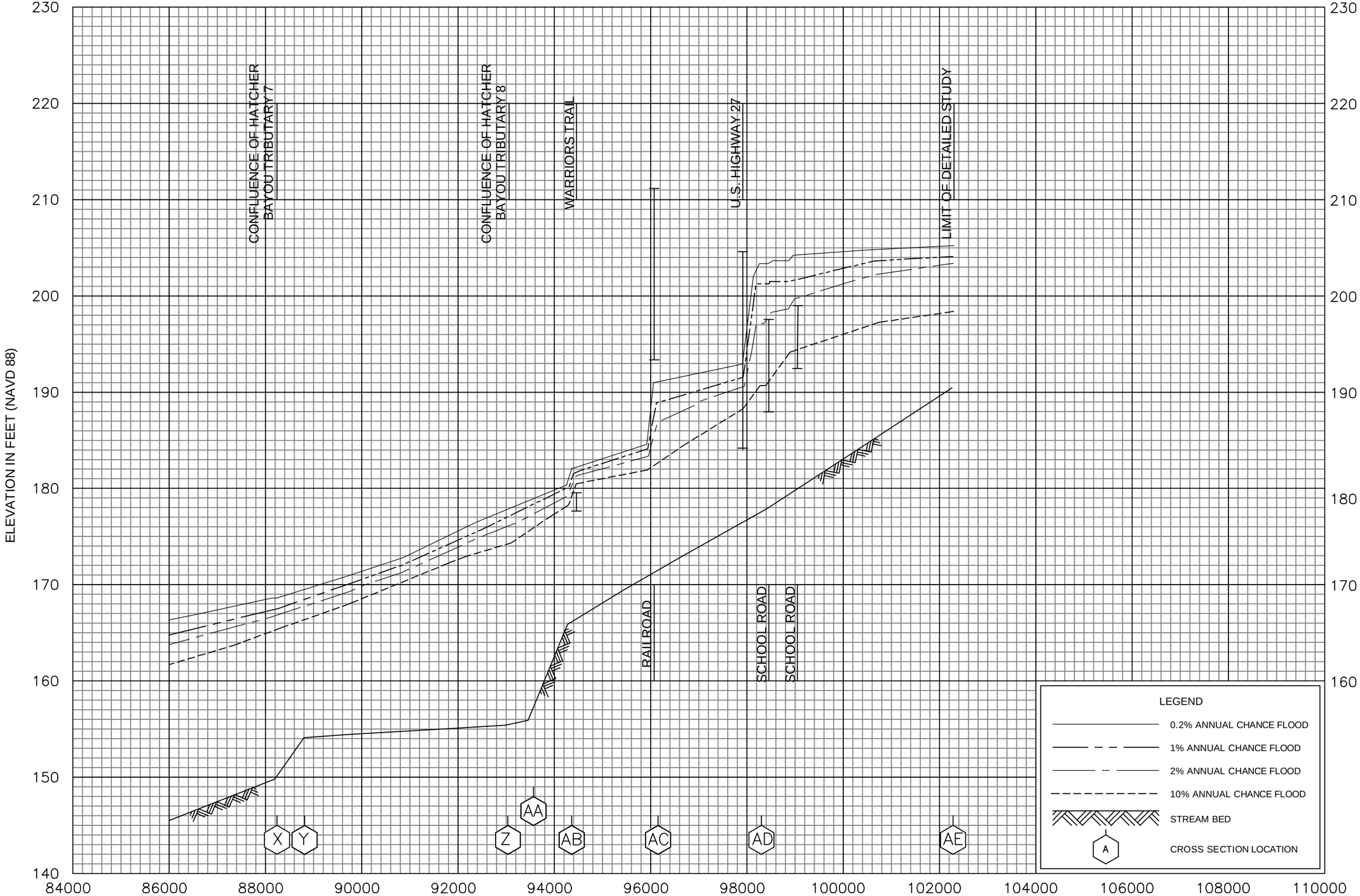
FEDERAL EMERGENCY MANAGEMENT AGENCY

WARREN COUNTY, MS
AND INCORPORATED AREAS

FLOOD PROFILES

HATCHER BAYOU



FLOOD PROFILES

HATCHER BAYOU

FEDERAL EMERGENCY MANAGEMENT AGENCY

WARREN COUNTY, MS
AND INCORPORATED AREAS

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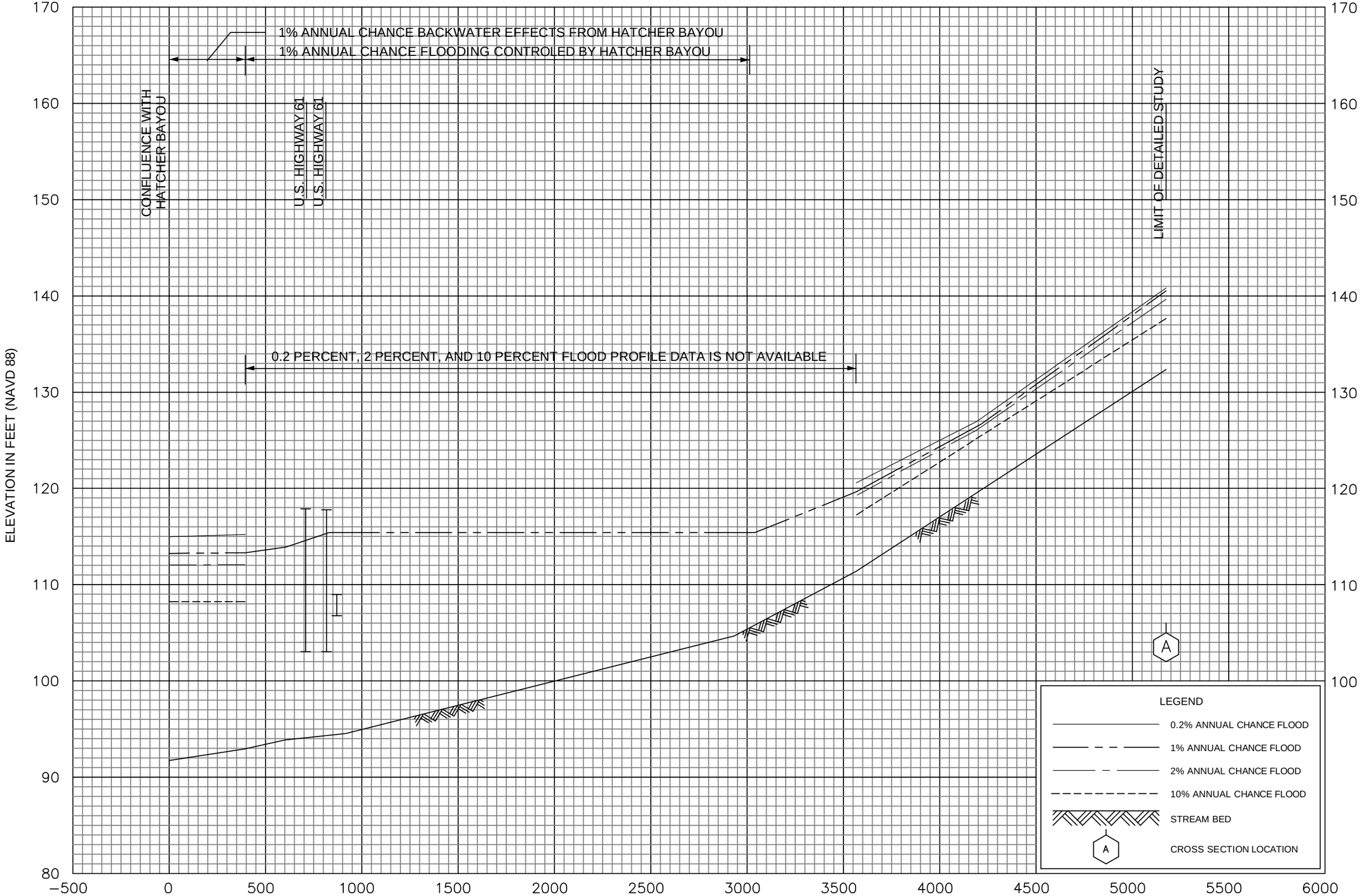

FLOOD PROFILES

HATCHER BAYOU TRIBUTARY 1

FEDERAL EMERGENCY MANAGEMENT AGENCY

WARREN COUNTY, MS
AND INCORPORATED AREAS

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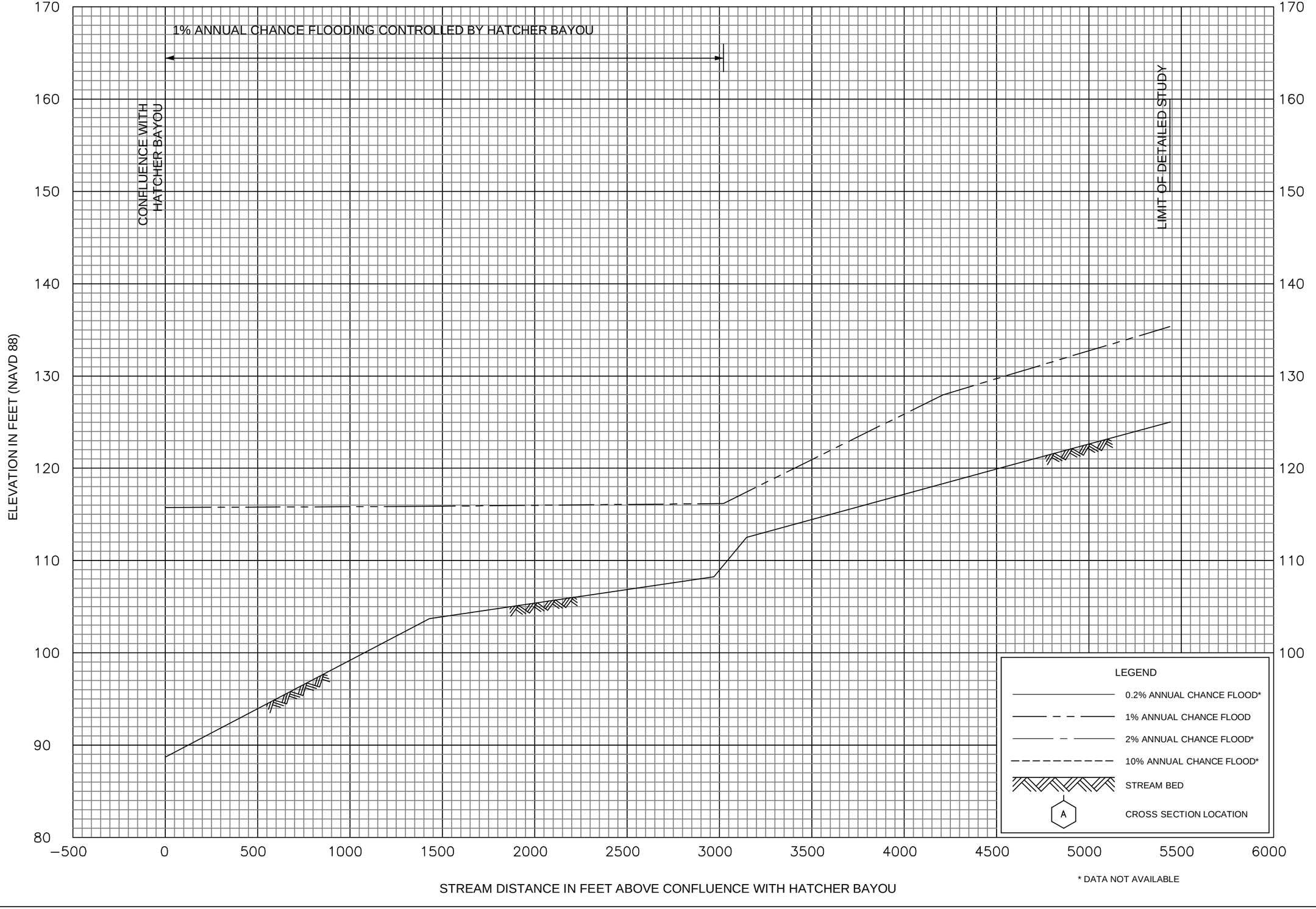

FLOOD PROFILES

HATCHER BAYOU TRIBUTARY 2

FEDERAL EMERGENCY MANAGEMENT AGENCY

WARREN COUNTY, MS
AND INCORPORATED AREAS

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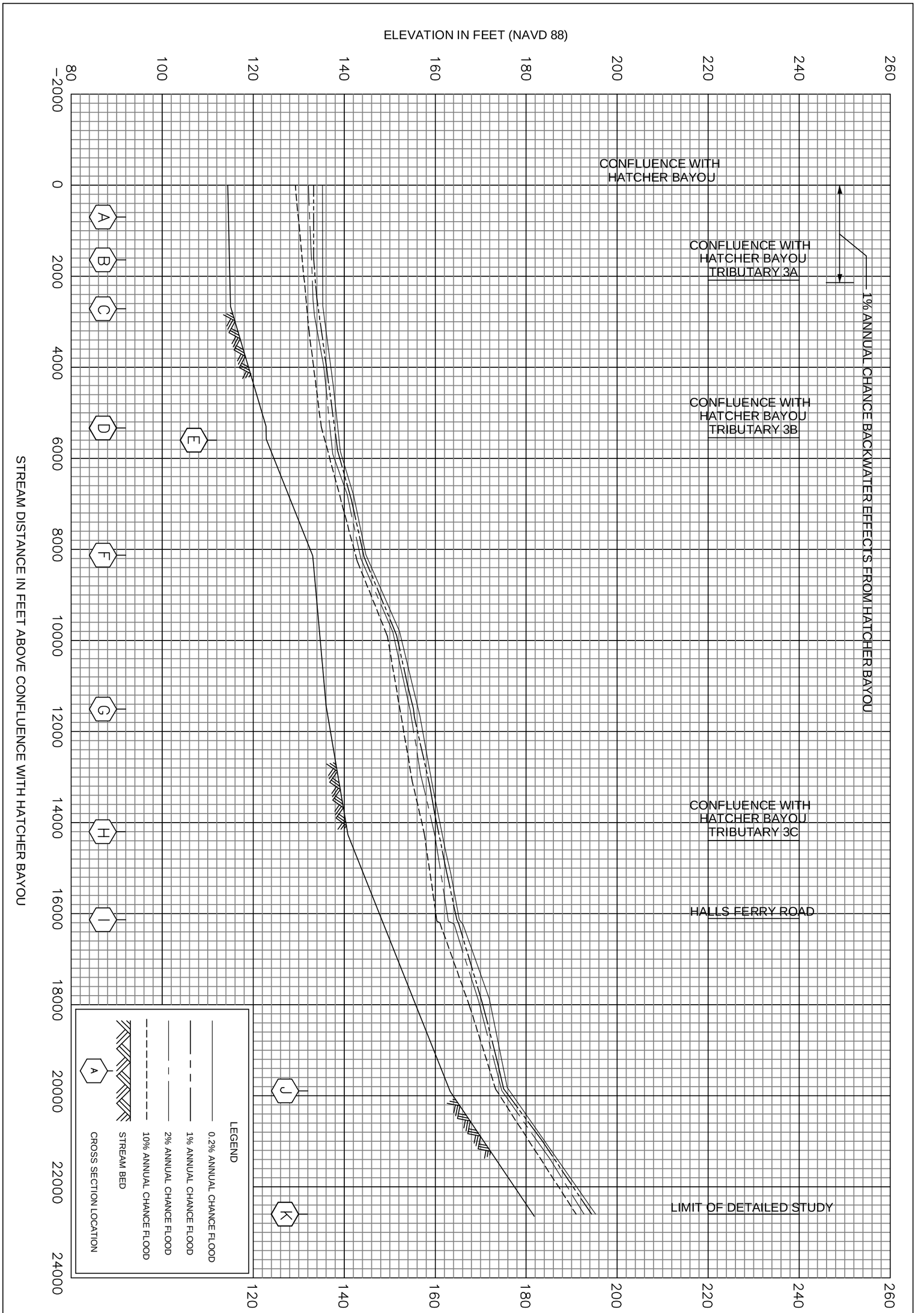
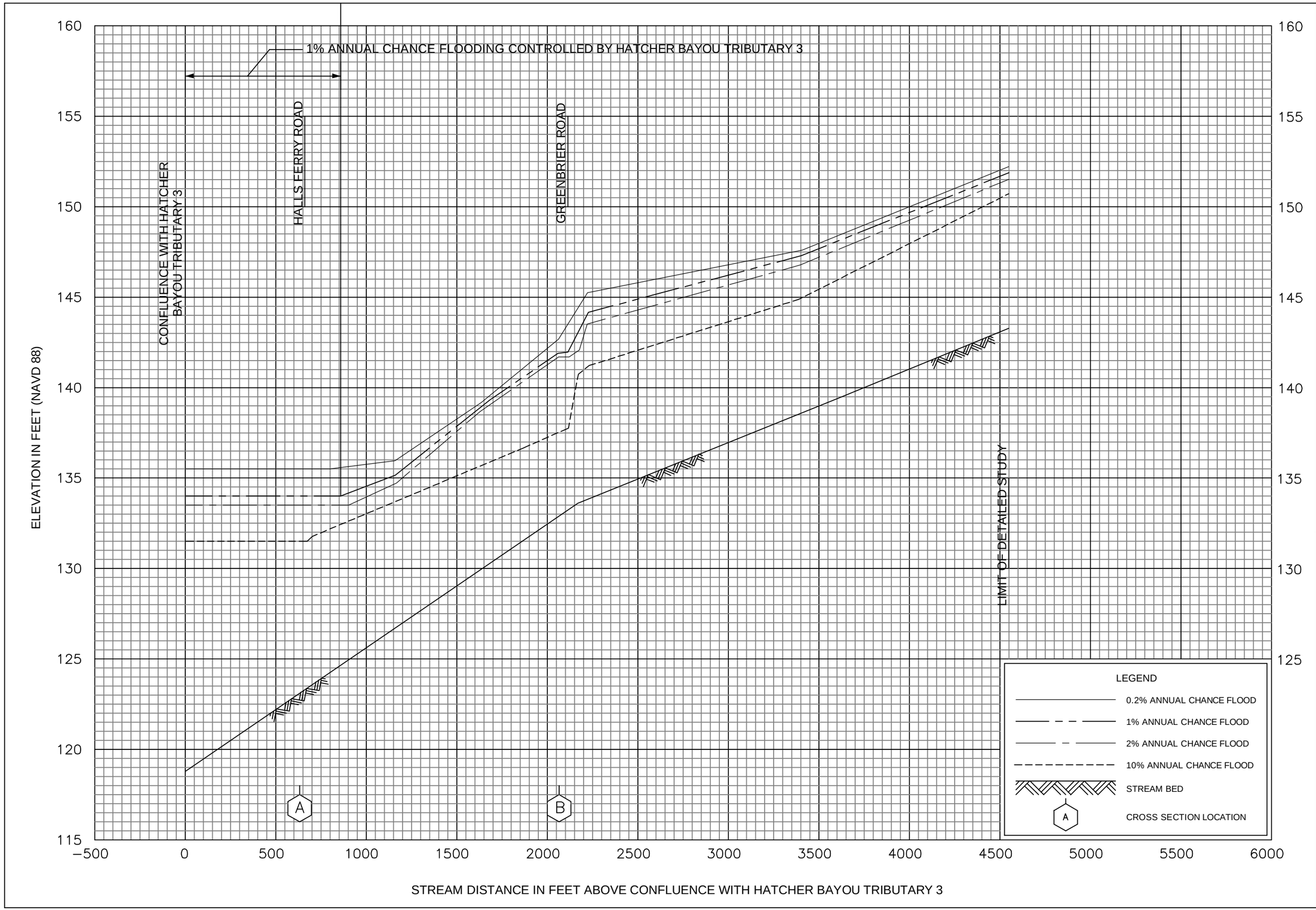


FEDERAL EMERGENCY MANAGEMENT AGENCY

WARREN COUNTY, MS
AND INCORPORATED AREAS

FLOOD PROFILES

HATCHER BAYOU TRIBUTARY 3



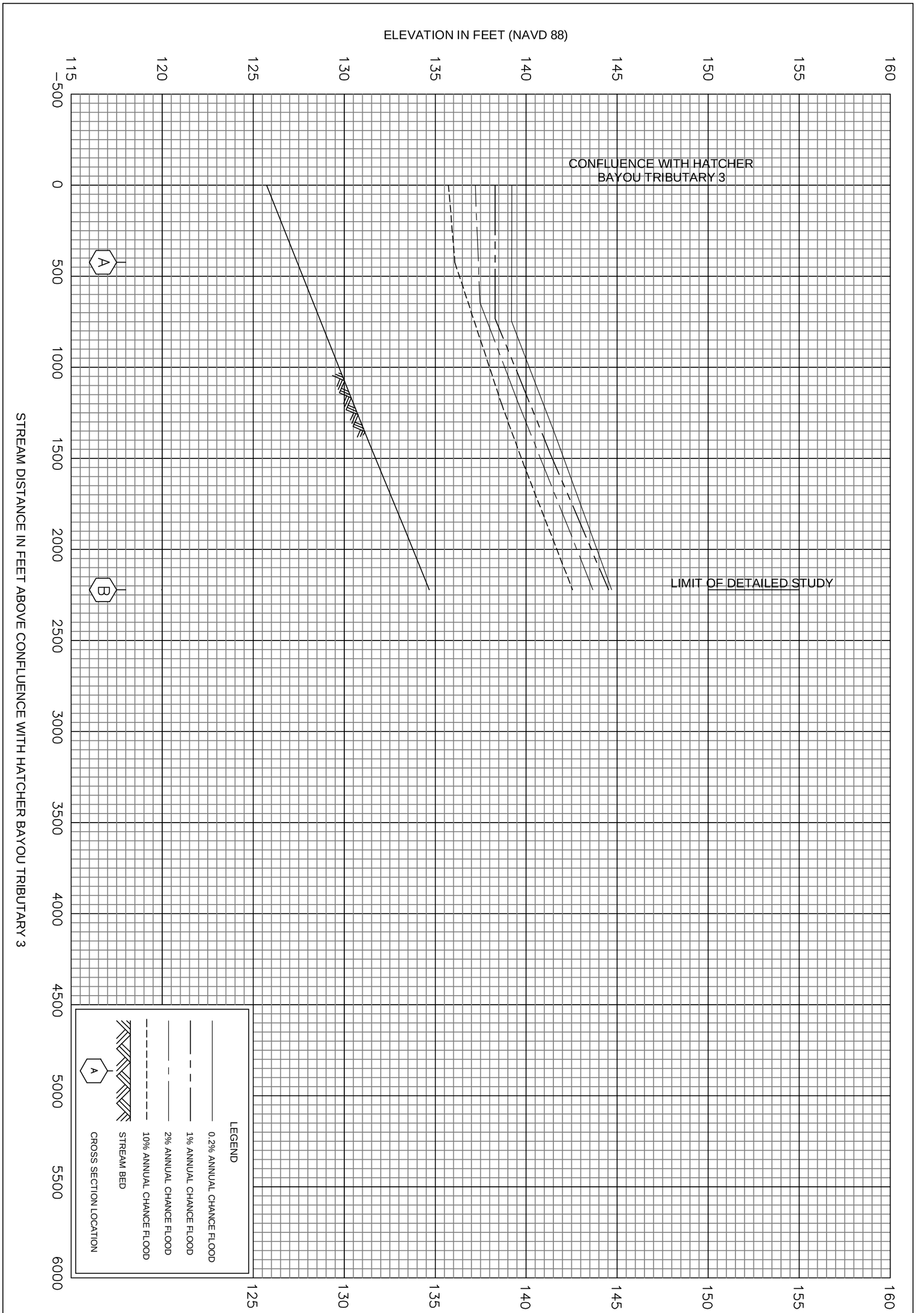
FLOOD PROFILES

HATCHER BAYOU TRIBUTARY 3A

FEDERAL EMERGENCY MANAGEMENT AGENCY

WARREN COUNTY, MS
AND INCORPORATED AREAS

22P

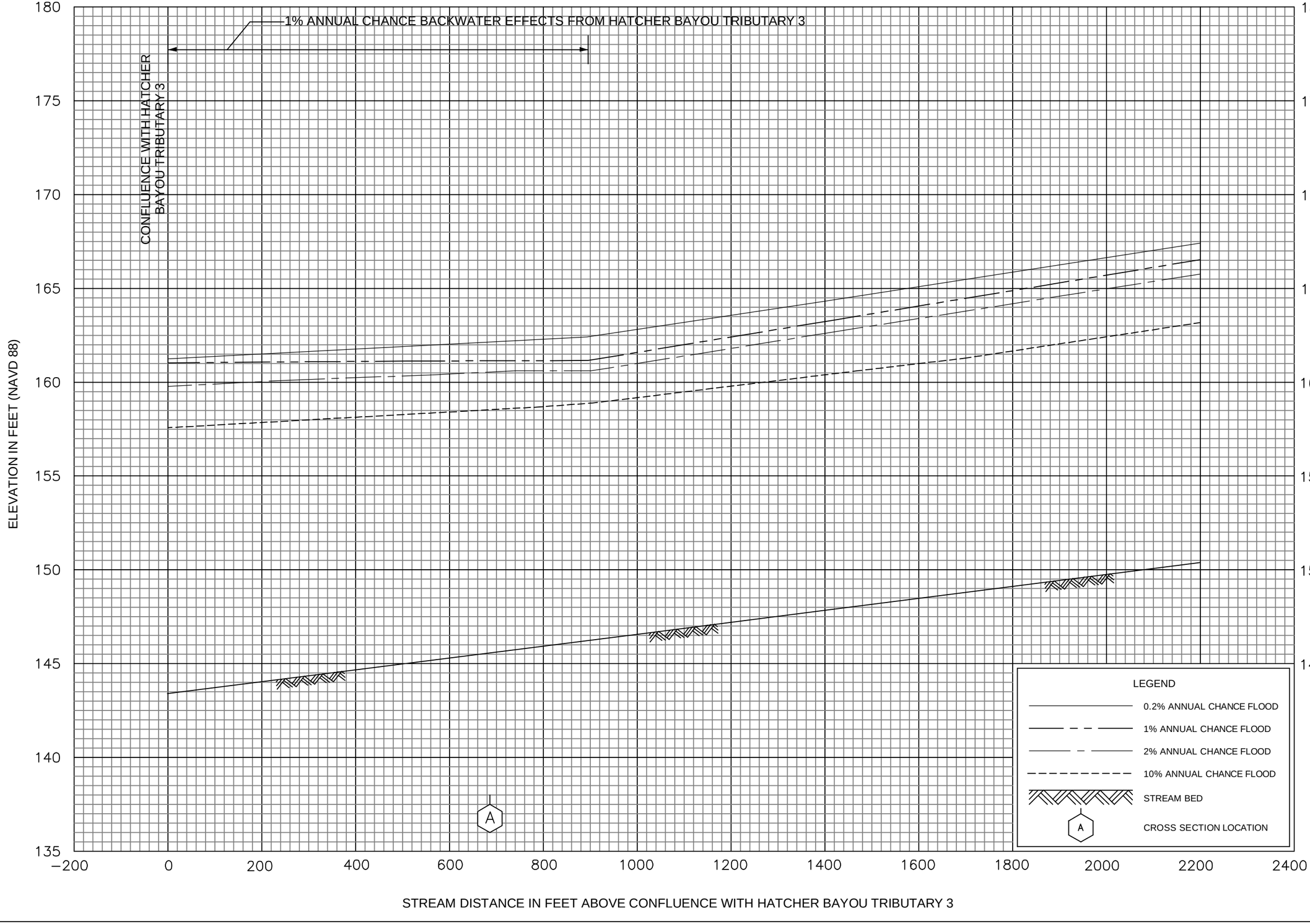


FEDERAL EMERGENCY MANAGEMENT AGENCY

WARREN COUNTY, MS
AND INCORPORATED AREAS

FLOOD PROFILES

HATCHER BAYOU TRIBUTARY 3B



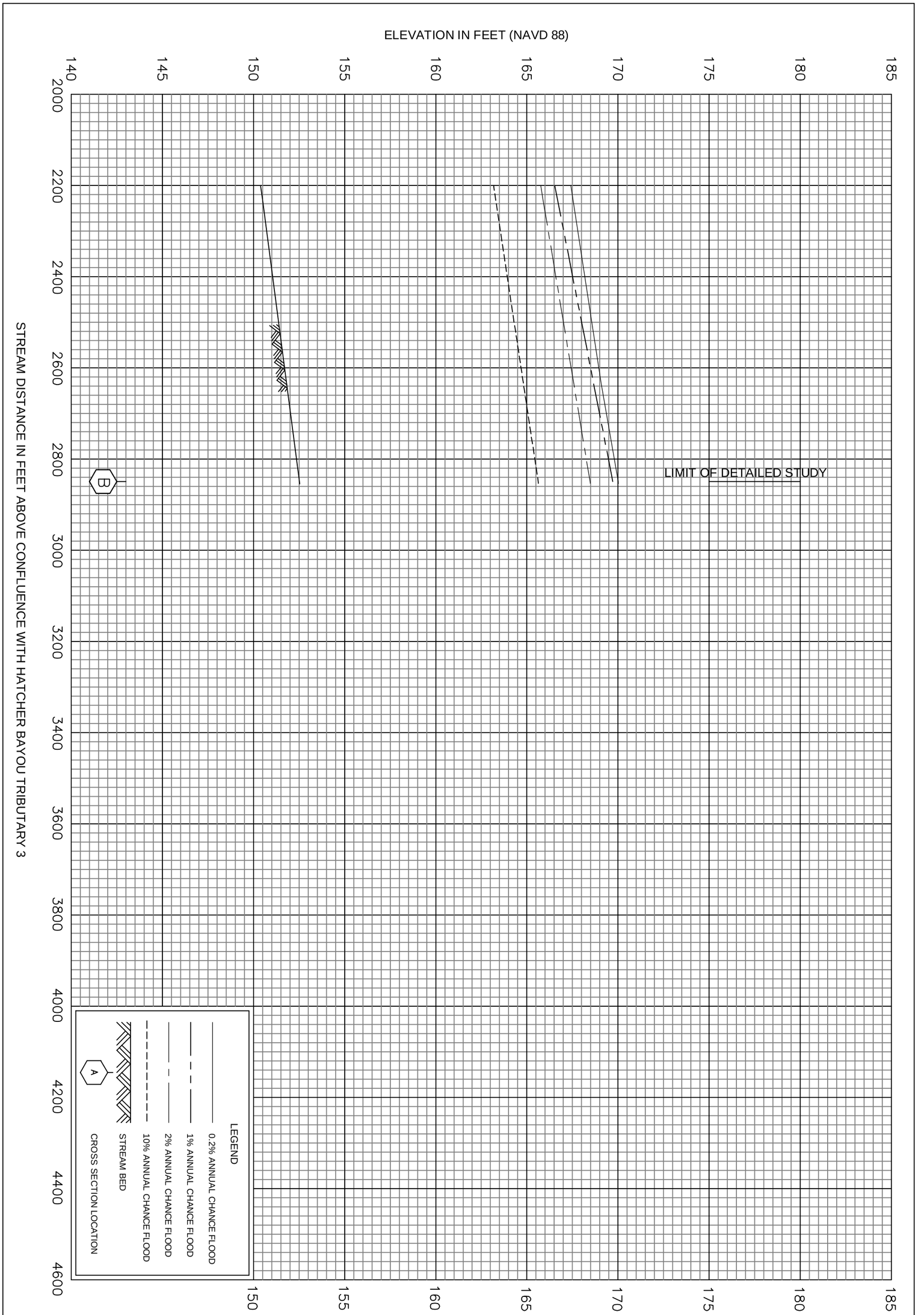
FLOOD PROFILES

HATCHER BAYOU TRIBUTARY 3C

FEDERAL EMERGENCY MANAGEMENT AGENCY

WARREN COUNTY, MS
AND INCORPORATED AREAS

24P



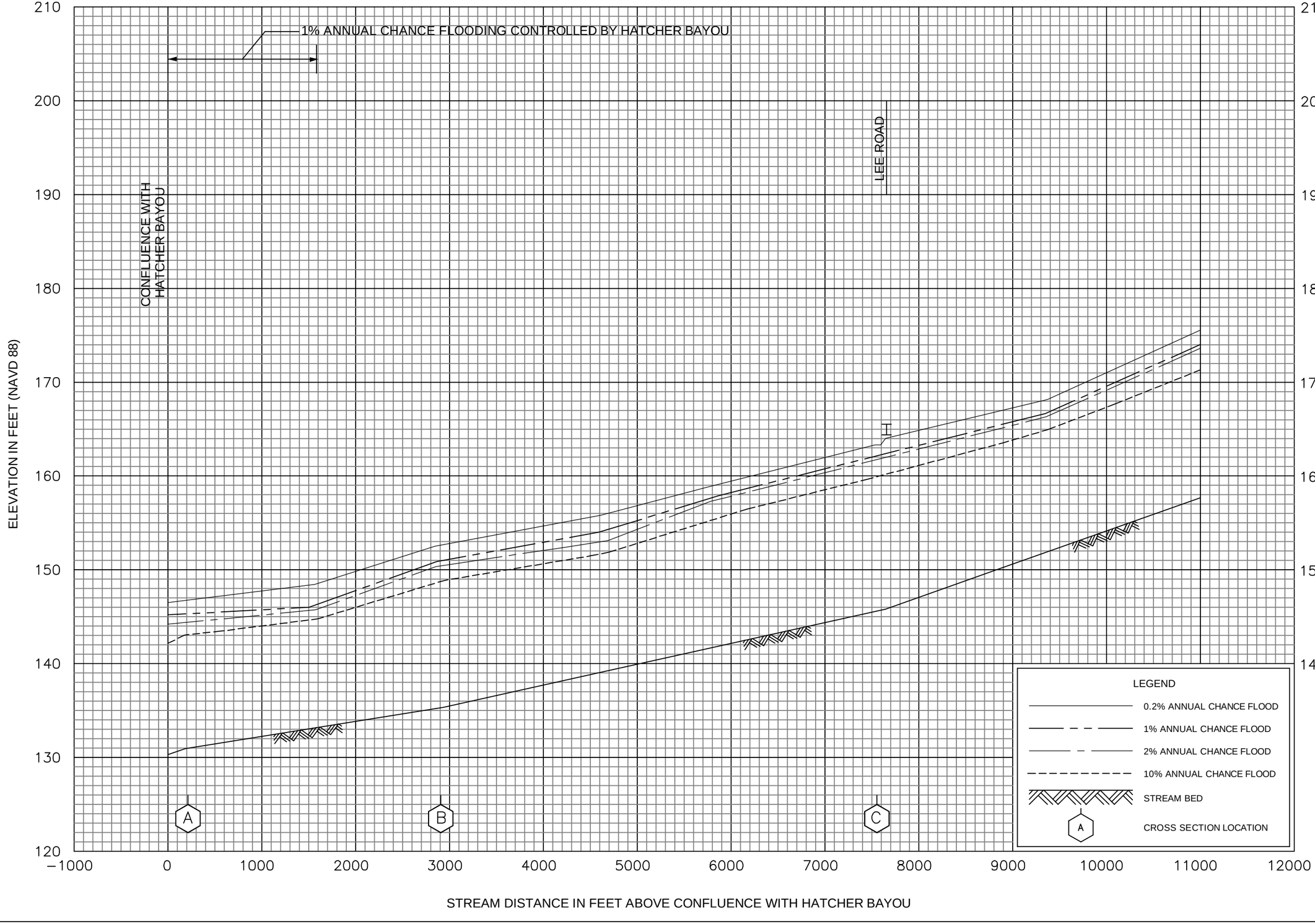
25P

FEDERAL EMERGENCY MANAGEMENT AGENCY

WARREN COUNTY, MS
AND INCORPORATED AREAS

FLOOD PROFILES

HATCHER BAYOU TRIBUTARY 3C



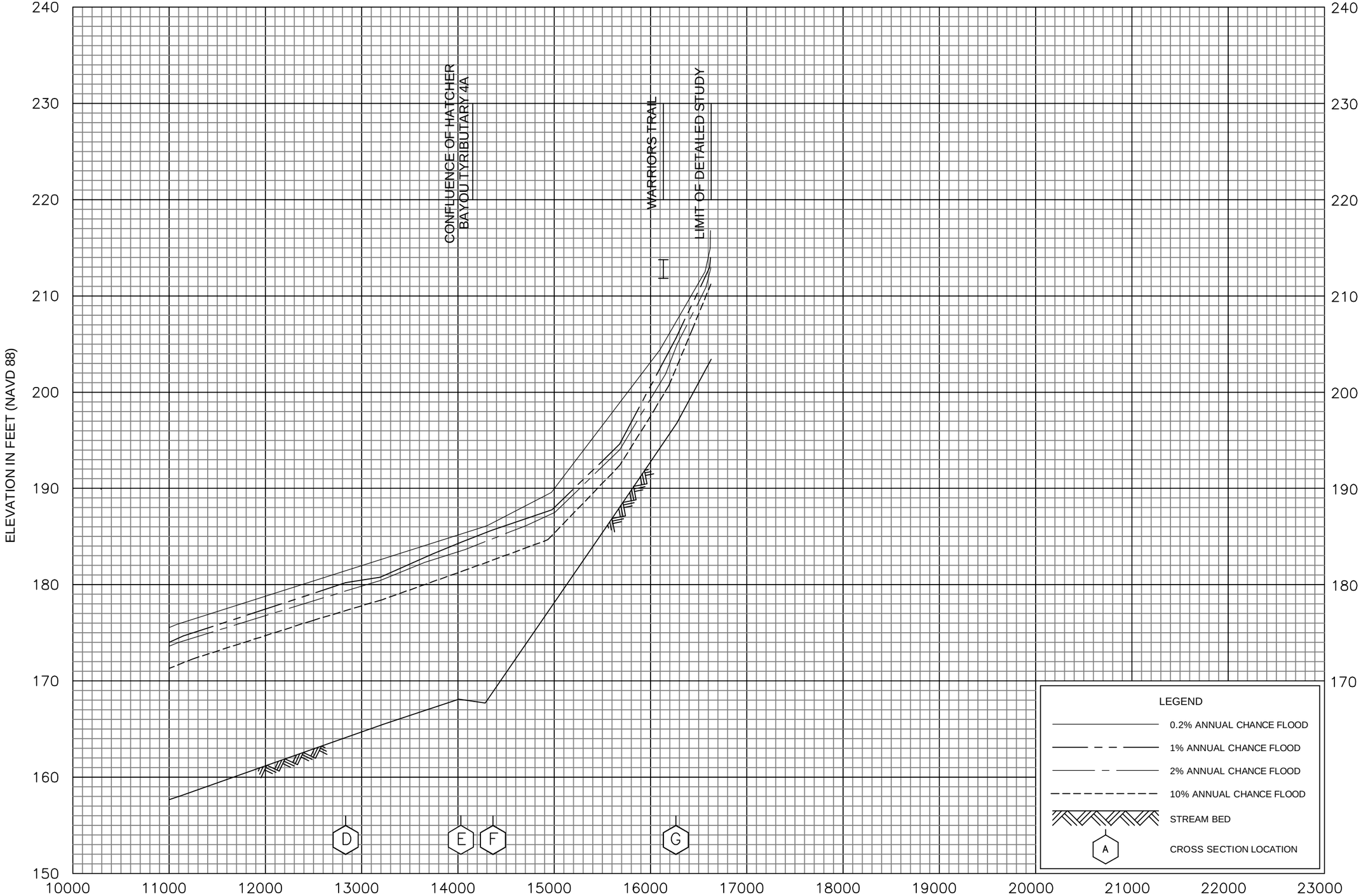
FLOOD PROFILES

HATCHER BAYOU TRIBUTARY 4

FEDERAL EMERGENCY MANAGEMENT AGENCY

WARREN COUNTY, MS
AND INCORPORATED AREAS

26P



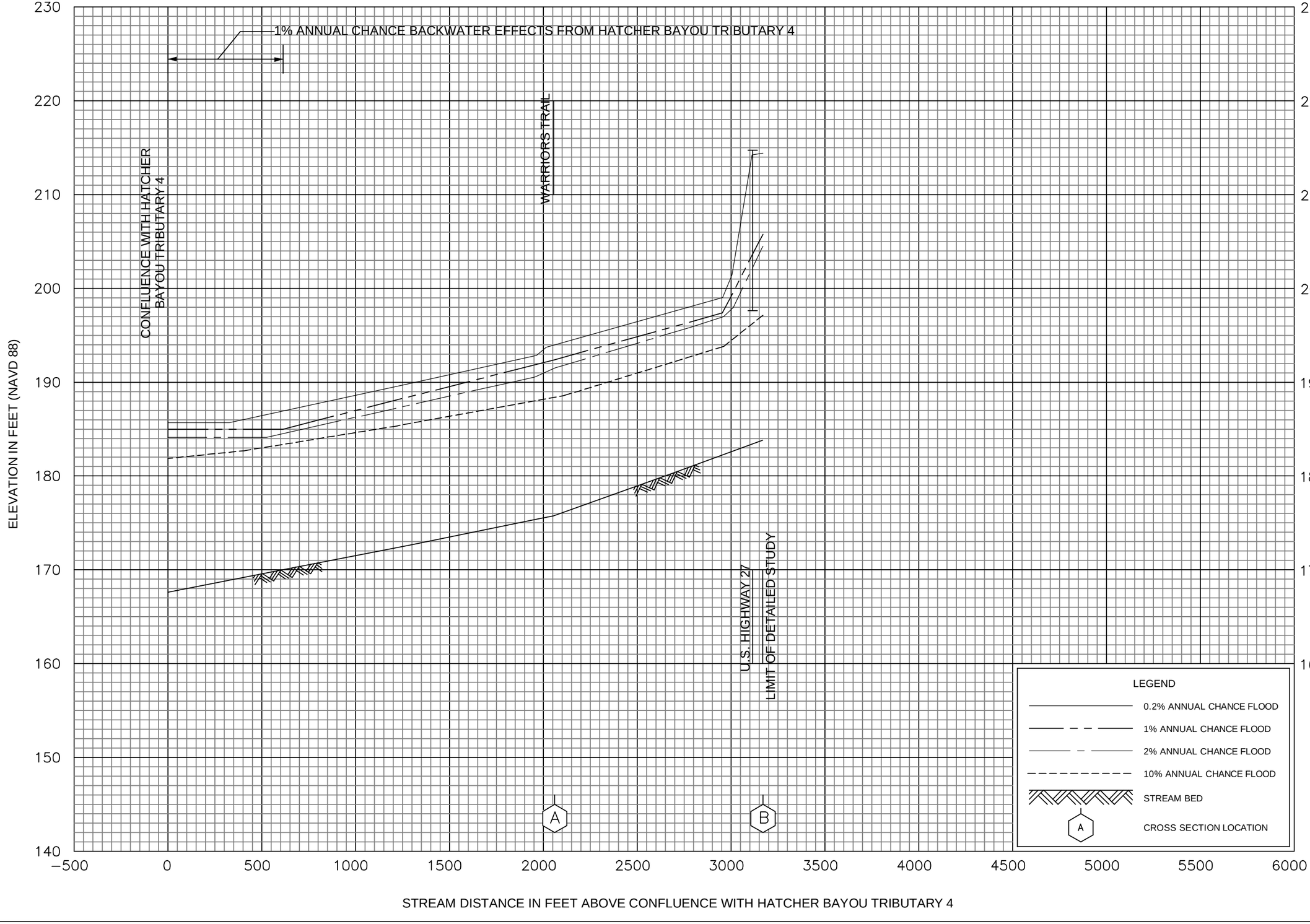
FLOOD PROFILES

HATCHER BAYOU TRIBUTARY 4

FEDERAL EMERGENCY MANAGEMENT AGENCY

WARREN COUNTY, MS
AND INCORPORATED AREAS

27P



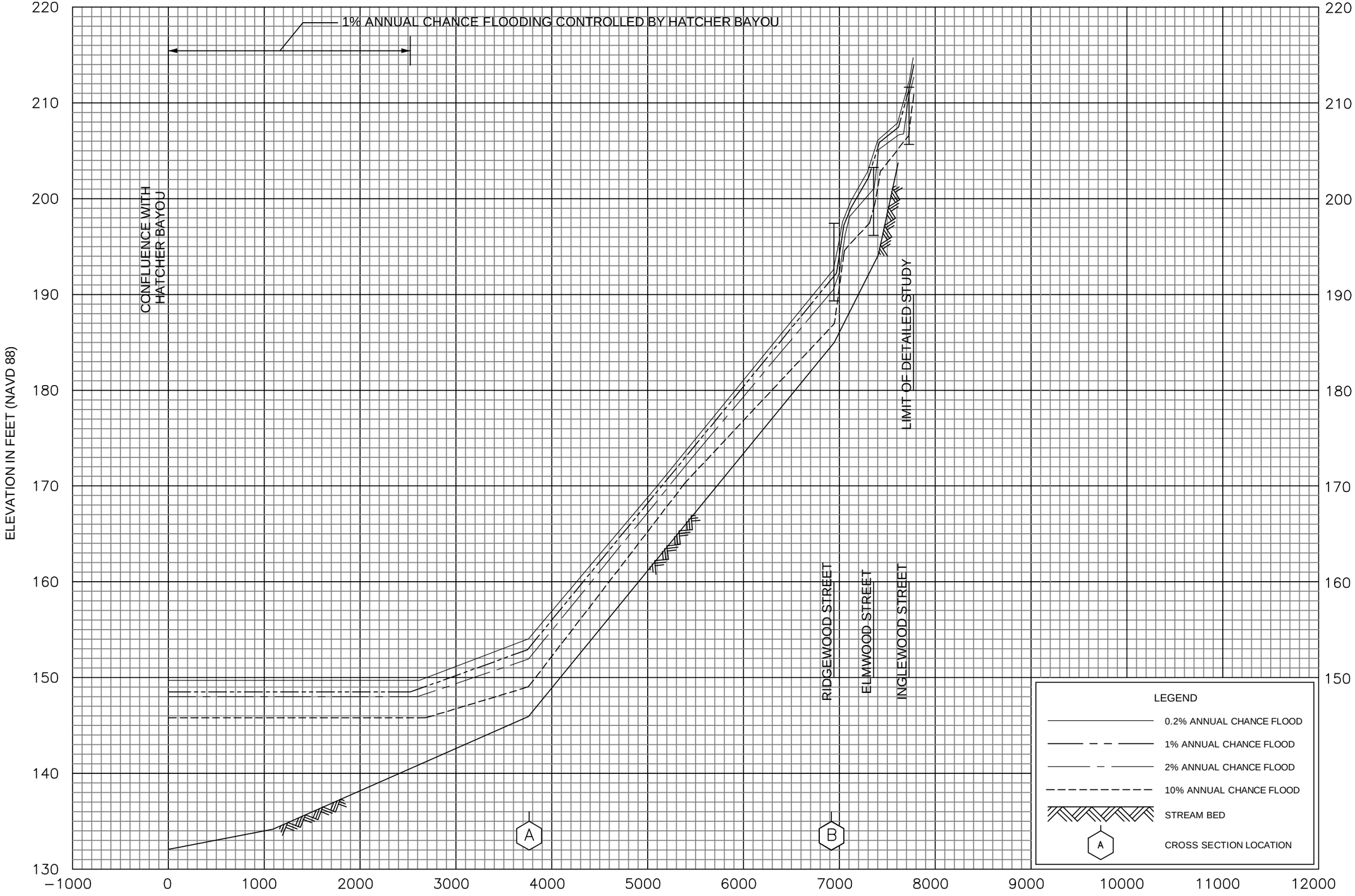
FLOOD PROFILES

HATCHER BAYOU TRIBUTARY 4A

FEDERAL EMERGENCY MANAGEMENT AGENCY

WARREN COUNTY, MS
AND INCORPORATED AREAS

28P



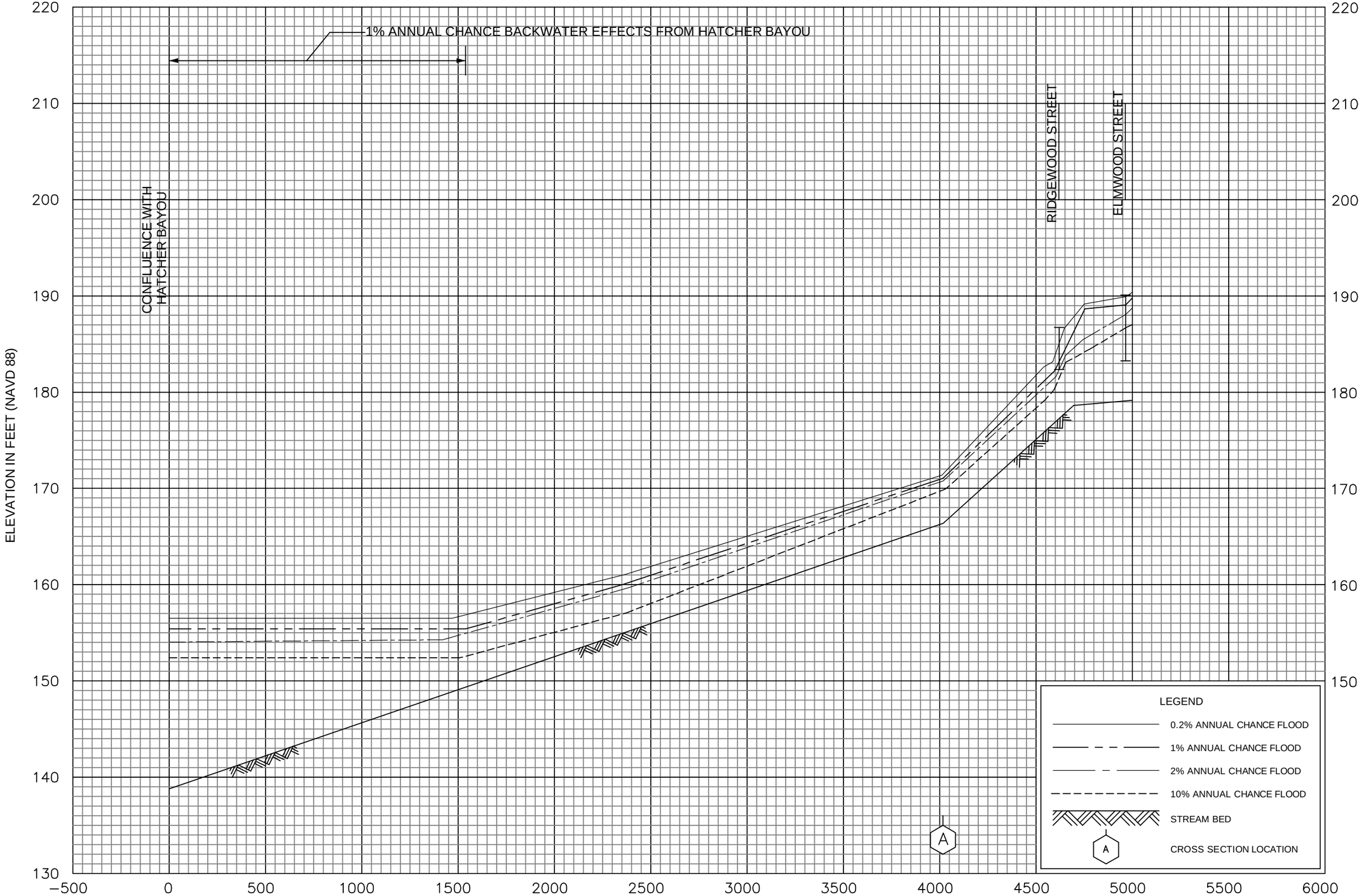
FLOOD PROFILES

HATCHER BAYOU TRIBUTARY 5

FEDERAL EMERGENCY MANAGEMENT AGENCY

WARREN COUNTY, MS
AND INCORPORATED AREAS

29P



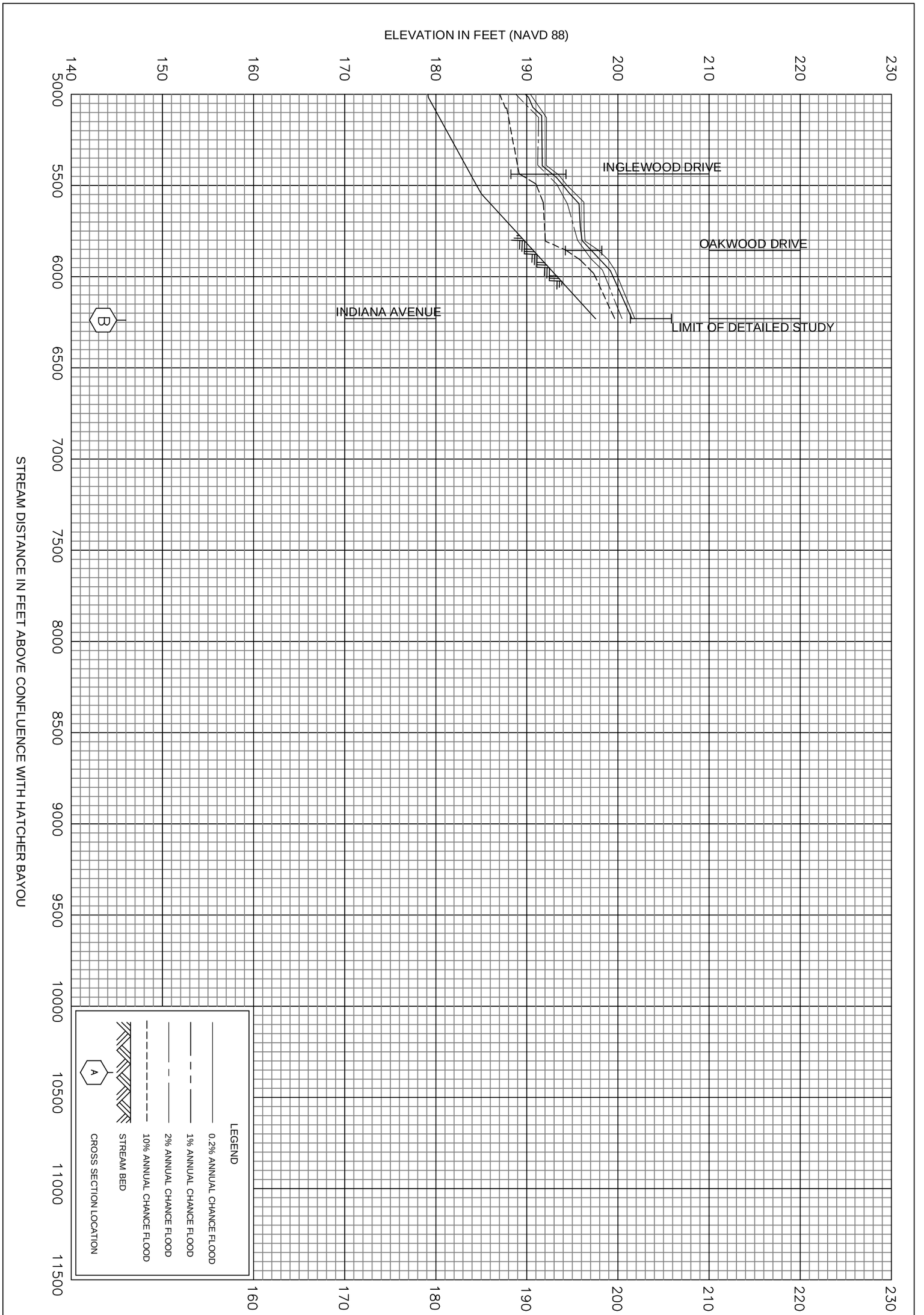
FLOOD PROFILES

HATCHER BAYOU TRIBUTARY 6

FEDERAL EMERGENCY MANAGEMENT AGENCY

WARREN COUNTY, MS
AND INCORPORATED AREAS

30P

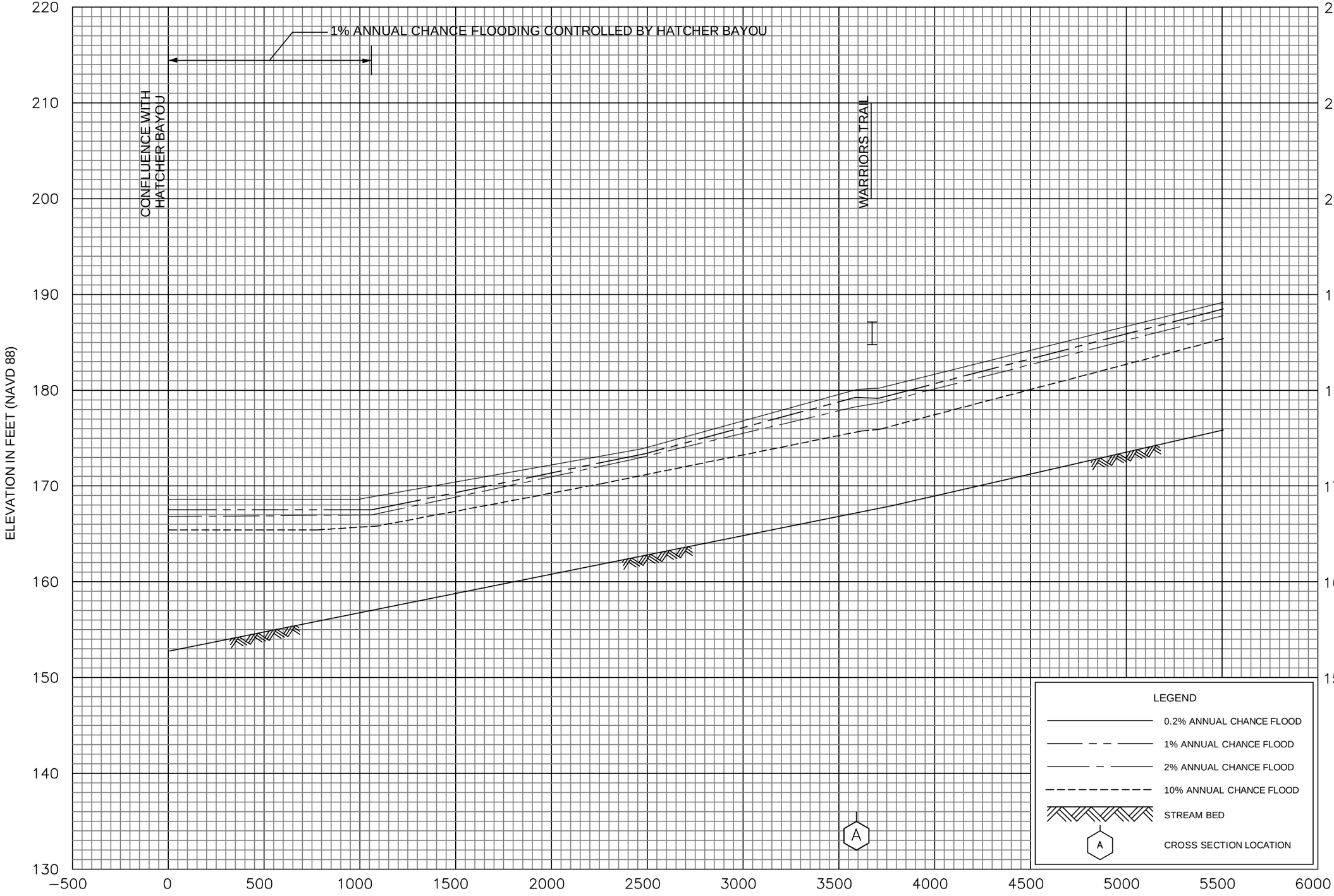


FEDERAL EMERGENCY MANAGEMENT AGENCY

WARREN COUNTY, MS
AND INCORPORATED AREAS

FLOOD PROFILES

HATCHER BAYOU TRIBUTARY 6



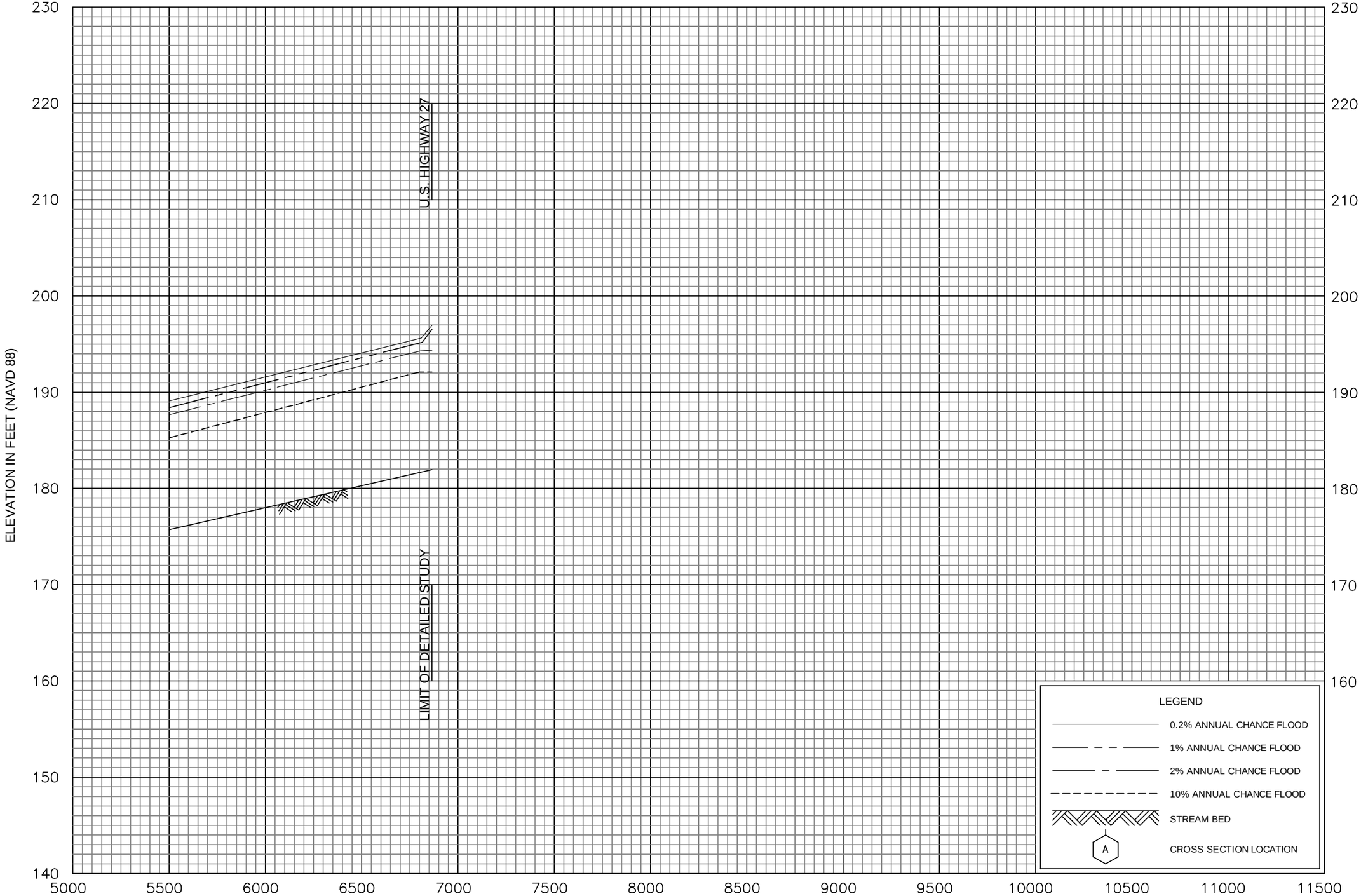
FLOOD PROFILES

HATCHER BAYOU TRIBUTARY 7

FEDERAL EMERGENCY MANAGEMENT AGENCY

WARREN COUNTY, MS
AND INCORPORATED AREAS

32P



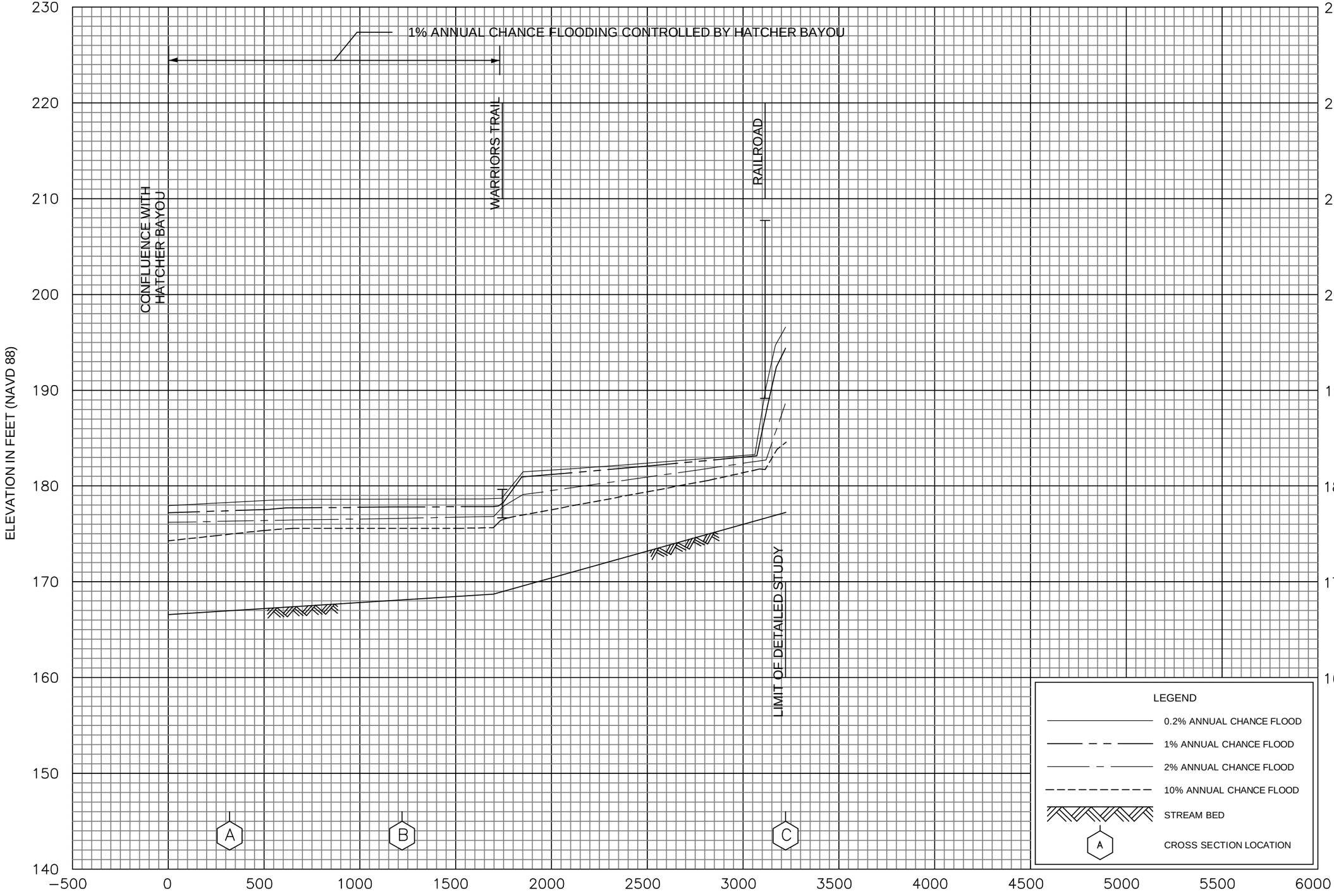
FLOOD PROFILES

HATCHER BAYOU TRIBUTARY 7

FEDERAL EMERGENCY MANAGEMENT AGENCY

WARREN COUNTY, MS
AND INCORPORATED AREAS

33P



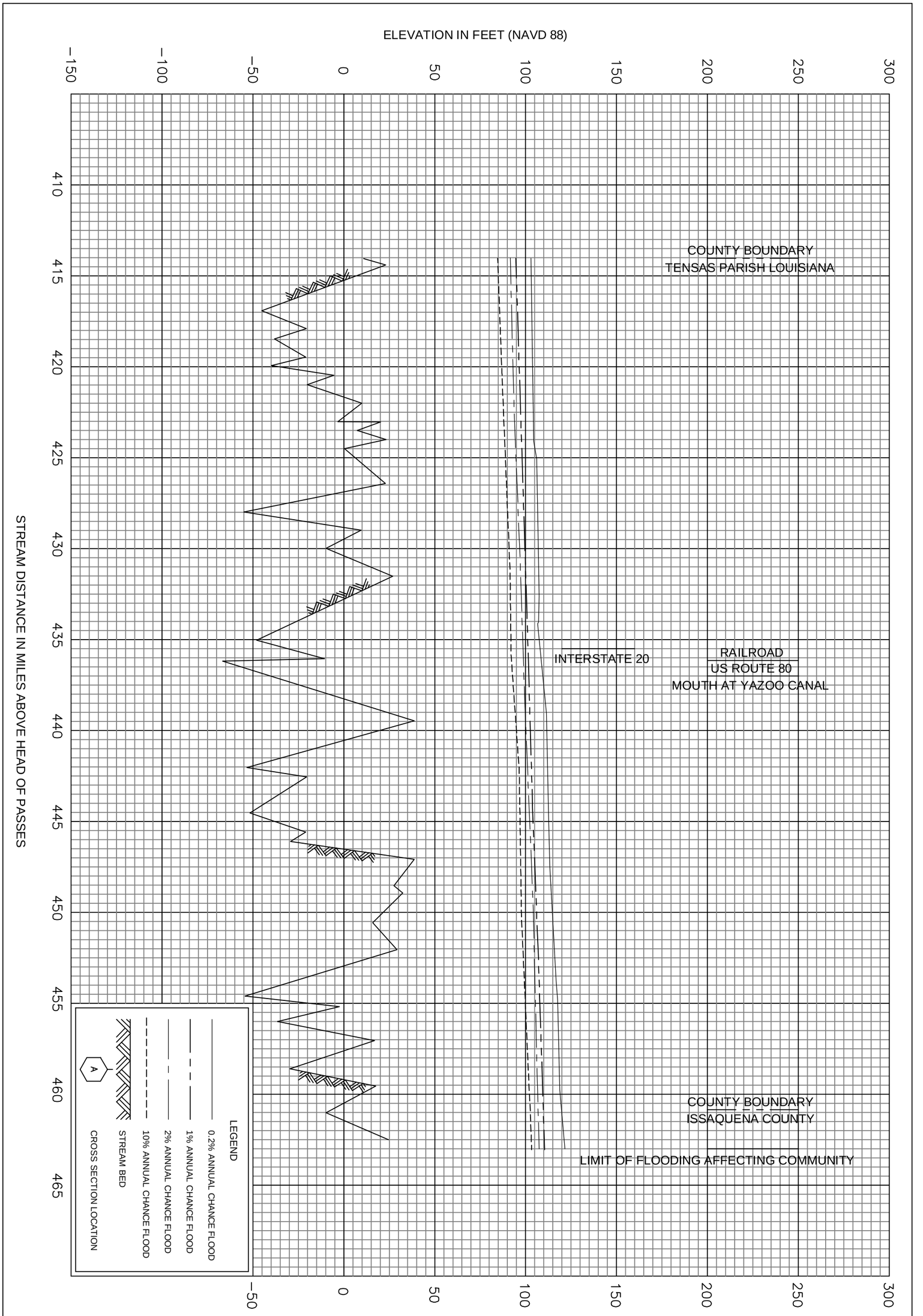
FLOOD PROFILES

HATCHER BAYOU TRIBUTARY 8

FEDERAL EMERGENCY MANAGEMENT AGENCY

WARREN COUNTY, MS
AND INCORPORATED AREAS

34P



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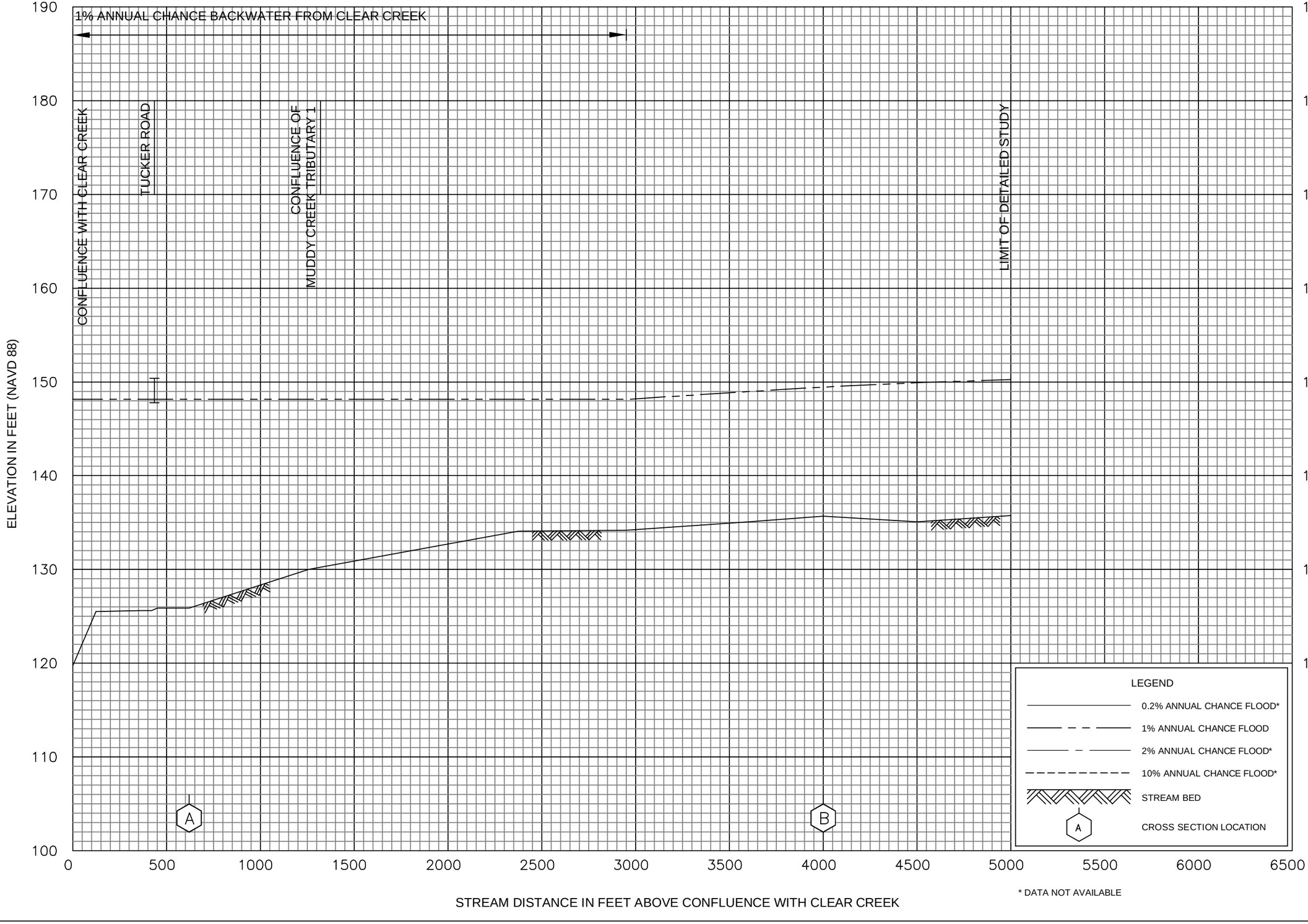
FEDERAL EMERGENCY MANAGEMENT AGENCY

WARREN COUNTY, MS
AND INCORPORATED AREAS

FLOOD PROFILES

MISSISSIPPI RIVER



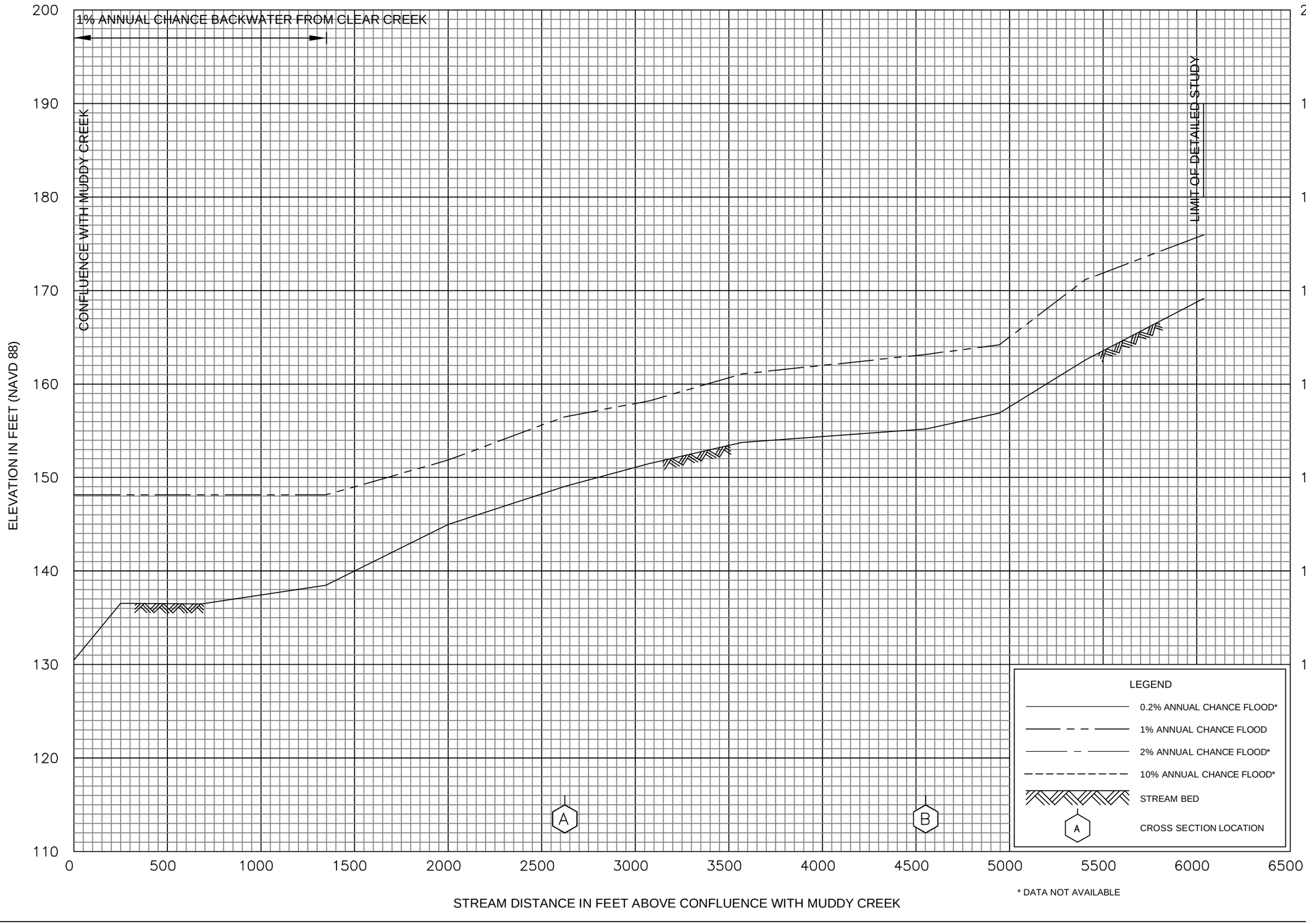
FLOOD PROFILES

MUDDY CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

WARREN COUNTY, MS
AND INCORPORATED AREAS

36P



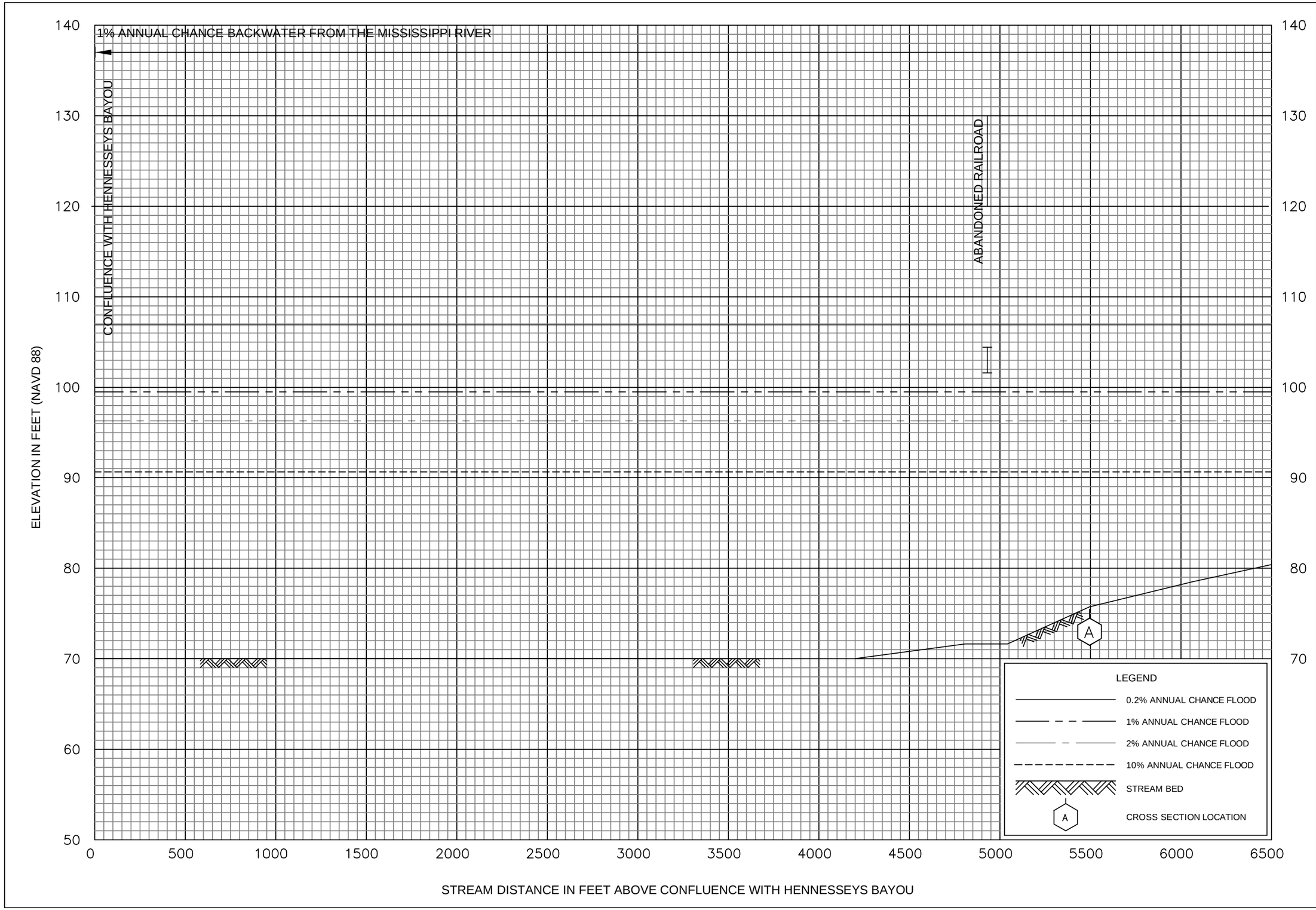
FLOOD PROFILES

MUDDY CREEK TRIBUTARY 1

FEDERAL EMERGENCY MANAGEMENT AGENCY

WARREN COUNTY, MS
AND INCORPORATED AREAS

37P



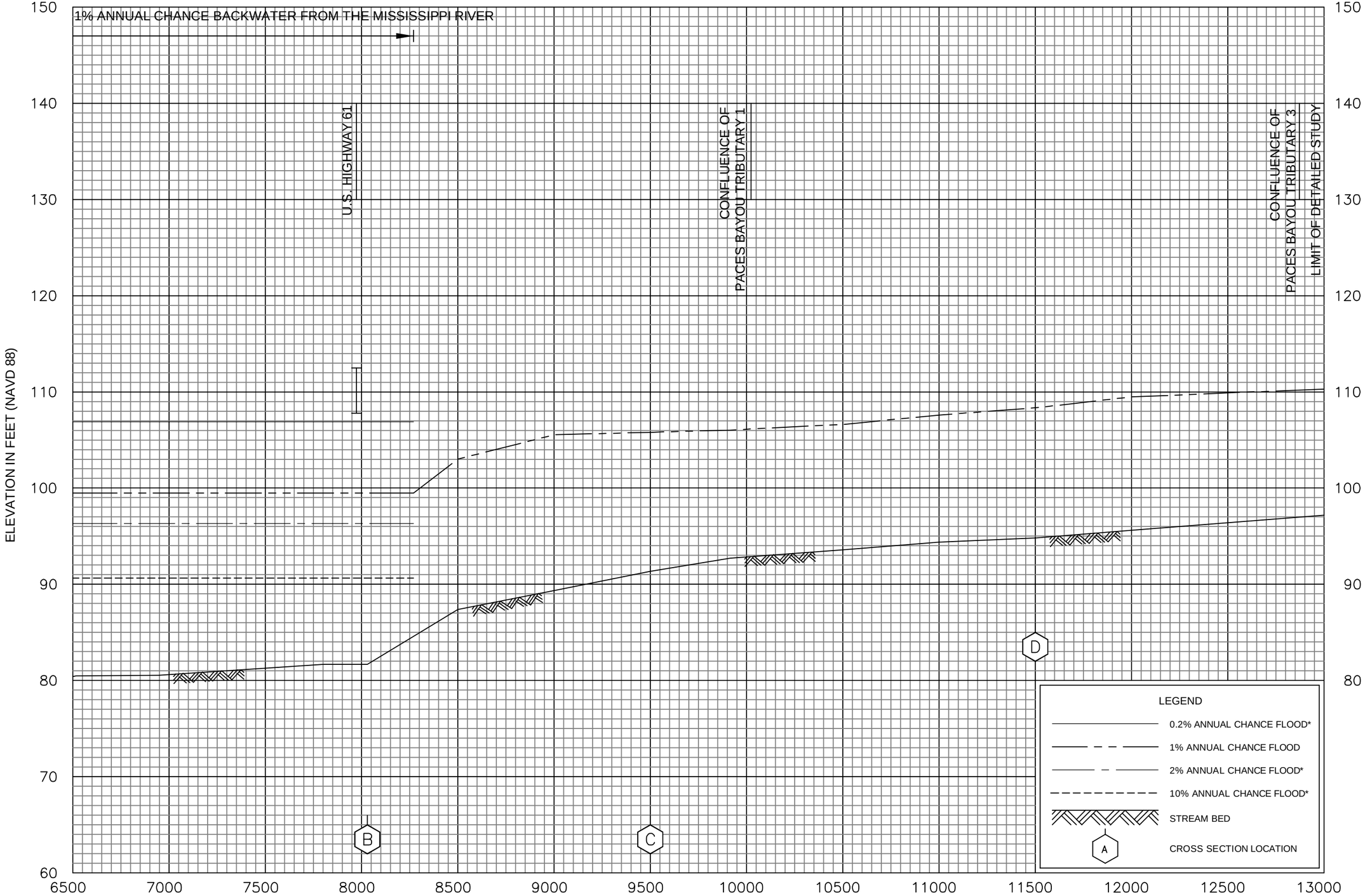
FLOOD PROFILES

PACES BAYOU

FEDERAL EMERGENCY MANAGEMENT AGENCY

WARREN COUNTY, MS
AND INCORPORATED AREAS

38P



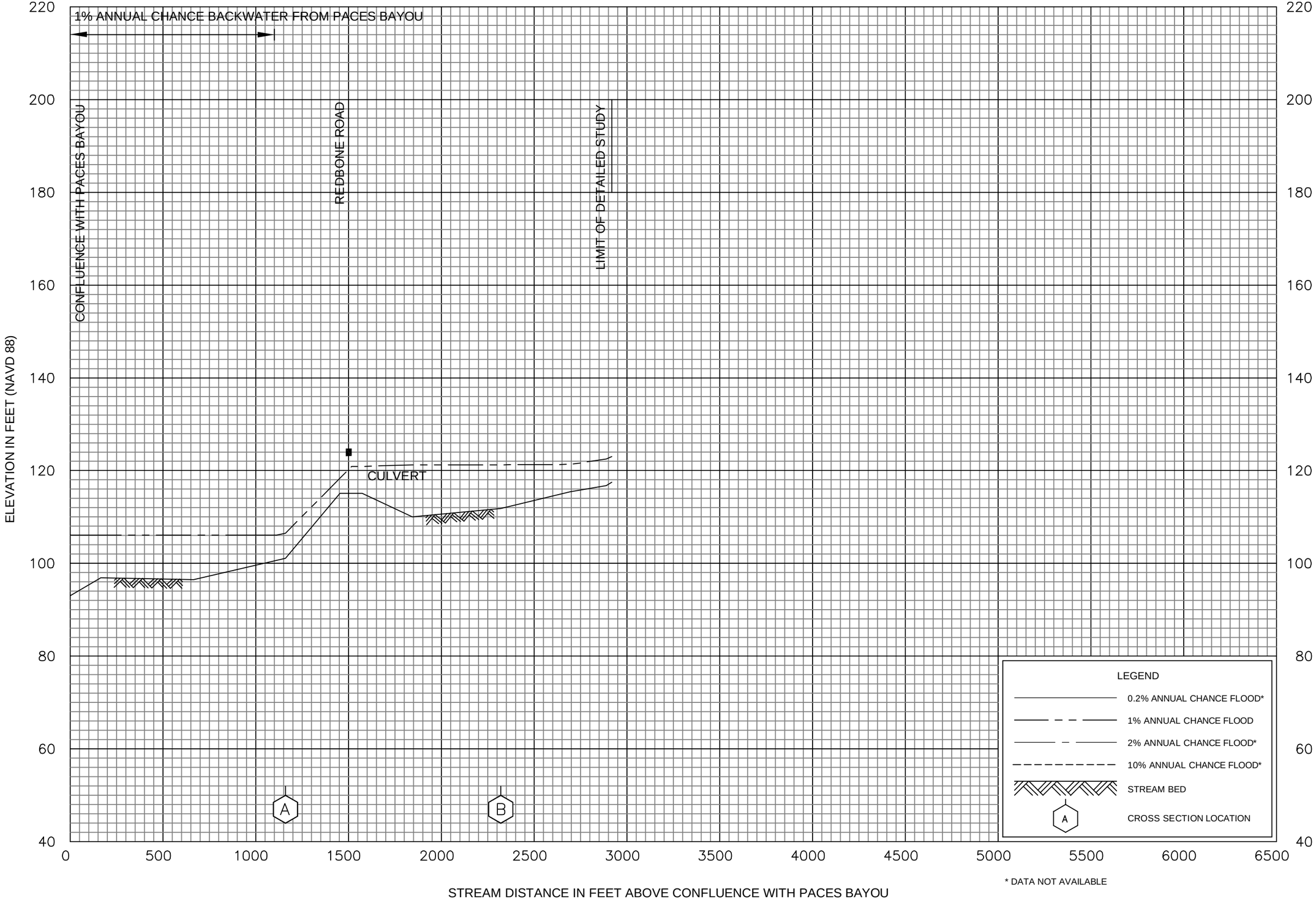
FLOOD PROFILES

PACES BAYOU

FEDERAL EMERGENCY MANAGEMENT AGENCY

WARREN COUNTY, MS
AND INCORPORATED AREAS

39P



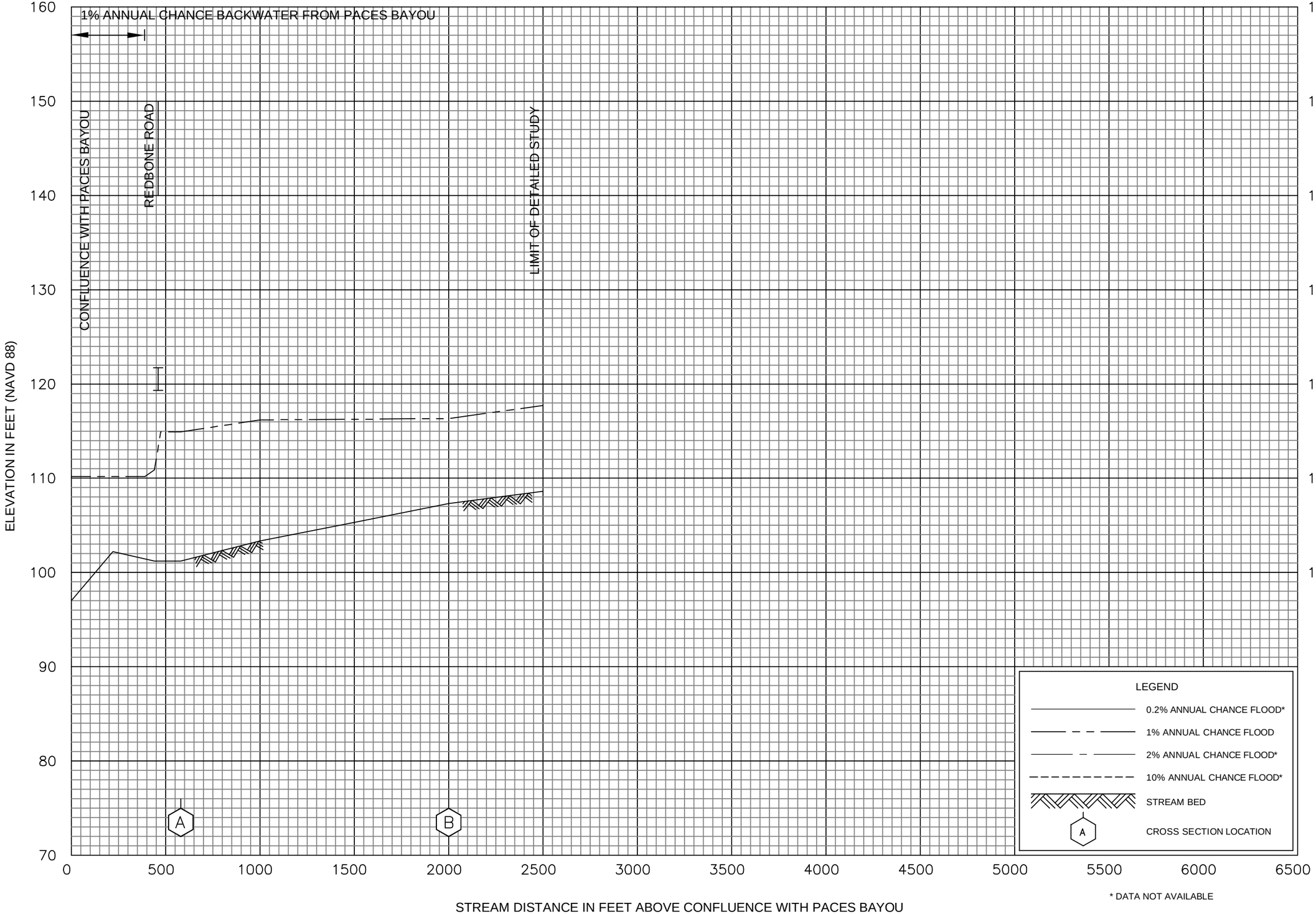
FLOOD PROFILES

PACES BAYOU TRIBUTARY 1

FEDERAL EMERGENCY MANAGEMENT AGENCY

WARREN COUNTY, MS
AND INCORPORATED AREAS

40P



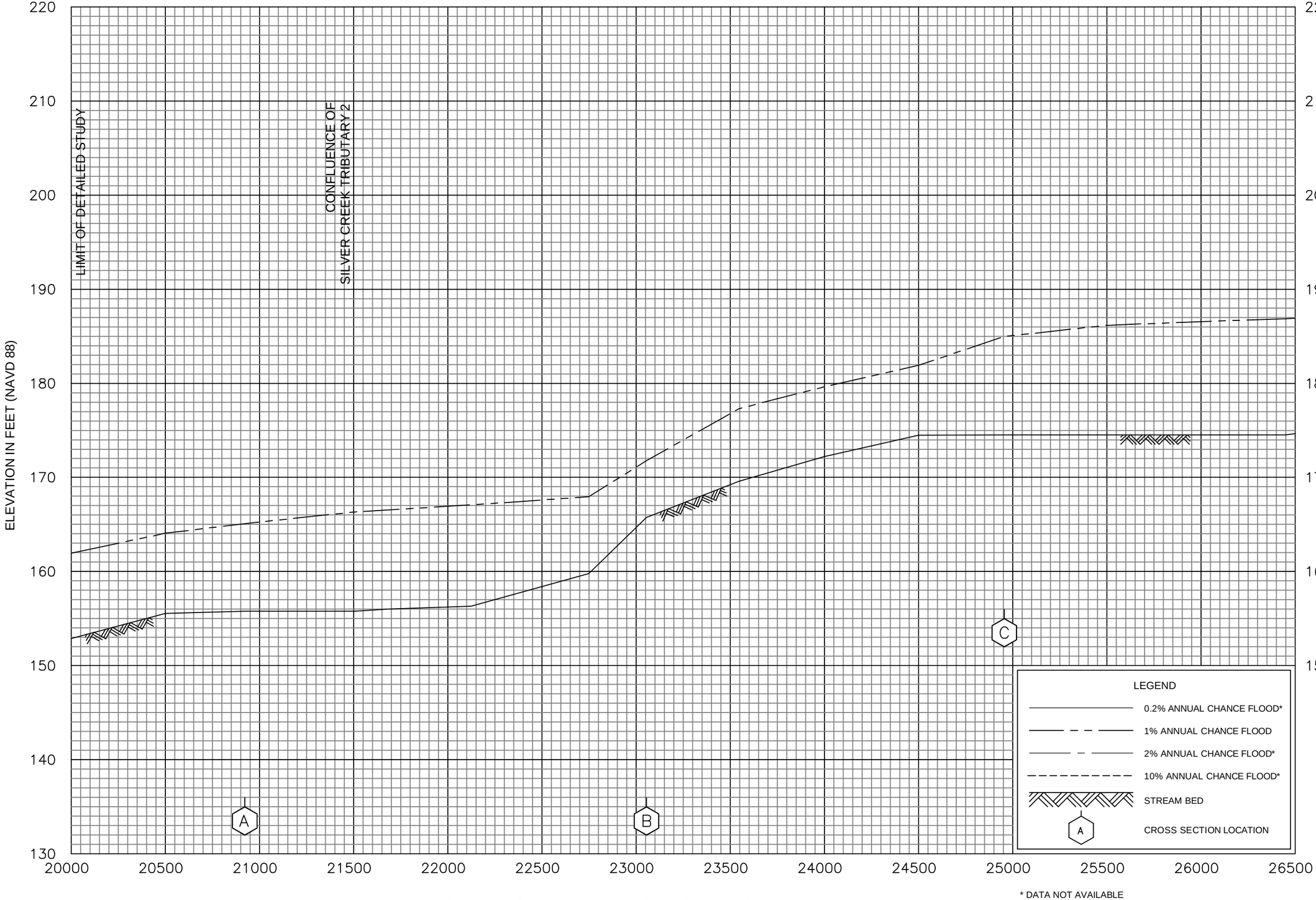
FLOOD PROFILES

PACES BAYOU TRIBUTARY 3

FEDERAL EMERGENCY MANAGEMENT AGENCY

WARREN COUNTY, MS
AND INCORPORATED AREAS

41P



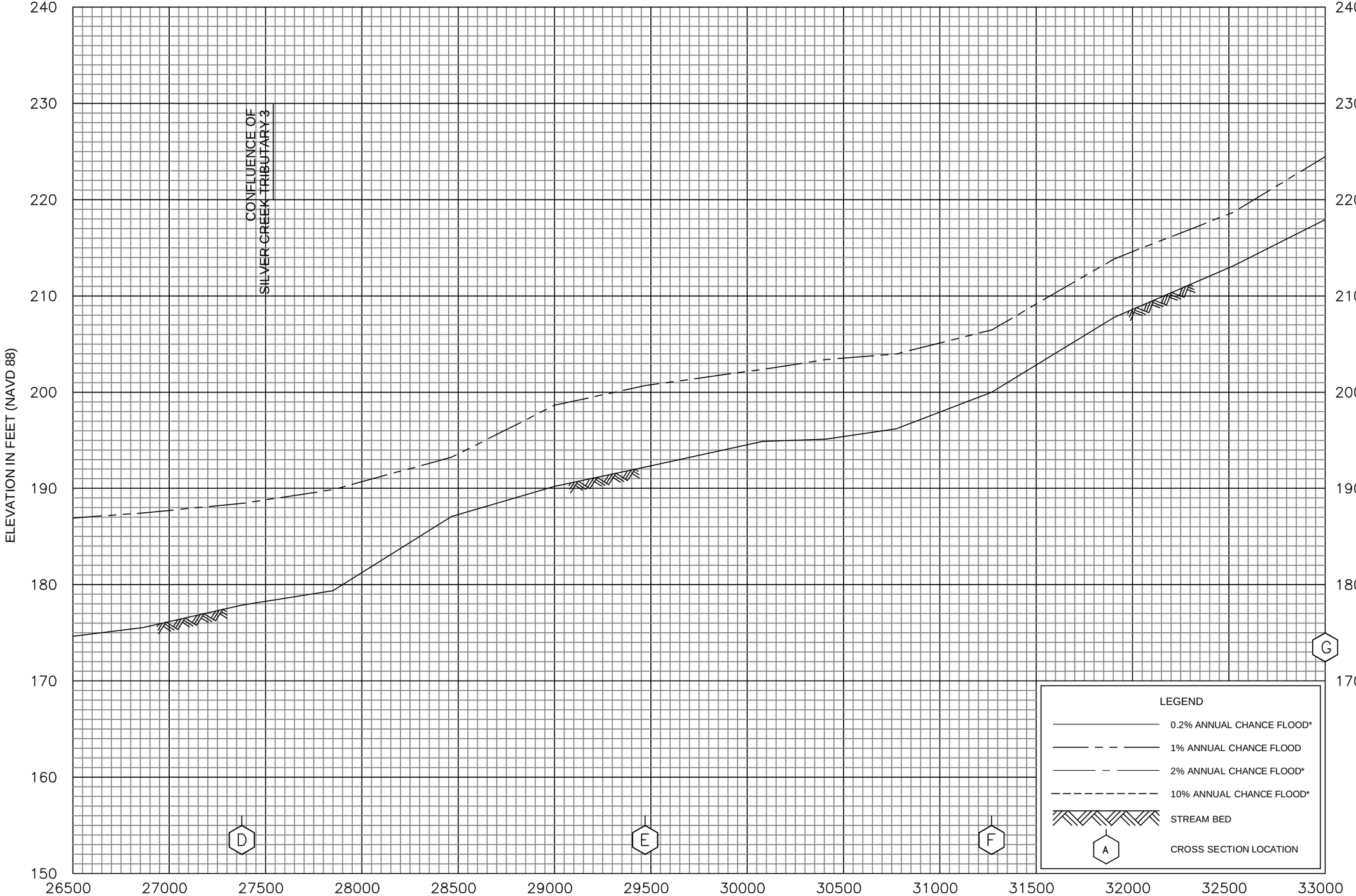
FLOOD PROFILES

SILVER CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

WARREN COUNTY, MS
AND INCORPORATED AREAS

42P



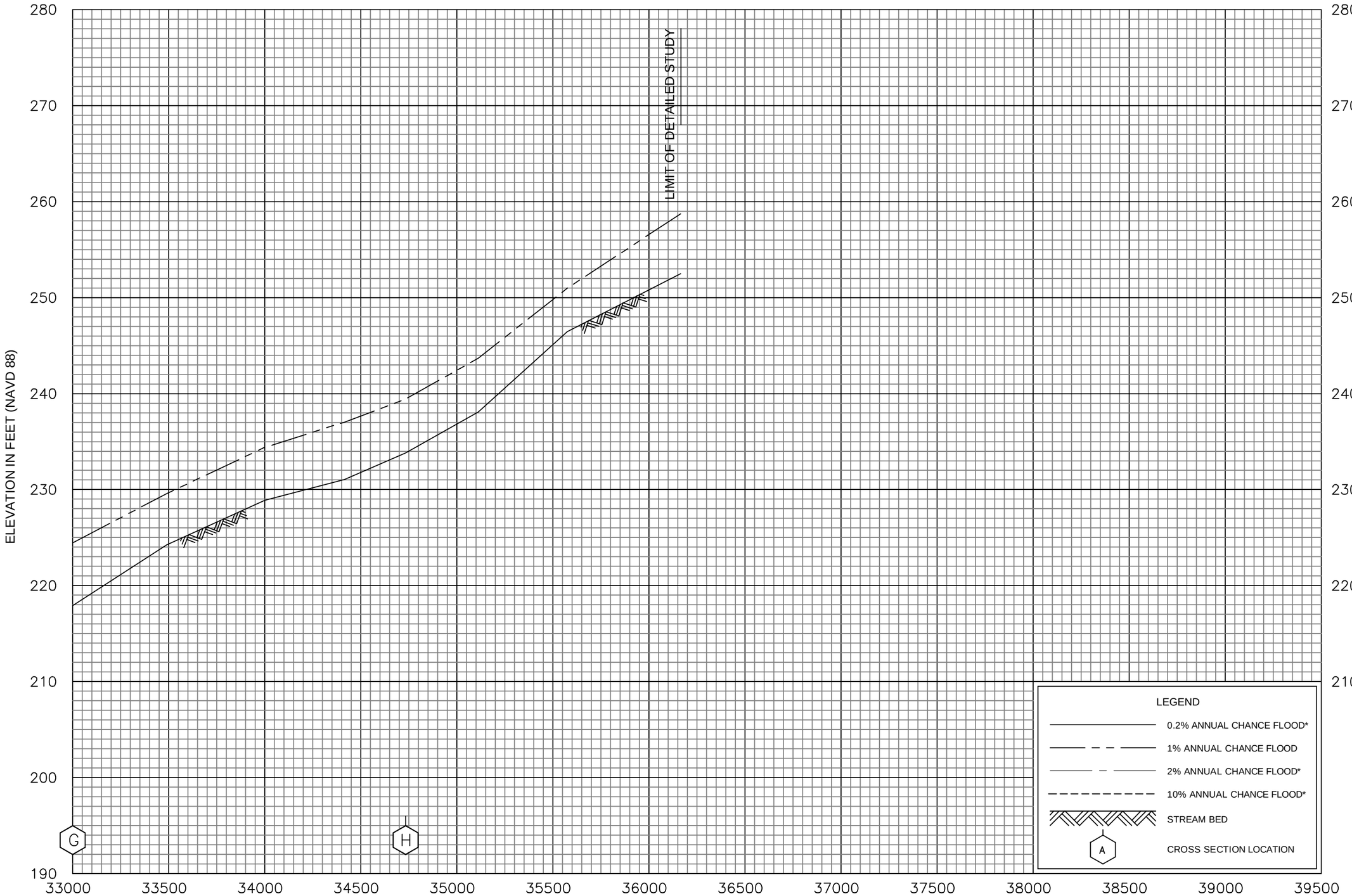
FLOOD PROFILES

SILVER CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

WARREN COUNTY, MS
AND INCORPORATED AREAS

43P



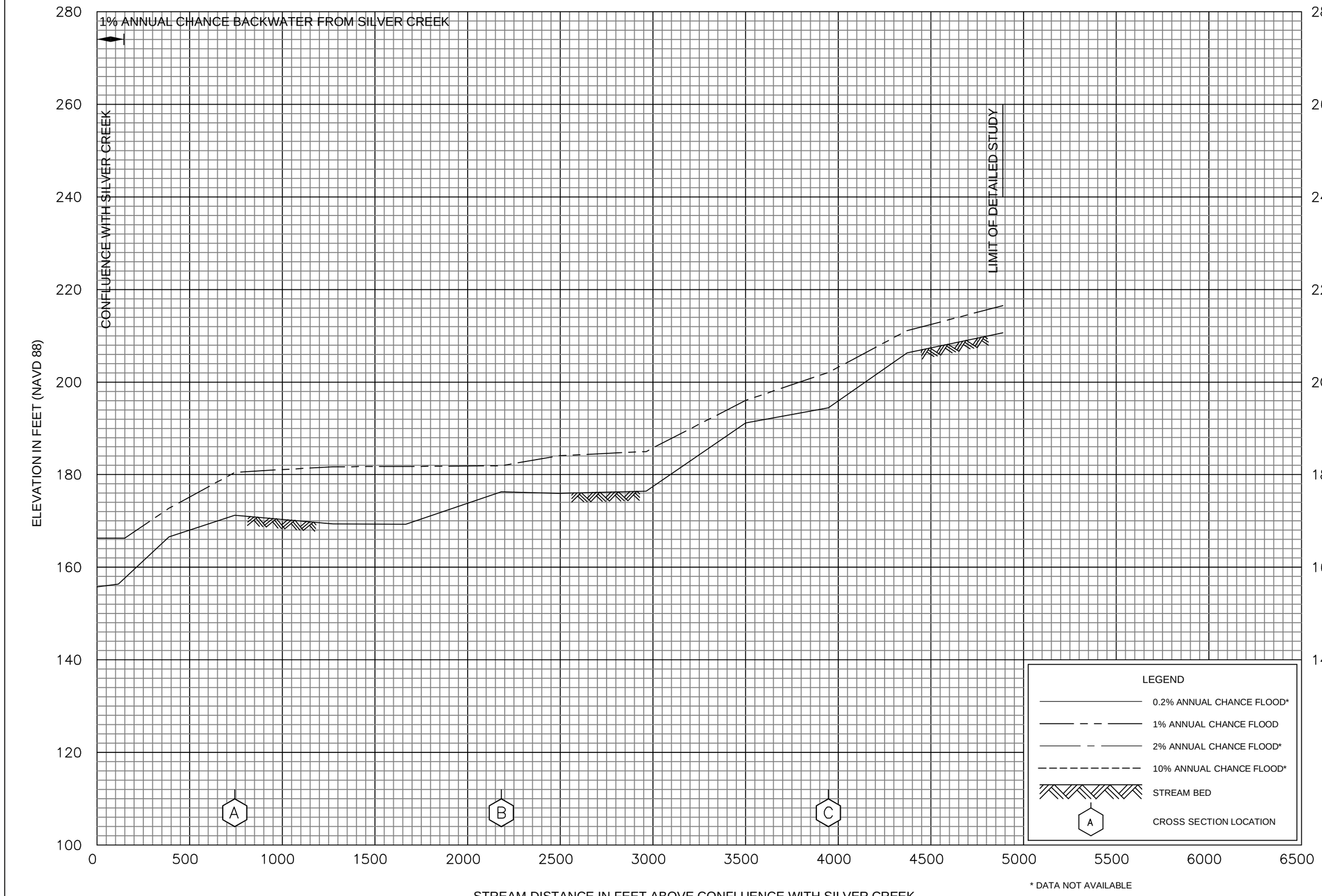
FLOOD PROFILES

SILVER CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

WARREN COUNTY, MS
AND INCORPORATED AREAS

44P



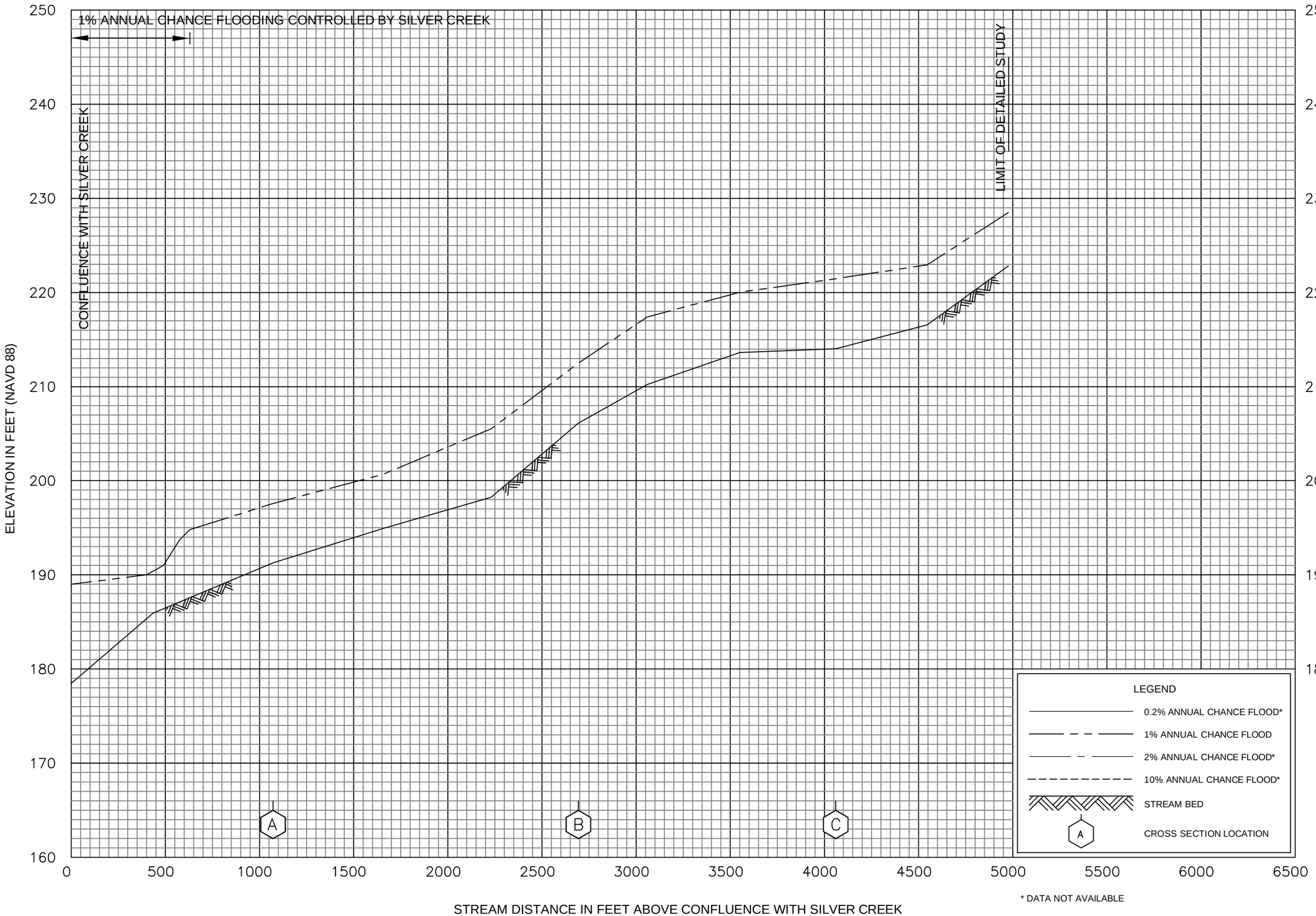
FLOOD PROFILES

SILVER CREEK TRIBUTARY 2

FEDERAL EMERGENCY MANAGEMENT AGENCY

WARREN COUNTY, MS
AND INCORPORATED AREAS

45P



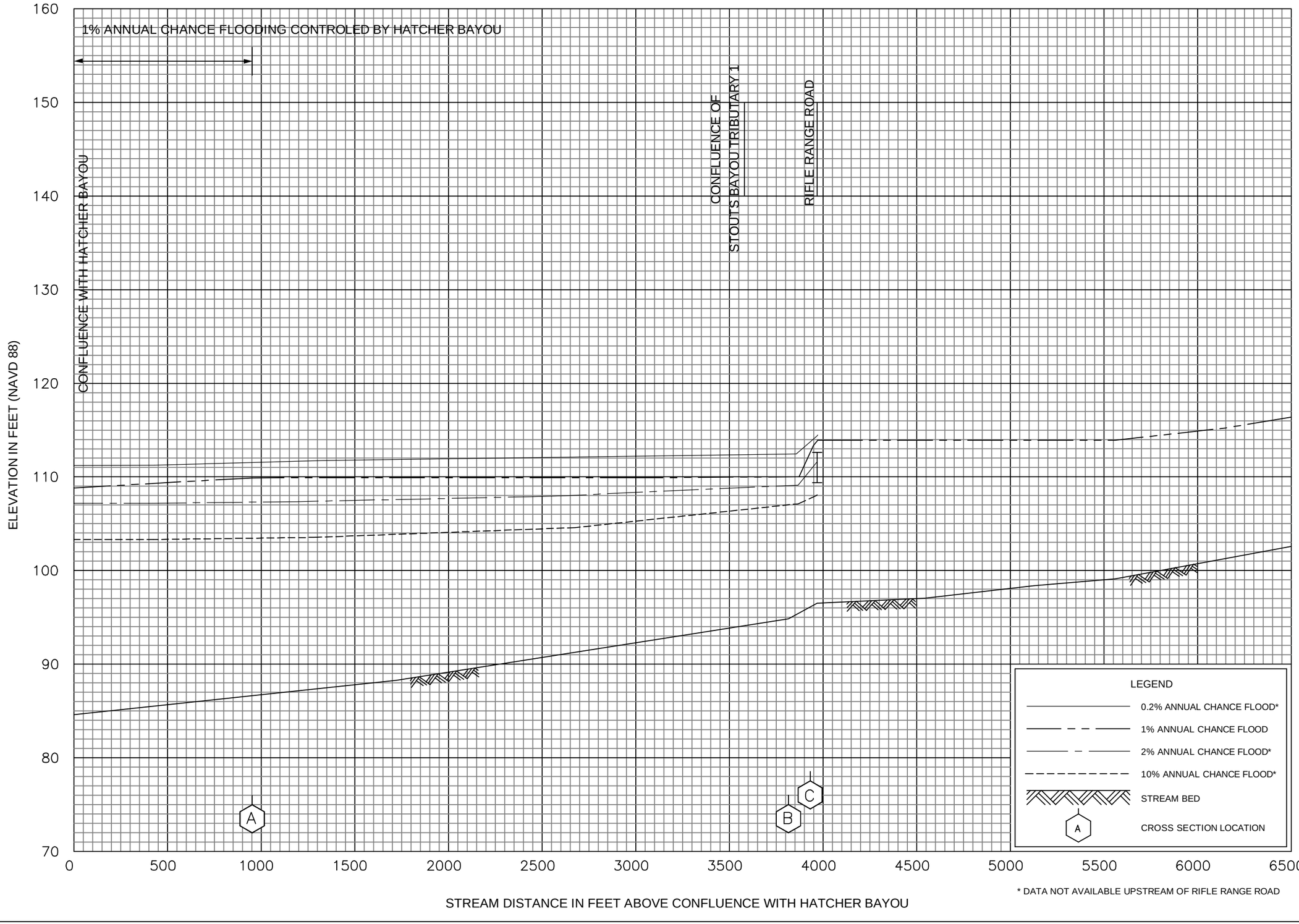
FLOOD PROFILES

SILVER CREEK TRIBUTARY 3

FEDERAL EMERGENCY MANAGEMENT AGENCY

WARREN COUNTY, MS
AND INCORPORATED AREAS

46P



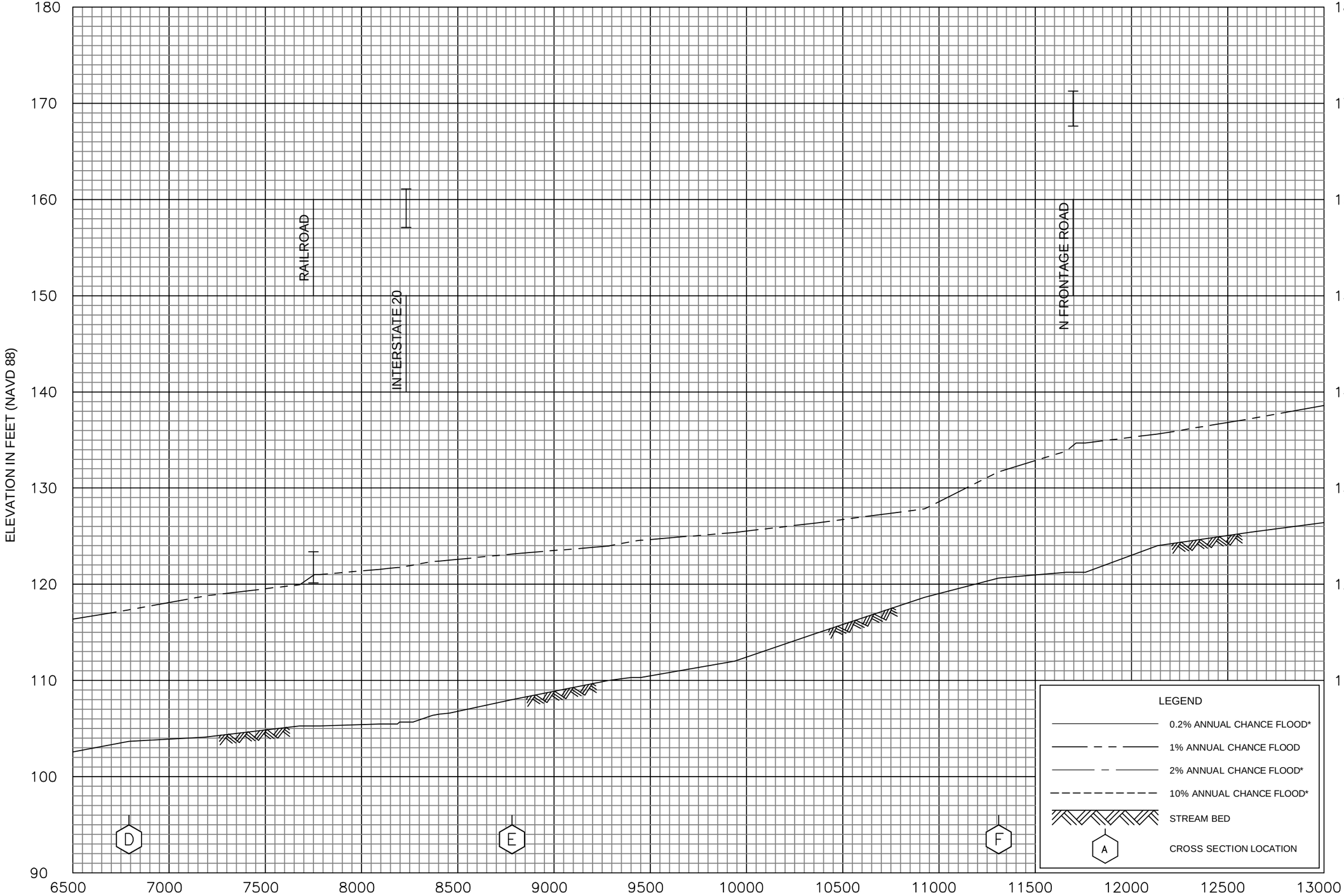
FLOOD PROFILES

STOUTS BAYOU

FEDERAL EMERGENCY MANAGEMENT AGENCY

WARREN COUNTY, MS
AND INCORPORATED AREAS

47P



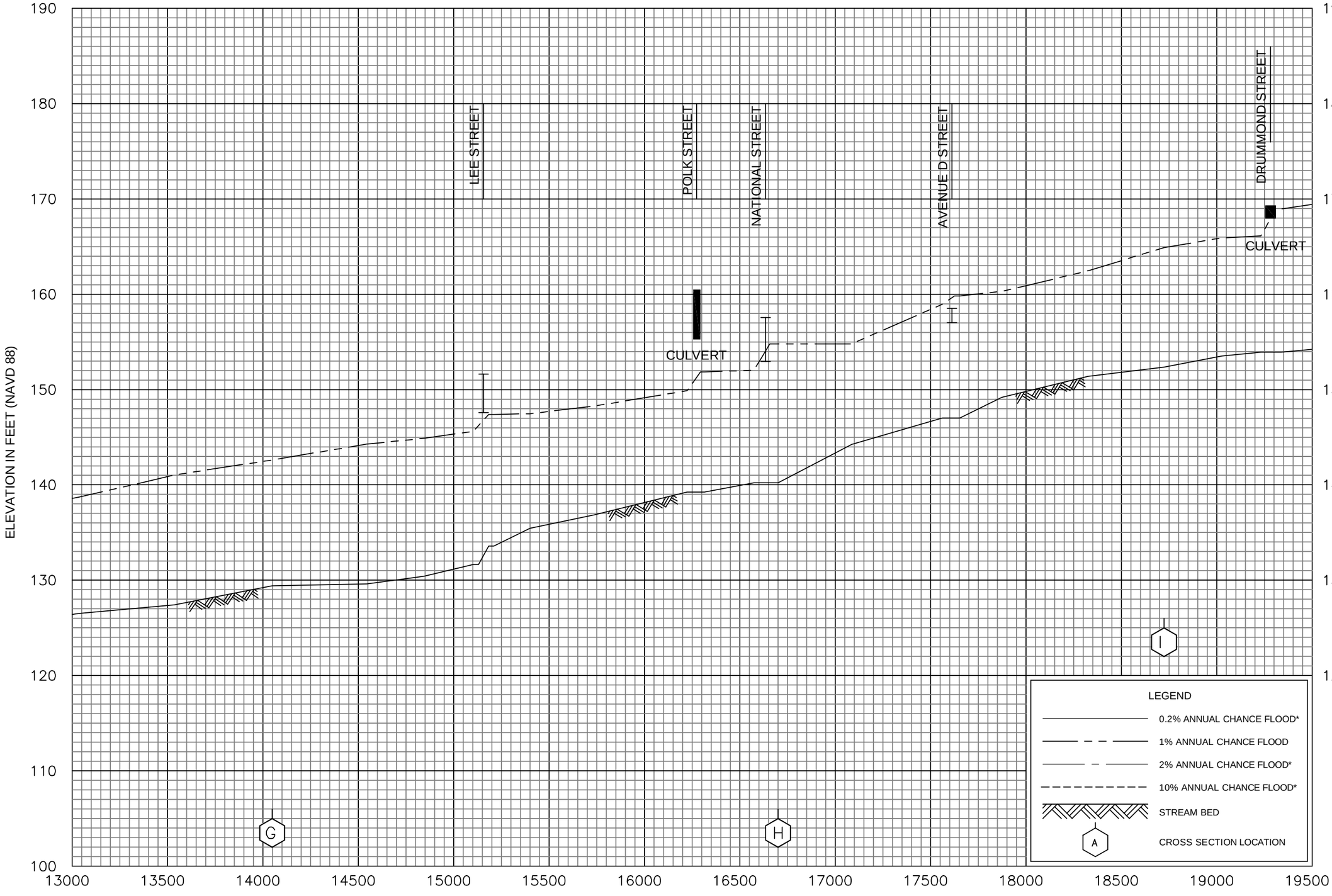
FLOOD PROFILES

STOUTS BAYOU

FEDERAL EMERGENCY MANAGEMENT AGENCY

WARREN COUNTY, MS
AND INCORPORATED AREAS

48P



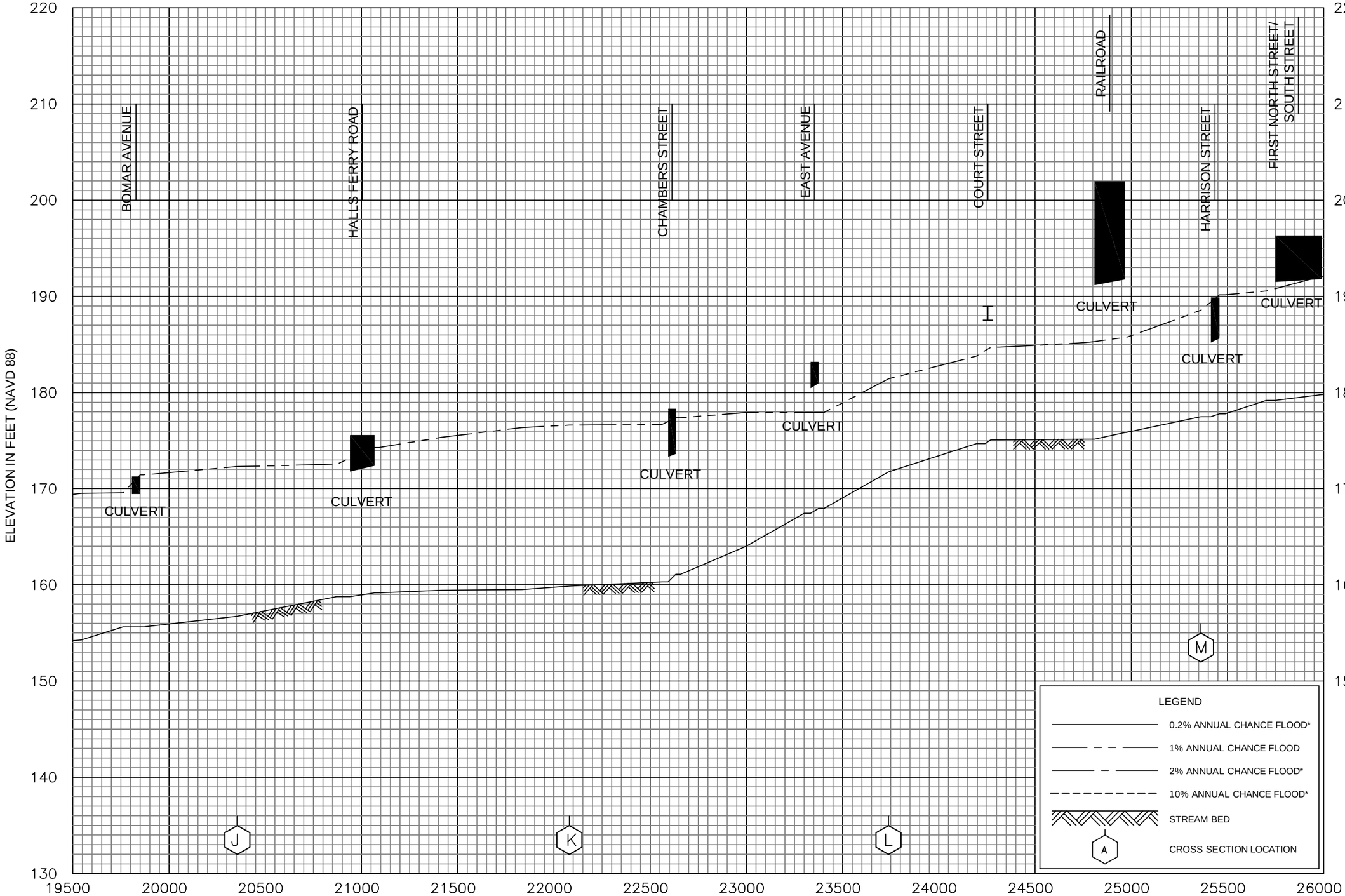
FLOOD PROFILES

STOUTS BAYOU

FEDERAL EMERGENCY MANAGEMENT AGENCY

WARREN COUNTY, MS
AND INCORPORATED AREAS

49P



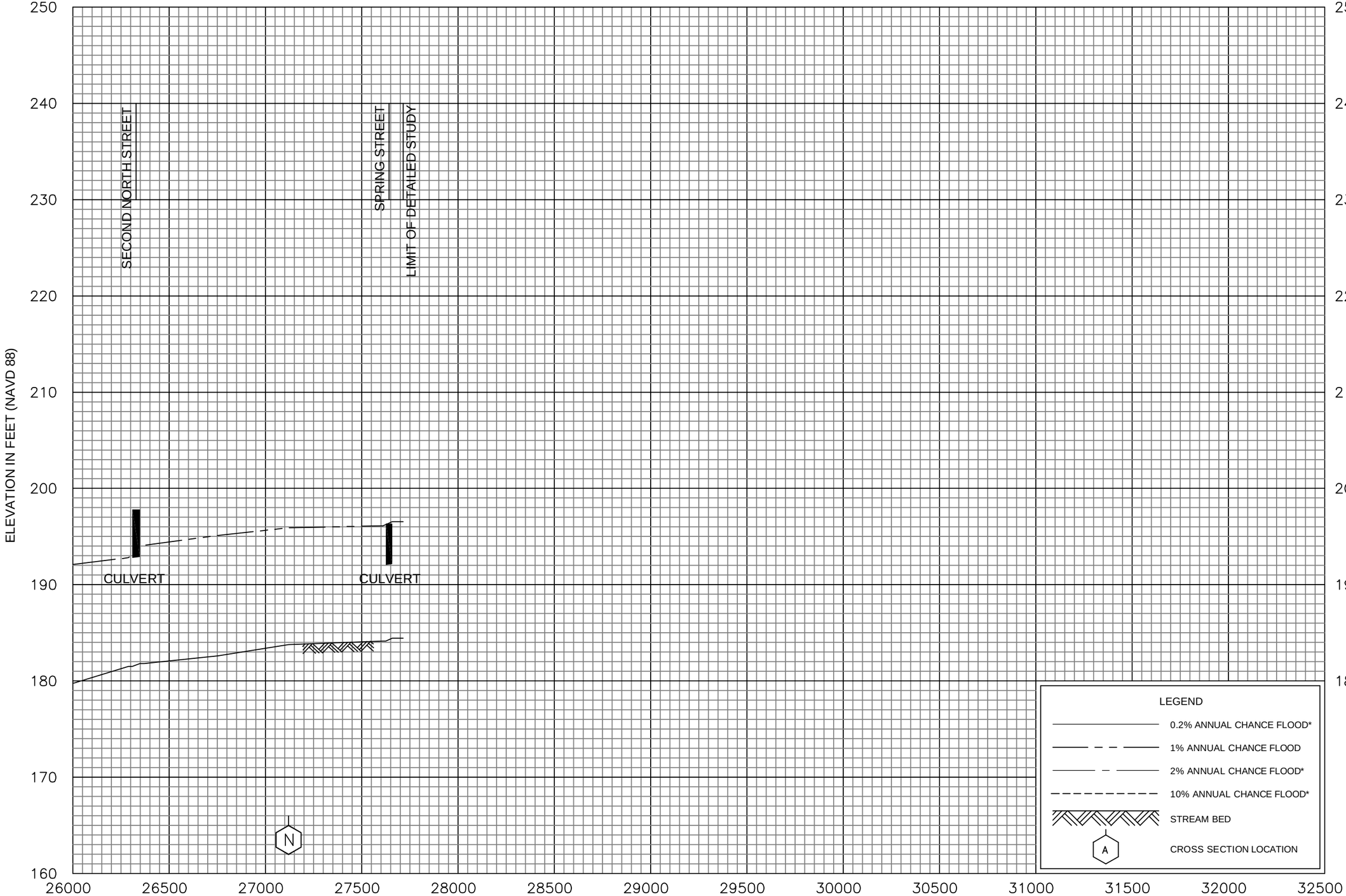
FLOOD PROFILES

STOUTS BAYOU

FEDERAL EMERGENCY MANAGEMENT AGENCY

WARREN COUNTY, MS
AND INCORPORATED AREAS

50P



FLOOD PROFILES

STOUTS BAYOU

FEDERAL EMERGENCY MANAGEMENT AGENCY

WARREN COUNTY, MS
AND INCORPORATED AREAS

51P