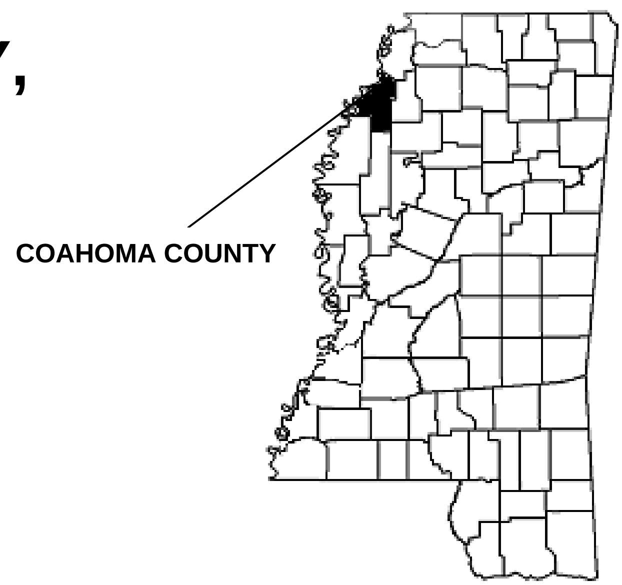
FLOOD INSURANCE STUDY

COAHOMA COUNTY, MISSISSIPPI
AND INCORPORATED AREAS



COMMUNITY NAME	COMMUNITY NUMBER
CLARKSDALE, CITY OF	280039
COAHOMA, TOWN OF	285264
COAHOMA COUNTY (UNINCORPORATED AREAS)	280038
FRIAR'S POINT, TOWN OF	280040
JONESTOWN, TOWN OF	280041
LULA, TOWN OF	280042
LYON, TOWN OF	280043

EFFECTIVE:

Federal Emergency Management Agency

FLOOD INSURANCE STUDY NUMBER
28027CV000A

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) report 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 report may be revised and republished at any time. In addition, part of this FIS report 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 report components.

Selected Flood Insurance Rate Map panels for this community contain information that was previously shown on the corresponding Flood Boundary and Floodway Map panels (e.g., floodways, cross sections). In addition, former flood hazard zone designations have been changed as follows:

Old Zone(s)	New Zone
A1 – A30	AE
B	X
C	X

Initial Countywide FIS Report Effective Date:

Revised Countywide FIS Report Dates:

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FLOOD INSURANCE STUDY
COAHOMA 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 Coahoma County, Mississippi, including the City of Clarksdale, the Towns of Coahoma, Friars Point, Jonestown, Lula, and Lyon, and unincorporated areas of Coahoma County (hereinafter referred to collectively as Coahoma 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 Coahoma 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.

April 17, 1995, Coahoma County (Unincorporated Areas) FIS

In the original study, the hydrologic and hydraulic analyses were prepared by Smith and Sanders, Inc., for the Federal Insurance Administration (FIA), under Contract No. H-4057. That work was completed in October 1977.

In the April 17, 1995, revision, the hydrologic and hydraulic analyses were prepared by Neel-Schaffer, Inc., for the Federal Emergency Management Agency (FEMA), under Contract No. EMW-90-C-3129. This work was completed in April 1993.

September 1979, City of Clarksdale, FIS

The hydrologic and hydraulic analyses for this study were performed by Smith and Sanders, Inc. for the FIA under Contract No. H-4057. This work, which was completed in October 1977, covered all significant flooding sources in the City of Clarksdale.

March 1979, Town of Jonestown FIS

The hydrologic and hydraulic analyses for this study were performed by Smith and Sanders, Inc., for the FIA under Contract No. H-4057. This work, which was completed in October 1977, covered all significant flooding sources in the Town of Jonestown.

This Countywide FIS

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-2008-CA-5883. This study was completed in August 2010.

The digital base map information files were provided by the State of Mississippi. The digital orthophotography was acquired in March 2006, with the imagery processed to a 2-foot pixel resolution.

The digital FIRM was produced using the Mississippi State Plane Coordinate System, West Zone, FIPS ZONE 2302. The horizontal datum was the North American Datum of 1983, GRS 1980 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.

April 17, 1995, Coahoma County (Unincorporated Areas) FIS

For the original study, an initial CCO meeting was held in July 1976, and a final CCO meeting was held on June 27, 1978. Both meetings were attended by representatives of Smith and Sanders, Inc., Coahoma County, and the FIA.

For the April 17, 1995, revision, FEMA notified the county by letter on June 11, 1993, that a revision to the FIS and FIRM would be prepared using the analyses performed by Neel-Schaffer, Inc. A final CCO meeting was held on February 23, 1994, and was attended by representatives of Neel-Schaffer, Inc., Coahoma County, and FEMA.

September 1979, City of Clarksdale FIS

The community base map was obtained from the Mississippi State Highway Department. Identification of streams and areas to be studied were determined at a meeting attended by representatives of the FIA, the City of Clarksdale, and Smith and Sanders, Inc., held in Clarksdale on July 7, 1976.

Other coordination efforts include meetings with the Vicksburg District, U.S. Army Corps of Engineers (USACE), the Yazoo-Mississippi Delta Levee Board, and the U.S. Soil Conservation Service (SCS). Periodic consultations were held with representatives of the FIA including a meeting held at the Office of Smith and Sanders, Inc., on May 16, 1977, to develop methodology for studies to be conducted in Clarksdale and other Delta communities.

The results of the work prepared by Smith and Sanders, Inc., was reviewed at a final coordination meeting attended by representatives of the FIA, the City of Clarksdale, and Smith and Sanders, Inc., on June 27, 1978.

March 1979, Town of Jonestown FIS

The community base map for Jonestown was obtained from the Mississippi State Highway Department and the identification of streams requiring study was made in a meeting attended by representatives of the FIA, the Town of Jonestown, and Smith and Sanders, Inc., in July 1976. Notice of intent to perform a Flood Insurance Study in Jonestown was published in a local newspaper on three separate occasions in February and March, 1977.

Other coordination activities undertaken in connection with this study include contacts and meetings with the Vicksburg District, USACE, the U.S. Soil Conservation Service, representatives from the FIA, the Town of Jonestown, and Smith and Sanders, Inc.

On June 27, 1978, the results of the work performed by Smith and Sanders, Inc., was reviewed at a final coordination meeting attended by representatives of the FIA, the Town of Jonestown, and Smith and Sanders, Inc.

This Countywide FIS

For this countywide FIS, the Project Scoping Meeting was held on August 26, 2008 in Clarksdale, MS. Attendees for these meetings included representatives from the Mississippi Department of Environmental Quality, Mississippi Emergency Management Agency, FEMA National Service Provider, Coahoma County, the City of Clarksdale, the Towns of Friars Point and Jonestown, 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 Coahoma County, Mississippi, and its incorporated communities listed in Section 1.1 Several flooding sources within the county were studied by approximate methods. Approximate analyses are 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 and the State of Mississippi.

April 17, 1995, Coahoma County (Unincorporated Areas) FIS

In the original study, the following streams were studied by detailed methods: the Mississippi River, the Big Sunflower River, and the Little Sunflower River.

In the April 15, 1995, revision, the following streams were studied by detailed methods: Oxbow Bayou, from a point approximately 300 feet upstream of its confluence with Cassidy Bayou to a point approximately 1,000 feet upstream of Laney Road; and Lake Bayou, from its confluence with Oxbow Bayou to a point approximately 0.6 miles upstream.

September 1979, City of Clarksdale FIS

Floods caused by the overflow of the Big Sunflower River and Little Sunflower River were studied in detail. Flooding on Mill Creek and shallow flooding in other parts of the city caused by ponding of runoff and inadequate drainage structures were studied by approximate methods.

March 1979, Town of Jonestown FIS

Floods caused by the overflow of Moore Bayou were studied in detail. The area studied in detail was chosen with consideration given to development and proposed construction expected to occur within the next five years, until 1983.

This Countywide FIS

In this countywide study, Mill Creek was studied by detailed methods from its confluence with the Little Sunflower River to a point approximately 2.4 miles upstream of the confluence with the Little Sunflower River. Moore Bayou in Jonestown was restudied to determine a stillwater elevation due to it being cutoff by the Soil Conservation Service (SCS).

Several flooding sources within the county were studied by approximate methods. Approximate analyses are used to study those areas having a low developmental potential or minimal flood hazards. The scope and methods of study were proposed to, and agreed upon, by FEMA and the State of Mississippi.

Floodplain boundaries of streams that have been previously studied by detailed methods were redelineated based on best available topographic information.

2.2 Community Description

Formed in 1836 and named for the Indian word meaning “red panther”, Coahoma County is a 536 square mile county located in northwestern Mississippi and is bordered on the west by the Mississippi River and Philips County, Arkansas; on the south by Bolivar and Sunflower Counties, Mississippi; on the north by Tunica County, Mississippi; and on the east by Quitman and Talahatchie Counties, Mississippi. Coahoma County is served by U.S. Highway 49, 61, and 278; State Highways 1, 6, and 322; and the Canadian National Railroad. The 2009 population was reported to be 26,936 (U.S. Census Bureau, 2010).

The climate of Coahoma County is influenced mainly by its subtropical latitude, the huge landmass to the north, its proximity to the warm waters of the Gulf of Mexico, and the prevailing southerly winds. The minimum mean temperature is 40.5 ^{o}F in January, and the maximum mean temperature is 82.0 ^{o}F in July. Moisture is ample throughout the year, often with prolonged rainfall in the winter and spring due to warm air from the Gulf of Mexico overriding cooler air masses near the ground surface. The mean annual precipitation is 54 inches (NOAA Southern Regional Climate Center, 2010).

2.3 Principal Flood Problems

Prior to development of modern levee systems, the Mississippi Delta was subject to almost yearly flooding. The floods of 1844, 1849, 1850, 1882, and 1927 created havoc throughout the entire Delta and caused great loss of life, property, and livestock. Today, Coahoma County is protected by the levee system that was built along the Mississippi and Yazoo Rivers.

Only minor damage occurs in the county as a result of flooding of the Big Sunflower River and its tributaries. According to a flood hazard report for Clarksdale and surrounding area, prepared by the USACE in 1970, the 1.0-percent annual chance flood on the Big Sunflower River is contained within the banks, from approximately Second Street in north central Clarksdale to a point approximately eight miles south of the southern corporate limits of the city (USACE, 1970). Some overbank flooding occurs north of Clarksdale, along the Big Sunflower River, Little Sunflower River, and Mill Creek.

Principal flood problems in Coahoma County result from the terrain. Flows in the flat Delta area occur over alluvial fans, and over broad areas. Watercourses have minimal capacity; flows often cross the individual drainage divides; and the direction of overflow is often indeterminate, variable, or unpredictable. All these factors combine to cause shallow flooding in the area.

Periodic shallow flooding occurs in certain portions of the county in proximity to the City of Clarksdale because of inadequate drainage structures and outlet ditches. In Lane Acres, a subdivision located approximately three miles north of Clarksdale on U.S. Highway 61, home owners report periodic flooding of streets and slow runoff of storm water from yards. However, no damage due to flooding was reported in this area.

2.4 Flood Protection Measures

Mississippi River flooding has been reduced by channel improvements and regulation of flow through upstream reservoirs. Levees have been placed along the Mississippi River along the entire western county boundary. The criteria used to evaluate protection against the 1-percent-annual-chance flood are 1) adequate design, including freeboard, 2) structural stability, and 3) proper operation and maintenance. Levees that do not protect against the 1-percent-annual-chance flood are not considered in the hydraulic analysis of the 1-percent-annual-chance flood zone.

The Flood Control Act of 1944 authorized major drainage improvements on the Big Sunflower River and tributaries. As a result, channel improvement work on the Big Sunflower River was begun by the USACE in 1947 at the mouth of the Big Sunflower River in Sharkey County, Mississippi. The project consists primarily of clearing and snagging the channels to increase their capacity. The Big Sunflower River channel in Clarksdale was improved during 1964-1965. According to "Effects of Major Drainage Works – Big Sunflower River Basin" (USACE, 1965), the drainage improvement project on the Big Sunflower River has lowered stages, increased channel capacity and reduced the duration of overbank flooding on the stream. Maintenance of the project within Clarksdale is performed by the Yazoo-Mississippi Delta Levee Board.

During 1973 and 1974, storm sewer improvements in the area of Clarksdale east of the Big Sunflower River were made. These improvements significantly reduced damages from shallow flooding in the eastern section of Clarksdale.

In 1973, the SCS undertook a channel improvement project on Moore Bayou. This project included channel clearing, enlargement, and improvement of drainage structures. Additionally, a street improvement project in 1976 improved local drainage. More recently, a channel cutoff on Moore Bayou was built to divert flood flows east before entering the corporate limits of Jonestown. The isolated bayou is still subject to localized runoff, but the base flood elevation has been reduced.

A levee constructed by Coahoma County exists around a small subdivision near the mouth of Oxbow Bayou.

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, 1995, Coahoma County (Unincorporated Areas) FIS

For the Mississippi River, flow frequencies were developed based on statistical analyses, historical floods routings, and model studies. The 0.2 percent annual chance flood frequency discharges and corresponding flood elevations on the Mississippi River within the study area were not determined because of the difficulty analyzing a specified flood frequency of this magnitude in such a large and unique drainage basin. The sequence and severity of meteorological and hydrological events, which could reasonably be expected to occur and cause a major event such the 0.2 percent annual chance flood, would involve the consideration of storm transpositions, storm adjustments, seasonal variations, storm mechanics, and the determination of the feasibility of the occurrence of events, and the determination of flows under natural conditions and as regulated by reservoirs at key stations on the tributaries and on the main Mississippi River. The Mississippi River project flood studies were used in the FIS as an alternative to the 0.2 percent annual chance flood (USACE, 1976). While no specific return period is assigned to this project flood, typically it is greater than the 1.0 percent annual chance flood.

Gaging stations maintained by the USACE on the Big Sunflower River at the City of Clarksdale and Harvey's Chapel, located approximately 15 miles downstream of Clarksdale, were the principle sources of data used for defining peak stage-frequency relationships for the Big and Little Sunflower Rivers. The gage at Clarksdale has been operated continuously since 1937, and the gage at Harvey's Chapel has been operated continuously since 1948. Values from the 10- and 1.0 percent annual chance peak stages at these stations were obtained from a log-Pearson Type III distribution of annual peak stage data. These analyses were performed according to the Water Resource Council's Bulletin No. 17 (Water Resources Council, 1976). Discharge-frequency relationships were not developed for the Big and Little Sunflower Rivers because the flood hazard data for the study of these streams could be obtained from stage-frequency relationships at gaging stations along the streams and from high water marks taken along the streams during recent years.

For Oxbow and Lake Bayous, the hydrologic analysis was performed by estimating the magnitude and frequency of the 10-, 2.0-, 1.0-, and 0.2-percent annual chance floods using the regression equations developed by the U.S. Geological Survey (USGS). The USGS method estimates the peak discharges developed for rural streams and makes adjustments with the gage data. The equations from rural streams applicable to Coahoma County, Mississippi (Dept. of the Interior, 1991):

$$RQ_{10} = 205A^{0.96} * S^{0.42} * L^{-0.56}$$
$$RQ_{2.0} = 232A * S^{0.52} * L^{-0.57}$$
$$RQ_{1.0} = 236A * S^{0.57} * L^{-0.55}$$
$$RQ_{0.2} = 249A * S^{0.64} * L^{-0.55}$$

where: RQ_T = peak discharge, in cubic feet per second (cfs), for a flood frequency of magnitude "T" years

A = drainage area, in square miles
S = channel slope, in feet per mile, between points located at 10 and 85 percent of the main channel length
L = stream basin length, in miles, from the point of discharge to the drainage divide

Because the area is primarily rural and agricultural, adjustment of discharges for urbanization was considered unnecessary.

Some hydrologic data were available from the Mississippi District of the USGS. Discharge measurements were made on Cassidy Bayou at State Route 6, which is approximately 400 feet downstream of the confluence of Oxbow and Cassidy Bayous, on February 19, 1991. According to the USGS, however, "much uncertainty still exists for both the flood discharges and elevations at this site," because of the behavior of these typical Delta streams; it is difficult to predict the direction or magnitude of flows in the network of tributaries, which are interconnected.

A flood frequency curve was developed by the USGS for this site. The contributing drainage area used was 7.13 square miles; the stream basin length used was 6.7 miles; and the channel slope used was 2.0 ft/mi. The 2.0- and 1.0-percent annual chance floods from this curve are 812 and 888 cfs, respectively, which compares favorable to the data used in the FIS.

September 1979, City of Clarksdale FIS Analyses

No hydrologic analyses were carried out in the community.

March 1979, Town of Jonestown FIS Analyses

The detailed study of Moore Bayou in Jonestown was based on hydrologic and hydraulic data developed by the U.S. Soil Conservation Service for the channel improvement project performed in 1973. The Cypress Creek Formula (Soil Conservation Service, 1971), employed by many engineers as a means of determining runoff from relatively flat watersheds, was used by the Soil Conservation Service in developing the peak discharge-frequency data fro the Moore Bayou project. Instantaneous peak discharge was computed for the 24-hour rainfall periods. The 10- and 1.0-percent annual chance discharges were selected for use in the Flood Insurance Study.

This Countywide FIS Analysis

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 as necessary. The 10-, 2.0, 1.0- and 0.2-percent annual chance discharges were calculated for Mill Creek using the USGS regional regression equations. The cutoff of Moore Bayou by the SCS has limited the flow in Jonestown to localized runoff. Therefore, the flows from the March 1979, Town of Jonestown FIS no longer apply and have been removed.

TABLE 1. SUMMARY OF DISCHARGES

FLOODING SOURCE AND LOCATION	DRAINAGE AREA (sq. mi.)	PEAK DISCHARGES (cfs)			
		10-percent	2-percent	1-percent	0.2-percent
LAKE BAYOU					
At Mouth	1.10	290	380	430	520
At Stream Mile 0.81	0.80	280	370	410	490
MILL CREEK					
At Confluence With Little Sunflower River	1.66	465	664	772	982
At Friars Point Road	1.53	455	651	757	965
At North Desoto Avenue	1.11	391	562	656	840
Approximately 2,500 feet downstream of Barkley Road	0.28	165	220	253	303
OXBOW BAYOU					
At Mouth	6.09	570	740	810	970
At a point approximately 720 feet upstream of its confluence with Cassidy Bayou	5.27	520	680	740	880
At a point approximately 50 feet downstream of Laney Road	4.17	420	540	590	700
At Stream Mile 1.61	3.54	360	450	490	580

* Data Not 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 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.

April 17, 1995, Coahoma County (Unincorporated Areas) FIS Analyses

Hydraulic analyses on the Mississippi River for floods of the selected recurrence intervals were made from peak stage frequency relationships developed from gages at Helena, Arkansas, and Memphis, Tennessee, and from physical model tests conducted at the USACE Waterways Experiment Station, Vicksburg, Mississippi.

The 10- and 1.0-percent annual chance water surface profiles on the Big and Little Sunflower Rivers were developed from these peak stage-frequency relationships computed at the gaging stations and high-water marks taken along the streams during recent years.

Cross sections for the Oxbow and Lake Bayous were obtained from field surveys. All bridges, dams, and culverts were field surveyed to obtain elevation data and structural geometry.

Water-surface elevations of floods of the selected recurrence intervals for Oxbow and Lake Bayous were computed using the USACE HEC-2 step-backwater computer program (USACE, 1991). Starting water-surface elevations for Oxbow and Lake Bayous were calculated using the slope/area method. Flood profiles were drawn showing computed water-surface elevations for floods of the selected recurrence intervals.

Channel roughness (Manning's "n") used in the hydraulic computations were chosen by field observation. For Oxbow and Lake Bayous, the channel "n" value was 0.050, and the overbank value was 0.100.

September 1979, City of Clarksdale FIS Analyses

Gaging stations maintained by the USACE on the Big Sunflower River at Clarksdale, were the principal sources of data used for defining peak stage-frequency relationships for the streams. The gage at Clarksdale has been operated continuously since 1937 and the gage at Harvey's Chapel has been operated continuously since 1948. Values for the 10- and 1.0-percent annual chance peak stages at these stations were obtained from a log-Pearson Type III distribution of annual peak stage data. These analyses were performed according to "Guidelines for Determining Flood Flow Frequency," Bulletin No. 17 of the Hydrologic Committee, United States Water Resources Council (USACE, 1976). The 10- and 1.0-percent annual chance water surface profiles on the Big Sunflower River and Little Sunflower River were developed from these peak stage-frequency relationships computed at the gaging stations and high water marks taken along the streams during recent years.

Flood boundaries along Mill Creek and boundaries of areas in Clarksdale subject to shallow flooding from ponding of runoff and inadequate drainage structures were approximated from field reconnaissance, recorded information, local accounts and professional judgment.

March 1979, Town of Jonestown FIS Analyses

The cross section data for Moore Bayou upon which the hydraulic computations were made were developed from field measurements and the channel improvement design slopes and channel sections. The location of selected cross sections used in the hydraulic analyses is shown on the Flood Profiles (Exhibit 1).

This Countywide FIS Analysis

Cross section geometries were obtained from a combination of terrain data and field surveys. Bridges and culverts located within the detailed study limits were field surveyed to obtain elevation data and structural geometry. 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. Manning's "n" values for Mill Creek ranged from 0.05 to 0.15 for the overbanks and 0.04 for the channel.

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 4.0 computer program (USACE, 2008). The model was run for the 10-, 2.0-, 1.0-, and 0.2-percent-annual-chance storm for detailed studies. For enhanced approximate studies, only the 1-percent annual-chance flood was run on the models.

Due to the channel cutoff of Moore Bayou in Jonestown by the SCS, Moore Bayou now only experiences backwater flow from the Moore Bayou Cutoff. The backwater elevation that impacts Moore Bayou is shown below in Table 2.

TABLE 2. SUMMARY OF STILLWATER ELEVATIONS

FLOODING SOURCE AND LOCATION	ELEVATION (Feet)			
	10-percent	2-percent	1-percent	0.2-percent
Moore Bayou				
At Coldwater River Road	*	*	170.0	*

* Data Not Available

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.

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 -0.17 feet to the NAVD88 elevation. The 0.17 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, 1963). The BFE's 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. Between cross sections, the boundaries were interpolated using 5-foot contour intervals developed from the March 2006 2-foot digital orthophotography provided by the State of Mississippi.

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 the 5-foot contours developed from the March 2006 2-foot digital orthophotography from the State of Mississippi, then refined using detailed hydrographic data.

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.

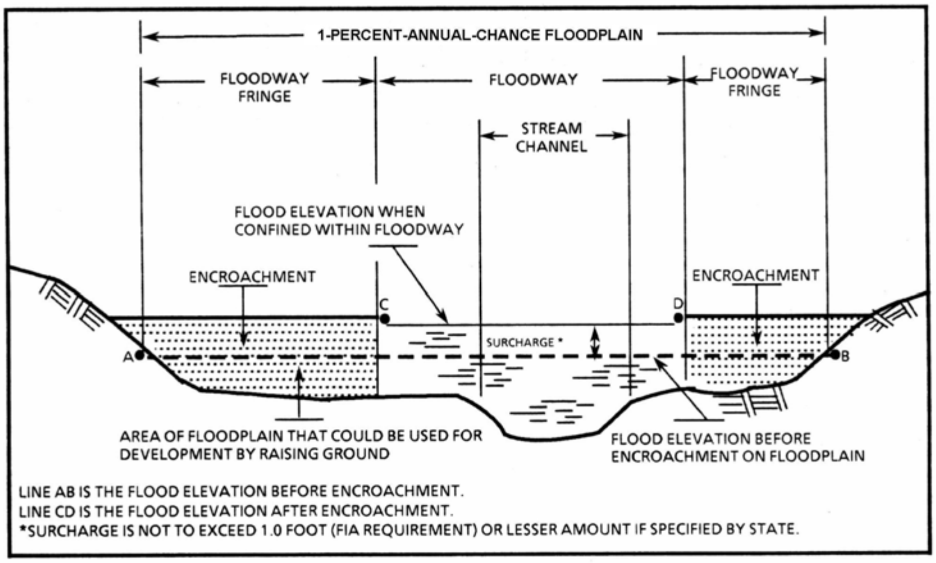
The floodway presented in this FIS report and on the FIRM was computed for certain stream segments on the basis of equal-conveyance reduction from each side of the floodplain. Floodway widths were computed at cross sections. Between cross sections, the floodway boundaries were interpolated. The results of the floodway computations have been tabulated for selected cross sections of detailed study streams (Table 2). 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 2, “Floodway 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 2. 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.

Floodways were calculated for Lake Bayou, Mill Creek, and Oxbow Bayou.



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
LAKE BAYOU								
A	620	371	1,231	0.3	158.7	157.0[2]	158.0	1.0
B	3,285	357	1,342	0.3	158.7	157.2[2]	158.2	1.0
C	5,410	778	703	0.6	158.7	157.8[2]	158.5	0.7
MILL CREEK								
A	1,521	250	2,020	0.4	153.8	153.1[3]	153.3	0.2
B	3,022	235	2,184	0.9	153.8	153.2[3]	153.3	0.2
C	3,185	330	3,220	0.7	156.6	156.6	157.0	0.4
D	5,273	198	2,065	0.4	156.6	156.6	157.0	0.4
E	7,493	226	960	1.8	156.7	156.7	157.1	0.4
F	8,503	90	241	3.8	157.0	157.0	157.4	0.4
G	8,574	140	548	2.1	159.9	159.9	160.0	0.1
H	9,424	57	192	1.4	160.0	160.0	160.1	0.1
I	11,351	88	112	5.6	161.3	161.3	161.4	0.1
J	11,422	88	88	6.8	161.9	161.9	162.1	0.2
K	11,954	200	504	0.7	162.4	162.4	162.9	0.5

[1] FEET ABOVE MOUTH
[2] ELEVATION COMPUTED WITHOUT CONSIDERATION OF BACKWATER EFFECTS FROM OXBOW BAYOU
[3] ELEVATION COMPUTED WITHOUT CONSIDERATION OF BACKWATER EFFECTS FROM BIG SUNFLOWER RIVER

TABLE 3

FEDERAL EMERGENCY MANAGEMENT AGENCY

COAHOMA COUNTY, MS AND INCORPORATED AREAS

FLOODWAY DATA

LAKE BAYOU – MILL 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
OXBOW BAYOU								
A	1,030	148	711	1.1	157.9	157.9	158.8	0.9
B	3,970	300	1,500	0.5	158.4	158.4	159.3	0.9
C	7,110	164	559	1.1	159.7	159.7	160.6	0.9
D	11,355	129	517	1.0	160.8	160.8	161.8	1.0
E	13,540	278	996	0.5	161.1	161.1	162.1	1.0

[1] STREAM DISTANCE IN FEET ABOVE CONFLUENCE WITH CASSIDY BAYOU

TABLE 3

FEDERAL EMERGENCY MANAGEMENT AGENCY

COAHOMA COUNTY, MS AND INCORPORATED AREAS

FLOODWAY DATA

OXBOW 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 Coahoma 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 3, "Community Map History."

COMMUNITY NAME	INITIAL IDENTIFICATION	FLOOD HAZARD BOUNDARY MAP REVISIONS DATE	FIRM EFFECTIVE DATE	FIRM REVISIONS DATE
City of Clarksdale	June 7, 1974	June 18, 1976	March 4, 1980	--
Coahoma County (Unincorporated Areas)	October 21, 1977	--	February 1, 1980	April 17, 1995
Town of Coahoma	--	--	--	--
Town of Friars Point	June 28, 1974	July 23, 1976	August 19, 1987	--
Town of Jonestown	March 3, 1976	--	September 28, 1979	--
Town of Lula	September 6, 1974	June 18, 1976	August 1, 1986	
Town of Lyon	August 30, 1974	--	June 25, 1976	

TABLE 4

FEDERAL EMERGENCY MANAGEMENT AGENCY

COAHOMA COUNTY, MS

AND INCORPORATED AREAS

COMMUNITY MAP HISTORY

7.0 OTHER STUDIES

Information pertaining to revised and unrevised flood hazards for each jurisdiction within Coahoma 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 Coahoma County and should be considered authoritative for purposes of the NFIP.

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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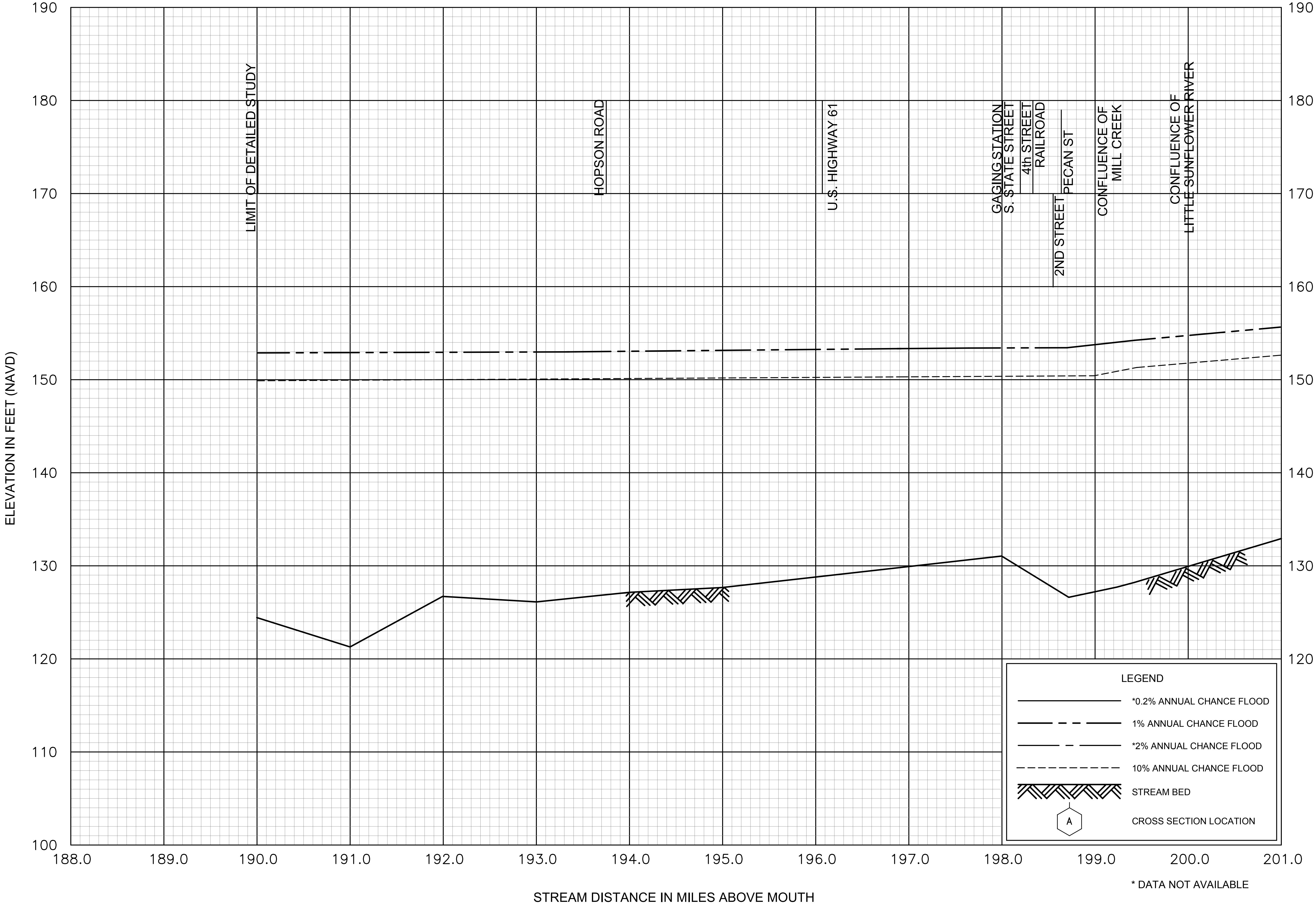


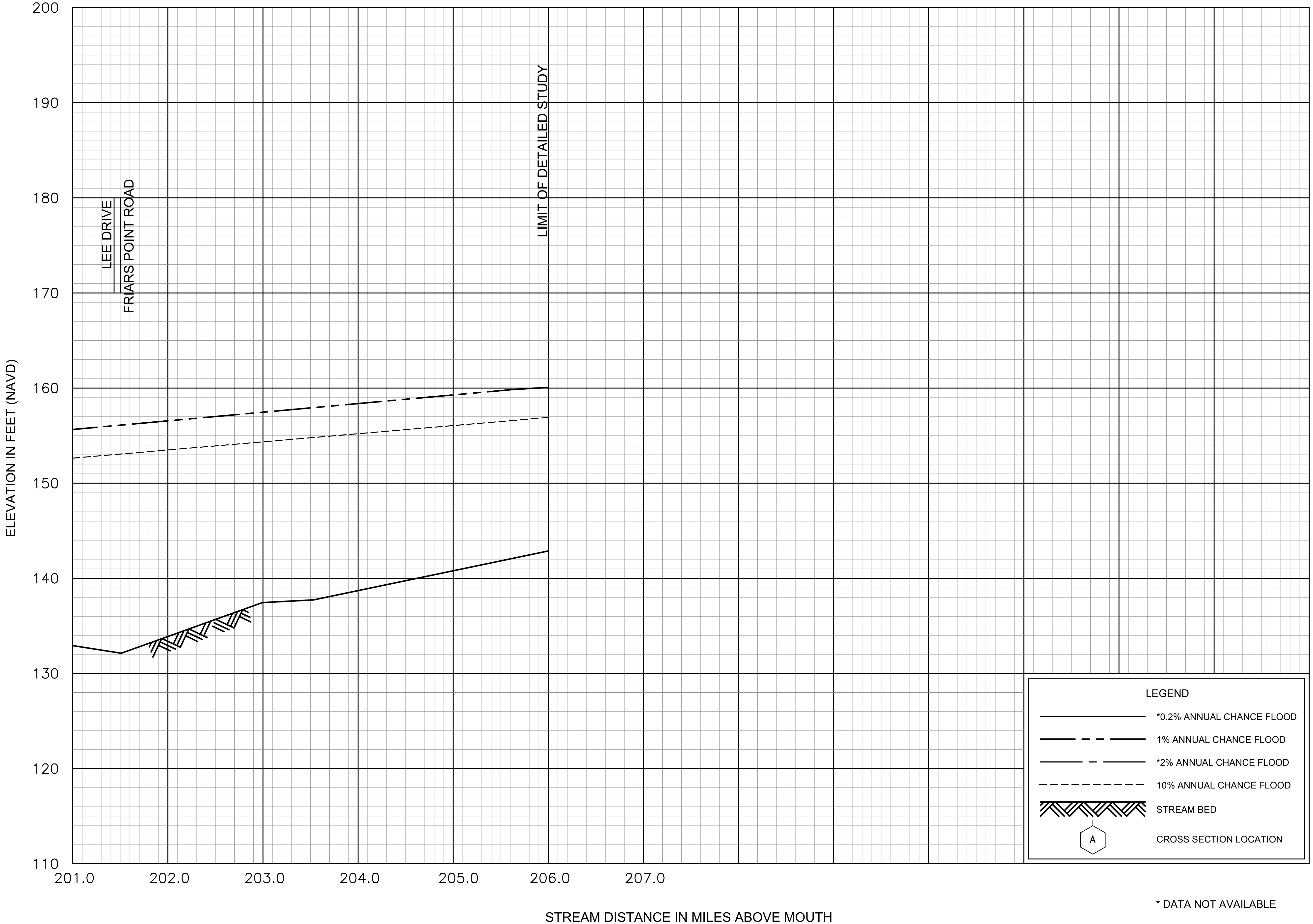
FLOOD PROFILES

BIG SUNFLOWER RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

COAHOMA COUNTY, MS
AND INCORPORATED AREAS

01P



* DATA NOT AVAILABLE

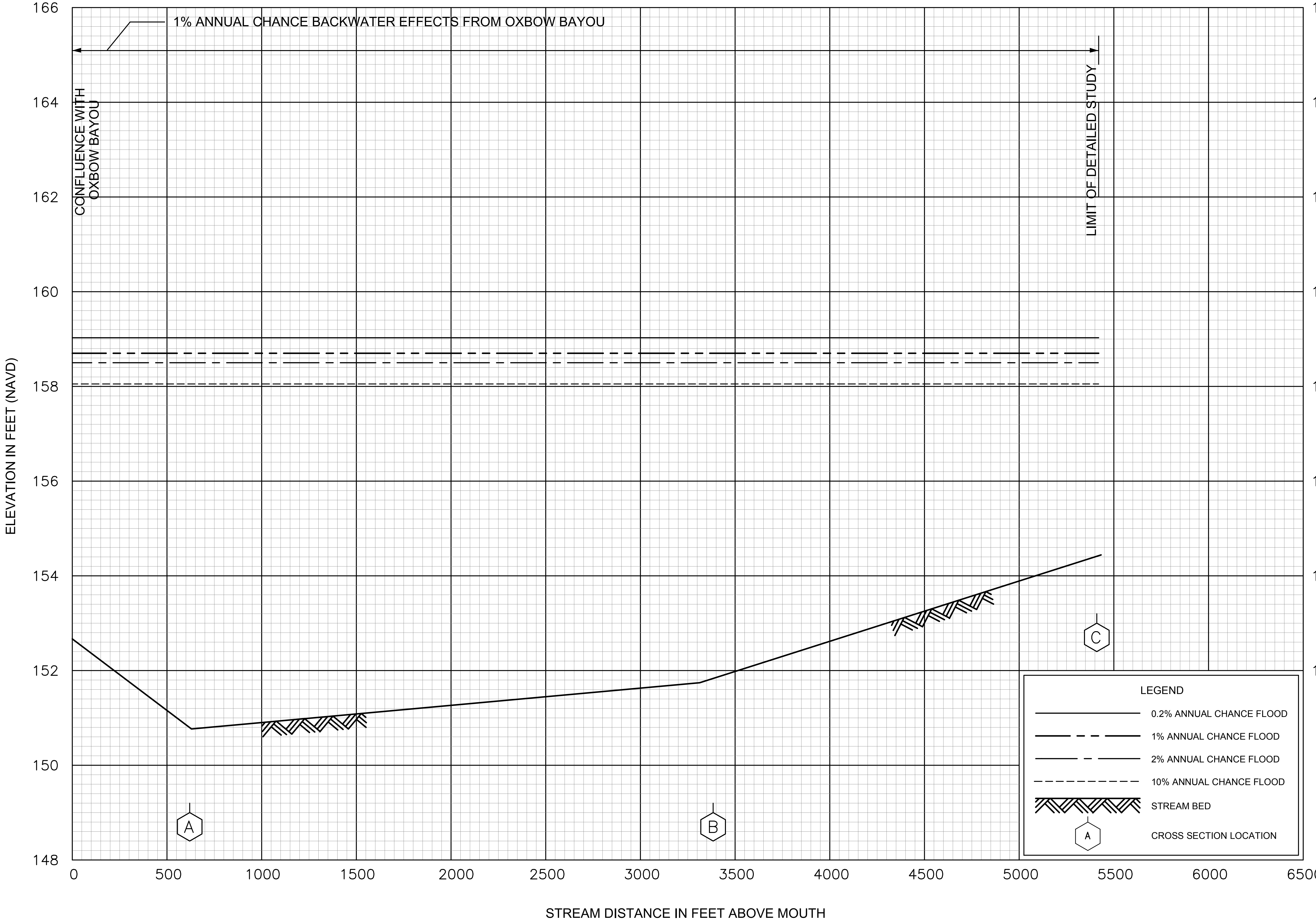
FLOOD PROFILES

BIG SUNFLOWER RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

COAHOMA COUNTY, MS
AND INCORPORATED AREAS

02P



FLOOD PROFILES

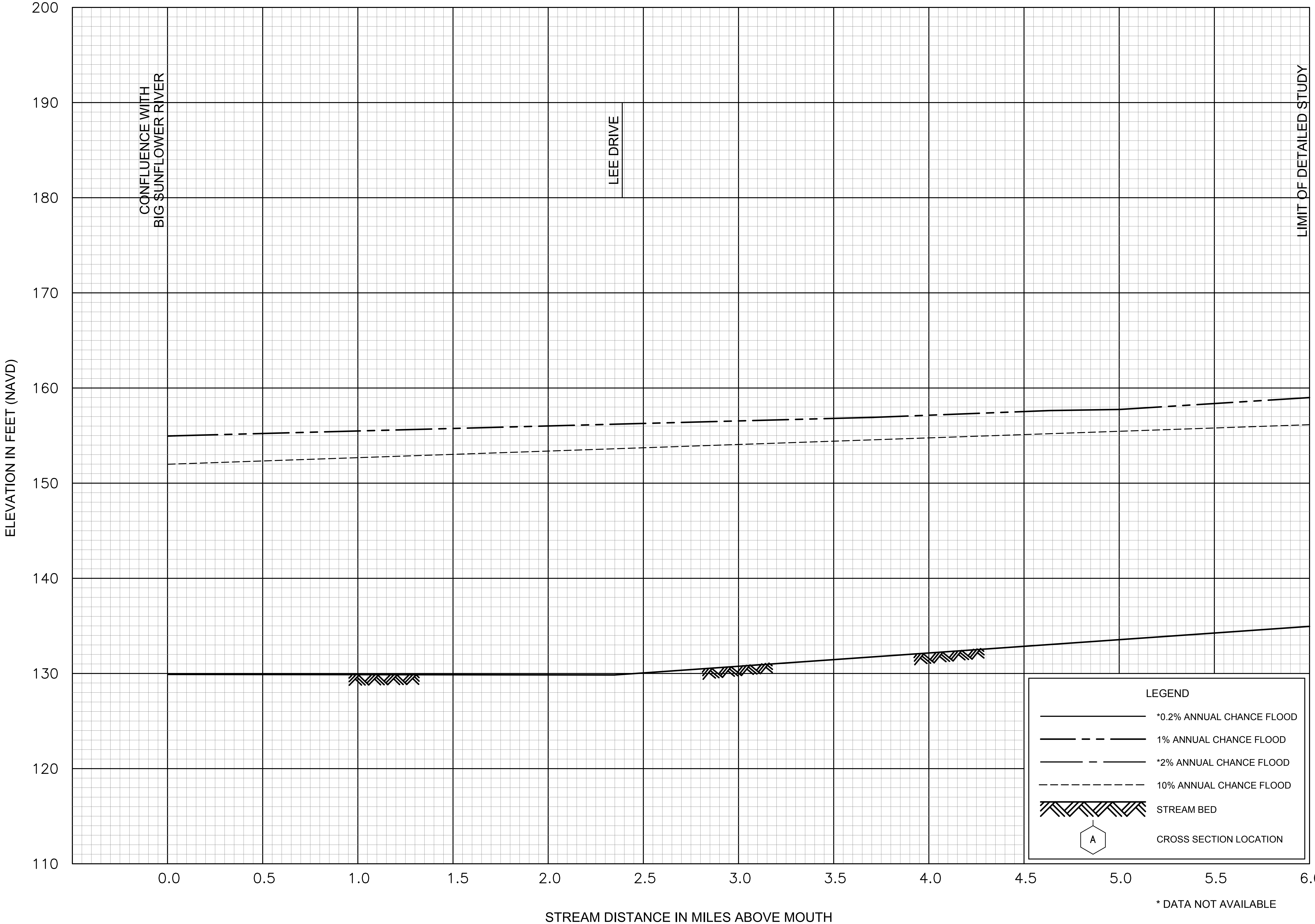
LAKE BAYOU

FEDERAL EMERGENCY MANAGEMENT AGENCY

COAHOMA COUNTY, MS

AND INCORPORATED AREAS

03P



FLOOD PROFILES

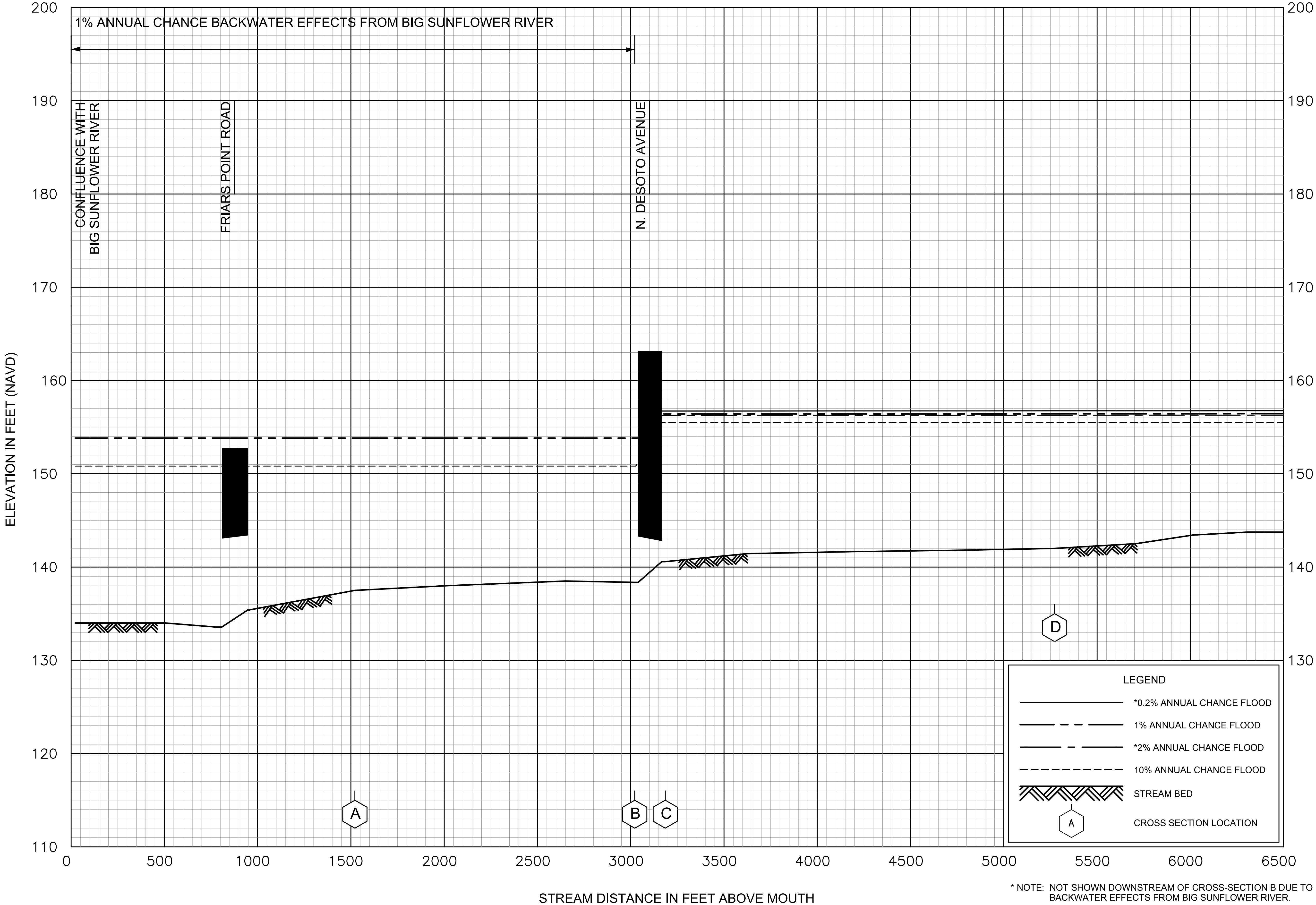
LITTLE SUNFLOWER RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

COAHOMA COUNTY, MS

AND INCORPORATED AREAS

04P



* NOTE: NOT SHOWN DOWNSTREAM OF CROSS-SECTION B DUE TO BACKWATER EFFECTS FROM BIG SUNFLOWER RIVER.

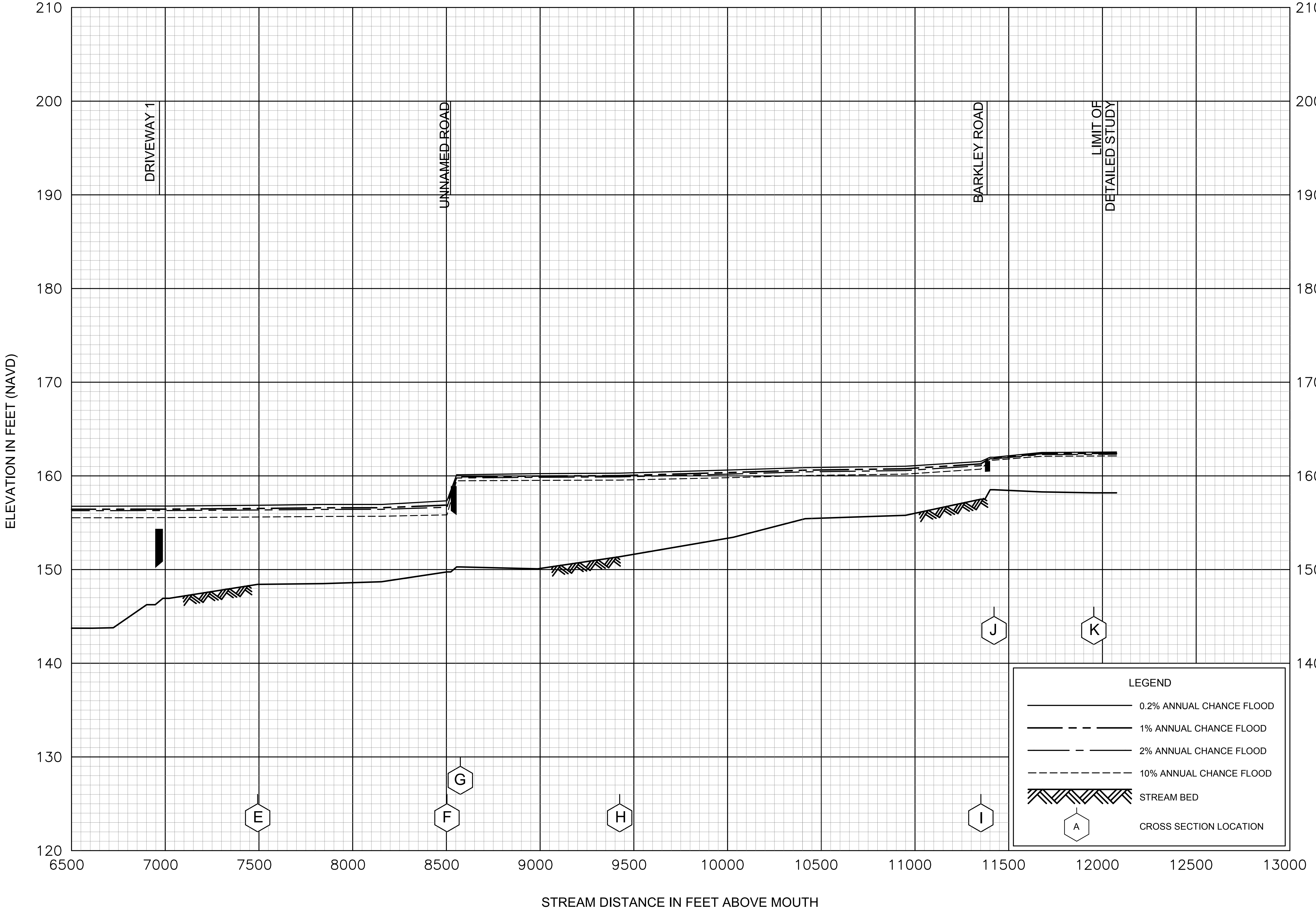
FLOOD PROFILES

MILL CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

COAHOMA COUNTY, MS
AND INCORPORATED AREAS

05P



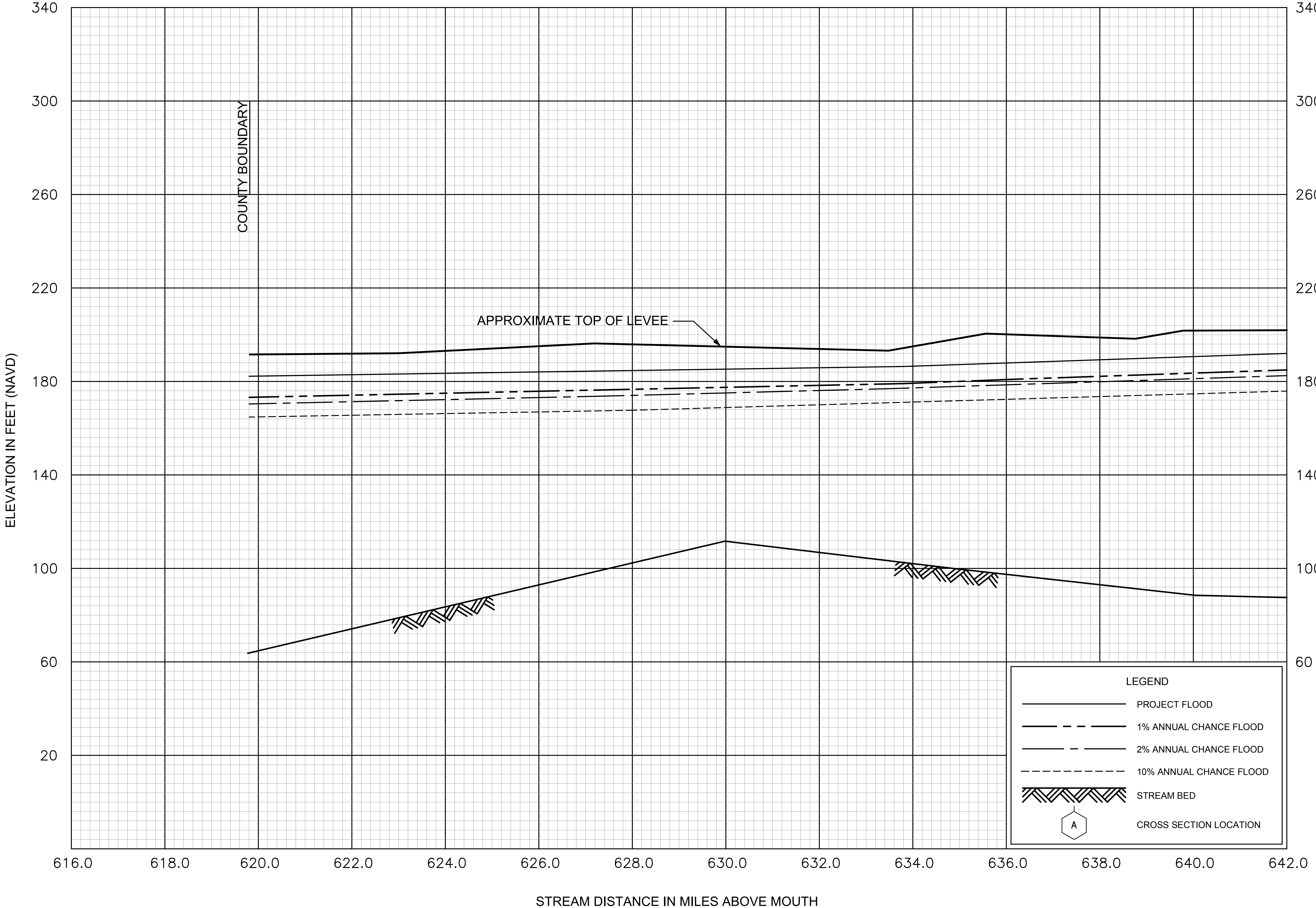
FLOOD PROFILES

MILL CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

COAHOMA COUNTY, MS
AND INCORPORATED AREAS

06P



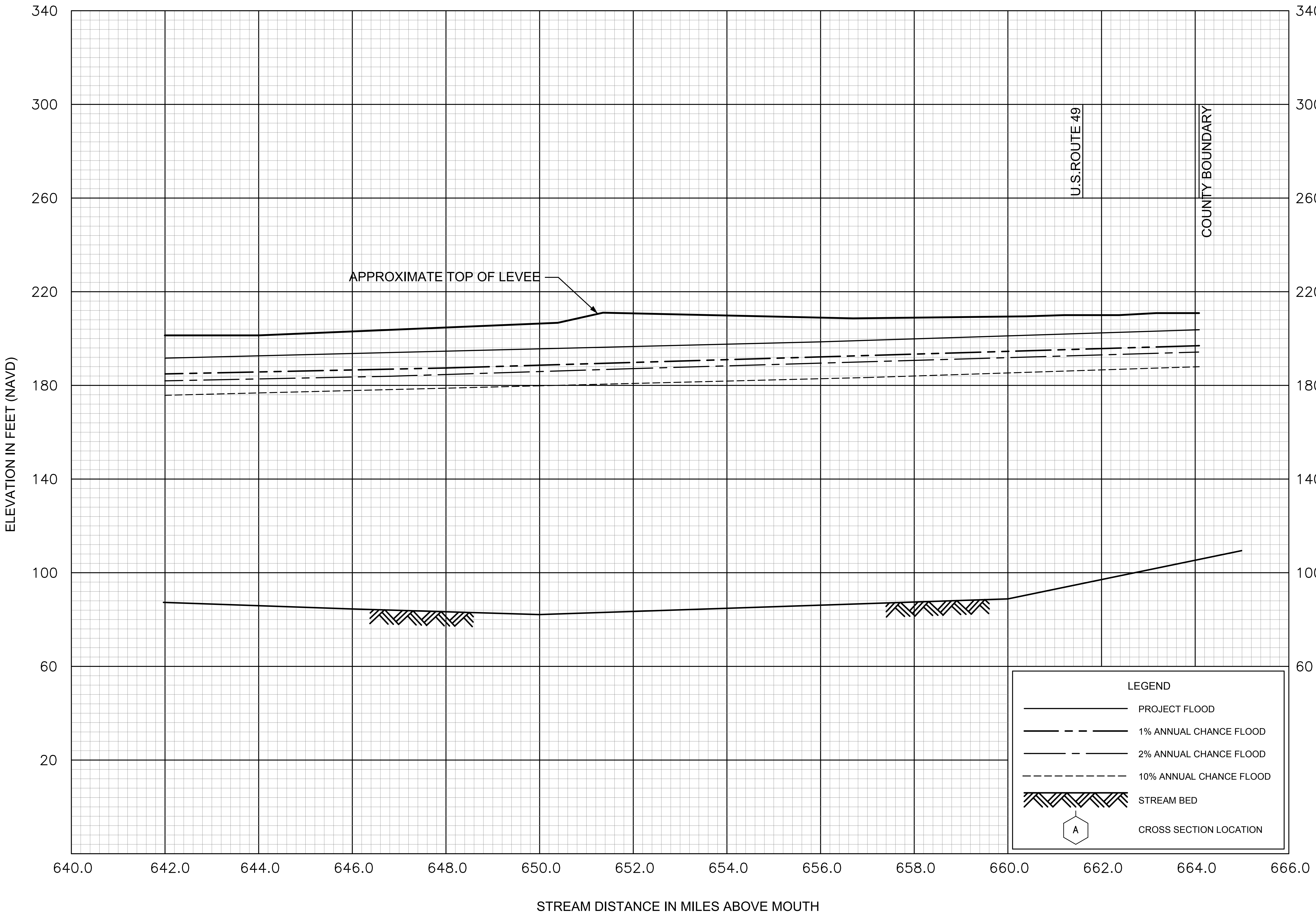
FLOOD PROFILES

MISSISSIPPI RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

COAHOMA COUNTY, MS
AND INCORPORATED AREAS

07P



FLOOD PROFILES

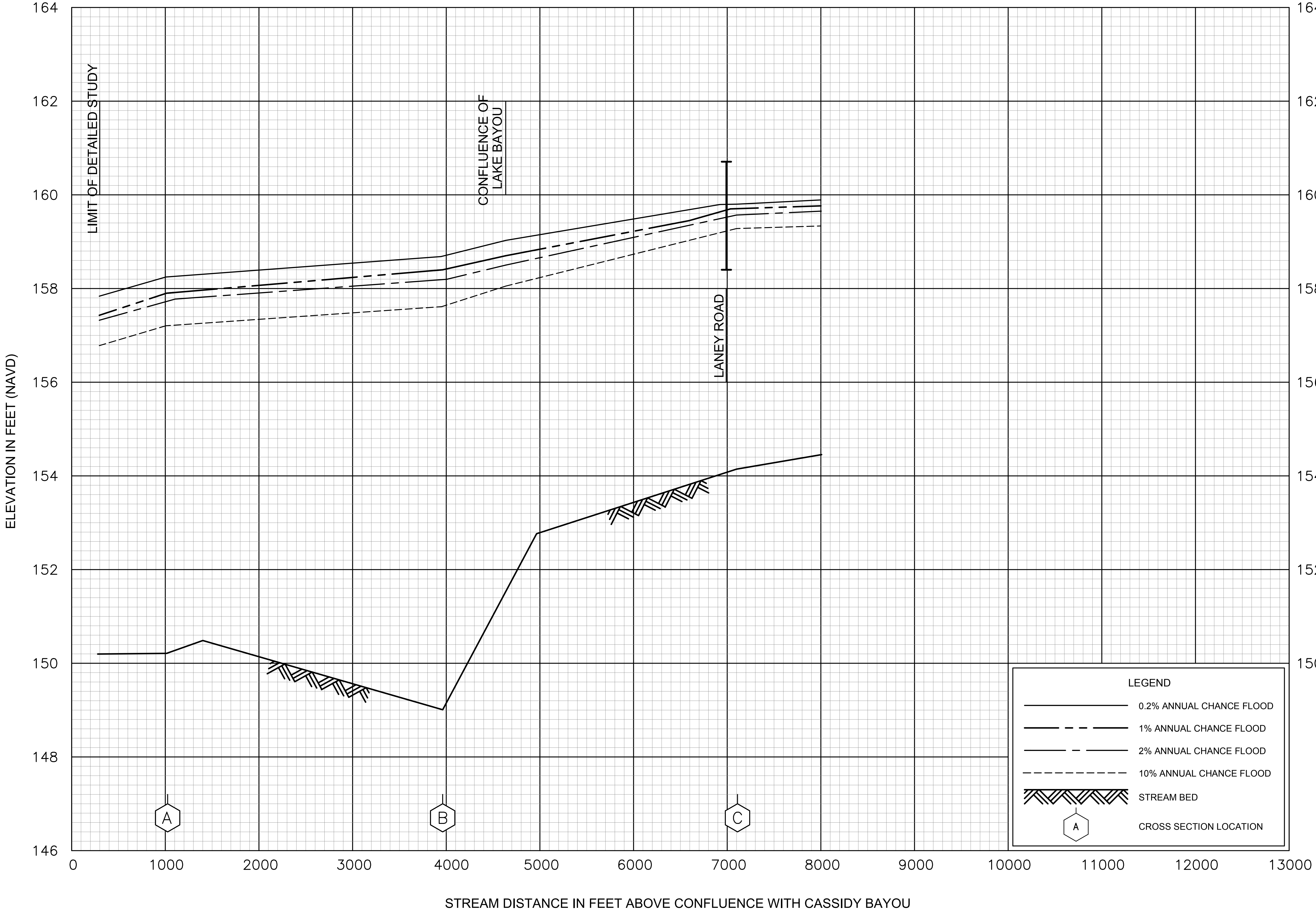
MISSISSIPPI RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

COAHOMA COUNTY, MS

AND INCORPORATED AREAS

08P



FLOOD PROFILES

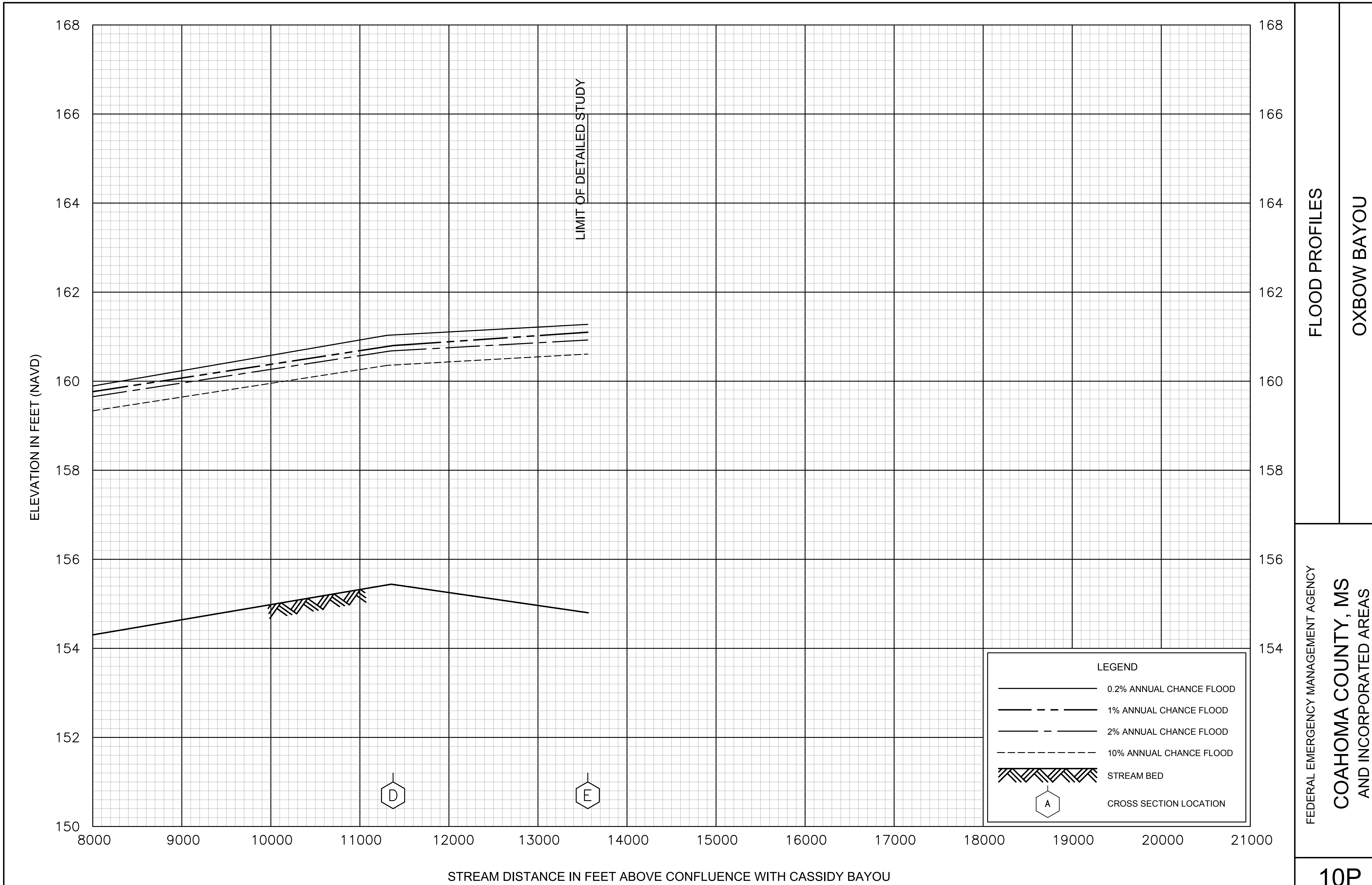
OXBOW BAYOU

FEDERAL EMERGENCY MANAGEMENT AGENCY

COAHOMA COUNTY, MS

AND INCORPORATED AREAS

09P



168
166
164
162
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152
150
ELEVATION IN FEET (NAVD)
LIMIT OF DETAILED STUDY
D
E
8000
9000
10000
11000
12000
13000
14000
15000
16000
17000
18000
19000
20000
21000
STREAM DISTANCE IN FEET ABOVE CONFLUENCE WITH CASSIDY BAYOU
LEGEND
0.2% ANNUAL CHANCE FLOOD
1% ANNUAL CHANCE FLOOD
2% ANNUAL CHANCE FLOOD
10% ANNUAL CHANCE FLOOD
STREAM BED
A
CROSS SECTION LOCATION
FLOOD PROFILES
OXBOW BAYOU
FEDERAL EMERGENCY MANAGEMENT AGENCY
COAHOMA COUNTY, MS
AND INCORPORATED AREAS
10P