FLOOD INSURANCE STUDY

COLUMBIA COUNTY, FLORIDA
AND INCORPORATED AREAS

COMMUNITY NAME	COMMUNITY NUMBER
COLUMBIA COUNTY (UNINCORPORATED AREAS)	120070
FORT WHITE, TOWN OF	120349
LAKE CITY, CITY OF	120406

PRELIMINARY:

Federal Emergency Management Agency

FLOOD INSURANCE STUDY NUMBER
12023CV000A

NOTICE TO
FLOOD INSURANCE STUDY USERS

Communities participating in the National Flood Insurance Program 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:

Revised Countywide FIS Date:

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COLUMBIA COUNTY, FLORIDA AND INCORPORATED AREAS

1.0 INTRODUCTION

1.1 Purpose of Study

This countywide Flood Insurance Study (FIS) investigates the existence and severity of flood hazards in, or revises and updates previous FISs / Flood Insurance Rate Maps (FIRMs) for the geographic area of Columbia County, Florida, including: the City of Lake City and the unincorporated areas of Columbia County (hereinafter referred to collectively as Columbia County). The Town of Fort White is not a floodprone community.

This FIS aids in the administration of the National Flood Insurance Act of 1968 and the Flood Disaster Protection Act of 1973. This FIS has developed flood risk data for various areas of the county that will be used to establish actuarial flood insurance rates. This information will also be used by Columbia County to update existing floodplain regulations as part of the Regular Phase of the National Flood Insurance Program (NFIP), and will also be used 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 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, Columbia County in a countywide format. Information on the authority and acknowledgments for each jurisdiction included in this countywide FIS, as compiled from their previously printed FIS reports, is shown below.

Columbia County (Unincorporated Areas):	the hydrologic and hydraulic analyses from the FIS report dated January 6, 1988, were performed by the U.S. Army Corps of Engineers (USACE), Jacksonville District (the study contractor) for the Federal Emergency Management Agency (FEMA), under Inter-Agency Agreement No. EMW-E-1153, Project Order No. 1. That study was completed in March 1985. Information for

Alligator Lake was taken from the FIS for the City of Lake City (FEMA, 1988).

Lake City, City of:	the hydrologic and hydraulic analyses from the FIS report dated January 6, 1988, were performed by the U.S. Department of the Interior, Geological Survey, Water Resources Division (the study contractor) for FEMA, under Inter-Agency Agreement No. EMW-85-E-1823. That study was completed in June 1986.

For this countywide FIS, revised hydrologic and hydraulic analyses were prepared for FEMA by Dewberry & Davis LLC, as a subcontractor to URS Corporation, under contract with the Suwannee River Water Management District (SRWMD), a FEMA Cooperating Technical Partner (CTP). All work was completed in August 2006.

The digital base map files were derived from U.S. Geological Survey (USGS) Digital Orthophoto Quadrangles, produced at a scale of 1:12,000 from photography dated 2004.

The coordinate system used for the production of the digital FIRM is State Plane in the Florida North projection zone 0903, referenced to the North American Datum of 1983.

1.3 Coordination

Consultation Coordination Officer's (CCO) meetings may be held for each jurisdiction in this countywide FIS. An initial CCO meeting is held typically with representatives of 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 typically with representatives of FEMA, the community, and the study contractor to review the results of the study.

For the precountywide FISs, a final CCO meeting was held on February 18, 1987, and was attended by representatives of the USACE, the U.S. Department of the Interior, Columbia County, the City of Lake City, and FEMA.

For this countywide FIS, an initial CCO meeting was held on December 21, 2005, and was attended by representatives of the SRWMD, Columbia County, the City of Lake City, the town of Fort White and the study contractor. A final CCO meeting was held ♦. These meetings were attended by representatives of the study contractors, the communities, and the Suwannee River Water Management District.

2.0 <u>AREA STUDIED</u>

2.1 Scope of Study

This FIS covers the geographic area of Columbia County, Florida.

As part of this countywide FIS, flooding caused by overflow of Alligator Lake, Lake Montgomery, Montgomery Outlet Stream, the Suwannee River, and the Santa Fe River were studied in detail. Cannon Creek, Rose Creek and Ponding Areas 1, 2 and 3a-3e were also studied in detail. Limits of the detailed study are indicated on the Flood Profiles (Exhibit 1) and on the FIRM (Exhibit 2).

The areas studied by detailed methods were selected with priority given to all known flood hazard areas and areas of projected development and proposed construction.

All or portions of Lake Isabelle, Lake Desoto, Lake Harper, and Gwen Lake were studied by approximate methods. 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 and Columbia County.

2.2 Community Description

Columbia County is located in north-central Florida. It is bordered on the north by Clinch and Echols Counties, Georgia; on the south by Alachua and Gilchrist Counties, Florida; on the east by Baker and Union Counties, Florida; and on the west by Suwannee and Hamilton Counties, Florida. The county is served by Interstates 10 and 75, and the CSX Railroad and Norfolk Southern Railway. The 2000 population of Columbia County was reported to be 56,513, an increase of 32.6 percent over the 1990 population of 38,090 (U.S. Department of Commerce, 2000).

Columbia County is located in the Gulf Coastal Lowlands physiographic area with topography ranging from 10 feet to about 120 feet above North American Vertical Datum of 1988 (NAVD 88). There are two soil associations abutting the Suwannee River. The Surrency-Portsmouth Association, which is adjacent to the river except in the vicinity of Robinson Creek, consists of nearly level, very poorly drained sandy soils with loamy subsoils and very poorly drained loamy soils, underlain by sand. The next association landward (and adjacent to the river at Robinson Creek) is the Chipley-Albany-Rutledge. This consists of nearly level to gently sloping, moderately well-drained sandy soils and poorly drained sandy soils over loamy subsoil, and very poorly drained sandy soils (Florida Bureau of Comprehensive Planning, 1975).

The climate of Columbia County is semi-tropical, characterized by long, hot summers and mild winters. The average annual rainfall is 53.7 inches, while the average temperature varies from 55.6 degrees Fahrenheit (°F) in January to 81.1°F in August.

The drainage area of the Suwannee River at the mouth is 9,950 square miles, of which 4,230 square miles are in north-central Florida, and 5,720 square miles are in south-central Georgia. The drainage area of the Santa Fe River, at the mouth, is 1,380 square miles.

2.3 Principal Flood Problems

A number of major floods have occurred on the Suwannee River during the 20th century. The four largest floods at White Springs occurred in October 1947, April 1948, April 1973, and April 1984. The respective discharges associated with these floods are 23,700 cubic feet per second (cfs), 28,5000 cfs, 38,100 cfs, and 26,100 cfs. The estimated return period for floods of these magnitudes are 30, 50, 150, and 40 years, respectively.

The April 1973 flood was the largest flood at the Town of White Springs since 1862 and exceeded the 1948 flood by 3 feet at the White Springs gage. Floodwaters remained over the lowland for 30 days, and for a time several major highways (Interstate 75, U.S. Route 41, and U.S. Route 129) were closed. Many people were forced to evacuate their homes, and Columbia County was included in the "major disaster area" declared by the President.

During peak stages of the 1948 flood, the Suwannee River was out of its banks from the Gulf of Mexico to north of the Georgia-Florida state line and its width varied from 0.5 to 6 miles. The flooded area comprised almost 500 square miles along the major rivers.

The largest flood known to have occurred on the Santa Fe River in Columbia County was the flood of September 1964. The peak discharge for this flood was 17,000 cfs at the USGS gage near the Town of Ft. White and 20,000 cfs at the now non-existent USGS gage at the City of High Springs.

2.4 Flood Protection Measures

Flood protection measures do not exist within the study area.

3.0 ENGINEERING METHODS

For the flooding sources studied in detail in the county, standard hydrologic and hydraulic study methods were used to determine the flood hazard data required for this FIS. Flood events of a magnitude which 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 which equals or exceeds the 100-year flood (1-percent chance of annual exceedence) in any 50-year period is approximately 40 percent (4 in 10), and, 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 county at the time of completion of this FIS. Maps and flood elevations will be amended periodically to reflect future changes.

3.1 Hydrologic Analyses

Hydrologic analyses were carried out to establish the peak discharge-frequency relationships for the flooding sources studied in detail affecting the county.

Precountywide Analyses

The hydrologic analyses described in previously printed FIS reports have been compiled and are summarized below.

Analyses of discharge records of all gaged locations on the Suwannee River were used to establish a peak discharge-frequency relationship throughout the river. Flood recurrence frequencies were determined by log-Pearson Type III statistical analysis in accordance with procedures recommended by the U.S. Water Resources Council (Interagency Advisory Committee on Water Data, 1981).

Hydrologic analysis for the Santa Fe River was performed by standard engineering methods. Statistical data from five long-term discharge gages were used to calibrate a hydrologic runoff model. A rainfall-runoff model was developed for the Santa Fe River using the Soil Conservation Service (SCS) option in the HEC-1 computer program (USACE, 1973). Rainfall frequency was developed from U.S. Weather Bureau Technical Paper No. 40 (U.S. Department of Commerce, 1963) and runoff losses were accounted for by SCS curve number techniques. In the vicinity of O'leno State Park, the Santa Fe River flows underground for approximately 4.5 miles. For this portion of the river, the modeling was developed by computing the discharges to reflect the amount of storage available with the remainder considered as overland flow.

Using 17 years of periodic stage observations on Alligator Lake, log-Pearson Type III analysis was performed to determine the peak elevation. The stage data were converted to volumes before the frequency analysis was performed. The 1-percent annual chance volume was then converted back to stage elevation. The maximum elevation observed in the period from 1964 to 1985 was 102.1 feet National Geodetic Vertical Datum of 1929 (NGVD) on September 12, 1964 (Suwannee River Water Management District).

Equations have been developed by Franklin and Losey (USGS, 1984) for estimating the peak discharge frequency from urban streams in the City of Tallahassee, Florida. The area studied in Lake City is similar in soil type and topography to Tallahassee. The discharge computed using these equations is considered the best estimate for Lake City.

A stage volume relation was established from topographic maps for Lake Montgomery. The elevation of the lake on June 5, 1985, was 129.75 feet NGVD. This reading is considered low since the rainfall was below normal for northern Florida during this period; therefore, the average lake elevation was assumed to be 130 feet NGVD. The 1-percent annual chance runoff volume was added to determine the flood elevation of Lake Montgomery. Outflow from the lake begins at 130 feet NGVD; therefore, the peak was reduced to account for the volume lost. The final results indicated a 1-percent annual chance flood elevation for Lake Montgomery of 131.3 feet NGVD with a peak discharge of 60 cfs.

Revised Analyses

Information on the methods used to determine peak discharge-frequency relationships for the streams restudied as part of this countywide FIS is shown below.

A revised gage analysis was performed at all gage locations on the Santa Fe and Suwannee rivers. Analysis of the results determined that the results were not significantly different from the effective hydrology. In accordance with the Guidelines and Specifications for Flood Hazard Mapping Partners, the revised analysis did not justify revising the effective hydrology.

Cannon Creek was studied in detail using the HEC-HMS hydrologic model (USACE, 2006) with the NRCS Curve Number and TR-55 methodologies. The watershed was divided into 13 subcatchments and flows were routed through the watershed using the Muskingum-Cunge method for channel routing and level pool routing for large backwaters behind structures.

Lake Montgomery Outlet Stream was studied in detail using the HEC-HMS hydrologic model (USACE, 2006) with the NRCS Curve Number and TR-55 methodologies. The watershed was divided into 4 subcatchments and flows were routed through the watershed using the Muskingum-Cunge method for channel routing and level pool routing for large backwaters behind structures.

Lake Montgomery was modeled using level pool routing and storage/elevation relationships were determined through ground survey of the lake area. The stage outflow relationship for the lake was determined using the HEC-RAS model (USACE, 2005) for the Montgomery Outlet Stream which extended as far as the spill crest of the lake.

Rose Creek was studied using regional regression equations to determine the flood flows of this riverine system. Drainage areas were determined using topographic maps at a scale of 1:24,000 with a contour interval of 5 feet (USGS, 1962 and 1963).

For Ponding Areas 1, 2 and 3a – 3e, detailed hydrologic analysis was performed using EPA-SWMM5 (EPA, 2005) and the Horton rainfall-runoff methodology. The Horton method was selected due to the extremely well drained nature of these watersheds. Drainage areas were determined from the 5-foot contour information provided on the USGS topographic maps (USGS, 1962 and 1963).

A summary of the drainage area-peak discharge relationships for all the streams studied by detailed methods is shown in Table 1, "Summary of Discharges."

TABLE 1 – SUMMARY OF DISCHARGES

FLOODING SOURCE AND LOCATION	DRAINAGE AREA (sq. miles)	PEAK DISCHARGES (cfs)			
		10-PERCENT	2-PERCENT	1-PERCENT	0.2-PERCENT
CANNON CREEK					
At Mouth	7.59	1,115	1,655	1,960	2,745
At Ward Road	6.64	1,330	2,100	2,420	3,215
At Cross Section W	4.78	1,235	1,870	2,165	2,855
At Cessna Boulevard	2.95	720	1,195	1,420	2,230
Downstream of abandoned embankment just downstream of Route 341	2.52	640	1,060	1,265	2,005
At Quail Heights Boulevard	2.03	1,170	1,770	2,030	2,620
MONTGOMERY OUTLET STREAM					
At Inglewood Avenue	1.83	485	800	920	1,210
At St. Margaret Road	1.46	325	525	615	825
At Grandview Avenue	1.07	145	200	270	505
At Alamo Drive	0.58	20	35	40	55
ROSE CREEK					
At Mouth	35.38	1,290	2,550	3,470	5,140
At Interstate 75	28.73	1,090	2,180	2,960	4,410
SUWANNEE RIVER					
At U.S. Route 41 near White Springs	2,430	16,700	28,000	33,600	49,100
At Georgia-Florida State line	1,872	13,200	21,400	25,300	35,500
SANTA FE RIVER					
At mouth	1,380	8,500	13,400	16,400	22,200
At USGS gage #02322500 near Ft. White	1,017	9,200	13,800	16,700	22,200
At USGS gage #0232200 near High Springs	950	9,300	15,800	19,600	29,700
Just downstream of confluence of Olustee Creek	*	17,100	26,900	32,800	46,500

*Data not available

The stillwater elevations have been determined for the 10-, 2-, 1-, and 0.2-percent annual chance floods for the flooding sources studied by detailed methods and are summarized in Table 2, "Summary of Stillwater Elevations."

TABLE 2 – SUMMARY OF STILLWATER ELEVATIONS

FLOODING SOURCE AND LOCATION	ELEVATION (feet NAVD*)			
	10-PERCENT	2-PERCENT	1-PERCENT	0.2-PERCENT
ALLIGATOR LAKE				
Along entire shoreline	**	**	103.5	**
LAKE MONTGOMERY	130.1	130.6	130.8	131.3
PONDING AREA 1	84.8	89.6	91.3	94.3
PONDING AREA 2	91.9	93.1	93.6	94.7
PONDING AREA 3a	103.2	103.2	103.2	103.3
PONDING AREA 3b	107.0	107.5	107.7	108.1
PONDING AREA 3c	104.1	104.2	104.2	104.2
PONDING AREA 3d	103.5	104.2	104.5	105.0
PONDING AREA 3e	104.1	105.0	105.3	105.9

*North American Vertical Datum of 1988
**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 tables in the FIS report. For construction and/or floodplain management purposes, users are encouraged to use the flood elevation data presented in this FIS in conjunction with the data shown on the FIRM.

Cross sections were determined from topographic maps and field surveys. All bridges, dams, and culverts were field surveyed to obtain elevation data and structural geometry. All topographic mapping used to determine cross sections are referenced in Section 4.1.

Locations of selected cross sections used in the hydraulic analyses are shown on the Flood Profiles (Exhibit 1). For stream segments for which a floodway was computed (Section 4.2), selected cross section locations are also shown on the FIRM (Exhibit 2).

The hydraulic analyses for this FIS were based on unobstructed flow. The flood elevations shown on the profiles are thus considered valid only if hydraulic structures remain unobstructed, operate properly, and do not fail.

All 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.

Bench marks 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 monument 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 bench marks, the FIRM may also show vertical control monuments 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 bench marks shown on the FIRM for this jurisdiction, please contact the Information Services Branch of the NGS at (301) 713-3242, or visit their Web site at www.ngs.noaa.gov.

It is important to note that 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 this FIS and FIRM. Interested individuals may contact FEMA to access this data.

Precountywide Analyses

The hydraulic analyses described in previously printed FIS reports have been compiled and are summarized below.

Cross-section data for the Suwannee River were obtained by aerial survey methods from photography flown for the floodplain areas and by field measurements for the main channel and immediate overbanks (USACE, Stream Cross Sections). All bridges were field surveyed to obtain elevation data and structural geometry. Stream cross sections and bridge geometries for the Santa Fe River were compiled by photogrammetric methods from aerial photography (Southern Resource Mapping, Suwannee River Basin Surveys).

Roughness coefficients (Manning's "n") used in the hydraulic computations for the Suwannee River were determined by analyzing known flood events in the Columbia County reach of the river. The coefficients ranged from 0.045 to 0.050 for the main channel, and 0.2 to 0.48 for the overbanks. Roughness coefficients for the Santa Fe River were determined by analyzing a hydraulic model that was calibrated to reproduce the 1964 flood. The values ranged from 0.035 to 0.100 for the main channel and 0.20 to 0.28 for the overbank. Water-surface profiles of the floods of the selected recurrence intervals were computed using the USACE HEC-2 step-backwater computer program (USACE, 1976). Starting water-surface elevations were computed using the slope/area method. Roughness values for Montgomery Outlet Stream range from 0.025 in the main channel to 0.125 in the floodplain.

The USGS step-backwater computer program (U.S. Department of the Interior, 1976) was used to compute the water-surface elevation for the 1-percent annual chance flood on the Montgomery Outflow Stream. The elevation of Alligator Lake was used at the starting water-surface elevation. The step-backwater program cannot route through culverts, so at each road crossing the computer run was stopped at the downstream side of the road. The water-surface elevation was then transferred to the upstream side of the road using techniques described by Bodhaine and Hulsing (USGS, 1968; USGS, 1967).

Revised Analyses

The HEC-2 computer files for the Suwannee River and Santa Fe River were converted to HEC-RAS by the SRWMD prior to this revised analysis. As part of this analysis, the structures in the HEC-RAS model were modified to conform to standard procedures outlined in the HEC-RAS Users Manual (USACE, 2002).

New riverine hydraulic analysis was performed along Cannon Creek, Rose Creek and Montgomery Outlet Stream. Cannon Creek was studied from the confluence with Clay Hole Creek to a point approximately 650 feet upstream of Quail Heights Boulevard. Rose Creek was studied from the confluence with Clay Hole Creek to a point just downstream of Interstate 75, and Montgomery Outlet Stream was studied from Alligator Lake to Lake Montgomery. HEC-RAS version 3.1.3 (HEC, 2005) was used to model the hydraulic characteristics of these streams.

Cross sections and hydraulic structures were ground surveyed and used to build the HEC-RAS models.

New hydraulic analysis was performed for several ponding areas with known flooding problems. These are referred to as Ponding Areas 1, 2 and 3a – 3e. Both hydrologic and hydraulic analyses were performed using EPA-SWMM5 (EPA, 2005). Spills between ponding areas were modeled using weirs for overland spills and closed conduits for culvert structures.

All field surveys were established with vertical control in the NAVD 1988 datum. All of the NGVD 29 elevation data in the input HEC-RAS files for Columbia County from the SRWMD were converted to NAVD 88. Therefore, the input and output of the revised HEC-RAS files now reflect elevations in NAVD 88.

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

3.3 Vertical Datum

All FISs 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 FISs 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.

All flood elevations shown in this FIS report and on the FIRM are referenced to NAVD 88. Structure and ground elevations in the community must, therefore, be referenced to NAVD 88. It is important to note that adjacent communities may be referenced to NGVD 29. This may results in differences in base flood elevations across corporate limits between the communities.

Prior versions of the FIS report and FIRM were referenced to NGVD 29. When a datum conversion is effected for an FIS report and FIRM, the Flood Profiles, base flood elevations (BFEs) and ERMs reflect new datum values. To compare structure and ground elevations to 1% annual chance flood elevations shown in the FIS and on the FIRM, the subject structure and ground elevation must be referenced to the new datum values.

As noted above, the elevations shown in the FIS report and on the FIRM for Dixie County and Incorporated Areas are referenced to NAVD 88. Ground, structure, and flood elevations may be compared and/or referenced to NGVD 29 by applying a standard conversion factor. The conversion factor to NGVD 29 is +0.84. The BFEs shown on the FIRM represent whole-foot rounded values. For example, a BFE of 102.4 will appear as 102 on the FIRM and 102.6 will appear as 103. Therefore, users that wish to convert the elevations in the FIS to NGVD 29 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. Figure 1 illustrates the differences in BFEs due to the datum conversion.

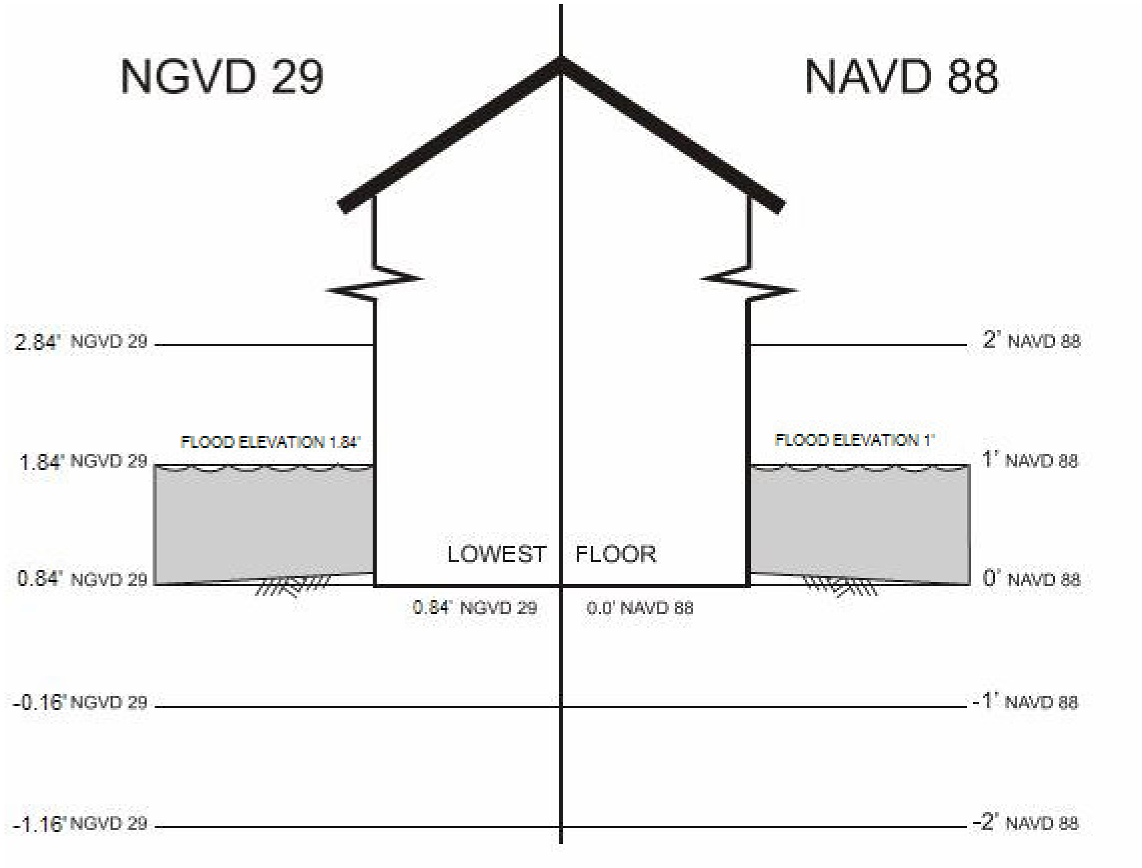

Figure 1 – Datum Conversion Schematic

For more information on NAVD 88, see Converting the National Flood Insurance Program to the North American Vertical Datum of 1988, FEMA Publication FIA-20/June 1992, 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. To assist in this endeavor, each FIS provides 100-year floodplain data, which may include a combination of the following: 10-, 50-, 100-, and 500-year flood elevations; delineations of the 100-year and 500-year floodplains; and 100-year floodway. This information is presented on the FIRM and in many components of the FIS, including Flood Profiles, Floodway Data tables, and Summary of Stillwater Elevation tables. Users should reference the data presented in the FIS 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 (100-year) flood has been adopted by FEMA as the base flood for floodplain management purposes. The 0.2-percent annual chance (500-year) flood is employed to indicate additional areas of flood risk in the county. For the streams studied in detail, the 100- and 500-year 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 1:12,000 with a contour interval of 2 feet (USACE, Stream Cross Sections); and at a scale of 1:24,000, with a contour interval of 5 feet (USGS, 1962 and 1963).

For this countywide FIS, between cross sections, the boundaries were interpolated using topographic maps at a scale of 1:24,000 with a contour interval of 5 feet (USGS, 1962 and 1963).

For the flooding sources studied by approximate methods, the boundaries of the 1-percent annual chance floodplains were delineated using topographic maps taken from the previously printed FIS reports, FHBMs, and/or FIRMs for all of the incorporated and unincorporated jurisdictions within Columbia County.

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.

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 100-year 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 FIS 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 FIS 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 (Table 3). The computed floodways are shown on the FIRM (Exhibit 2). In cases where the floodway and 1-percent annual chance floodplain boundaries are either close together or collinear, only the floodway boundary is shown.

Portions of the floodways for the Suwannee River extend beyond the county boundary.

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. A listing of stream velocities at selected cross sections is provided in Table 3, "Floodway Data." In order 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.

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 by 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 2.

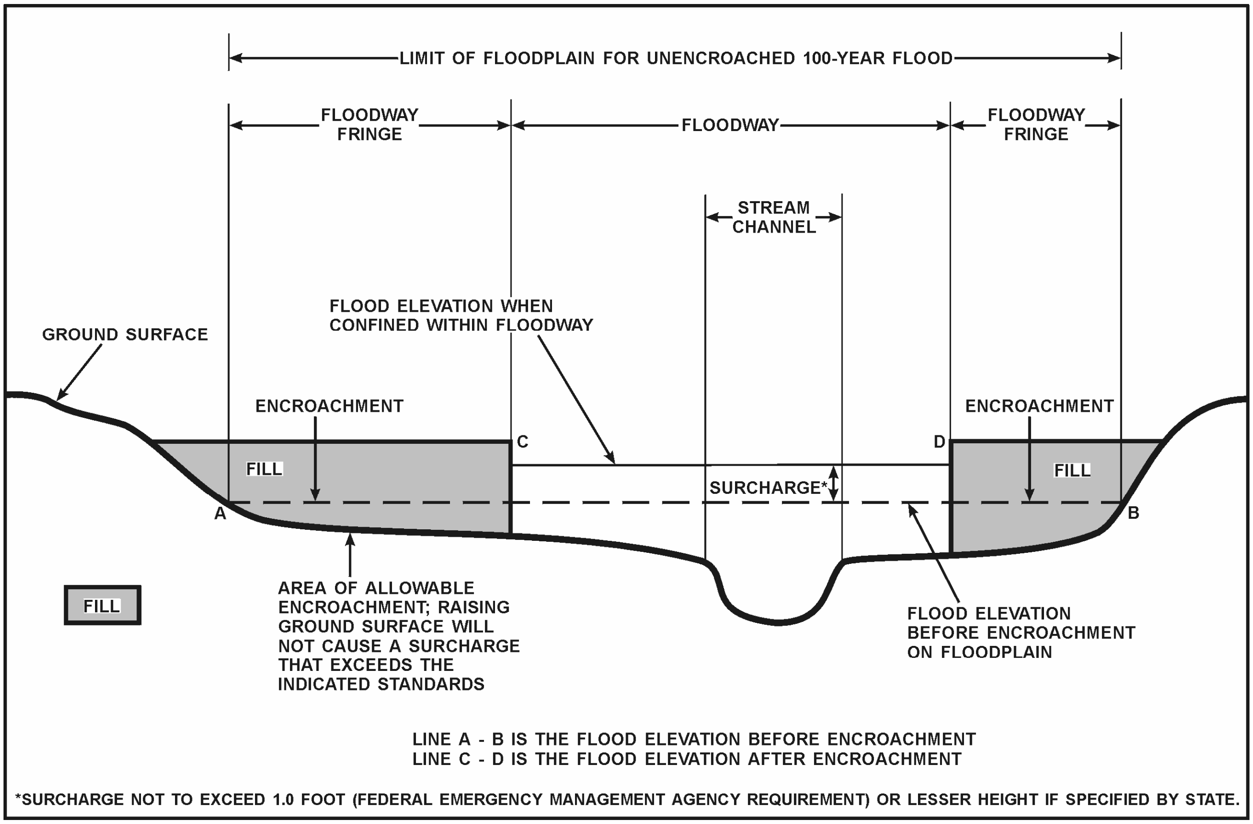

Figure 2 – Floodway Schematic

INSURANCE APPLICATIONS

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

Zone A

Zone A is the flood insurance rate zone that corresponds to the 100-year floodplains that are determined in the FIS by approximate methods. Because detailed hydraulic analyses are not performed for such areas, no base flood elevations or depths are shown within this zone.

Zone AE

Zone AE is the flood insurance rate zone that corresponds to the 100-year floodplains that are determined in the FIS by detailed methods. In most instances, whole-foot base flood elevations 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 100-year 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 this zone.

Zone AO

Zone AO is the flood insurance rate zone that corresponds to the areas of 100-year shallow flooding (usually sheet flow on sloping terrain) where average depths are between 1 and 3 feet. Average whole-foot depths derived from the detailed hydraulic analyses are shown within this zone.

Zone AR

Area of special flood hazard formerly protected from the 1% annual chance flood event by a flood control system that was subsequently decertified. Zone AR indicates that the former flood control system is being restored to provide protection from the 1% annual chance or greater flood event.

Zone A99

Zone A99 is the flood insurance rate zone that corresponds to areas of the 100-year 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 100-year 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 100-year 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 rate zone that corresponds to areas outside the 500-year floodplain, areas within the 500-year floodplain, and to areas of 100-year flooding where average depths are less than 1 foot, areas of 100-year flooding where the contributing drainage area is less than 1 square mile, and areas protected from the 100-year flood by levees. No base flood elevations 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 rate zones as described in Section 5.0 and, in the 100-year floodplains that were studied by detailed methods, shows selected whole-foot base flood elevations or average depths. Insurance agents use the zones and base flood elevations 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 100- and 500-year floodplains. Floodways and the locations of selected cross sections used in the hydraulic analyses and floodway computations are shown where applicable.

The current FIRM presents flooding information for the entire geographic area of Columbia County. Previously, separate Flood Hazard Boundary Maps and/or FIRMs were prepared for each identified flood-prone incorporated community and the unincorporated areas of the county. 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 4, "Community Map History."

7.0 OTHER STUDIES

FISs have been prepared for Alachua County and incorporated areas, Gilchrist County and incorporated areas and Hamilton County and incorporated areas, as well as the unincorporated areas of Baker, Suwannee and Union Counties (FEMA, 2006, 1989, etc.)..

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

This study is referenced to the new vertical datum of NAVD 88 and therefore does not match Flood Insurance Studies of adjacent counties that are referenced to NGVD 29. However, this is a datum change only, and does not affect actual levels.

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 Division, Koger Center - Rutgers Building, 3003 Chamblee Tucker Road, Atlanta, Georgia 30341.

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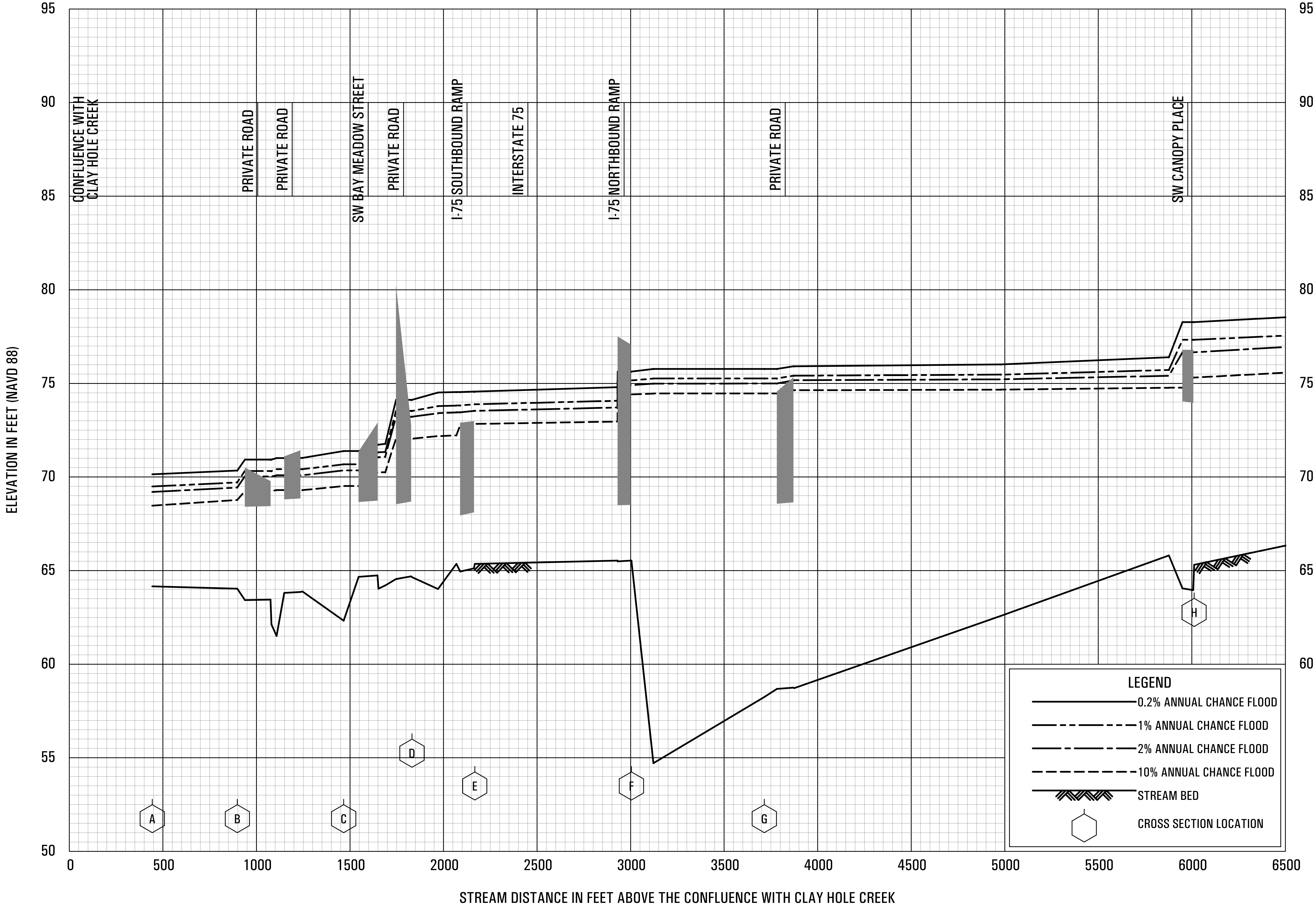


FLOOD PROFILES

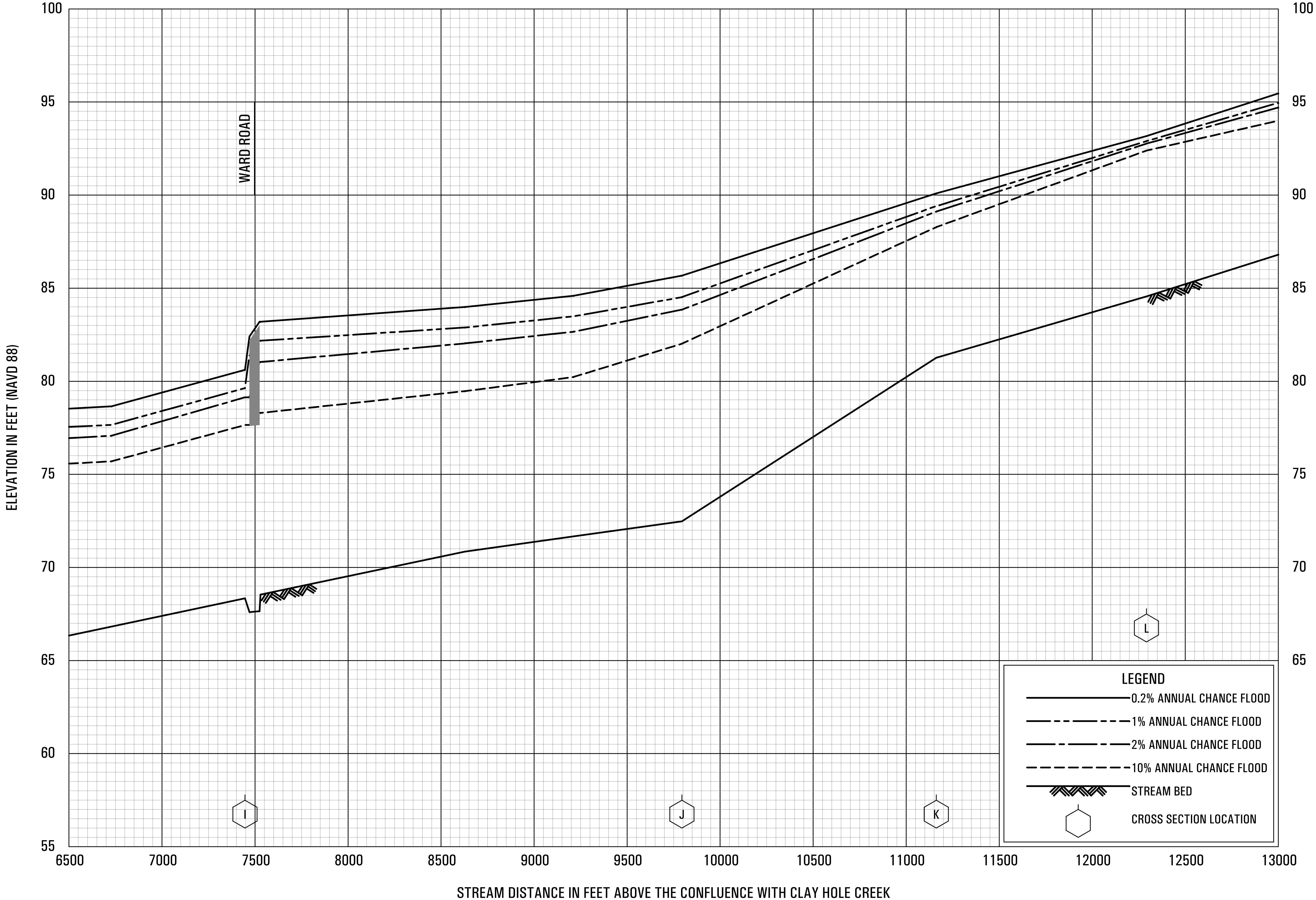
CANNON CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

COLUMBIA COUNTY, FL

AND INCORPORATED AREAS

01P



FLOOD PROFILES

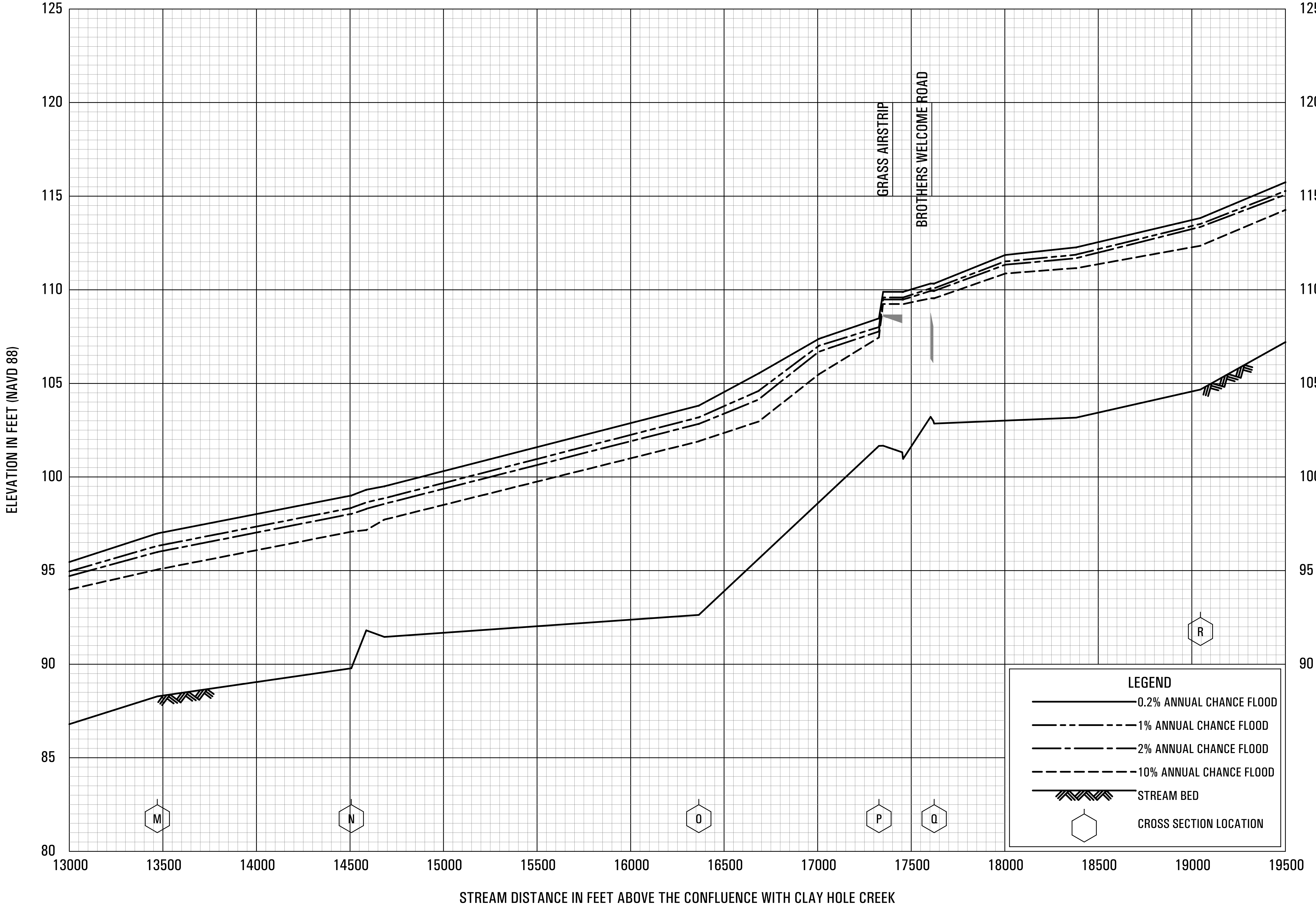
CANNON CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

COLUMBIA COUNTY, FL

AND INCORPORATED AREAS

02P



FLOOD PROFILES

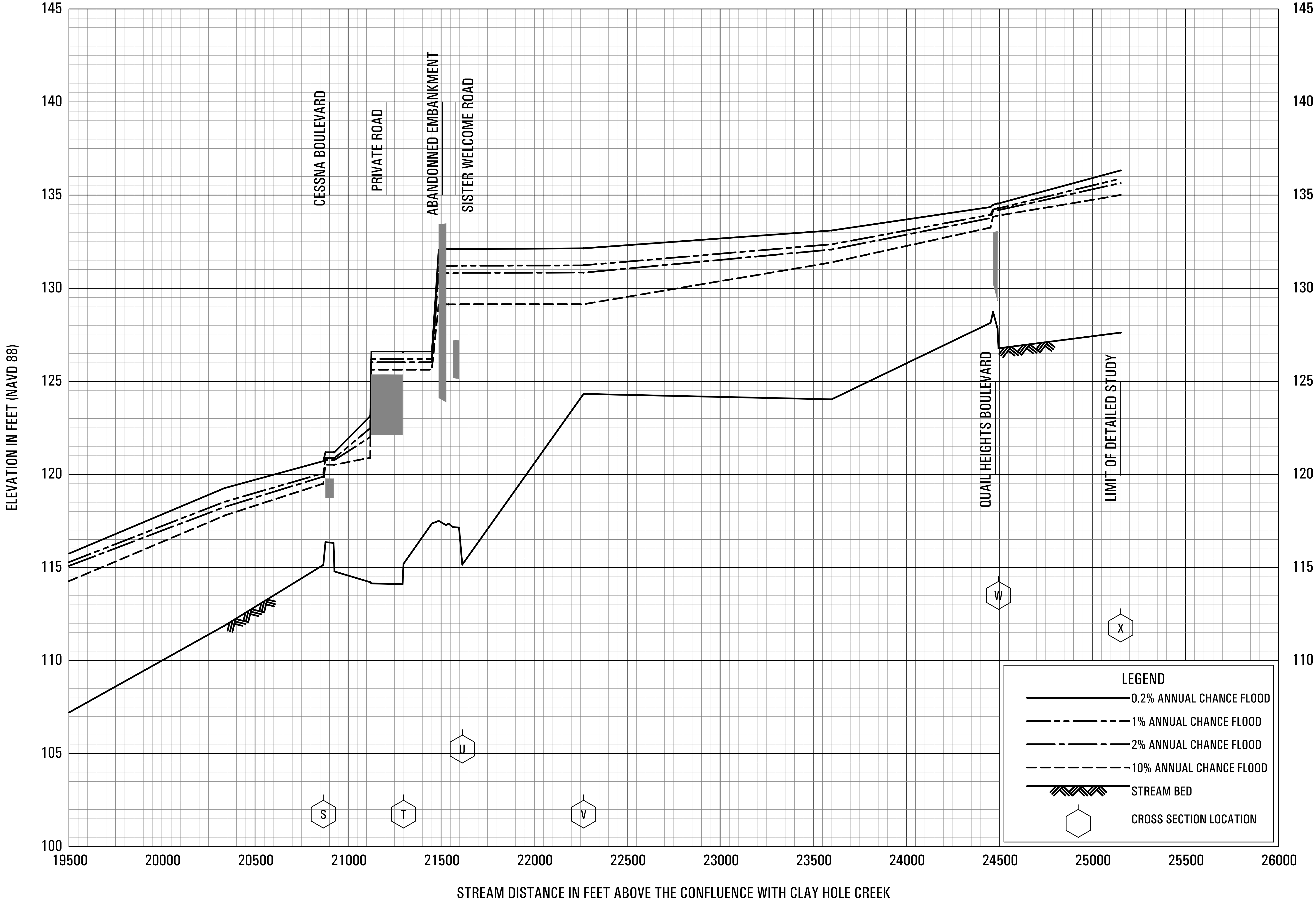
CANNON CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

COLUMBIA COUNTY, FL

AND INCORPORATED AREAS

03P



FLOOD PROFILES

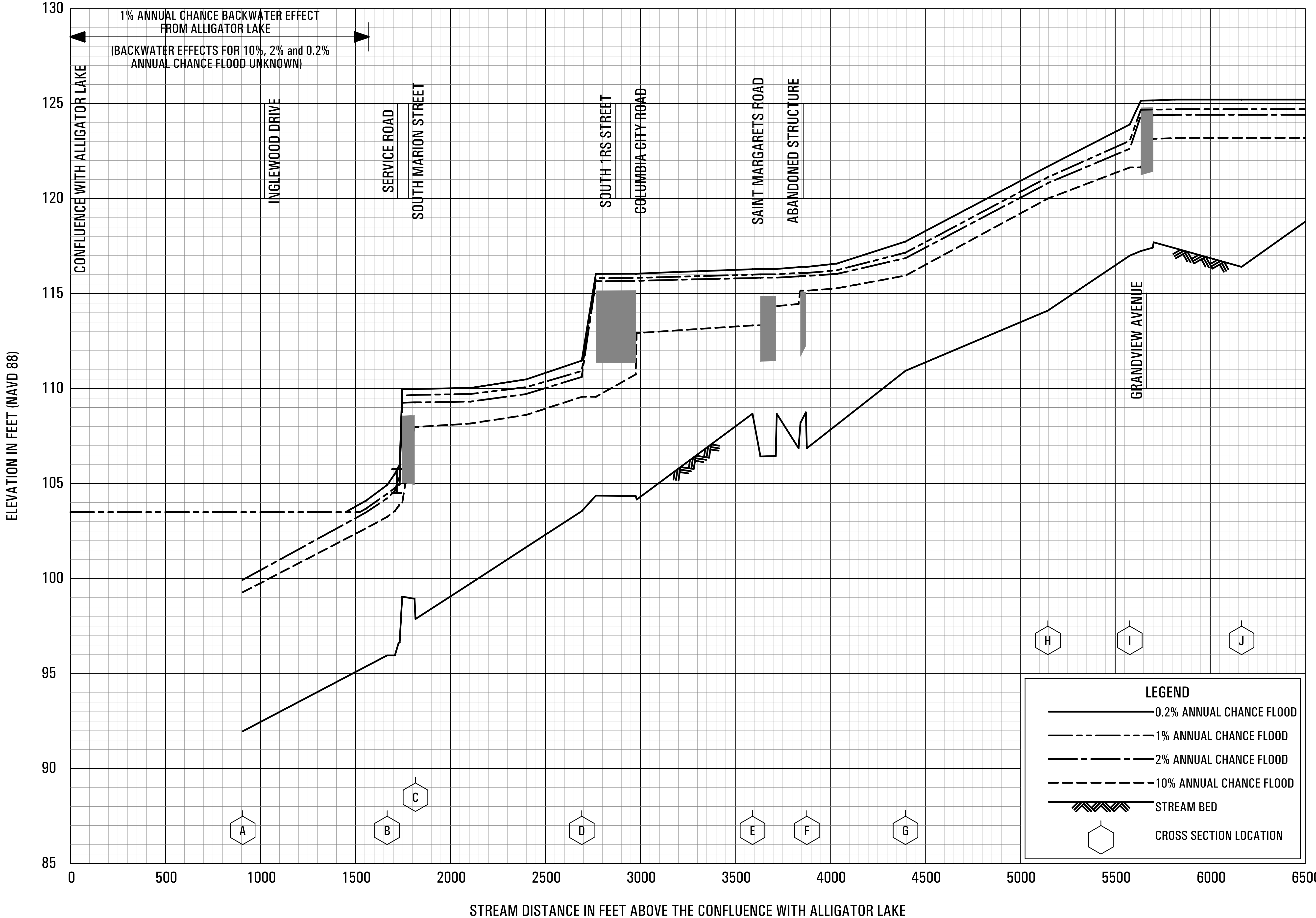
CANNON CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

COLUMBIA COUNTY, FL

AND INCORPORATED AREAS

04P



FLOOD PROFILES

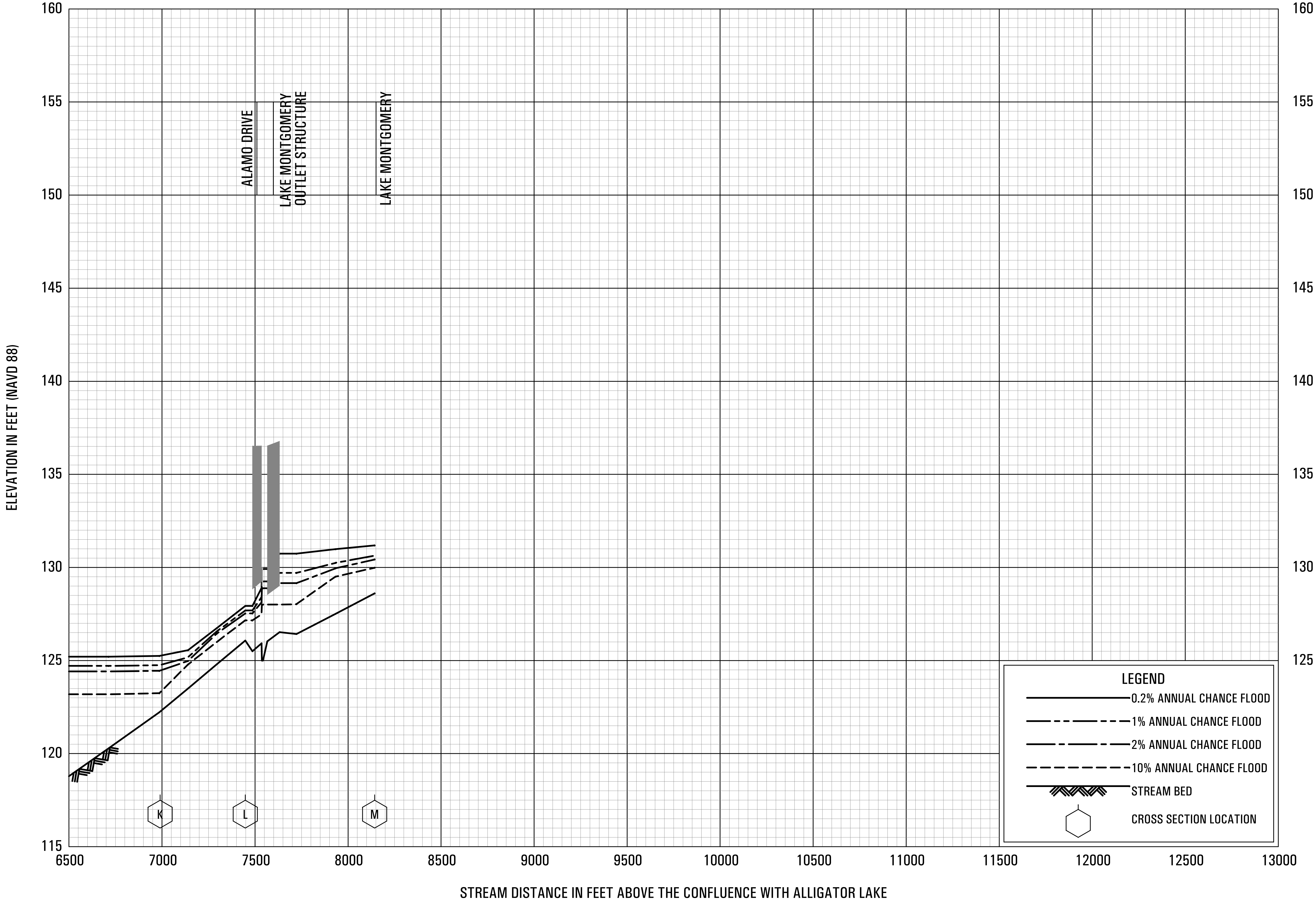
MONTGOMERY OUTLET STREAM

FEDERAL EMERGENCY MANAGEMENT AGENCY

COLUMBIA COUNTY, FL

AND INCORPORATED AREAS

05P



FLOOD PROFILES

MONTGOMERY OUTLET STREAM

FEDERAL EMERGENCY MANAGEMENT AGENCY

COLUMBIA COUNTY, FL

AND INCORPORATED AREAS

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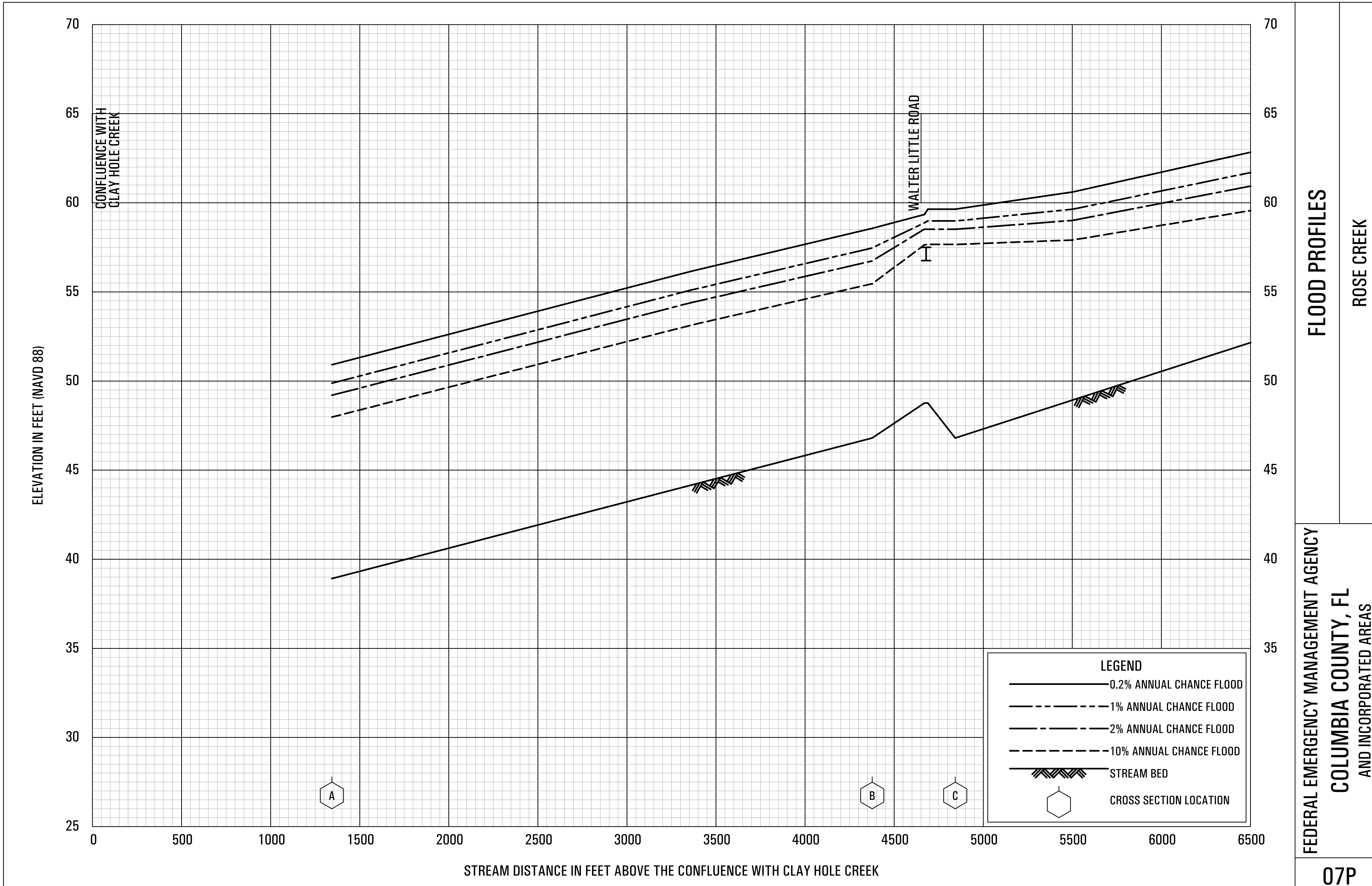
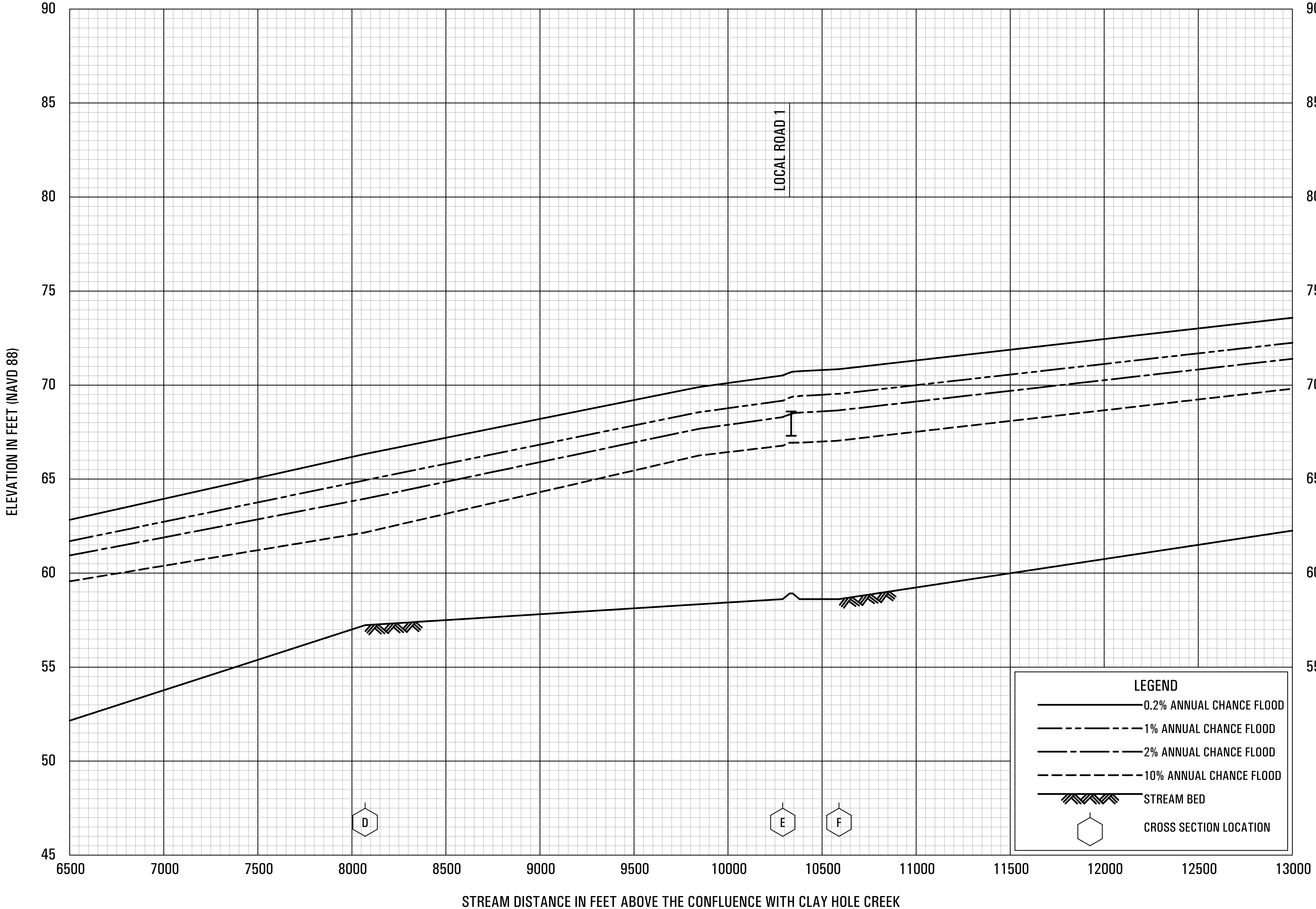


CONFLUENCE WITH CLAY HOLE CREEK
WALTER LITTLE ROAD
ELEVATION IN FEET (NAVD 88)
STREAM DISTANCE IN FEET ABOVE THE CONFLUENCE WITH CLAY HOLE CREEK
70
65
60
55
50
45
40
35
30
25
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
6000
6500
A
B
C
LEGEND
0.2% ANNUAL CHANCE FLOOD
1% ANNUAL CHANCE FLOOD
2% ANNUAL CHANCE FLOOD
10% ANNUAL CHANCE FLOOD
STREAM BED
CROSS SECTION LOCATION
FLOOD PROFILES
ROSE CREEK
FEDERAL EMERGENCY MANAGEMENT AGENCY
COLUMBIA COUNTY, FL
AND INCORPORATED AREAS
07P



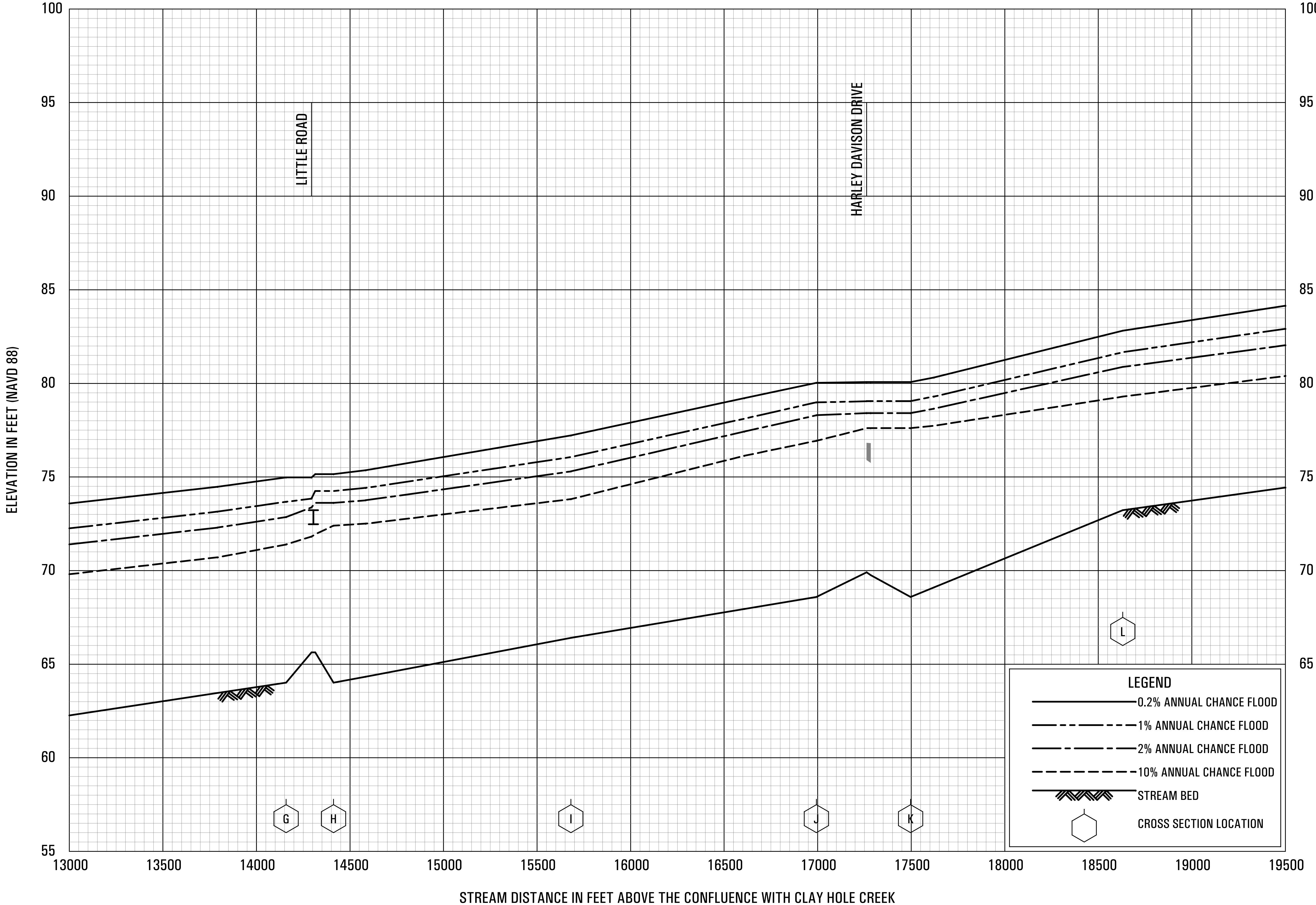
FLOOD PROFILES

ROSE CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

COLUMBIA COUNTY, FL

AND INCORPORATED AREAS



FLOOD PROFILES

ROSE CREEK

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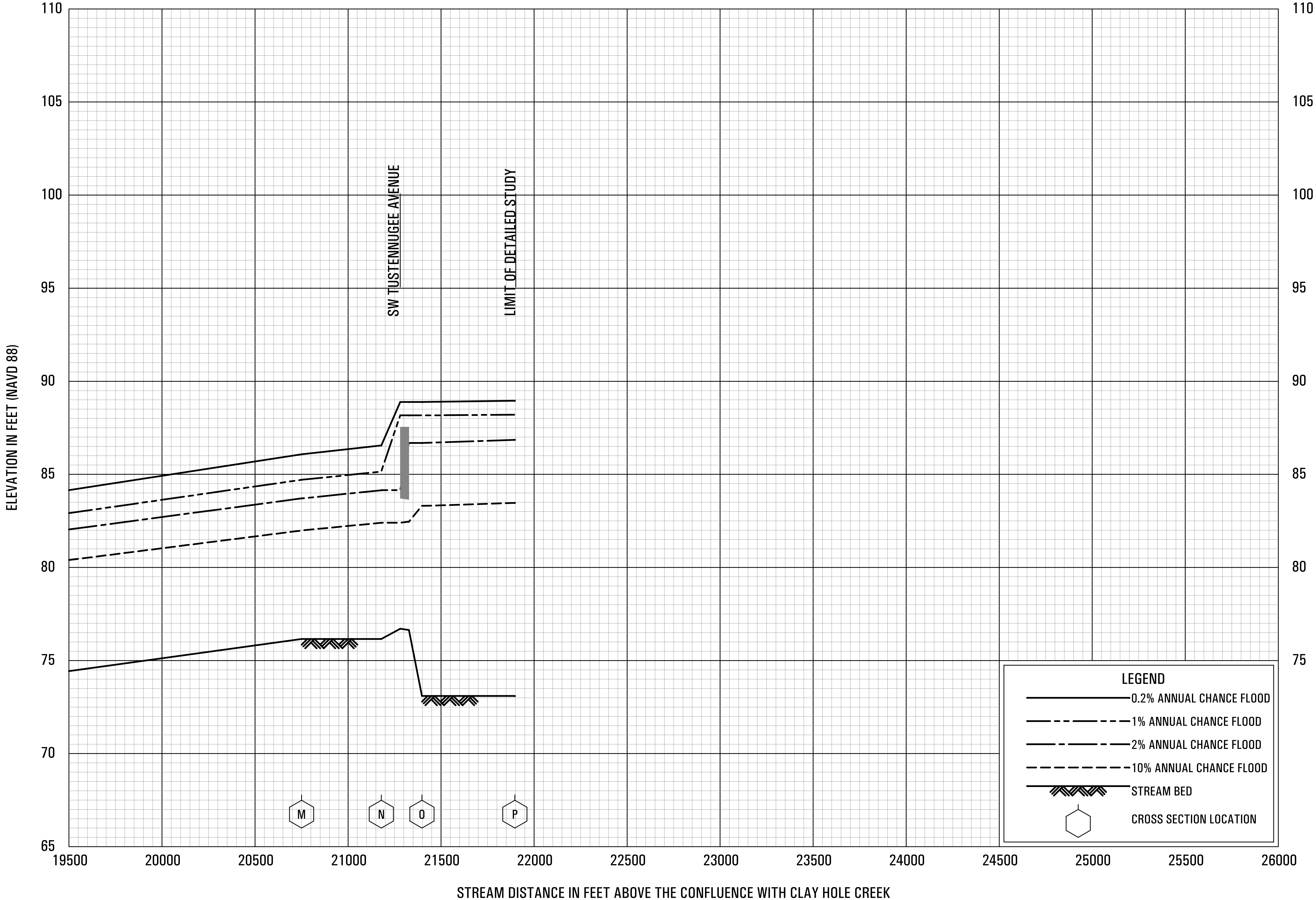


FLOOD PROFILES

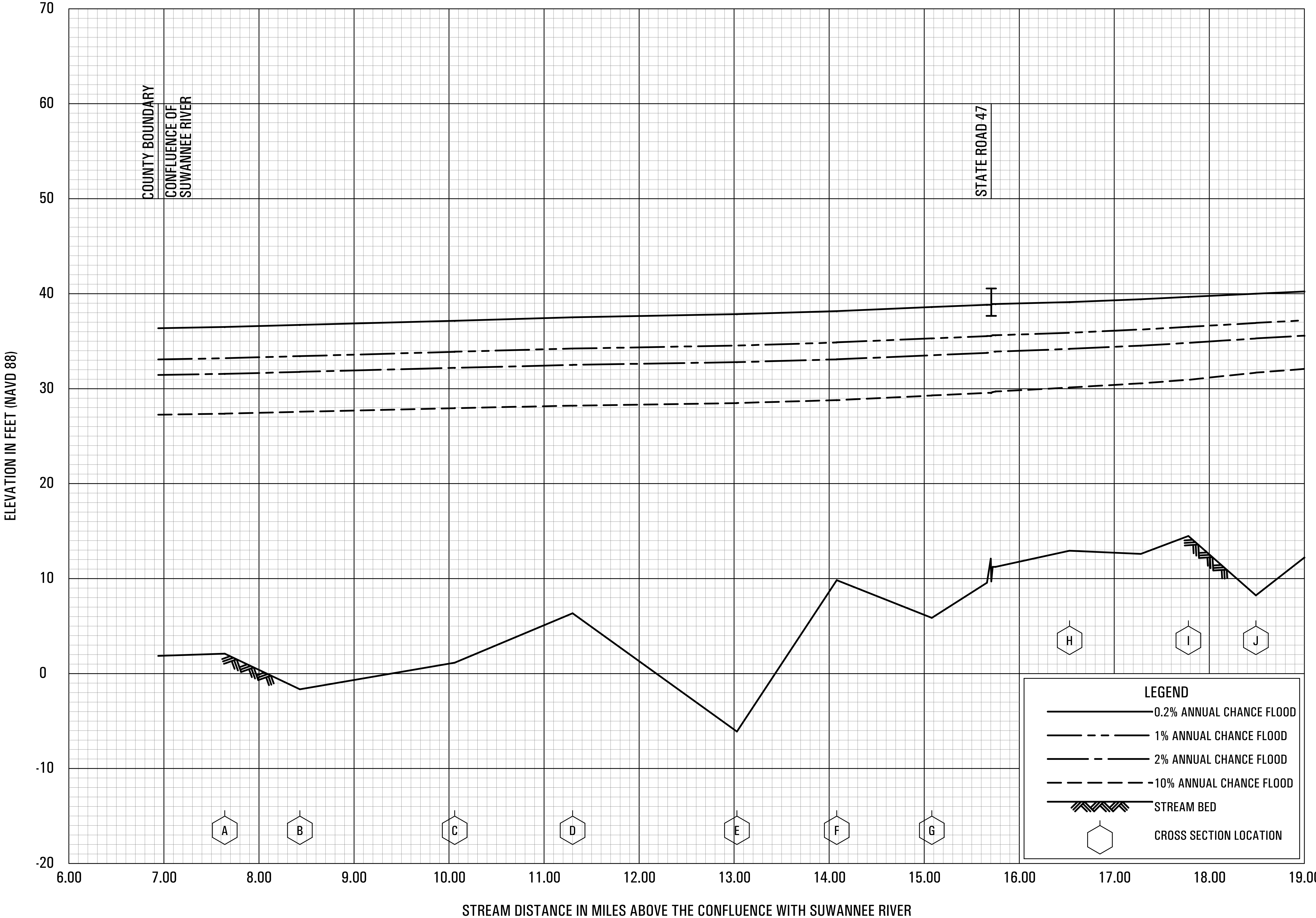
ROSE CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

COLUMBIA COUNTY, FL

AND INCORPORATED AREAS

10P



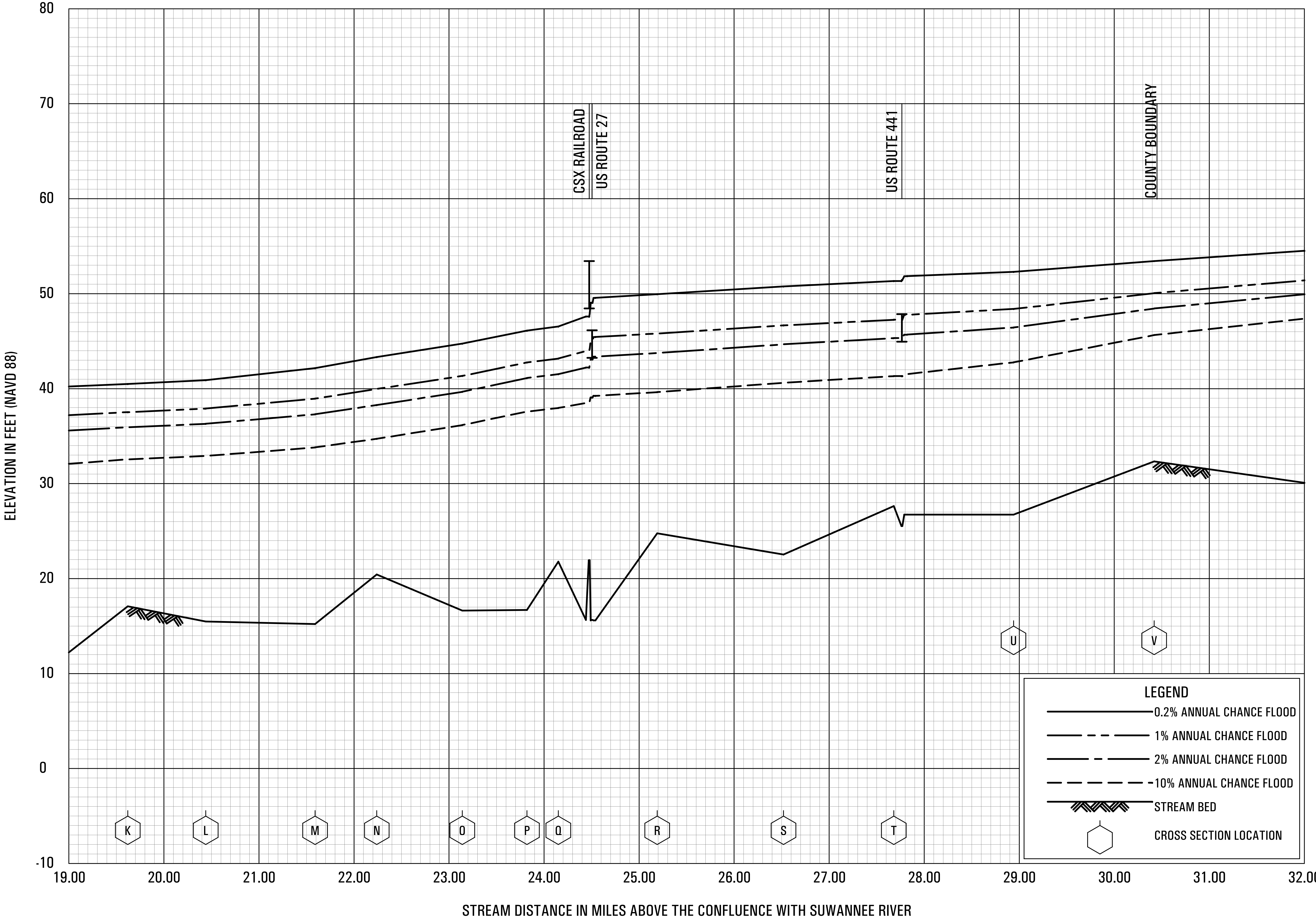
FLOOD PROFILES

SANTA FE RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

COLUMBIA COUNTY, FL
AND INCORPORATED AREAS

11P



FLOOD PROFILES

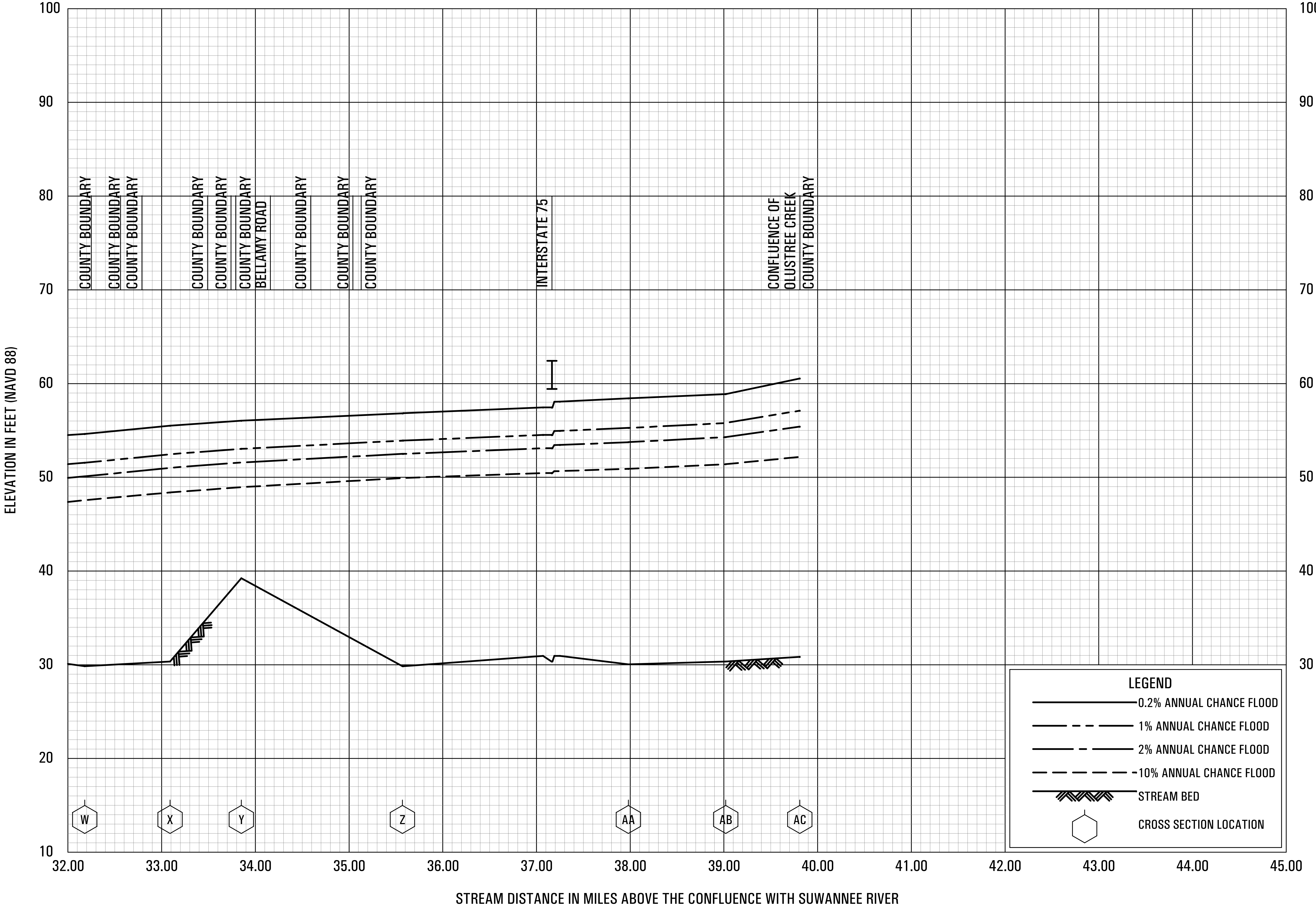
SANTA FE RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

COLUMBIA COUNTY, FL

AND INCORPORATED AREAS

12P



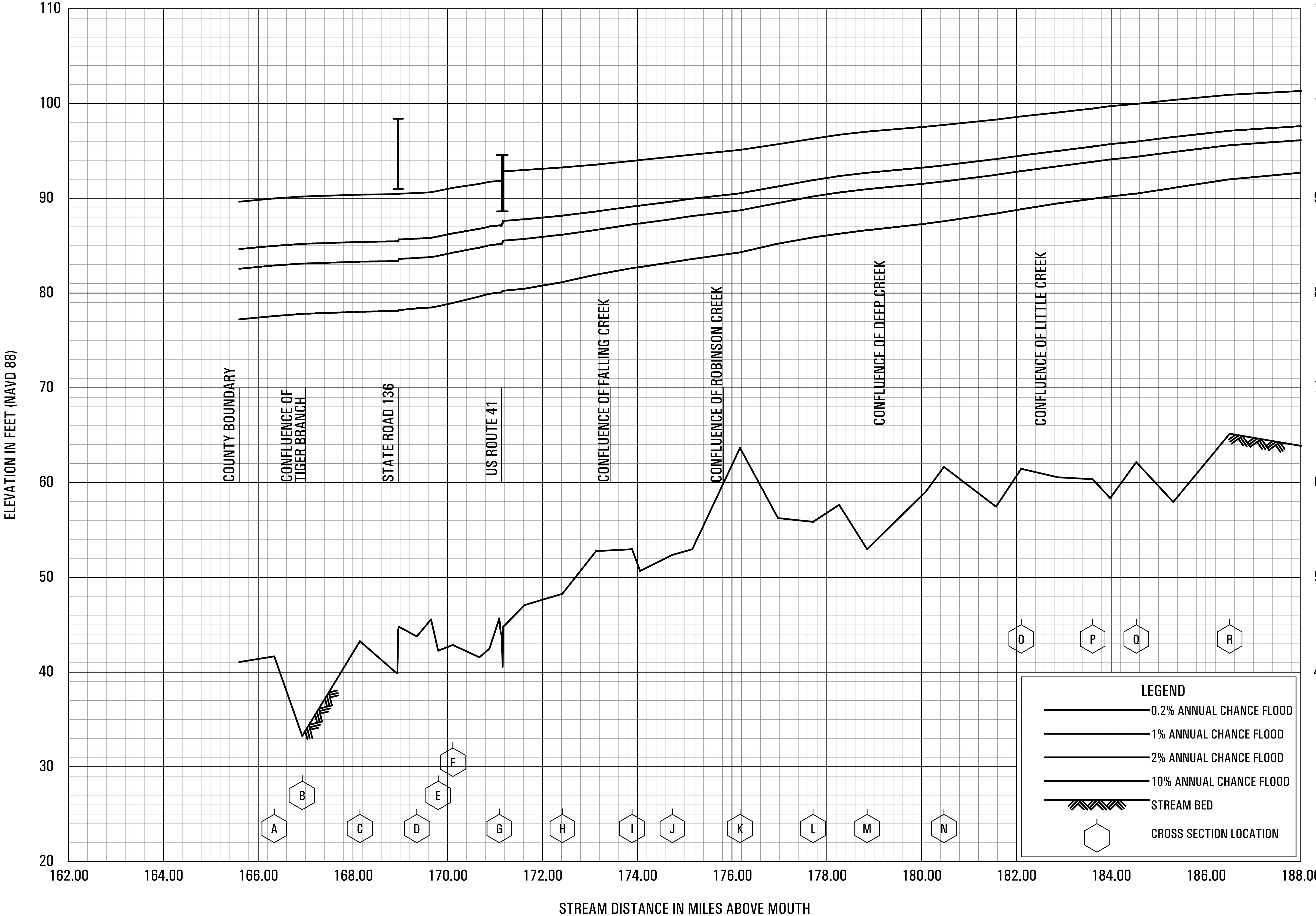
FLOOD PROFILES

SANTA FE RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

COLUMBIA COUNTY, FL

AND INCORPORATED AREAS



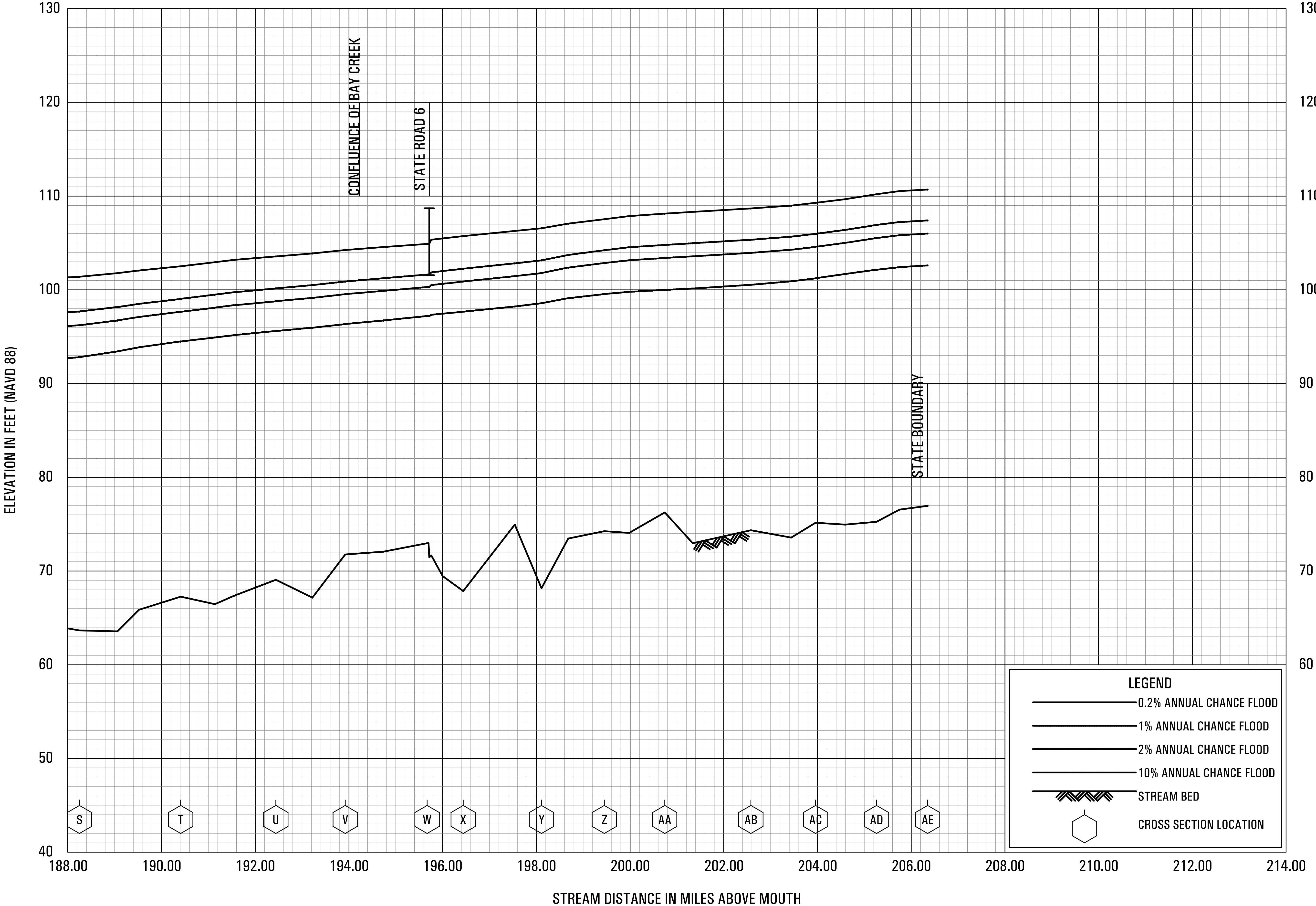
FLOOD PROFILES

SUWANNEE RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

COLUMBIA COUNTY, FL

AND INCORPORATED AREAS



FLOOD PROFILES

SUWANNEE RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

COLUMBIA COUNTY, FL

AND INCORPORATED AREAS