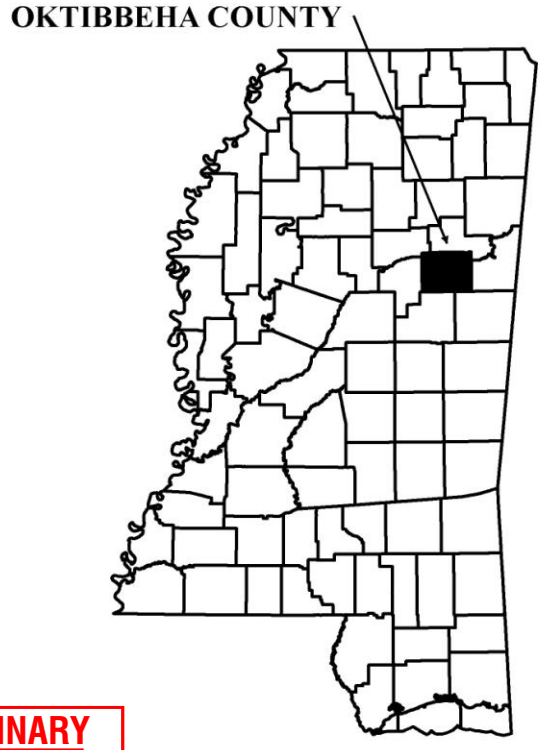
FLOOD INSURANCE STUDY

OKTIBBEHA COUNTY, MISSISSIPPI
AND INCORPORATED AREAS

COMMUNITY NAME	COMMUNITY NUMBER
MABEN, TOWN OF*	280252
OKTIBBEHA COUNTY (UNINCORPORATED AREAS)	280277
STARKVILLE, CITY OF	280124
STURGIS, VILLAGE OF	280253

*Non-floodprone community



PRELIMINARY

FEB 27 2009

Federal Emergency Management Agency

FLOOD INSURANCE STUDY NUMBER
28105CV001A

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 Countywide FIS Effective Date: Month, Day, and Year

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 Countywide FIS Effective Date: Month, Day, and Year

TABLE OF CONTENTS

TABLE OF CONTENTS – continued

Page

FIGURES

TABLES

EXHIBITS

FLOOD INSURANCE STUDY
OKTIBBEHA 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 Oktibbeha County, Mississippi, including the City of Starkville, Town of Maben, Village of Sturgis, and unincorporated areas of Oktibbeha County (hereinafter referred to collectively as Oktibbeha County). The Town of Maben is included in its entirety in Oktibbeha County.

This FIS aids in 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 in the community that will be used to establish actuarial flood insurance rates. This information will also be used by Oktibbeha 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 Flood Insurance Study are the National Flood Insurance Act of 1968 and the Flood Disaster Protection Act of 1973.

This FIS was prepared to include the unincorporated areas of, and incorporated communities within, Oktibbeha County in a countywide format. Information on the authority and acknowledgements for each jurisdiction included in this countywide FIS, as compiled from their previously printed FIS reports, is shown below.

Oktibbeha County: (Unincorporated Areas)	The hydrologic and hydraulic analyses for the June 19, 1989 FIS report, were performed by the U.S. Geological Survey (USGS), for the Federal Emergency Management Agency (FEMA), under Inter-Agency Agreement No. EMW-85-E-1823, Project Order No. 13. That study, which was completed in July 1987, covered all significant flooding sources in the unincorporated areas of Oktibbeha County (Reference 1).
Starkville, City of:	The hydrologic and hydraulic analyses for the February 1981 FIS report were performed by Smith and Sanders, Inc., for the Federal Insurance Administration (FIA), under Contract No. H-4057. That study, which was completed in

August 1979, and covered all flooding sources affecting the City of Starkville (Reference 2).

The hydrologic and hydraulic analyses for the June 4, 1990 revision to the City of Starkville FIS (Reference 3) were performed by the U.S. Army Corps of Engineers, Mobile District.

The authority and acknowledgments for the Towns of Sturgis and Maben are not available because no FIS reports were published for those communities.

For this countywide FIS, new hydrologic and hydraulic analyses were prepared by Watershed Concepts, a division of HSMM AECOM for FEMA, under Contract No. EMA-2006-CA-5617. This study was completed in September, 2008.

Base map information shown on the FIRM was provided in digital format by the State of Mississippi. The digital orthoimagery was photogrammetrically compiled at a scale of 1:400 from aerial photography dated October 2006.

The coordinate system used for the production of this FIRM is Mississippi State Plane East FIPS 2301. Corner coordinates shown on the FIRM are in latitude and longitude referenced to the UTM projection, North American Datum of 1983 (NAD 83) and the GRS80. Differences in the datum and spheroid used in the production of the FIRMs for adjacent counties may result in slight positional differences in map features at the county boundaries. These differences do not affect the accuracy of information shown on the FIRM.

1.3 Coordination

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

The dates of the initial and final CCO meetings held for the communities within the boundaries of Oktibbeha County are shown in Table 1, "CCO Meeting Dates."

Table 1. CCO Meeting Dates

Community Name	Initial CCO Date	Final CCO Date
City of Starkville	June 1976	September 12, 1978
Oktibbeha County (Countywide)	*	July, 21 1988

*Data not available

For this countywide FIS, an initial CCO meeting was held with the representatives from

FEMA, the impacted communities, and the study contractor on December 11, 2006. A final meeting, the Preliminary DFIRM Community Coordination (PDCC) was held on Month DD, YEAR to review the results of this study.

2.0 AREA STUDIED

2.1 Scope of Study

This Flood Insurance Study covers the geographic area of Oktibbeha County, Mississippi, including the incorporated communities listed in Section 1.1.

New detailed studies have been performed as part of this new countywide study for Hollis Creek and Hollis Creek Tributary 1. These studies were performed by Kenneth Van Wilson, Jr., P.E. for FEMA LOMR Case Number 94-04-239P on February 8, 1995 (Reference 4).

Limited detail analyses were performed on Skinner Creek.

For this countywide study, limits of new detailed and new limited detailed study streams are shown in Table 2. "Scope of Study."

Table 2. Scope of Study

Stream	Limits of Revised or New Detailed Study
Hollis Creek	From a point approximately 1,600 feet upstream of Mount Olive Road to the downstream side of South Ridge Road
Hollis Creek Tributary 1	From the confluence with Hollis Creek to a point approximately 1,300 feet upstream of the confluence with Hollis Creek
Sand Creek	From just upstream of U.S. Highway 82 to a point approximately 300 feet upstream of West Point Road
Stream	**Limits of Revised or New Limited Detail Study**
Skinner Creek	From the confluence with Hollis Creek to a point approximately 478 feet downstream of Fairway Drive

Approximate analyses were used to study those areas having a low development potential or minimal flood hazards. The scope and methods of study were proposed to, and agreed upon, by FEMA, Oktibbeha County, and the Study Contractor.

Floodplain Boundaries of streams that have been previously studied by detailed methods were redelineated based on more detailed and up-to-date topographic mapping. Streams that were redelineated include Hollis Creek, Sand Creek, Sand Creek Tributary 1, Sand Creek

Tributary 2, Talking Warrior Creek, Tobacco Juice Creek, Glen Creek, Josey Creek Tributary 1, Josey Creek Tributary 2, Josey Creek Tributary 3, and Springer's Branch.

This countywide FIS also incorporates the determination of letters issued by FEMA resulting in map changes as shown in Table 3, "Letters of Map Change."

TABLE 3. LETTERS OF MAP CHANGE

Community	Flooding Source (s) and Project Identifier	Date Issued	Type
Oktibbeha County (Unincorporated Areas)	Hollis Creek and Hollis Creek Tributary 1- Case Number 1- 94-04-239P	February 8, 1995	LOMR

2.2 Community Description

Oktibbeha County, and its county seat, the City of Starkville, are located in east-central Mississippi. The county is bounded on the north by Webster and Clay Counties, on the east by Clay and Lowndes Counties, on the south by Noxubee and Winston Counties, and on the west by Choctaw and Webster Counties (Reference 1).

The floodplains of Oktibbeha County are located in the northeastern prairie section of the state. Soils consist mainly of a silty clay layer approximately 4 inches thick underlain by clay and chalk formations. Vegetation throughout the area consists of moderate stands of a large variety of hardwoods. Along stream banks the vegetative cover includes willow trees, brush, and many instances of thick grasses (Reference 3).

The population of Oktibbeha County was 43,898 according to the year 2007 census (Reference 5). The land area of Oktibbeha County covers approximately 462 square miles or 1,196 square kilometers (Reference 6).

The climate of Oktibbeha County is characterized by long, hot summers, and short mild winters. Temperatures average 47 degrees Fahrenheit (^{O}F) in January and 81°F in July. Annual precipitation over the study area averages 51 inches (Reference 3).

2.3 Principal Flood Problems

Portions of Starkville experience extensive flooding after periods of heavy rainfall. The most severe flooding in recent years occurred on March 3, 1977, when 4.36 inches of rain fell in a 24-hour period, with most of this amount fa1 ling in a four-hour period. According to newspaper accounts, flash floods occurred throughout most of the city due both to stream flooding and the inability of storm drainage facilities to accommodate runoff.

Starkville officials report that Hollis Creek floods periodically in the downtown area in the vicinity of Montgomery and Lafayette Streets. Lindberg Branch, a tributary of Glen Creek, floods a large area upstream of Mississippi State Highway 12 and several homes and a shopping center in this area were damaged during the March 3, 1977 flood. Stream flooding

also has damaged homes periodically on Glenn Street, Maple Drive and Greensboro Street, between Gladney and Whitfield Streets (Reference 3).

High-water marks were flagged and the discharge was measured at the State Highway 25 bridge over Talking Warrior Creek during a flood on May 19, 1983. The crest elevation of this flood was 253.98 feet National Geodetic Vertical Datum of 1929 (NGVD). The flood had an estimated peak discharge of 2,420 cubic feet per second and a recurrence interval of about 7 years. There is no information available regarding floods on Sand Creek, Sand Creek Tributary No. 1, Tobacco Juice Creek, or Hollis Creek (Reference 1).

2.4 Flood Protection Measures

There are no natural or manmade flood protection measures in Oktibbeha County.

3.0 ENGINEERING METHODS

For the flooding sources studied by detailed methods in the community, 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 100-year flood (1-percent-chance of annual 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

Pre-countywide Analyses

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

For the June 19, 1989 Oktibbeha County Mississippi Unincorporated Areas FIS, the 1-percent-annual-chance peak discharges on Sand Creek, Tobacco Juice Creek, Sand Creek Tributary No. 1, and Talking Warrior Creek were estimated using regional methods described in the USGS report titled “Flood Frequency of Mississippi Streams” (Reference 7).

Independent hydrologic analyses were carried out to verify that the 1-percent-annual-chance peak discharges for Sand Creek used in the Flood Insurance Study for the City of Starkville agreed closely with those computed for this study using BGS methods. At two of the three locations, the 1-percent-annual-chance peak discharges used in the Starkville study compared well with USGS-determined peak discharges. In the Starkville study, the 1-percent-annual-chance peak discharge at the extreme upstream crossing was computed using the total

drainage area for Sand Creek and a tributary at the crossing. Only the drainage area for Sand Creek was used to compute the 1-percent-annual-chance peak discharges in this study. Adjustments for urbanization were made to the estimated 1-percent-annual-chance peak discharges for Sand Creek (Reference 9).

For the February 1981, City of Starkville FIS (Reference 2), peak discharge-frequency data for the 10-, 2-, 1- and 0.2-percent-annual-chance floods for all streams studied by detailed methods were computed using regional relationships relating basin characteristics to stream flow characteristics developed by the USGS (Reference 7). Adjustments for urbanization effects were made according to the methodology presented by the USGS in "An Approach to Estimating Flood Frequency for Urban Areas in Oklahoma" (Reference 10).

For the June 4, 1990 City of Starkville Revision (Reference 3) hydrologic analyses were carried out to establish the peak discharge-frequency and peak elevation-frequency relationships along Springer's Branch and Sand Creek. The natural peak discharges for the 10-, 2-, 1-, and 0.2-percent-annual-chance flood events for Springer's Branch were computed using the U.S. Geological Survey (USGS) report “Flood Frequency of Mississippi Streams” (Reference 7). The drainage areas and slopes were measured from USGS topographic maps at a scale of 1-24,000, with a contour interval of 10 feet (Reference 8). Flows were adjusted for urbanization using he USGS publication "An Approach to Estimating Flood Frequency for Urban Areas in Oklahoma” (Reference 10). The adjusted flows were plotted on log-probability paper and extrapolated to obtain the 0.2-percent-annual-chance event. The 10-, 2-, 1-, and 0.2-percent-annual-chance peak discharges for the drainage areas were determined utilizing USGS regression equations developed by the USGS for the Oktibbeha County, Mississippi, Flood Insurance Study (Reference 1). Peak flows for the 10-, 2-, 1-, and 0.2-percent-annual-chance events for Springer’s Branch and Sand Creek are shown in Table 4, “Summary of Discharges for Detailed Study Streams.”

Countywide Analyses

For this countywide study, hydrologic analyses were carried out to establish peak discharge-frequency relationships for each flooding source studied by detail, limited detail and approximate methods affecting the community.

Discharges for the 10-, 2-, 1-, and 0.2-percent-annual-chance recurrence interval for Hollis Creek and Hollis Creek Tributary 1, were determined utilizing USGS regression equations for Mississippi as described in the USGS Water-Resources Investigations report 94-4002 (Reference 11).

Adjustments for urbanization effects were made according to the methodology presented by the USGS in "An Approach to Estimating Flood Frequency for Urban Areas in Oklahoma" (Reference 10).

Discharges for the 1-percent-annual-chance recurrence interval for all new limited detail and approximate study streams in Oktibbeha County were determined using the Rural-East Region USGS regression equations for Mississippi as described in the USGS Water-Resources Investigations report 94-4002 (Reference 11).

Drainage areas along streams were determined using a flow accumulation grid developed from the USGS 10 meter digital elevation models and corrected National Hydrologic Data (NHD) stream coverage. Flow points along stream centerlines were calculated using the

regression equations in conjunction with accumulated area for every 10 percent increase in flow along a particular stream.

A summary of the drainage area-peak discharge relationships for the streams studied by detailed methods is shown in Table 4, "Summary of Discharges."

TABLE 4 - SUMMARY OF DISCHARGES

FLOODING SOURCE AND LOCATION	DRAINAGE AREA (sq. mi.)	PEAK DISCHARGES (cfs) 10-Percent Chance	2-Percent Chance	1-Percent Chance	0.2-Percent Chance
GLEN CREEK					
At Cross Section A	2.09	920	1,320	1,600	2,020
At Industrial Park Drive	1.06	750	1,020	1,200	1,470
At Cross Section F	0.89	730	980	1,150	1,400
At Lynn Lane	0.78	710	940	1,100	1,330
HOLLIS CREEK					
At Mouth	9.34	2,370	3,740	4,320	5,450
At the Starkville Corporate Limits	3.39	1,820	2,590	3,030	3,770
At Cross Section C	2.92	1,570	2,230	2,610	3,250
At Cross Section F	2.00	1,490	2,050	2,360	2,890
At Academy Road	1.33	1,260	1,700	1,930	2,350
At Cross Section L	0.87	1,110	1,470	1,660	1,990
At Cross Section M	0.74	980	1,300	1,460	1,760
HOLLIS CREEK TRIBUTARY 1					
At mouth	0.11	135	192	211	264
*	0.027	52.0	74.0	80	100.0
JOSEY CREEK TRIBUTARY 1					
Approximately 886 feet downstream of the confluence of Josey Creek Tributary 2	2.81	2,390	3,330	3,730	4,510
At Cross Section B	1.81	1,780	2,430	2,710	3,310
At Cross Section D	0.76	950	1,270	1,410	1,700
At Cross Section F	0.58	800	1,060	1,170	1,410
JOSEY CREEK TRIBUTARY 2					
At Cross Section A	0.93	1,320	1,740	1,930	2,310
JOSEY CREEK TRIBUTARY 3					
At Cross Section A	0.91	950	1,280	1,430	1,750

TABLE 4 - SUMMARY OF DISCHARGES

FLOODING SOURCE AND LOCATION	DRAINAGE AREA (sq. mi.)	PEAK DISCHARGES (cfs) 10-Percent Chance	2-Percent Chance	1-Percent Chance	0.2-Percent Chance
JOSEY CREEK TRIBUTARY 3					
At Cross Section B	0.73	890	1,190	1,330	1,610
At Cross Section D	0.64	840	1,110	1,250	1,500
SAND CREEK					
Approximately 0.6 mile downstream of Hickory Grove Road	29.20	*	*	10,100	*
Just downstream of Hickory Grove Road	28.60	*	*	10,100	*
Approximately 0.26 mile downstream of U.S. Highway 82	18.30	*	*	8,440	*
Just downstream of U.S. Highway 82	13.30	*	*	7,180	*
At Railroad	8.91	3,610	5,400	6,250	7,960
Just downstream of Railroad	8.46	3,300	4,990	5,770	7,740
At Cross Section T	7.44	3,200	4,760	5,510	7,020
At West Point Road	4.70	2,020	3,010	3,480	4,440
Just downstream of West Point Road	3.56	1,270	1,970	2,310	3,100
Approximately 1.17 miles upstream of West Point Road	1.80	*	*	1,350	*
SAND CREEK TRIBUTARY 1					
At Cross Section A	2.58	2,060	2,870	3,270	4,050
At West Point Road	1.32	970	1,360	1,560	1,940
SAND CREEK TRIBUTARY 2					
At West Point Road	1.21	1,420	1,910	2,140	2,600
At Trotter Road	1.03	1,360	1,810	1,980	2,440
At Cross Section C	0.95	1,330	1,760	1,960	2,360
At Cross Section D	0.89	1,310	1,730	1,920	2,310
SPRINGERS BRANCH					
At mouth	0.40	450	600	680	860
At State Highway 82	0.07	140	170	190	240
TALKING WARRIOR CREEK					
Just downstream of State Highway 25	18.00	*	*	5,660	*

TABLE 4 - SUMMARY OF DISCHARGES

FLOODING SOURCE AND LOCATION	DRAINAGE AREA (sq. mi.)	PEAK DISCHARGES (cfs) 10-Percent Chance	2-Percent Chance	1-Percent Chance	0.2-Percent Chance
TALKING WARRIOR CREEK					
Approximately 1,400 feet upstream of State Highway 25	17.80	*	*	5,660	*
TOBACCO JUICE CREEK					
Approximately 0.8 mile downstream of Southgate Drive	5.36	*	*	2,980	*
Just downstream of Southgate Drive	4.32	*	*	1,660	*
Just downstream of State Highway 25	2.29	*	*	1,500	*
Just upstream of State Highway 25	1.66	*	*	1,150	*

*Data no available

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 tables 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 in conjunction with the data shown on the FIRM.

Pre-Countywide Analyses

For the June 19, 1989 Oktibbeha County Mississippi Unincorporated Areas FIS (Reference 1), the cross sections and structural geometry of the bridges and culverts were obtained by field surveys.

Locations of selected cross sections used in the hydraulic analyses are shown on the Flood Profiles and on the Flood Insurance Rate Map.

Roughness coefficients (Manning's “n”) for this study were chosen by engineering judgment and based on field observation of the channel and floodplain areas. Table 5. “Manning’s “n” Values for Detailed Study Streams,” contains the channel and overbank "n" values for the streams studied by detailed methods.

The starting water-surface elevation for Sand Creek was estimated using slope-conveyance computations based on the slope of the low-water profile. The water-surface elevations for

the 100-year peak flood were computed using WSPRO, a step-backwater computer program (Reference 12).

The starting water-surface elevation for Tobacco Juice Creek was obtained using a slope-conveyance ratio based on the slope of high-water marks. The 1-percent-annual-chance flood profile was computed using WSPRO (Reference 12). The 1-percent-annual-chance flood profile was extended from 1.2 miles downstream of State Highway 25 using the slope of the surveyed high-water marks in the study reach.

The 1-percent-annual-chance peak discharge was routed through the culvert at State Highway 25 using the USGS culvert computer program A526 (Reference 13). The WSPRO-computed water-surface elevation (Reference 12) at the downstream end of the culvert was used as the tail-water elevation to determine the upstream water-surface elevation at State Highway 25.

The starting water-surface elevations for Sand Creek Tributary No. 1 and Hollis Creek were determined by the slope-area method. The water-surface profiles for these streams were developed using the HEC-2 step backwater computer program (Reference 14) and taken from the Flood Insurance Study for the City of Starkville (Reference 3).

The elevation of the 1-percent-annual-chance flood on Talking Warrior Creek at State Highway 25 was estimated to be 255.75 feet North American Vertical Datum of 1988 (NAVD 88). It was computed using the flood measurement and discharge-conveyance ratios of the May 19, 1983 flood, which had a seven-year recurrence interval in the study reach. The100-year elevation profile was extended upstream and downstream from the crossing using the water-surface slope computed from that May 1983 flood measurement (Reference 1).

For the February 1981, City of Starkville FIS (Reference 2), cross section data for streams in the area were obtained by field measurement. All bridges and culverts were surveyed to obtain elevation data and structural geometry.

Roughness coefficients (Manning's "n") were estimated by field inspection at each cross section. The following Table 5. “Manning’s “n” Values for Detailed Study Streams,” contains the channel and overbank "n" values for the streams studied by detailed methods.

Water-surface profiles were developed using the HEC-2 computer step-backwater model (Reference 15). Profiles were determined for the 2-, 10-, 1-, and 0.2 percent-annual-chance floods. These profiles are shown on the Flood Profiles (Exhibit I).

The starting water-surface elevations were determined by the slope-area method.

For the June 4, 1990 City of Starkville FIS revision, Field surveys were conducted along Springer’s Branch to determine channel dimensions, overbank areas, and an accurate description of all bridge openings, road crossings, and other channel descriptions Cross section geometry, bridge geometry, and elevations for Sand Creek were obtained from the USGS WSPRO model developed for the 1-percent-annual-chance flood profile computer runs for the Oktibbeha County Flood Insurance Study (Reference 1).

Roughness coefficients (Manning's “n”) were estimated by field inspection at each cross section.

Higher values were used to define non-effective flow areas near the edge of the floodplain and to match the 100-year profile data shown for Sand Creek in the Oktibbeha County Flood Insurance Study (Reference 1). Starting water-surface elevations for Sand Creek were computed using the slope-area method.

Field data were coded into the HEC-2 step backwater computer model (Reference 14) along with the peak discharges for the l0-, 2-, 1-, and 0.2-percent annual chance floods. The program was used to compute water surface elevations at each surveyed section for Springer's Branch and Sand Creek.

Table 5. Manning's "n" Values for Detailed Study Streams

Flooding Source	Channel "n"	Overbank "n"
GLEN CREEK	0.040-0.060	0.080-0.150
HOLLIS CREEK	0.040-0.070	0.080-0.220
HOLLIS CREEK TRIBUTARY 1		
JOSEY CREEK TRIBUTARY 1	0.040-0.060	0.080-0.150
JOSEY CREEK TRIBUTARY 2	0.040-0.060	0.080-0.150
JOSEY CREEK TRIBUTARY 3	0.040-0.060	0.080-0.150
SAND CREEK	0.040-0.070	0.080-0.220
SAND CREEK TRIBUTARY 1	0.040-0.070	0.080-0.220
SAND CREEK TRIBUTARY 2	0.040-0.060	0.080-0.150
SPRINGERS BRANCH	0.040-0.060	0.080-0.150
TALKING WARRIOR CREEK	0.090	0.170-0.220
TOBACCO JUICE CREEK	0.060-0.070	0.080-0.180

The zone designations for Springer's Branch and Sand Creek were revised based on the hydraulic analyses for those streams. The revised zone designations are shown on the FIRM (Exhibit 1), and on the Flood (Exhibit 2).

The hydraulic analyses for this study are based only on the effect on unobstructed flow. The flood elevations as shown on the profiles are thus considered valid only if hydraulic structures in general remain unobstructed and do not fail.

Countywide Analyses

Analyses of the hydraulic characteristics of flooding from the sources studied by limited detail and approximate methods were carried out to provide estimates of the elevations of floods of the selected recurrence intervals.

For this countywide study, field survey data were coded into the HEC-2 step backwater computer model (Reference 14) along with the peak discharges for the l0-, 2-, 1-, and 0.2-percent annual chance floods. The program was used to compute water surface elevations at each surveyed section for Hollis Creek and Hollis Creek Tributary 1 (Reference 4).

Water-surface profiles were computed for limited detail and approximate study streams through the use of the U.S. Army Corps of Engineers HEC-RAS version 3.1.2 computer program (Reference 16). Water surface profiles were produced for the 1-percent-annual-chance storms for limited detail and approximate studies.

The limited detail and approximate study methodology used Watershed Information SystEm (WISE) (Reference 17) as a preprocessor to HEC-RAS. Tools within WISE allowed the engineer to verify that the cross-section data was acceptable. The WISE program was used to generate the input data file for HEC-RAS. Then HEC-RAS was used to determine the flood elevation at each cross section of the modeled stream. No floodway was calculated for streams studied by approximate methods.

The hydraulic analyses for this study are based only on the effect on unobstructed flow. The flood elevations as shown on the profiles are thus considered valid only if hydraulic structures in general remain unobstructed and do not fail.

Floodplains were mapped to include backwater effects that govern each flooding source near its downstream extent. Floodplains were reviewed for accuracy and adjusted as necessary.

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 (NGVD 29). With the finalization of the North American Vertical Datum of 1988 (NAVD 88), many FIS reports and FIRMs are being prepared using NAVD 88 as the referenced vertical datum.

Flood elevations shown in this FIS report and on the FIRM are referenced to NAVD 88. These flood elevations must be compared to structure and ground elevations referenced to the same vertical datum. It is important to note that adjacent counties may be referenced to NGVD 29. This may result in differences in base flood elevations across county lines.

The elevations shown in the FIS report and on the FIRM for Oktibbeha County are referenced to NAVD88. Ground, structure, and flood elevations may be compared and/or referenced to NGVD29, add -0.20 feet to the NAVD88 elevation. The -0.20 feet value is an average for the entire county. 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 information regarding conversion between the NGVD and NAVD, visit the National Geodetic Survey website at www.ngs.noaa.gov, or contact the National Geodetic Survey at the following address:

Vertical Network Branch, N/CG13
National Geodetic Survey, NOAA
Silver Spring Metro Center 3
1315 East-West Highway
Silver Spring, Maryland 20910
(301) 713-3191

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 for this community. Interested individuals may contact FEMA to access these data.

4.0 FLOODPLAIN MANAGEMENT APPLICATIONS

The NFIP encourages State and local governments to adopt sound floodplain management programs. To assist in this endeavor, each FIS report provides 1-percent-annual-chance floodplain data, which may include a combination of the following: 10-, 2-, 1-, and 0.2-percent-annual-chance flood elevations; delineations of the 1- and 0.2-percent-annual-chance floodplains; and a 1-percent-annual-chance floodway. This information is presented on the FIRM and in many components of the FIS report, including Flood Profiles, Floodway Data tables, and Summary of Stillwater Elevation tables. Users should reference the data presented in the FIS report as well as additional information that may be available at the local community 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-percent-annual-chance floodplain boundaries have been delineated using the flood elevations determined at each cross section. Between cross sections, the boundaries were interpolated using topographic maps at a scale of 1" = 400' with a contour interval of 5 feet.

For each stream studied by approximate methods, the 1-percent-annual-chance floodplain boundaries have been delineated using interpolation of 5-foot interval topographic mapping developed from USGS 10 meter digital elevation models (DEM).

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, AE, and X) and 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 approximate methods, only the 1-percent-annual-chance floodplain boundary is shown on the Flood Insurance Rate Map (Exhibit 2).

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 floodways presented in this study were 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 are tabulated for selected cross sections in Table 6, "Floodway Data." The computed floodways are shown on the FIRM (Exhibit 2). In cases where the floodway and 100-year floodplain boundaries are either close together or collinear, only the floodway boundary is shown.

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. To reduce the risk of property damage in areas where the stream velocities are high, the community may wish to restrict development in areas outside the floodway.

Near the mouths of streams studied in detail, floodway computations are made without regard to flood elevations on the receiving water body.

Along streams where floodways have not been computed, the community must ensure that the cumulative effect of development in the floodplain will not cause more than a 1.0-foot increase in the BFEs at any point within the community.

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, "Floodway Schematic."

No floodways were computed for the downstream study of Hollis Creek, Hollis Creek Tributary 1, and streams studied by approximate methods because of limitations in the approximate study methodology.

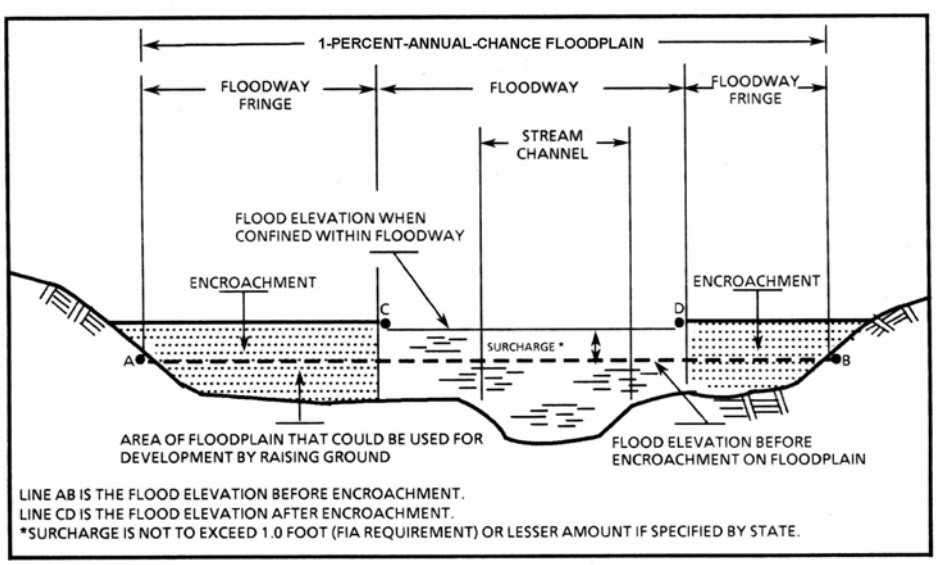


Figure 1. Floodway Schematic

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
GLEN CREEK								
A	2,000[1]	52	278	5.75	308.8	308.8	309.5	0.7
B	3,000[1]	158	941	1.70	310.7	310.7	311.4	0.7
C	3,400[1]	531	2,979	0.40	312.4	312.4	313.1	0.7
D	4,700[1]	178	810	1.48	312.6	312.6	313.3	0.7
E	5,200[1]	44	178	6.46	313.0	313.0	313.7	0.7
F	5,900[1]	147	707	1.63	316.0	316.0	317.0	1.0
G	7,650[1]	73	354	3.11	320.5	320.5	321.5	1.0

[1]Feet above Mississippi State Highway 25

TABLE 6

FEDERAL EMERGENCY MANAGEMENT AGENCY

OKTIBBEHA COUNTY, MS AND INCORPORATED AREAS

FLOODWAY DATA

GLEN CREEK

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
HOLLIS CREEK								
A	0	367	1,473	2.06	294.6	294.6	295.6	1.0
B	1,420	290	1,486	2.04	298.2	298.2	299.2	1.0
C	4,000	240	1,004	2.60	303.3	303.3	304.3	1.0
D	5,000	320	1,246	2.09	306.0	306.0	307.0	1.0
E	5,880	177	605	4.13	308.2	308.2	309.2	1.0
F	7,700	423	1,740	1.36	312.9	312.9	313.9	1.0
G	8,930	294	1,181	2.00	315.2	315.2	316.1	0.9
H	10,490	326	1,448	1.63	319.4	319.4	320.4	1.0
I	11,480	103	303	6.37	321.1	321.1	321.8	0.7
J	12,540	144	487	3.96	324.2	324.2	324.8	0.6
K	13,570	41	277	6.96	327.4	327.4	328.4	1.0
L	14,400	160	493	3.37	330.6	330.6	331.4	0.8
M	15,010	100	264	5.57	333.7	333.7	333.9	0.2
N	15,500	155	627	2.34	335.3	335.3	336.1	0.8

[1]Approximately 1,300 feet upstream of the City of Starkville corporate limits

TABLE 6

FEDERAL EMERGENCY MANAGEMENT AGENCY

OKTIBBEHA COUNTY, MS AND INCORPORATED AREAS

FLOODWAY DATA

HOLLIS CREEK

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
JOSEY CREEK TRIBUTARY 1								
A	0[1]	743	2,498	1.49	255.0	255.0	256.0	1.0
B	1,280[1]	201	820	3.30	258.5	258.5	259.2	0.7
C	2,850[1]	58	246	5.73	263.7	263.7	264.6	0.9
D	3,930[1]	37	204	6.92	271.4	271.4	272.3	0.9
E	4,950[1]	26	219	5.34	276.8	276.8	277.3	0.5
JOSEY CREEK TRIBUTARY 2								
A	1,360[2]	107	436	4.43	265.0	265.0	266.0	1.0
B	1,940[2]	42	357	5.41	267.5	267.5	268.2	0.7
JOSEY CREEK TRIBUTARY 3								
A	560[2]	130	512	2.79	258.9	258.9	259.8	0.9
B	1,350[2]	24	212	6.27	263.5	263.5	263.9	0.4
C	2,100[2]	174	507	2.62	266.3	266.3	266.9	0.6
D	3,060[2]	201	539	2.32	271.2	271.2	271.2	1.0

[1]Feet above confluence of Josey Creek Tributary 3

[2]Feet above mouth

TABLE 6

FEDERAL EMERGENCY MANAGEMENT AGENCY

OKTIBBEHA COUNTY, MS AND INCORPORATED AREAS

FLOODWAY DATA

JOSEY CREEK TRIBUTARY 1-JOSEY CREEK TRIBUTARY 2-JOSEY CREEK TRIBUTARY 3

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
SAND CREEK								
A*	*[1]	*	*	*	*	*	*	*
B*	*[1]	*	*	*	*	*	*	*
C*	*[1]	*	*	*	*	*	*	*
D*	*[1]	*	*	*	*	*	*	*
E*	*[1]	*	*	*	*	*	*	*
F	26,190[2]	133	838	8.60	261.6	261.6	262.6	1.0
G	26,610[2]	312	1,599	4.50	265.9	265.9	266.0	0.1
H	27,400[2]	1,134	6,143	1.20	266.1	266.1	267.1	1.0
I	27,590[2]	1,027	4,640	1.50	266.2	266.2	267.2	1.0
J	27,810[2]	1,053	5,772	1.20	267.3	267.3	268.3	1.0
K	30,970[2]	1,084	4,243	1.70	270.0	270.0	271.0	1.0
L	32,890[2]	1,200	3,426	2.10	273.6	273.6	274.5	0.9
M	33,115[2]	1,179	3,688	1.90	275.8	275.8	276.5	0.7
N	34,000[2]	425	1,878	3.10	277.1	277.1	278.1	1.0
O	34,415[2]	152	1,379	4.20	278.0	278.0	278.7	0.7
P	35,765[2]	1,322	3,184	1.80	280.9	280.9	281.7	0.8
Q	35,995[2]	1,370	6,113	0.90	283.3	283.3	283.9	0.6
R	38,100[2]	305	780	3.00	284.8	284.8	285.4	0.6
S	38,425[2]	188	402	5.80	286.3	286.3	286.7	0.4
T	38,700[2]	370	1,666	1.40	287.7	287.7	288.7	1.0

[1]Feet above Limit of Detailed Study approximately 3,000 feet downstream of Hickory Grove Road

[2]Feet above mouth

*Floodway Data Not Computed

TABLE 6

FEDERAL EMERGENCY MANAGEMENT AGENCY

OKTIBBEHA COUNTY, MS AND INCORPORATED AREAS

FLOODWAY DATA

SAND CREEK

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
SAND CREEK TRIBUTARY 1								
A	1,200	1,322[2]	3,184	1.80	280.9	280.9[3]	281.7	0.8
B	1,960	414	678	4.82	284.6	284.6	285.4	0.8
C	2,600	300	985	3.32	287.6	287.6	287.9	0.3
D	3,045	34	234	6.67	290.4	290.4	290.6	0.2
E	3,630	69	1,333	1.17	291.9	291.9	292.7	0.8

[1]Feet above mouth

[2]Combined floodway width of Sand Creek and Sand Creek Tribunary 1

[3]Elevation computed without consideration of backwater effects from Sand Creek

TABLE 6

FEDERAL EMERGENCY MANAGEMENT AGENCY

OKTIBBEHA COUNTY, MS AND INCORPORATED AREAS

FLOODWAY DATA

SAND CREEK TRIBUTARY 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
SAND CREEK TRIBUTARY 2								
A	950	73	381	5.62	283.3	278.3[2]	279.3	1.0
B	1,600	61	370	5.78	284.6	281.1[2]	282.0	0.9
C	2,180	215	471	4.54	286.3	286.3	287.2	0.9
D	2,700	66	490	4.37	291.4	291.4	291.9	0.5
E	3,350	119	421	4.70	292.5	292.5	293.3	0.8
F	4,350	95	398	4.92	295.7	295.7	296.7	1.0
G	5,000	96	402	4.78	298.6	298.6	299.6	1.0

[1]Feet above mouth

[2]Elevation computed without consideration of backwater effects from Sand Creek

TABLE 6

FEDERAL EMERGENCY MANAGEMENT AGENCY

OKTIBBEHA COUNTY, MS AND INCORPORATED AREAS

FLOODWAY DATA

SAND CREEK TRIBUTARY 2

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

Zone AE

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

Zone X

Zone X is the flood insurance rate 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 (sq. mi.), and areas protected from the 1-percent-annual-chance flood by levees. No BFEs or depths are shown within this zone.

6.0 FLOOD INSURANCE RATE MAP

The Flood Insurance Rate Map (FIRM) is designed for flood insurance and floodplain management applications.

For flood insurance applications, the map designates flood insurance rate zones as described in Section 5.0. 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 computation. The countywide Flood Insurance Rate Map presents flooding information for the entire geographic area of Oktibbeha County. Previously, Flood Insurance Rate Maps were prepared for each incorporated community and the unincorporated areas of the County identified as flood-prone. This countywide Flood Insurance Rate Map also includes flood-hazard information that was presented separately on Flood Boundary and Floodway Maps, where applicable. Historical data relating to the maps prepared for each community are presented in Table 7, “Community Map History.”

COMMUNTIY NAME	INITIAL IDENTIFICATION	FLOOD HAZARD BOUNDARY MAP REVISIONS DATE	FIRM EFFECTIVE DATE	FIRM REVISIONS DATE
Maben, Town of[1]				
Oktibbeha County (Unincorporated Areas)	February 17, 1978		June 19, 1989	
Starkville, City of	June 7, 1974	October 17, 1975 July 30, 1976	February 18, 1981	June 4, 1990
Sturgis, Village of		None		

[1]Non-floodprone community

TABLE 7

FEDERAL EMERGENCY MANAGEMENT AGENCY

OKTIBBEHA COUNTY, MS
AND INCORPORATED AREAS

COMMUNITY MAP HISTORY

7.0 OTHER STUDIES

The FIS published for Oktibbeha County, Unincorporated Areas (Reference 1), and the FIS published for the City of Starkville (Reference 2-3), and Flood Insurance Rate Maps for Webster, Winston, Noxubee, and Lowndes Counties (References 18-21) are in agreement with this study.

Information pertaining to revised and unrevised flood hazards for each jurisdiction within Oktibbeha County has been compiled into this FIS. Therefore, this FIS report supersedes or is compatible with all previously printed FIS reports, FIRMs, and Flood Hazard Boundary Maps (FBFMs) for all jurisdictions within Oktibbeha County, and should be considered authoritative for the purposes of the NFIP.

8.0 LOCATION OF DATA

Information concerning the pertinent data used in the preparation of this FIS can be obtained by contacting FEMA, Federal Insurance and Mitigation Administration, Koger Center - Rutgers Building, 3003 Chamblee Tucker Road, Atlanta, Georgia 30341.

Future revisions may be made that do not result in the republishing of the Flood Insurance Study report. To ensure that any user is aware of all revisions, it is advisable to contact the map repository of flood hazard data located in the community.

9.0 BIBLIOGRAPHY AND REFERENCES

1. Federal Emergency Management Agency, Flood Insurance Study, Oktibbeha County, Mississippi Unincorporated Areas, June 19, 1989.

2. Federal Emergency Management Agency, Flood Insurance Study, City of Starkville, Oktibbeha County, Mississippi, February 1981.

3. Federal Emergency Management Agency, Flood Insurance Study, City of Starkville, Oktibbeha County, Mississippi, June 4, 1990.

4. Federal Emergency Management Agency, Letter of Map Revision Case Number: 94-04-239P, Oktibbeha County, Mississippi, Performed by Monroe, Kenneth Van Wilson Jr., and James W. Hudson, February 8, 1995.

5. U.S. Census Bureau. http://www.census.gov/. Accessed August 20, 2008.

6. Oktibbeha County. http://www.gtpdd.com/counties/oktibbeha/index.htm. Accessed August 20, 2008.

7. U.S. Department of the Interior, Geological Survey, Flood Frequency of Mississippi Streams, B.E. Colson and J.W. Hudson, Jackson, Mississippi, May 1976.

8. U.S. Geological Survey, 7.5 Minute Series Topographic Maps, Scale 1:24,000, Contour Interval 10 Feet: Starkville, Mississippi, 1966.

9. U.S. Geological Survey, Water-Supply Paper 2207, Flood Characteristics of Urban Watersheds in the United States, V.B. Sauer, W.O. Thomas, Jr., V.A. Stricker, and K.V. Wilson, 1983.

10. U.S. Geological Survey, An Approach to Estimating Flood Frequency for Urban Areas in Oklahoma, July 1974.

11. U.S. Geological Survey, Nationwide Summary of U.S. Geological Survey Regional Regression Equations for Estimating Magnitude and Frequency of Floods for Ungaged Sites, U.S. Geological Survey Water-Resources Investigations Report 94-4002, 1993.

12. U.S. Department of Transportation, Federal Highway Administration, Report No. FHWA/RD-86/108, Bridge Waterways Analysis Model: Research Report, J.O. Shearman, W.H. Kirby, V.R. Snyder, and H.N. Flippo, July 1986.

13. U.S. Geological Survey, Preparation of Input Data for Automatic Computation of Stage-Discharge Relationships at Culverts: U.S. Geological Survey Techniques of Water Resource Investigations, Howard R. Matthai, Harold E. Stull, Jacob Davidian, undated.

14. U.S. Army Corps of Engineers, Hydrologic Engineering Center, HEC-2 Water Surface Profiles, Computer Program 723-X6-L202A, Davis, California, April 1984.

15. U.S. Army Corps of Engineers, Hydrologic Engineering Center, Computer Program HEC-2, Water Surface Profiles, Davis, California, 1976.

16. U.S. Army Corps of Engineers Hydrologic Engineering Center, HEC-RAS River Analysis System User's Manual, Version 3.1.2, April 2004.

17. Watershed Concepts, a Division of HSMM AECOM, Watershed Information SystEm Version 3.1.1, Greensboro, NC, July 2008.

18. Federal Emergency Management Agency, Flood Insurance Rate Map, Webster County, Unincorporated Areas, Mississippi, September 1985.

19. Federal Emergency Management Agency, Flood Insurance Rate Map, Winston County, Unincorporated Areas, Mississippi, August 1985.

20. Federal Emergency Management Agency, Flood Insurance Rate Map, Noxubee County, Unincorporated Areas, Mississippi, September 1987.

21. Federal Emergency Management Agency, Flood Insurance Rate Map, Clay County, Unincorporated Areas, Mississippi, July 16, 1990.

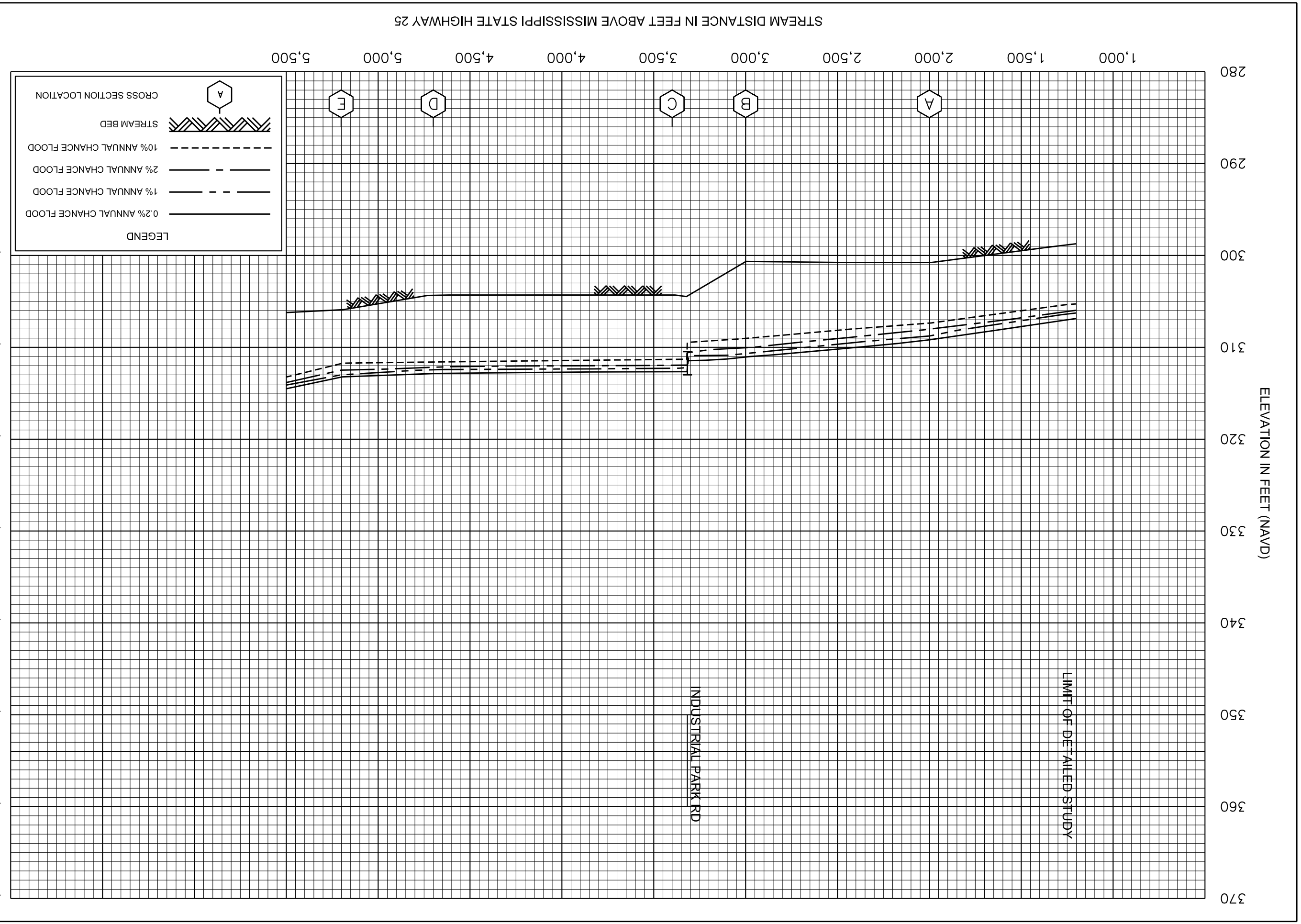
FEDERAL EMERGENCY MANAGEMENT AGENCY

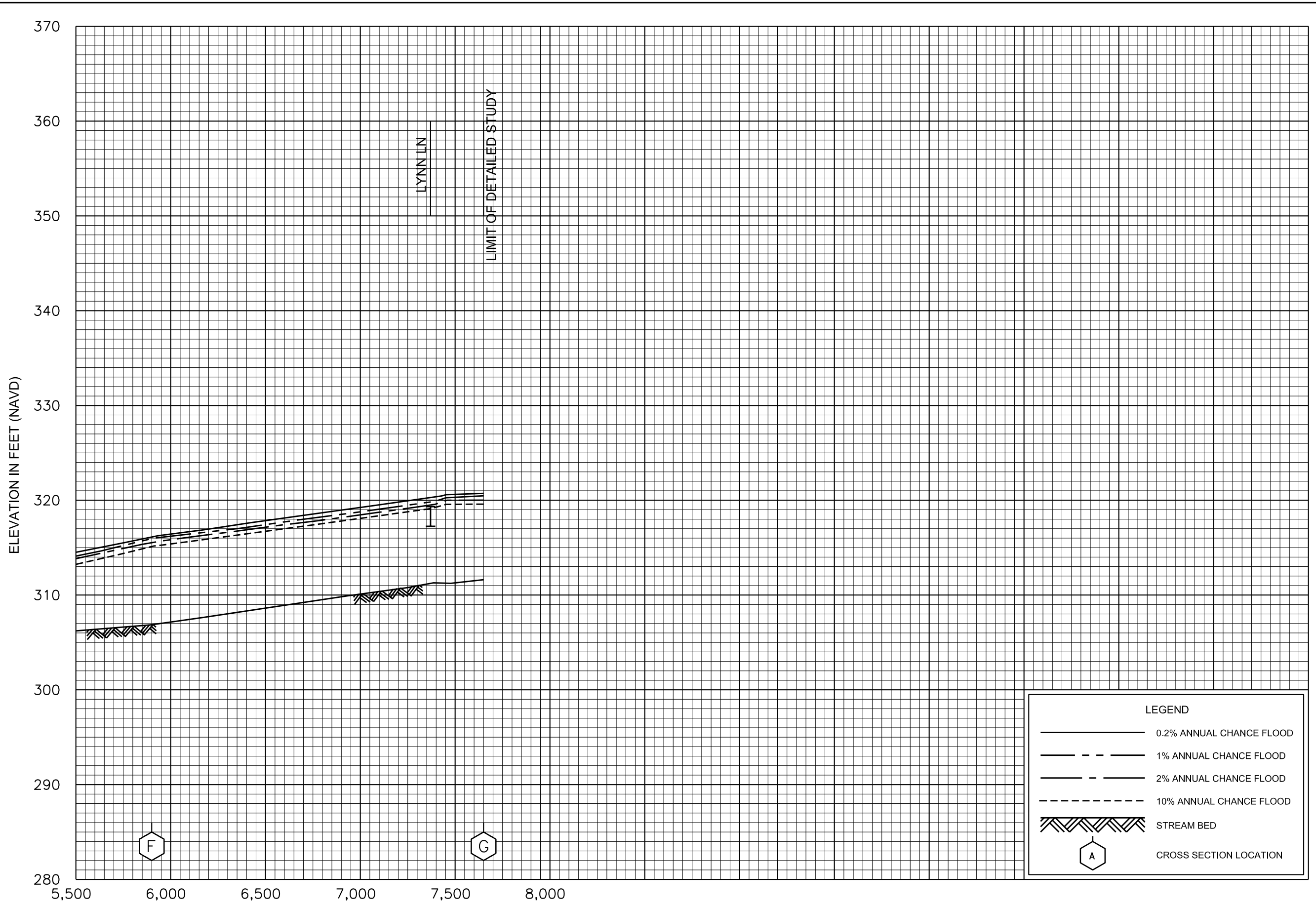
OKTIBBEHA COUNTY, MS
AND INCORPORATED AREAS

FLOOD PROFILES

GLEN CREEK

01P





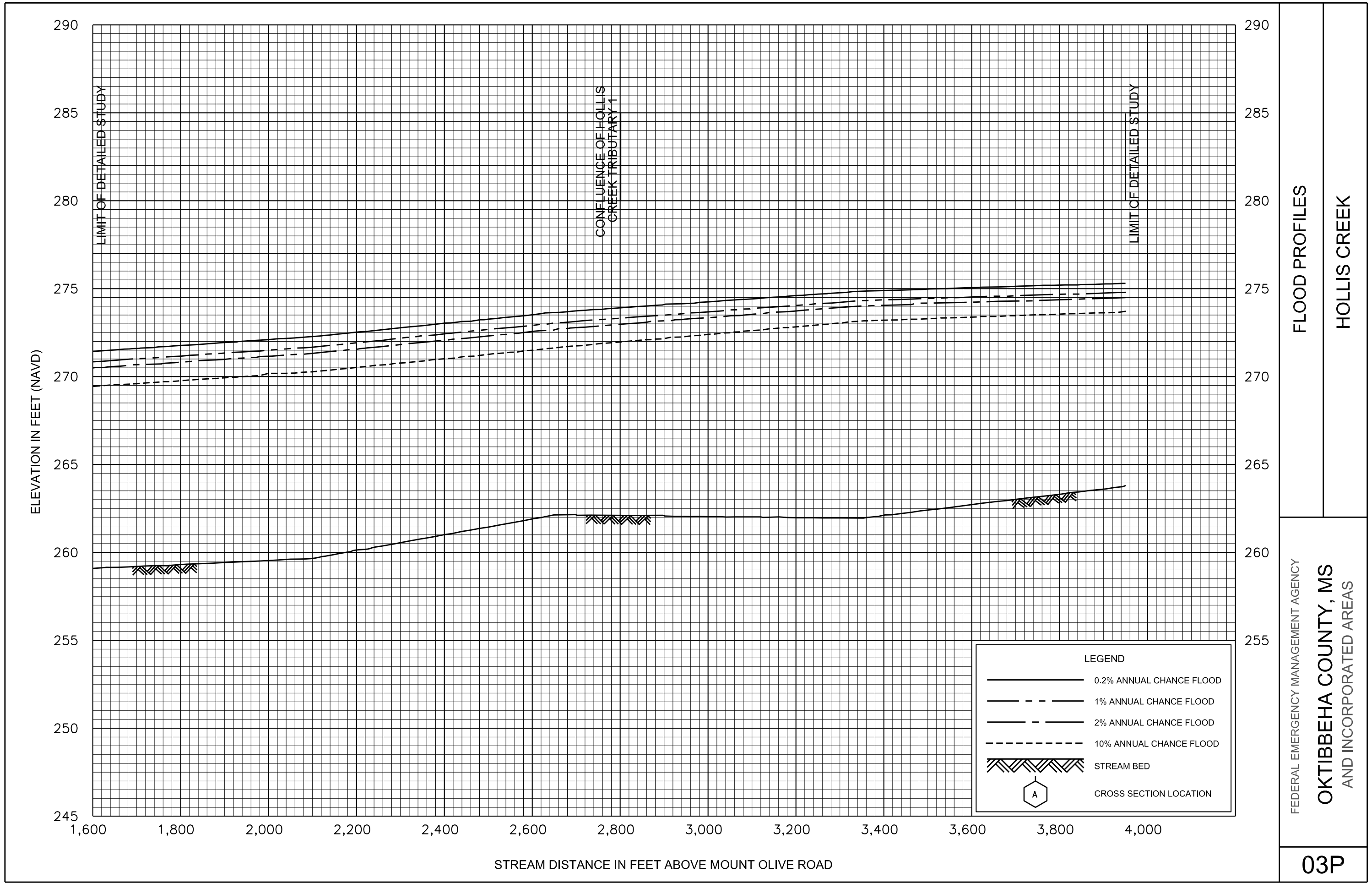
FLOOD PROFILES

GLEN CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

OKTIBBEHA COUNTY, MS
AND INCORPORATED AREAS

02P



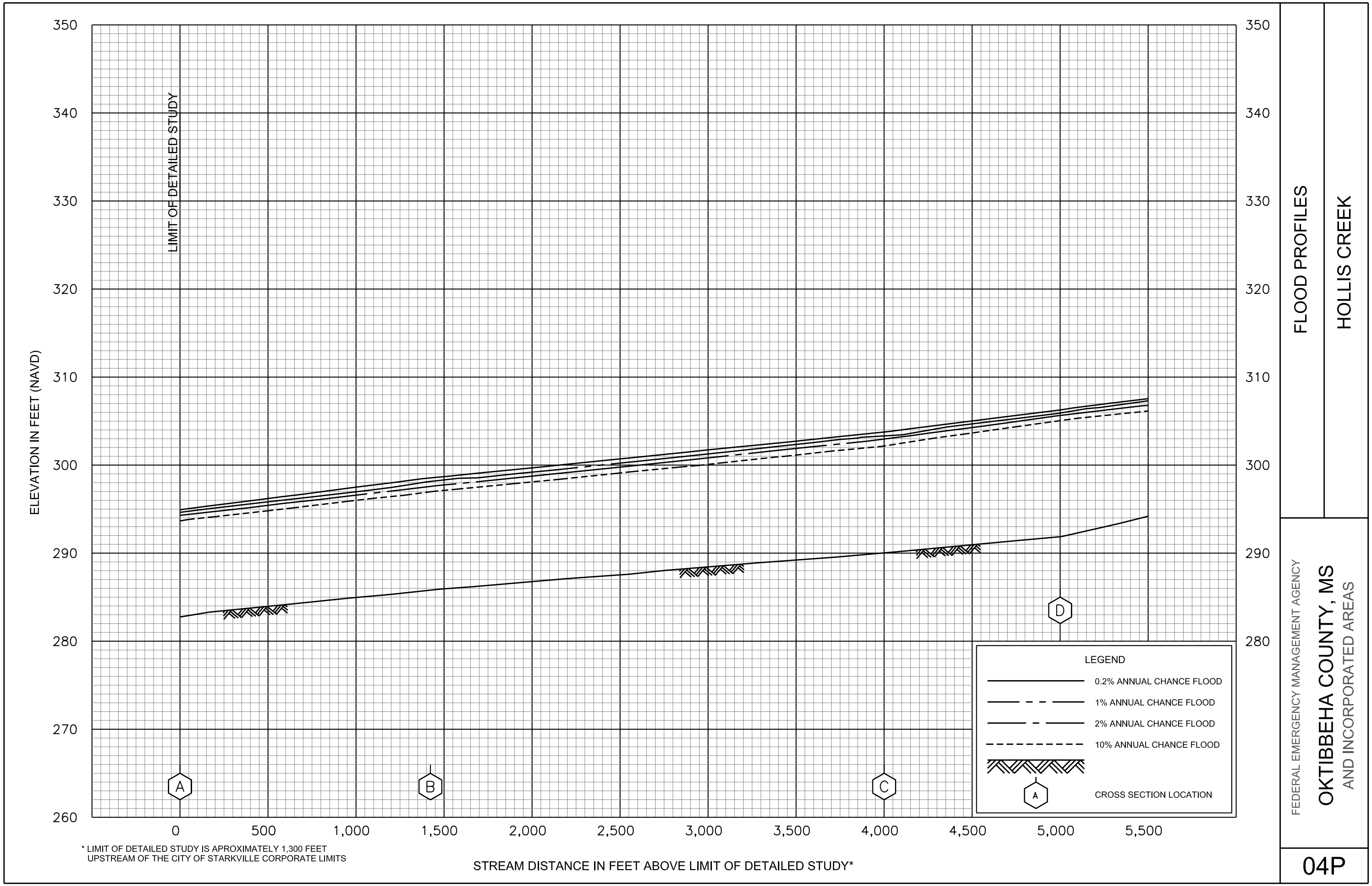
FLOOD PROFILES

HOLLIS CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

OKTIBBEHA COUNTY, MS
AND INCORPORATED AREAS

03P



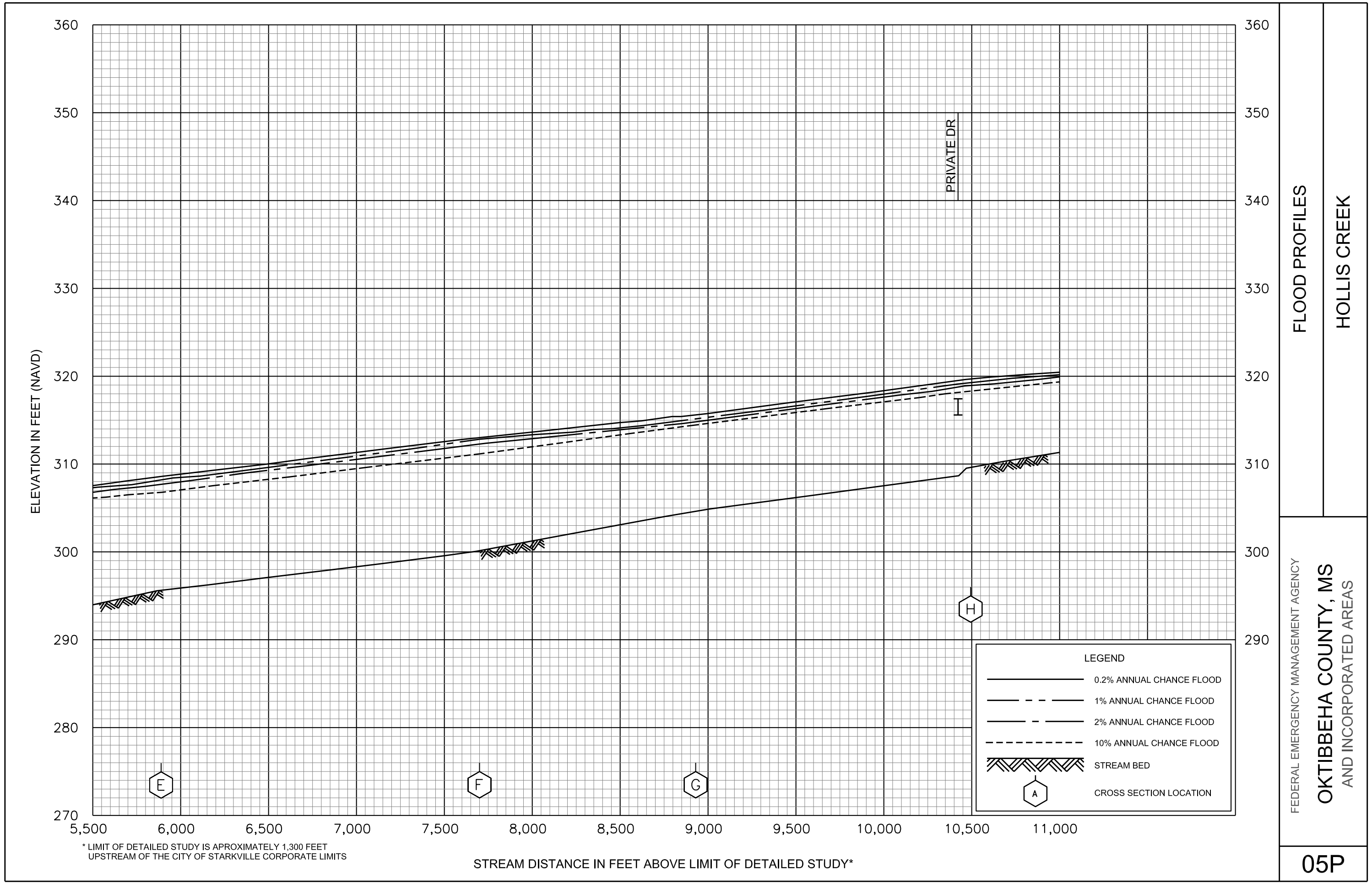
FLOOD PROFILES

HOLLIS CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

OKTIBBEHA COUNTY, MS
AND INCORPORATED AREAS

04P



FLOOD PROFILES

HOLLIS CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

OKTIBBEHA COUNTY, MS
AND INCORPORATED AREAS

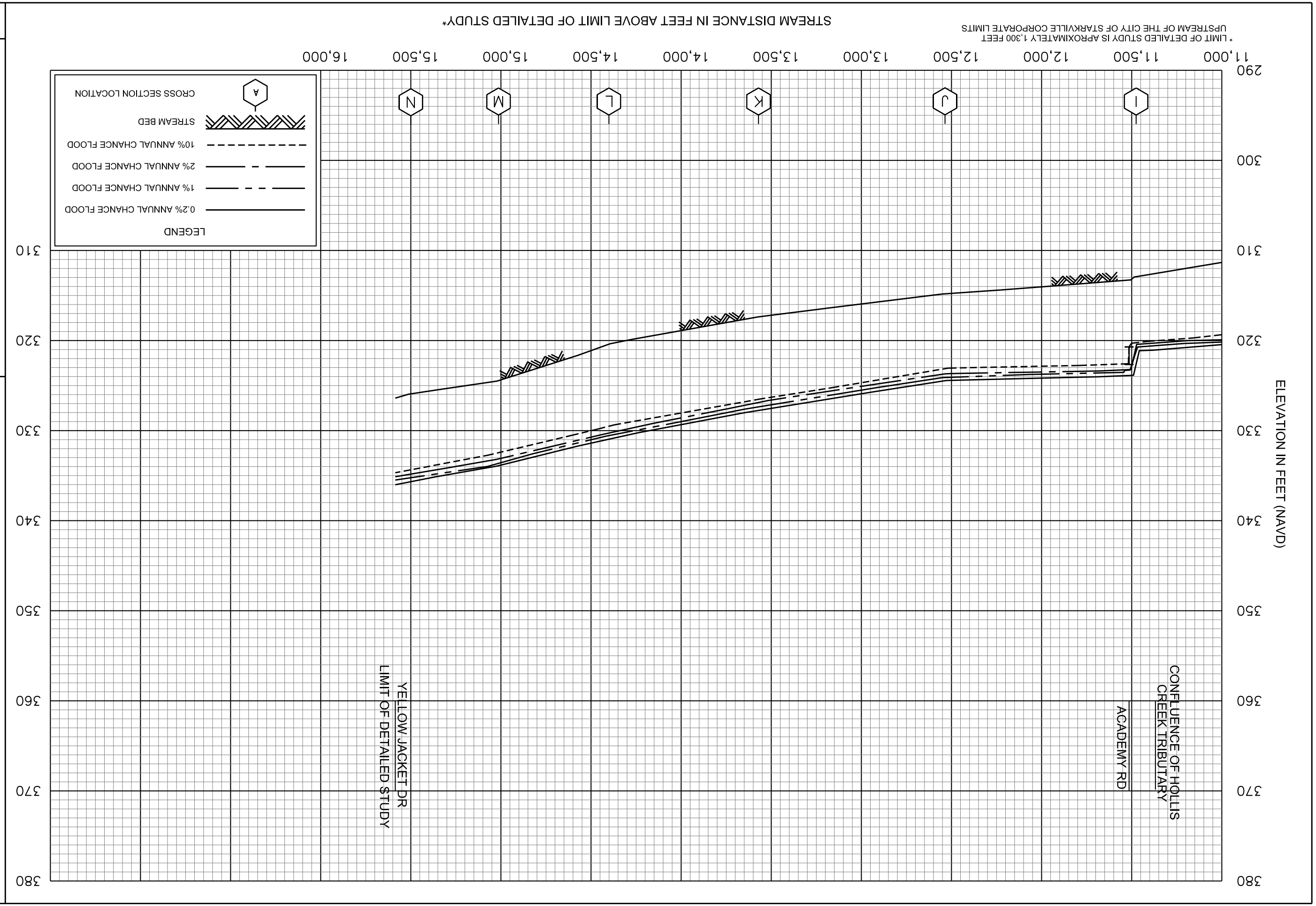
05P

FEDERAL EMERGENCY MANAGEMENT AGENCY

OKTIBBEHA COUNTY, MS
AND INCORPORATED AREAS

FLOOD PROFILES

HOLLIS CREEK



06P

ELEVATION IN FEET (NAVD)

255 260 265 270 275 280 285 290 295 300

CONFLUENCE WITH HOLLIS CREEK

CROSS CREEK RD

LIMIT OF DETAILED STUDY

0 500 1,000 1,500

STREAM DISTANCE IN FEET ABOVE CONFLUENCE WITH HOLLIS CREEK

LEGEND

0.2% ANNUAL CHANCE FLOOD

1% ANNUAL CHANCE FLOOD

2% ANNUAL CHANCE FLOOD

10% ANNUAL CHANCE FLOOD

STREAM BED

A

CROSS SECTION LOCATION

265 270 275 280 285 290 295 300

07P

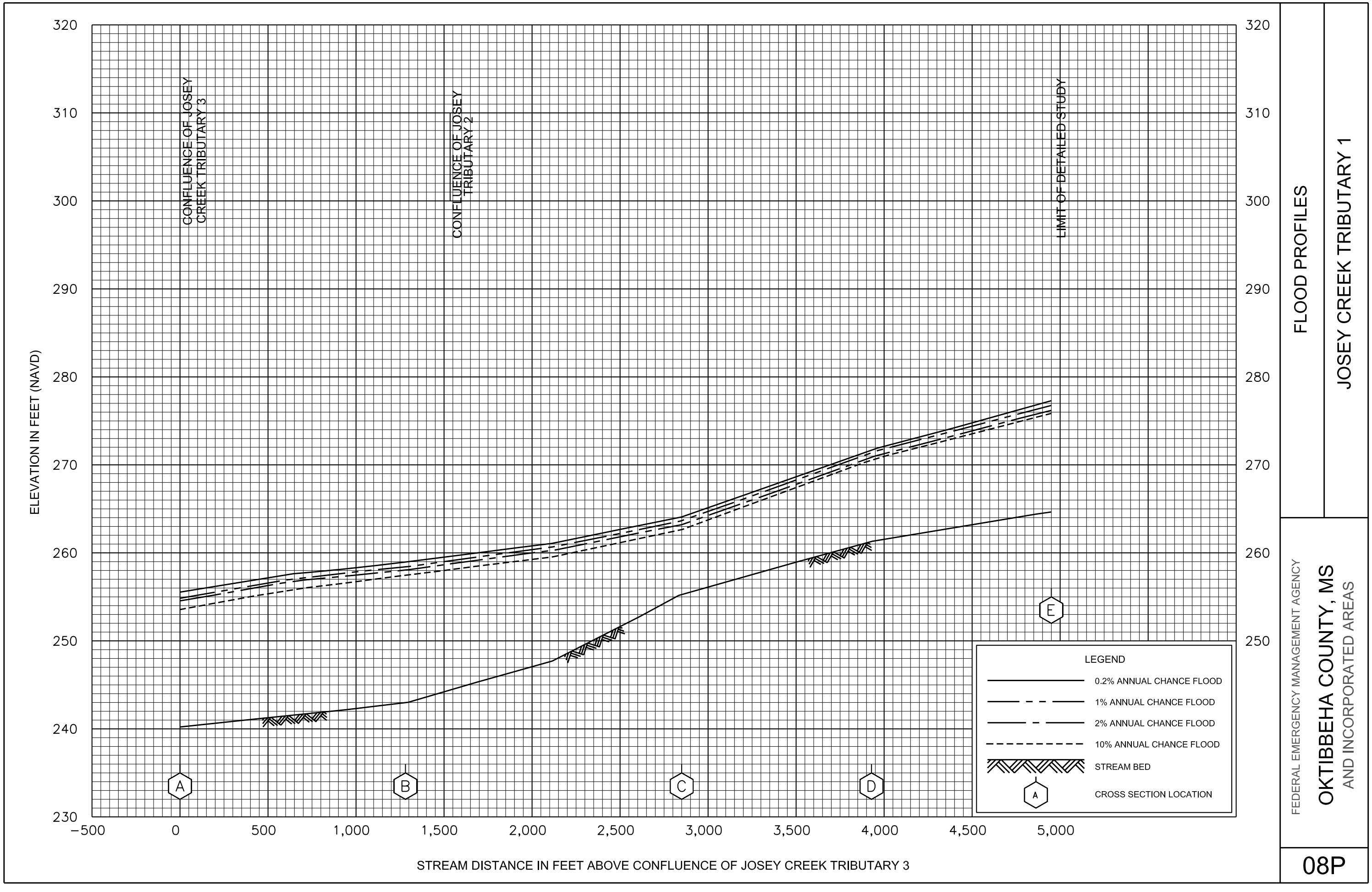
FEDERAL EMERGENCY MANAGEMENT AGENCY

OKTIBBEHA COUNTY, MS

AND INCORPORATED AREAS

FLOOD PROFILES

HOLLIS CREEK TRIBUTARY 1



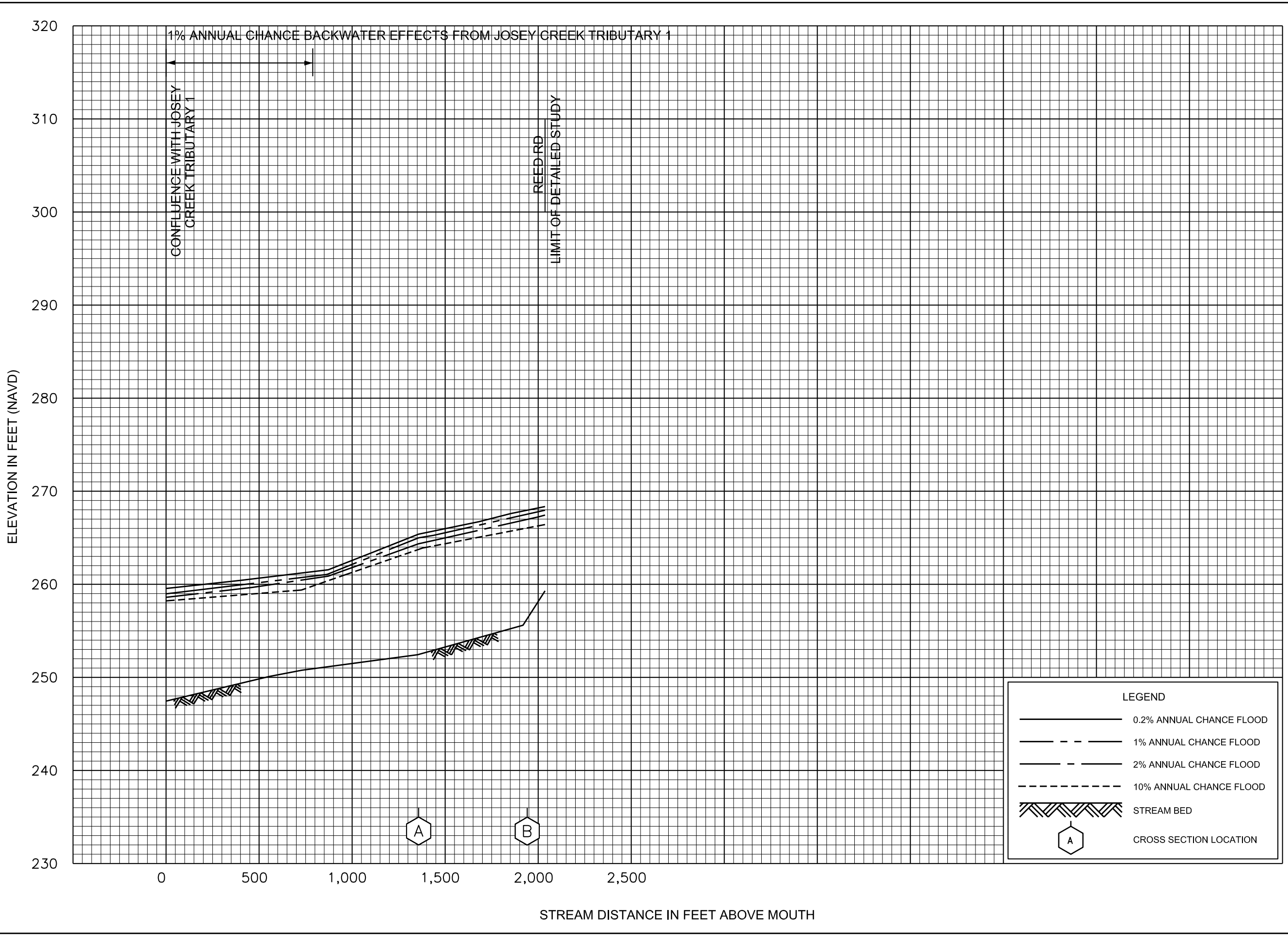
FLOOD PROFILES

JOSEY CREEK TRIBUTARY 1

FEDERAL EMERGENCY MANAGEMENT AGENCY

OKTIBBEHA COUNTY, MS
AND INCORPORATED AREAS

08P



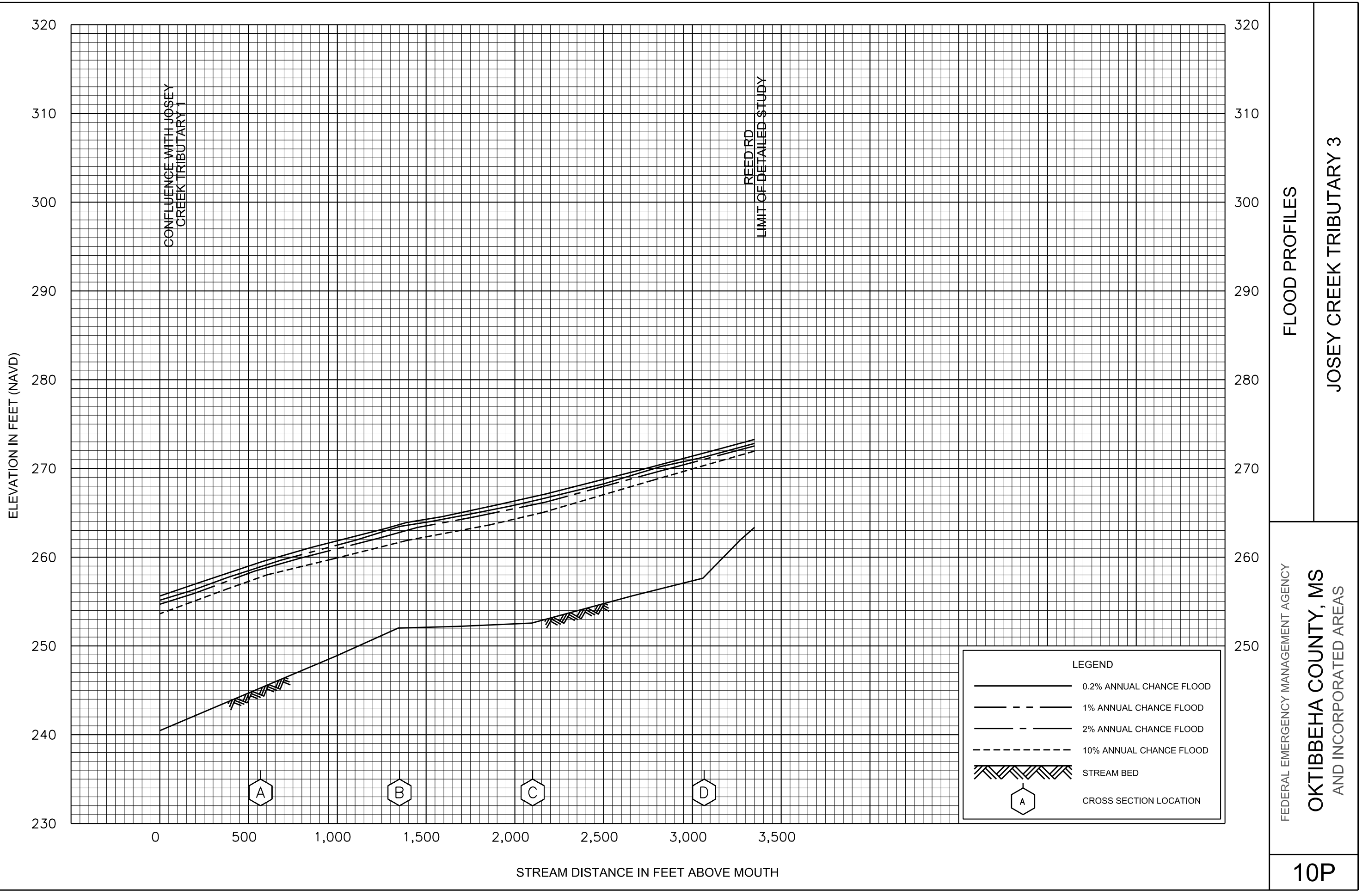
FLOOD PROFILES

JOSEY CREEK TRIBUTARY 2

FEDERAL EMERGENCY MANAGEMENT AGENCY

OKTIBBEHA COUNTY, MS
AND INCORPORATED AREAS

09P



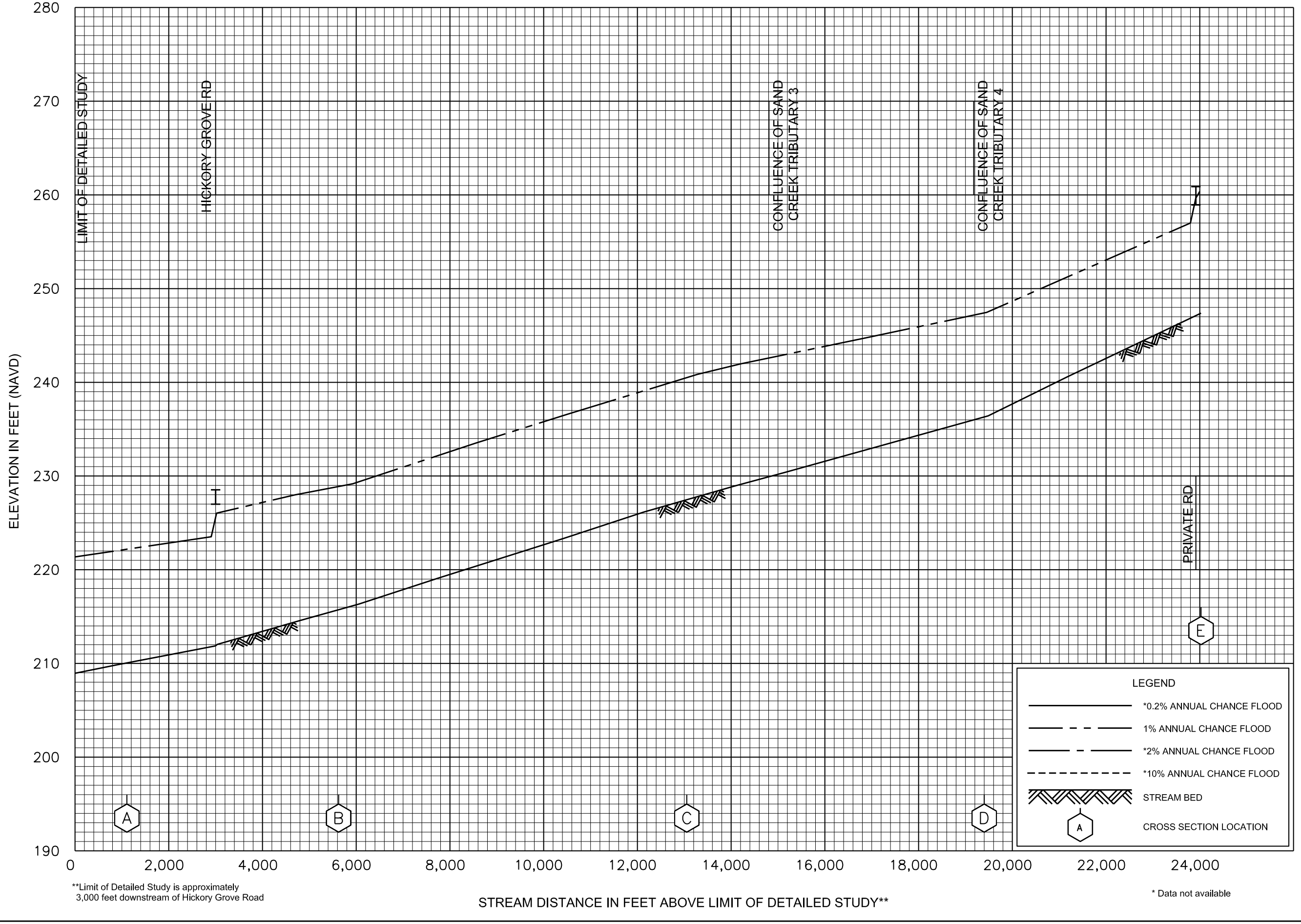
FLOOD PROFILES

JOSEY CREEK TRIBUTARY 3

FEDERAL EMERGENCY MANAGEMENT AGENCY

OKTIBBEHA COUNTY, MS
AND INCORPORATED AREAS

10P



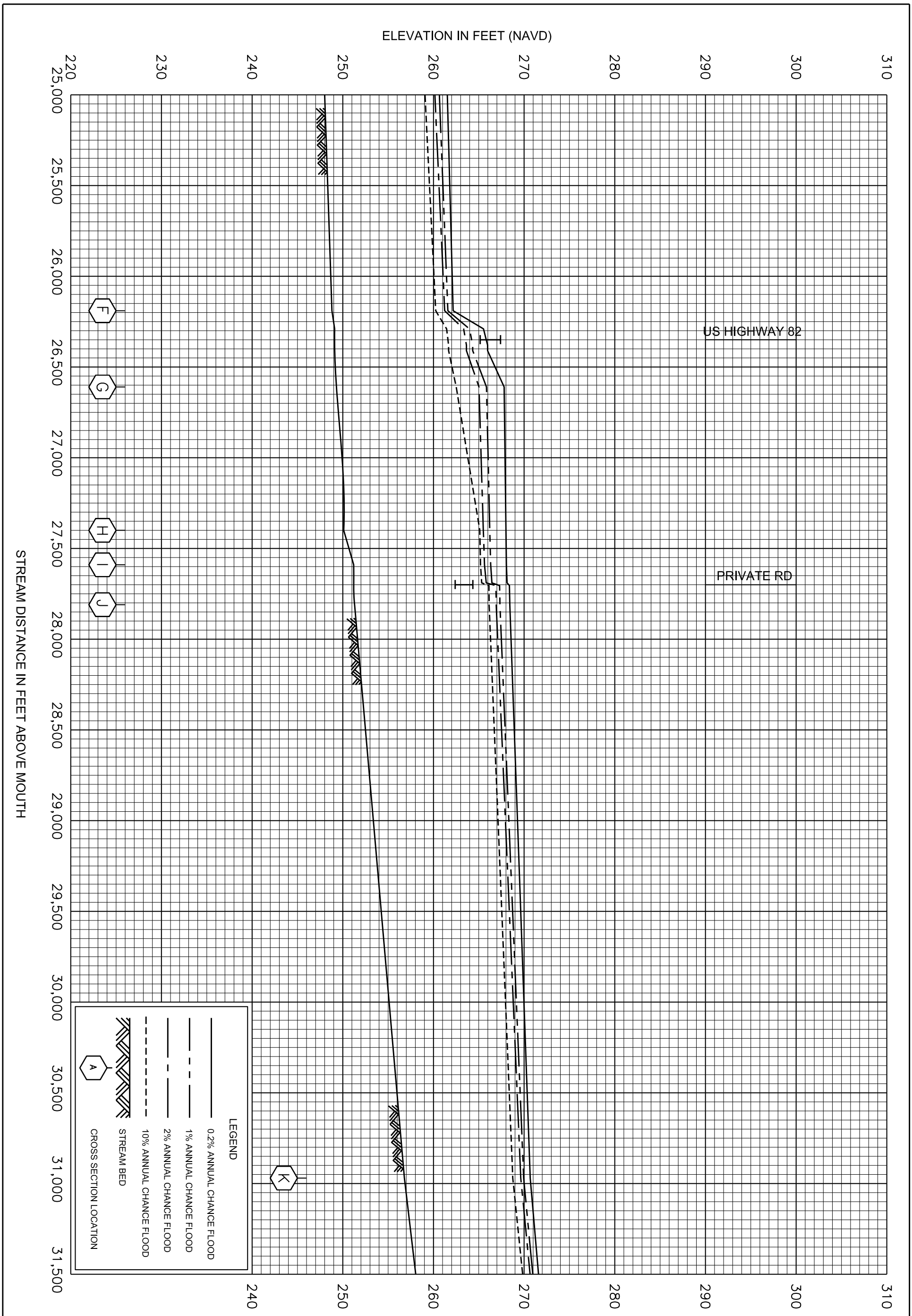
FLOOD PROFILES

SAND CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

OKTIBBEHA COUNTY, MS
AND INCORPORATED AREAS

11P



FEDERAL EMERGENCY MANAGEMENT AGENCY

OKTIBBEHA COUNTY, MS

AND INCORPORATED AREAS

FLOOD PROFILES

SAND CREEK

12P

ELEVATION IN FEET (NAVD)

240 250 260 270 280 290 300 310 320 330

31,500 32,000 32,500 33,000 33,500 34,000 34,500 35,000 35,500 36,000 36,500 37,000

STREAM DISTANCE IN FEET ABOVE MOUTH

L M N O P Q

PRIVATE RD

RAILROAD

CONFLUENCE OF SAND CREEK TRIBUTARY 1

PAT STATION RD

LEGEND

- 0.2% ANNUAL CHANCE FLOOD
- 1% ANNUAL CHANCE FLOOD
- 2% ANNUAL CHANCE FLOOD
- 10% ANNUAL CHANCE FLOOD
- STREAM BED
- A CROSS SECTION LOCATION

FEDERAL EMERGENCY MANAGEMENT AGENCY

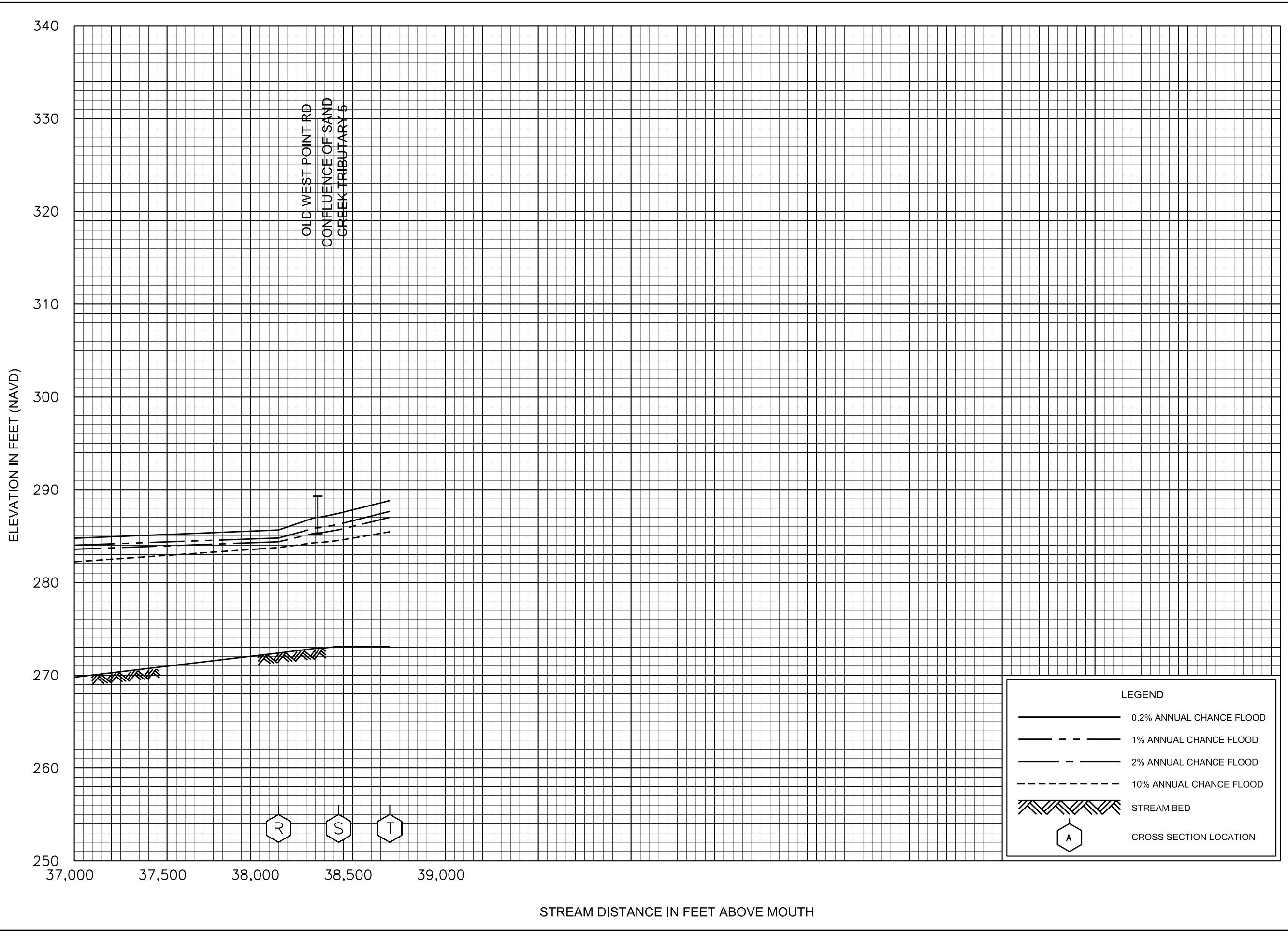
OKTIBBEHA COUNTY, MS

AND INCORPORATED AREAS

FLOOD PROFILES

SAND CREEK

13P



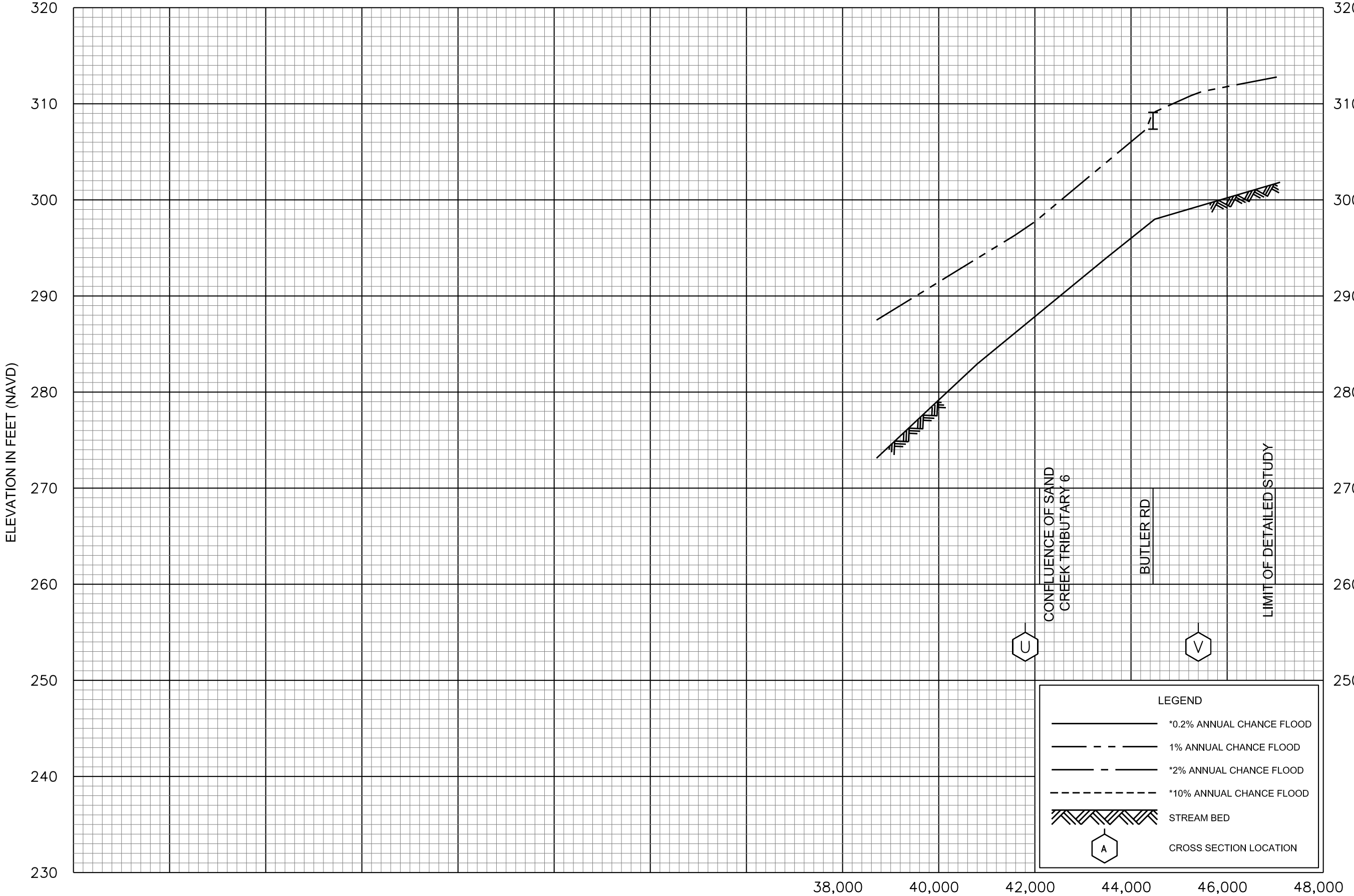
FLOOD PROFILES

SAND CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

OKTIBBEHA COUNTY, MS
AND INCORPORATED AREAS

14P



**Limit of Detailed Study is approximately 3,000 feet downstream of Hickory Grove Road

STREAM DISTANCE IN FEET ABOVE LIMIT OF DETAILED STUDY**

* Data not available

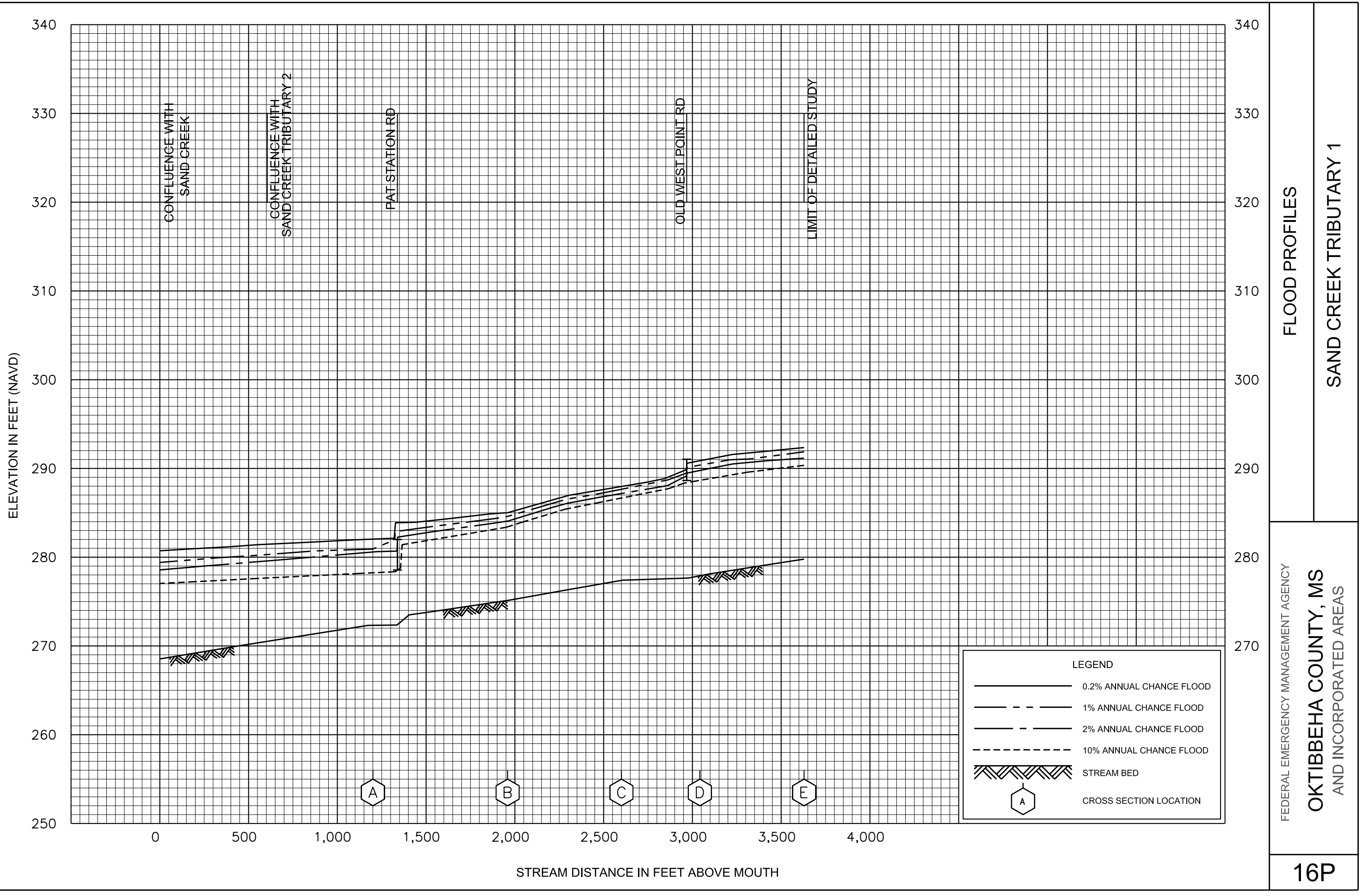
FLOOD PROFILES

SAND CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

OKTIBBEHA COUNTY, MS
AND INCORPORATED AREAS

15P



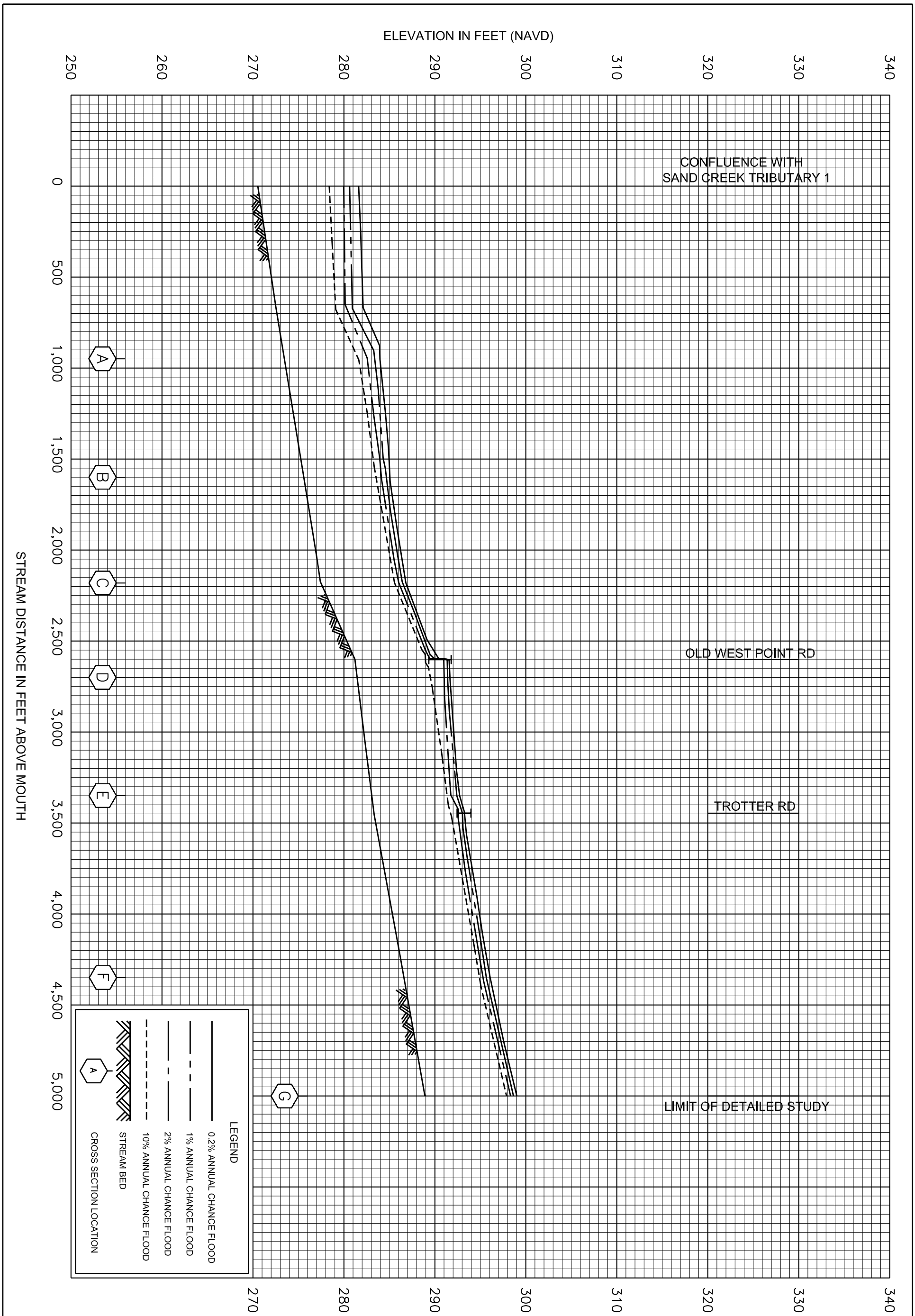
FLOOD PROFILES

SAND CREEK TRIBUTARY 1

FEDERAL EMERGENCY MANAGEMENT AGENCY

OKTIBBEHA COUNTY, MS
AND INCORPORATED AREAS

16P



17P

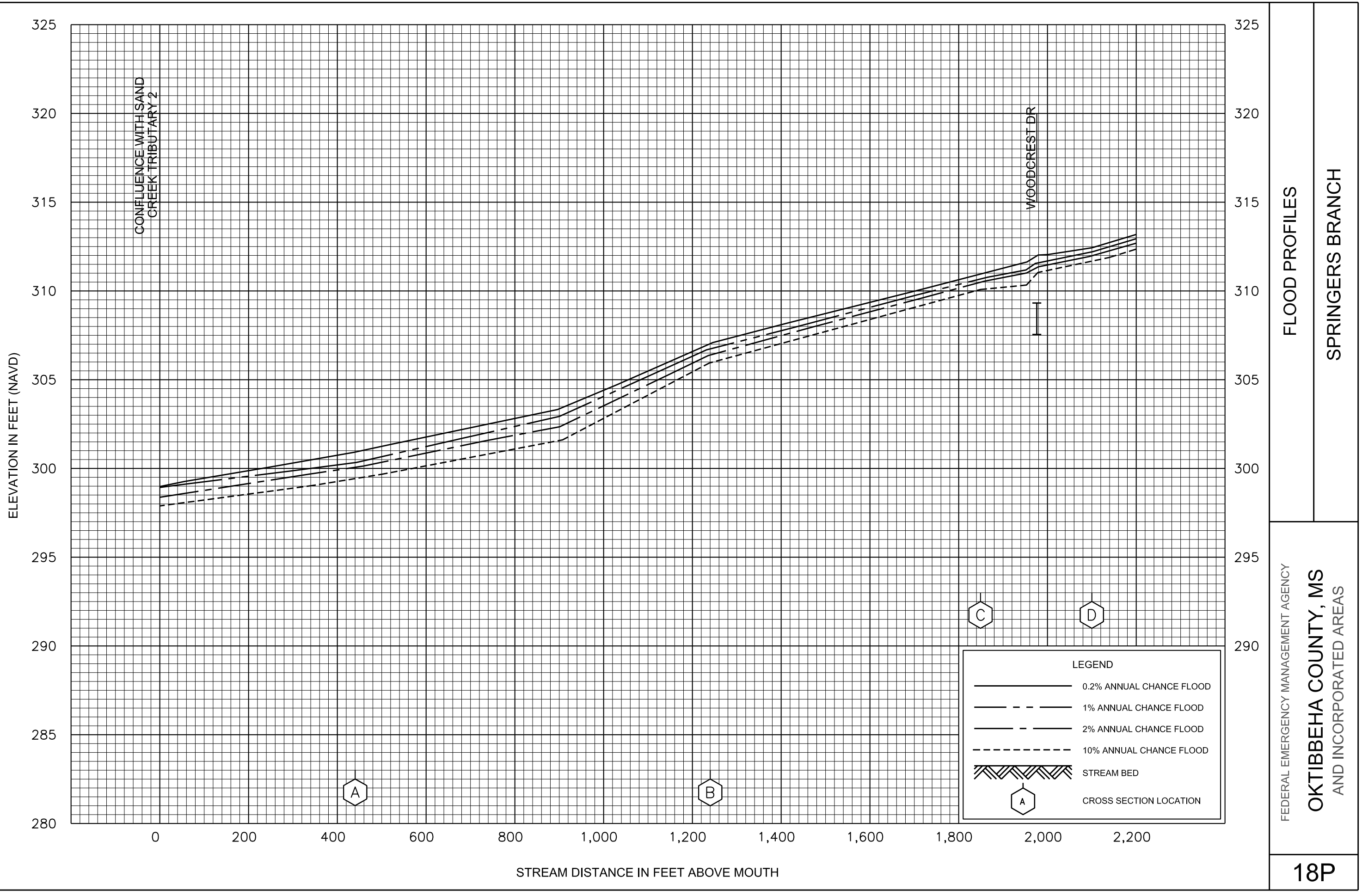
FEDERAL EMERGENCY MANAGEMENT AGENCY

OKTIBBEHA COUNTY, MS

AND INCORPORATED AREAS

FLOOD PROFILES

SAND CREEK TRIBUTARY 2



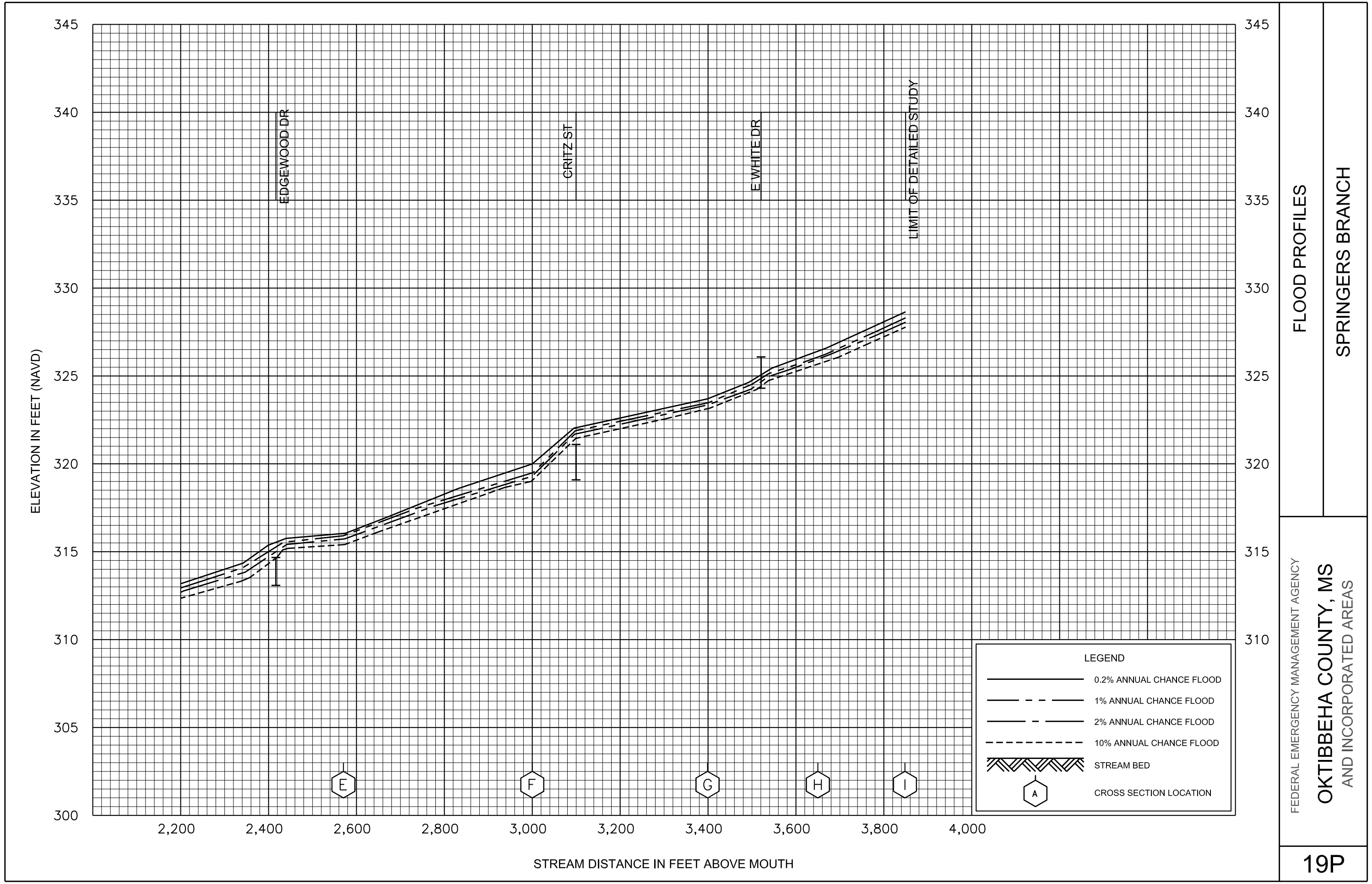
FLOOD PROFILES

SPRINGERS BRANCH

FEDERAL EMERGENCY MANAGEMENT AGENCY

OKTIBBEHA COUNTY, MS
AND INCORPORATED AREAS

18P



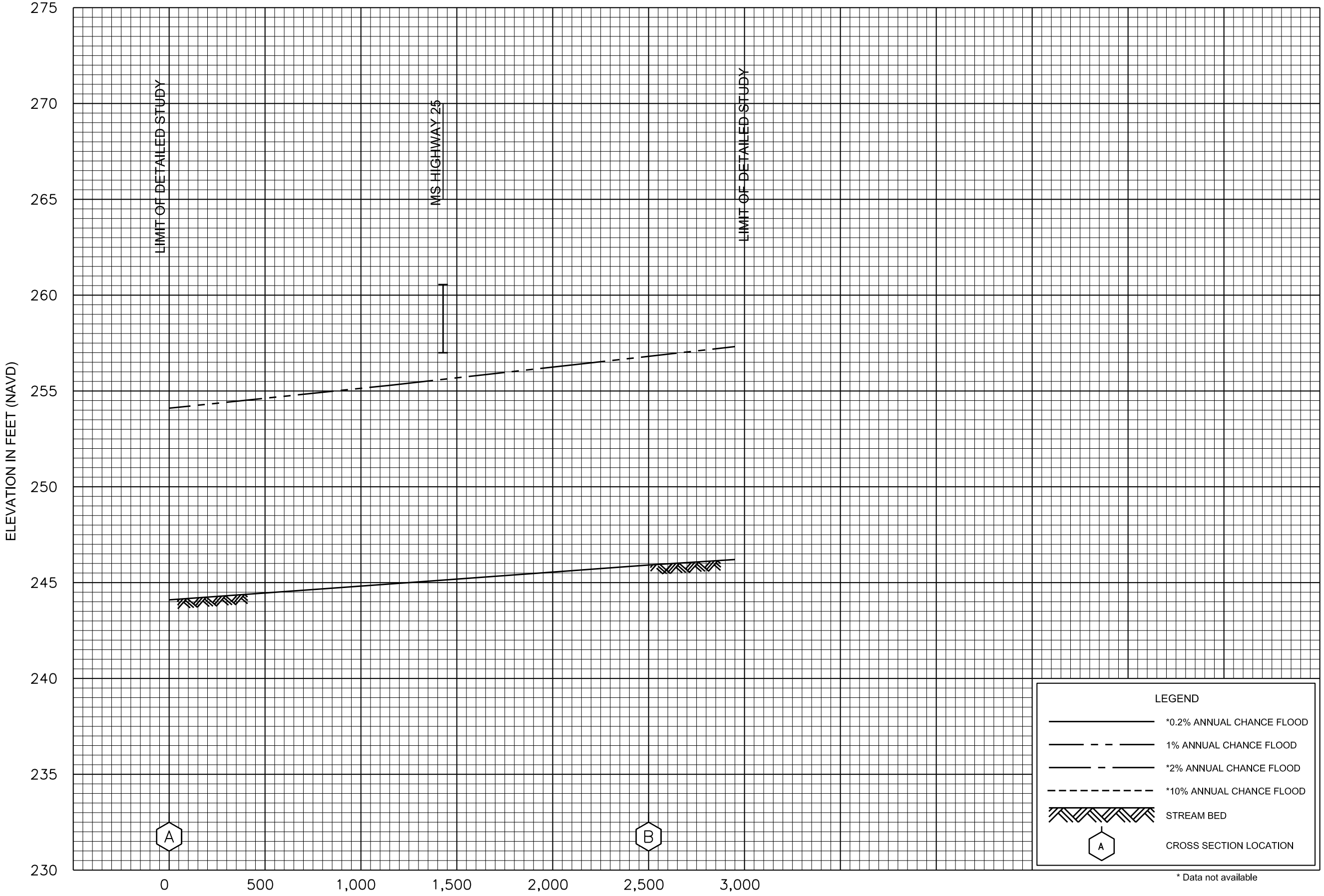
FLOOD PROFILES

SPRINGERS BRANCH

FEDERAL EMERGENCY MANAGEMENT AGENCY

OKTIBBEHA COUNTY, MS

AND INCORPORATED AREAS



FLOOD PROFILES

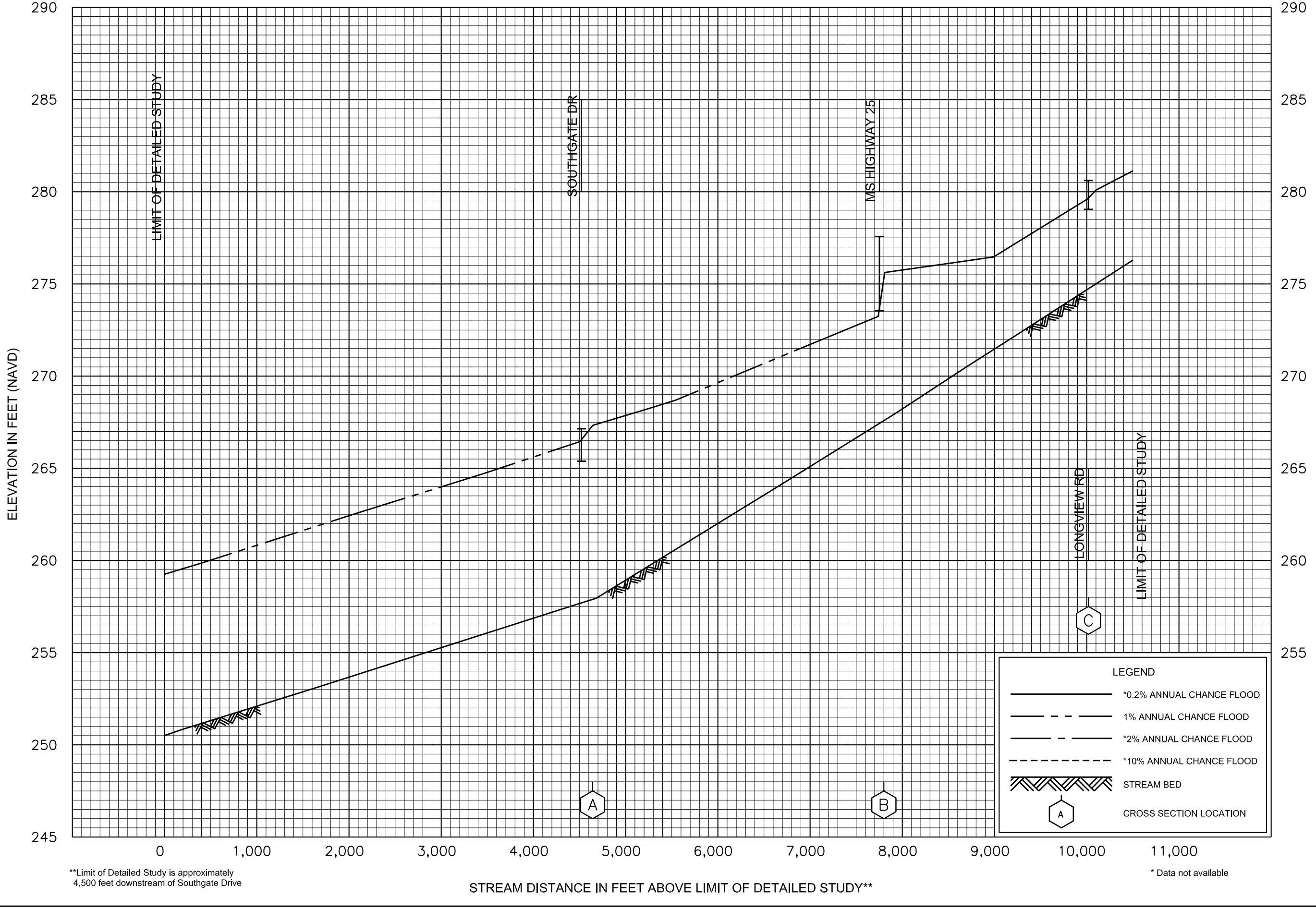
TALKING WARRIOR CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

OKTIBBEHA COUNTY, MS
AND INCORPORATED AREAS

TOBACCO JUICE CREEK

FLOOD PROFILES



FEDERAL EMERGENCY MANAGEMENT AGENCY

OKTIBBEHA COUNTY, MS
AND INCORPORATED AREAS