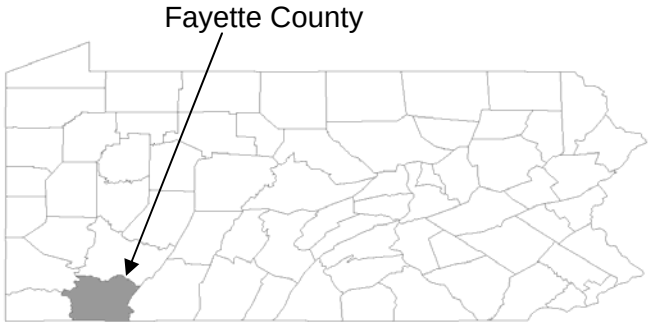
FLOOD INSURANCE STUDY

VOLUME 2 OF 4

FAYETTE COUNTY, PENNSYLVANIA

(ALL JURISDICTIONS)



COMMUNITY NAME	COMMUNITY NUMBER
BELLE VERNON, BOROUGH OF	420457
BROWNSVILLE, BOROUGH OF	420458
BROWNSVILLE, TOWNSHIP OF	421621
BULLSKIN, TOWNSHIP OF	421622
CONNELLSVILLE, CITY OF	420459
CONNELLSVILLE, TOWNSHIP OF	421623
DAWSON, BOROUGH OF	420460
DUNBAR, BOROUGH OF	420461
DUNBAR, TOWNSHIP OF	421624
EVERSON, BOROUGH OF	420462
FAIRCHANCE, BOROUGH OF	420463
FAYETTE CITY, BOROUGH OF	420464
FRANKLIN, TOWNSHIP OF	421625
GEORGES, TOWNSHIP OF	421626
GERMAN, TOWNSHIP OF	421627
HENRY CLAY, TOWNSHIP OF	421628
JEFFERSON, TOWNSHIP OF	421629
LOWER TYRONE, TOWNSHIP OF	421630
LUZERNE, TOWNSHIP OF	421631
MARKLEYSBURG, BOROUGH OF	422606
MASONTOWN, BOROUGH OF	422572
MENALLEN, TOWNSHIP OF	421632
NORTH UNION, TOWNSHIP OF	421633
NEWELL, BOROUGH OF	420465
NICHOLSON, TOWNSHIP OF	422420

COMMUNITY NAME	COMMUNITY NUMBER
OHIOPYLE, BOROUGH OF	421615
PERRY, TOWNSHIP OF	421634
PERRYOPOLIS, BOROUGH OF	421616
POINT MARION, BOROUGH OF	421617
REDSTONE, TOWNSHIP OF	421635
SOUTH CONNELLSVILLE, BOROUGH OF	421619
SOUTH UNION, TOWNSHIP OF	421637
SALTLICK, TOWNSHIP OF	421636
SMITHFIELD, BOROUGH OF	421618
SPRINGFIELD, TOWNSHIP OF	421638
SPRINGHILL, TOWNSHIP OF	421639
STEWART, TOWNSHIP OF	421640
UNIONTOWN, CITY OF	420466
UPPER TYRONE, TOWNSHIP OF	420467
VANDERBILT, BOROUGH OF	421620
WASHINGTON, TOWNSHIP OF	421641
WHARTON, TOWNSHIP OF	421642

Federal Emergency Management Agency

PRELIMINARY 11/24/2009

FLOOD INSURANCE STUDY NUMBER
42051CV002A

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) report may not contain all data available within the Community Map Repository. Please contact the Community Map Repository for any additional data.

The Federal Emergency Management Agency (FEMA) may revise and republish part or all of this FIS report at any time. In addition, FEMA may revise part of this FIS report by the Letter of Map Revision process, which does not involve republication or redistribution of the FIS report. Therefore, users should consult with community officials and check the Community Map Repository to obtain the most current FIS report components.

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

Old Zone(s)	New Zone
Al through A30	AE
B	X
C	X

Initial Countywide FIS Effective Date: To Be Determined

VOLUME 1: TABLE OF CONTENTS

1.0 INTRODUCTION 1

1.1 Purpose of Study 1

1.2 Authority and Acknowledgments 2

1.3 Coordination 9

2.0 AREA STUDIED 12

2.1 Scope of Study 12

2.2 Community Description 15

2.3 Principal Flood Problems 21

2.4 Flood Protection Measures 27

3.0 ENGINEERING METHODS 30

3.1 Hydrologic Analyses 30

3.2 Hydraulic Analyses 44

3.3 Vertical Datum 57

4.0 FLOODPLAIN MANAGEMENT APPLICATIONS 59

4.1 Floodplain Boundaries 59

4.2 Floodways 60

VOLUME 1: TABLE OF CONTENTS (cont.)

FIGURES

Figure 1 - Floodway Schematic 62

TABLES

Table 1 - Initial and Final CCO Meetings 10
Table 2 - Areas Studied by Detailed Methods 12
Table 3 - Stream Name Changes 15
Table 4 - Floods of Record on the Dunlap Creek 22
Table 5 - Floods of Record on the Monongahela River Lower Gage at Locks and Dam No. 4 23
Table 6 - Floods of Record on the Monongahela River Lower Gage at Maxwell Locks and Dam 24
Table 7 - Floods of Record on the Monongahela River at Locks and Dam No. 7 25
Table 8 - Floods of Record on the Monongahela River at the Morgantown Lock and Dam 25
Table 9 - Floods of Record on Redstone Creek at the Waltersburg, PA, Gaging Station 26
Table 10 - Summary of Discharges 38
Table 11 - Manning's "n" Values 56
Table 12 - Vertical Datum Conversion 58
Table 13 - Floodway Data Table 63

VOLUME 2: TABLE OF CONTENTS

5.0 INSURANCE APPLICATIONS 93

6.0 FLOOD INSURANCE RATE MAP 93

7.0 OTHER STUDIES 94

8.0 LOCATION OF DATA 94

9.0 BIBLIOGRAPHY AND REFERENCES 98

TABLES

Table 14 - Community Map History 97

EXHIBITS

Exhibit 1 - Flood Profiles

Back Creek	Panels 01P-03P
Bennington Spring Run	Panel 04P
Breakneck Run	Panels 05P-07P
Browns Run	Panels 08P-11P
Bute Run	Panels 12P-13P
Cheat River	Panels 14P-16P
Coal Lick Run	Panels 17P-19P
Connell Run	Panels 20P-22P
Cove Run	Panels 23P-26P
Downers Run	Panel 27P
Dunbar Creek	Panel 28P
Dunlap Creek	Panels 29P-35P
Galley Run	Panel 36P
Georges Creek	Panels 37P-42P
Indian Creek	Panels 43P-48P
Irish Run	Panels 49P-50P
Jacobs Creek	Panels 51P-59P
Jennings Run	Panels 60P-61P
Lick Run	Panels 62P-64P
Little Redstone Creek	Panels 65P-66P
Lutz Run	Panel 67P
Mill Run	Panels 68P-72P
Mill Run to Lutz Run	Panels 73P-74P

VOLUME 3: TABLE OF CONTENTS

EXHIBITS

Exhibit 1 - Flood Profiles

Monongahela River	Panels 75P-114P
Mountain Creek	Panels 115P-116P
Mounts Creek	Panels 117P-125P
Muddy Run	Panel 126P
North Branch Browns Run	Panels 127P-130P
Poplar Run	Panels 131P-132P
Redstone Creek	Panels 133P-148P
Saltlick Run	Panel 149P
South Branch Browns Run	Panel 150P
Stauffer Run	Panel 151P
Tributary A	Panel 152P
Tributary A to Little Redstone Creek	Panel 153P
Tributary B	Panel 154P
Trump Run	Panel 155P
Washington Run	Panels 156P-158P

VOLUME 4: TABLE OF CONTENTS

EXHIBITS

Exhibit 1 - Flood Profiles

Youghiogheny River	Panels 159P-182P

Exhibit 2 - Flood Insurance Rate Map Index
Flood Insurance Rate Map

5.0 INSURANCE APPLICATIONS

Zone AH

Zone AH is the flood insurance risk 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 BFEs derived from the detailed hydraulic analyses are shown at selected intervals within this zone.

Zone AO

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

Zone AR

Zone AR is the flood insurance risk zone that corresponds to an area of special flood hazard formerly protected from the 1-percent-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-percent-annual-chance or greater flood event.

Zone A99

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

Zone V

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

Zone VE

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

Zone X

Zone X is the flood insurance 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 1-percent-annual-chance flood by levees. No BFEs or base flood depths are shown within this zone.

Zone X (Future Base Flood)

Zone X (Future Base Flood) is the flood insurance risk zone that corresponds to the 1-percent-annual-chance floodplains that are determined based on future-conditions hydrology. No BFEs or base flood depths are shown within this zone.

Zone D

Zone D is the flood insurance risk 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 geographic area of Fayette County. Previously, FIRMs were prepared for each incorporated community 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 are presented in Table 14, “Community Map History.”

7.0 OTHER STUDIES

This FIS report either supersedes or is compatible with all previous studies published on streams studied in this report and should be considered authoritative for the purposes of the NFIP.

8.0 LOCATION OF DATA

Information concerning the pertinent data used in preparation of this study can be obtained by contacting the Natural and Technological Hazards Division, FEMA, Liberty Square Building (Second Floor), 105 South Seventh Street, Philadelphia, Pennsylvania 19106.

COMMUNITY NAME	INITIAL IDENTIFICATION	FLOOD HAZARD BOUNDARY MAP REVISIONS DATE	FIRM EFFECTIVE DATE	FIRM REVISIONS DATE
Belle Vernon, Borough of	January 16, 1974	May 21, 1976	July 16, 1981	November 16, 1995
Brownsville, Borough of	August 2, 1974	April 9, 1976	September 16, 1981	November 16, 1995
Brownsville, Township of	December 20, 1974	None	February 17, 1982	November 16, 1995
Bullskin, Township of	January 27, 1974	None	April 16, 1991	
Connellsville, City of	November 30, 1973	None	March 1, 1978	
Connellsville, Township of	December 20, 1974	None	July 16,1991	
Dawson, Borough of	December 20, 1974	None	July 16, 1991	
Dunbar, Borough of	May 31, 1974	April 16, 1976	March 18, 1991	
Dunbar, Township of	December 27, 1974	December 26, 1980	July 4, 1988	
Everson, Borough of	July 26, 1974	June 4, 1976	August 1, 1979	December 6, 2002
Fairchance, Borough of	July 26, 1974	April 16, 1976	April 16, 1991	
Fayette City, Borough of	February 22, 1974	April 16, 1976	February 3, 1982	December 19, 1995
Franklin, Township of	December 6, 1974	None	March 18, 1991	
Georges, Township of	January 24, 1975	None	April 16, 1991	

TABLE 14

FEDERAL EMERGENCY MANAGEMENT AGENCY

FAYETTE COUNTY, PA
(ALL JURISDICTIONS)

COMMUNITY MAP HISTORY

COMMUNITY NAME	INITIAL IDENTIFICATION	FLOOD HAZARD BOUNDARY MAP REVISIONS DATE	FIRM EFFECTIVE DATE	FIRM REVISIONS DATE
German, Township of	January 3, 1975	January 23, 1981	April 16, 1991	April 3, 1996
Henry Clay, Township of	December 6, 1974	None	February 1, 1980	
Jefferson, Township of	January 3, 1975	None	June 1, 1979	September 30, 1995
Lower Tyrone, Township of	December 6, 1974	None	March 4, 1988	
Luzerne, Township of	December 27, 1974	None	March 1, 1982	
Markleysburg, Borough of	October 15, 1976	None	June 19, 1985	
Masontown, Borugh of	January 17, 1975	None	September 4, 1991	February 2, 1995
Menallen, Township of	December 27, 1974	None	April 16, 1991	
Newell, Borough of	June 28, 1974	April 23, 1976	April 15, 1981	November 16, 1995
Nicholson, Township of	February 14, 1975	None	September 4, 1991	September 6, 1995
North Union, Township of	December 27, 1974	October 24, 1980	April 16, 1991	
Ohiopyle, Borough of	January 31, 1975	March 19, 1976	December 13, 1974	
Perry, Township of	December 13, 1974	None	April 15, 1982	

TABLE 14

FEDERAL EMERGENCY MANAGEMENT AGENCY

FAYETTE COUNTY, PA
(ALL JURISDICTIONS)

COMMUNITY MAP HISTORY

COMMUNITY NAME	INITIAL IDENTIFICATION	FLOOD HAZARD BOUNDARY MAP REVISIONS DATE	FIRM EFFECTIVE DATE	FIRM REVISIONS DATE
Perryopolis, Borough of	July 22, 1977	None	February 3, 1982	
Point Marion, Borough of	November 15, 1974	None	July 4, 1988	June 16, 1995
Redstone, Township of	January 17, 1975	None	January 6, 1982	
Saltlick, Township of	November 15, 1974	None	March 18, 1991	
Smithfield, Borough of	None	None	None	
South Connellsville, Borough of	None	None	None	
South Union, Township of	January 3, 1975	December 12, 1980	April 16, 1991	
Springfield, Township of	December 27, 1974	None	April 16, 1991	
Springhill, Township of	January 6, 1978	None	March 18, 1991	April 17, 1995
Stewart, Township of	December 13, 1974	None	March 14, 1980	
Uniontown, City of	June 14, 1974	None	May 1, 1978	
Upper Tyrone, Township of	November 30, 1973	June 18, 1976	March 15, 1979	December 6, 2002
Vanderbilt, Borough of	January 31, 1975	None	January 1, 1987	
Washington, Township of	December 20, 1974	None	January 20, 1982	September 6, 1995
Wharton, Township of	January 24, 1975	May 2, 1980	January 1, 1987	

TABLE 14

FEDERAL EMERGENCY MANAGEMENT AGENCY

FAYETTE COUNTY, PA
(ALL JURISDICTIONS)

COMMUNITY MAP HISTORY

9.0 BIBLIOGRAPHY AND REFERENCES

1. Federal Emergency Management Agency, Flood Insurance Study, Borough of Belle Vernon, Fayette County, Pennsylvania, Washington, D.C., January 16, 1981, revised November 16, 1995.
2. Federal Emergency Management Agency, Flood Insurance Study, Borough of Brownsville, Fayette County, Pennsylvania, Washington, D.C., March 16, 1981, revised November 16, 1995.
3. Federal Emergency Management Agency, Flood Insurance Study, Township of Brownsville, Fayette County, Pennsylvania, Washington, D.C., August 17, 1981, revised November 16, 1995.
4. Federal Emergency Management Agency, Flood Insurance Study, Township of Bullskin, Fayette County, Pennsylvania, Washington, D.C., April 16, 1991, revised December 6, 2002.
5. U.S. Department of Housing and Urban Development, Federal Insurance Administration, Flood Insurance Study, City of Connellsville, Fayette County, Pennsylvania, Washington, D.C., September 1977.
6. Federal Emergency Management Agency, Flood Insurance Study, Township of Connellsville, Fayette County, Pennsylvania, Washington, D.C., July 16, 1991.
7. Federal Emergency Management Agency, Flood Insurance Study, Borough of Dawson, Fayette County, Pennsylvania, Washington, D.C., March 4, 1988.
8. Federal Emergency Management Agency, Flood Insurance Study, Borough of Dunbar, Fayette County, Pennsylvania, Washington, D.C., March 18, 1991.
9. Federal Emergency Management Agency, Flood Insurance Study, Township of Dunbar, Fayette County, Pennsylvania, Washington, D.C., July 4, 1988.
10. Federal Emergency Management Agency, Flood Insurance Study, Borough of Everson, Fayette County, Pennsylvania, Washington, D.C., February 1979, revised December 6, 2002.
11. Federal Emergency Management Agency, Flood Insurance Study, Borough of Fairchance, Fayette County, Pennsylvania, Washington, D.C., April 16, 1991.
12. Federal Emergency Management Agency, Flood Insurance Study, Borough of Fayette City, Fayette County, Pennsylvania, Washington, D.C., August 3, 1981, revised December 19, 1995.
13. Federal Emergency Management Agency, Flood Insurance Study, Township of Franklin, Fayette County, Pennsylvania, Washington, D.C., March 18, 1991.
14. Federal Emergency Management Agency, Flood Insurance Study, Township of Georges, Fayette County, Pennsylvania, Washington, D.C., April 16, 1991.
15. Federal Emergency Management Agency, Flood Insurance Study, Township of German, Fayette County, Pennsylvania, Washington, D.C., April 16, 1991, revised September 30, 1995.

16. Federal Emergency Management Agency, Flood Insurance Study, Township of Jefferson, Fayette County, Pennsylvania, Washington, D.C., September 30, 1995.

17. Federal Emergency Management Agency, Flood Insurance Study, Township of Lower Tyrone, Fayette County, Pennsylvania, Washington, D.C., March 4, 1988.

18. Federal Emergency Management Agency, Flood Insurance Study, Township of Luzerne, Fayette County, Pennsylvania, Washington, D.C., September 20, 1995.

19. Federal Emergency Management Agency, Flood Insurance Study, Borough of Masontown, Fayette County, Pennsylvania, Washington, D.C., September 4, 1991, revised February 2, 1995.

20. Federal Emergency Management Agency, Flood Insurance Study, Township of Menallen, Fayette County, Pennsylvania, Washington, D.C., April 16, 1991.

21. Federal Emergency Management Agency, Flood Insurance Study, Borough of Newell, Fayette County, Pennsylvania, Washington, D.C., October 15, 1980, revised November 16, 1995.

22. Federal Emergency Management Agency, Flood Insurance Study, Township of Nicholson, Fayette County, Pennsylvania, Washington, D.C., September 4, 1991, revised September 6, 1995.

23. Federal Emergency Management Agency, Flood Insurance Study, Township of North Union, Fayette County, Pennsylvania, Washington, D.C., April 16, 1991.

24. Federal Emergency Management Agency, Flood Insurance Study, Township of Perry, Fayette County, Pennsylvania, Washington, D.C., October 15, 1981.

25. Federal Emergency Management Agency, Flood Insurance Study, Borough of Perryopolis, Fayette County, Pennsylvania, Washington, D.C., August 3, 1981.

26. Federal Emergency Management Agency, Flood Insurance Study, Borough of Point Marion, Fayette County, Pennsylvania, Washington, D.C., July 4, 1988, revised June 16, 1995.

27. Federal Emergency Management Agency, Flood Insurance Study, Township of Redstone, Fayette County, Pennsylvania, Washington, D.C., July 6, 1981.

28. Federal Emergency Management Agency, Flood Insurance Study, Township of Saltlick, Fayette County, Pennsylvania, Washington, D.C., March 18, 1991.

29. Federal Emergency Management Agency, Flood Insurance Study, Township of South Union, Fayette County, Pennsylvania, Washington, D.C., April 16, 1991.

30. Federal Emergency Management Agency, Flood Insurance Study, Township of Springfield, Fayette County, Pennsylvania, Washington, D.C., April 16, 1991.

31. Federal Emergency Management Agency, Flood Insurance Study, Township of Springhill, Fayette County, Pennsylvania, Washington, D.C., March 18, 1991, revised April 17, 1995.

32. U.S. Department of Housing and Urban Development, Federal Insurance Administration, Flood Insurance Study, City of Uniontown, Fayette County, Pennsylvania, Washington, D.C., November 1977.

33. Federal Emergency Management Agency, Flood Insurance Study, Township of Upper Tyrone, Fayette County, Pennsylvania, Washington, D.C., September 1978, revised December 6, 2002.

34. Federal Emergency Management Agency, Flood Insurance Study, Township of Washington, Fayette County, Pennsylvania, Washington, D.C., July 20, 1980, revised September 6, 1995.

35. U.S. Census Bureau, 2000 Census: Fayette County, Pennsylvania. Retrieved on September 15, 2006 from http://www.factfinder.census.gov.

36. Center for Economic and Community Development, The Pennsylvania State University. Retrieved on September 15, 2006 from http://cecd.aers.psu.edu/county_profile.htm.

37. The Weather Channel, Monthly Averages for Fayette County, Pennsylvania. Retrieved on October 13, 2006 from http://www.weather.com.

38. Southwestern Pennsylvania Planning Commission, Land-Use Date for Fayette County, Pittsburgh Pennsylvania, 1973.

39. U.S. Department of the Interior, Geological Survey, Water-Supply Paper 1675, Magnitude and Frequency of Floods in the United States, Part 3-A. Ohio River Basin Except Cumberland and Tennessee River Basins by Paul R. Speer and Charles R. Gamble, Washington, D.C., 1965.

40. Commonwealth of Pennsylvania, Department of Forests and Waters, Flood Discharge Records Relating to Pennsylvania Streams, Harrisburg, Pennsylvania, 1950.

41. U.S. Department of Housing and Urban Development, Federal Insurance Administration. (December 1976). Flood Insurance Study, Borough of Scottdale, Westmoreland County, Pennsylvania. Washington, D.C.

42. U.S. Department of Commerce, National Oceanic and Atmospheric Administration, Climates of the States, Washington, D.C., 1974.

43. U.S. Army Corps of Engineers, Flood Plain Information Report: Monongahela River. Fayette County, Pennsylvania, Pittsburgh, Pennsylvania, August 1973.

44. U.S. Department of the Interior, Geological Survey, Water Resources Data for Pennsylvania, Surface Water Records, Harrisburg, Pennsylvania, Published Annually 1962-1978.

45. U. S. Army Corps of Engineers, Pittsburgh District, Flood Plain Information, Ohio, Monongahela, and Youghiogheny Rivers, Allegheny County, Pennsylvania, Pittsburgh, Pennsylvania, March 1973.

46. U.S. Army Corps of Engineers, North Atlantic Division, Water Resources Development in Pennsylvania, New York, 1973.

47. U.S. Army Corps of Engineers, North Atlantic Division, Water Resources Development in Maryland, New York, 1973.

48. U.S. Army Corps of Engineers, Ohio River Division, Water Resources Development in West Virginia, Cincinnati, Ohio, 1975.

49. U.S. Department of Agriculture, Soil Conservation Service, et al. (September 1986). Work Plan for Jacobs Creek Watershed, Washington, D.C.

50. U.S. Army Corps of Engineers, Pittsburgh District, Untitled Regression Data, Pittsburgh, Pennsylvania, 1975.

51. U.S. Department of the Interior, Geological Survey, Magnitude and Frequency of Floods in the United States, Part 3-A, Ohio River Basin Except Cumberland and Tennessee River Basins, Water Supply Paper 1675. Washington, D.C., U.S. Government Printing Office, 1965.

52. U.S. Army Corps of Engineers, Flood Damage Survey, Youghiogheny River, November 1973.

53. U.S. Army Corps of Engineers, Pittsburgh District, "Multi-Regression Formulas for Streams with Small Drainage Areas," Pittsburgh, Pennsylvania (unpublished).

54. Water Resources Council, "Guidelines for Determining Flood Flow Frequency," Bulletin 17A, Washington, D.C., June 1997.

55. Ven Te Chow, ed. (1964). Handbook of Applied Hydrology, New York. McGraw-Hill.

56. Water Resources Council. (March 1976). Bulletin 17, "Guidelines for Determining Flood Flow Frequencies."

57. U.S. Department of Agriculture, Natural Resources Conservation Service. (February 1974). TR-28 Hydrology Model of Jacobs Creek Watershed with Dams and Channel Added. West Virginia.

58. Federal Highway Administration, Washington, D.C., The Design of Encroachments on Flood Plains Using Risk Analysis, Hydraulic Engineering Circular No. 17, October 1980.

59. U.S. Department of the Interior, Geological Survey, Office of Water Data Collection, Interagency Advisory Committee on Water Data, Guidelines for Determining Flood Flow Frequency, Bulletin 17B, Reston, Virginia, Revised September 1981, revised March 1982.

60. B.M. Reich, et al., Flood Peak Frequency Design Manual, PSU III, State College, Pennsylvania, Pennsylvania State University, June 1971.

61. L.C. Shaw, and W.F. Busch, Floods in Pennsylvania - Frequency and Magnitude. An open-file report of the Pennsylvania Department of Environmental Resources, 1960.

62. The Pennsylvania State University, Institute for Research on Land and Water Resources. Procedure PSU-IV for Estimating Design Flood Peaks on Ungaged Pennsylvania Watershed, University Park, Pennsylvania, April 1981.

63. U.S. Department of Agriculture, Soil Conservation Service, Technical Release No. 55, Urban Hydrology for Small Watersheds, Washington, D.C., January 1975.

64. U.S. Department of Agriculture, Soil Conservation Service, Engineering Field Manual, Volume 1, Washington, D.C., 1971.

65. Herbert Flippo, U.S. Department of the Interior, Geological Survey, Personal Communication, Harrisburg, Pennsylvania.

66. Commonwealth of Pennsylvania, Department of Environmental Resources, in cooperation with the U.S. Geological Survey, Water Resources Bulletin No. 13, Floods in Pennsylvania, A Manual for Estimation of their Magnitude and Frequency, by Herbert J. Flippo, Jr., Harrisburg, Pennsylvania, October 1977.

67. U.S. Department of the Interior, Geological Survey, Water Resources Data for Pennsylvania, Part 1, Surface Water Records, U.S. Department of the Interior, Geological Survey, Harrisburg, Pennsylvania, 1961-1975.

68. Water Resources Council, "A Uniform Technique for Determining Flood Flow Frequencies," Bulletin No. 15, December 1967.

69. U.S. Army Corps of Engineers, Hydrologic Engineering Center, HEC-2 Water Surface Profiles, Generalized Computer Program, Davis, California, April 1984, revised May 1991.

70. Michael Baker, Jr., Inc., of Beaver, Pennsylvania, Topographic Maps compiled from aerial photographs, Scale 1:4,800, Contour Interval 4 Feet: Point Marion, Pennsylvania, September 1984.

71. Eastern Mapping Company of Blawnox, Pennsylvania, Topographic Maps compiled from aerial photographs, scale 1:2,400, Contour Interval 4 Feet; Monongahela River, Downers Run, Fayette County, Pennsylvania, 1979; Blawnox, 1979; Luzerne, 1979; Perry, 1979; Perryopolis, 1979; Redstone, 1979.

72. U.S. Army Corps of Engineers, Hydrologic Engineering Center, HEC-2 Water Surface Profiles, Users Manual, Davis, California, October 1973.

73. Federal Emergency Management Agency, Flood Insurance Study, Township of Mount Pleasant, Westmoreland County, Pennsylvania, Washington, D.C., September 4, 1986.

74. U.S. Department of Agriculture, Soil Conservation Service, Drawing and Cross-Section Data for Jacobs Creek Watershed, Modified Channel Improvements PA-658, Fayette and Westmoreland Counties, Pennsylvania, Washington, D.C., November 1992.

75. Federal Emergency Management Agency, Flood Insurance Study, Township of East Huntington, Westmoreland County, Pennsylvania, Washington, D.C., August 2, 1990.

76. Federal Emergency Management Agency, Flood Insurance Administration, Flood Insurance Study, Borough of Scottdale, Westmoreland County, Pennsylvania, Washington, D.C., May 18, 1981.

77. Federal Emergency Management Agency, Flood Insurance Study, Westmoreland County, Pennsylvania (all Jurisdictions), Washington, D.C., November 20, 2000.

78. Intergraph Corporation, Intergraph/Inroads Software Package, 1992.

79. U.S. Army Corps of Engineers, HEC-2 Water Surface Profiles-Computer Program 723-X6-L202A, Error Correction 01 thru 09, Modifications 52 thru 58, Davis, California, Hydrologic Engineering Center, October 1973.

80. U.S. Department of the Interior, Bureau of Reclamation, Design of Small Dams, Washington, D.C., U.S. Government Printing Office, 1974.

81. U.S. Army Corps of Engineers, Pittsburgh District, High Water Profile for the Youghiogheny River, Mile 0.0 to 74.0, Pittsburgh, Pennsylvania (undated).

82. Federal Emergency Management Agency, Flood Insurance Administration, Flood Insurance Study, Township of Rostraver, Westmoreland County, Pennsylvania, (unpublished).

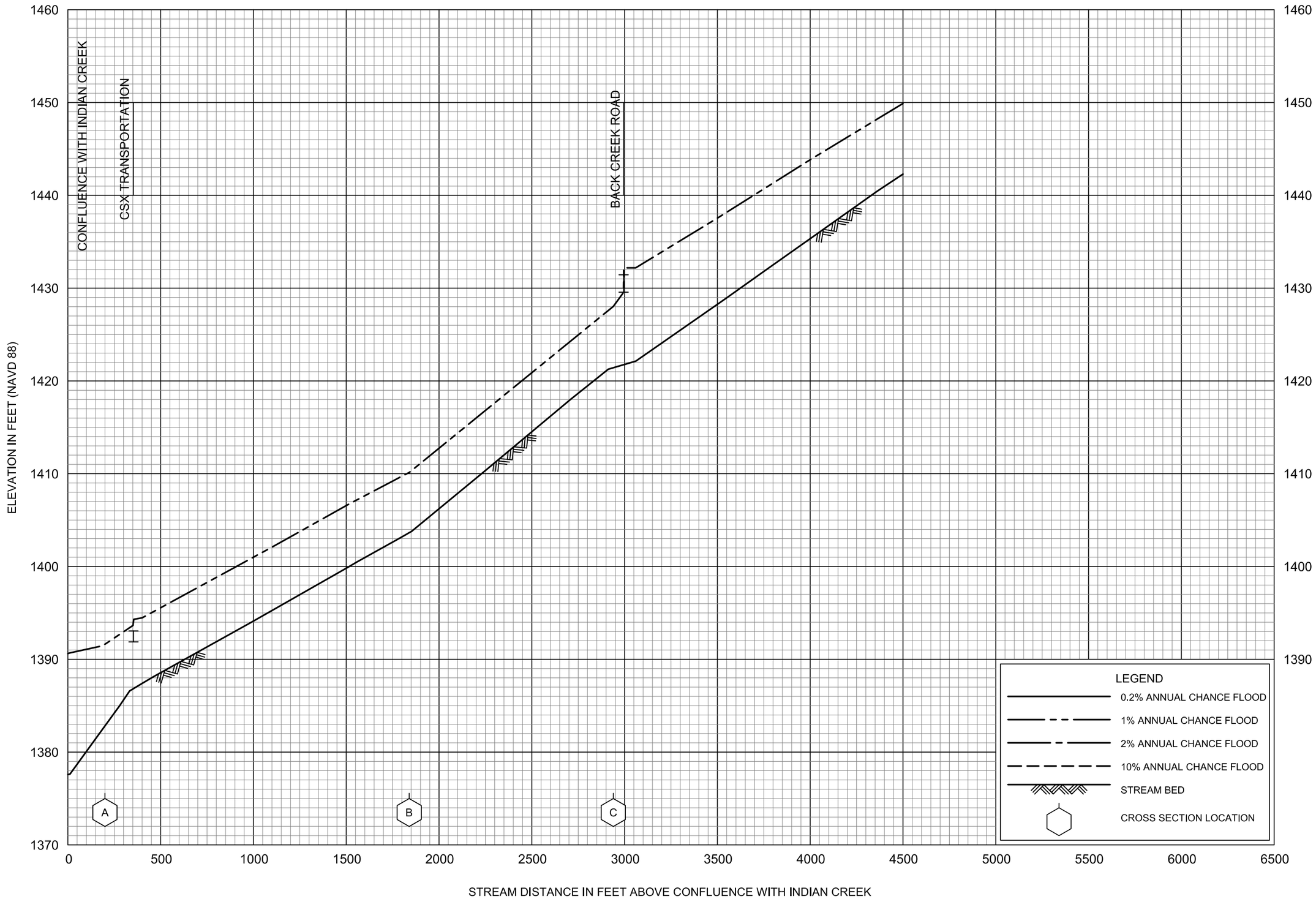
83. U.S. Department of the Interior, Geological Survey, Water-Supply Paper 1849, Roughness Characteristics of Natural Channels, Washington, D.C., 1967.

84. U.S. Department of the Interior, Geological Survey, 7.5-Minute Series Topographic Maps, Scale 1:24,000, Contour Interval 20 Feet: Brownfield, Pennsylvania, 1964, Photorevised 1973; Carmichaels, Pennsylvania, 1964, Photorevised 1979; Connellsville, Pennsylvania, 1964, Photorevised 1973, Photoinspected 1977; Dawson, Pennsylvania, 1964, Photorevised 1973; Donegal, Pennsylvania, 1967, Photorevised 1979; Lake Lynn, Pennsylvania-West Virginia, 1960, Photorevised 1976; Mammoth, Pennsylvania, 1964, Photorevised 1973; Masontown, Pennsylvania, 1964, Photorevised 1979; Mill Run, Pennsylvania, 1967, Photorevised 1980; Morgantown North, West Virginia-Pennsylvania, 1957, Photorevised 1976; Mount Pleasant, Pennsylvania, 1964, Photorevised 1979; New Salem, Pennsylvania, 1964, Photorevised 1973, Photoinspected 1977; Seven Springs, Pennsylvania, 1967, Photorevised 1973; Smithfield, Pennsylvania, 1964, Photorevised 1979; South Connellsville, Pennsylvania, 1964, Photorevised 1973; Uniontown, Pennsylvania, 1963, Photorevised 1973.

85. U.S. Army Corps of Engineers, Pittsburgh District, Digitally Prepared Topographic Base Maps, Scale 1:2,400, Contour Interval 5 Feet, Pittsburgh, Pennsylvania, October 1992.

86. Bentley Corporation. Microstation Software Package, Version 5.0.

87. Federal Emergency Management Agency, Flood Insurance Study, Borough of Greensboro, Greene County, Pennsylvania, Washington, D.C., March 2, 1989, revised September 6, 1995.



FLOOD PROFILES

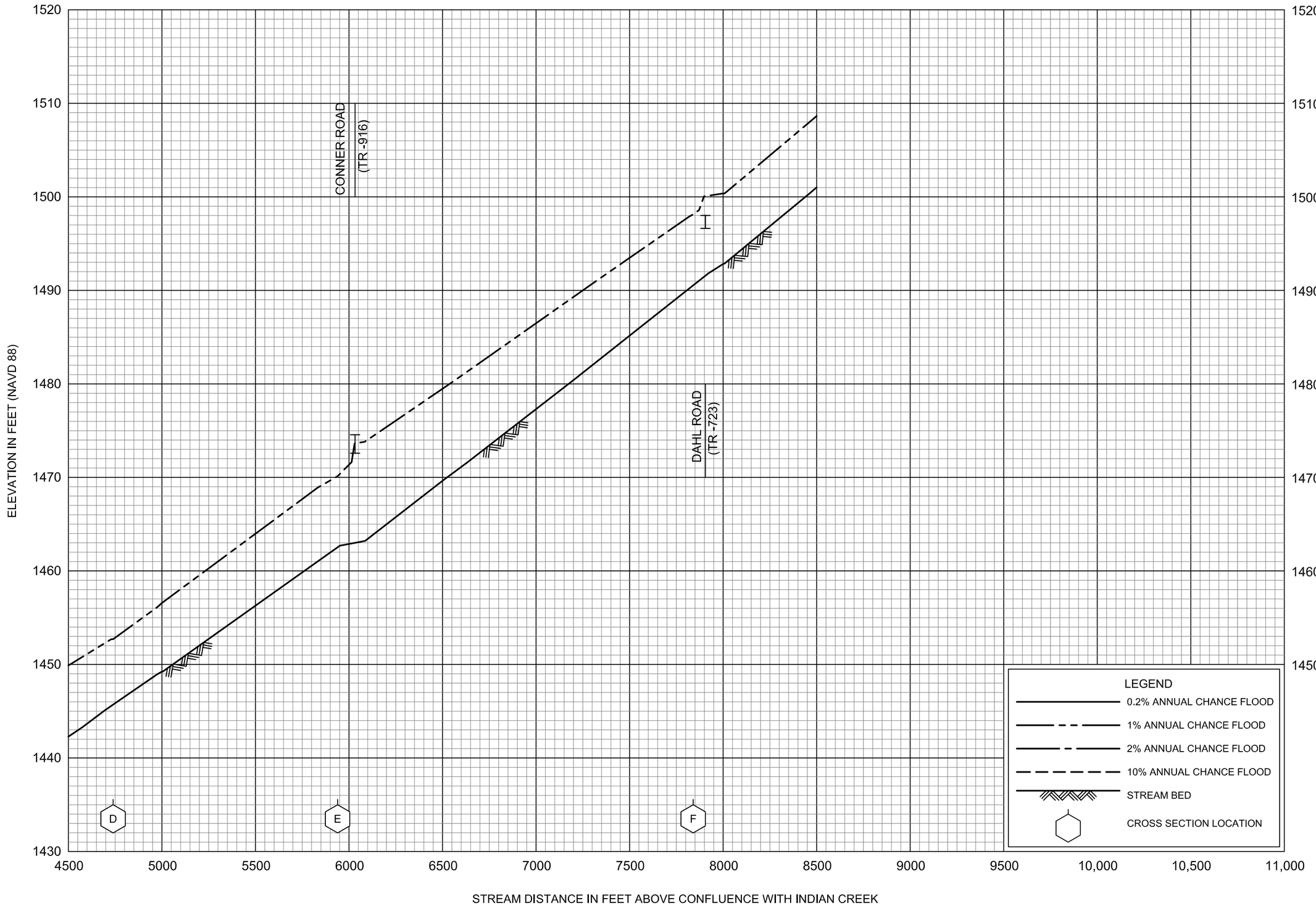
BACK CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

FAYETTE COUNTY, PA

(ALL JURISDICATIONS)

01P



FLOOD PROFILES

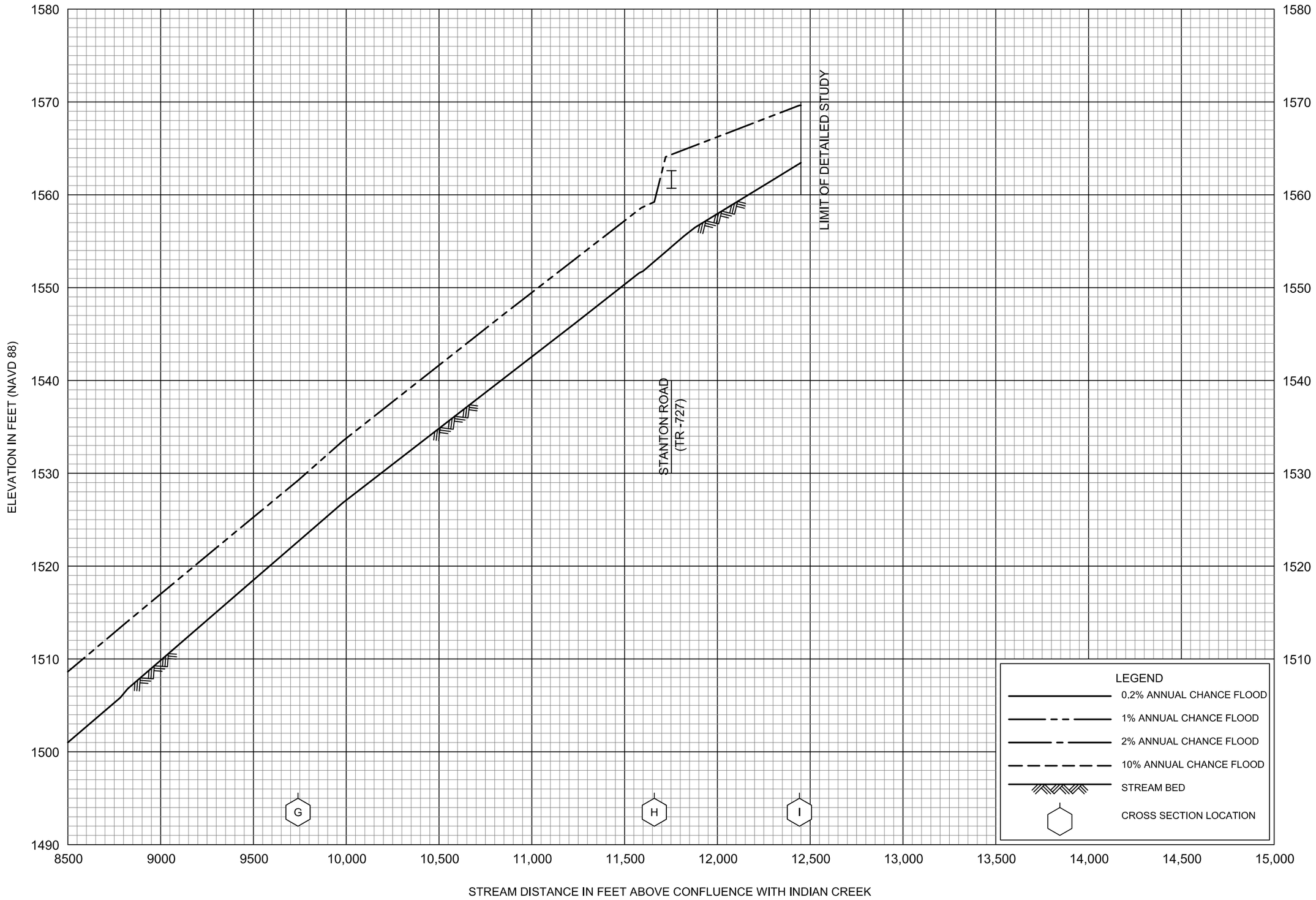
BACK CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

FAYETTE COUNTY, PA

(ALL JURISDICATIONS)

02P



FLOOD PROFILES

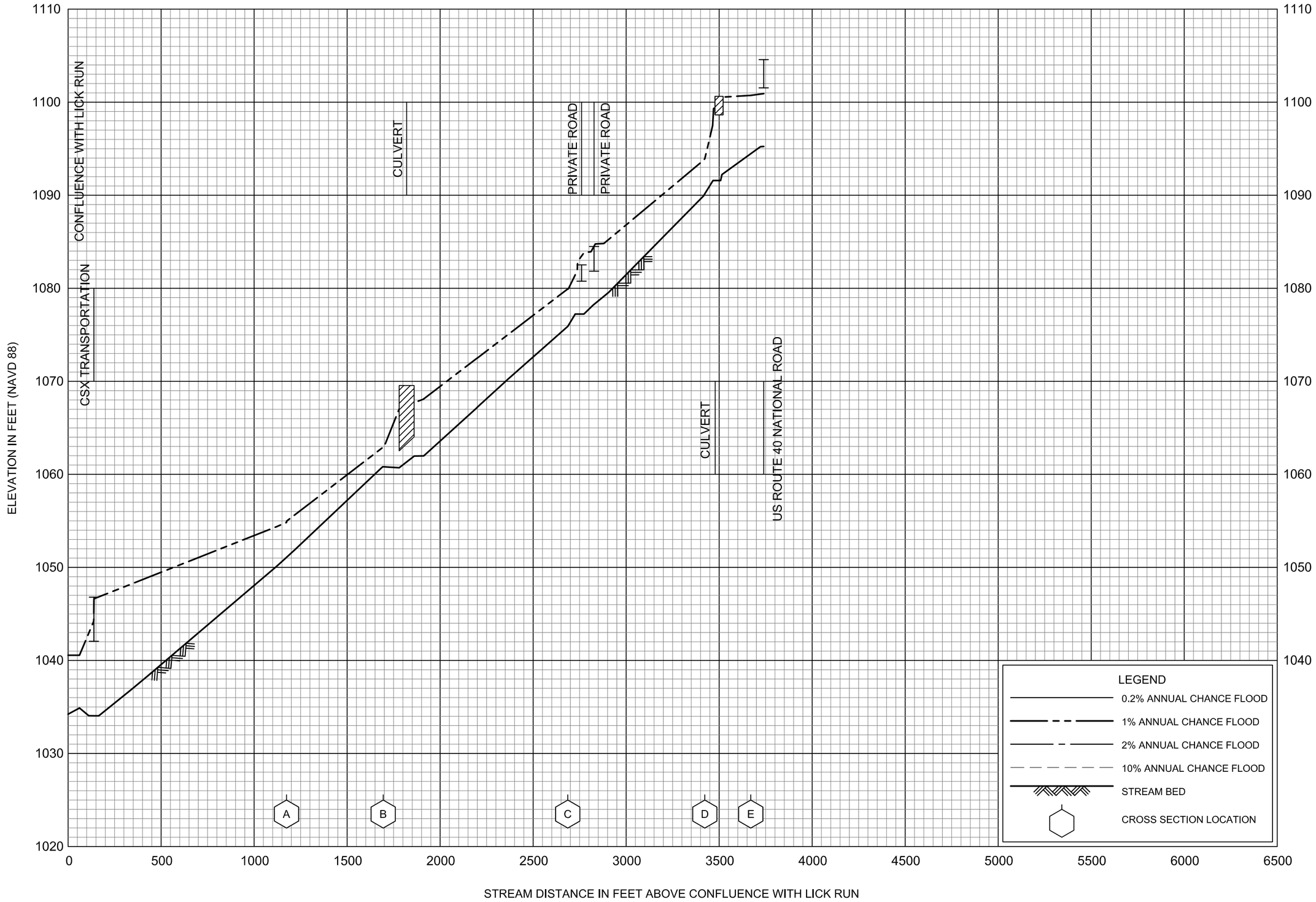
BACK CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

FAYETTE COUNTY, PA

(ALL JURISDICATIONS)

03P



FLOOD PROFILES

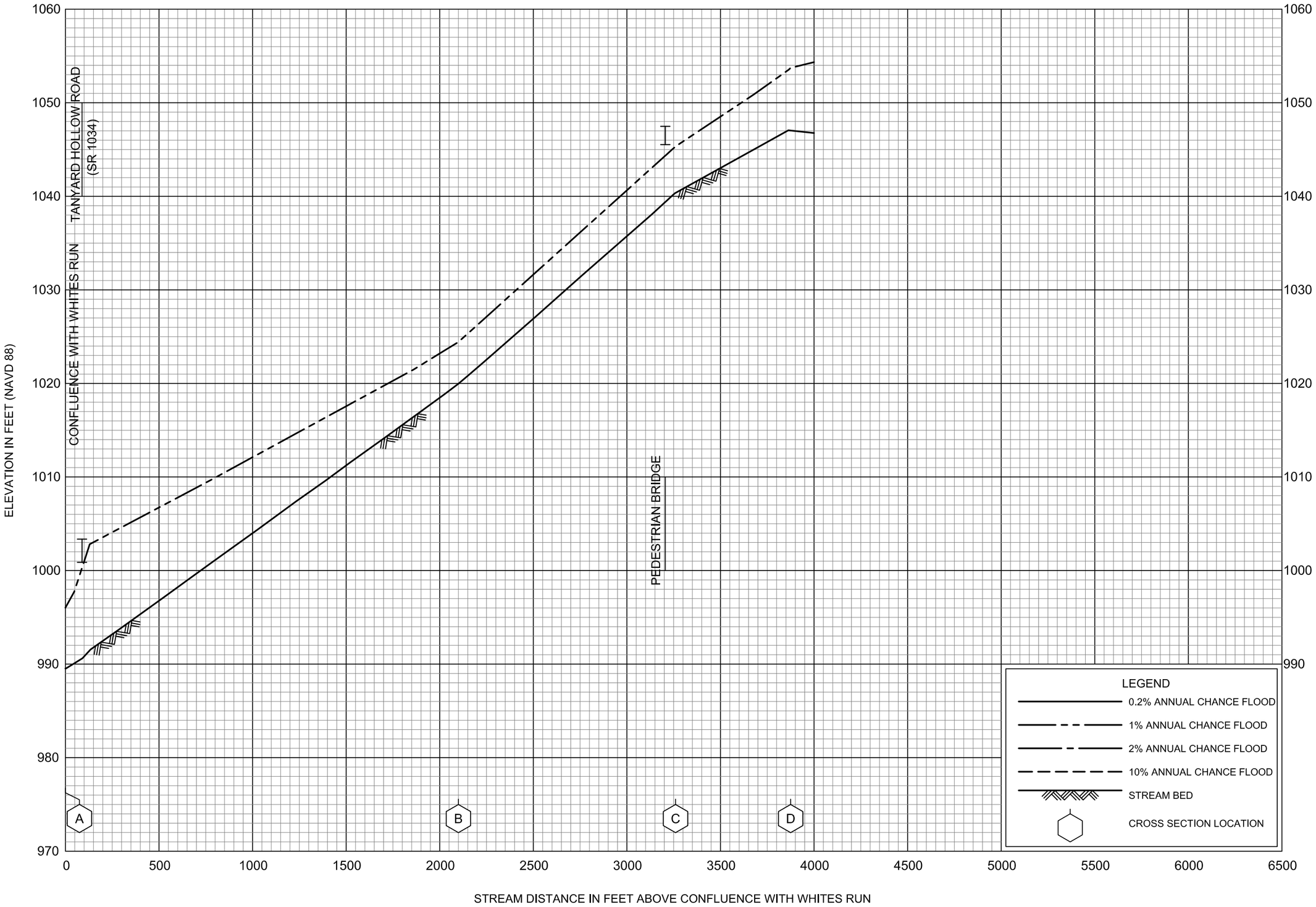
BENNINGTON SPRING RUN

FEDERAL EMERGENCY MANAGEMENT AGENCY

FAYETTE COUNTY, PA

(ALL JURISDICATIONS)

04P



FLOOD PROFILES

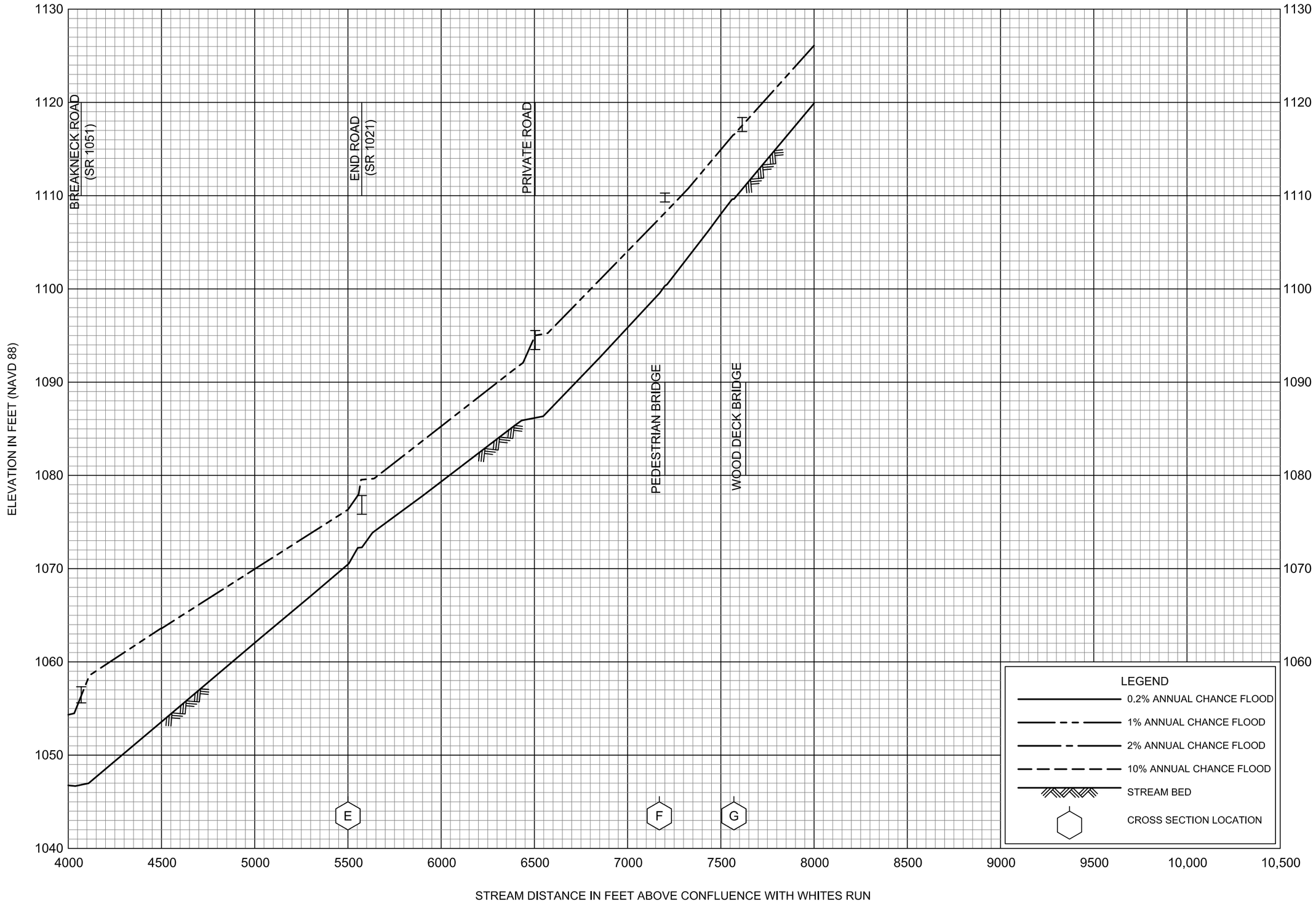
BREAKNECK RUN

FEDERAL EMERGENCY MANAGEMENT AGENCY

FAYETTE COUNTY, PA

(ALL JURISDICATIONS)

05P



FLOOD PROFILES

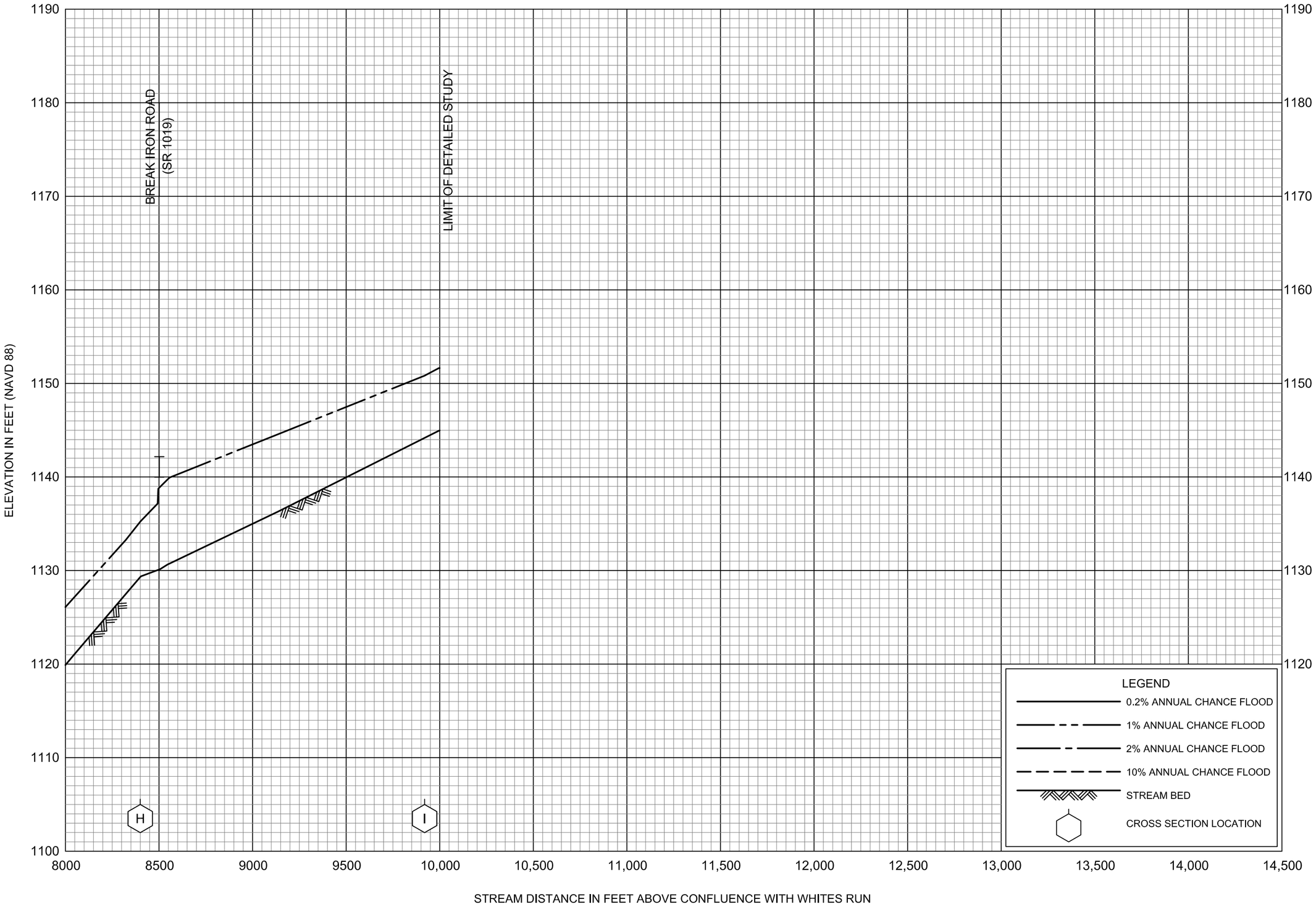
BREAKNECK RUN

FEDERAL EMERGENCY MANAGEMENT AGENCY

FAYETTE COUNTY, PA

(ALL JURISDICATIONS)

06P



FLOOD PROFILES

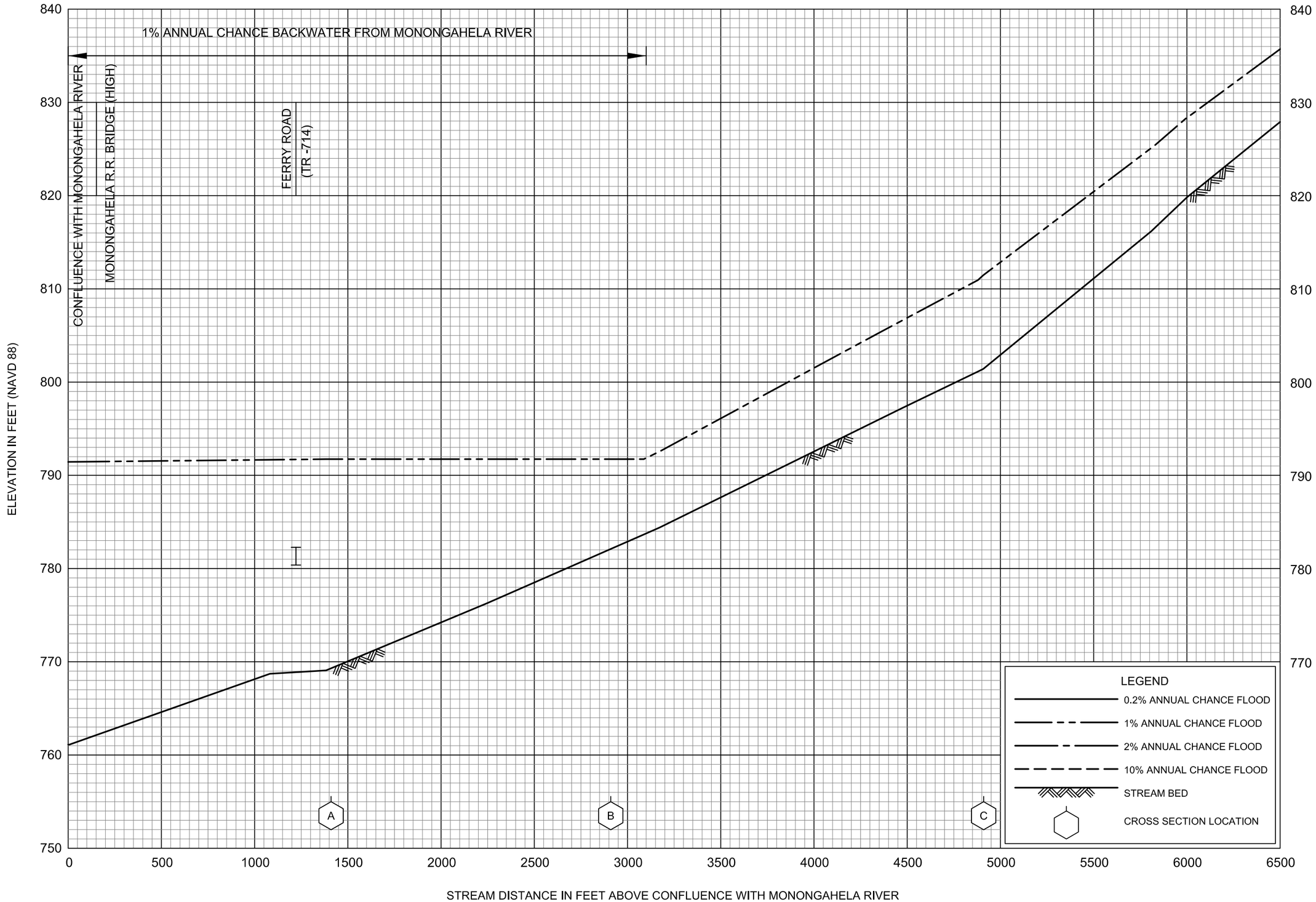
BREAKNECK RUN

FEDERAL EMERGENCY MANAGEMENT AGENCY

FAYETTE COUNTY, PA

(ALL JURISDICATIONS)

07P



FLOOD PROFILES

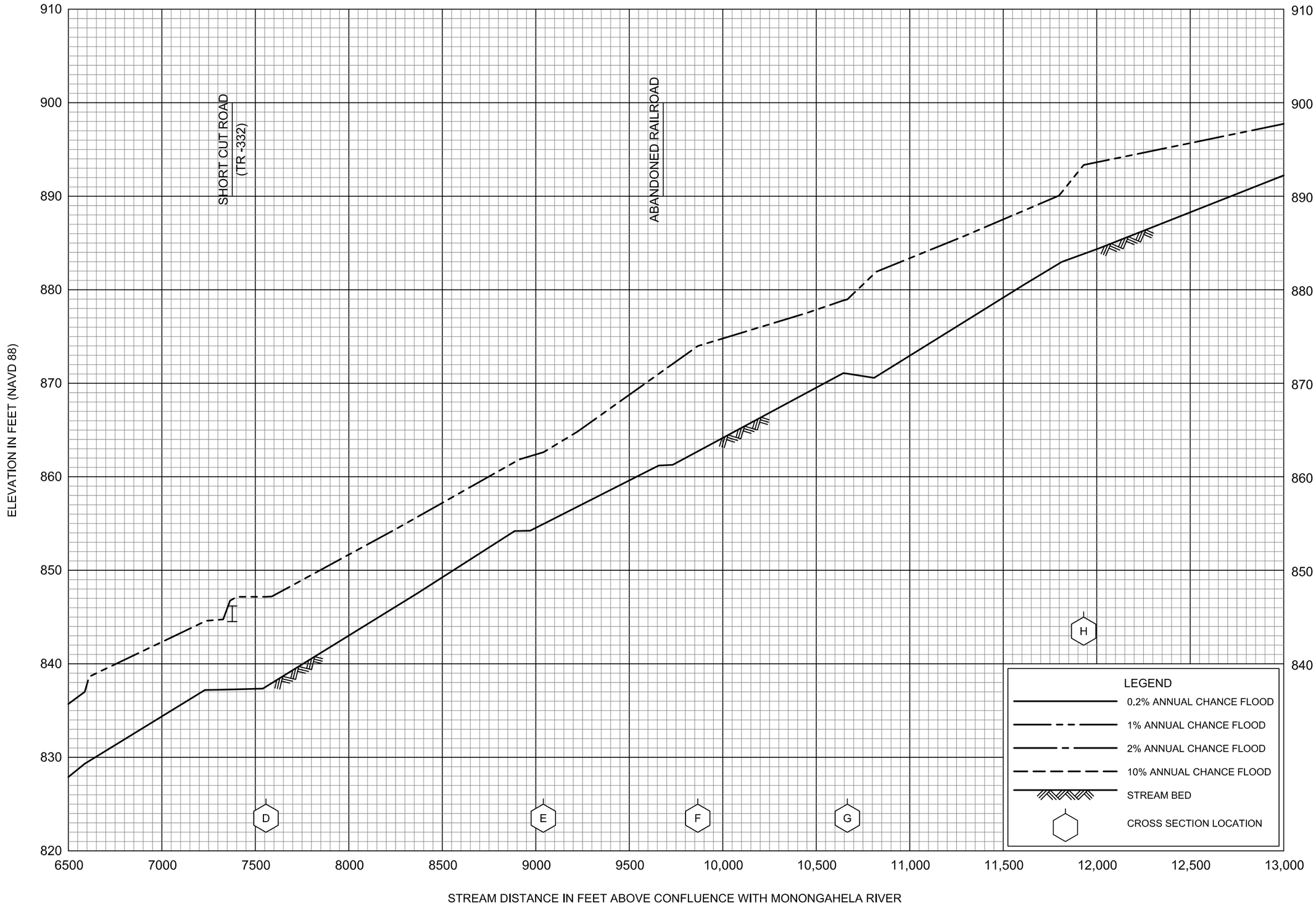
BROWNS RUN

FEDERAL EMERGENCY MANAGEMENT AGENCY

FAYETTE COUNTY, PA

(ALL JURISDICATIONS)

08P



FLOOD PROFILES

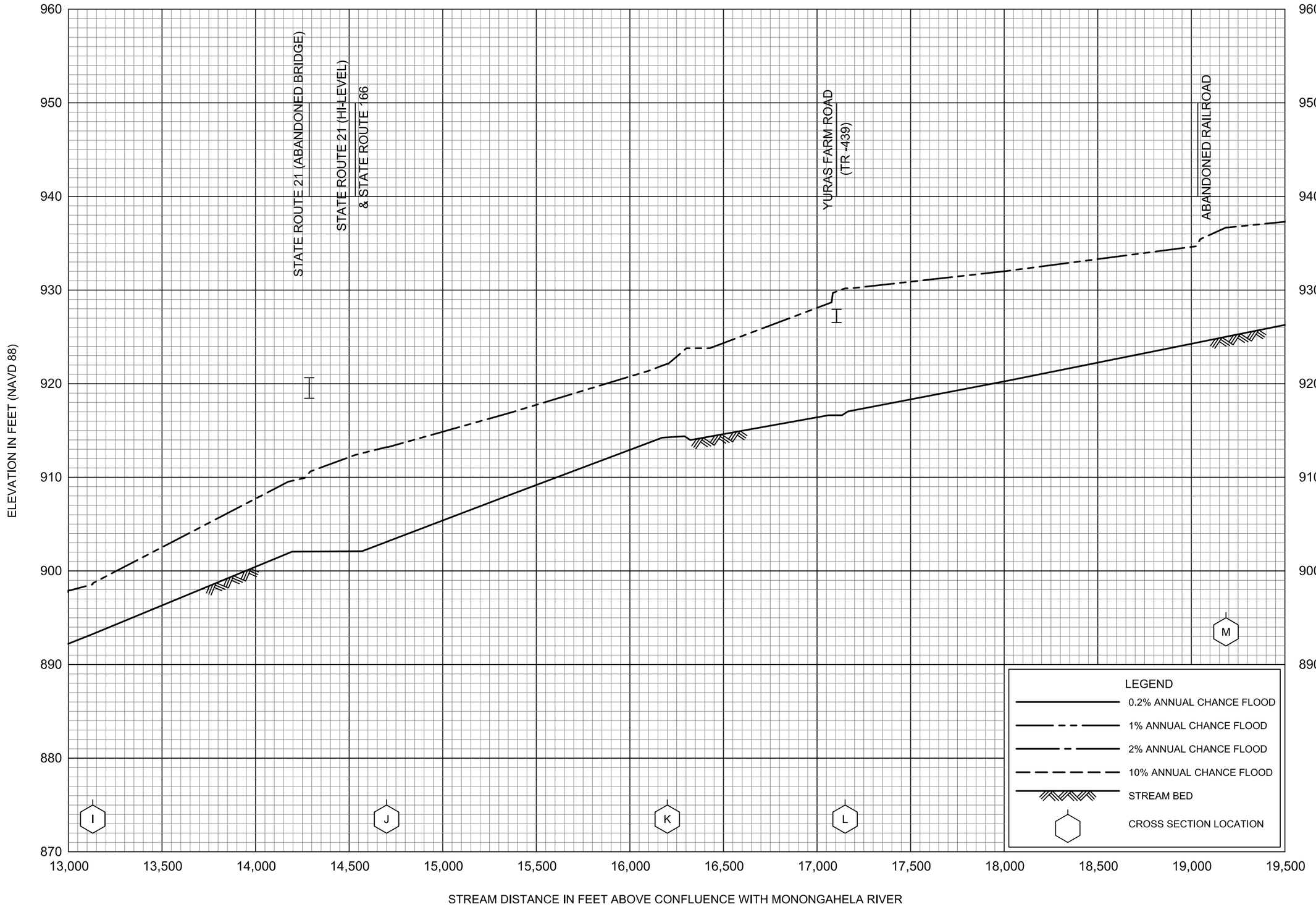
BROWNS RUN

FEDERAL EMERGENCY MANAGEMENT AGENCY

FAYETTE COUNTY, PA

(ALL JURISDICATIONS)

09P



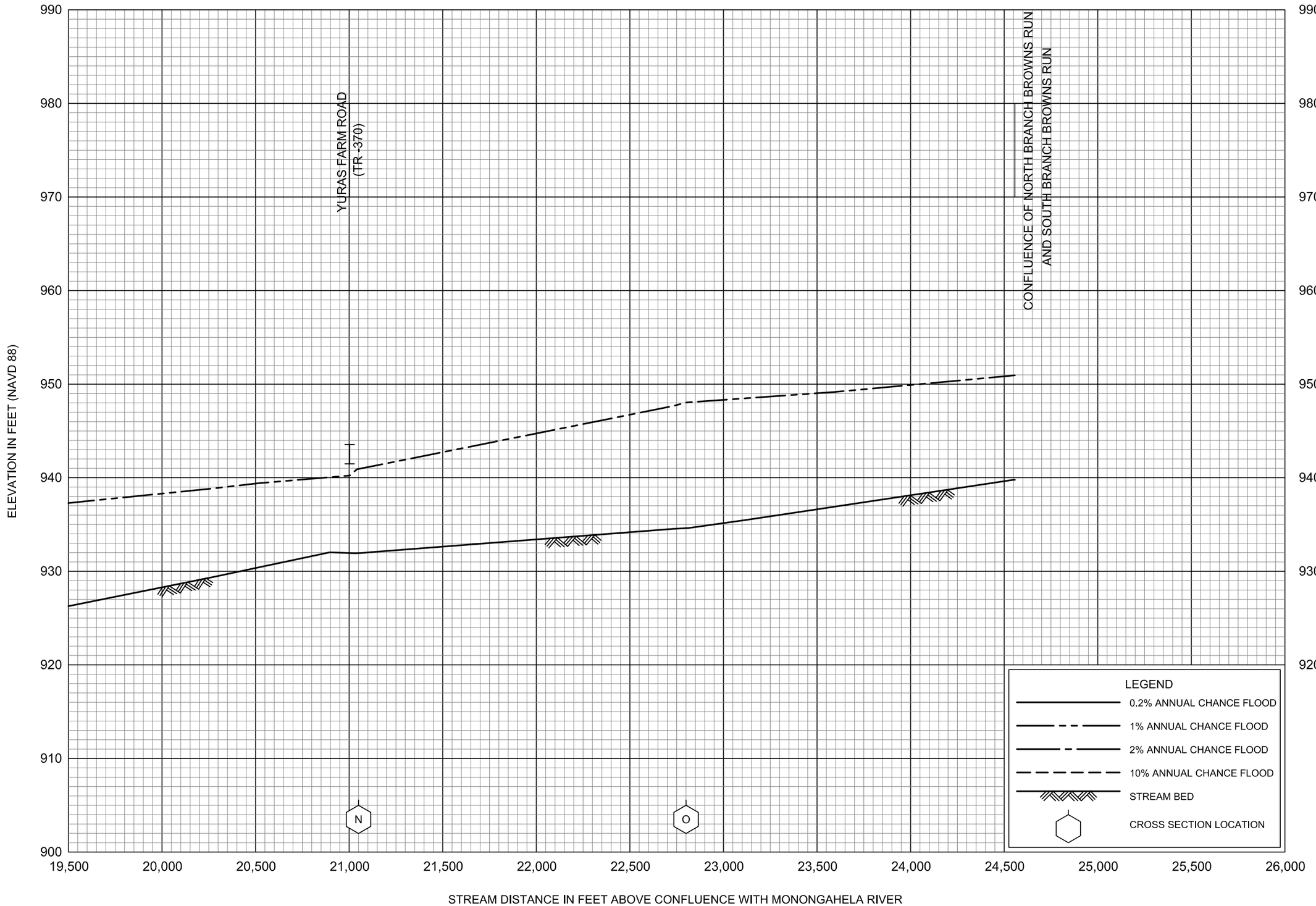
FLOOD PROFILES

BROWNS RUN

FEDERAL EMERGENCY MANAGEMENT AGENCY

FAYETTE COUNTY, PA

(ALL JURISDICATIONS)



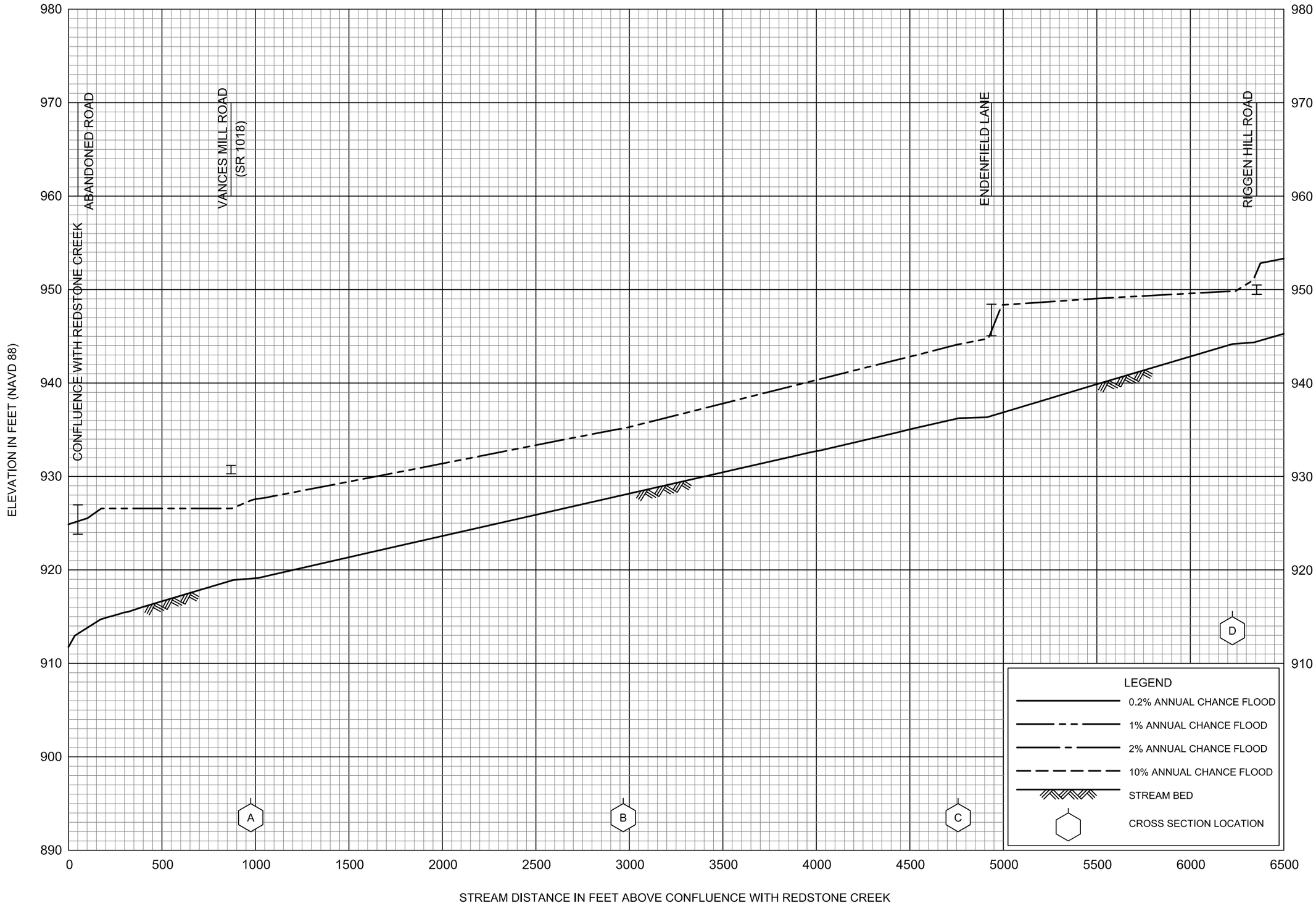
FLOOD PROFILES

BROWNS RUN

FEDERAL EMERGENCY MANAGEMENT AGENCY

FAYETTE COUNTY, PA

(ALL JURISDICATIONS)



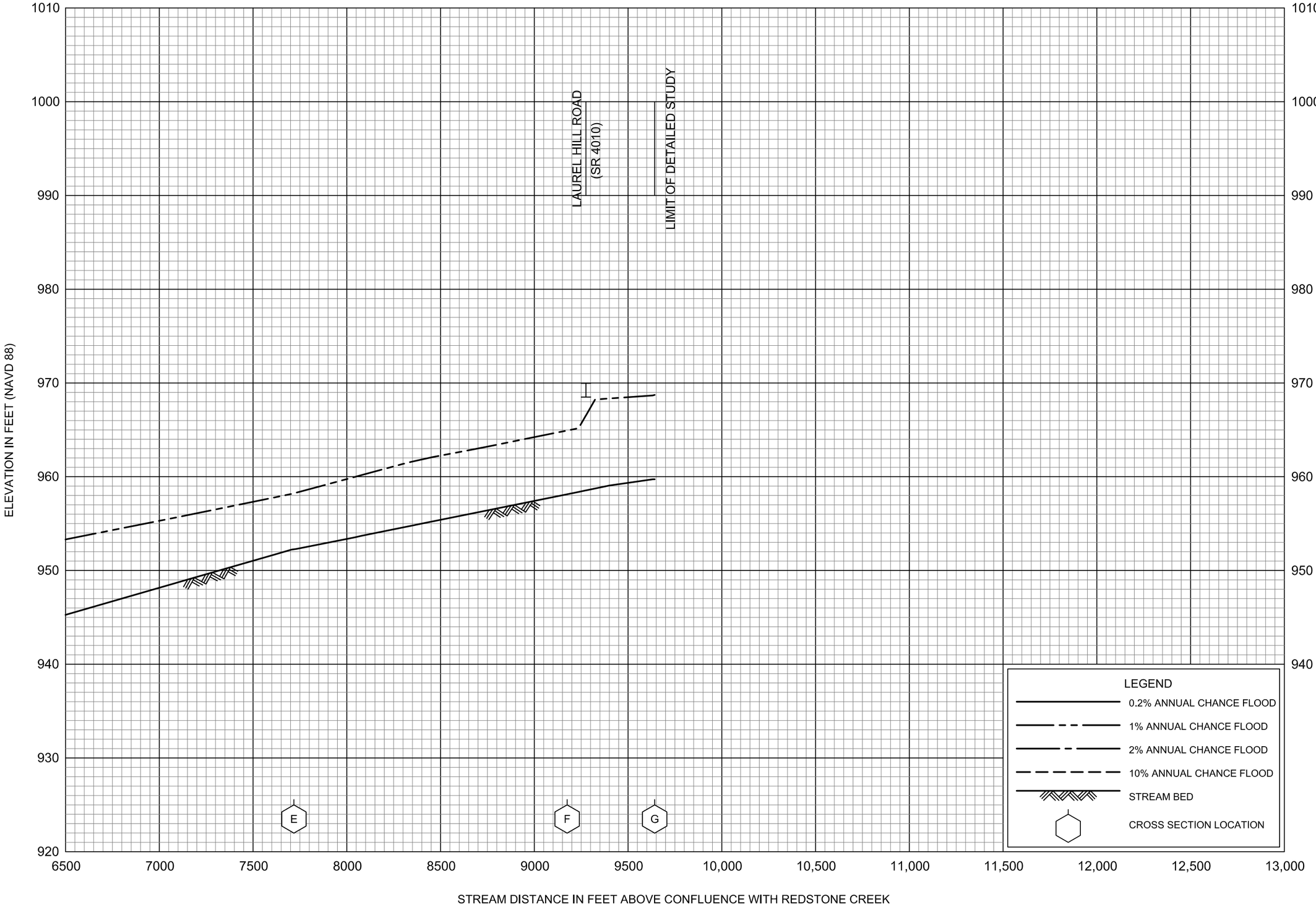
FLOOD PROFILES

BUTE RUN

FEDERAL EMERGENCY MANAGEMENT AGENCY

FAYETTE COUNTY, PA

(ALL JURISDICATIONS)



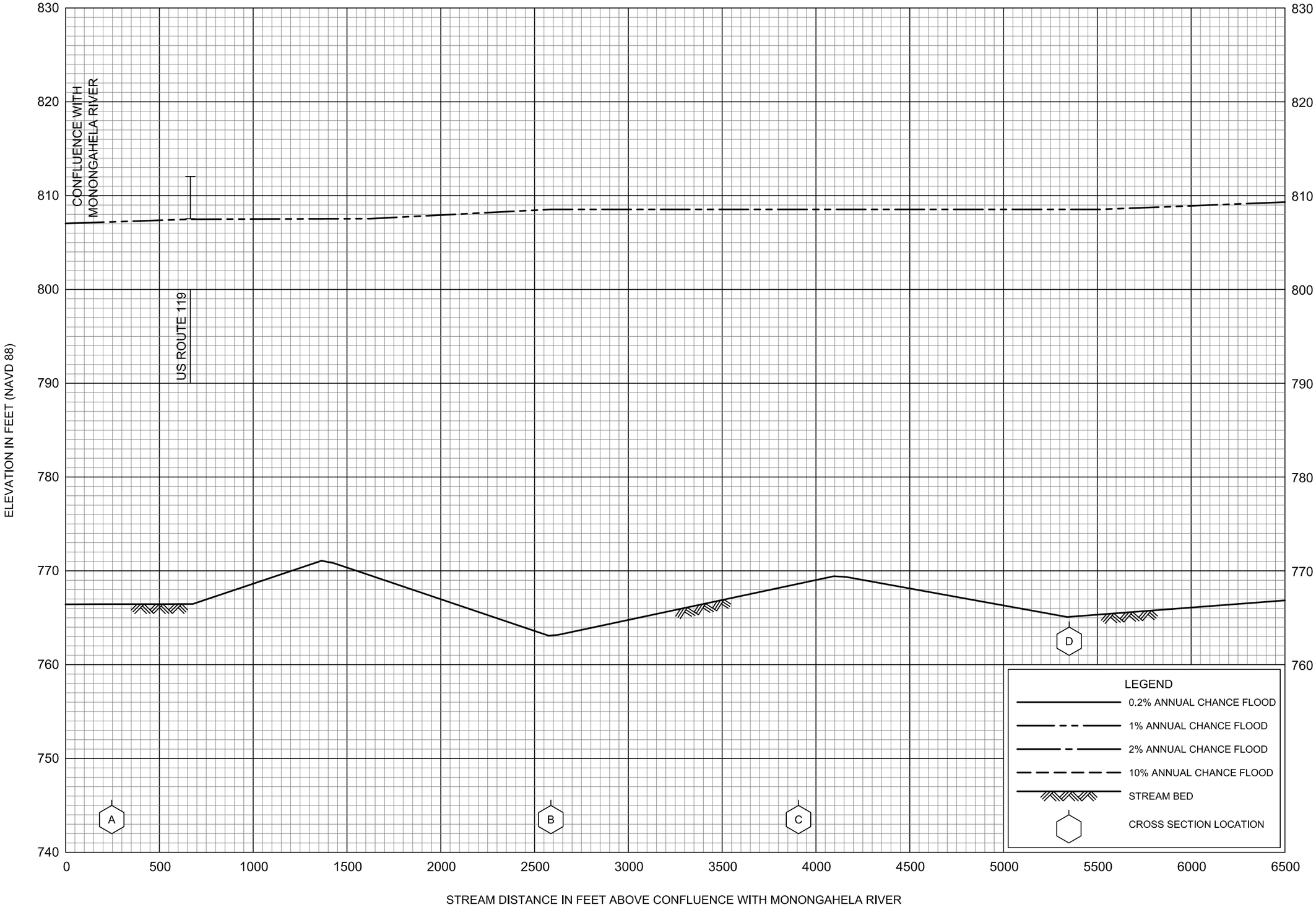
FLOOD PROFILES

BUTE RUN

FEDERAL EMERGENCY MANAGEMENT AGENCY

FAYETTE COUNTY, PA

(ALL JURISDICATIONS)



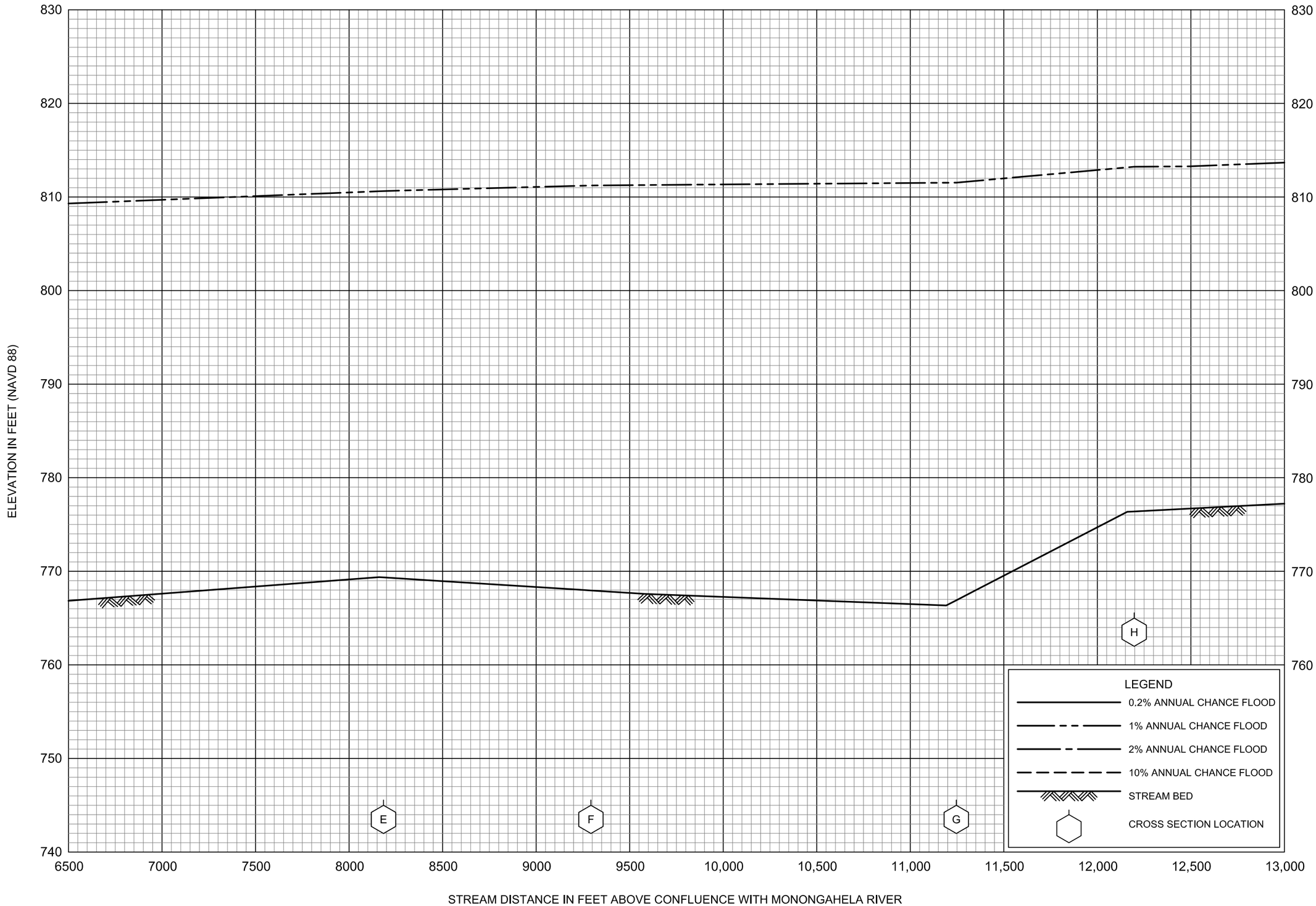
FLOOD PROFILES

CHEAT RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

FAYETTE COUNTY, PA

(ALL JURISDICATIONS)



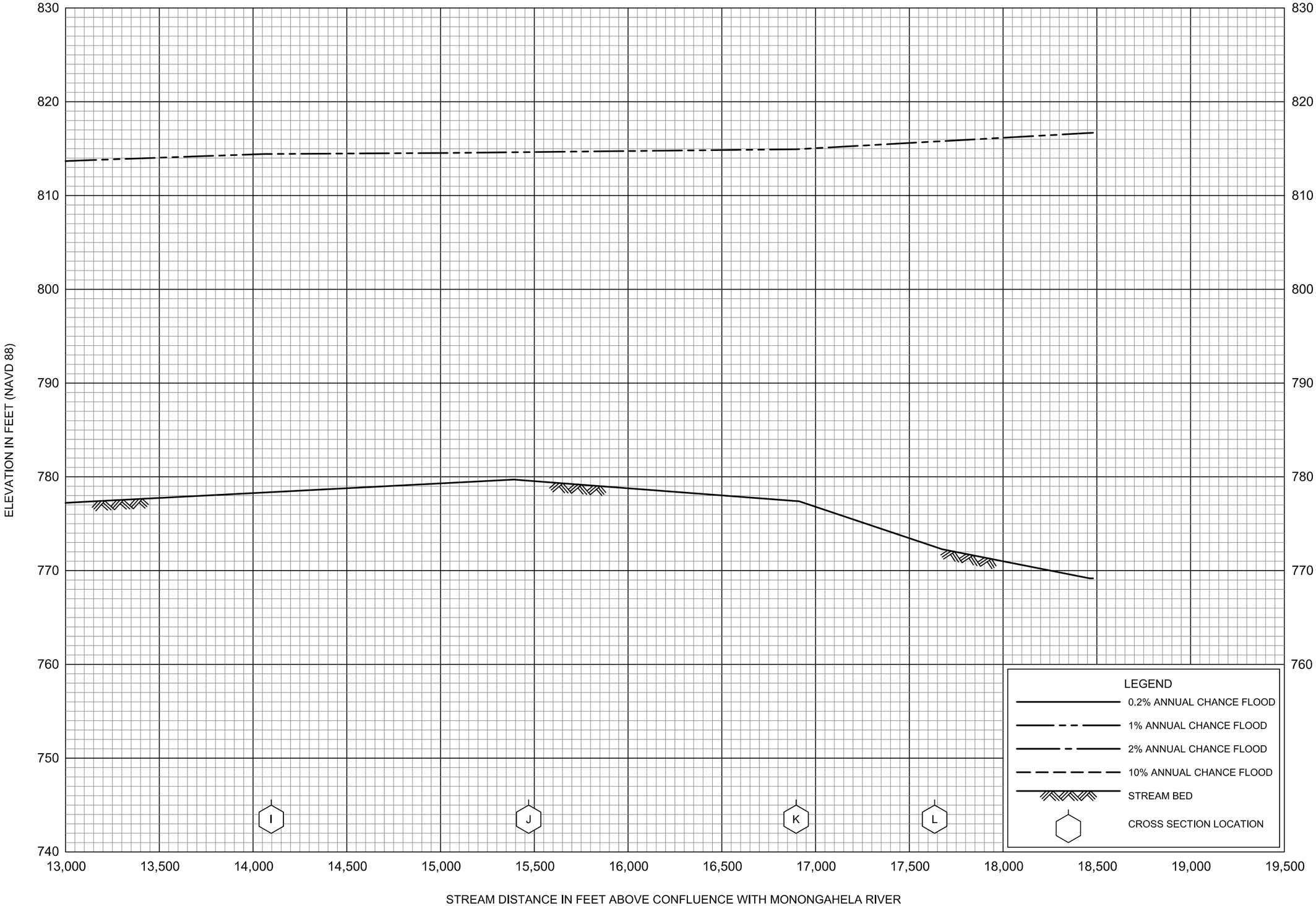
FLOOD PROFILES

CHEAT RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

FAYETTE COUNTY, PA

(ALL JURISDICATIONS)



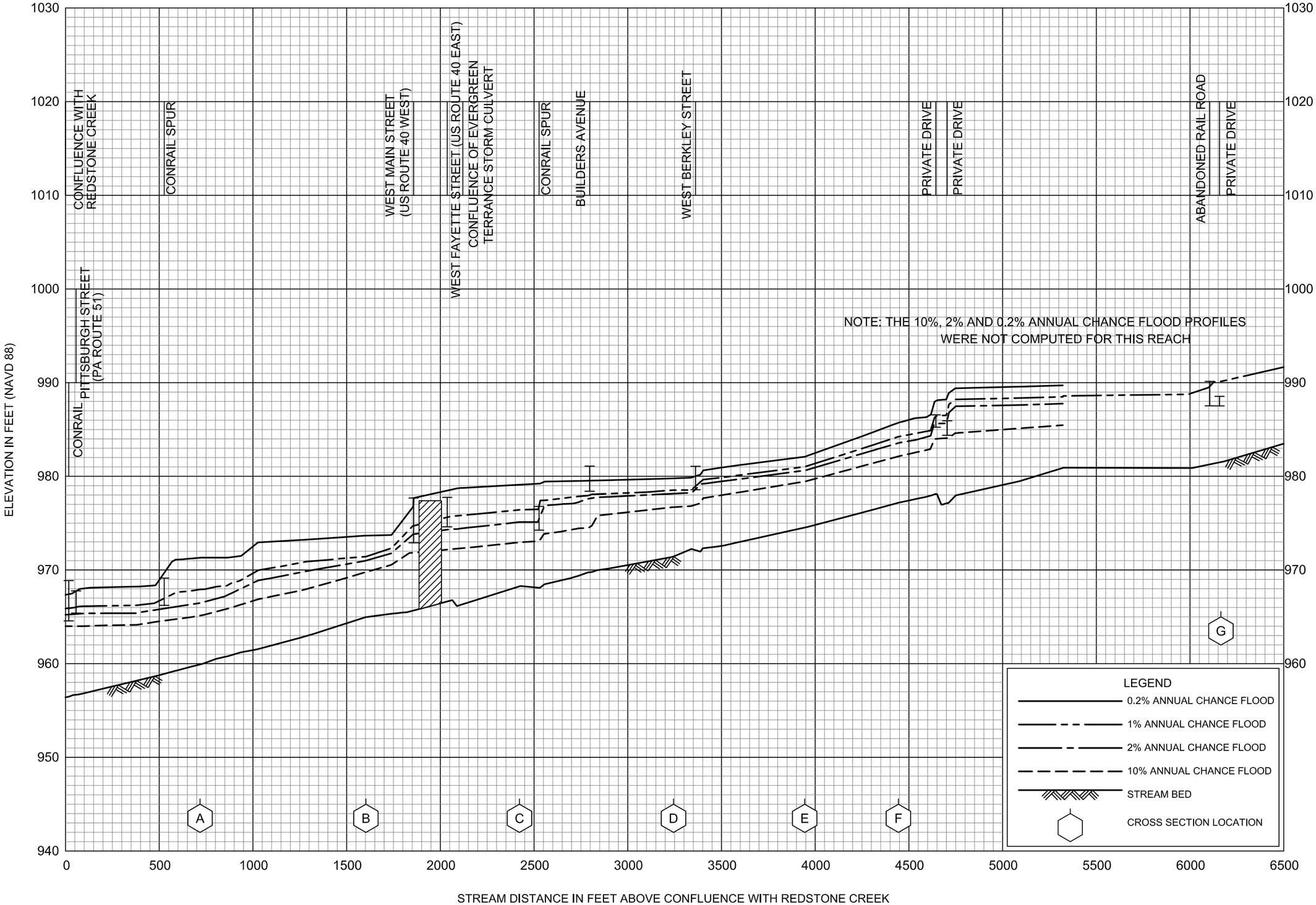
FLOOD PROFILES

CHEAT RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

FAYETTE COUNTY, PA

(ALL JURISDICTIONS)



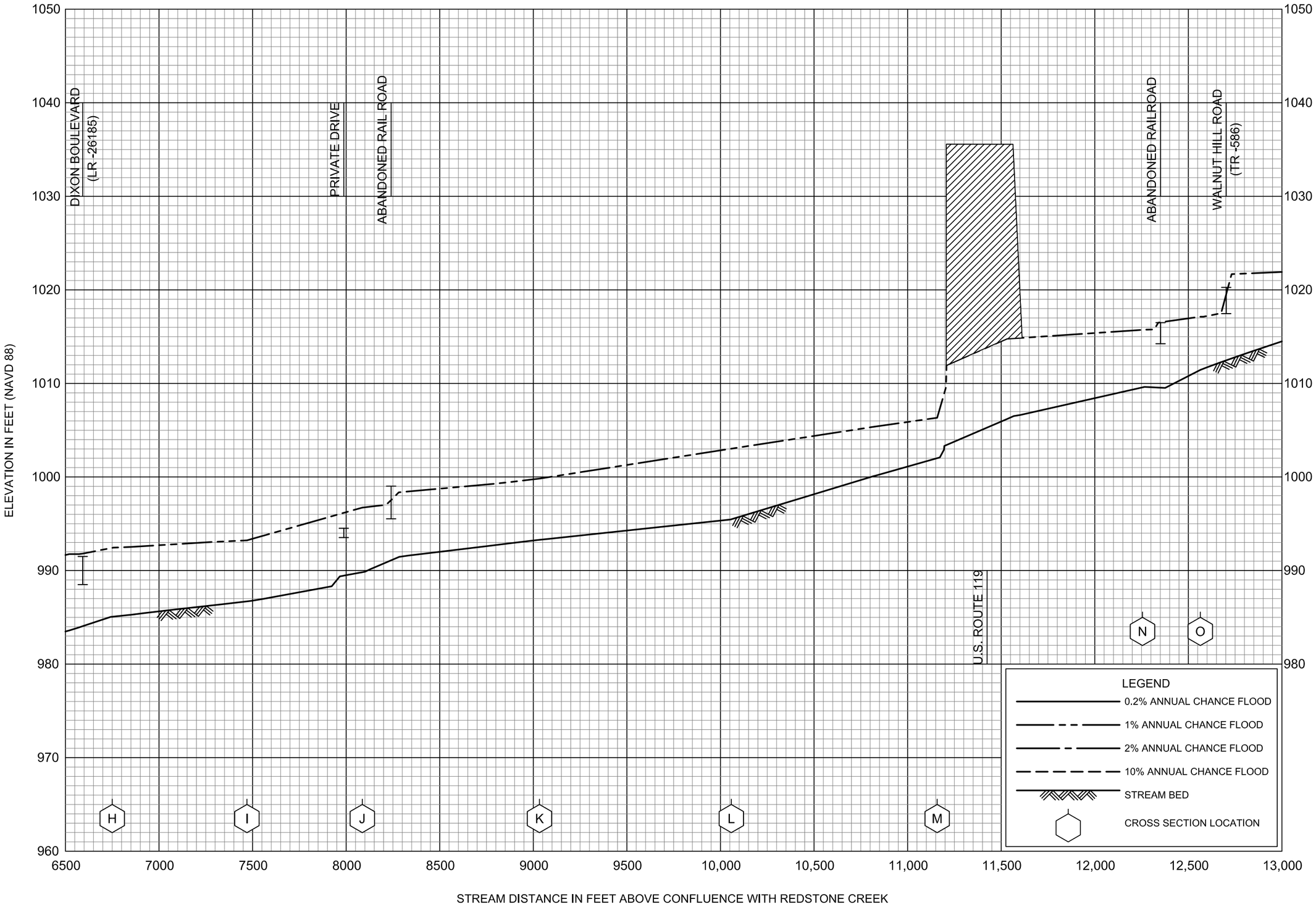
FLOOD PROFILES

COAL LICK RUN

FEDERAL EMERGENCY MANAGEMENT AGENCY

FAYETTE COUNTY, PA

(ALL JURISDICTIONS)

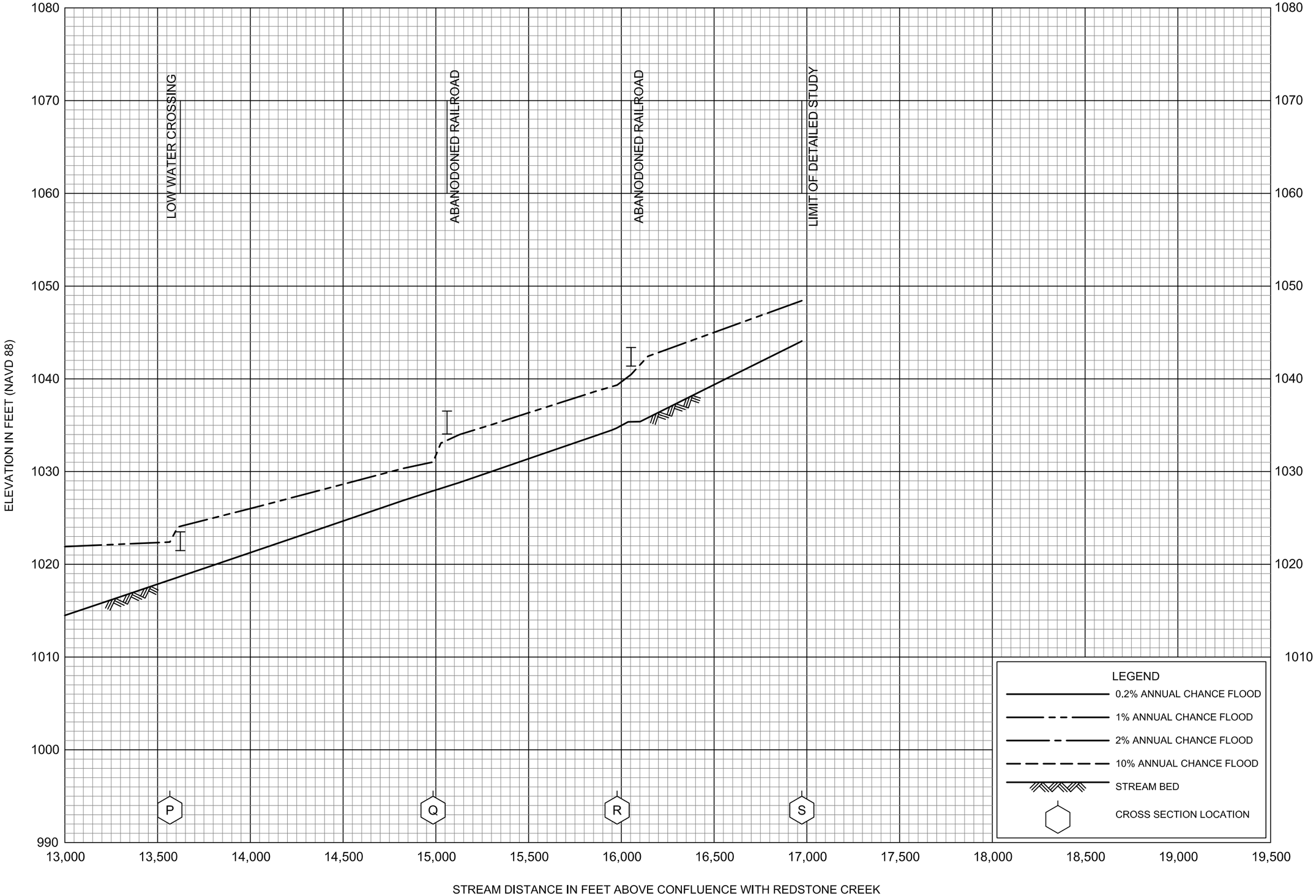


FLOOD PROFILES

COAL LICK RUN

FEDERAL EMERGENCY MANAGEMENT AGENCY

FAYETTE COUNTY, PA
(ALL JURISDICTIONS)



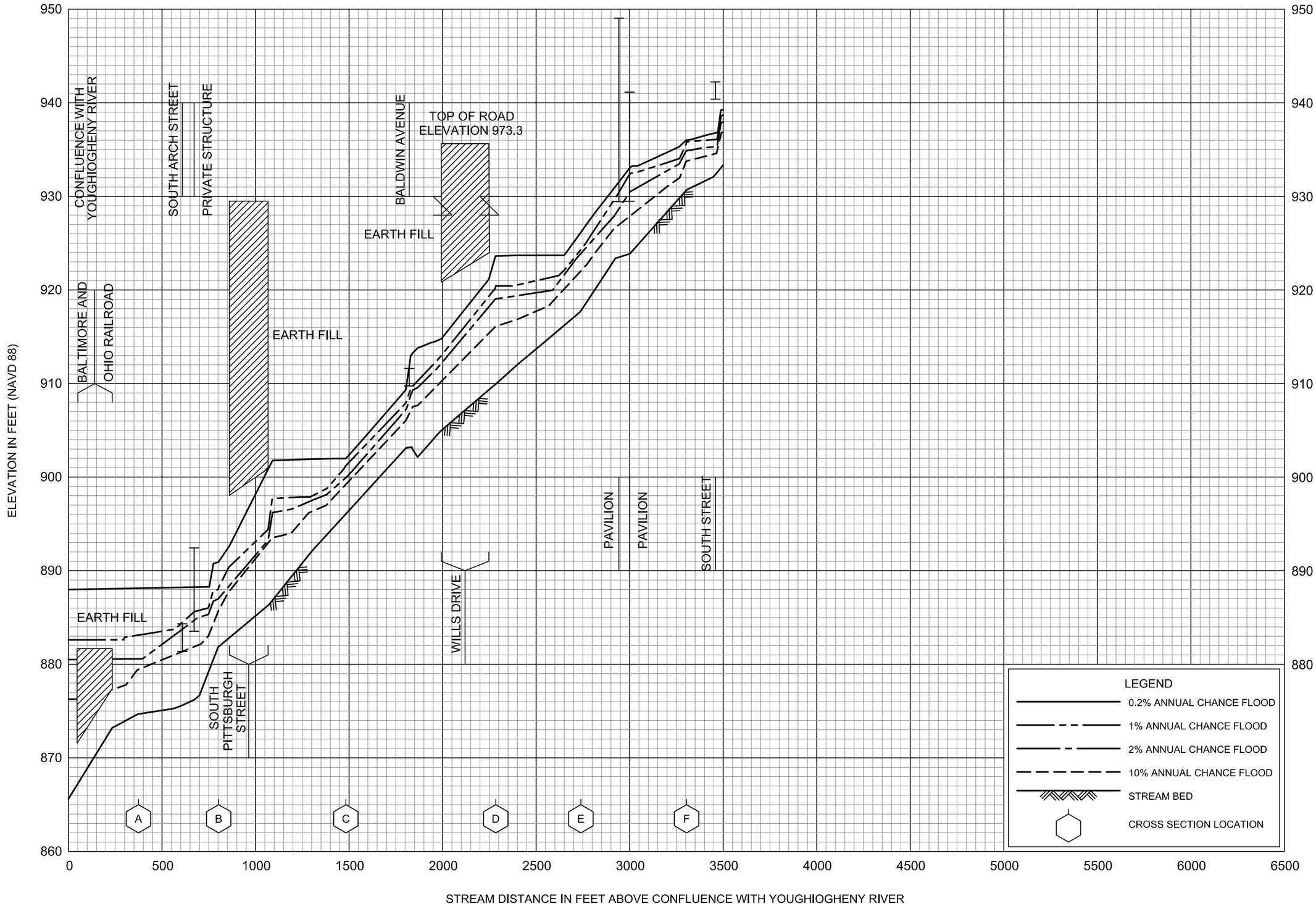
FLOOD PROFILES

COAL LICK RUN

FEDERAL EMERGENCY MANAGEMENT AGENCY

FAYETTE COUNTY, PA

(ALL JURISDICTIONS)



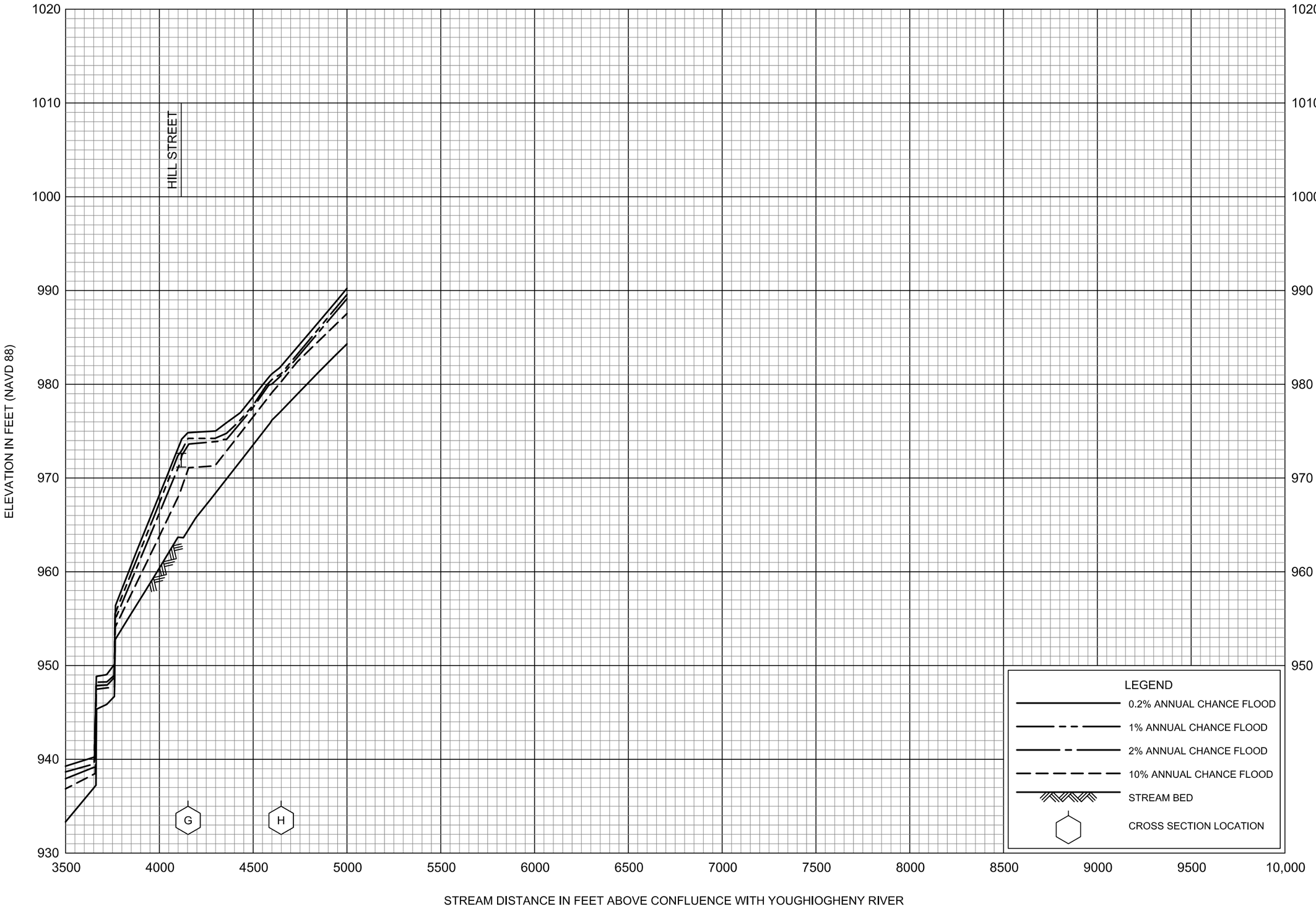
FLOOD PROFILES

CONNELL RUN

FEDERAL EMERGENCY MANAGEMENT AGENCY

FAYETTE COUNTY, PA

(ALL JURISDICATION)



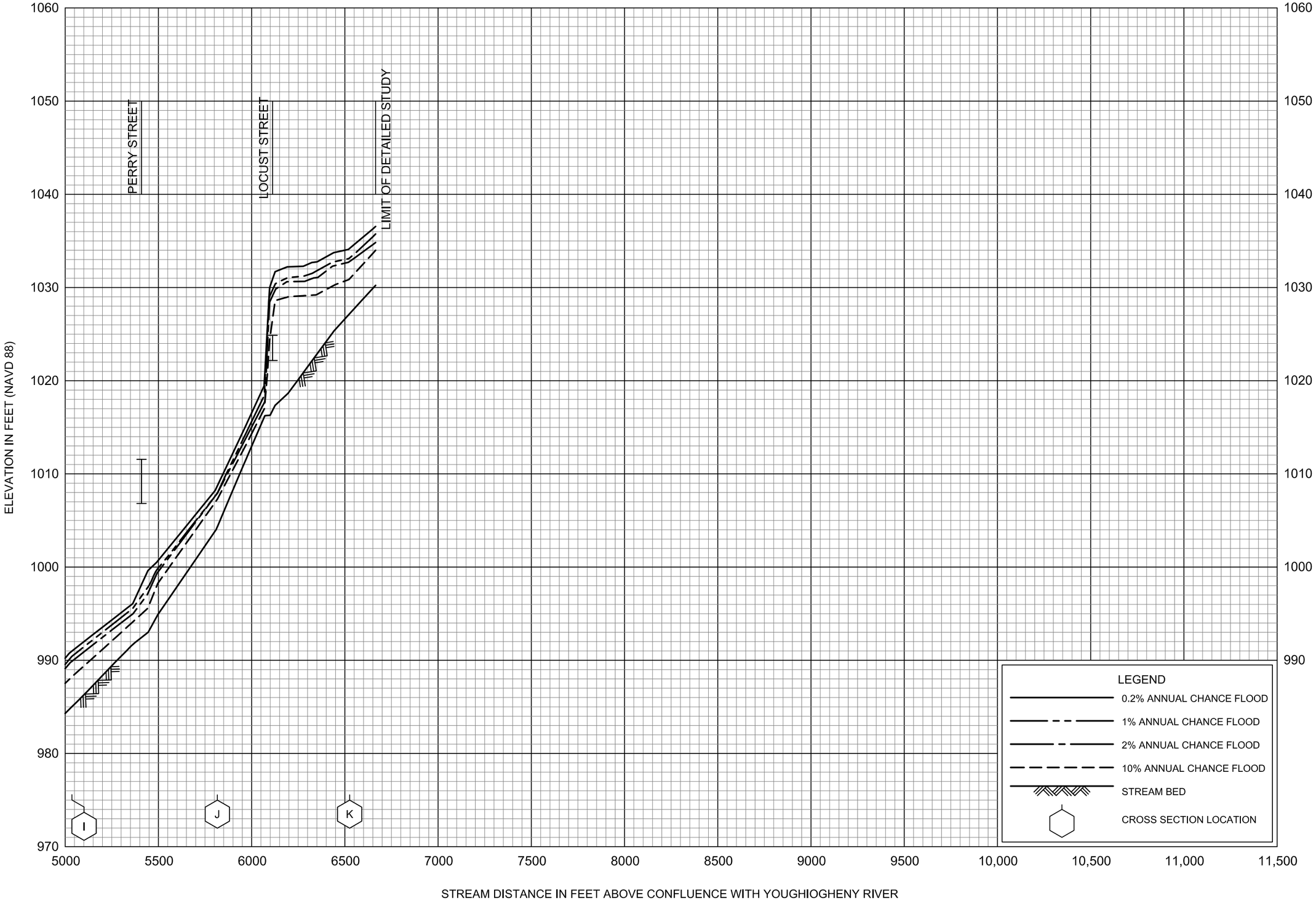
FLOOD PROFILES

CONNELL RUN

FEDERAL EMERGENCY MANAGEMENT AGENCY

FAYETTE COUNTY, PA

(ALL JURISDICATION)



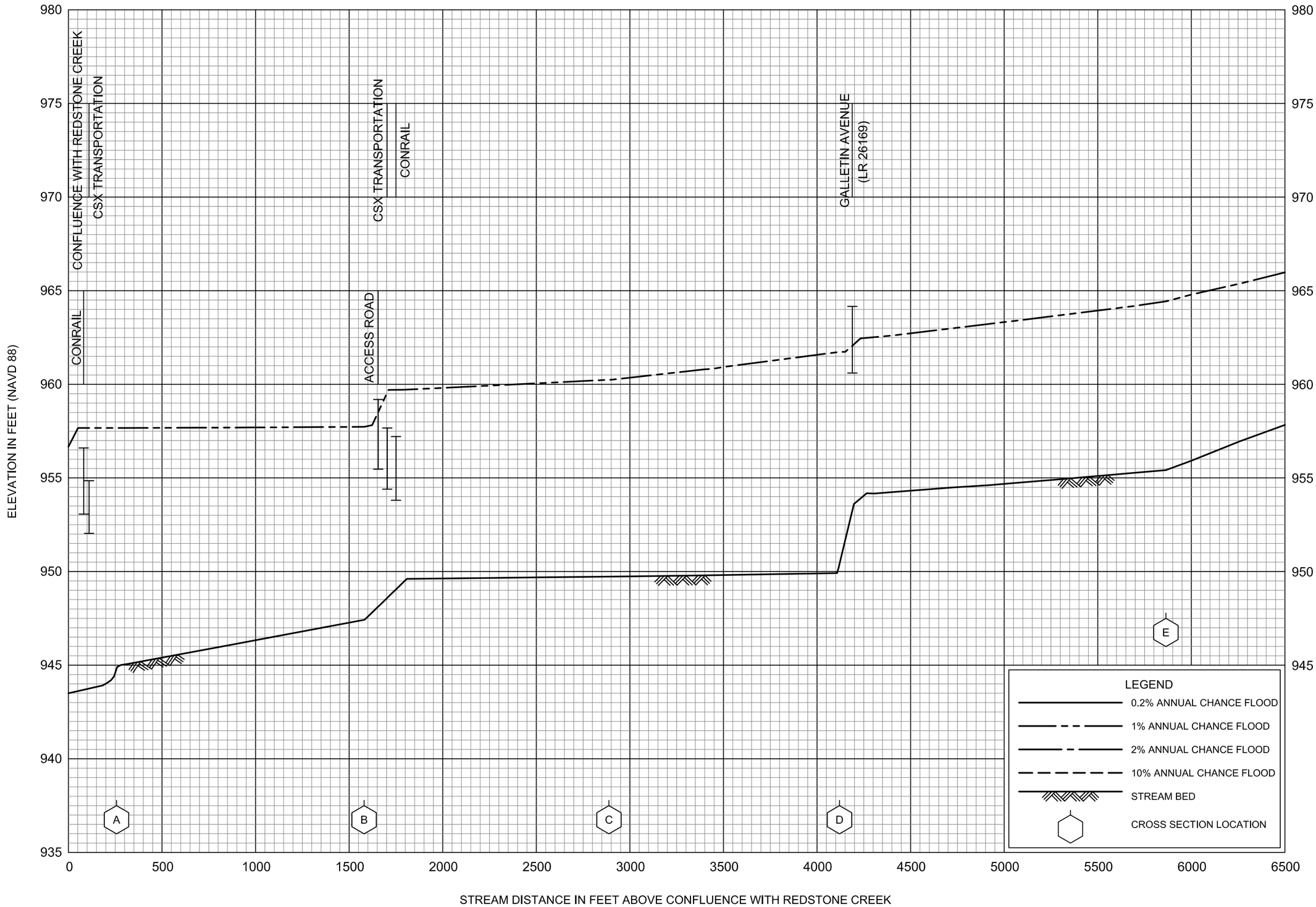
FLOOD PROFILES

CONNELL RUN

FEDERAL EMERGENCY MANAGEMENT AGENCY

FAYETTE COUNTY, PA

(ALL JURISDICATION)



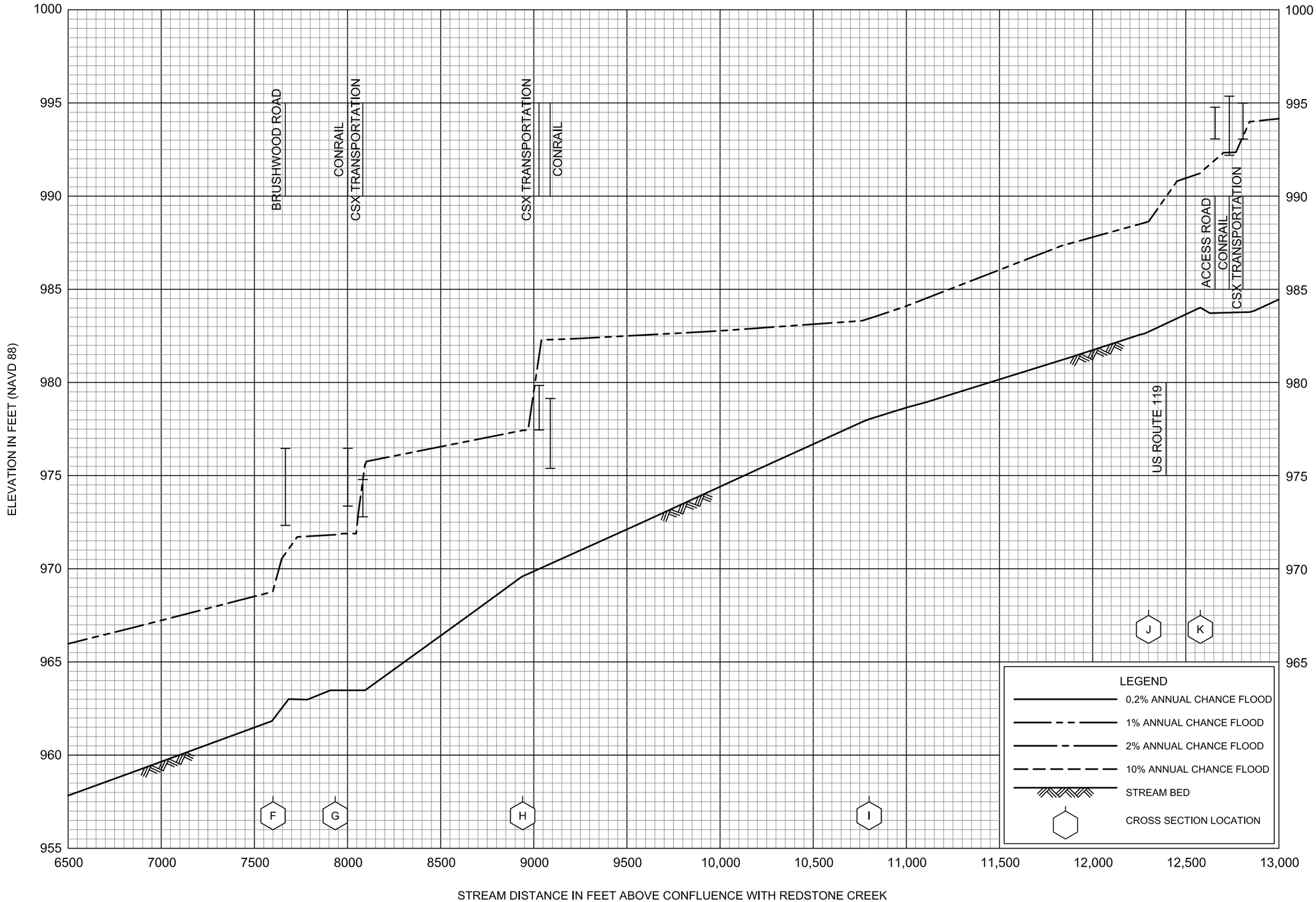
FLOOD PROFILES

COVE RUN

FEDERAL EMERGENCY MANAGEMENT AGENCY

FAYETTE COUNTY, PA

(ALL JURISDICTIONS)



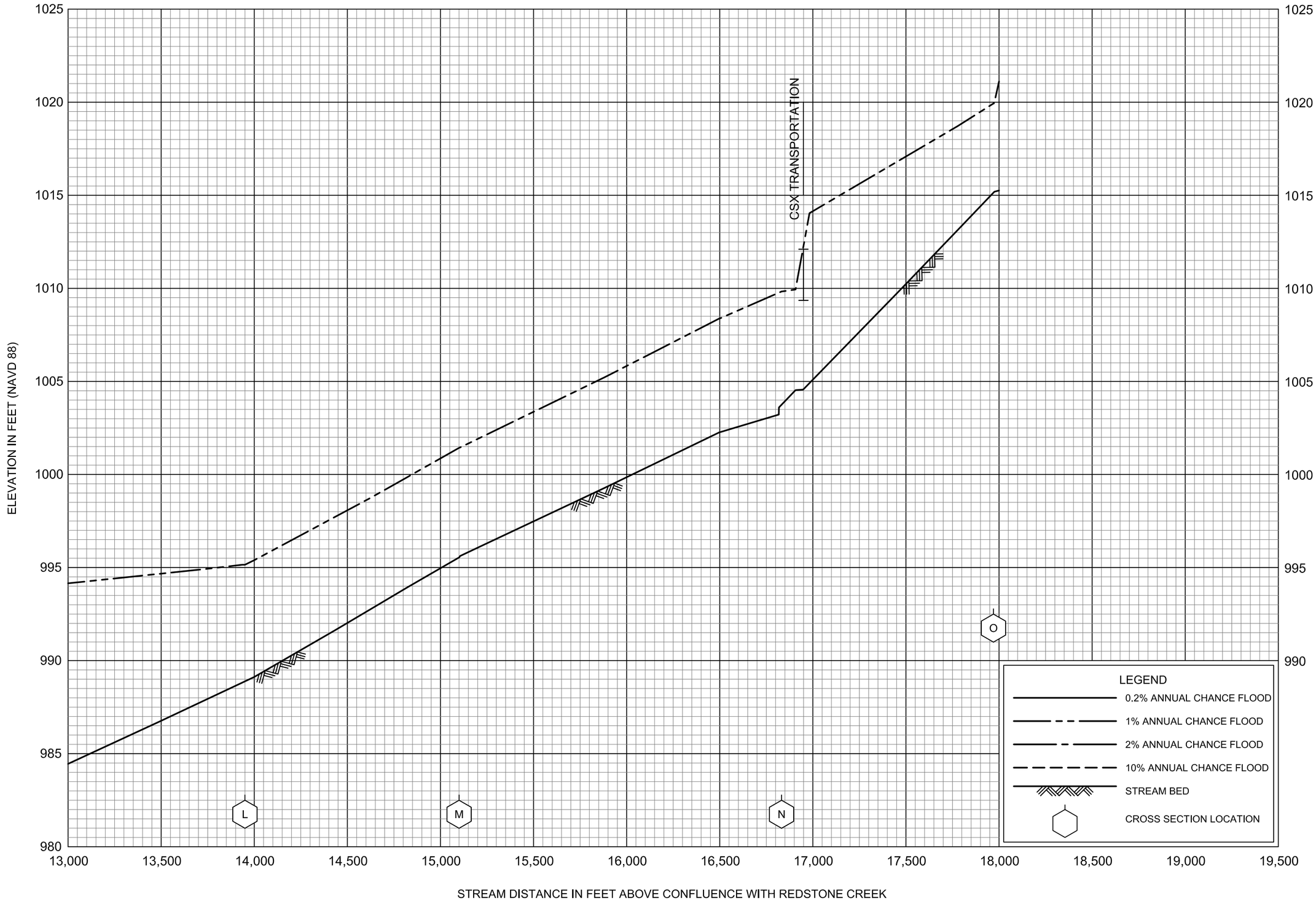
FLOOD PROFILES

COVE RUN

FEDERAL EMERGENCY MANAGEMENT AGENCY

FAYETTE COUNTY, PA

(ALL JURISDICTIONS)



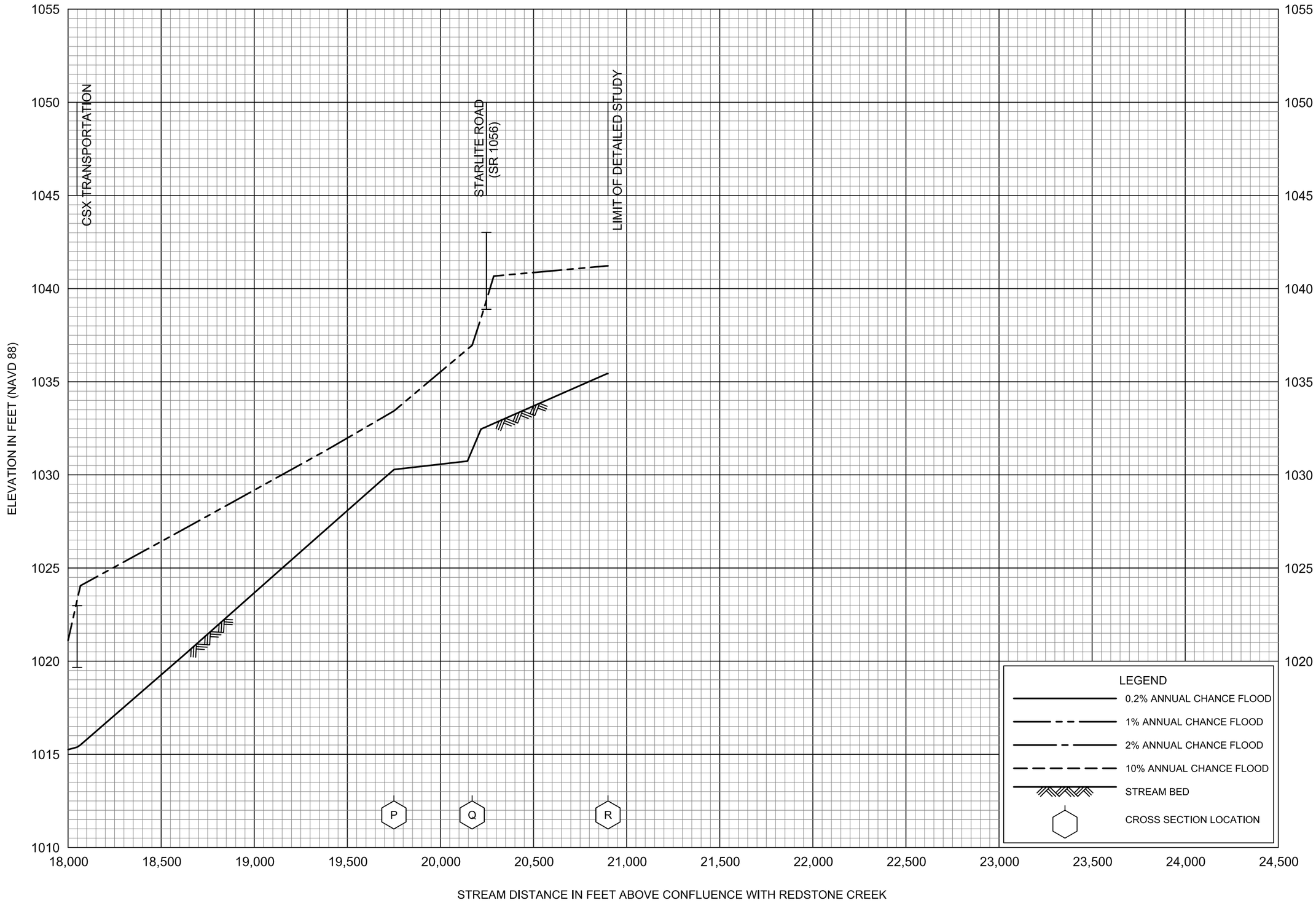
FLOOD PROFILES

COVE RUN

FEDERAL EMERGENCY MANAGEMENT AGENCY

FAYETTE COUNTY, PA

(ALL JURISDICTIONS)



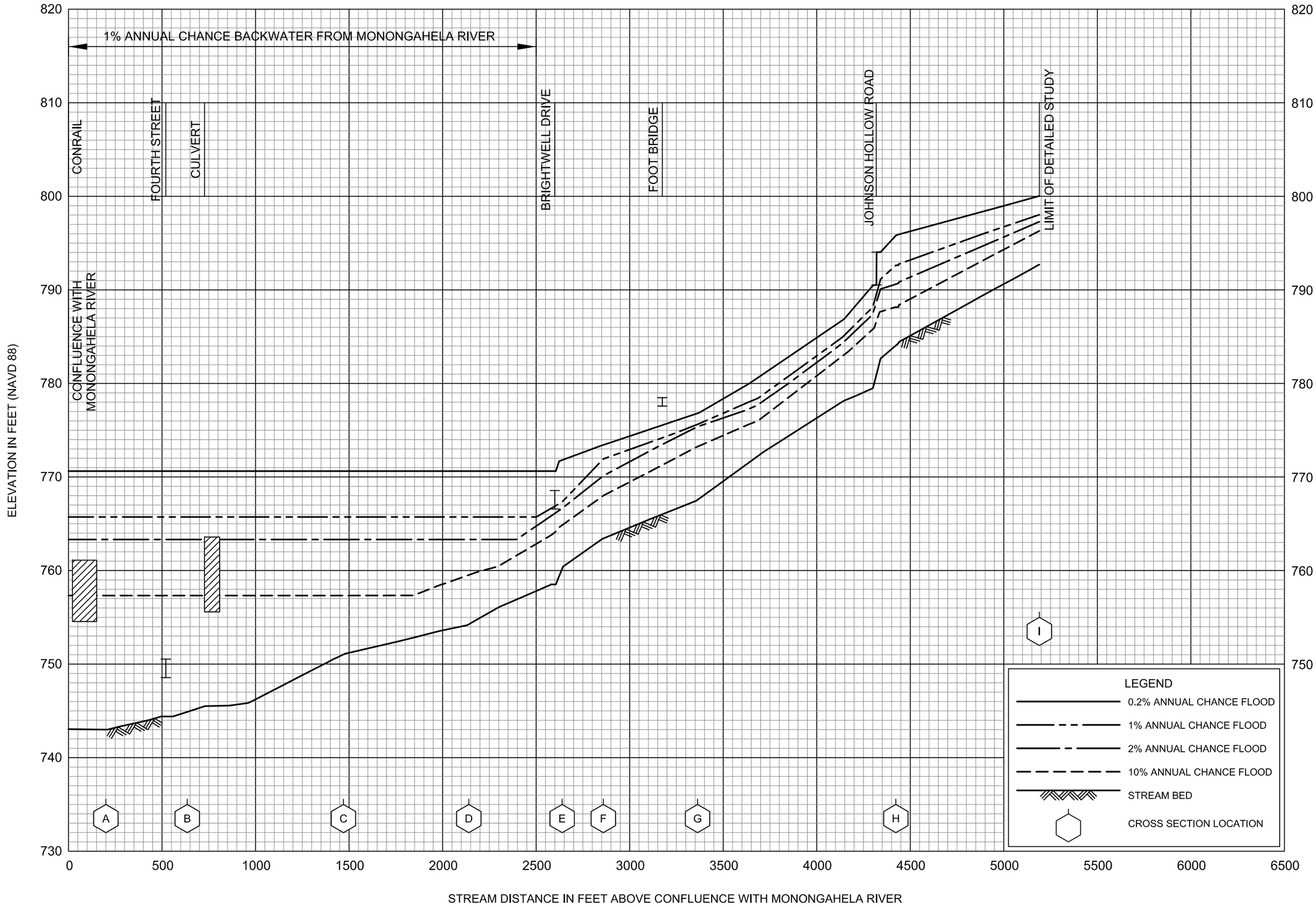
FLOOD PROFILES

COVE RUN

FEDERAL EMERGENCY MANAGEMENT AGENCY

FAYETTE COUNTY, PA

(ALL JURISDICTIONS)



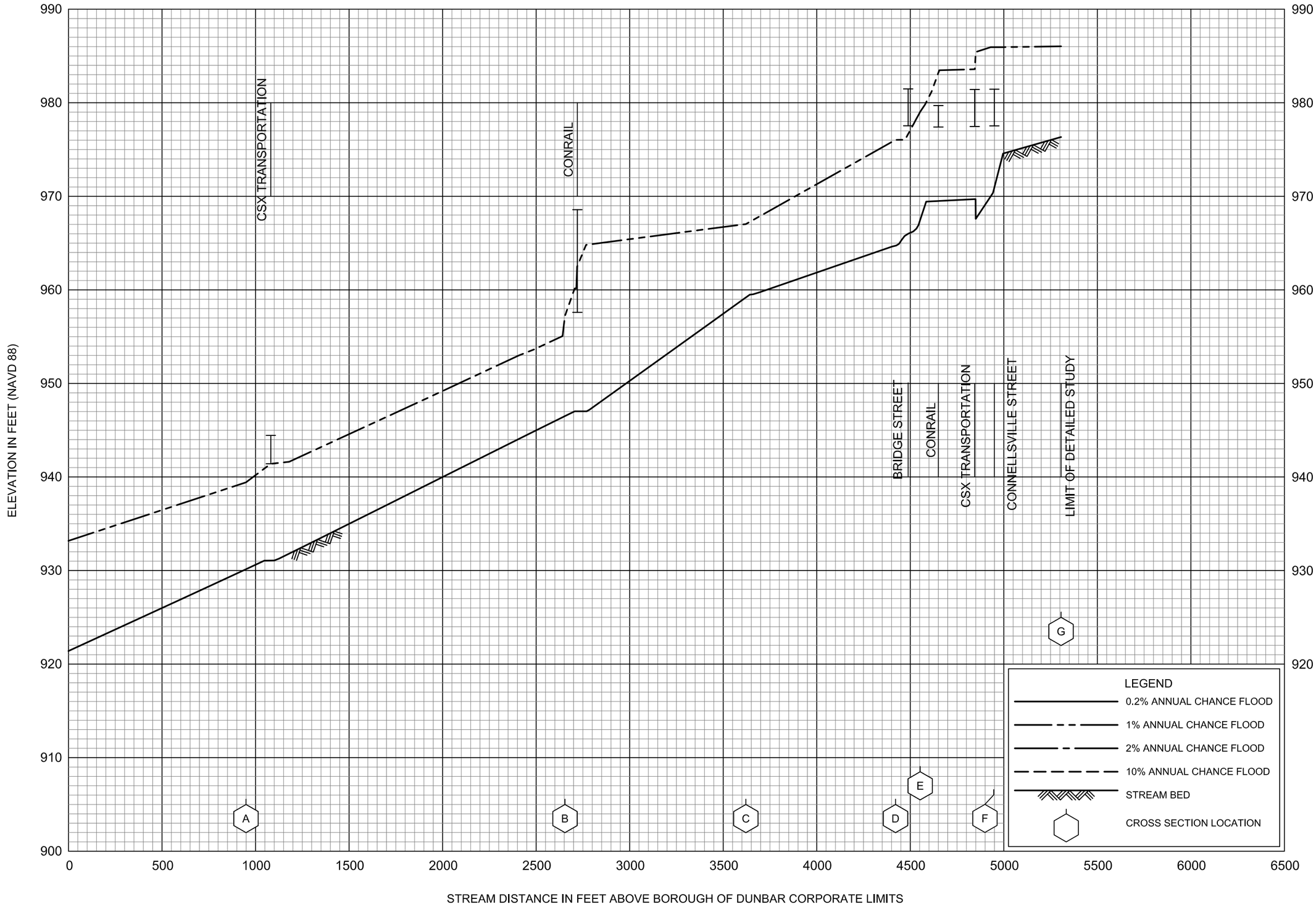
FLOOD PROFILES

DOWNERS RUN

FEDERAL EMERGENCY MANAGEMENT AGENCY

FAYETTE COUNTY, PA

(ALL JURISDICATIONS)



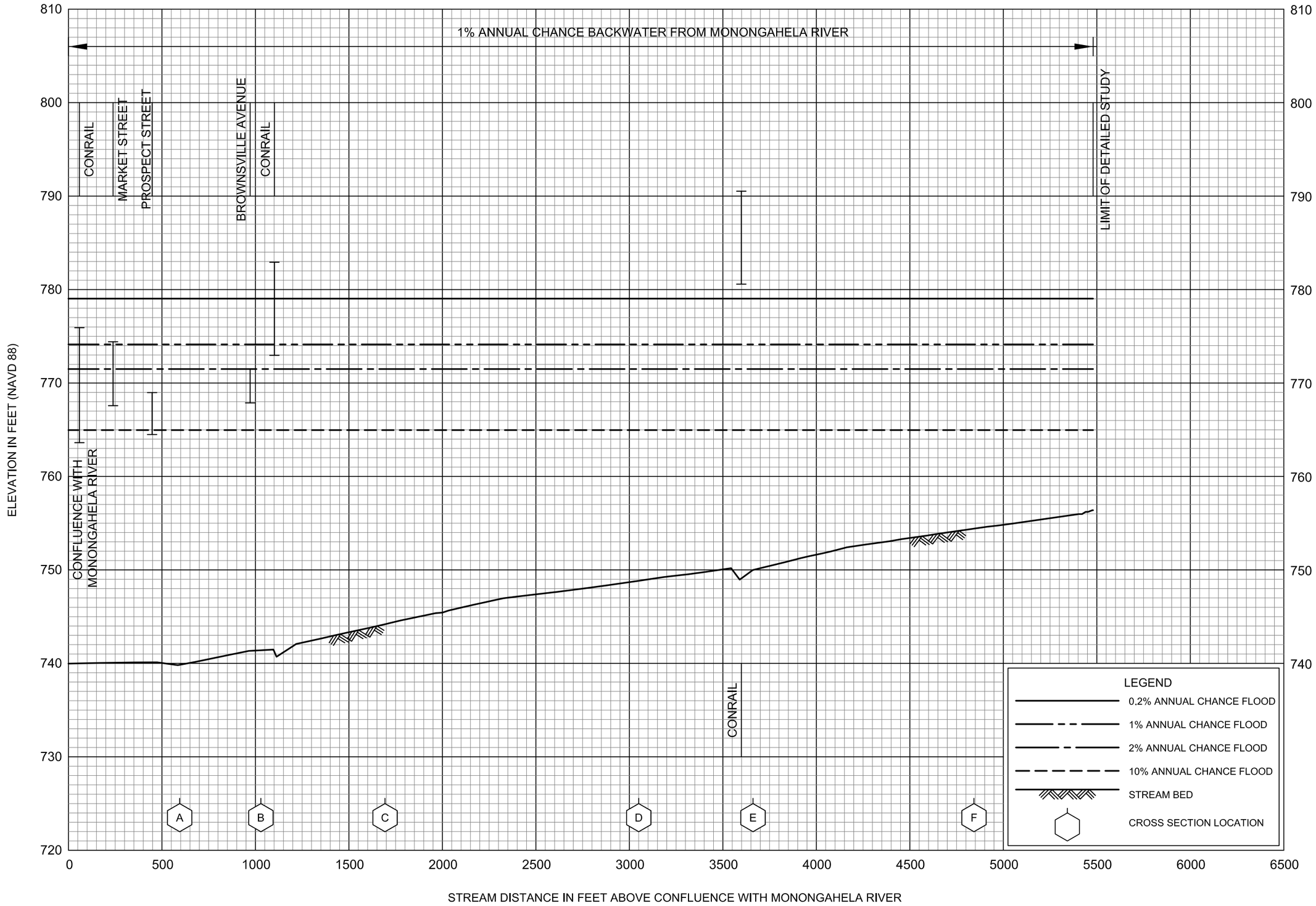
FLOOD PROFILES

DUNBAR CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

FAYETTE COUNTY, PA

(ALL JURISDICATIONS)



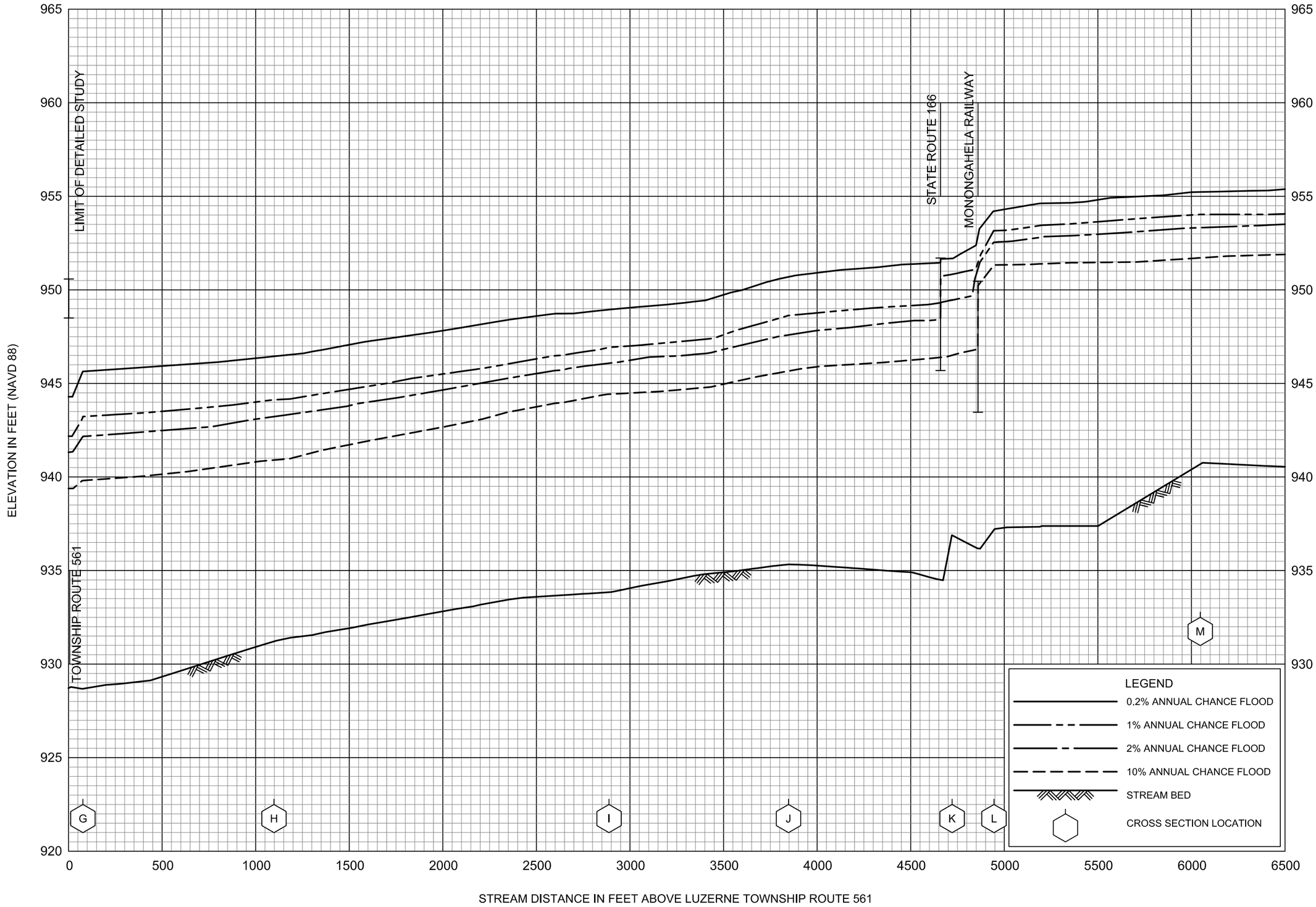
FLOOD PROFILES

DUNLAP CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

FAYETTE COUNTY, PA

(ALL JURISDICTIONS)



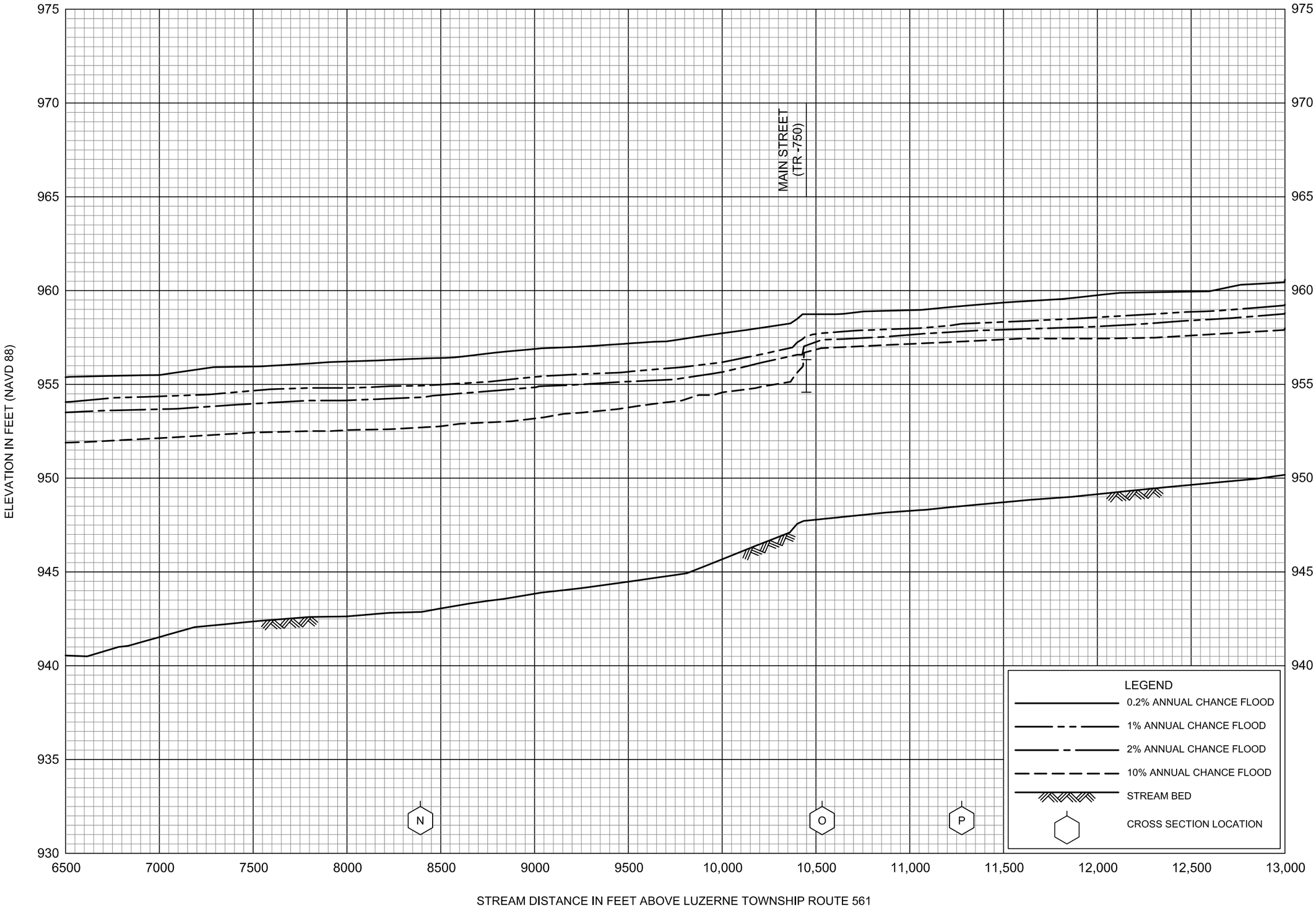
FLOOD PROFILES

DUNLAP CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

FAYETTE COUNTY, PA

(ALL JURISDICTIONS)



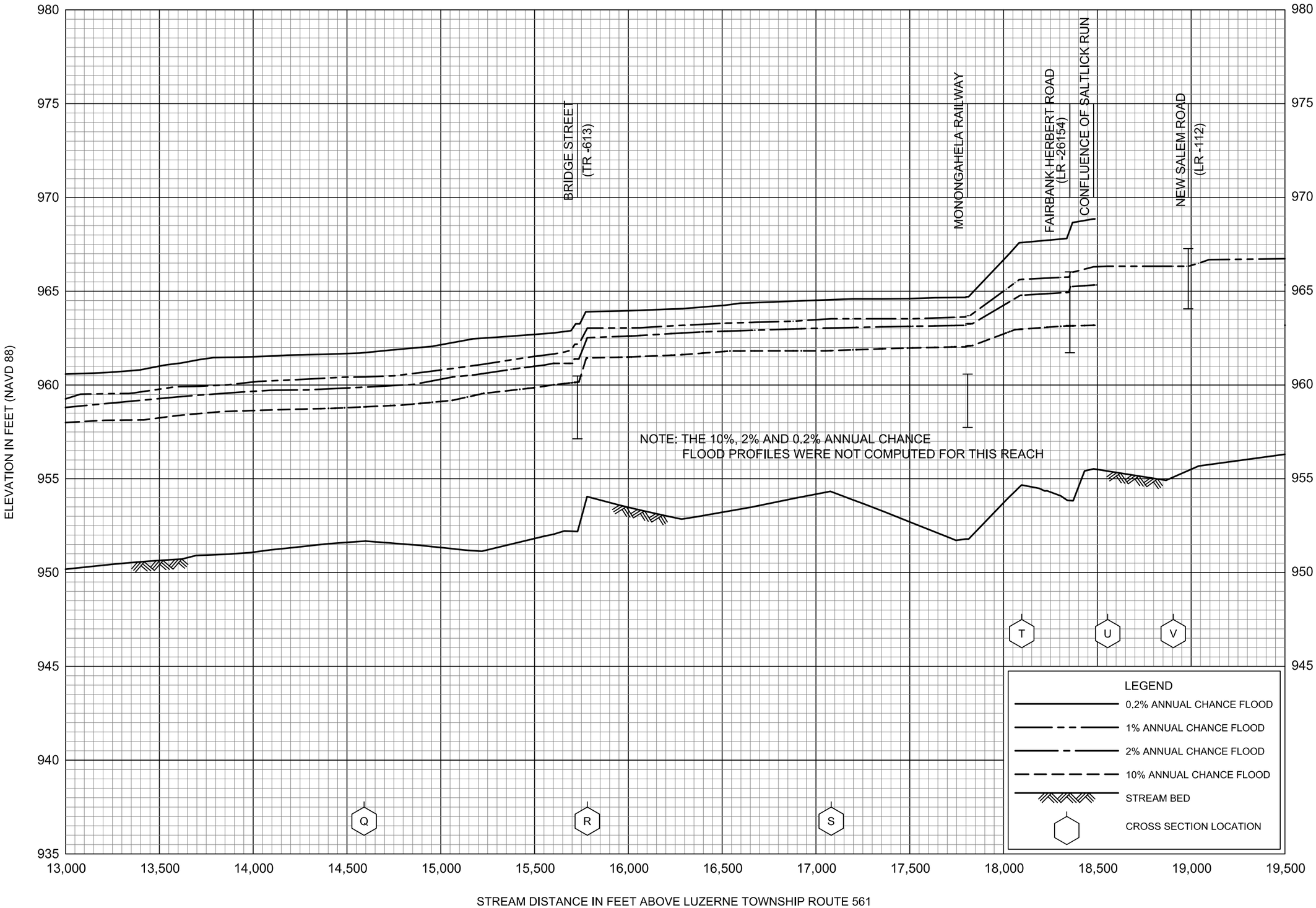
FLOOD PROFILES

DUNLAP CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

FAYETTE COUNTY, PA

(ALL JURISDICTIONS)



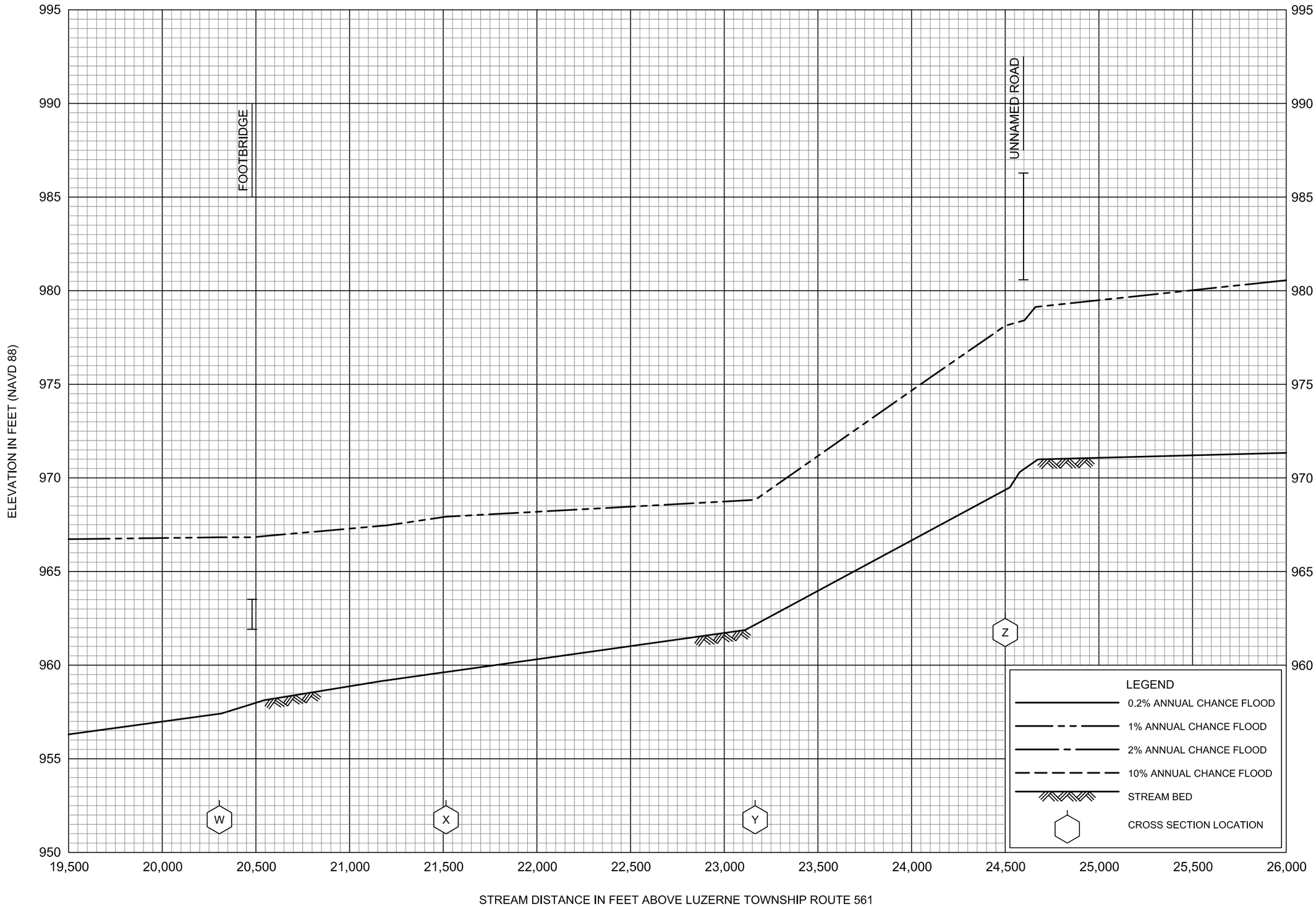
FLOOD PROFILES

DUNLAP CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

FAYETTE COUNTY, PA

(ALL JURISDICTIONS)

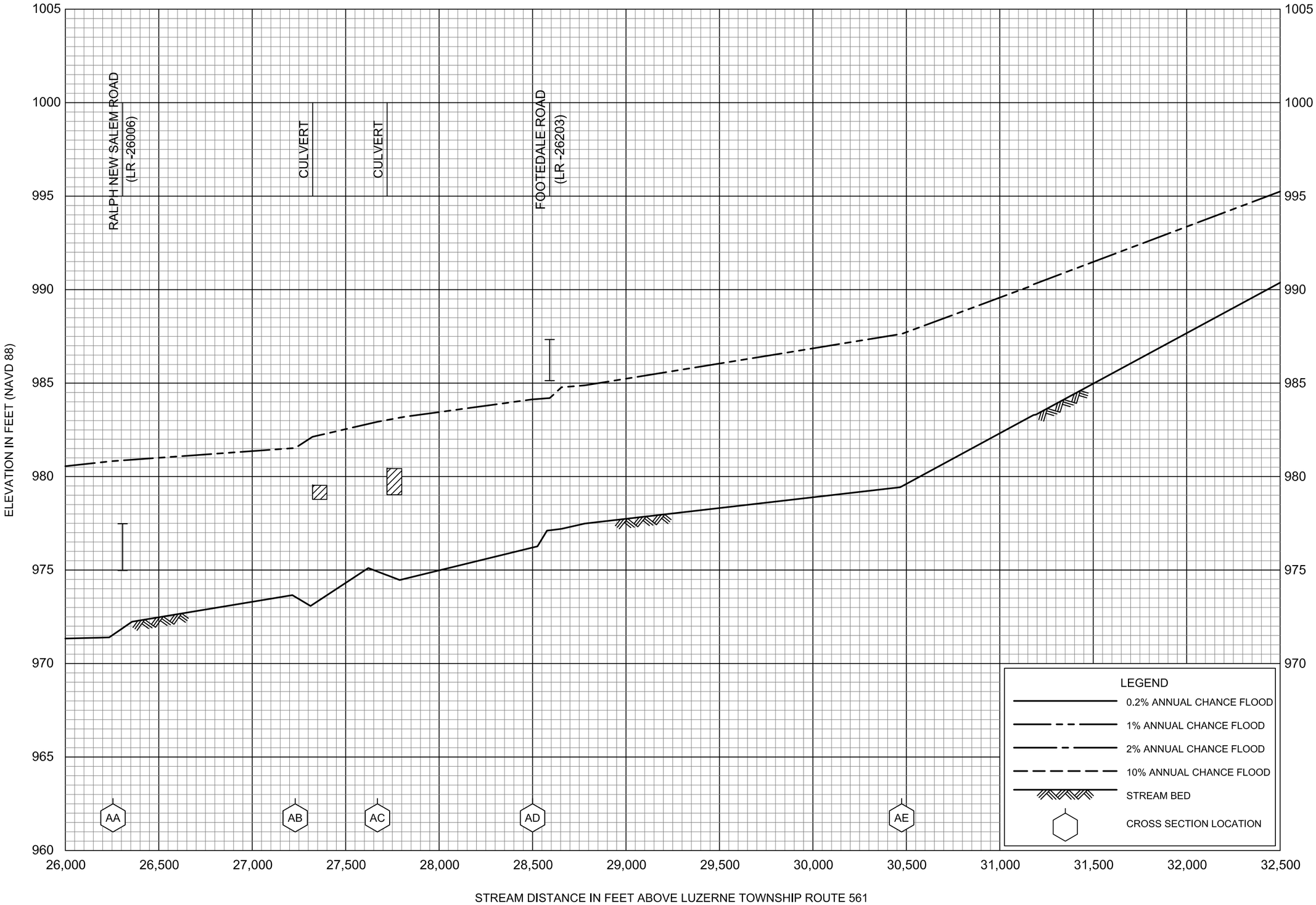


FLOOD PROFILES

DUNLAP CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

FAYETTE COUNTY, PA
(ALL JURISDICTIONS)



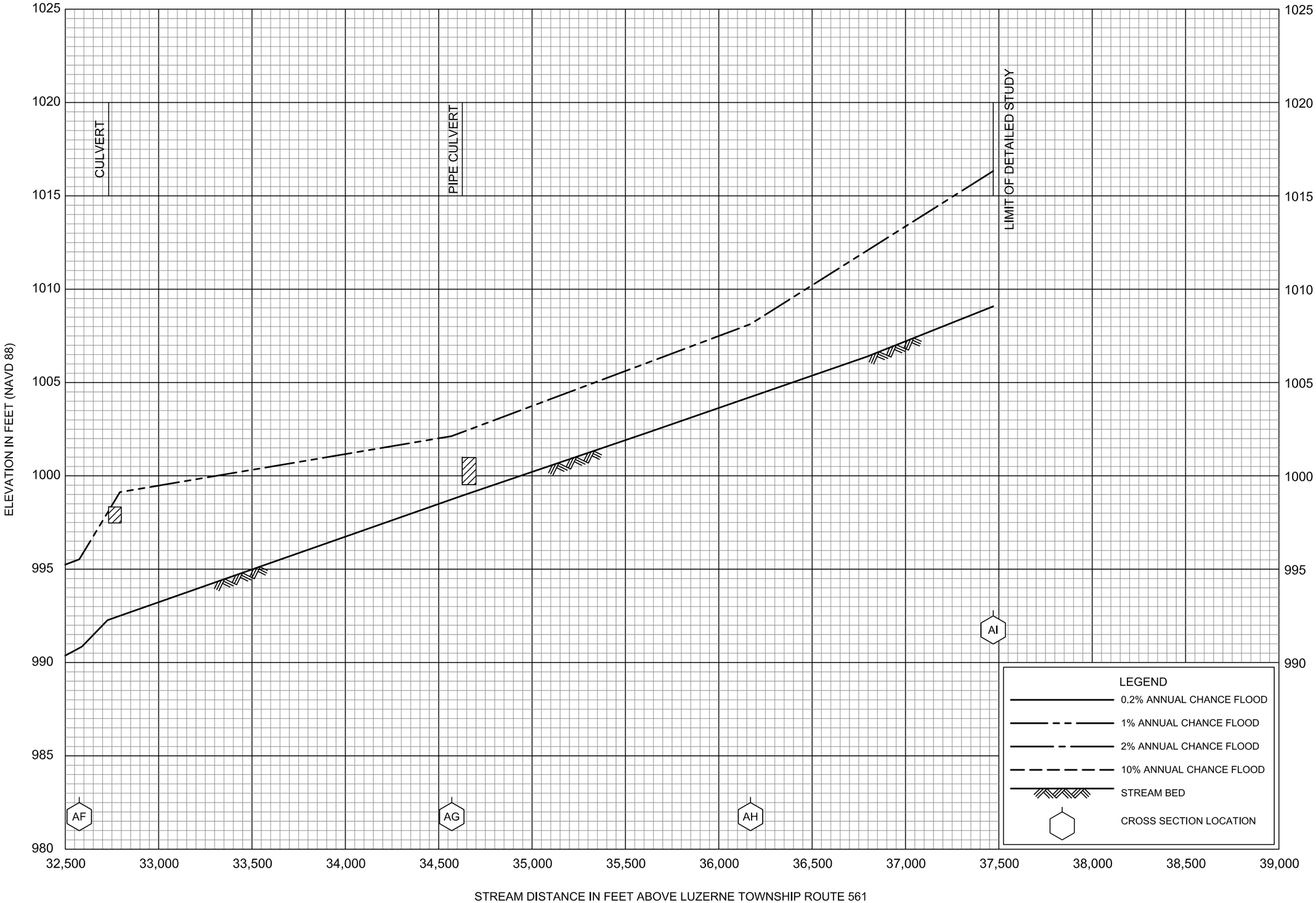
FLOOD PROFILES

DUNLAP CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

FAYETTE COUNTY, PA

(ALL JURISDICTIONS)



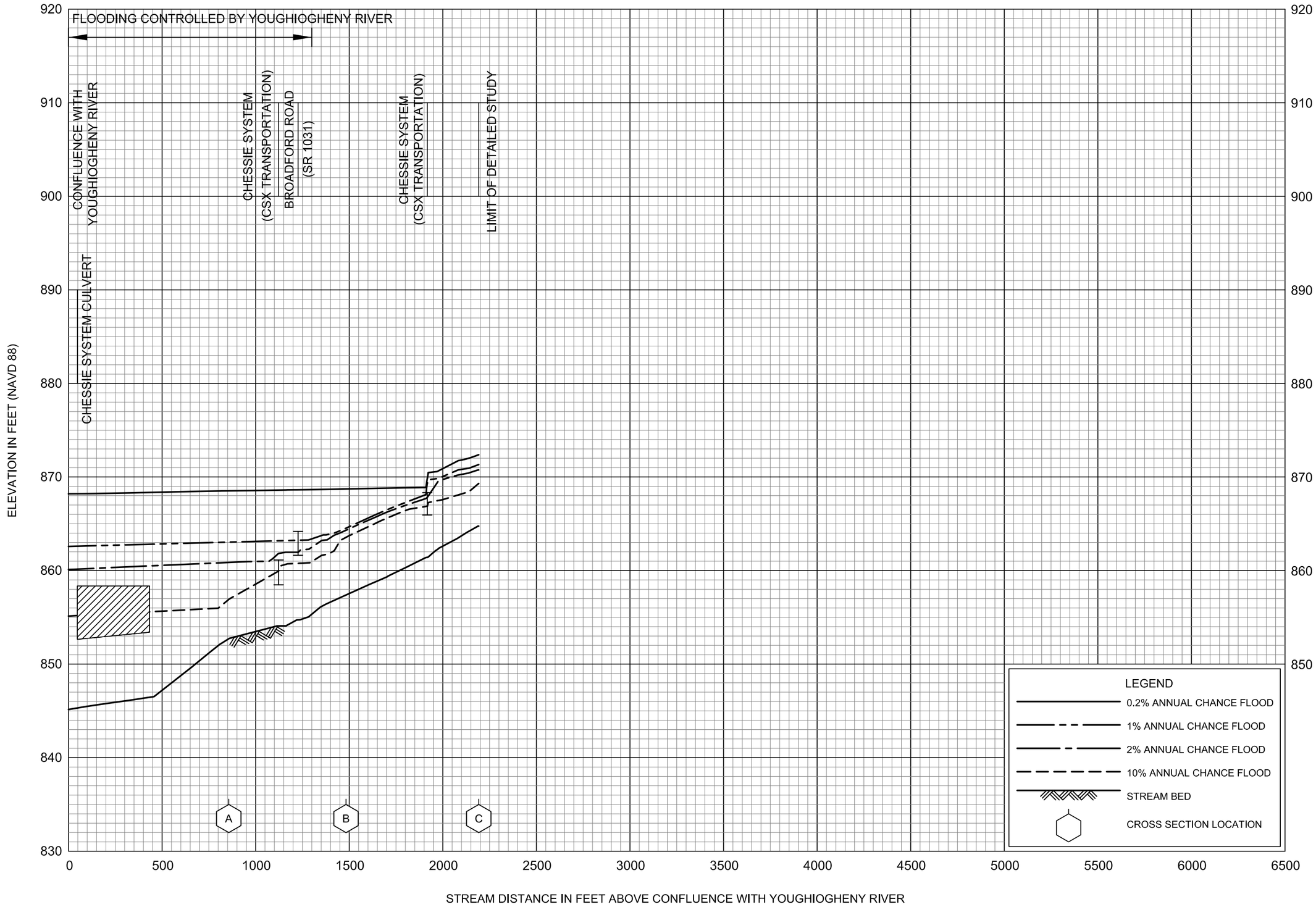
FLOOD PROFILES

DUNLAP CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

FAYETTE COUNTY, PA

(ALL JURISDICTIONS)



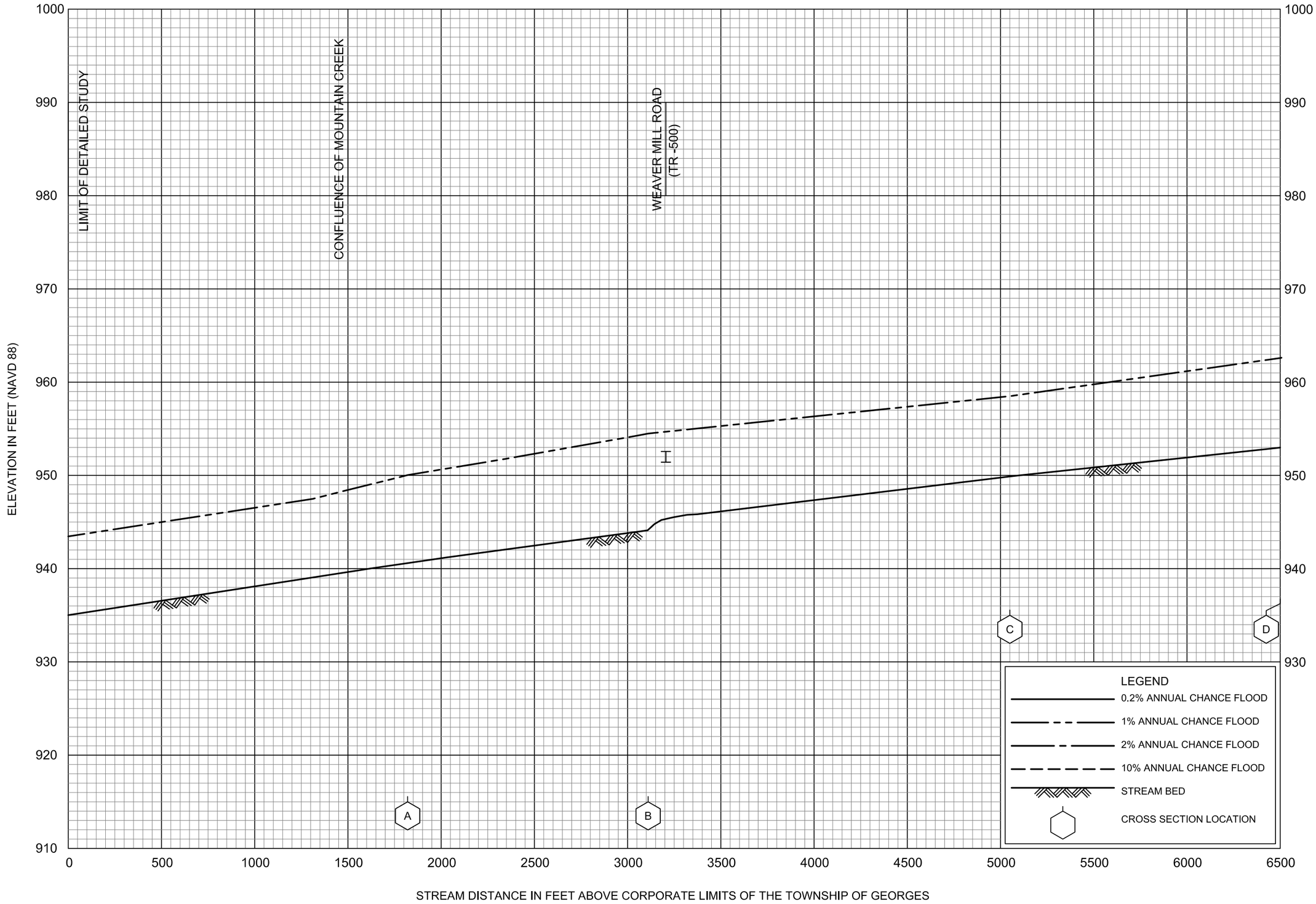
FLOOD PROFILES

GALLEY RUN

FEDERAL EMERGENCY MANAGEMENT AGENCY

FAYETTE COUNTY, PA

(ALL JURISDICATIONS)



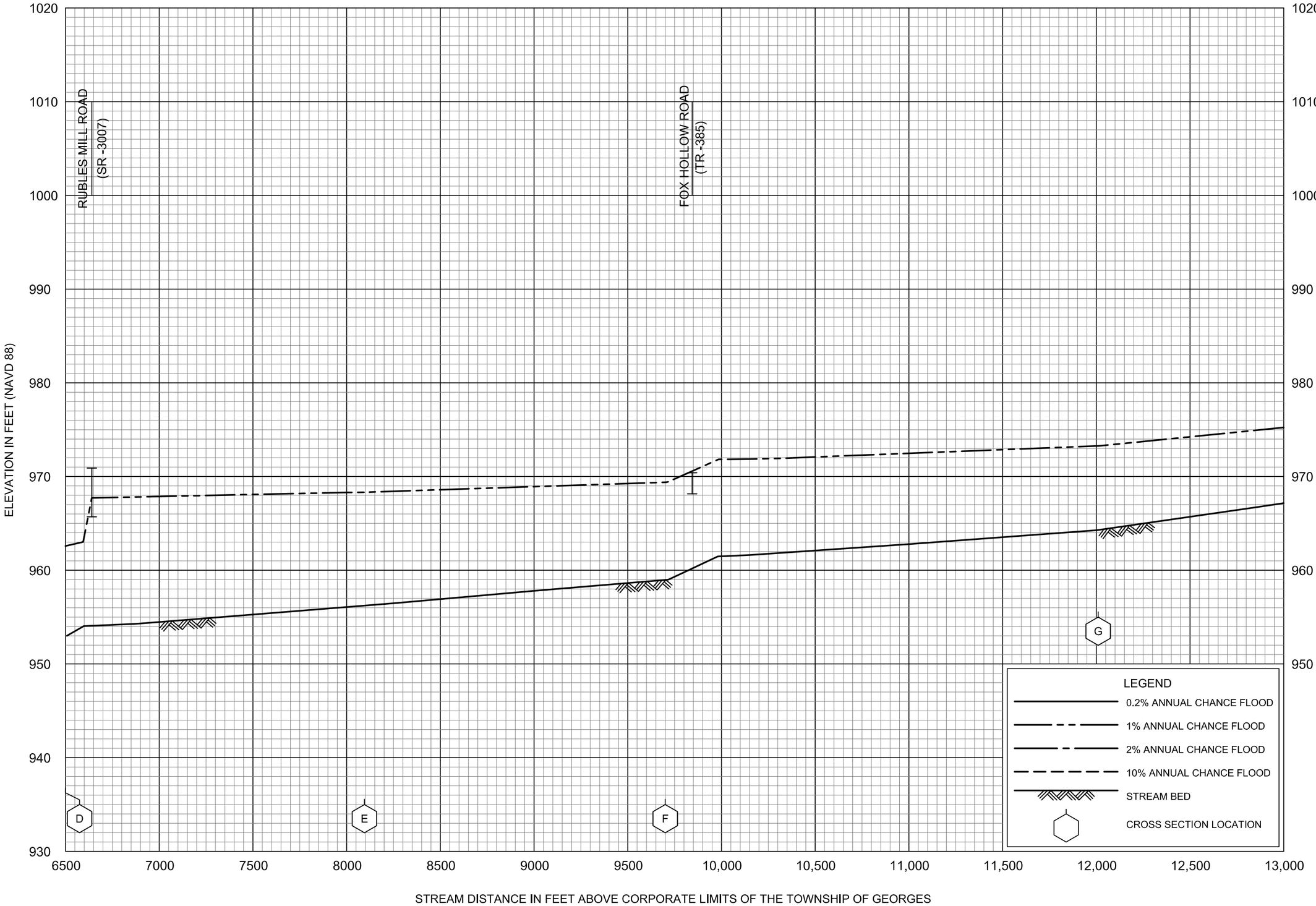
FLOOD PROFILES

GEORGES CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

FAYETTE COUNTY, PA

(ALL JURISDICATIONS)



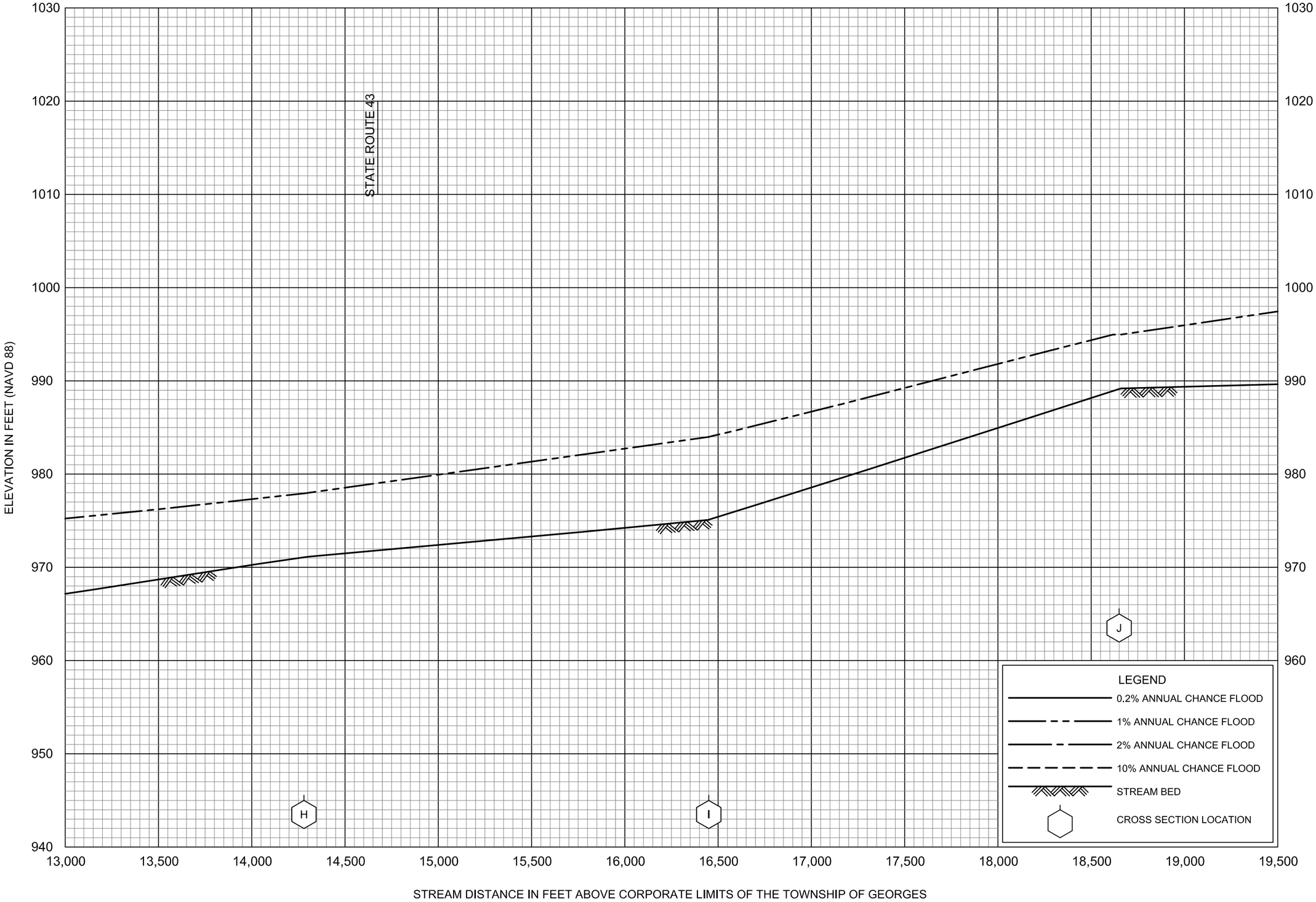
FLOOD PROFILES

GEORGES CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

FAYETTE COUNTY, PA

(ALL JURISDICATIONS)



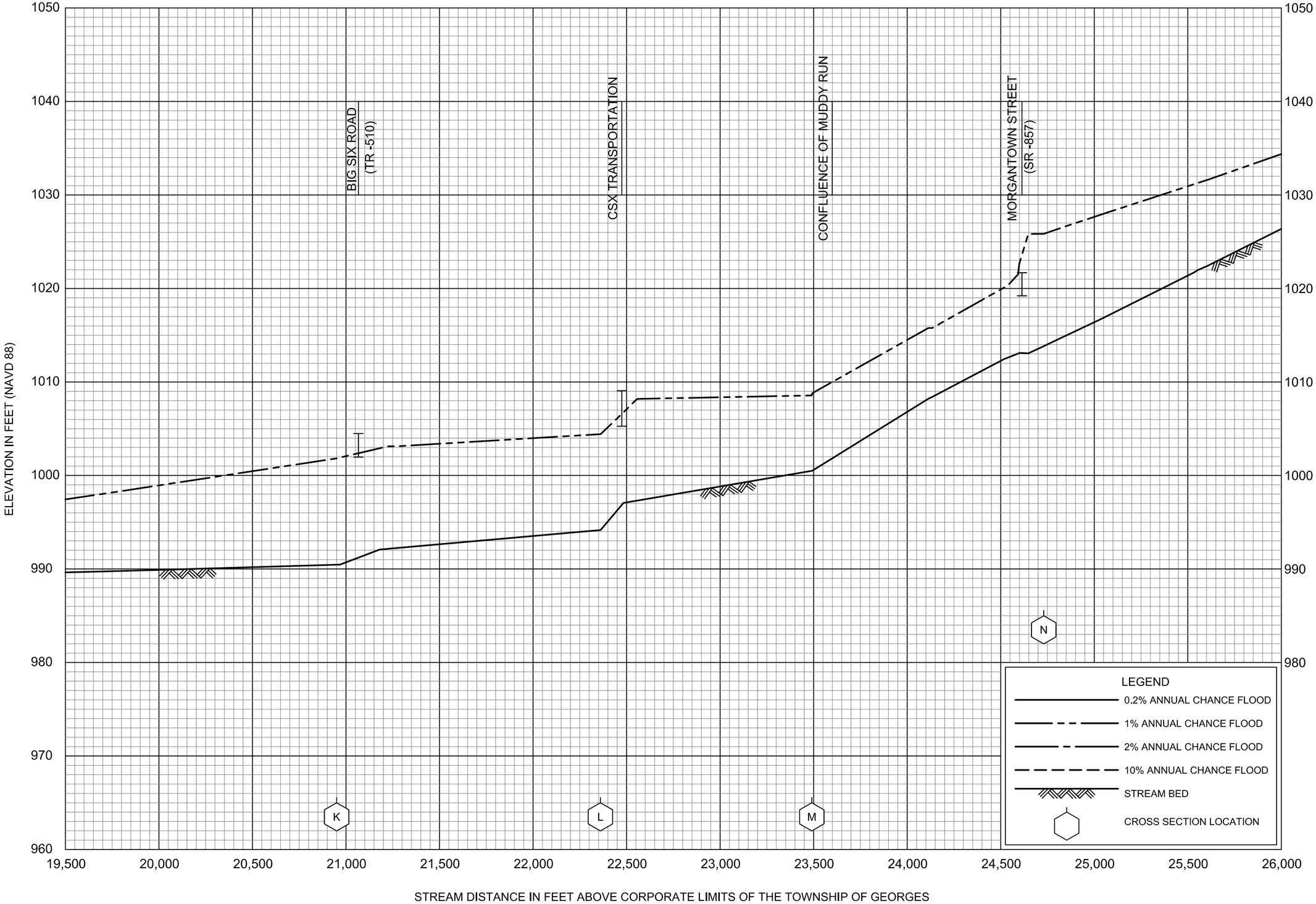
FLOOD PROFILES

GEORGES CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

FAYETTE COUNTY, PA

(ALL JURISDICATIONS)



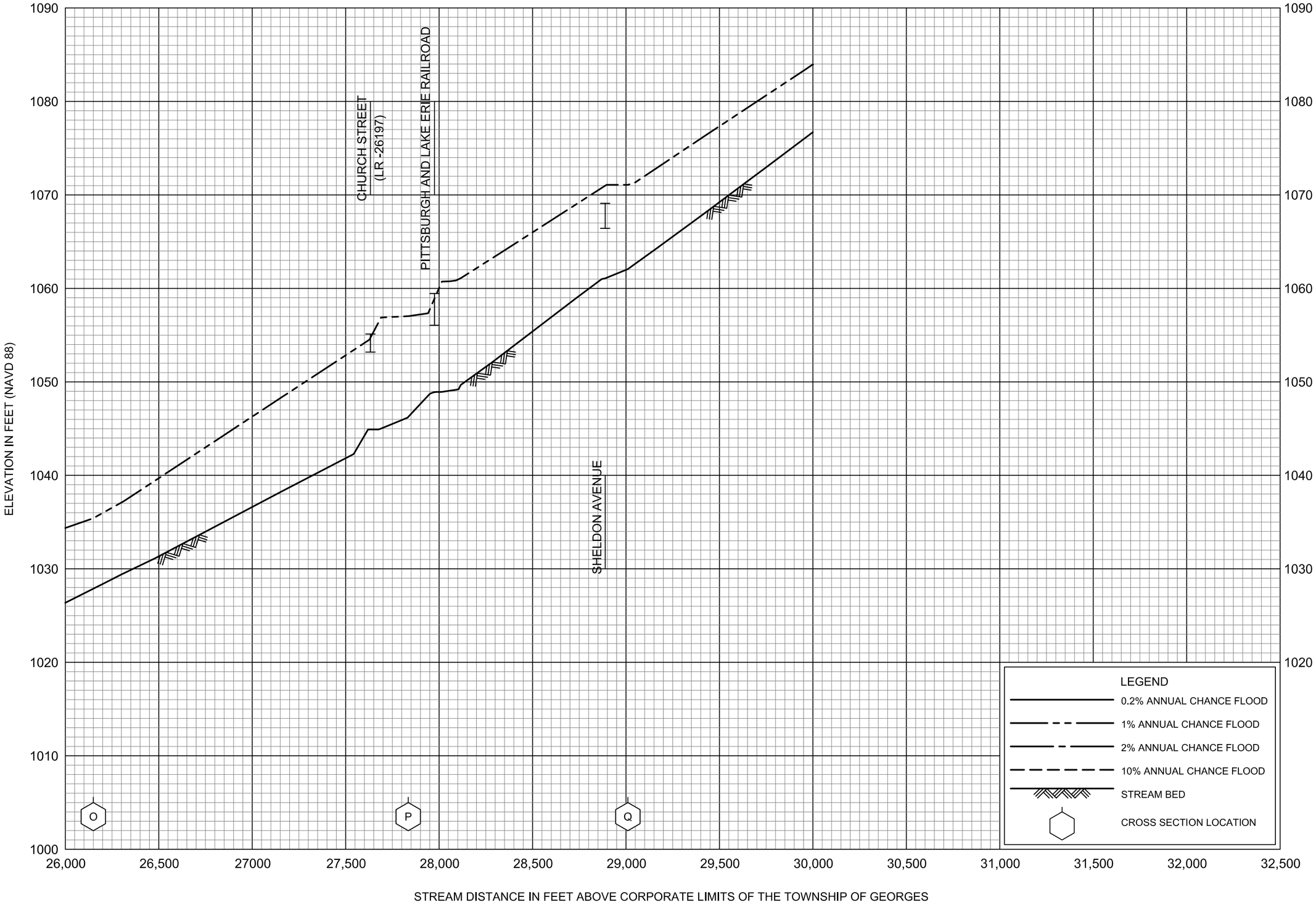
FLOOD PROFILES

GEORGES CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

FAYETTE COUNTY, PA

(ALL JURISDICATIONS)



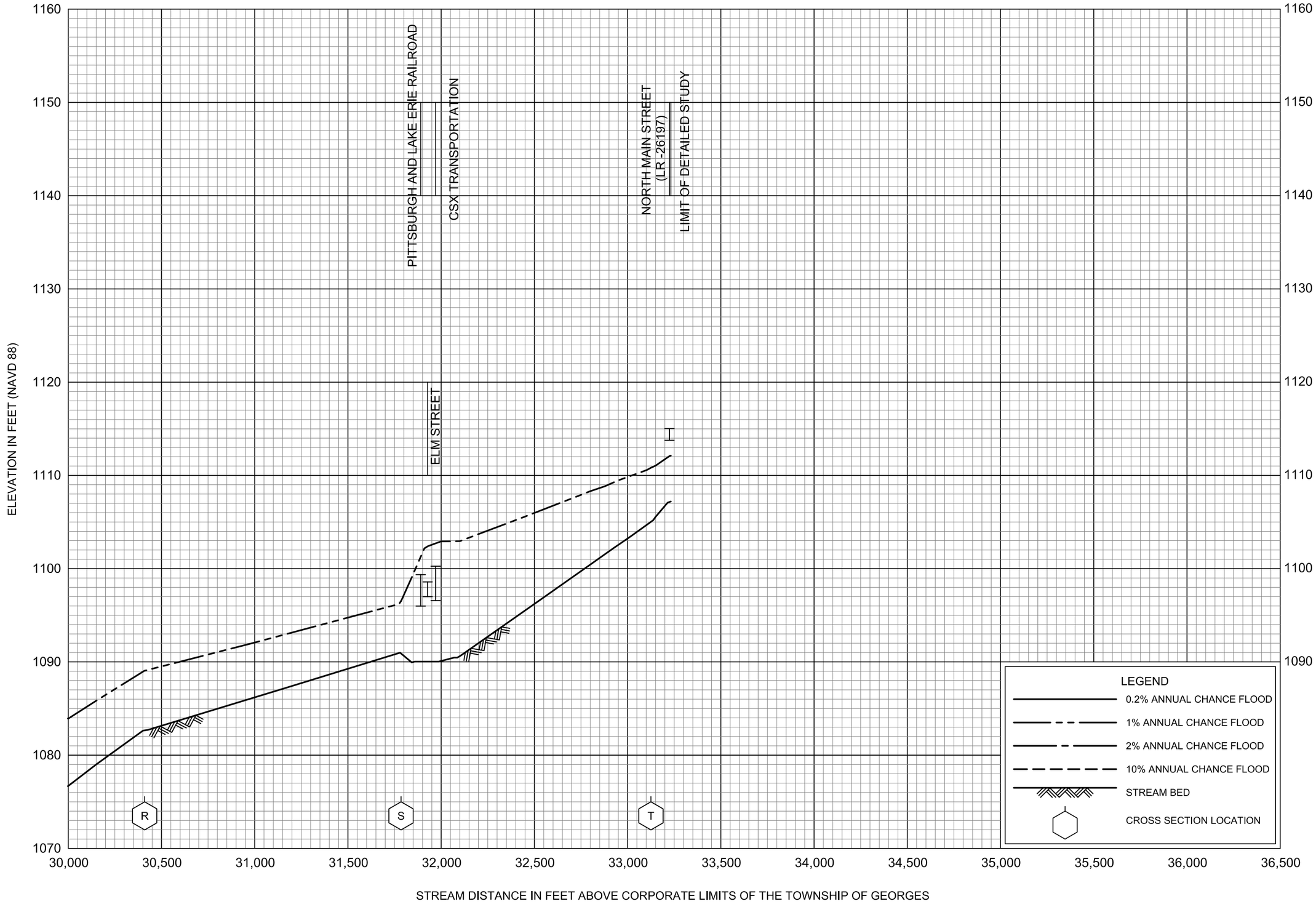
FLOOD PROFILES

GEORGES CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

FAYETTE COUNTY, PA

(ALL JURISDICATIONS)



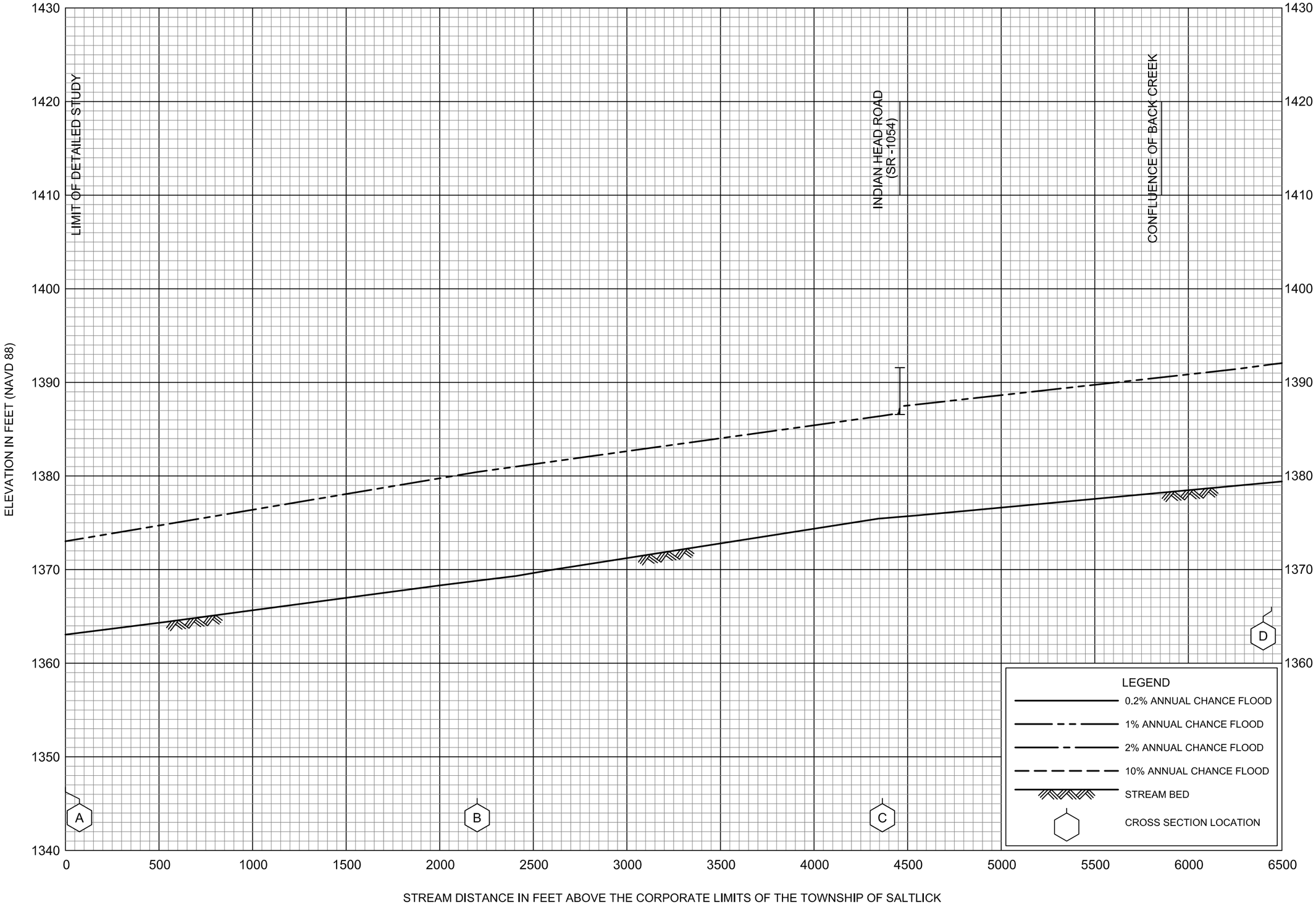
FLOOD PROFILES

GEORGES CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

FAYETTE COUNTY, PA

(ALL JURISDICATIONS)



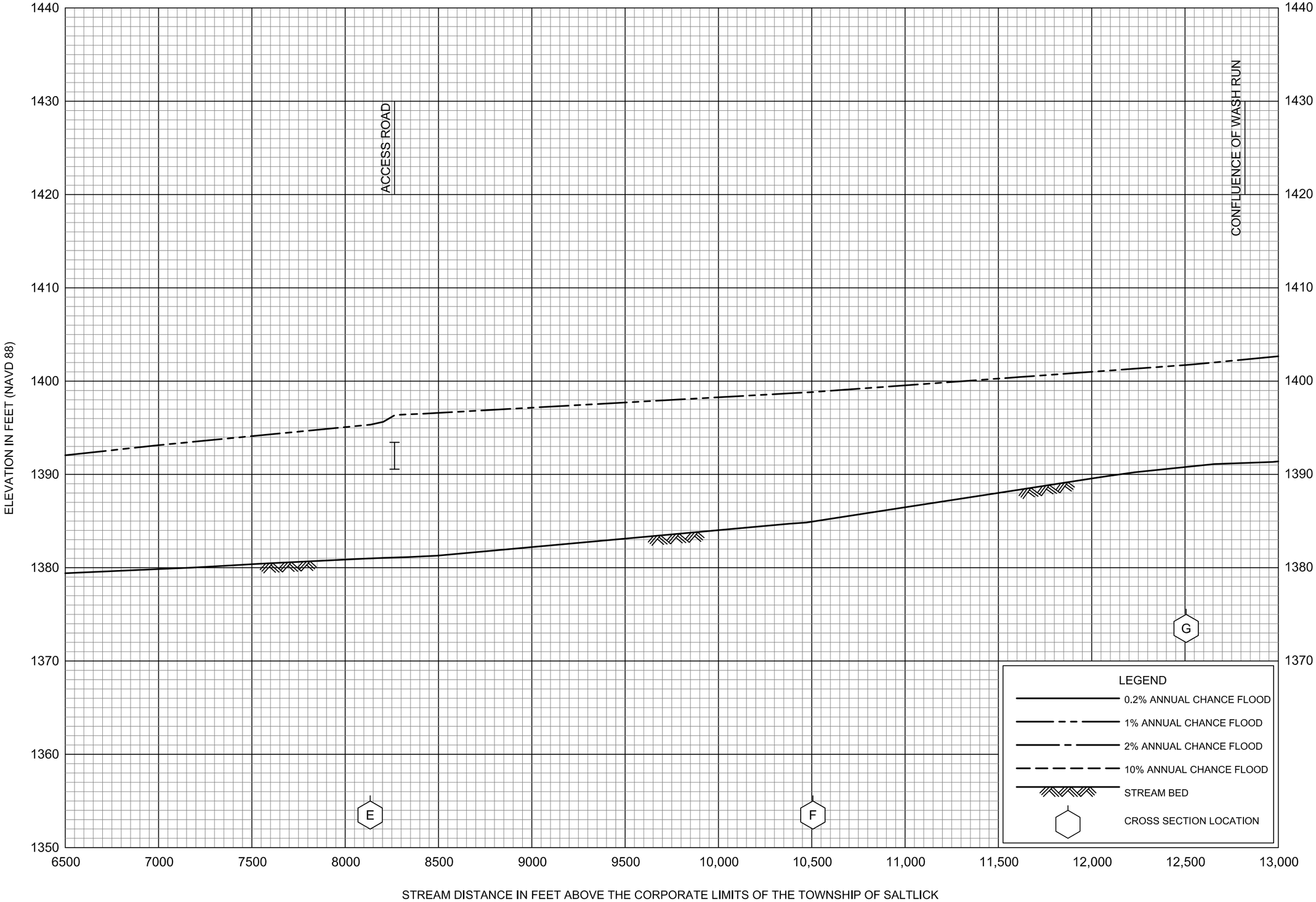
FLOOD PROFILES

INDIAN CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

FAYETTE COUNTY, PA

(ALL JURISDICATIONS)



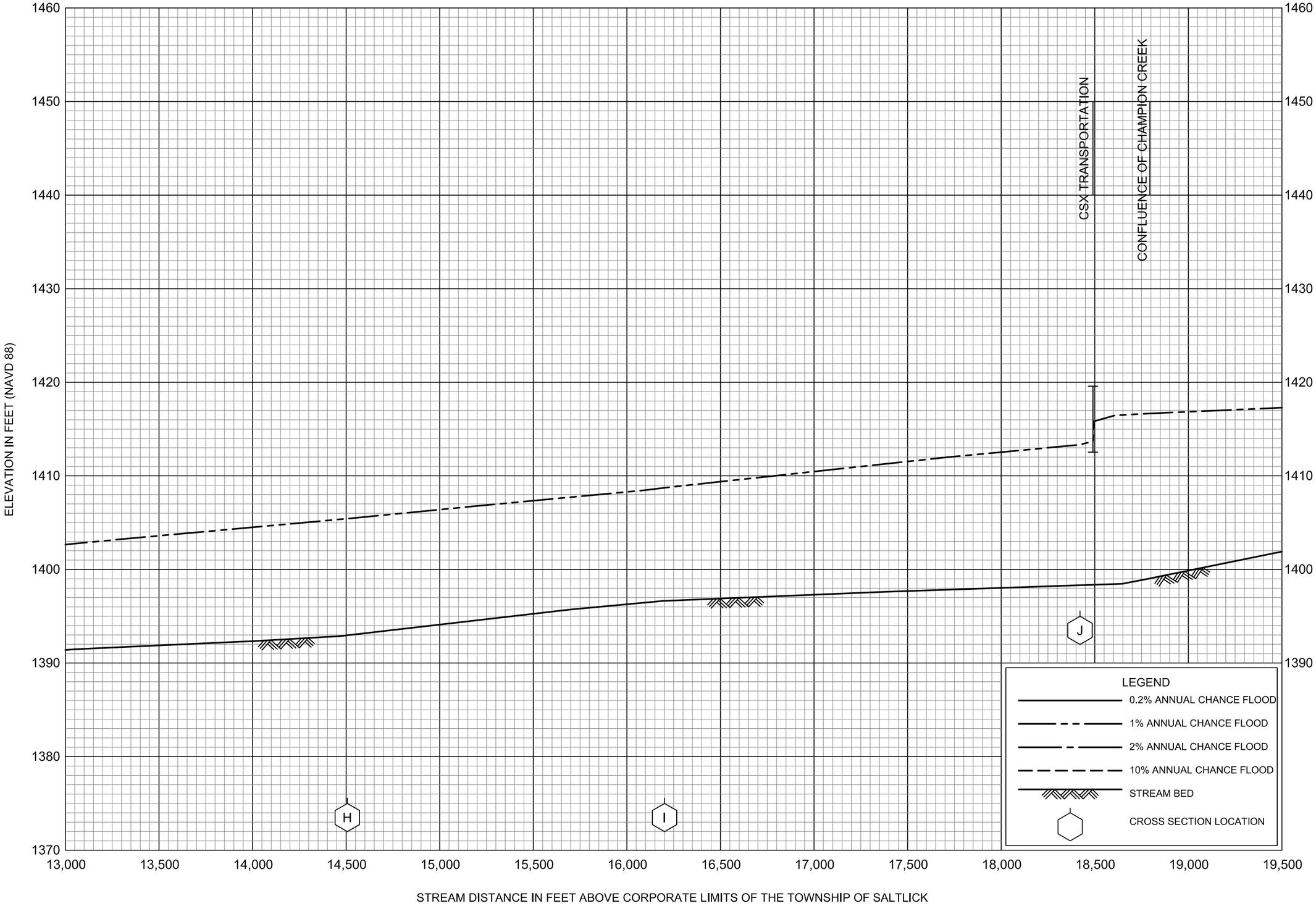
FLOOD PROFILES

INDIAN CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

FAYETTE COUNTY, PA

(ALL JURISDICATIONS)



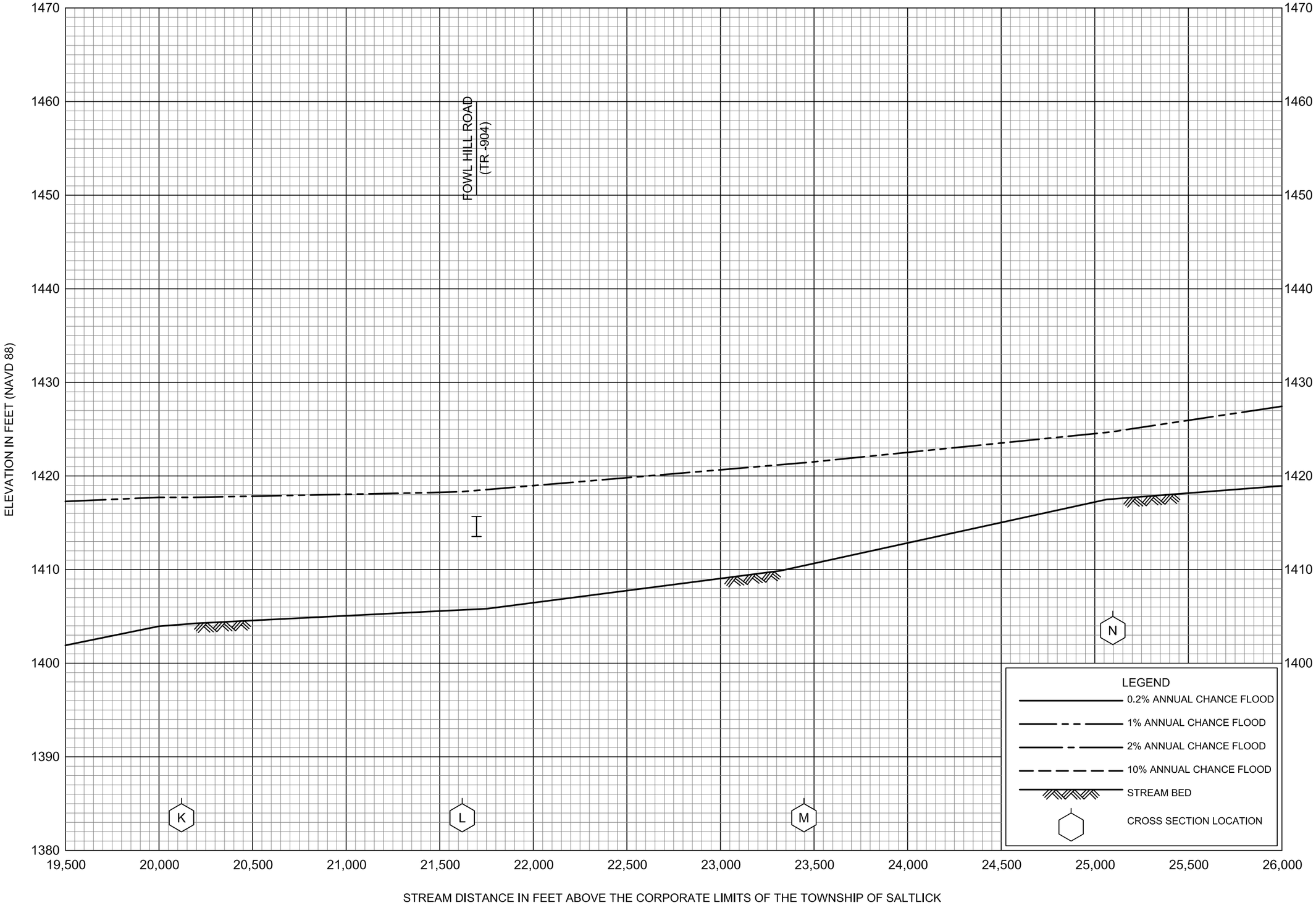
FLOOD PROFILES

INDIAN CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

FAYETTE COUNTY, PA

(ALL JURISDICATIONS)



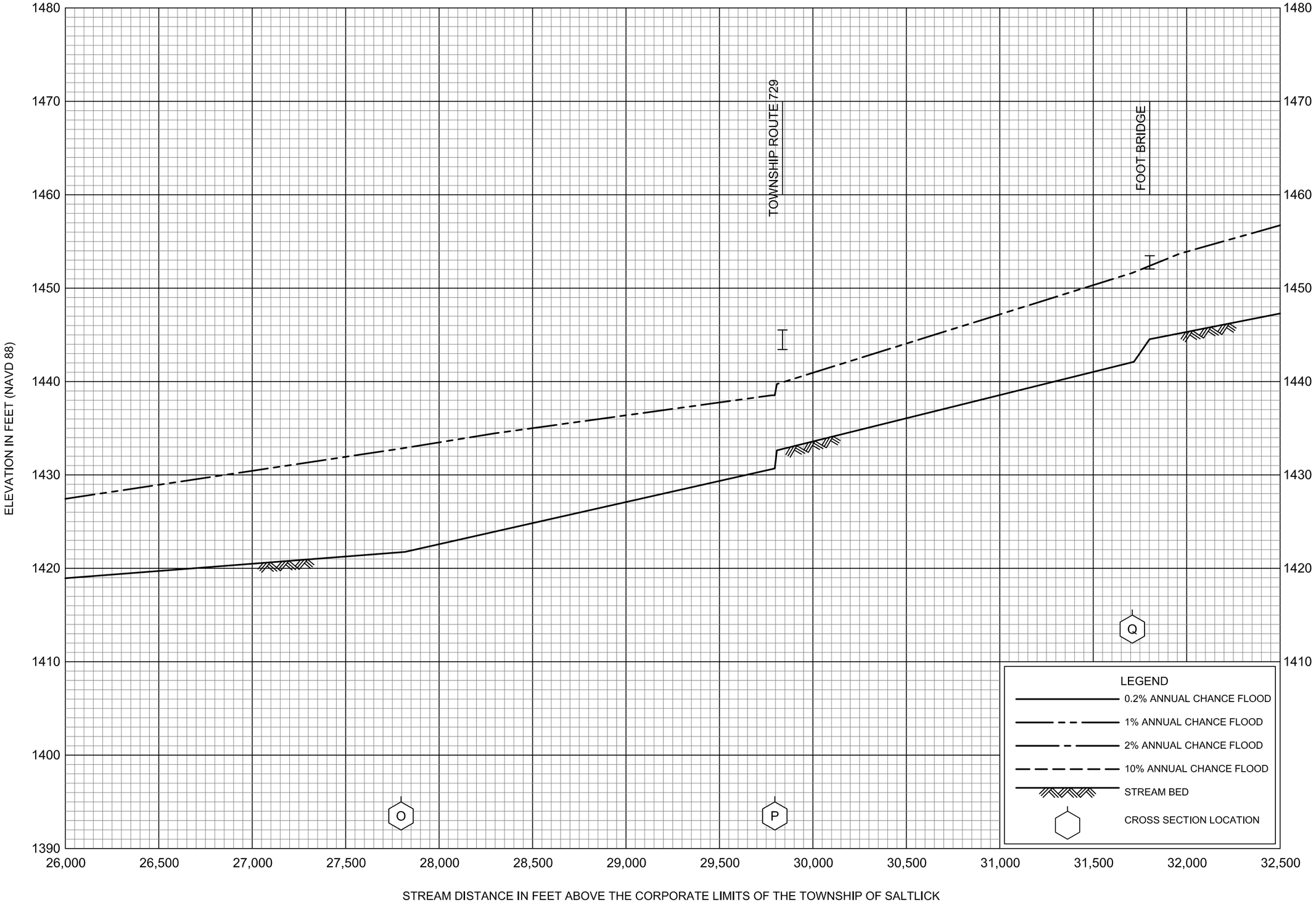
FLOOD PROFILES

INDIAN CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

FAYETTE COUNTY, PA

(ALL JURISDICATIONS)



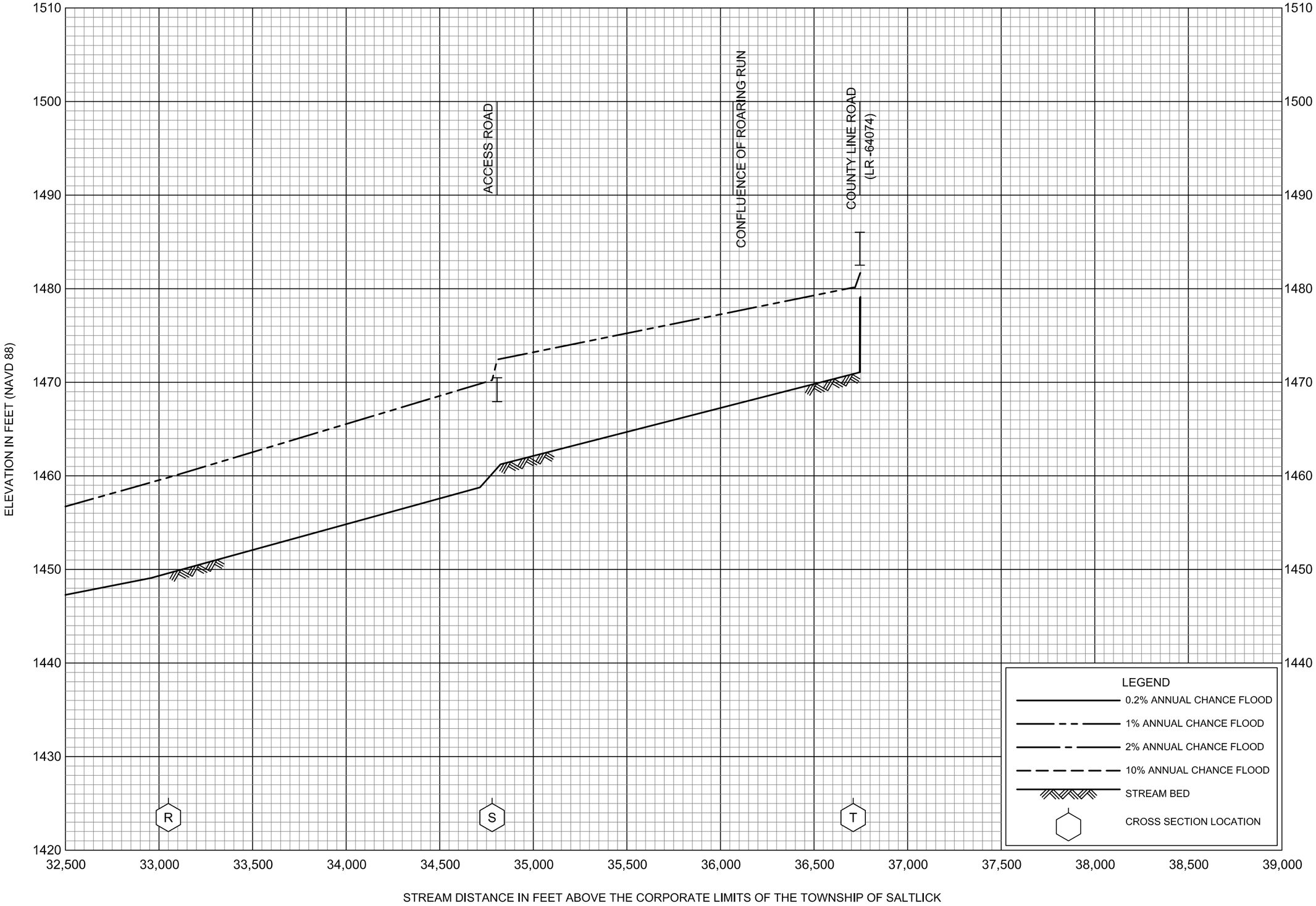
FLOOD PROFILES

INDIAN CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

FAYETTE COUNTY, PA

(ALL JURISDICATIONS)



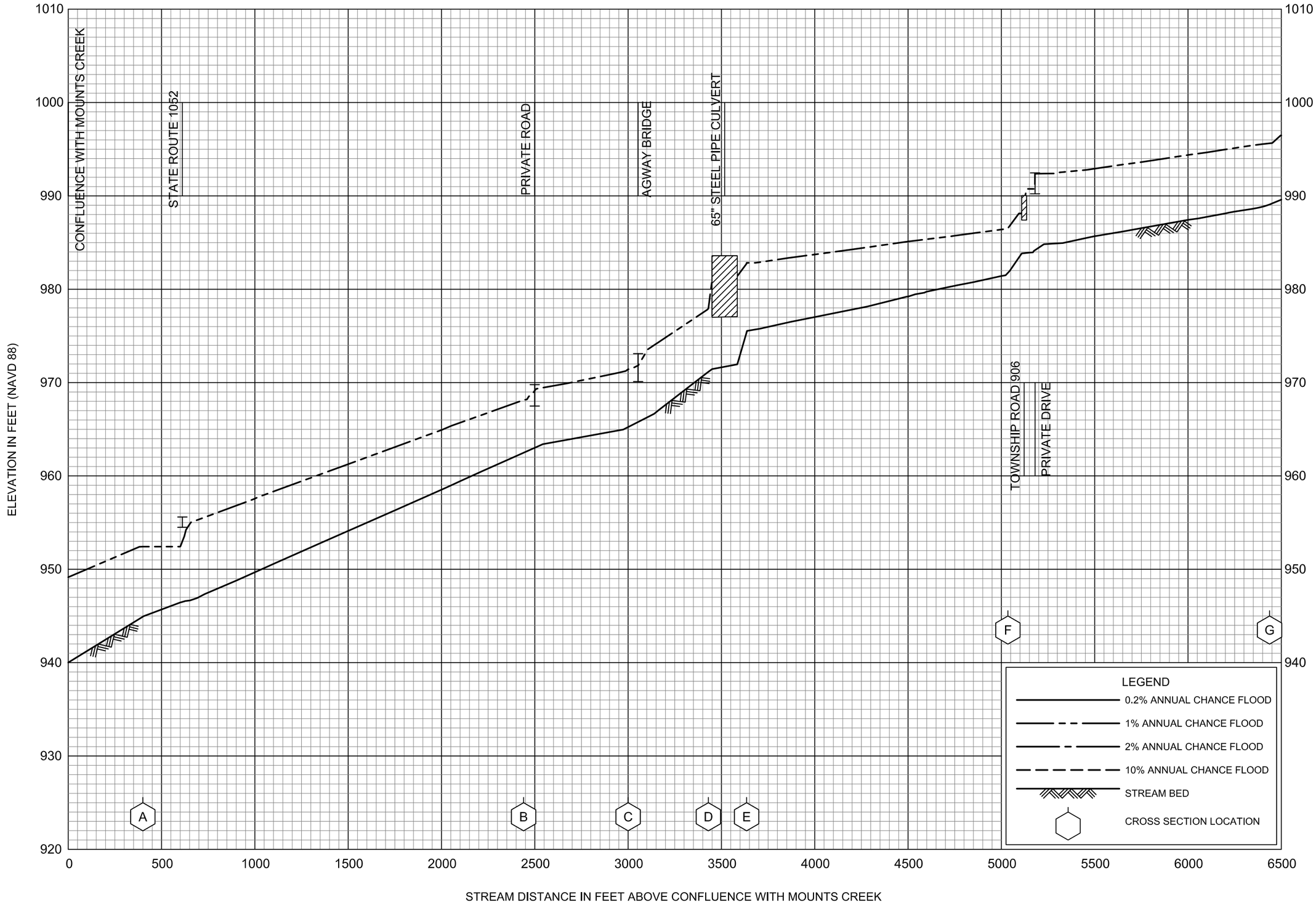
FLOOD PROFILES

INDIAN CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

FAYETTE COUNTY, PA

(ALL JURISDICATIONS)



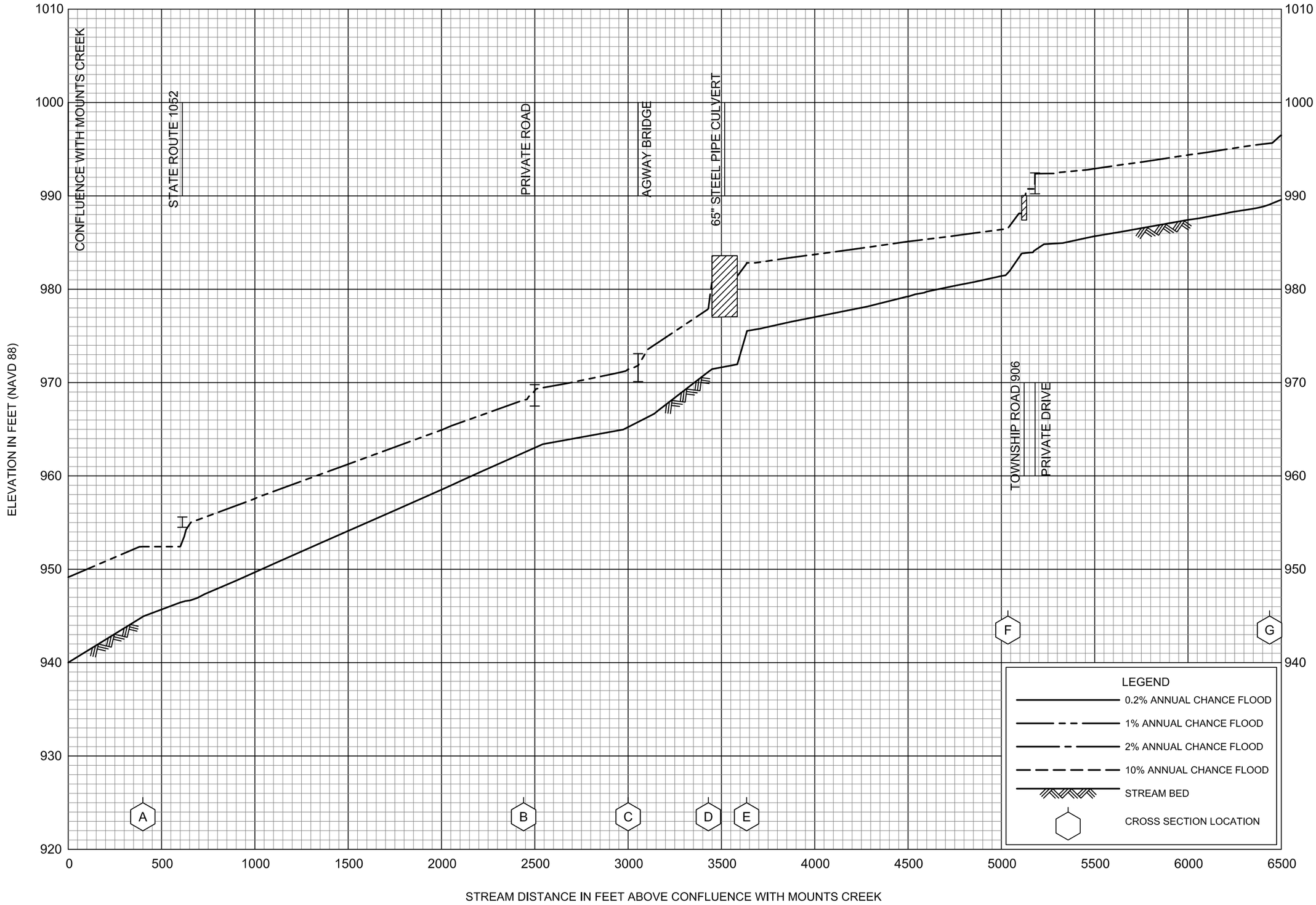
FLOOD PROFILES

IRISH RUN

FEDERAL EMERGENCY MANAGEMENT AGENCY

FAYETTE COUNTY, PA

(ALL JURISDICATION.)



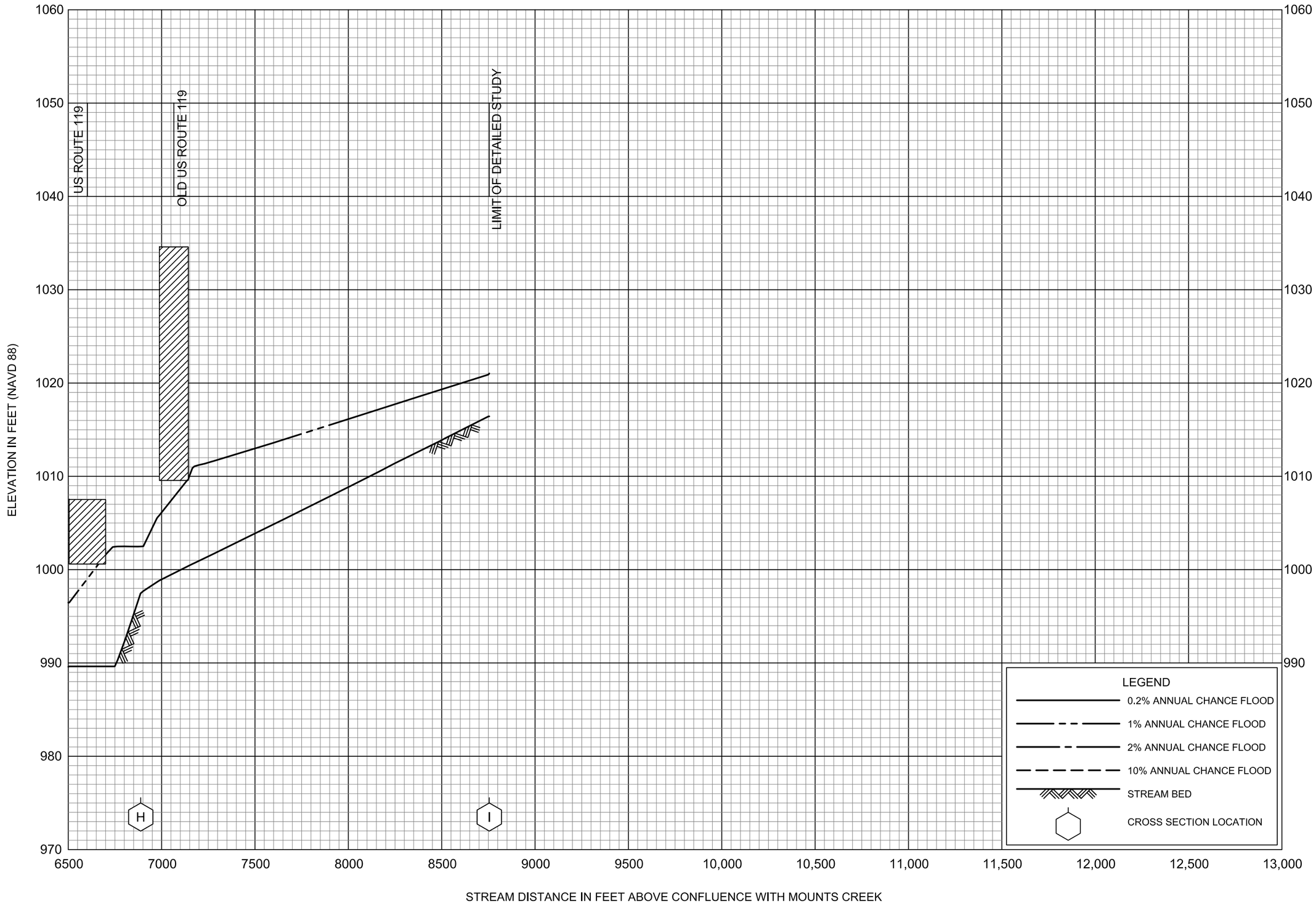
FLOOD PROFILES

IRISH RUN

FEDERAL EMERGENCY MANAGEMENT AGENCY

FAYETTE COUNTY, PA

(ALL JURISDICATION.)



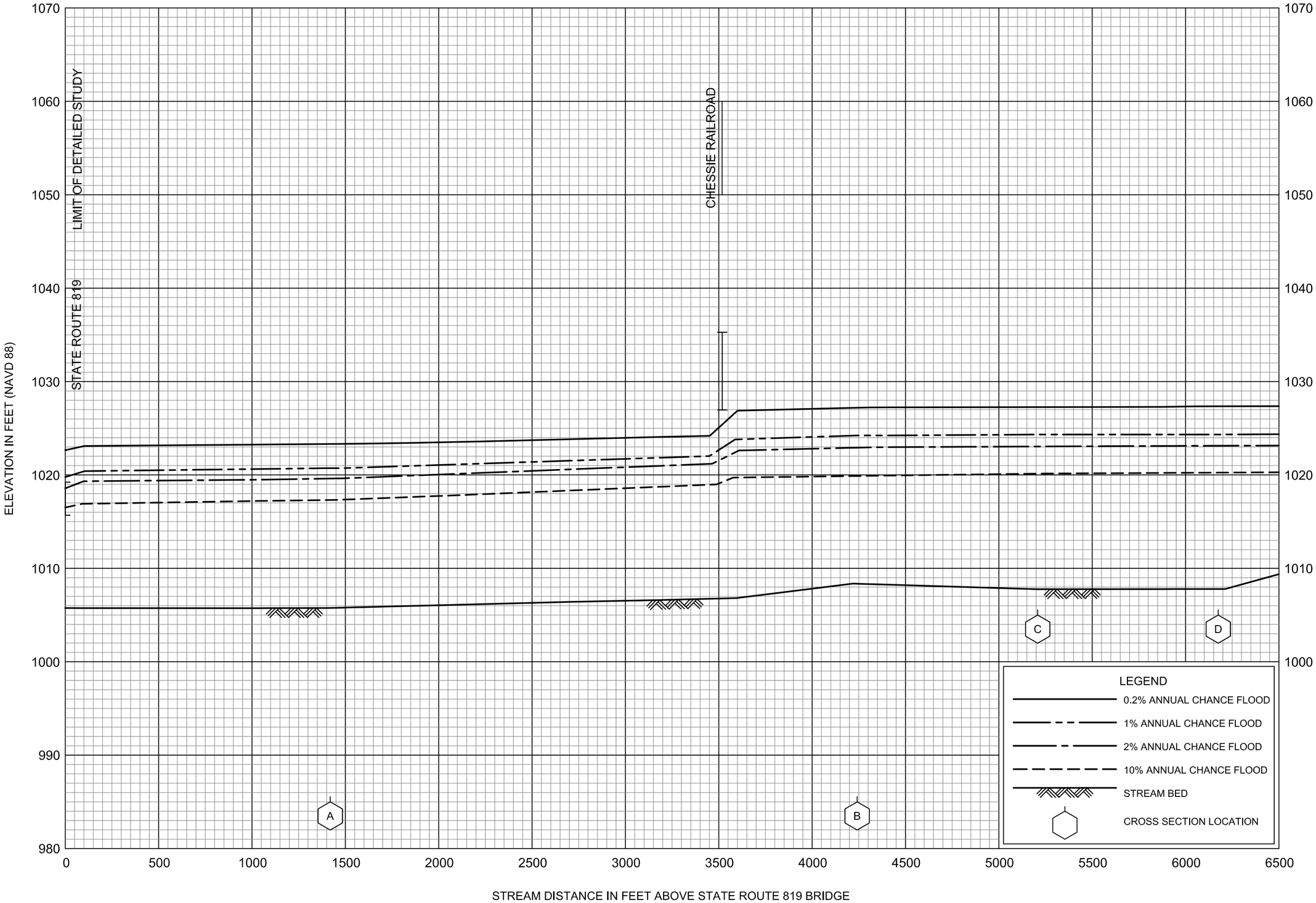
FLOOD PROFILES

IRISH RUN

FEDERAL EMERGENCY MANAGEMENT AGENCY

FAYETTE COUNTY, PA

(ALL JURISDICATION.)



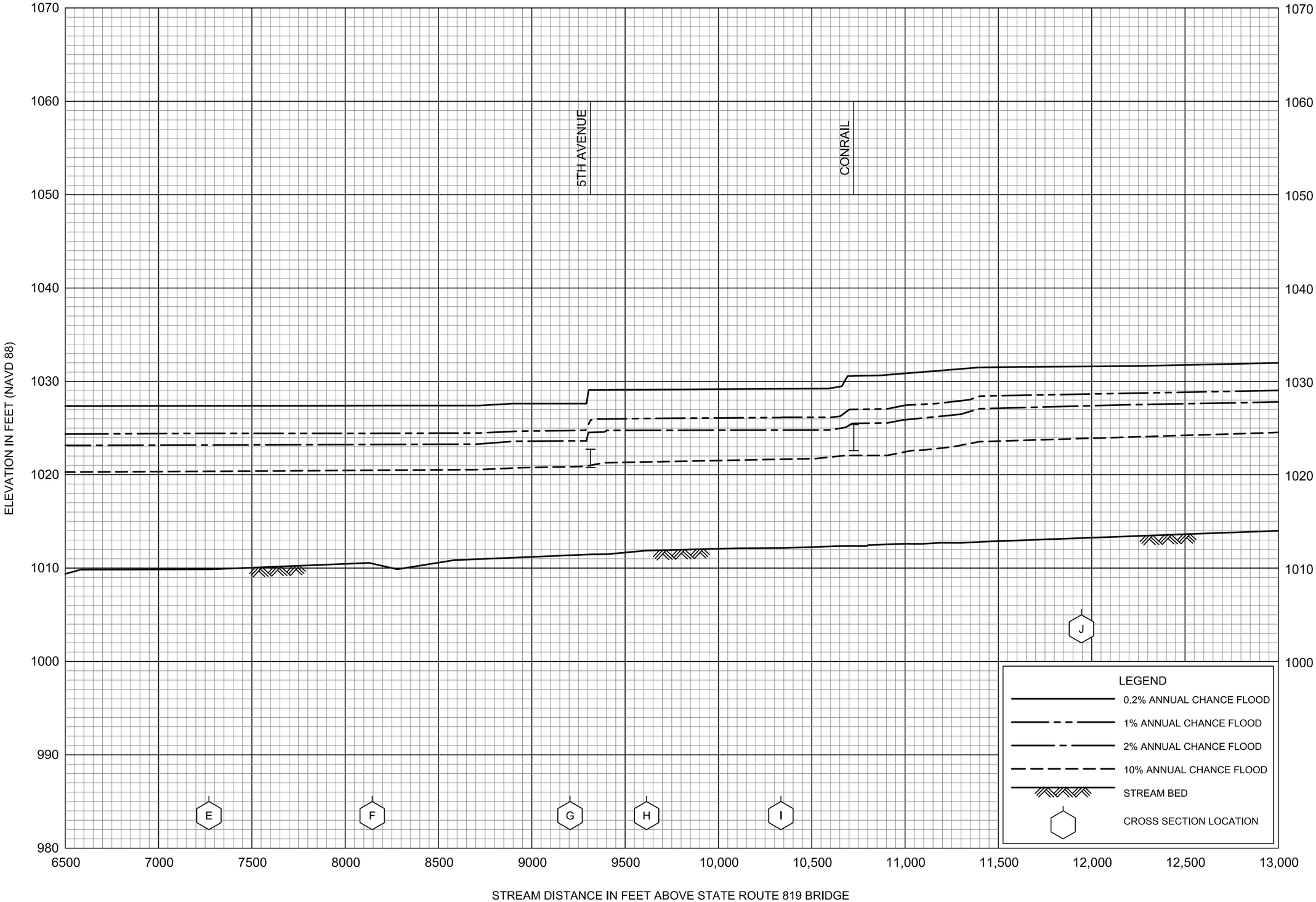
FLOOD PROFILES

JACOBS CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

FAYETTE COUNTY, PA

(ALL JURISDICATIONS)



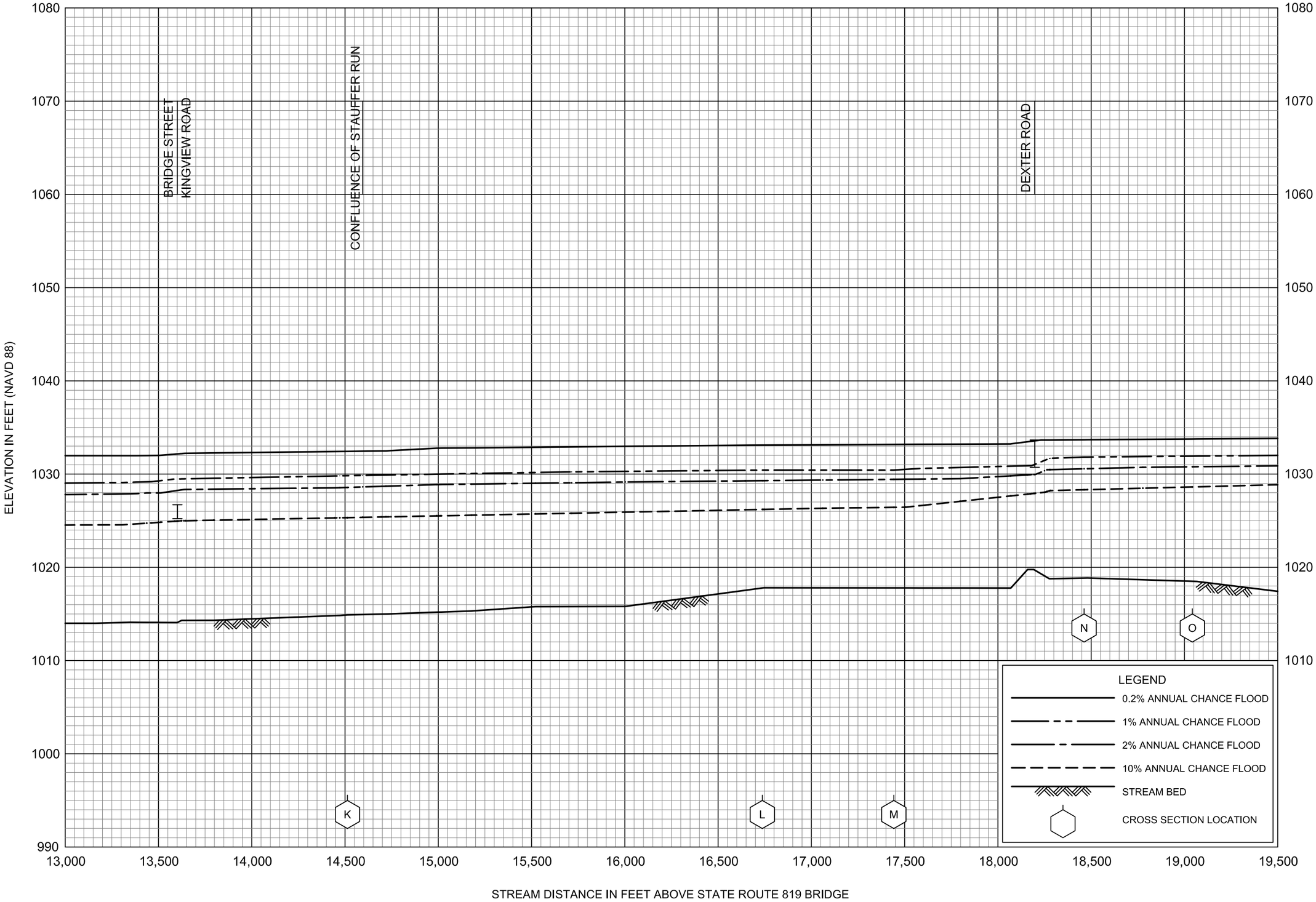
FLOOD PROFILES

JACOBS CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

FAYETTE COUNTY, PA

(ALL JURISDICATIONS)



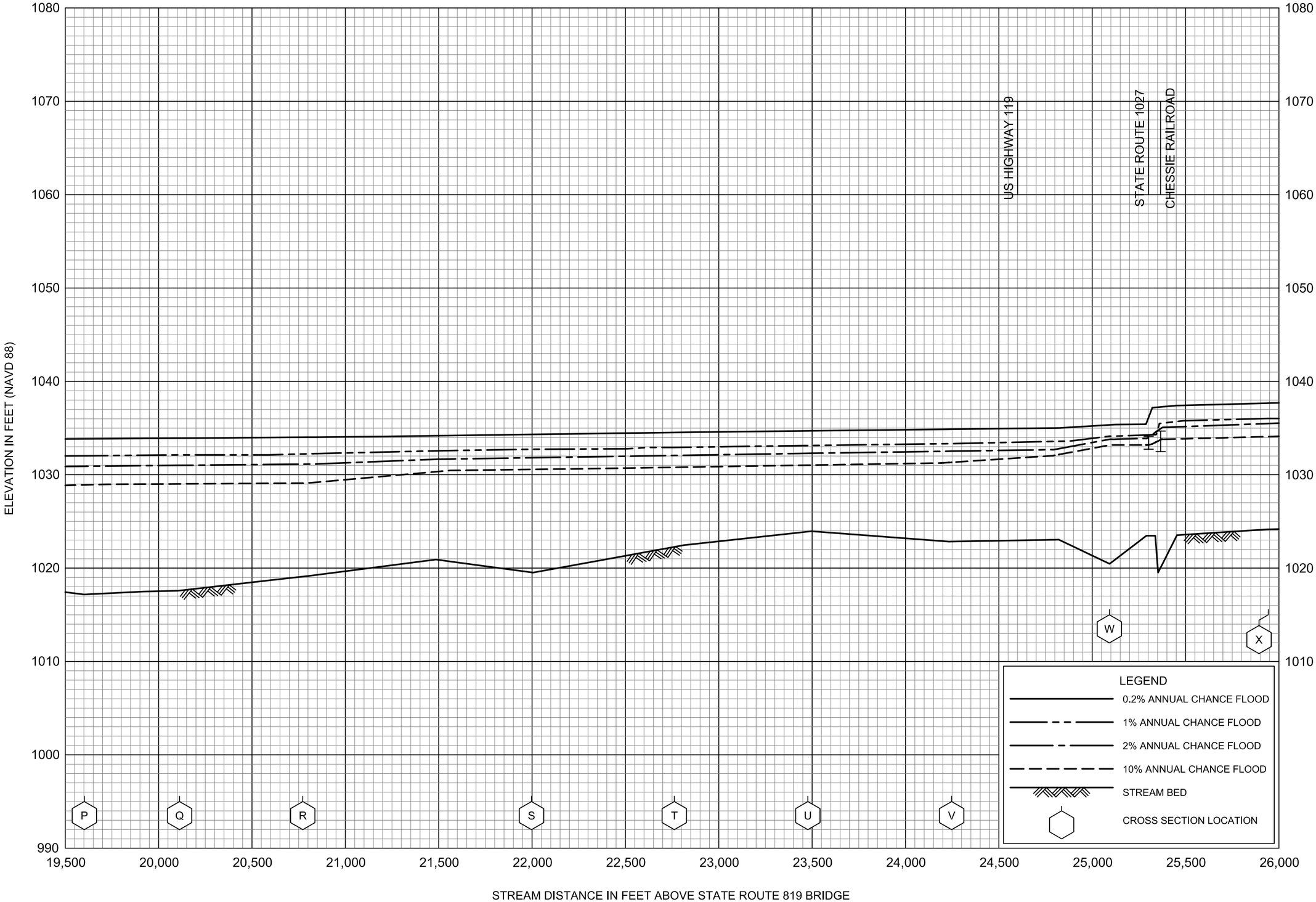
FLOOD PROFILES

JACOBS CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

FAYETTE COUNTY, PA

(ALL JURISDICATIONS)



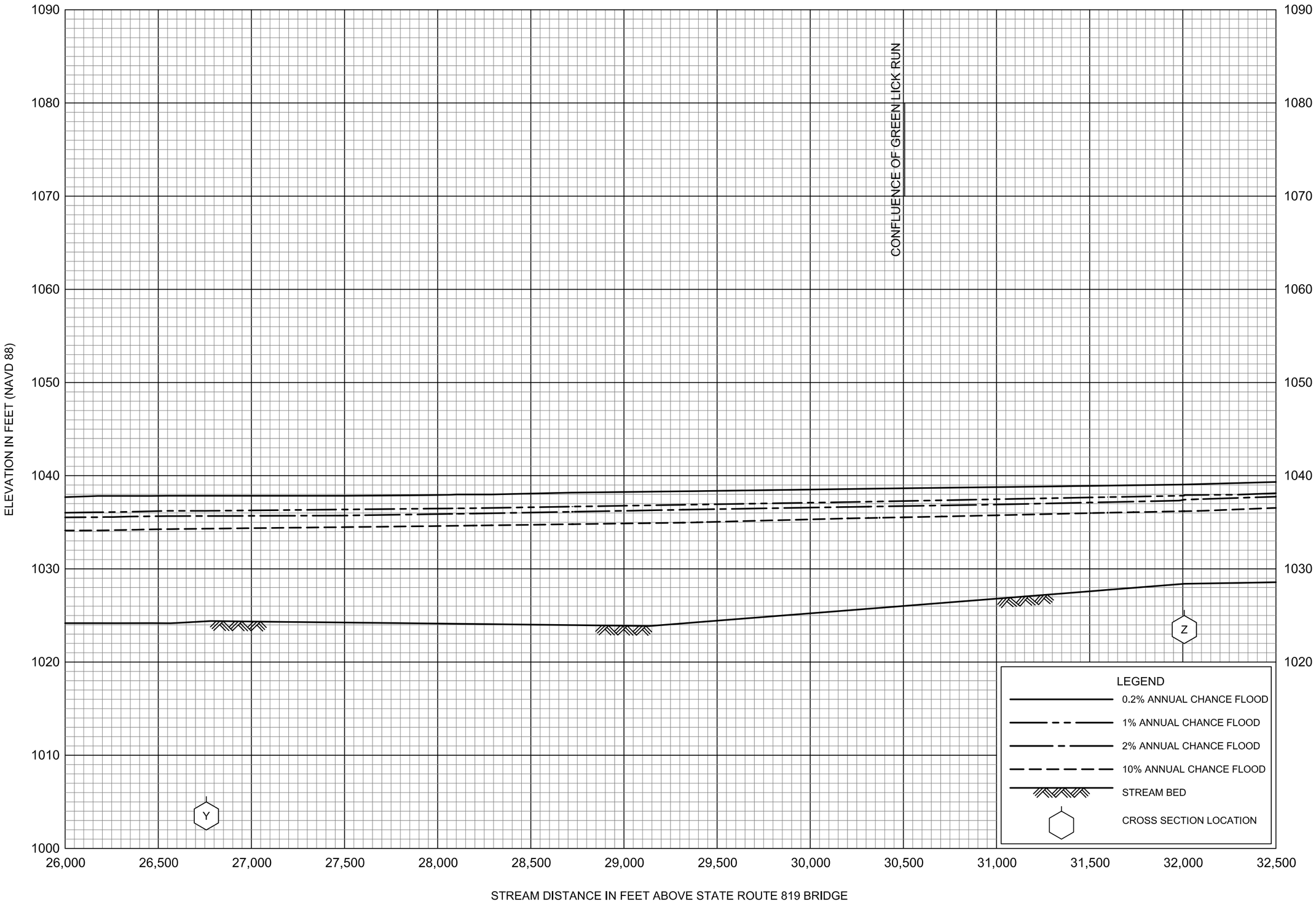
FLOOD PROFILES

JACOBS CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

FAYETTE COUNTY, PA

(ALL JURISDICATIONS)



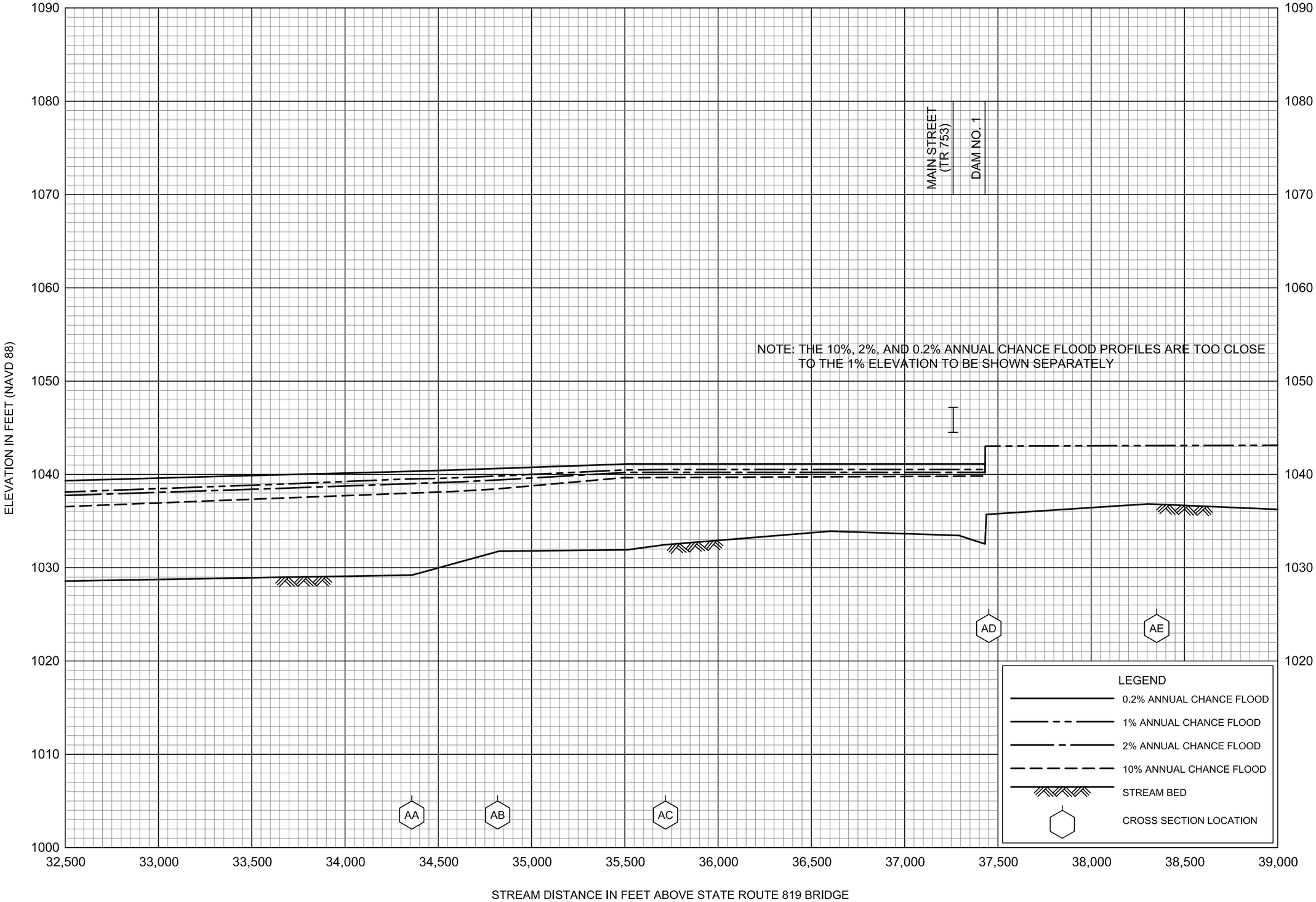
FLOOD PROFILES

JACOBS CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

FAYETTE COUNTY, PA

(ALL JURISDICATIONS)



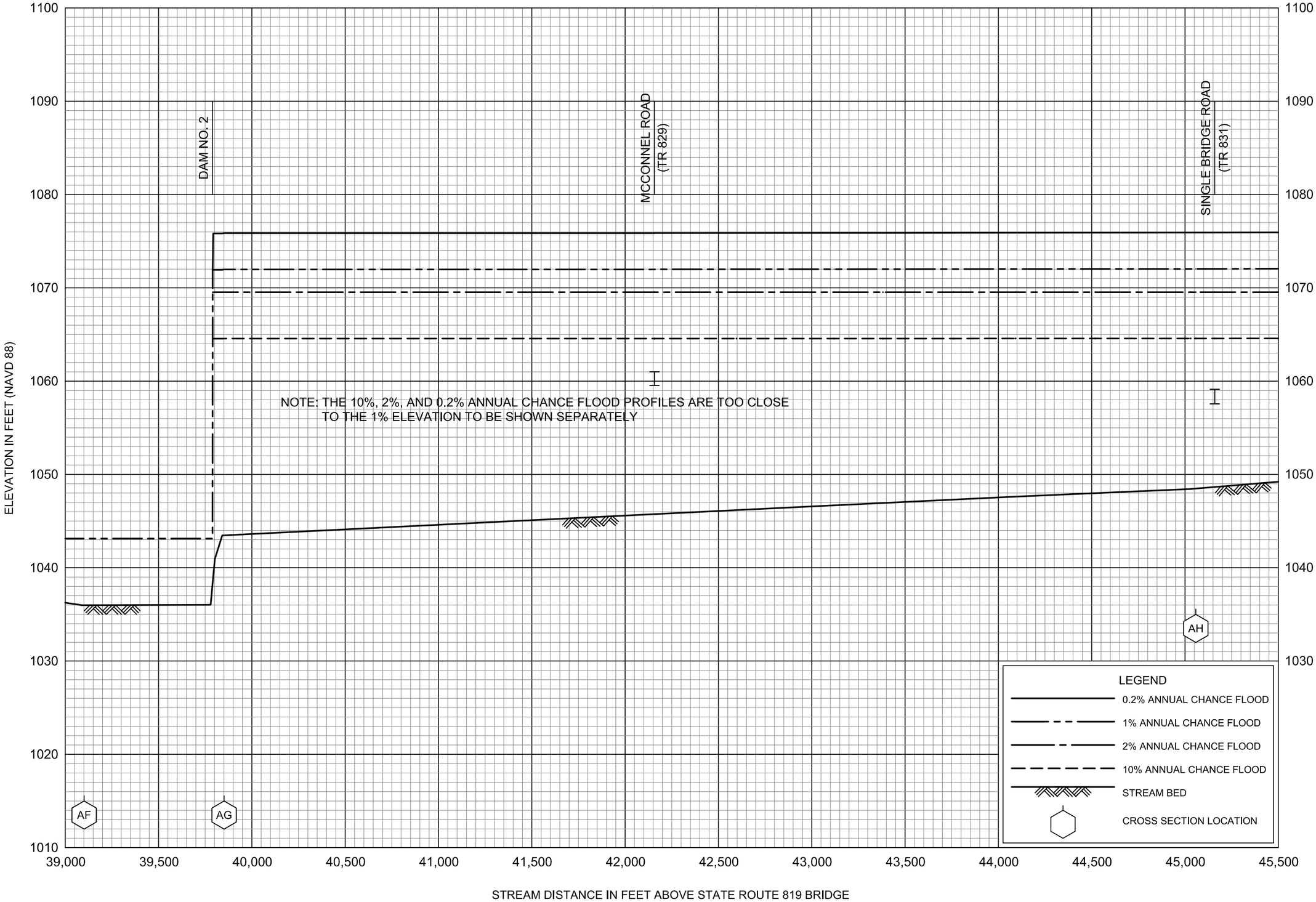
FLOOD PROFILES

JACOBS CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

FAYETTE COUNTY, PA

(ALL JURISDICATIONS)



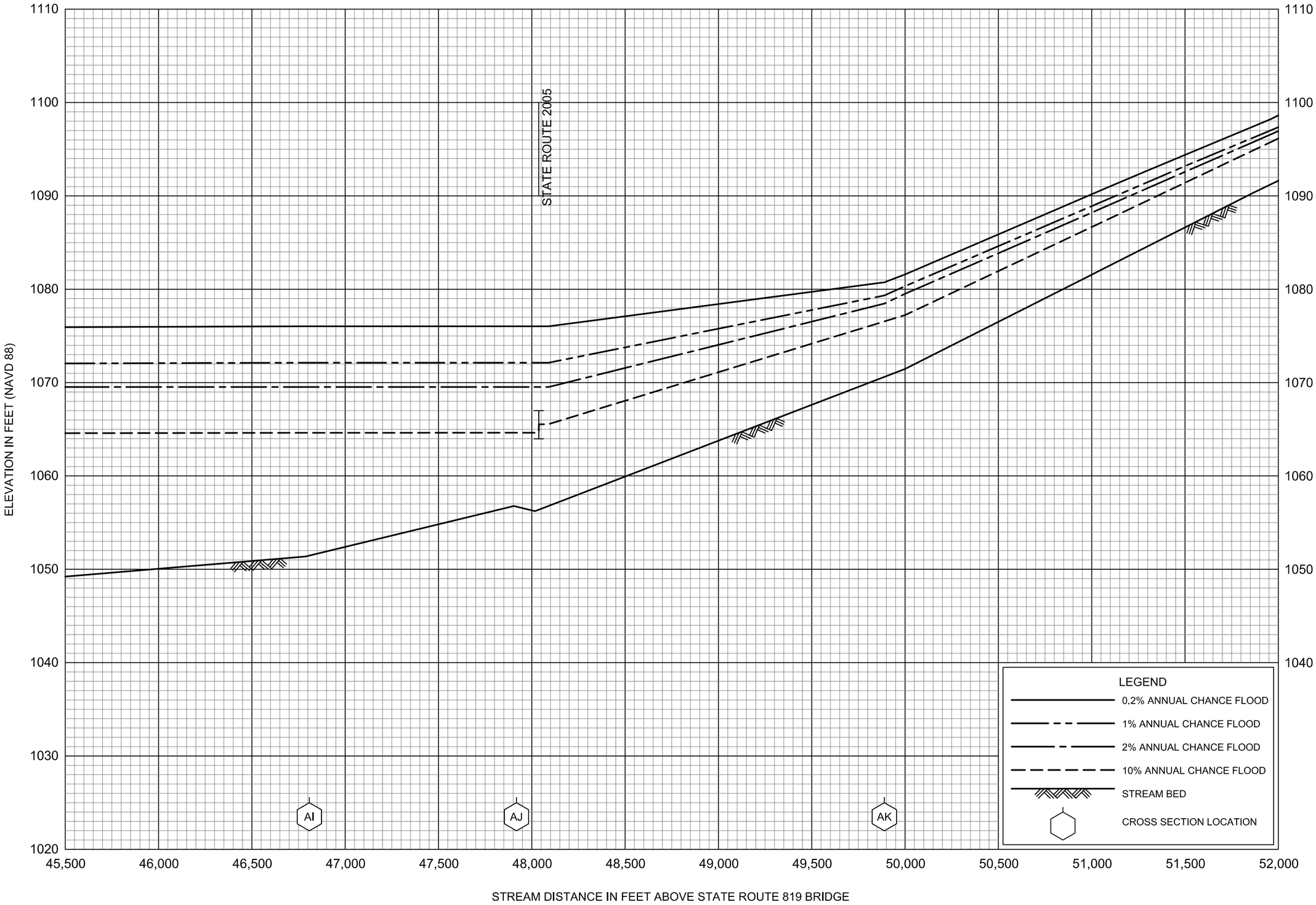
FLOOD PROFILES

JACOBS CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

FAYETTE COUNTY, PA

(ALL JURISDICATIONS)



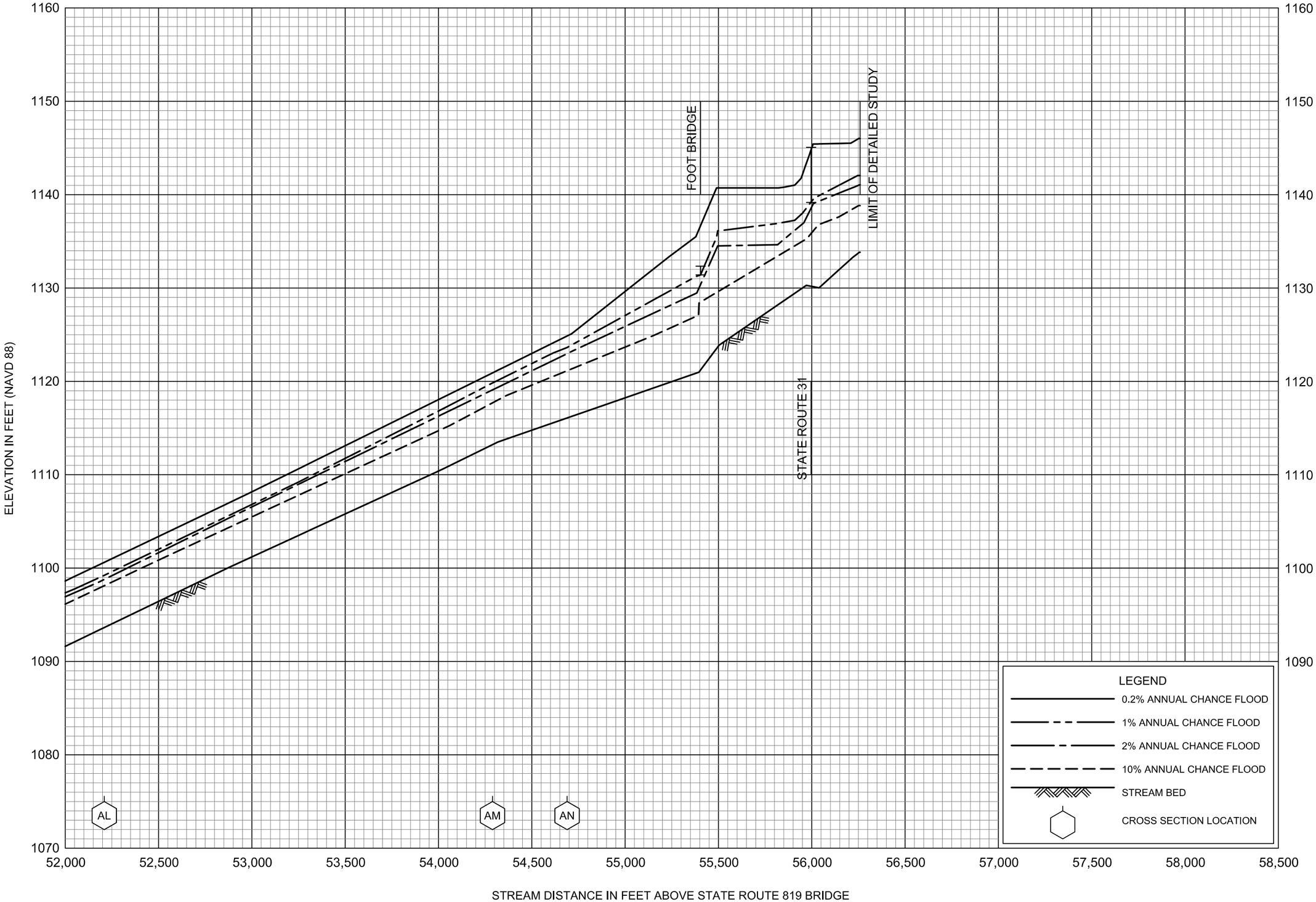
FLOOD PROFILES

JACOBS CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

FAYETTE COUNTY, PA

(ALL JURISDICATIONS)



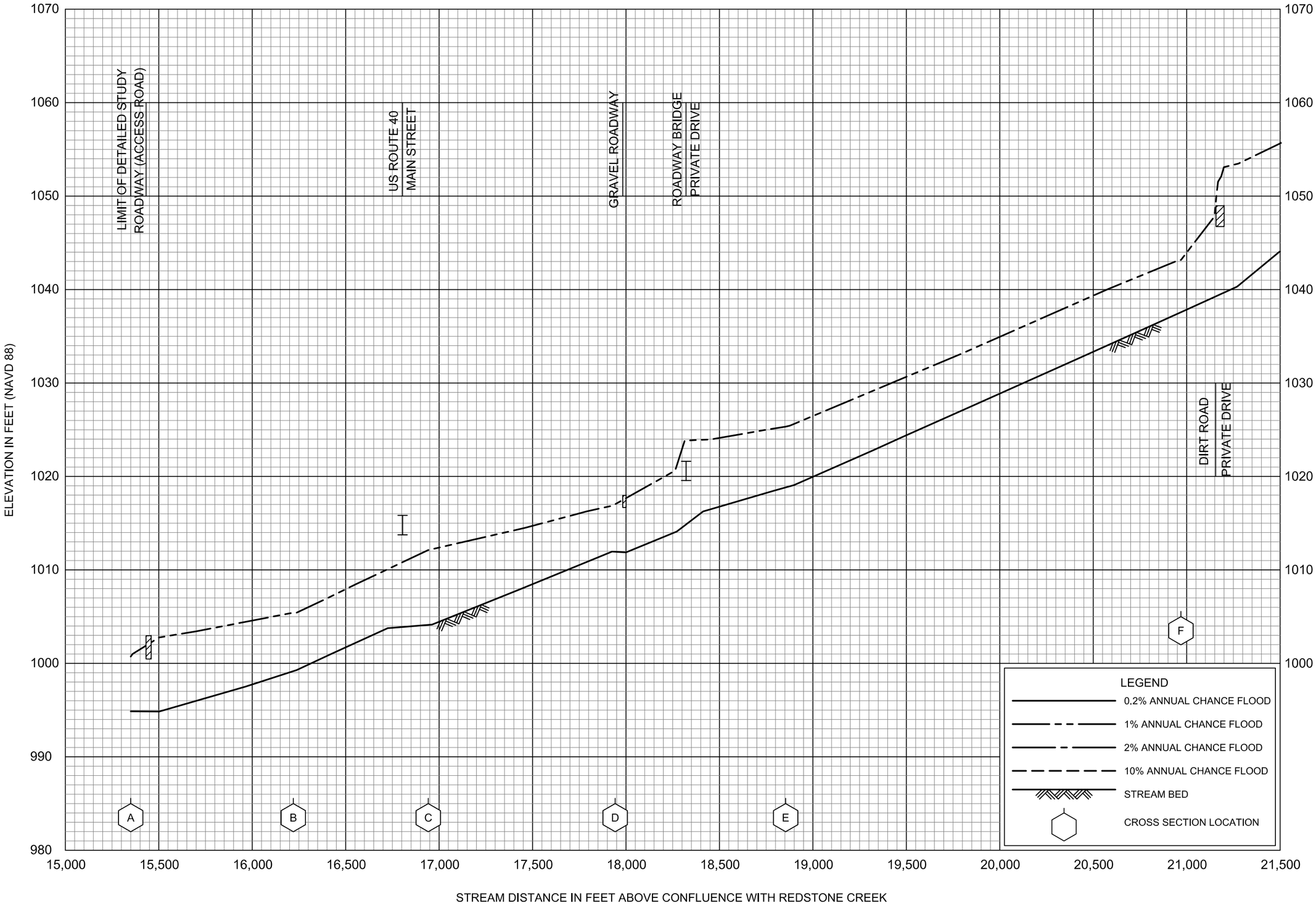
FLOOD PROFILES

JACOBS CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

FAYETTE COUNTY, PA

(ALL JURISDICATIONS)



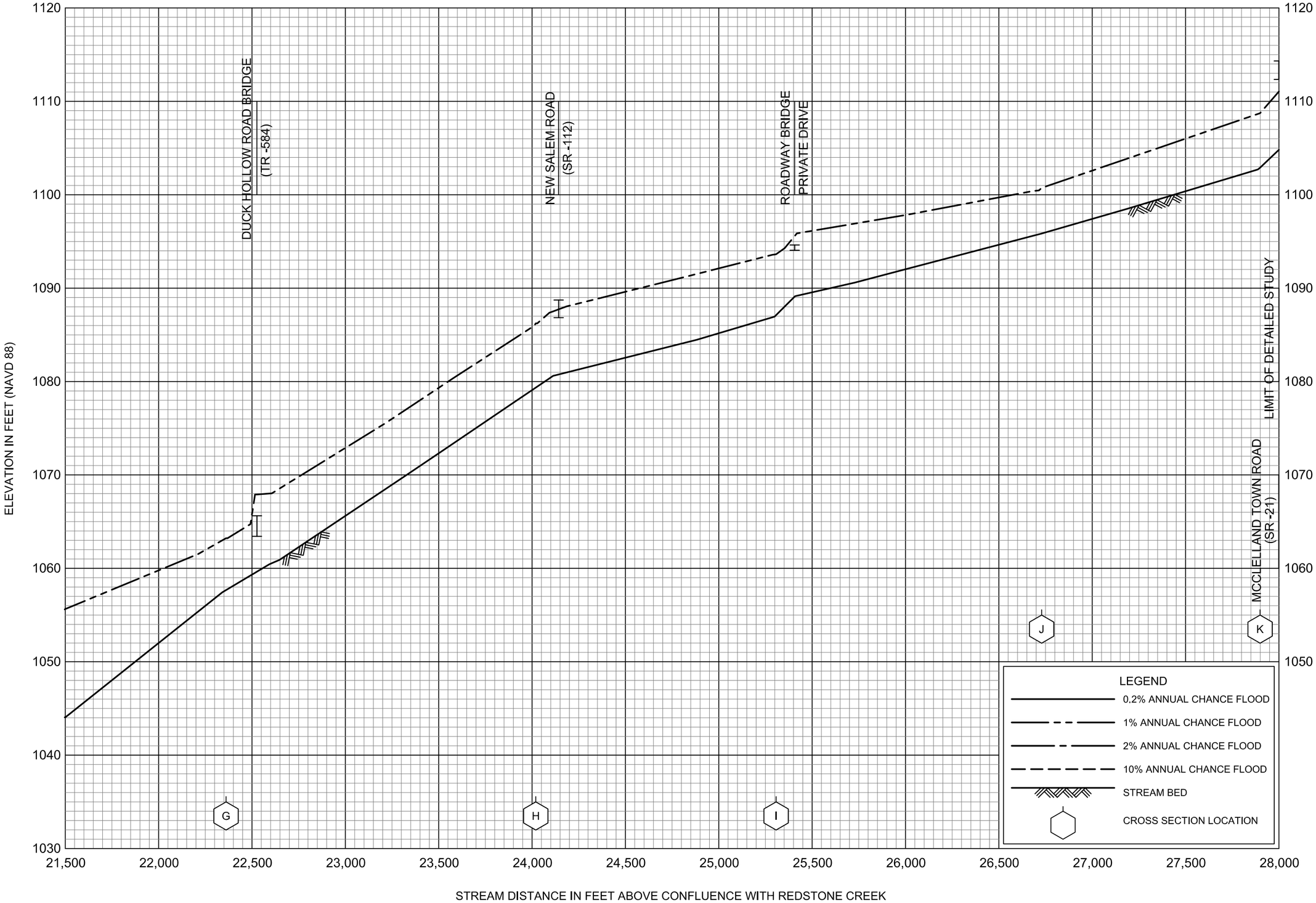
FLOOD PROFILES

JENNINGS RUN

FEDERAL EMERGENCY MANAGEMENT AGENCY

FAYETTE COUNTY, PA

(ALL JURISDICATIONS)



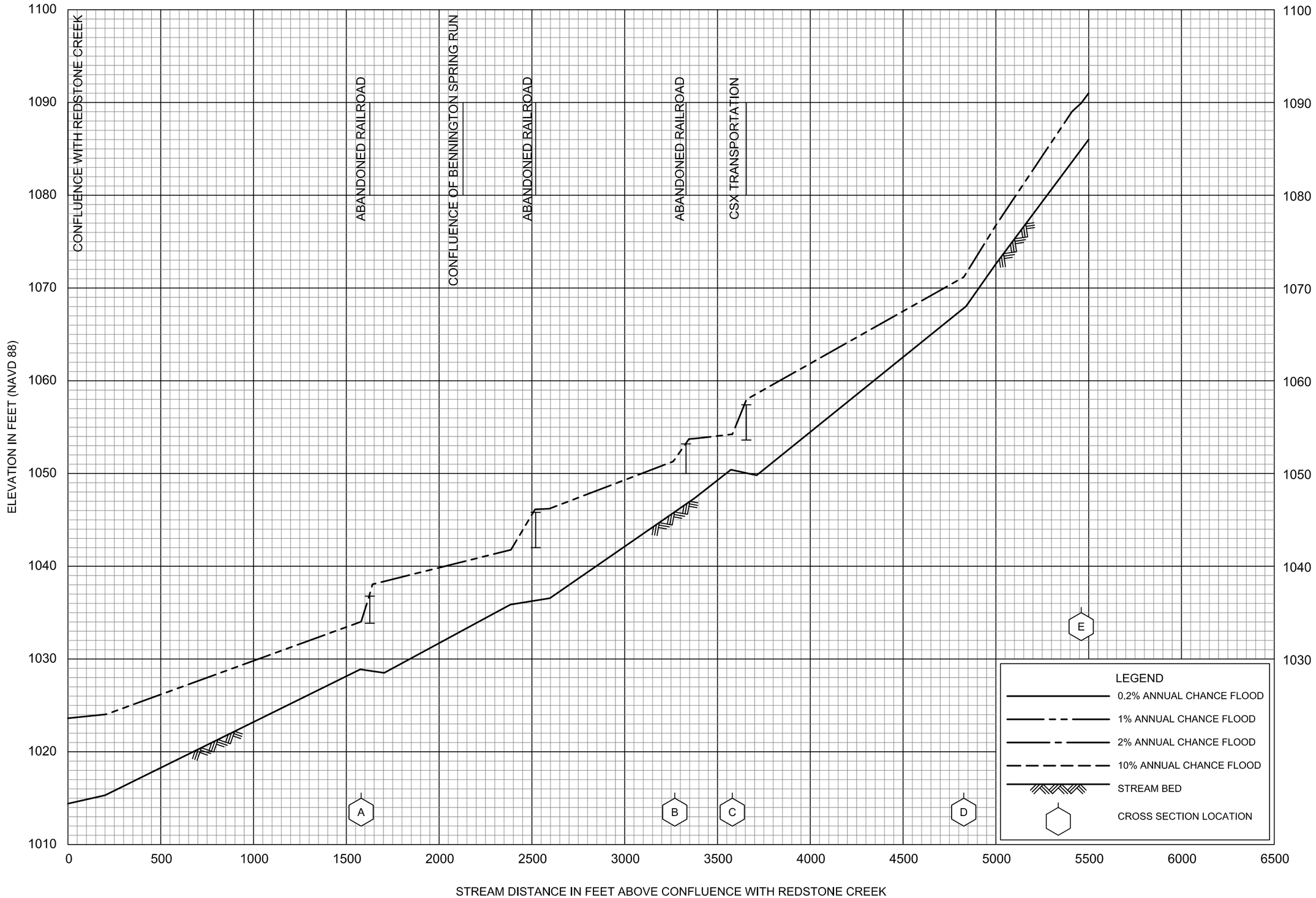
FLOOD PROFILES

JENNINGS RUN

FEDERAL EMERGENCY MANAGEMENT AGENCY

FAYETTE COUNTY, PA

(ALL JURISDICATIONS)



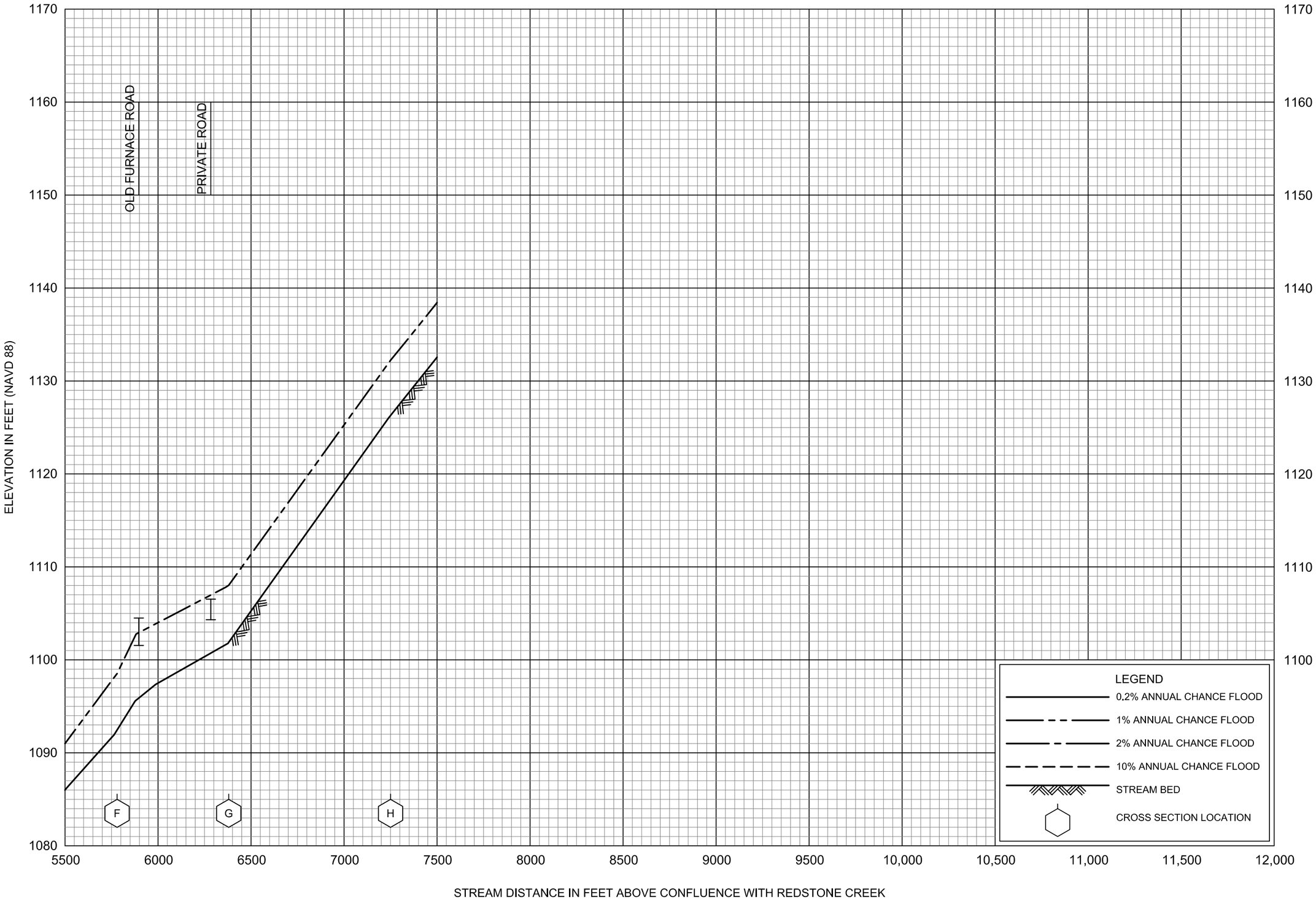
FLOOD PROFILES

LICK RUN

FEDERAL EMERGENCY MANAGEMENT AGENCY

FAYETTE COUNTY, PA

(ALL JURISDICATIONS)



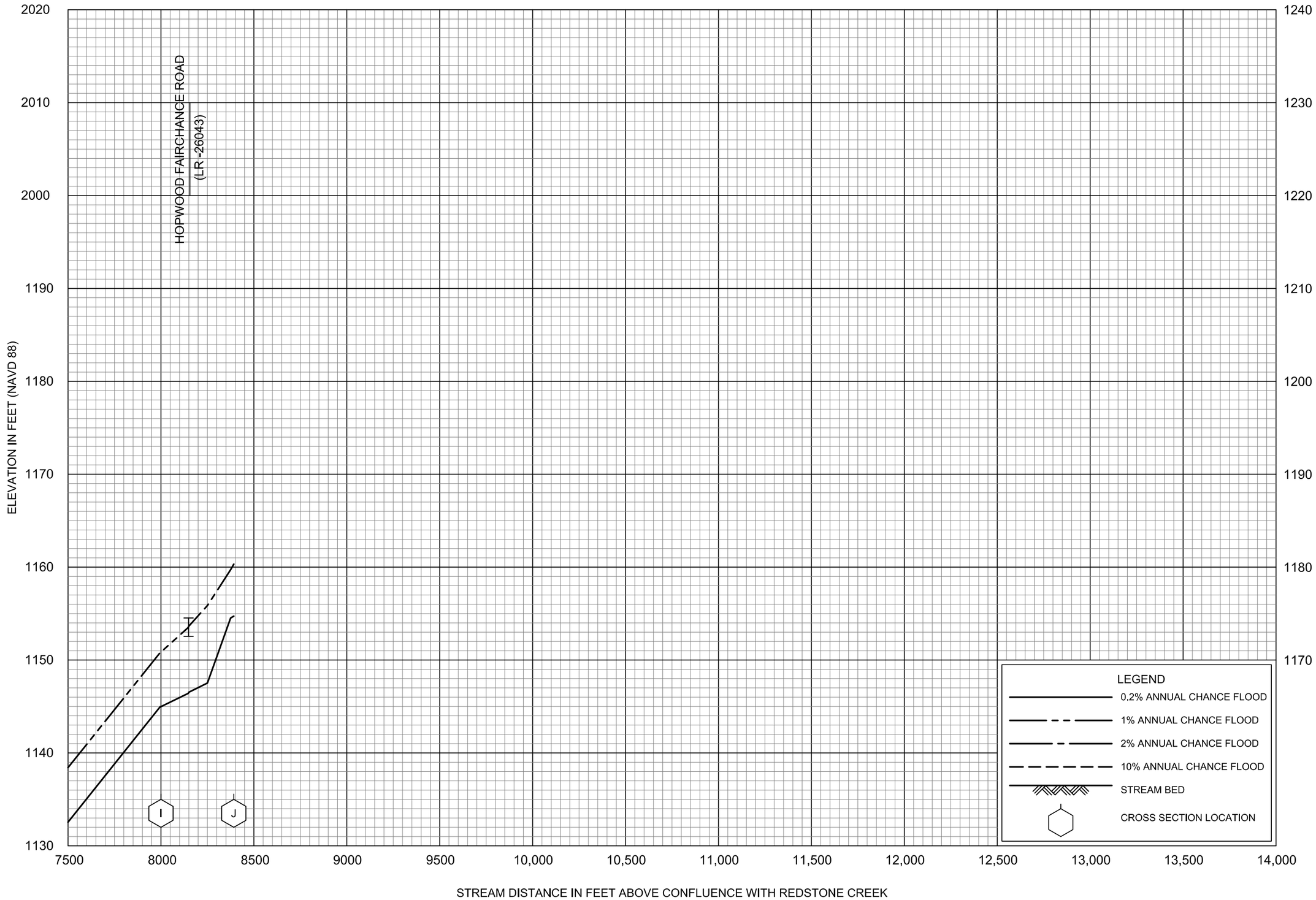
FLOOD PROFILES

LICK RUN

FEDERAL EMERGENCY MANAGEMENT AGENCY

FAYETTE COUNTY, PA

(ALL JURISDICATIONS)



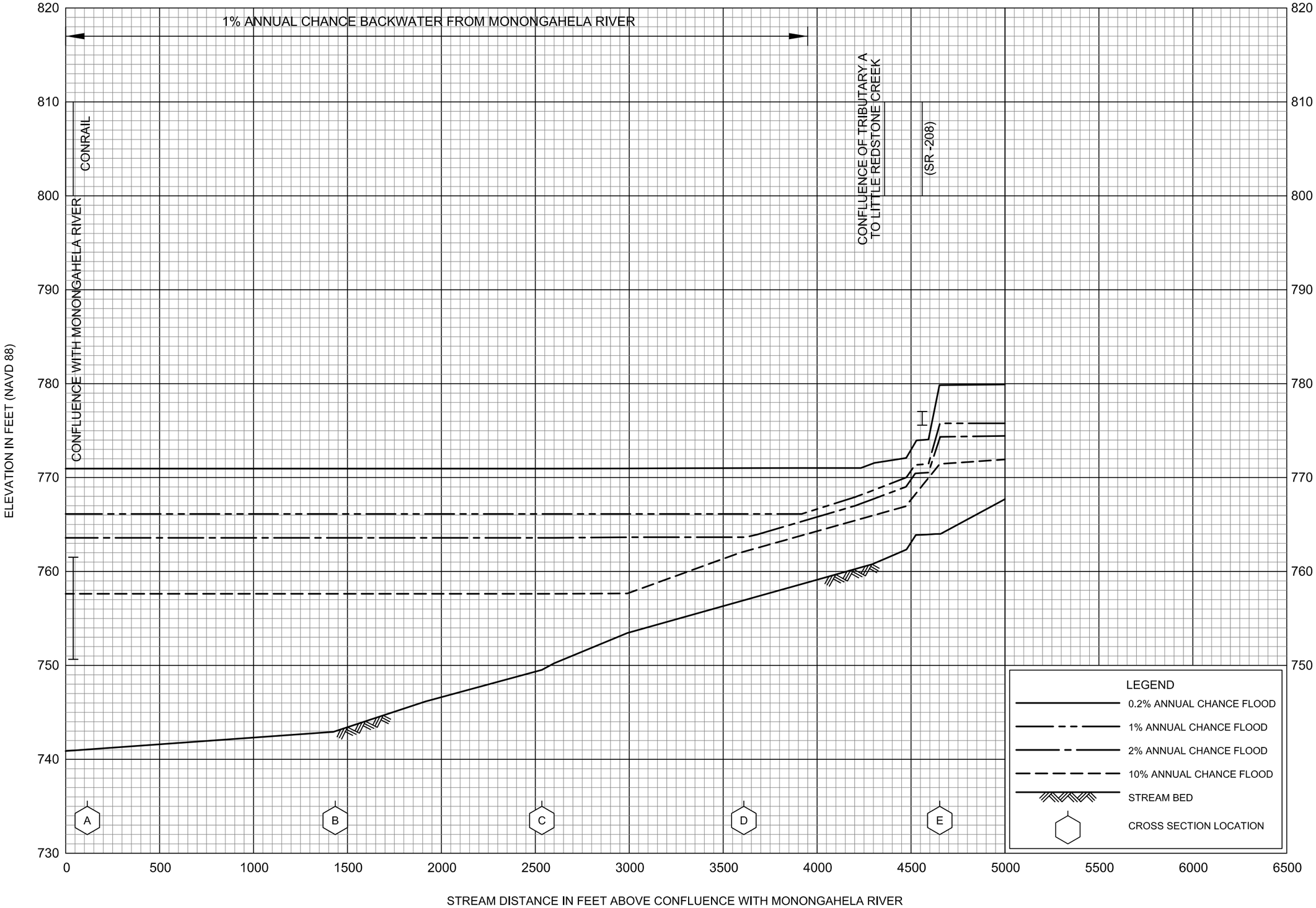
FLOOD PROFILES

LICK RUN

FEDERAL EMERGENCY MANAGEMENT AGENCY

FAYETTE COUNTY, PA

(ALL JURISDICATIONS)



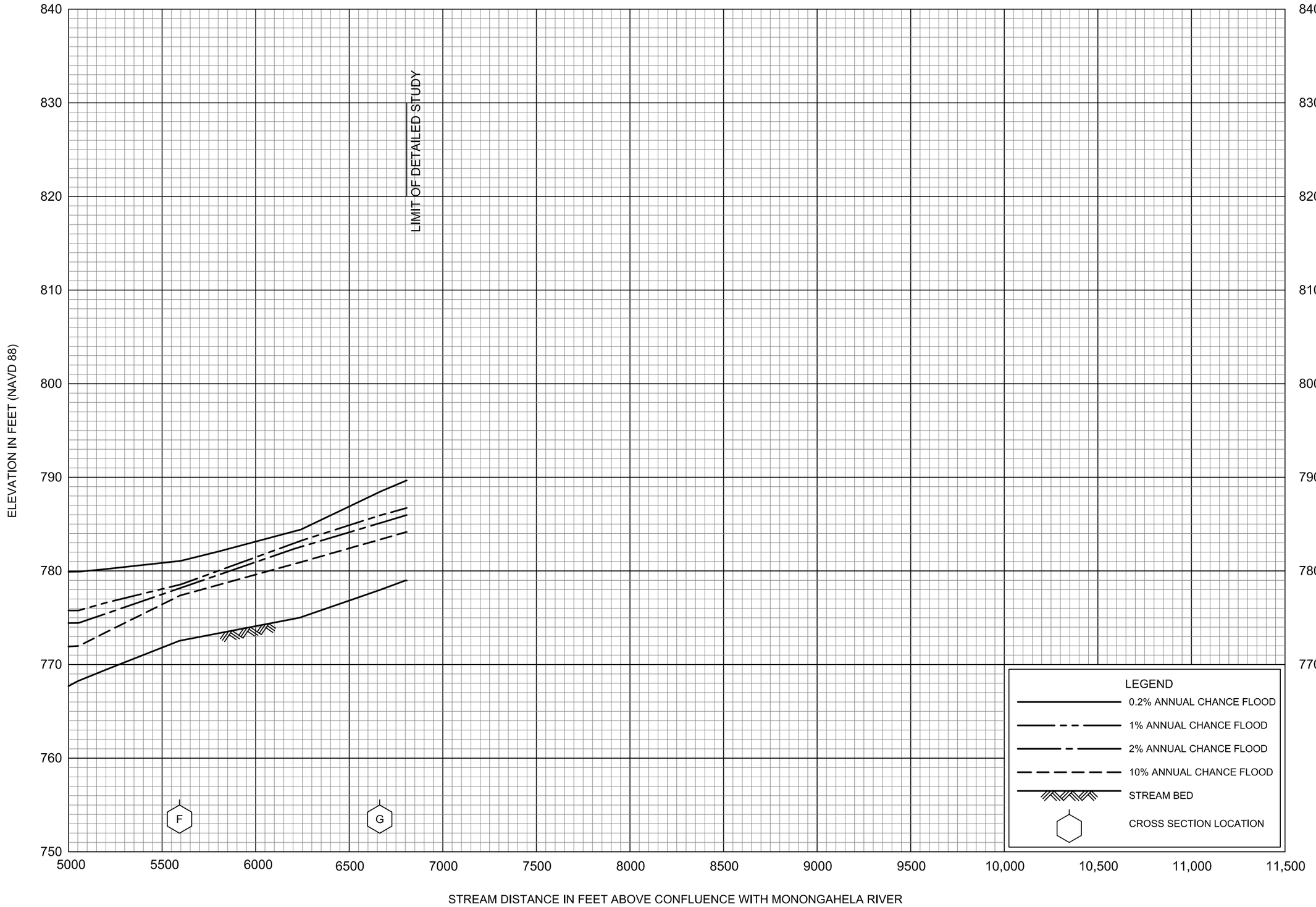
FLOOD PROFILES

LITTLE REDSTONE CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

FAYETTE COUNTY, PA

(ALL JURISDICATIONS)



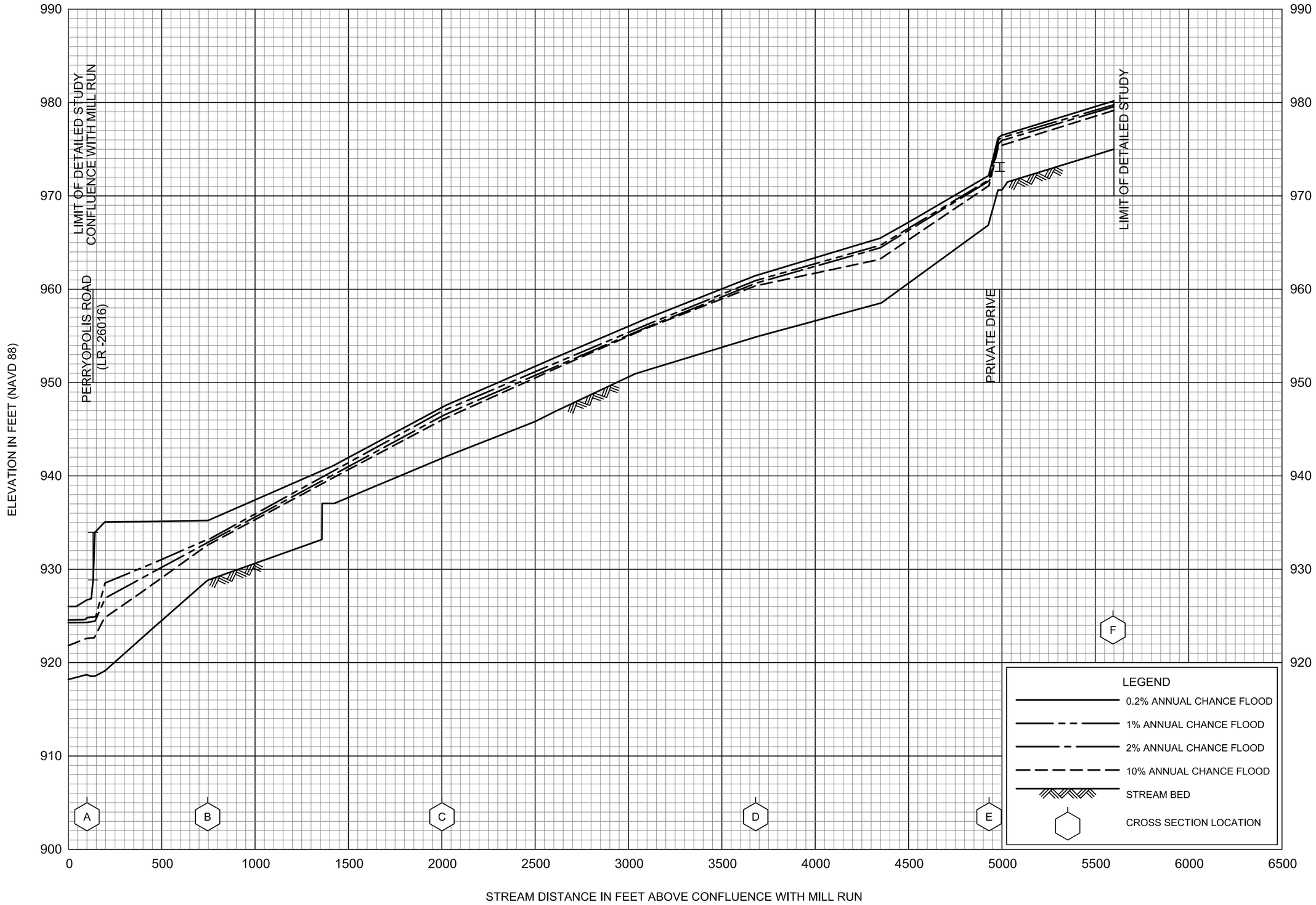
FLOOD PROFILES

LITTLE REDSTONE CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

FAYETTE COUNTY, PA

(ALL JURISDICATIONS)



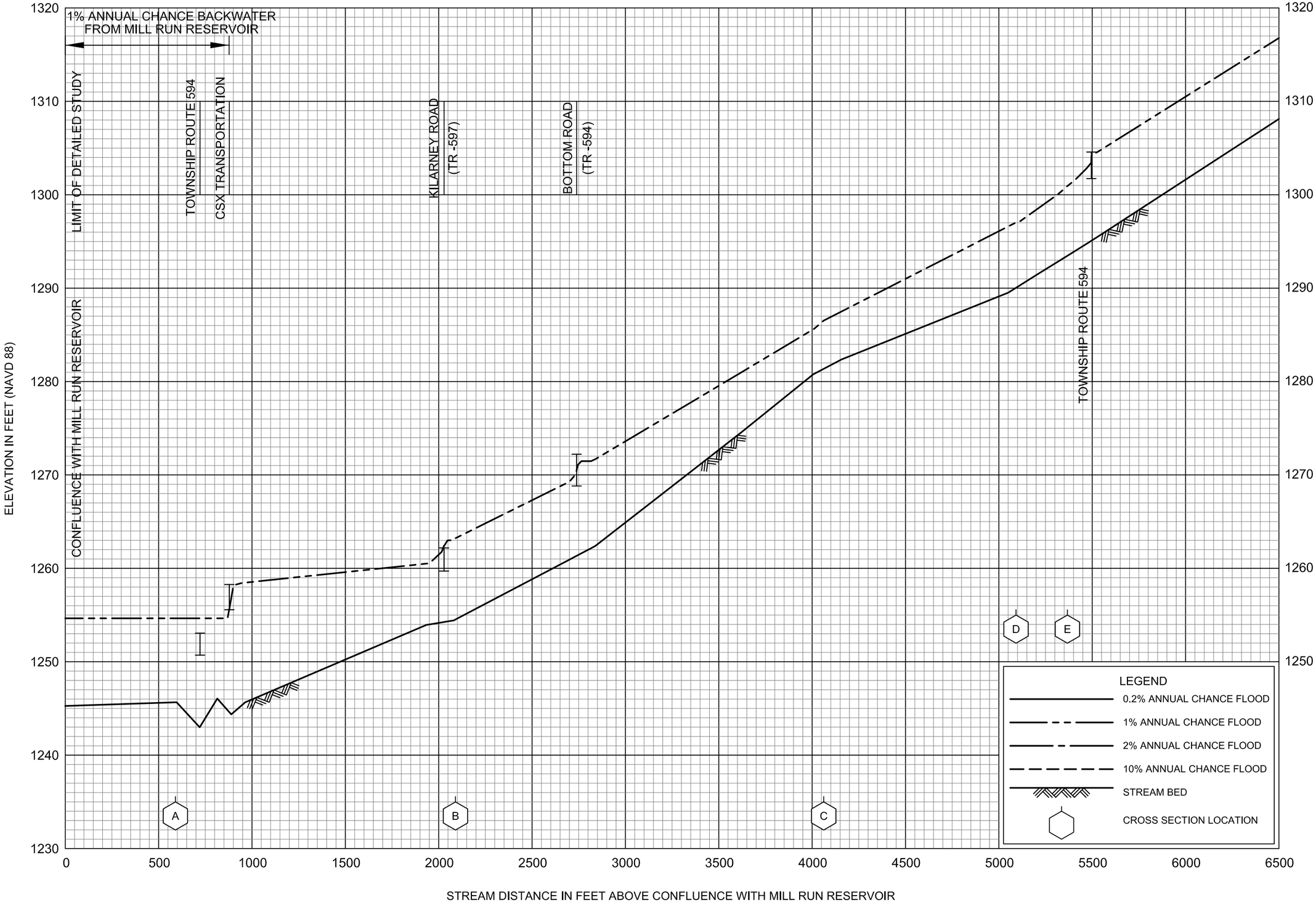
FLOOD PROFILES

LUTZ RUN

FEDERAL EMERGENCY MANAGEMENT AGENCY

FAYATTE COUNTY, PA

(ALL JURISDICATIONS)



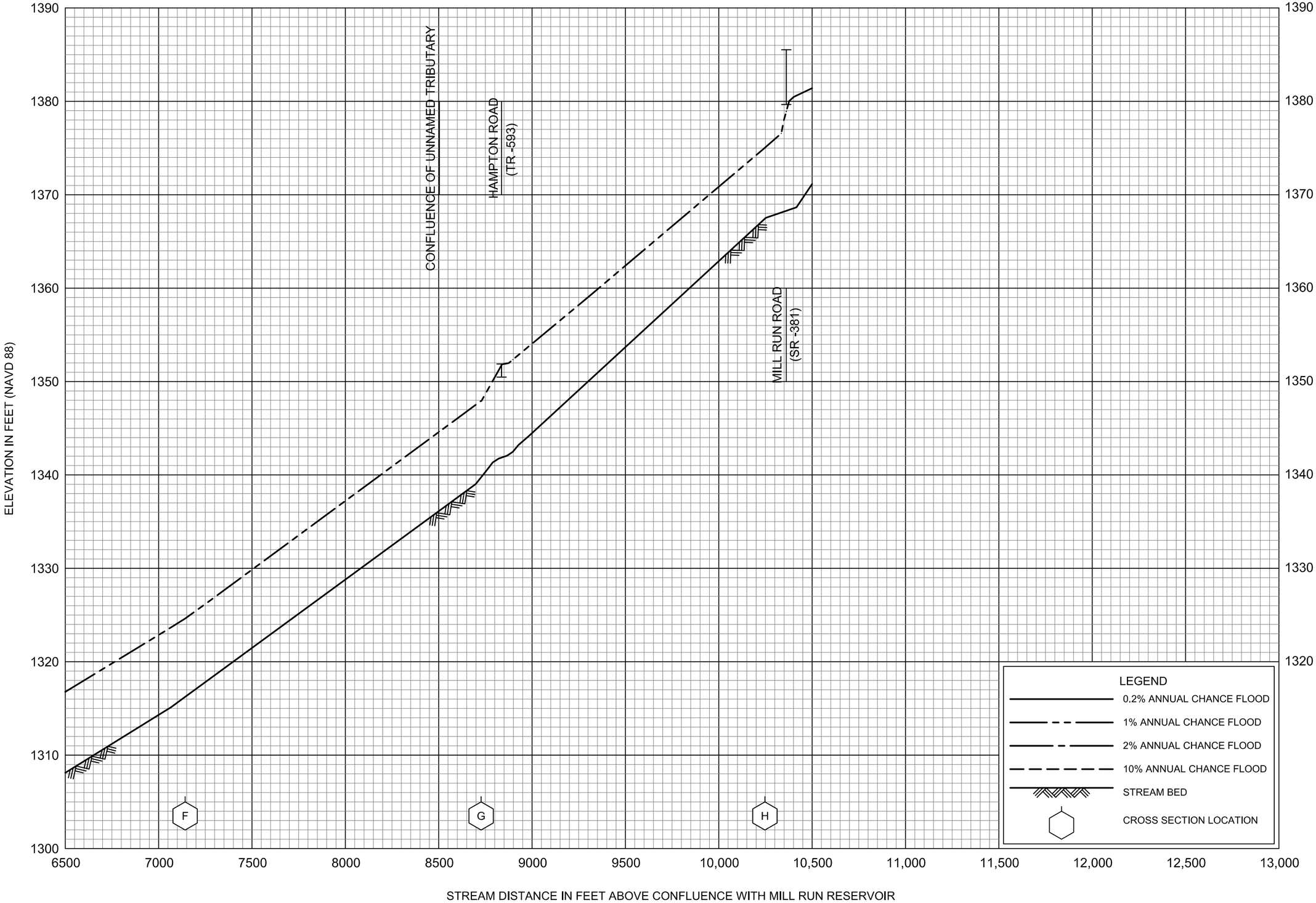
FLOOD PROFILES

MILL RUN

FEDERAL EMERGENCY MANAGEMENT AGENCY

FAYETTE COUNTY, PA

(ALL JURISDICATIONS)



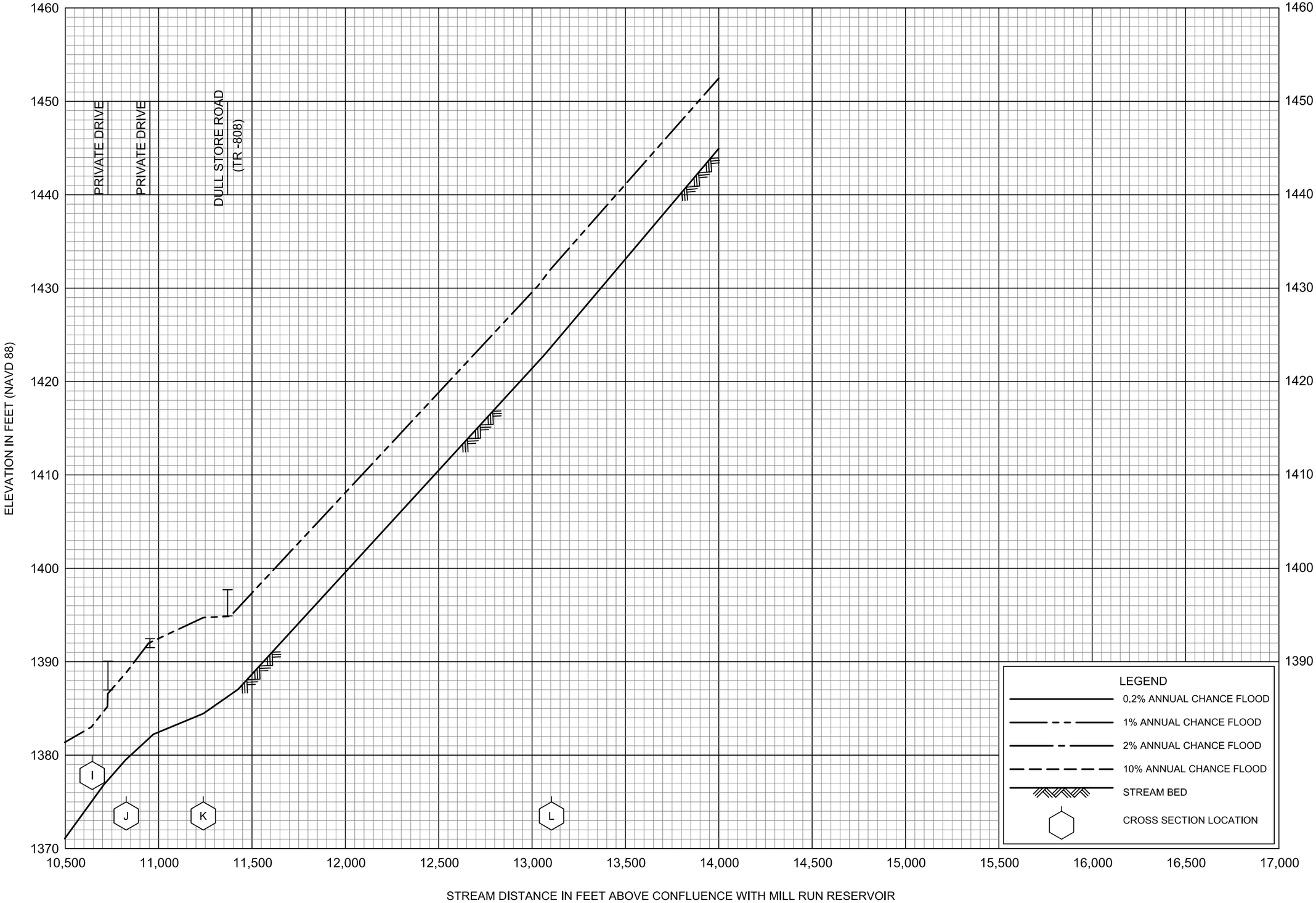
FLOOD PROFILES

MILL RUN

FEDERAL EMERGENCY MANAGEMENT AGENCY

FAYETTE COUNTY, PA

(ALL JURISDICATIONS)



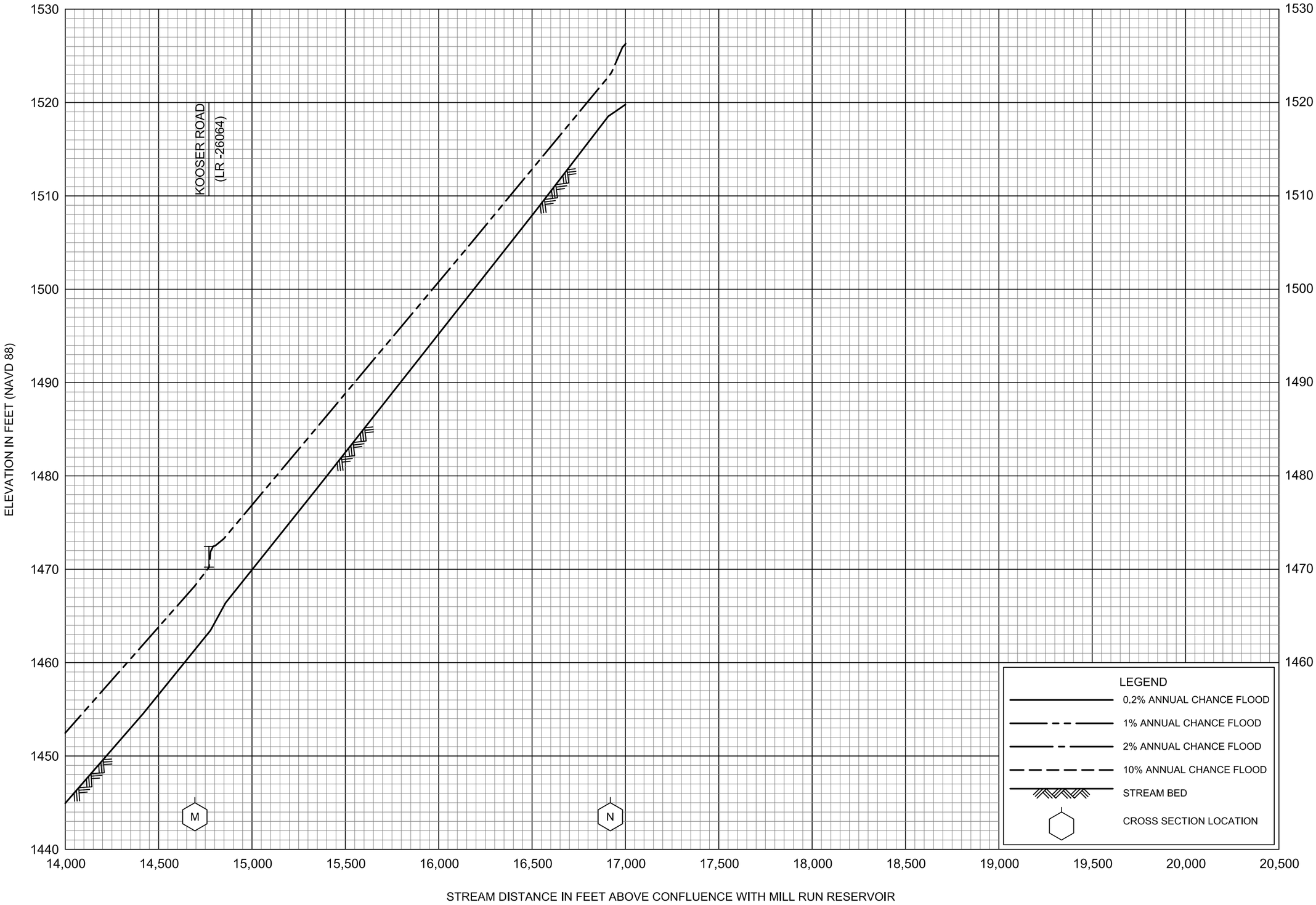
FLOOD PROFILES

MILL RUN

FEDERAL EMERGENCY MANAGEMENT AGENCY

FAYETTE COUNTY, PA

(ALL JURISDICATIONS)



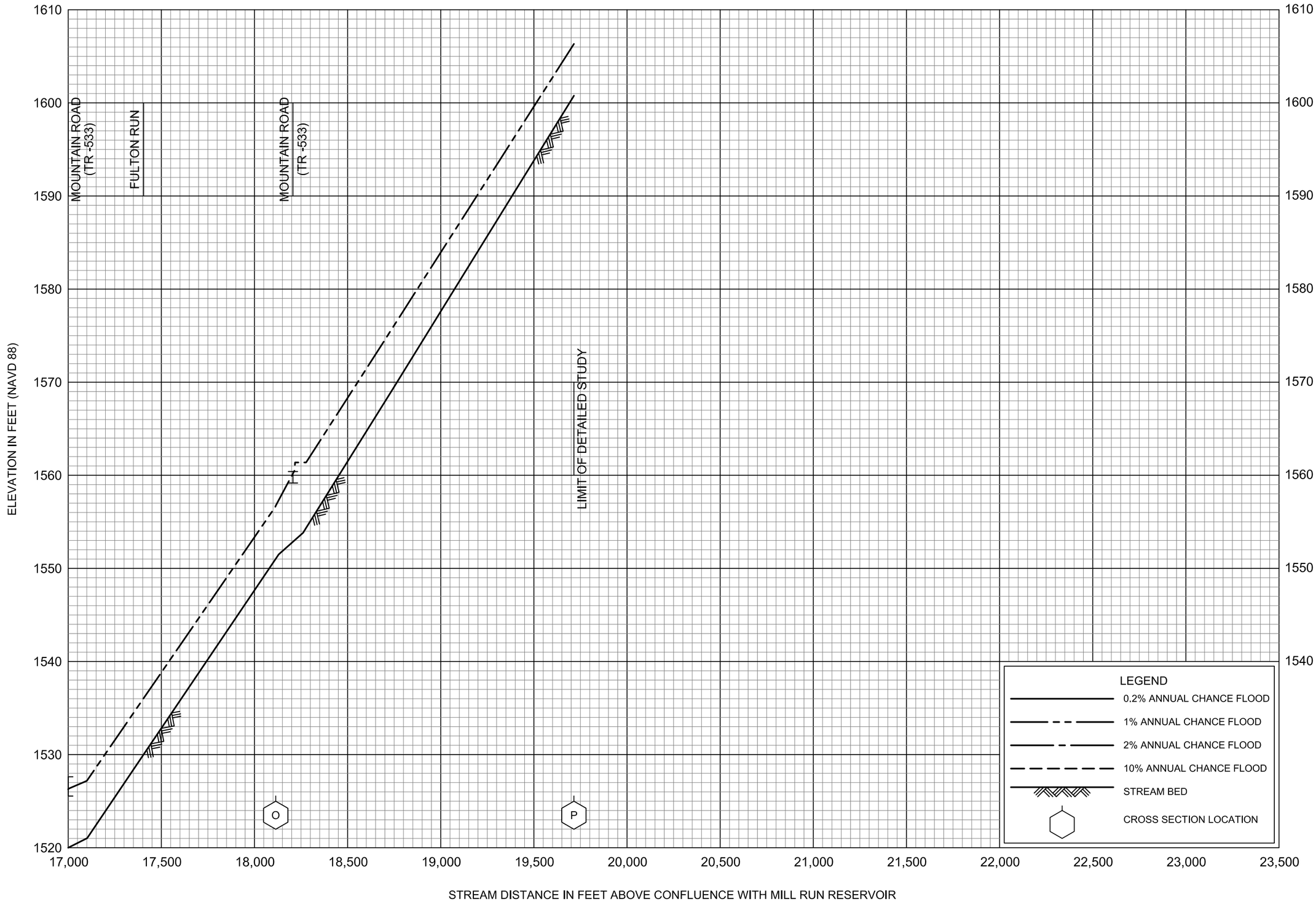
FLOOD PROFILES

MILL RUN

FEDERAL EMERGENCY MANAGEMENT AGENCY

FAYETTE COUNTY, PA

(ALL JURISDICATIONS)



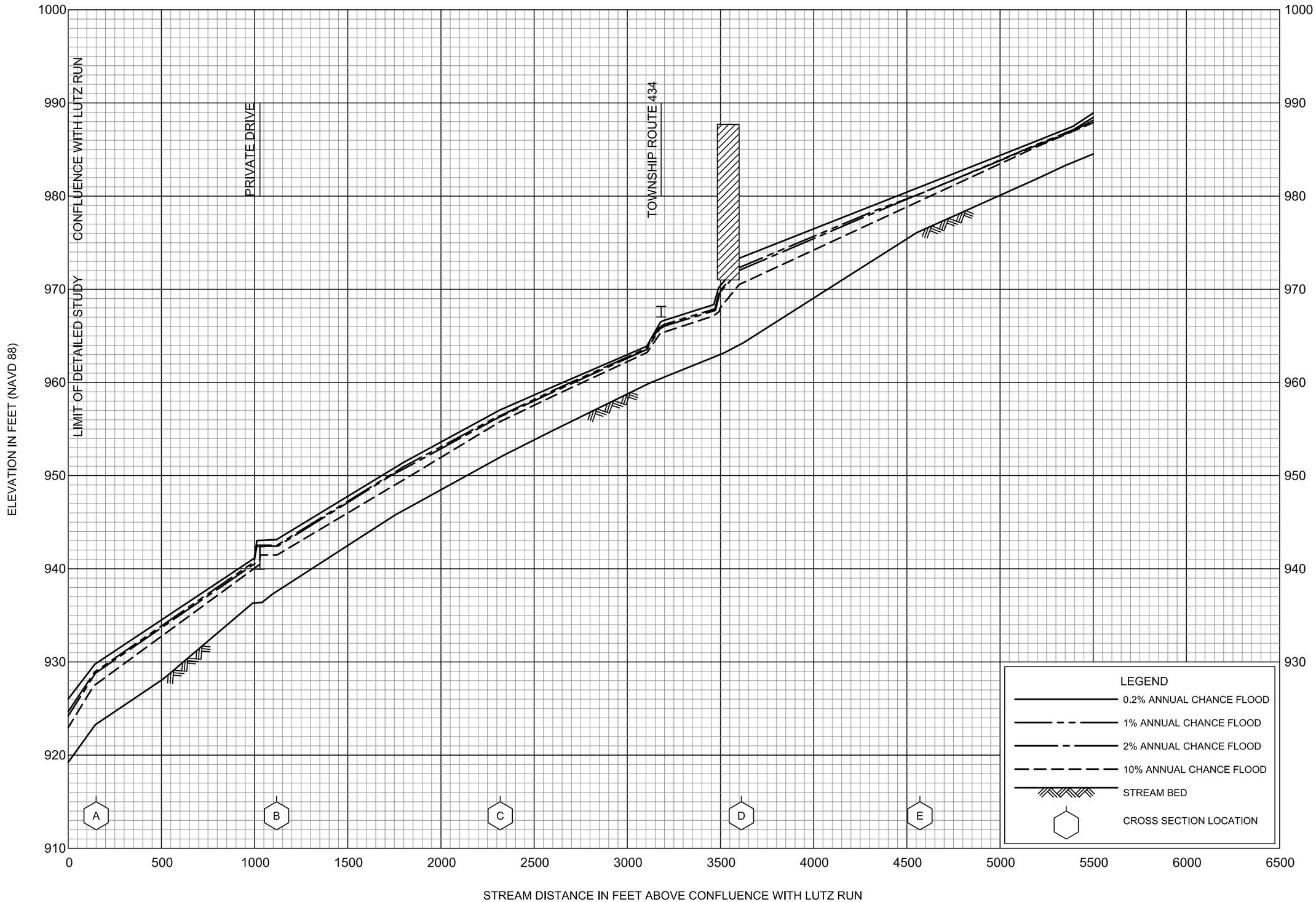
FLOOD PROFILES

MILL RUN

FEDERAL EMERGENCY MANAGEMENT AGENCY

FAYETTE COUNTY, PA

(ALL JURISDICATIONS)



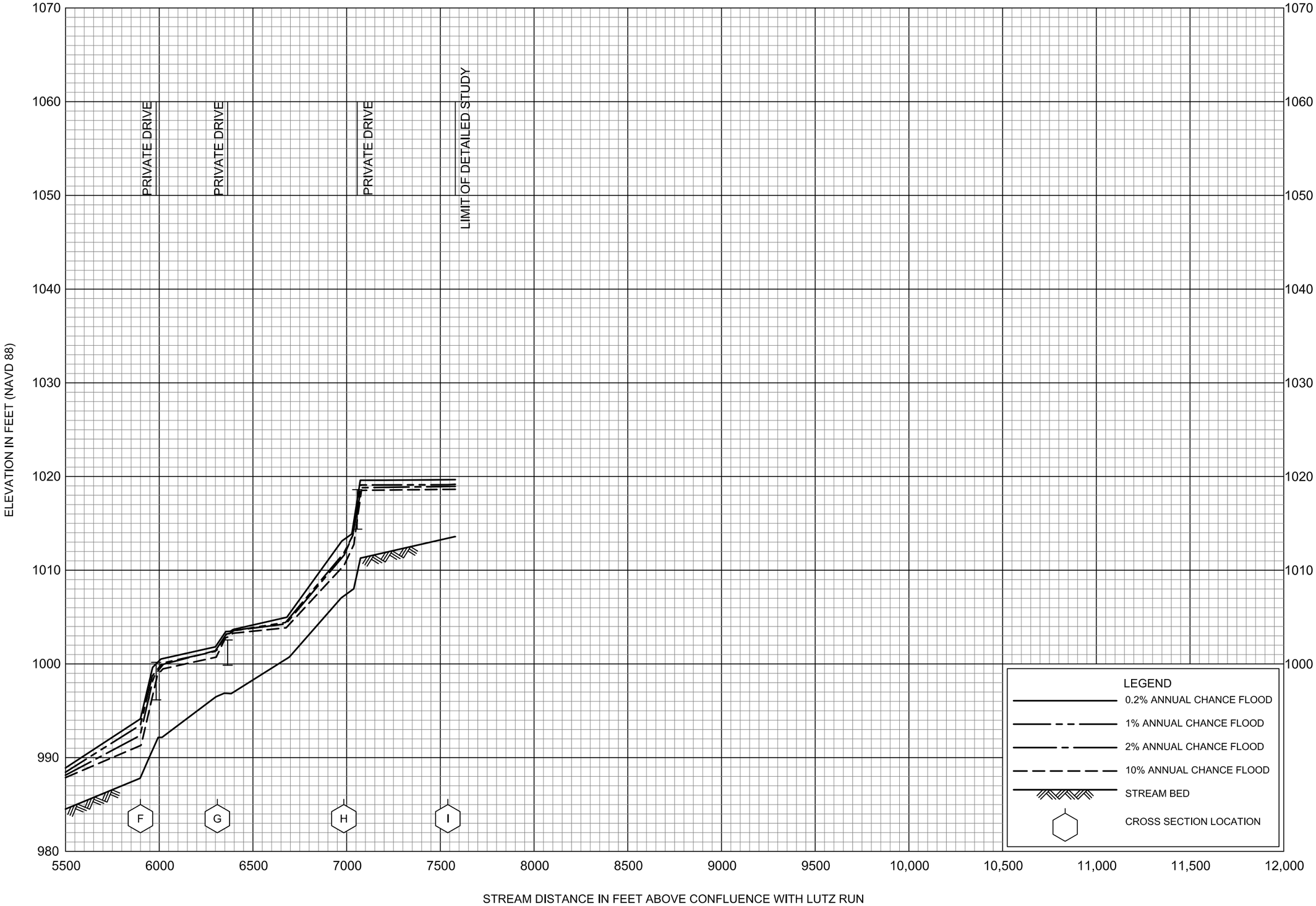
FLOOD PROFILES

MILL RUN TO LUTZ RUN

FEDERAL EMERGENCY MANAGEMENT AGENCY

FAYETTE COUNTY, PA

(ALL JURISDICATIONS)



FLOOD PROFILES

MILL RUN TO LUTZ RUN

FEDERAL EMERGENCY MANAGEMENT AGENCY

FAYETTE COUNTY, PA

(ALL JURISDICATIONS)