FLOOD INSURANCE STUDY

TUSCARAWAS COUNTY, OHIO
AND INCORPORATED AREAS

COMMUNITY NAME	COMMUNITY NUMBER
BALTIC, VILLAGE OF	390886
*BARNHILL, VILLAGE OF	390947
BOLIVAR, VILLAGE OF	390643
DENNISON, VILLAGE OF	390542
DOVER, CITY OF	390543
GNADENHUTTEN, VILLAGE OF	390613
MIDVALE, VILLAGE OF	390715
MINERAL CITY, VILLAGE OF	390842
NEW PHILADELPHIA, CITY OF	390545
NEWCOMERSTOWN, VILLAGE OF	390544
*PARRAL, VILLAGE OF	390946
PORT WASHINGTON, VILLAGE OF	390664
ROSWELL, VILLAGE OF	390813
*STONE CREEK, VILLAGE OF	390945
STRASBURG, VILLAGE OF	390631
SUGARCREEK, VILLAGE OF	390546
TUSCARAWAS COUNTY (UNINCORPORATED AREAS)	390782
TUSCAWARAS, VILLAGE OF	390666
UHRICHSVILLE, CITY OF	390547
ZOAR, VILLAGE OF	390752

* NO SPECIAL FLOOD HAZARD AREAS IDENTIFIED

PRELIMINARY

March 18, 2016

Revised:
To Be Determined

Federal Emergency Management Agency

FLOOD INSURANCE STUDY NUMBER
39157CV000B

NOTICE TO
FLOOD INSURANCE STUDY USERS

Communities participating in the National Flood Insurance Program (NFIP) have established repositories of flood hazard data for floodplain management and flood insurance purposes. This Flood Insurance Study (FIS) report may not contain all data available within the Community Map Repository. It is advisable to 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 at any time. In addition, FEMA may revise part of this FIS report by the Letter of Map Revision (LOMR) 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 panels for this community contain information that was previously shown separately on the corresponding Flood Boundary and Floodway Map panels (e.g., floodways, cross sections). In addition, former flood hazard zone designations have been changed as follows:

Old Zones	New Zone
A1 through A30	AE
B	X (shaded)
C	X
V1 through V30	VE

Initial Countywide FIS Effective Date: **July 22, 2010**

Revised Countywide FIS Date(s): **To Be Determined**

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South Fork Sugar Creek	Panel 11P
Stilllwater Creek	Panels 12P-13P
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Tuscarawas River	Panels 17P-26P

Published Separately

Flood Insurance Rate Map Index
Flood Insurance Rate Map

FLOOD INSURANCE STUDY

TUSCARAWAS COUNTY, OHIO AND INCORPORATED AREAS

1.0 INTRODUCTION

1.1 Purpose of Study

This Flood Insurance Study (FIS) revises and supersedes the FIS reports, Flood Insurance Rate Maps (FIRMs) and/or Flood Boundary and Floodway Maps (FBFMs) in the geographic area of Tuscarawas County, Ohio, including the Cities of Dover, New Philadelphia and Uhrichsville; Villages of Baltic, Barnhill, Bolivar, Dennison, Gnadenhutten, Midvale, Mineral City, Newcomerstown, Parral, Port Washington, Roswell, Stone Creek, Strasburg, Sugarcreek, Tuscarawas, and Zoar; and the Unincorporated Areas of Tuscarawas County (hereinafter referred to collectively as Tuscarawas County) and aids in the administration of the National Flood Insurance Act of 1968 and the Flood Disaster Protection Act of 1973. No Special Flood Hazard Areas were identified in the Villages of Barnhill, Parral and Stone Creek. This study has developed flood-risk data for various areas of the community that will be used to establish actuarial flood insurance rates and to assist the community in its efforts to promote sound floodplain management. Minimum floodplain management requirements for participation in the National Flood Insurance Program (NFIP) are set forth in the Code of Federal Regulations at 44 CFR. 60.3.

Please note that the Village of Baltic is geographically located in Coshocton, Holmes and Tuscarawas Counties. The Village of Baltic will be included in its entirety in this FIS report.

Please note that the Villages of Barnhill, Parral and Stone Creek have no identified special flood hazard areas.

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.

The Digital Flood Insurance Rate Map (DFIRM) and FIS Report for this countywide study have been produced in digital format. Flood hazard information was converted to meet the FEMA DFIRM database specifications and Geographic Information System (GIS) format requirements. The flood hazard information was created and is provided in a digital format so that it can be incorporated into a local GIS and be accessed more easily by the community.

1.2 Authority and Acknowledgements

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

Information on the authority and acknowledgements for the previously printed FIS and FIRMs for Tuscarawas County is shown below:

Pre-Countywide

Village of Dennison - The hydrologic and hydraulic analyses were obtained from "Flood Plain Information, Tuscarawas River and Adjacent Tributary Areas, Tuscarawas County, Ohio" (References 1 and 2).

City of Dover - The hydrologic and hydraulic analyses were obtained from "Flood Plain Information, Tuscarawas River and Adjacent Tributary Areas, Tuscarawas County, Ohio" (References 2). A floodway analysis for the Tuscarawas River was completed by FEMA in March 1985. No floodway was computed for Sugar Creek (Reference 3).

Village of Gnadenhutten - The hydrologic and hydraulic analyses were obtained from "Flood Plain Information, Tuscarawas River and Adjacent Tributary Areas, Tuscarawas County, Ohio" (Reference 2). A floodway analysis was prepared by FEMA in March 1985 (Reference 4).

City of New Philadelphia - The hydrologic and hydraulic analyses were obtained from "Flood Plain Information, Tuscarawas River and Adjacent Tributary Areas, Tuscarawas County, Ohio" (Reference 2). A floodway analysis was prepared by FEMA in March 1985 (Reference 5).

Village of Newcomerstown - The hydrologic and hydraulic analyses were obtained from "Flood Plain Information, Tuscarawas River and Adjacent Tributary Areas, Tuscarawas County, Ohio" (Reference 2). A floodway analysis was prepared by FEMA in March 1985 (Reference 6).

Village of Port Washington - The hydrologic and hydraulic analyses were obtained from "Flood Plain Information, Tuscarawas River and Adjacent Tributary Areas, Tuscarawas County, Ohio" (Reference 2). A floodway analysis was prepared by FEMA in March 1985 (Reference 7).

Village of Strasburg - The hydrologic and hydraulic analyses were obtained from a report entitled, "Flood Plain Management Study, Sugar Creek, South Fork of Sugar Creek, Brandywine Creek and Broad Run, Tuscarawas County, Ohio" (References 8 and 9).

Village of Sugarcreek - The hydrologic and hydraulic analyses were obtained from a report entitled, "Flood Plain Management Study Sugar Creek, South Fork of Sugar Creek, Brandywine Creek and Broad Run, Tuscarawas County, Ohio" (References 9 and 10).

Tuscarawas County - The hydrologic and hydraulic analyses were obtained from reports entitled, "Flood Plain Information, Tuscarawas River and Adjacent Tributary Areas, Tuscarawas County, Ohio" and "Flood Plain Management Study, Sugar Creek, South Fork of Sugar

Creek, Brandywine Creek and Broad Run, Tuscarawas County, Ohio" (References 2 and 9). The floodway analysis for the Tuscarawas River was completed by FEMA in March 1985 (Reference 11).

City of Uhrichsville -The hydrologic and hydraulic analyses were obtained from "Flood Plain Information, Tuscarawas River and Adjacent Tributary Areas, Tuscarawas County, Ohio" (References 2 and 12).

Flood Insurance Studies for the Villages of Baltic, Barnhill, Bolivar, Midvale, Mineral City, Roswell and Stone Creek have not been previously published.

Initial Countywide (July 22, 2010)

Re-delineation of previously effective detailed study areas, updated hydrologic and hydraulic analyses and floodplain mapping for approximate stream reaches and the conversion of the unincorporated and incorporated areas of Tuscarawas County into Countywide format was performed by Stantec Consulting Services Inc. (Stantec) for FEMA Region V under Contract No. HSFE05-05-D0026, Task Order No. 29. This work was completed in February 2010.

In addition to incorporating the existing Flood Insurance Study for Tuscarawas County and Incorporated Communities, this countywide FIS included incorporation of approved Letters of Map Change (LOMCs).

The vertical datum for elevation data was shifted to North American Vertical Datum of 1988 (NAVD88). The digital floodplain data was merged into a single updated DFIRM. The DFIRM includes 2006 orthophotography, political boundaries, road centerlines with street names, railroads, rivers, lakes, streams and elevation reference marks. The basemap information was obtained from the U.S. Geological Survey (USGS) National Hydrography Dataset, National Geodetic Survey, Tuscarawas County GIS Department and State of Ohio Office of Information Technology, Ohio Geographically Referenced Program (OGRIP).

Revised Countywide (To Be Determined)

This FIS revision was initiated by a Physical Map Revision (PMR) request and included incorporation of enhanced hydrologic and hydraulic analyses performed on a portion of Sandy Creek by Strategic Alliance for Risk Reduction (STARR). Incorporation of these studies into this FIS and accompanying FIRMs was performed by STARR as part of FEMA Contract No. HSFEHQ-09-D-0370, Task Order No. HSFE05-11-J-0080. This work was completed in TBD.

1.3 Coordination

The purpose of an initial Consultation and Coordination Officer (CCO) meeting is to discuss the scope of the FIS. A final CCO meeting is held to review the results of the study.

Pre-Countywide

The dates of the initial and final CCO meetings held for the previous FIS reports covering the incorporated and unincorporated areas of Tuscarawas County, Ohio are presented in Table 1.

Table 1. CCO Meeting Dates for Pre-Countywide FIS*

Community Name	Initial CCO Date	Final CCO Date
Dennison, Village of	N/A	January 29, 1986
Dover, City of	N/A	February 2, 1986
Gnadenhutten, Village of	N/A	January 22, 1986
New Philadelphia, City of	N/A	January 22, 1986
Newcomerstown, Village of	N/A	January 23, 1986
Port Washington, Village of	N/A	January 3, 1986
Strasburg, Village of	N/A	September 2, 1986
Sugarcreek, Village of	N/A	September 9, 1986
Tuscarawas County	N/A	August 12, 1986
Uhrichsville, City of	N/A	January 23, 1986

*References 1, 3, 4, 5, 6, 7, 8, 10, 11, and 12

Initial Countywide (July 22, 2010)

For the initial countywide FIS, an initial CCO meeting was held on June 14, 2007 and attended by representatives of FEMA Region V, Ohio Department of Natural Resources (ODNR), Stantec (Study Contractor), Tuscarawas County, Cities of Dover and New Philadelphia, the Villages of Sugarcreek and Tuscarawas, and the Tuscarawas County Emergency Management Agency. The results of the study were reviewed at the final CCO meeting held on April 30, 2009, and attended by representative of FEMA Region V, ODNR, Stantec, U.S. Army Corps of Engineers (USACE), Tuscarawas County, City of Dover and Villages of Mineral City,

Newcomerstown, Port Washington, Tuscarawas and Zoar. All problems raised at that meeting have been addressed in this study.

Revised Countywide (To Be Determined)

For this revised FIS, the results of the study were reviewed at the final CCO meeting held on _____ and attended by representatives of _____. All problems raised at that meeting have been addressed in this study.

2.0 AREA STUDIED

2.1 Scope of Study

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

Initial Countywide (July 22, 2010)

Effective approximate studies were revised with new hydrologic and hydraulic analyses and floodplain mapping.

Approximate flood hazards for the pools upstream of the Muskingum Watershed Conservancy District (MWCD) Atwood Lake Dam, Beach City Dam and Bolivar Dam reservoirs were mapped using unpublished 1-percent-annual-chance reservoir pool elevation data provided by the USACE.

The areas studied by detailed methods were selected based on the extent and validity of existing hydrologic and hydraulic data at the time of the Flood Insurance Studies for the Cities of Dover, New Philadelphia and Uhrichsville; Villages of Dennison, Gnadenhutten, Newcomerstown, Port Washington, Strasburg, Sugarcreek; and the Unincorporated Areas of Tuscarawas County. The flooding sources studied by detailed methods and redelineated for the initial countywide FIS are included in Table 3.

Flood hazard information for the Tuscarawas River upstream of the MWCD Dover Dam was mapped with approximate flood hazards on the previous FIRMs. For this mapping update, this reach was mapped with detailed flood hazards using the 1-percent-annual-chance reservoir pool elevation for the Dover Dam provided by the USACE.

The initial countywide FIS also incorporated the determination of letters issued by FEMA resulting in LOMCs. All LOMCs in Tuscarawas County for which information could be found are summarized in the Summary of Map Amendment (SOMA) included in the Technical Support Data Notebook (TSDN) associated with this FIS update. Copies of the SOMA may be obtained from the Community Map Repository.

Revised Countywide (To Be Determined)

For this revised FIS, a new detailed hydraulic analysis was performed on Sandy Creek as shown in Table 2. All flooding sources studied by detailed methods are shown in Table 3.

Table 2. Limits of New or Revised Detailed Studies

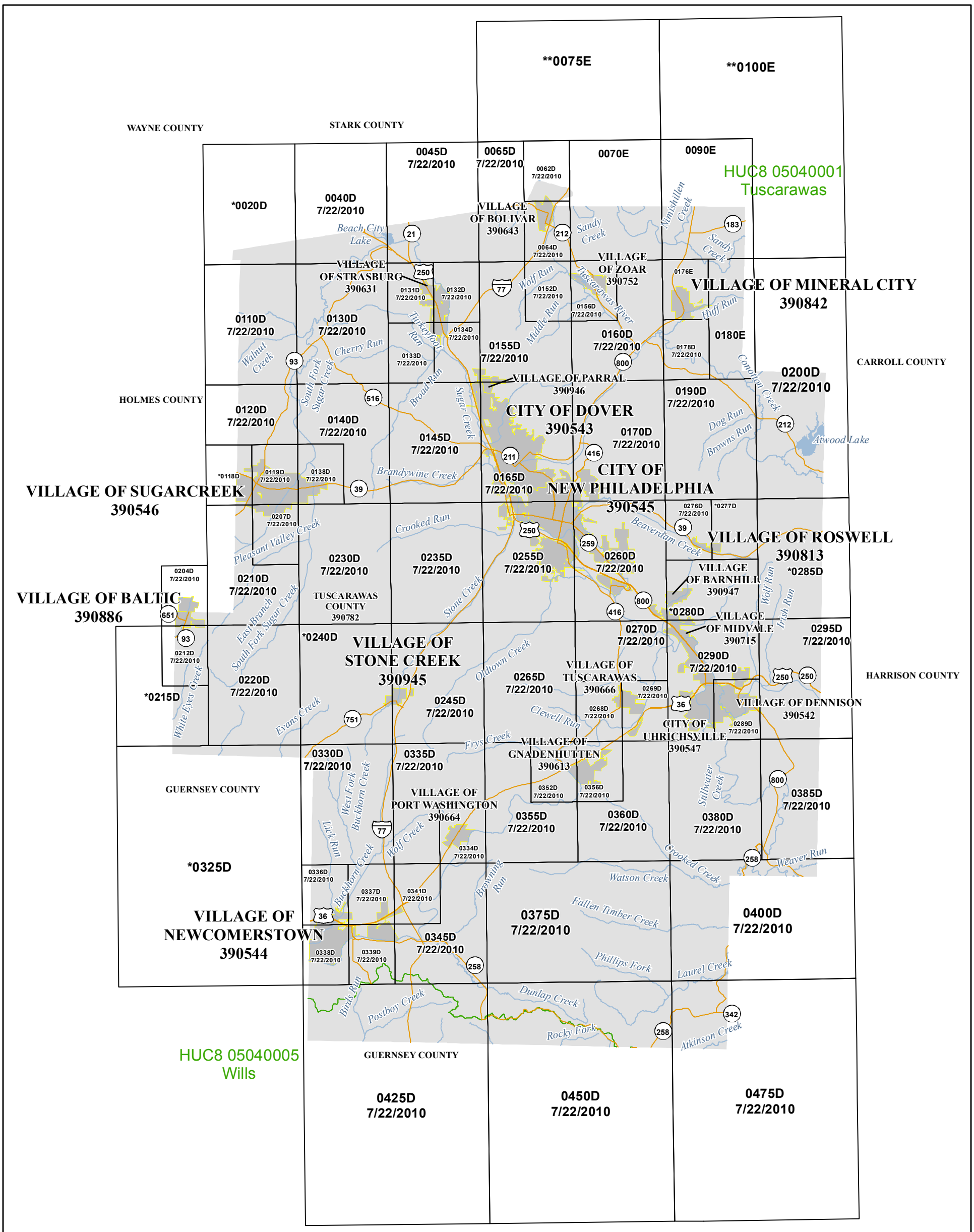
Flooding Source	Limits of Detailed Study
Sandy Creek	From Bolivar Dam to the Tuscarawas / Carroll County boundary

Table 3. Limits of Detailed Studies

Flooding Source	Limits of Detailed Study
Beaverdam Creek	From mouth at Tuscarawas River to State Route 39.
Brandywine Creek	From confluence with Sugar Creek to Township Road 367.
Broad Run	From mouth at Sugar Creek to State Route 516.
Little Stillwater Creek	From confluence with Stillwater Creek to 0.64 miles upstream of confluence of Irish Run.
Sandy Creek	From Bolivar Dam to the Tuscarawas / Carroll County boundary
South Fork Sugar Creek	From 100 feet downstream of County Route 75 to Township Road 350.
Stillwater Creek	From mouth at Tuscarawas River to 0.23 miles upstream of County Route 87.
Sugar Creek	From mouth at Tuscarawas River to 200 feet upstream of State Route 21.
Tuscarawas River (below Dover Dam)	From the Coshocton and Tuscarawas county boundary to 1.1 miles upstream of County Route 85.

No new approximate analyses were conducted as a part of this revised FIS.

No Letters of Map Revisions (LOMRs) or Letters of Map Amendments (LOMAs) were incorporated into this revised countywide FIS. A Summary of Map Actions (SOMA), which lists the status of the Letters of Map Changes (LOMCs) associated with Tuscawaras County, is included in the Technical Support Data Notebook (TSDN) associated with this FIS update. Copies of the TSDN may be obtained from the Community Map Repository.



ATTENTION: The corporate limits shown on this FIRM Index are based on the best information available at the time of publication. As such, they may be more current than those shown on FIRM panels issued before [most recent FIRM panel date].

N

1 inch = 18,333 feet 1:220,000

0 5,000 10,000 20,000 30,000 40,000 feet

Map Projection:
State Plane Ohio North, FIPS 3401;
North American Datum 1983

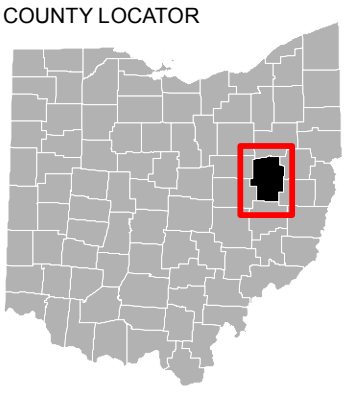
THE INFORMATION DEPICTED ON THIS MAP AND SUPPORTING DOCUMENTATION ARE ALSO AVAILABLE IN DIGITAL FORMAT AT

HTTP://MSC.FEMA.GOV

SEE FLOOD INSURANCE STUDY FOR ADDITIONAL INFORMATION

* PANEL NOT PRINTED - NO SPECIAL FLOOD HAZARD AREAS
** PANEL NOT PRINTED - AREA OUTSIDE OF COUNTY BOUNDARY

COUNTY LOCATOR



NATIONAL FLOOD INSURANCE PROGRAM

FLOOD INSURANCE RATE MAP INDEX

TUSCARAWAS COUNTY, OHIO and Incorporated Areas

PRELIMINARY
3/18/2016

PANELS PRINTED:
0040, 0045, 0062, 0064, 0065, 0070, 0090, 0110, 0119, 0120, 0130, 0131, 0132, 0133, 0134, 0138, 0140, 0145, 0152, 0155, 0156, 0160, 0165, 0170, 0176, 0178, 0180, 0190, 0200, 0204, 0207, 0210, 0212, 0220, 0230, 0235, 0245, 0255, 0260, 0265, 0268, 0269, 0270, 0276, 0289, 0290, 0295, 0330, 0334, 0335, 0336, 0337, 0338, 0339, 0341, 0345, 0352, 0355, 0356, 0360, 0375, 0380, 0385, 0400, 0425, 0450, 0475

FEMA

MAP NUMBER
39157CIND0B

MAP REVISED

2.2 Community Description

Tuscarawas County is located in east-central Ohio. The county is bordered by Stark County on the north and Carroll and Harrison Counties on the east. Bordering on the south is Guernsey County and on the west are Coshocton and Holmes Counties. The major thoroughfares through the county are Interstate 77, U.S. Routes 21, 36, and 250, and State Routes 39, 75, 93, 416, and 800. Conrail, CSX railroad, and the Norfolk Southern Railway also serve the county. According to the United States Census Bureau statistics, the population of Tuscarawas County was 92,582 in 2010 (Reference 13). The county seat is the City of New Philadelphia.

After visits as early as 1761, Moravian missionaries and families from the City of Bethlehem, Pennsylvania, settled the area in 1771-1772. They developed agricultural mission villages for the Indians at the Town of Schoenbrunn and the Village of Gnadenhutten. Schoenbrunn, established in 1772, is regarded as Ohio's first town. At one time, it was almost completely destroyed by white marauders. Partial reconstruction of the town was accomplished in 1923 by the Ohio State Archaeological and Historical Society.

Tuscarawas County was permanently settled about 1803 by immigrants from the western portions of Virginia and Pennsylvania, many of whom were of Germanic origin. Tuscarawas County was formed from a portion of Muskingum County in 1808, with New Philadelphia established as the county seat.

The Ohio and Erie Canal, completed in 1832, opened up vast wilderness areas in the state in its traverse from the City of Cleveland, on Lake Erie, to the City of Portsmouth, its southern terminus on the Ohio River. Its main trunk length was 310 miles, with navigable feeder lines to major towns and other adjacent waterways adding an additional 24 miles. Development of important water transportation facilities came during the next few years and stimulated manufacturing activities in the urban centers and exploitation of the mineral resources of the area, particularly the extensive coal deposits. Commercial river traffic flourished until the coming of the railroads in the 1860s, which resulted in a rapid decline and almost complete disappearance of river commerce by 1900.

With the increase in rail traffic and the construction of an adequate highway system throughout the valley, the twentieth century witnessed major advancements. These include not only population gains, but the expansion of industrial and commercial developments in the area (Reference 2).

Tuscarawas County is part of the Kanawha Section of the Appalachian Plateaus Province, which is a mature plateau of moderate to strong relief. Meandering rivers and valley widths that range from 500 feet to over 6,000 feet are typical of the region. The streambed elevation of the

Tuscarawas River falls 2.1 feet per mile within the study reach (Reference 2).

The soils in Tuscarawas County reflect their glacial origins. Well-drained Huntington soils occupy the floodplains and are underlain by silty, alluvial material. Well-drained Wheeling and well-drained droughty Chillean soils occupy alluviated terraces that are underlain by stratified gravelly and sandy material. Terraces are level to gently sloping.

A continental climate pervades the study area with air masses from northwest and central Canada much of the year and warm, tropical air from the Gulf of Mexico during the summer months. Precipitation totals forty (40) inches per year with the heaviest rain occurring in the early spring (Reference 2).

The **Village of Dennison** is located in eastern Tuscarawas County in east-central Ohio. The village is bordered on the west by the City of Uhrichsville, and on all other sides by the unincorporated areas of Tuscarawas County. The area is served by U.S. Route 36, State Route 800, and Conrail. The 2010 population estimate was 2,655 (Reference 13).

The Village of Dennison was established in the early 1800s and increased in size and prosperity with the opening of the Ohio and Erie Canal.

The **City of Dover** is located in central Tuscarawas County in east-central Ohio. It is bordered on the southeast by the City of New Philadelphia, Ohio, and is bordered on the other sides by the unincorporated areas of Tuscarawas County. The City is served by Interstate 77, State Routes 39, 211, and 800, Conrail, and the Chessie System. In 2010, the population of the City of Dover was reported to be 12,826 (Reference 13).

The City of Dover was permanently settled in 1807 by immigrants from the western portions of Virginia and Pennsylvania, many of whom were of Germanic origin. Dover, originally Canal Dover, grew in size and prosperity with the opening of the Ohio and Erie Canal in 1932.

The **Village of Gnadenhutten** is located in south-central Tuscarawas County and is surrounded by the unincorporated areas of the county. Gnadenhutten is served by U.S. Route 36, State Route 416, County Route 39, and Conrail. The 2010 census reported a population of 1,288 in Gnadenhutten (Reference 13).

The **City of New Philadelphia** is located in south-central Tuscarawas County and is the county seat. The city is bordered on the northwest by the City of Dover, Ohio. On all other sides, New Philadelphia is surrounded by the unincorporated areas of Tuscarawas County. The area is served by U.S. Route 250 and State Routes 39, 259, 416, and 800. Railroads in the area include the Chessie System and Conrail. The 2010 population was reported to be 17,288 (Reference 13).

The City of New Philadelphia was established in 1804. In 1808, Tuscarawas County was formed from a portion of Muskingum County, with New Philadelphia established as the county seat.

The **Village of Newcomerstown** is located in southwestern Tuscarawas County in east-central Ohio. It is bordered on the west by an unincorporated area of Coshocton County and on its remaining sides by the unincorporated areas of Tuscarawas County. The major thoroughfares serving the community are U.S. Routes 36 and 21, State Route 41, and County Route 1. Conrail also serves Newcomerstown. The 2010 population estimate was 3,822 (Reference 13).

The study area is part of the Kanawha Section of the Appalachian Plateaus Province, which is a mature plateau of moderate to strong relief. Meandering rivers and valley widths that range from 3,000 feet to over 7,000 feet are typical. The streambed elevation for the Tuscarawas River falls 2.4 feet per mile within the study reach (Reference 14).

The **Village of Port Washington** is located in southwestern Tuscarawas County, Ohio, and is bordered by the unincorporated areas of the county. Tuscarawas County is located in eastern Ohio approximately 15 miles south of the City of Canton. The community is served by U.S. Route 36, County Route 14, and Conrail. The 2010 population of the community was reported to be 569 (Reference 13).

The **Village of Strasburg** is located in northwestern Tuscarawas County, Ohio, and is surrounded by the unincorporated areas of the county. Tuscarawas County is located in eastern Ohio approximately 15 miles south of the City of Canton. The community is serviced by Interstate 77 and U.S. Route 250. The 2010 population of the community was reported to be 2,608 (Reference 13).

The **Village of Sugarcreek** is located in western Tuscarawas County and is bordered on the north, south, east, and west by the unincorporated areas of Tuscarawas County. On the west, the community is also bordered by the unincorporated areas of Holmes County. Sugarcreek is serviced by the Norfolk Southern Railway and by State Routes 39 and 93. The 2010 population of Sugarcreek was reported to be 2,220 (Reference 13).

The **City of Uhrichsville** is located in east-central Tuscarawas County. It is bordered on the east by the Village of Dennison, on the north by the Village of Midvale, and is otherwise surrounded by the unincorporated areas of Tuscarawas County. The area is served by U.S. Routes 36 and 250, State Route 800, and Conrail. In 2010, the population was reported to be 5,413 (Reference 13).

The City of Uhrichsville (originally named Uhrich's Mills or Waterford) was permanently settled in the early 1800s and increased in size and prosperity with the opening of the Ohio and Erie Canal in 1832.

2.3 Principal Flood Problems

Large floods have occurred along the major streams in the basin during all seasons of the year. However, the most devastating floods have occurred between the months of December and March. The maximum flood of record occurred along the Tuscarawas River in March 1913. Along small tributaries, flood stages can rise from normal flow to extreme flood peaks, with accompanying high velocities, in a relatively short period. Along the main stem of the Tuscarawas River, floods rise to their crest over a longer period and remain out of banks for a more extended length of time.

Although many severe floods have occurred in the Muskingum River basin since the area was first settled, accurate records prior to 1913 are nonexistent. Considering the available records of all known floods in the basin, it is probable that the ten (10) largest floods in the Tuscarawas River basin occurred in 1913, twice in 1927, 1929, 1930, 1933, 1935, 1936, 1937, and 1939. A flood that occurred in 1959 probably would be ranked as the second largest flood of record in the basin, had not the upstream Muskingum basin reservoir system been in operation (Reference 2). Discharges for the five largest floods of record for the Tuscarawas River at Newcomerstown are presented in Table 4.

Information on historical floods in Tuscarawas County along the main stem of the Tuscarawas River and along the lower reaches of its major tributaries was obtained from stream gaging stations maintained by the USGS at several locations within the drainage basin.

USGS recording gages within the study area are located below Dover Dam, Tuscarawas River mile 60.3 at Newcomerstown, Tuscarawas River mile 21.3, Home Creek near the City of New Philadelphia, and Stillwater Creek river mile 5.3 near Uhrichsville.

Table 4. Five Largest Floods of Record for Tuscarawas River[1]

Date of Crest	Estimated Peak Discharge (cfs)
March 1913	83,000
February 28, 1929	32,400
March 17, 1933	32,900
August 9, 1935	41,700
January 26, 1937	46,800

[1] Tuscarawas River at Newcomerstown, Ohio, U.S. Geological Survey (USGS) Gage; data for floods prior to February 1939 from gaging station 1.5 miles upstream of present gage station.

2.4 Flood Protection Measures

A basin-wide water development program for the Muskingum River basin, consisting of fourteen (14) flood control reservoirs and several local protection projects, was officially turned over to the Muskingum Watershed Conservancy District (MWCD) by the USACE in July 1938. The reservoirs were substantially completed in time to be effective during the major flood that occurred in January 1937. This program was planned and initiated by the Conservancy District, with actual construction, operation, and maintenance of the completed projects performed by the USACE. The basin flood control plan is divided into three systems located on the Walhonding River, Wills Creek, and the Tuscarawas River.

The Tuscarawas River system includes the Dover, Bolivar, Atwood, Leesville, Beach City, Tappan, Clendening, and Piedmont Reservoirs. Dover Dam on the Tuscarawas River forms the key reservoir in this system. The largest portion of Dover Dam storage is reserved for flood control. Three of the projects, Bolivar, Atwood, and Leesville, are located on tributaries upstream of Dover while the remaining four, Beach City on Sugar Creek, Tappan on Little Stillwater Creek, and Clendening and Piedmont in the upstream reaches of Stillwater Creek, are located below Dover Dam.

Bolivar Dam, located along the boundary of Tuscarawas County and Stark County, is an earth-fill “dry dam” used for flood control that was initially constructed in 1938 by the U.S. Army Corps of Engineers (USACE). During historical flood events in 2005 and 2008, seepage was observed beneath the dam. Beginning in January 2015, construction began on a concrete seepage barrier with work anticipated to continue for four years. The project is cost-shared between USACE and the Muskingum Watershed Conservancy District (MWCD) (Reference 23).

These flood control projects provide a high degree of protection against main stem river flooding with lesser degrees of protection afforded along the lower reaches of tributary streams.

A channel improvement project on Little Stillwater Creek between the Village of Dennison and Tappan Dam was accomplished by the USACE in 1946. The purpose of this project was to increase the channel capacity of Little Stillwater Creek. This modification reduced flood levels downstream from the dam and increased the operating efficiency of Tappan Reservoir.

The USGS recording gages below Dover Dam and on Stillwater Creek are classified as tailwater recording gages and serve as flow regulators below the upstream flood control structures. A USACE gage located on the Tuscarawas River, south of New Philadelphia at river mile 53.8, also serves as a control gage for reservoir discharges.

Village of Dennison

Beach City Dam on Sugar Creek, Dover Dam, and Tappan Dam on Little Stillwater Creek all provide protection for the Village of Dennison.

City of Dover

Atwood, Beach City, Bolivar, Dover and Leesville Dams provide protection for the City of Dover.

Village of Gnadenhutten

Gnadenhutten is provided with a high degree of protection against flooding primarily by the Dover, Tappan, Clendening, and Beach City Dams.

City of New Philadelphia

Four of the MWCD dams, Bolivar, Atwood, Leesville and Beach City, provide protection for New Philadelphia.

Village of Newcomerstown

The Village of Newcomerstown is provided with a high degree of protection by the Dover, Beach City, Tappan and Piedmont Dams.

Village of Strasburg

The Beach City Dam provides a high degree of protection against flooding along Sugar Creek through the community of Strasburg.

Village of Sugarcreek

Flood protection measures are not known to exist within the study area.

City of Uhrichsville

Beach City Dam on Sugar Creek, Dover Dam, Tappan Dam on Little Stillwater Creek, Clendening Dam and Piedmont Dam, both on Stillwater Creek, provide the City of Uhrichsville with protection.

Village of Zoar

At the time of this countywide DFIRM update, FEMA determined that the Village of Zoar Levee does not meet requirements to comply with Code of Federal Regulations, Title 44, Section 65.10. On the previous Village of Zoar FIRM the levee had been shown as protecting from the 1-percent-annual-chance flood. Per FEMA guidance, the levee system is not shown as providing protection from the 1-percent-annual-chance flood on the countywide DFIRM.

3.0 ENGINEERING METHODS

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

3.1 Hydrologic Analyses

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

Pre-Countywide Analyses

For the Beaverdam Creek, Little Stillwater Creek, Stillwater Creek and Tuscarawas River below Dover Dam study reaches, peak discharges were established using natural discharge-frequency curves. Natural discharge- frequency curves used in this study were developed on a regional basis in accordance with the method outlined in "Statistical Methods in Hydrology" (Reference 15).

Discharges for Sugar Creek were obtained from the COE stream gages at Beach City Dam and Strasburg. Discharges for Brandywine Creek, Broad Run and South Fork Sugar Creek were established by valley flood routings computed through use of the U.S. Soil Conservation Service (SCS) TR-20 computer software (Reference 16).

Peak discharge-drainage area relationships for the 10-, 2-, 1-, and 0.2-percent- annual-chance floods of each flooding source studied in detail in the community are presented in Table 5.

Initial Countywide Analyses (July 22, 2010)

For the revised approximate studies included in the initial countywide FIS, 1-percent- annual-chance discharges were calculated using regression equations presented in USGS Scientific Investigations Report (SIR) 2006-5312 (Reference 17).

Revised Countywide Analysis (To Be Determined)

Peak discharges for the 10-, 2-, 1-, 1-percent-plus, and 0.2-percent-annual-chance recurrence floods along Sandy Creek were calculated using the drainage area ratio method, leveraging flows from the effective detailed study for Sandy Creek (Lower Reach) in Stark County, Ohio (Reference 18)

The 4-percent-annual-chance recurrence discharges for all flow locations along Sandy Creek were calculated from logarithmic regression of the 10-, 2-, 1-, and 0.2-percent-annual-chance recurrence floods.

A summary of the drainage area-peak discharge relationships for all the streams studied by detailed methods is shown in Table 5.

Table 5. Summary of Discharges

		Peak Discharges (cfs)					
Flooding Source and Location	**Drainage Area (square miles)**	**10-percent-annual-chance**	**4-percent-annual-chance**	**2-percent-annual-chance**	**1-percent-annual-chance**	**1-percent-plus-annual-chance**	**0.2-percent-annual-chance**
Beaverdam Creek							
At mouth	21.8	1,400	*	2,580	3,150	*	5,120
Brandywine Creek							
Just upstream of confluence with Sugar Creek	N/A	955	*	1,460	1,580	*	2,215
Broad Run							
Data Not Available	*	*	*	*	*	*	*
Little Stillwater Creek							
USGS gage 150 feet downstream of Tappan Dam	96.4	600[1]	*	600[1]	600[1]	*	600[1]
Sandy Creek At Bolivar Dam	502	10,940	13,900	16,050	18,560	23,950	24,920
Just upstream of confluence with Nimishillen Creek	316	7,550	9,600	11,090	12,820	16,540	17,200
South Fork Sugar Creek							
Just upstream of County Route 75	N/A	3,500	*	6,240	7,055	*	10,195
Stillwater Creek							
USGS gage, just upstream of Trenton Avenue in Uhrichsville	367	4,650	*	5,700	6,100	*	7,050

Table 5. Summary of Discharges

		Peak Discharges (cfs)					
Flooding Source and Location	**Drainage Area (square miles)**	**10-percent-annual-chance**	**4-percent-annual-chance**	**2-percent-annual-chance**	**1-percent-annual-chance**	**1-percent-plus-annual-chance**	**0.2-percent-annual-chance**
Sugar Creek							
USGS tailwater gage, 1,200 feet downstream of Beach City Dam	300	2,400	*	2,600	4,290	*	*
Tuscarawas (below Dover Dam)							
USGS gage, just downstream of County Route 1 in Newcomerstown	2,443	15,000	*	17,800	24,500	*	68,800
Just downstream of Main Street in Gnadenhutten	2,375	14,000	*	16,800	21,600	*	43,100
USGS gage just upstream of State Route 416 in New Philadelphia	1,814	9,600	*	11,800	14,100	*	24,400
Just upstream of confluence of Sugar Creek	*	7,255	*	8,725	11,000	*	28,720
USGS tailwater gage, just below Dover Dam	1,405	6,300[2]	*	6,300[2]	6,300[2]	*	*

[1] Flow remains within channel
[2] Discharges regulated by dam
* 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 Flood Insurance Rate Map (FIRM) represent rounded whole-foot elevations and may not exactly reflect the elevations shown on the Flood Profiles or in the Floodway Data table in the FIS report. Flood elevations shown on the FIRM are primarily intended for flood insurance rating purposes. For construction and/or floodplain management purposes, users are cautioned to use the flood elevation data presented in this FIS report in conjunction with the data shown on the FIRM.

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

This section includes information from previously published FIS reports and information from the analyses performed for this FIS. All elevations are referenced to NAVD88. Elevation reference marks used in this study, and their descriptions, are shown on the FIRM.

Flood profiles were drawn showing the computed WSELs for floods of the selected recurrence intervals. Flood profiles were drawn showing the computed water-surface elevations to an accuracy of 0.5 foot for floods of the selected recurrence intervals. In cases where two or more profiles are close together, due to limitations of the profile scale, only the higher profile has been shown.

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

Pre-Countywide Analyses

For the Beaverdam Creek, Brandywine Creek, Broad Run, Little Stillwater Creek, South Fork Sugar Creek Stillwater Creek, Sugar Creek and Tuscarawas River below Dover Dam study reaches, cross-section data for streams were obtained from field surveys, which included the channel and a nominal distance across the overbank. The remaining overbank data were taken from topographic maps (Reference 20). In addition, all bridges within the study reach were field surveyed.

Starting water-surface elevations for detailed study reaches were developed using established ratings at the appropriate gaging station. Water-surface profiles of floods of the selected recurrence intervals for the Beaverdam Creek, Little Stillwater, Stillwater Creek, Sugar Creek (downstream of County Route 80), and Tuscarawas River (below Dover Dam) were computed using the USACE HEC-2 step-backwater computer

program (Reference 21). Water-surface profiles at the selected recurrence intervals for Sugar Creek (upstream of County Route 80), Brandywine Creek, Broad Run and South Fork Sugar Creek were computed using the SCS water-surface profile program, WSP-2 (Reference 22).

Roughness coefficients (Manning's "n") for the streams previously studied in detail were chosen based upon field observation and engineering judgment (Reference 28). Manning's "n" value ranges for channel and overbank are provided in Table 7.

Initial Countywide Analyses (July 22, 2010)

For the initial countywide FIS, hydraulic analyses for the 1-percent-annual-chance flood event were performed using the USACE Hydrologic Engineering Center River Analysis Software (HEC-RAS) model, version 3.1.3 (Reference 19).

Models for revised approximate study reaches contained unsurveyed cross- sections with an average spacing of approximately 2,000 feet and did not include structures, such as bridges and culverts. Cross-section geometry model data was created using 5-foot contour topographic mapping from 2006 obtained from the State of Ohio Office of Information Technology.

Aerial photography from 2006 obtained from the State of Ohio, Office of Information Technology was used to determine the Manning's roughness coefficients for the approximate hydraulic models. A representative overbank and channel Manning's roughness coefficient was selected for each revised approximate study reach. Roughness values ranged from 0.040 to 0.100 for the overbanks and 0.035 to 0.045 within the channel.

Detail-studied streams that were not re-studied as part of this map update may include a "profile base line" on the maps. This "profile base line" provides a link to the flood profiles included in the Flood Insurance Study report. The detail- studied stream centerline may have been digitized or redelineated as part of this revision. The "profile base lines" for these streams were based on the best available data at the time of their study and are depicted as they were on the previous FIRMs. In some cases where improved topographic data was used to redelineate floodplain boundaries, the "profile base line" may deviate significantly from the channel centerline or may be outside the Special Flood Hazard Area (SFHA).

Revised Countywide Analyses (To Be Determined)

For the new detailed study of Sandy Creek, cross section locations were leveraged from the HEC-RAS model created for the USACE Magnolia Levee certification report (Reference 26). Additional sections were added to address spacing issues and improve modeling. For the lower reach, cross sections were redrawn. Channel survey data was combined with

the 2007 Ohio Statewide Imagery Program (OSIP) Digital Elevation Model (DEM) (Reference 27) to determine cross section elevations.

Three hydraulic structures along Sandy Creek were modeled using the USACE HEC-RAS program within Tuscawaras County. Two bridges were modeled using survey data. Survey was unable to be performed at the railroad bridge near Sandyville, Ohio. For this structure, geometry was leveraged from the USACE HEC-RAS model (Reference 26). Structures were modeled with the assumption that bridge openings would not be obstructed by debris. A low head dam located at the very upstream end of the study in Waynesburg was modeled as a weir. The dam elevation was obtained from the Stark County FIS report (Reference 18).

Known water surface elevations were used as downstream boundary conditions; these elevations are shown in Table 6. When available, elevations were leveraged from the USACE HEC-RAS model. Elevations for the 4-percent-annual-chance, 1-percent-annual-chance plus, and the 0.2 percent-annual-chance profiles were obtained from Annual Exceedance Probability Curve for Bolivar Dam (Reference 26).

Table 6. Summary of Stillwater Elevation (NAVD88)

Flooding Source	10-Percent Annual Chance Event	4-Percent Annual Chance Event	2-Percent Annual Chance Event	1-Percent Annual Chance Event	1-Percent Plus Annual Chance Event	0.2-Percent Annual Chance Event
Tuscarawas River At Dover Dam	897.1	*	903.6	909.3	*	N/A
Sandy Creek At Bolivar Dam	939.8	943.4	946.3	951.8	961.5	964.4

* Data not available

Manning's "n" values were selected from published values in Open-Channel Hydraulics (Reference 28) based on survey photos and orthophotography. As shown below in Table 7, Manning's "n" values for the Sandy Creek channel range from 0.032 to 0.037. Manning's "n" values for the overbanks ranged from 0.03 to 0.1.

Table 7. Manning's "n" Values

Flooding Source	Roughness Coefficients	
	Channel	Overbanks
Sandy Creek	0.032 to 0.037	0.030 to 0.100
South Fork Sugar Creek	0.025 to 0.040	0.040 to 0.090
Sugar Creek	0.037 to 0.043	0.040 to 0.100
Tuscarawas River	0.035 to 0.045	*

* Data not available

3.3 Vertical Datum

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

All flood elevations shown in this FIS report and on the FIRM are referenced to NAVD88. Effective information for this FIS report was converted from NGVD29 to NAVD88 using a countywide average conversion of -0.7 feet (NAVD88 = NGVD29 – 0.7). Structure and ground elevations in the community must, therefore, be referenced to NAVD88. It is important to note that adjacent counties may be referenced to NGVD29. This may result in differences in Base Flood Elevations (BFEs) across the corporate limits between the communities.

For more information on NAVD88, see the FEMA publication entitled *Converting the National Flood Insurance Program to the North American Vertical Datum of 1988* (FEMA, June 1992), or contact the Vertical Network Branch, National Geodetic Survey, Coast and Geodetic Survey, National Oceanic and Atmospheric Administration, Silver Spring, Maryland 20910 (internet address http://www.ngs.noaa.gov).

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

4.0 FLOODPLAIN MANAGEMENT APPLICATIONS

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

4.1 Floodplain Boundaries

In order to provide a national standard without regional discrimination, the 1- percent annual chance flood has been adopted by FEMA as the base for floodplain management purposes. The 0.2-percent-annual-chance flood is employed to indicate additional areas of flood risk in the community. For each stream studied by detailed methods, the 1- and 0.2-percent-annual-chance floodplain boundaries have been delineated using the flood elevations determined at each cross section. Between cross sections, the boundaries were interpolated using digital basemap information provided by the Tuscarawas County Engineer's Office and State of Ohio Office of Information Technology, Ohio Geographically Referenced Information Program (OGRIP). This basemap data included 2006 orthophotography and contours at five-foot intervals referenced to the Ohio State Plane coordinate system, NAD83 horizontal datum and NAVD88 vertical datum.

The 1- and 0.2-percent-annual-chance floodplain boundaries are shown on the DFIRM (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 the areas of moderate flood hazards (Zone X). 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.

For the streams studied by approximate methods, only the 1-percent-annual- chance floodplain boundary is shown on the DFIRM (Exhibit 2). Approximate 1- percent-annual-chance floodplain boundaries were delineated using digital basemap information described above. Approximate flood boundaries in some portions of the study area were digitized from the previous Flood Hazard Boundary Maps.

4.2 Floodways

Encroachment on floodplains, such as structures and fill, reduces flood-carrying capacity, increases flood heights and velocities, and increases flood hazards in areas beyond the encroachment itself. One aspect of

floodplain management involves balancing the economic gain from floodplain development against the resulting increase in flood hazard. For purposes of the NFIP, a floodway is used as a tool to assist local communities in this aspect of floodplain management.

Under this concept, the area of the 1-percent-annual-chance floodplain is divided into a floodway and a floodway fringe. The floodway is the channel of a stream, plus any adjacent floodplain areas, that must be kept free of encroachment so that the 1-percent-annual-chance flood can be carried without substantial increases in flood heights. Minimum standards of FEMA and Ohio limit such increases in flood heights to 1.0 foot, provided that hazardous velocities are not produced. The floodways in this study are presented to local agencies as minimum standards that can be adopted directly or that can be used as a basis for additional floodway studies.

The floodways presented in this FIS report and on the DFIRM were computed for certain stream segments on the basis of equal conveyance reduction from each side of the floodplain. In those areas where problems arose with the equal conveyance reduction encroachment option of the HEC-2 or HEC-RAS backwater programs, modifications were applied based on experience. Floodway widths were computed at cross sections. Between cross sections, the floodway boundaries were interpolated. The results of the floodway computations have been tabulated for selected cross sections (Table 8). In cases where the floodway and 1-percent annual chance floodplain boundaries are either close together or collinear, only the floodway boundary has been shown.

No floodway analyses were computed for the Beaverdam Creek, Little Stillwater Creek and Stillwater Creek detailed study reaches. Along streams where floodways have not been computed, the community must ensure that the cumulative effect of development in the floodplain will not cause more than a 1.0-foot increase in the base flood elevations at any point within the community.

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

In the redelineation efforts, the floodway was not recalculated. As a result, there were areas where the previous floodway did not fit within the boundaries of the 1-percent-annual-chance floodplain. Therefore, in these areas, the floodway was reduced, Table 8 Floodway Data lists the water surface elevations, with and without floodway, the mean velocity in the floodway, and the location and area at each surveyed cross section as

determined by hydraulic methods. The width of the floodway depicted by the FIRM panels and the amount of reduction to fit the floodway inside the 1-percent-annual-chance floodplain, if necessary is also listed.

The floodways in this report are recommended to local agencies as minimum standards that can be adopted or used as a basis for additional studies.

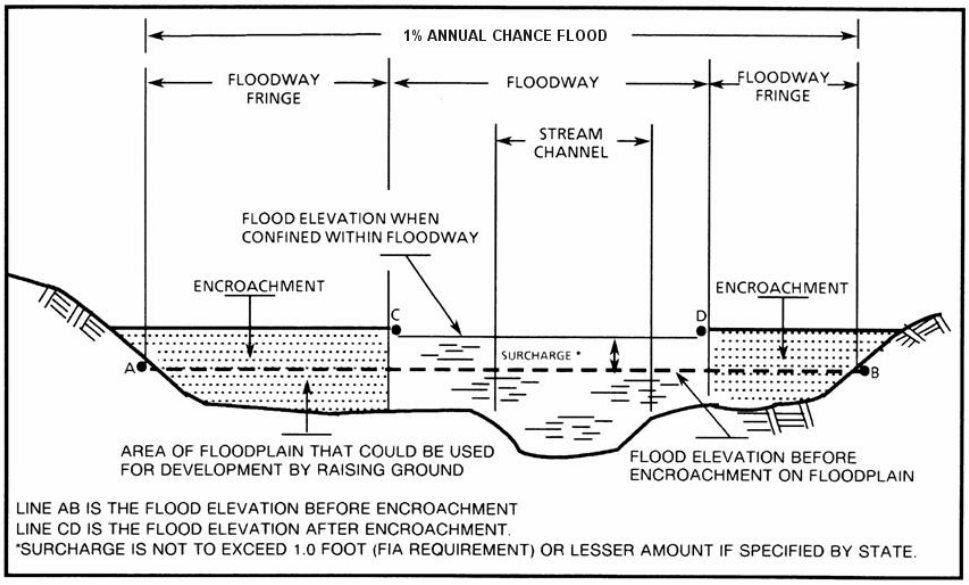


Figure 2. Floodway Schematic

FLOODING SOURCE		FLOODWAY				1-PERCENT-ANNUAL-CHANCE WATER SURFACE ELEVATION (FEET NAVD)			
CROSS SECTION	DISTANCE	WIDTH (FEET)	WIDTH REDUCED FROM PRIOR STUDY[3] (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
Brandywine Creek									
A	1,475 [1]	137		713	2.2	876.9	876.9	877.9	1.0
B	2,375 [1]	138		695	2.3	879.9	879.9	880.9	1.0
C	3,125 [1]	190		658	2.4	880.4	880.4	881.4	1.0
D	5,125 [1]	88		403	3.9	884.4	884.4	885.4	1.0
E	6,040 [1]	75		330	4.3	886.6	886.6	887.6	1.0
F	8,030 [1]	89		314	4.5	892.2	892.2	893.2	1.0
G	10,030 [1]	22		176	8.1	897.9	897.9	898.9	1.0
H	11,280 [1]	85		351	4.3	902.5	902.5	903.5	1.0
I	12,660 [1]	116		504	3.0	907.0	907.0	908.0	1.0
J	13,250 [1]	106		434	3.5	909.5	909.5	910.5	1.0
K	15,390 [1]	77		353	4.3	917.2	917.2	918.2	1.0
Broad Run									
A	1,800 [2]	253		1,132	3.2	905.4	905.4	906.4	1.0
B	2,950 [2]	363		1,482	2.5	906.5	906.5	907.5	1.0
C	5,250 [2]	266		1,100	2.6	908.6	908.6	909.6	1.0
D	6,450 [2]	250		837	3.4	910.4	910.4	911.4	1.0
E	7,620 [2]	247		882	3.2	911.8	911.8	912.8	1.0
F	10,170 [2]	165		748	3.8	915.8	915.8	916.8	1.0

[1]Feet above confluence with Sugar Creek [2]Feet above mouth at confluence with Sugar Creek
[3]See Explanation in Section 4.2 Floodways

Table 8

FEDERAL EMERGENCY MANAGEMENT AGENCY

TUSCARAWAS COUNTY, OH

AND INCORPORATED AREAS

FLOODWAY DATA

Brandywine Creek - Broad Run

FLOODING SOURCE		FLOODWAY			1-PERCENT-ANNUAL-CHANCE FLOOD WATER SURFACE ELEVATION (FEET NAVD)			
CROSS SECTION	DISTANCE	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
Broad Run								
G	12,370 [1]	212	963	3.4	920.2	920.2	921.2	1.0
H	14,370 [1]	189	1,060	3.1	922.6	922.6	923.6	1.0
I	15,070 [1]	182	947	1.4	925.1	925.1	926.1	1.0
J	15,970 [1]	81	348	3.8	925.8	925.8	926.8	1.0
Sandy Creek								
A	4,471 [2]	1,770	73,310	0.3	951.8	951.8	952.8	1.0
F	27,538 [2]	1,467	42,944	0.4	951.8	951.8	952.8	1.0
G	33,759 [2]	1,381	45,710	0.4	951.8	951.8	952.8	1.0
H	37,459 [2]	1,465	45,135	1.0	951.8	951.8	952.8	1.0
I	40,966 [2]	1,788	37,952	0.6	951.9	951.9	952.8	1.0
J	44,236 [2]	935	25,403	0.5	952.1	952.1	953.1	1.0
K	46,407 [2]	1,932	50,631	0.3	952.2	952.2	953.2	1.0
L	51,993 [2]	1,688	39,690	0.3	952.2	952.2	953.2	1.0
M	56,036 [2]	1,503	31,263	0.4	952.2	952.2	953.2	1.0
N	62,126 [2]	1,234	21,127	0.6	952.3	952.3	953.3	0.9

[1]Feet above confluence with Sugar Creek [2]Feet above confluence with Tuscarawas River

TABLE 8

FEDERAL EMERGENCY MANAGEMENT AGENCY

TUSCARAWAS COUNTY, OH

AND INCORPORATED AREAS

FLOODWAY DATA

Broad Run - Sandy Creek

FLOODING SOURCE		FLOODWAY			1-PERCENT-ANNUAL-CHANCE FLOOD WATER SURFACE ELEVATION (FEET NAVD)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
South Fork Sugar Creek								
A	800	131	1,115	6.3	982.9	982.9	983.9	1.0
B	2,300	461	3,137	2.2	984.6	984.6	985.6	1.0
C	4,100	489	3,530	2.0	985.3	985.3	986	1.0
D	5,480	569	4,227	1.6	986.1	986.1	987	1.0
E	7,451	361	2,660	2.6	987.1	987.1	988.1	1.0
F	7,914	332	3,123	2.2	988.9	988.9	989.9	1.0
G	9,976	720	5,674	1.2	989.2	989.2	990.2	1.0
H	11,192	609	4,871	1.4	989.8	989.8	990.8	1.0
I	12,510	527	1,019	1.7	990.1	990.1	991.1	1.0
J	14,110	625	3,771	1.8	990.7	990.7	991.7	1.0
K	15,420	529	3,125	2.2	991.5	991.5	992.5	1.0
L	17,090	594	3,832	1.8	992.4	992.4	993.4	1.0

[1]Feet above limit of detailed study (1,050 feet downstream from confluence of East Branch)

TABLE 8

FEDERAL EMERGENCY MANAGEMENT AGENCY

TUSCARAWAS COUNTY, OH

AND INCORPORATED AREAS

FLOODWAY DATA

South Fork Sugar Creek

FLOODING SOURCE		FLOODWAY				1-PERCENT-ANNUAL-CHANCE WATER SURFACE ELEVATION (FEET NAVD)			
CROSS SECTION	DISTANCE [1]	WIDTH (FEET)	WIDTH REDUCED FROM PRIOR STUDY[2] (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
Sugar Creek									
A	21,648	98		716	6.4	890.7	890.7	891.7	1.0
B	23,971	180		828	5.6	893.2	893.2	894.2	1.0
C	24,658	116		1,092	4.2	893.7	893.7	894.7	1.0
D	25,344	309		2,406	1.9	895.4	895.4	896.4	1.0
E	26,664	131		1,359	3.4	895.7	895.7	896.7	1.0
F	28,406	194		1,451	3.2	896.3	896.3	897.3	1.0
G	29,040	120		757	6.1	896.5	896.5	897.5	1.0
H	31,891	109		812	5.7	899.7	899.7	900.7	1.0
I	34,162	84		801	5.7	903.4	903.4	904.4	1.0
J	35,006	101		909	5.1	904.6	904.6	905.6	1.0
K	35,482	145		1,159	3.7	905.3	905.3	906.3	1.0
L	37,171	125		1,191	3.6	907.1	907.1	908.1	1.0
M	39,336	120		989	4.3	909.6	909.6	910.6	1.0
N	42,007	88		710	6.0	912.5	912.5	913.5	1.0
O	45,778	518		3,369	1.3	919.1	919.1	920.1	1.0
P	49,104	100		851	5.0	922.1	922.1	923.1	1.0
Q	51,269	162		773	5.6	925.6	925.6	926.6	1.0
R	54,120	125		922	4.7	928.5	928.5	929.5	1.0
S	58,714	140		842	5.1	932.7	932.7	933.7	1.0

[1]Feet above mouth at confluence with Tuscarawas River [2] See Explanation in Section 4.2 Floodways

Table 8

FEDERAL EMERGENCY MANAGEMENT AGENCY

TUSCARAWAS COUNTY, OH

AND INCORPORATED AREAS

FLOODWAY DATA

Sugar Creek

FLOODING SOURCE		FLOODWAY				1-PERCENT-ANNUAL-CHANCE WATER SURFACE ELEVATION (FEET NAVD)			
CROSS SECTION	DISTANCE [1]	WIDTH (FEET)	WIDTH REDUCED FROM PRIOR STUDY[2] (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
Tuscarawas River									
A	110,880	700		6,090	4.0	792.0	792.0	792.8	0.8
B	111,936	285		4,246	5.8	792.4	792.4	793.3	0.9
C	112,992	289		3,866	6.3	793.0	793.0	793.9	0.9
D	116,688	1,400		8,372	2.9	795.4	795.4	796.0	0.6
E	119,645	240		4,189	5.8	796.1	796.1	796.8	0.7
F	121,018	297		4,552	5.4	796.9	796.9	797.6	0.7
G	129,677	629		6,990	3.5	801.0	801.0	801.9	0.9
H	137,808	385		4,976	4.9	803.6	803.6	804.6	1.0
I	147,418	2,458		8,873	2.8	806.0	806.0	807.0	1.0
J	150,427	705		5,097	4.9	806.8	806.8	807.8	1.0
K	153,120	1,085		9,571	2.6	808.5	808.5	809.4	0.9
L	156,710	489		4,812	5.2	809.9	809.9	810.9	1.0
M	161,462	613		5,994	4.2	812.4	812.4	813.2	0.8
N	163,891	1,375		13,781	1.9	813.5	813.5	814.3	0.8
O	167,640	480		5,177	4.9	814.8	814.8	815.5	0.7
P	170,016	420		4,623	5.5	815.9	815.9	816.8	0.9
Q	177,514	3,460		28,448	0.9	818.2	818.2	819.0	0.8
R	182,846	300		4,398	5.9	820.5	820.5	821.2	0.7
S	189,077	1,367		13,219	2.0	823.5	823.5	824.2	0.7
T	196,416	1124		9,081	2.9	827.0	827.0	827.5	0.5

[1]Feet above mouth at confluence with Muskingum River

[2]See Explanation in Section 4.2 Floodways

Table 8

FEDERAL EMERGENCY MANAGEMENT AGENCY

TUSCARAWAS COUNTY, OH

AND INCORPORATED AREAS

FLOODWAY DATA

Tuscarawas River

FLOODING SOURCE		FLOODWAY				1-PERCENT-ANNUAL-CHANCE WATER SURFACE ELEVATION (FEET NAVD)			
CROSS SECTION	DISTANCE [1]	WIDTH (FEET)	WIDTH REDUCED FROM PRIOR STUDY[2] (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
Tuscarawas River									
U	197,736	700		8,217	3.2	827.1	827.1	827.6	0.5
V	198,686	550		6,801	3.9	827.3	827.3	827.9	0.6
W	199,109	510		7,512	3.5	827.5	827.5	828.2	0.7
X	203,280	2,187		12,401	2.1	828.9	828.9	829.6	0.7
Y	212,045	2,235		12,998	2.1	831.1	831.1	831.8	0.7
Z	216,322	265		2,932	9.2	831.6	831.6	832.3	0.7
AA	226,406	438		4,747	5.7	837.7	837.7	838.5	0.8
AB	230,736	290		4,363	6.3	839.8	839.8	840.5	0.7
AC	234,221	1,850		11,630	2.4	841.2	841.2	841.9	0.7
AD	239,501	2,720		14,860	1.9	842.0	842.0	842.8	0.8
AE	261,624	770		5,460	2.7	849.6	849.6	850.2	0.6
AF	263,208	1,010		7,054	2.1	850.5	850.5	851.1	0.6
AG	268,910	902		5,353	2.7	853.2	853.2	853.8	0.6
AH	274,666	535		5,107	2.8	856.3	856.3	857.0	0.7
AI	277,992	814		5,526	2.6	857.2	857.2	858.1	0.9
AJ	281,688	1,600		10,134	1.4	858.5	858.5	859.2	0.7
AK	283,166	750		4,975	2.9	858.7	858.7	859.4	0.7
AL	285,014	270		3,793	3.8	859.1	859.1	859.9	0.8
AM	286,704	245		3,107	4.6	859.6	859.6	860.4	0.8
AN	291,350	520		3,991	3.6	863.4	863.4	864.4	1.0

[1]Feet above mouth at confluence with Muskingum River

[2]See Explanation in Section 4.2 Floodways

Table 8

FEDERAL EMERGENCY MANAGEMENT AGENCY

TUSCARAWAS COUNTY, OH

AND INCORPORATED AREAS

FLOODWAY DATA

Tuscarawas River

FLOODING SOURCE		FLOODWAY				1-PERCENT-ANNUAL-CHANCE WATER SURFACE ELEVATION (FEET NAVD)			
CROSS SECTION	DISTANCE [1]	WIDTH (FEET)	WIDTH REDUCED FROM PRIOR STUDY[2] (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
Tuscarawas River									
AO	293,462	500		6,082	2.3	864.8	864.8	865.5	0.7
AP	295,627	880		4,707	2.9	865.0	865.0	865.7	0.7
AQ	299,218	269		2,267	6.1	866.5	866.5	867.0	0.5
AR	300,802	424		3,661	3.0	867.6	867.6	868.1	0.5
AS	302,544	220		2,567	4.3	868.5	868.5	869.3	0.8
AT	303,653	242		3,057	3.6	869.2	869.2	869.9	0.7
AU	306,504	225		2,733	4.0	870.0	870.0	870.6	0.6
AV	308,986	297		3,794	2.9	870.3	870.3	871.2	0.9
AW	321,816	265		3,233	3.4	873.4	873.4	874.3	0.9
AX	329,419	295		3,453	3.2	876.2	876.2	877.0	0.8

[1]Feet above mouth at confluence with Muskingum River

[2]See Explanation in Section 4.2 Floodways

5.0 INSURANCE APPLICATION

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

Zone A	The flood insurance risk zone that corresponds to the 1-percent-annual-chance floodplains that are determined in the FIS by approximate methods. Because detailed hydraulic analyses are not performed for such areas, no BFEs or base flood depths are shown within this zone.
Zone AE	The flood insurance risk zone that corresponds to the 1-percent-annual-chance floodplains that are determined in the FIS by detailed methods. In most instances, whole-foot BFEs derived from the detailed hydraulic analyses are shown at selected intervals within this zone.
Zone X	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.

6.0 FLOOD INSURANCE RATE MAP (FIRM)

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

The FIRM for Tuscarawas County is, for insurance purposes, the principal result of the FIS. This map (published separately) contains the official delineation of the flood insurance zones and BFE lines. BFE lines show the locations of the expected whole-foot WSELs of the base flood. This map is developed in accordance with the latest FIRM preparation guidelines published by FEMA.

For flood insurance applications, the map designates flood insurance rate 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 are shown where applicable. This FIRM included flood hazard information that was presented separately on the Flood Boundary and Floodway Maps in previously printed FISs for Tuscarawas County, Ohio.

The countywide FIRM presents flooding information for the entire geographic area of Tuscarawas County. Previously, FIRMs were prepared for each incorporated community and the unincorporated areas of the county with identified special flood hazard areas. Historical data relating to the maps prepared for each community are presented in Table 9, Community Map History.

7.0 OTHER STUDIES

This FIS incorporates all previously published FISs and FIRMs for the incorporated and unincorporated areas within Tuscarawas County.

This 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 National Flood Insurance Program.

Revised countywide studies are in progress for Carroll and Stark Counties. The results of these studies will be in agreement with the results of this countywide study.

8.0 LOCATION OF DATA

Information concerning the pertinent data used in preparation of this study can be obtained by contacting the FEMA, Mitigation Division, 536 South Clark Street, Sixth Floor, Chicago, Illinois 60605.

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

COMMUNITY NAME	INITIAL IDENTIFICATION	FLOOD HAZARD BOUNDARY MAP REVISIONS DATE	FIRM EFFECTIVE DATE	FIRM REVISIONS DATE
Baltic, Village of	June 15, 1988	None	June 15, 1988	
Barnhill, Village of [1,2]	N/A	N/A	N/A	
Bolivar, Village of [2]	N/A	N/A	N/A	
Dennison, Village of	March 15, 1974	May 28, 1976 March 30, 1979	December 18, 1986	
Dover, City of	March 1, 1974	November 7, 1975	July 16, 1987	
Gnadenhutten, Village of	July 30, 1976	None	December 18, 1986	
Midvale, Village of [2]	N/A	N/A	N/A	
Mineral City, Village of [2]	N/A	N/A	N/A	
New Philadelphia, City of	March 15, 1974	June 21, 1976 April 23, 1982	January 2, 1987	
Newcomerstown, Village of	May 17, 1974	May 21, 1976 October 27, 1978	January 2, 1987	
Parral, Village of [1,2]	N/A	N/A	N/A	
Port Washington, Village of	April 5, 1974	May 28, 1976	January 15, 1988	
Roswell, Village of	March 10, 1978	None	August 1, 1987	
Stone Creek, Village of [1,2]	N/A	N/A	N/A	
Strasburg, Village of	April 5, 1974	July 2, 1976	August 4, 1987	
Sugarcreek, Village of	May 31, 1974	June 11, 1976	August 4, 1987	
Tuscarawas County (Unincorporated Areas)	February 24, 1978	None	September 30, 1987	
Tuscarawas, Village of [2]	N/A	N/A	N/A	
Uhrichsville, City of	November 9, 1973	July 9, 1976 June 1, 1979	January 2, 1987	
Zoar, Village of	April 18, 1975	None	September 4, 1987	

[1] No Special Flood Hazard Areas Identified [2] This community does not have map history prior to the first countywide mapping

TABLE 9

FEDERAL EMERGENCY MANAGEMENT AGENCY

TUSCARAWAS COUNTY, OH
(AND INCORPORATED AREAS)

COMMUNITY MAP HISTORY

9.0 BIBLIOGRAPHY AND REFERENCES

1. Federal Emergency Management Agency, Flood Insurance Study, Village of Dennison, Tuscarawas County, Ohio, December 18, 1986 (Flood Insurance Study); December 18, 1986 (Flood Insurance Rate Map); March 1974 (Flood Hazard Boundary Map).
2. U.S. Army Corps of Engineers, Huntington District, Floodplain Information, Tuscarawas River and Adjacent Tributary Areas, Tuscarawas County, Ohio, Huntington, West Virginia, June 1973.
3. Federal Emergency Management Agency, Flood Insurance Study, City of Dover, Tuscarawas County, Ohio, July 16, 1987 (Flood Insurance Study); July 16, 1987 (Flood Insurance Rate Map); November 1975 (Flood Hazard Boundary Map).
4. Federal Emergency Management Agency, Flood Insurance Study, Village of Gnadenhutten, Tuscarawas County, Ohio, December 18, 1986 (Flood Insurance Study); December 18, 1986 (Flood Insurance Rate Map); July 1976 (Flood Hazard Boundary Map).
5. Federal Emergency Management Agency, Flood Insurance Study, City of New Philadelphia, Tuscarawas County, Ohio, January 2, 1987 (Flood Insurance Study); January 2, 1987 (Flood Insurance Rate Map); April 1982 (Flood Hazard Boundary Map).
6. Federal Emergency Management Agency, Flood Insurance Study, Village of Newcomerstown, Tuscarawas County, Ohio, January 2, 1987 (Flood Insurance Study); January 2, 1987 (Flood Insurance Rate Map); October 1978 (Flood Hazard Boundary Map).
7. Federal Emergency Management Agency, Flood Insurance Study, Village of Port Washington, Tuscarawas County, Ohio, January 15, 1988 (Flood Insurance Study); January 15, 1988 (Flood Insurance Rate Map); May 1976 (Flood Hazard Boundary Map).
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Study); August 4, 1987 (Flood Insurance Rate Map); June 1976 (Flood Hazard Boundary Map).

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27. Ohio Statewide Imagery Program, Tuscarawas County Digital Elevation Model, Contour Interval 5 Feet: March, 2007.

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10.0 ADDITIONAL INFORMATION

Information concerning the pertinent data used in the preparation of this FIS Report can be obtained by submitting an order with any required payment to the FEMA Engineering Library. For more information on this process, see http://www.fema.gov.

10.1 FIRM Notes to Users

Each FIS report provides floodplain data, which may include a combination of the following: 10-, 4-, 2-, 1-, and 0.2-percent-annual-chance flood elevations (the 1-percent-annual-chance flood elevation is also referred to as the Base Flood Elevation (BFE)); delineations of the 1-percent-annual-chance and 0.2-percent-annual-chance floodplains; and 1-percent-annual-chance floodway. This information is presented on the FIRM and/or in many components of the FIS report, including Flood Profiles and Floodway Data tables.

Figure 3 presents important considerations for using the information contained in this FIS report and the FIRM. It is provided in response to changes in format and content. Figure 4 presents the map legend for the FIRM.

Figure 3. FIRM Notes to Users

NOTES TO USERS

For information and questions about this Flood Insurance Rate Map (FIRM), available products associated with this FIRM, including historic versions, the current map date for each FIRM panel, how to order products, or the National Flood Insurance Program (NFIP) in general, please call the FEMA Map Information eXchange at 1-877-FEMA-MAP (1-877-336-2627) or visit the FEMA Flood Map Service Center website at http://msc.fema.gov. Available products may include previously issued Letters of Map Change, a Flood Insurance Study Report, and/or digital versions of this map. Many of these products can be ordered or obtained directly from the website.

Communities annexing land on adjacent FIRM panels must obtain a current copy of the adjacent panel as well as the current FIRM Index. These may be ordered directly from the Flood Map Service Center at the number listed above.

For community and countywide map dates, refer to **Table 9** in this FIS Report.

To determine if flood insurance is available in this community, contact your insurance agent or call the National Flood Insurance Program at 1-800-638-6620.

PRELIMINARY FIS REPORT: FEMA maintains information about map features, such as street locations and names, in or near designated flood hazard areas. Requests to revise information in or near designated flood hazard areas may be provided to FEMA during the community review period, at the final Consultation Coordination Officer's meeting, or during the statutory 90-day appeal period. Approved requests for changes will be shown on the final printed FIRM.

Figure 3. FIRM Notes to Users

The map is for use in administering the NFIP. It may not identify all areas subject to flooding, particularly from local drainage sources of small size. Consult the community map repository to find updated or additional flood hazard information.

BASE FLOOD ELEVATIONS: For more detailed information in areas where Base Flood Elevations (BFEs) and/or floodways have been determined, consult the Flood Profiles and Floodway Data and/or Summary of Stillwater Elevations tables within this FIS Report. Use the flood elevation data within the FIS Report in conjunction with the FIRM for construction and/or floodplain management.

FLOODWAY INFORMATION: Boundaries of the floodways were computed at cross sections and interpolated between cross sections. The floodways were based on hydraulic considerations with regard to requirements of the National Flood Insurance Program. Floodway widths and other pertinent floodway data are provided in the FIS Report for this jurisdiction.

FLOOD CONTROL STRUCTURE INFORMATION: Certain areas not in Special Flood Hazard Areas may be protected by flood control structures. Refer to Section 4.3 "Non-Levee Flood Protection Measures" of this FIS Report for information on flood control structures for this jurisdiction.

PROJECTION INFORMATION: The projection used in the preparation of the map was State Plane Ohio North, Zone 3401. The horizontal datum was NAD83, GRS1980 spheroid. Differences in datum, spheroid, projection or State Plane zones used in the production of FIRMs for adjacent jurisdictions may result in slight positional differences in map features across jurisdiction boundaries. These differences do not affect the accuracy of the FIRM.

ELEVATION DATUM: Flood elevations on the FIRM are referenced to the North American Vertical Datum of 1988. These flood elevations must be compared to structure and ground elevations referenced to the same vertical datum. For information regarding conversion between the National Geodetic Vertical Datum of 1929 and the North American Vertical Datum of 1988, visit the National Geodetic Survey website at http://www.ngs.noaa.gov/ or contact the National Geodetic Survey at the following address:

NGS Information Services
NOAA, N/NGS12
National Geodetic Survey
SSMC-3, #9202
1315 East-West Highway
Silver Spring, Maryland 20910-3282
(301) 713-3242

Local vertical monuments may have been used to create the map. To obtain current monument information, please contact the appropriate local community listed in Table 11 of this FIS Report.

BASE MAP INFORMATION: Base map information shown on the FIRM was provided by multiple sources. Base map files were provided in digital format by Tuscarawas County and the Ohio Statewide Imagery Program dated 2013.

Figure 3. FIRM Notes to Users

Corporate limits shown on the map are based on the best data available at the time of publication. Because changes due to annexations or de-annexations may have occurred after the map was published, map users should contact appropriate community officials to verify current corporate limit locations.

NOTES FOR FIRM INDEX

REVISIONS TO INDEX: As new studies are performed and FIRM panels are updated within Tuscarawas County, Ohio, corresponding revisions to the FIRM Index will be incorporated within the FIS Report to reflect the effective dates of those panels. Please refer to Table 9 of this FIS Report to determine the most recent FIRM revision date for each community. The most recent FIRM panel effective date will correspond to the most recent index date.

SPECIAL NOTES FOR SPECIFIC FIRM PANELS

This Notes to Users section was created specifically for Tuscarawas County, Ohio, effective _____.

FLOOD RISK REPORT: A Flood Risk Report (FRR) may be available for many of the flooding sources and communities referenced in this FIS Report. The FRR is provided to increase public awareness of flood risk by helping communities identify the areas within their jurisdictions that have the greatest risks. Although non-regulatory, the information provided within the FRR can assist communities in assessing and evaluating mitigation opportunities to reduce these risks. It can also be used by communities developing or updating flood risk mitigation plans. These plans allow communities to identify and evaluate opportunities to reduce potential loss of life and property. However, the FRR is not intended to be the final authoritative source of all flood risk data for a project area; rather, it should be used with other data sources to paint a comprehensive picture of flood risk.

Each FIRM panel contains an abbreviated legend for the features shown on the maps. However, the FIRM panel does not contain enough space to show the legend for all map features. Figure 3 shows the full legend of all map features. Note that not all of these features may appear on the FIRM panels in Tuscarawas County.

Figure 4. Map Legend for FIRM

SPECIAL FLOOD HAZARD AREAS: *The 1% annual chance flood, also known as the base flood or 100-year flood, has a 1% chance of happening or being exceeded each year. Special Flood Hazard Areas are subject to flooding by the 1% annual chance flood. The Base Flood Elevation is the water surface elevation of the 1% annual chance flood. The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood heights. See note for specific types. If the floodway is too narrow to be shown, a note is shown.*

	Special Flood Hazard Areas subject to inundation by the 1% annual chance flood (Zones A, AE, AH, AO, AR, A99, V and VE)
Zone A	The flood insurance rate zone that corresponds to the 1% annual chance floodplains. No base (1% annual chance) flood elevations (BFEs) or depths are shown within this zone.
Zone AE	The flood insurance rate zone that corresponds to the 1% annual chance floodplains. Base flood elevations derived from the hydraulic analyses are shown within this zone, either at cross section locations or as static whole-foot elevations that apply throughout the zone.
Zone AH	The flood insurance rate zone that corresponds to the areas of 1% annual chance shallow flooding (usually areas of ponding) where average depths are between 1 and 3 feet. Whole-foot BFEs derived from the hydraulic analyses are shown at selected intervals within this zone.
Zone AO	The flood insurance rate zone that corresponds to the areas of 1% annual chance shallow flooding (usually sheet flow on sloping terrain) where average depths are between 1 and 3 feet. Average whole-foot depths derived from the hydraulic analyses are shown within this zone.
Zone AR	The flood insurance rate zone that corresponds to areas that were formerly protected from the 1% annual chance flood 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.
Zone A99	The flood insurance rate zone that corresponds to areas of the 1% annual chance floodplain that will be protected by a Federal flood protection system where construction has reached specified statutory milestones. No base flood elevations or flood depths are shown within this zone.
Zone V	The flood insurance rate zone that corresponds to the 1% annual chance coastal floodplains that have additional hazards associated with storm waves. Base flood elevations are not shown within this zone.

Figure 4. Map Legend for FIRM

Zone VE	Zone VE is the flood insurance rate zone that corresponds to the 1% annual chance coastal floodplains that have additional hazards associated with storm waves. Base flood elevations derived from the coastal analyses are shown within this zone as static whole-foot elevations that apply throughout the zone.
	Regulatory Floodway determined in Zone AE.
OTHER AREAS OF FLOOD HAZARD	
	Shaded Zone X: Areas of 0.2% annual chance flood hazards and areas of 1% annual chance flood hazards with average depths of less than 1 foot or with drainage areas less than 1 square mile.
	Future Conditions 1% Annual Chance Flood Hazard – Zone X: The flood insurance rate zone that corresponds to the 1% annual chance floodplains that are determined based on future-conditions hydrology. No base flood elevations or flood depths are shown within this zone.
	Area with Reduced Flood Risk due to Levee: Areas where an accredited levee, dike, or other flood control structure has reduced the flood risk from the 1% annual chance flood. See Notes to Users for important information.
OTHER AREAS	
	Zone D (Areas of Undetermined Flood Hazard): The flood insurance rate zone that corresponds to unstudied areas where flood hazards are undetermined, but possible.
	Unshaded Zone X: Areas of minimal flood hazard.
FLOOD HAZARD AND OTHER BOUNDARY LINES	
(ortho) (vector)	Flood Zone Boundary (white line on ortho-photography-based mapping; gray line on vector-based mapping)
	Limit of Study
	Jurisdiction Boundary
	Limit of Moderate Wave Action (LiMWA): Indicates the inland limit of the area affected by waves greater than 1.5 feet
GENERAL STRUCTURES	
Aqueduct *Channel* *Culvert* *Storm Sewer*	Channel, Culvert, Aqueduct, or Storm Sewer

Figure 4. Map Legend for FIRM

Dam *Jetty* *Weir*	Dam, Jetty, Weir
	Levee, Dike, or Floodwall accredited or provisionally accredited to reduce the flood risk from the 1% annual chance flood.
	Levee, Dike or Floodwall not accredited to reduce the flood risk from the 1% annual chance flood.
Bridge	Bridge
COASTAL BARRIER RESOURCES SYSTEM (CBRS) AND OTHERWISE PROTECTED AREAS (OPA): *CBRS areas and OPAs are normally located within or adjacent to Special Flood Hazard Areas. See Notes to Users for important information.*	
CBRS AREA **09/30/2009**	Coastal Barrier Resources System Area: Labels are shown to clarify where this area shares a boundary with an incorporated area or overlaps with the floodway.
OTHERWISE PROTECTED AREA **09/30/2009**	Otherwise Protected Area
REFERENCE MARKERS	
22.0	River mile Markers
CROSS SECTION & TRANSECT INFORMATION	
B 20.2	Lettered Cross Section with Regulatory Water Surface Elevation (BFE)
5280 21.1	Numbered Cross Section with Regulatory Water Surface Elevation (BFE)
17.5	Unlettered Cross Section with Regulatory Water Surface Elevation (BFE)
8	Coastal Transect
	Profile Baseline: Indicates the modeled flow path of a stream and is shown on FIRM panels for all valid studies with profiles or otherwise established base flood elevation.

Figure 4. Map Legend for FIRM

——-·——--	Coastal Transect Baseline: Used in the coastal flood hazard model to represent the 0.0-foot elevation contour and the starting point for the transect and the measuring point for the coastal mapping.
~~ 513 ~~~~	Base Flood Elevation Line
ZONE AE (EL 16)	Static Base Flood Elevation value (shown under zone label)
ZONE AO (DEPTH 2)	Zone designation with Depth
ZONE AO (DEPTH 2) (VEL 15 FPS)	Zone designation with Depth and Velocity
BASE MAP FEATURES	
Missouri Creek	River, Stream or Other Hydrographic Feature
234	Interstate Highway
234	U.S. Highway
234	State Highway
234	County Highway
MAPLE LANE	Street, Road, Avenue Name, or Private Drive if shown on Flood Profile
RAILROAD	Railroad
	Horizontal Reference Grid Line
—	Horizontal Reference Grid Ticks
+	Secondary Grid Crosshairs
Land Grant	Name of Land Grant
7	Section Number
R. 43 W. T. 22 N.	Range, Township Number
$^{42}76^{000m}$E	Horizontal Reference Grid Coordinates (UTM)
365000 FT	Horizontal Reference Grid Coordinates (State Plane)
80° 16’ 52.5”	Corner Coordinates (Latitude, Longitude)

10.2 Jurisdictions Included in the Flood Insurance Study Project

This FIS Report covers the entire geographic area of Tuscarawas County, Ohio.

The jurisdictions that are included in this project area, along with the Community Identification Number (CID) for each community and the 8-digit Hydrologic Unit Codes (HUC-8) sub-basins affecting each, are shown in Table 10. The Flood Insurance Rate Map (FIRM) panel numbers that affect each community are listed. If the flood hazard data for the community is not included in this FIS Report, the location of that data is identified.

The location of flood hazard data for participating communities in multiple jurisdictions is also indicated in the table.

Jurisdictions that have no identified SFHAs as of the effective date of this study are indicated in the table. Changed conditions in these communities (such as urbanization or annexation) or the availability of new scientific or technical data about flood hazards could make it necessary to determine SFHAs in these jurisdictions in the future.

Table 10. Listing of NFIP Jurisdictions

Community	CID	HUC-8 Sub-Basin(s)	Located on FIRM Panel(s)	If Not Included, Location of Flood Hazard Data
Baltic, Village of	390886	05040001	204, 212	
Barnhill, Village of[1]	390947	05040001	260, 280[2]	
Bolivar, Village of	390643	05040001	062, 064	
Dennison, Village of	390542	05040001	289, 290	
Dover, City of	390543	05040001	134, 145, 155, 165, 255	
Gnadenhutten, Village of	390613	05040001	352, 356	
Midvale, Village of	390715	05040001	260, 270, 280[2], 290	
Mineral City, Village of	390842	05040001	176, 178	
New Philadelphia, City of	390545	05040001	165, 170, 255, 260	
Newcomerstown, Village of	390544	05040001	336, 337, 338, 339, 341, 345	
Parral, Village of[1]	390946	05040001	155, 165	
Port Washington, Village of	390664	05040001	334	
Roswell, Village of	390813	05040001	276, 277[2]	
Stone Creek, Village of[1]	390945	05040001	240[2], 245	
Strasburg, Village of	390631	05040001	131, 132, 133, 134	
Sugarcreek, Village of	390546	05040001	118[2], 119, 138, 207, 210	

Table 10. Listing of NFIP Jurisdictions

Community	CID	HUC-8 Sub-Basin(s)	Located on FIRM Panel(s)	If Not Included, Location of Flood Hazard Data
Tuscarawas County (Unincorporated Areas)	390782	05040001, 05040005	020[2], 040, 045, 062, 064, 065, 070, 075[2], 090, 100[2], 110, 118[2], 119, 120, 130, 131, 132, 133, 134, 138, 140, 145, 152, 155, 156, 160, 165, 170, 176, 178, 180, 190, 200, 204, 207, 210, 212, 215[2], 220, 230, 235, 240[2], 245, 255, 260, 265, 268, 269, 270, 276, 277[2], 280[2], 285[2], 289, 290, 295, 325[2], 330, 334, 335, 336, 337, 338, 339, 341, 345, 352, 355, 356, 360, 375, 380, 385, 400, 425, 450, 475	
Tuscarawas, Village of	390666	05040001	268, 269	
Uhrichsville, City of	390547	05040001	289, 290	
Zoar, Village of	390752	05040001	152, 156	

[1] No Special Flood Hazard Areas Identified [2] Panel Not Printed

10.3 Map Repositories

Table 11 is a list of the locations where FIRMs for Tuscarawas County can be viewed. Please note that the maps at these locations are for reference only and are not for distribution. Also, please note that only the maps for the community listed in the table are available at that particular repository. A user may need to visit another repository to view maps from an adjacent community.

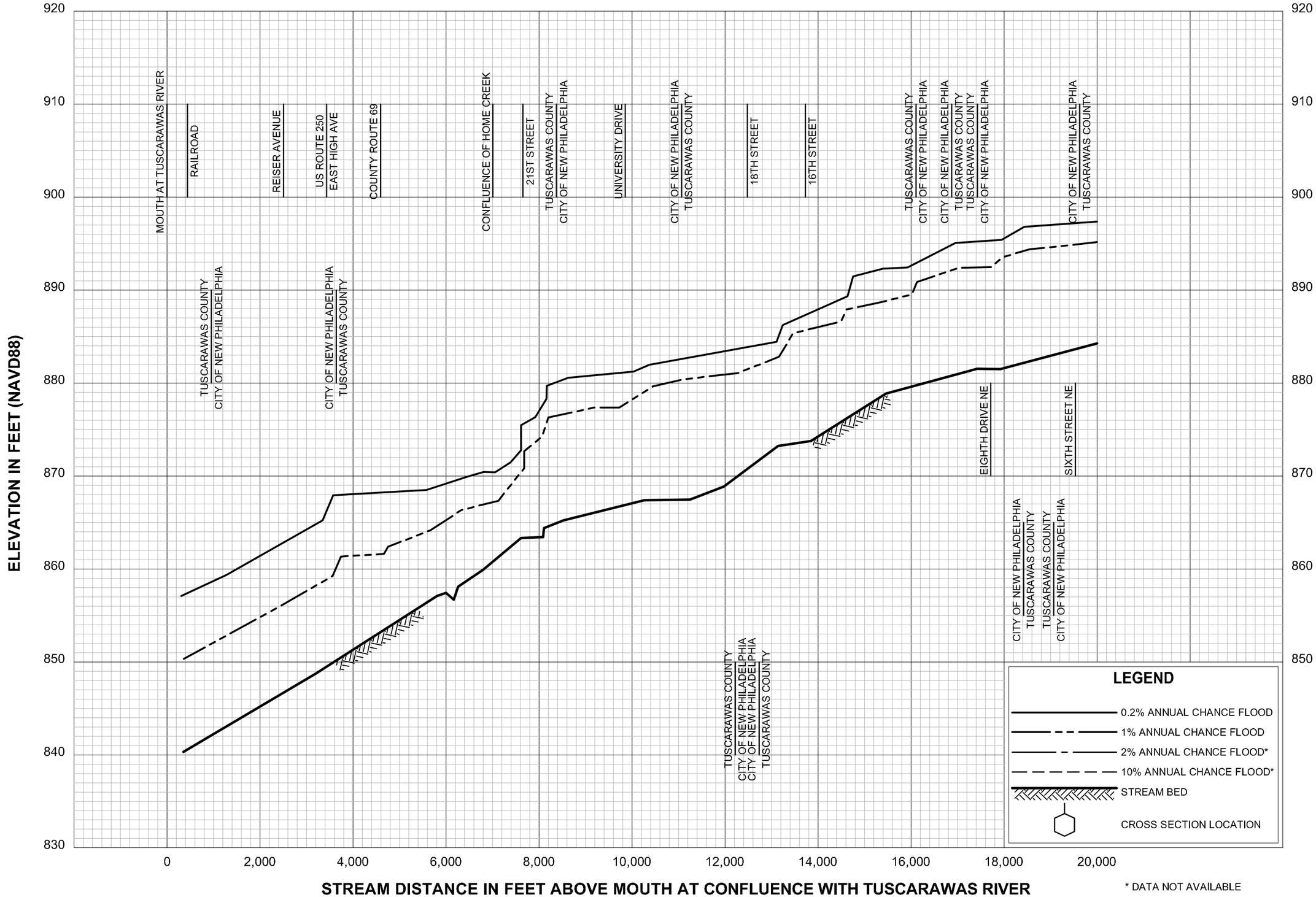
Table 11. Map Repositories

Community	Address	City	State	Zip Code
Baltic, Village of	Village Hall 102 Main Street	Baltic	Ohio	43804
Barnhill, Village of[1]	County Administrative Offices 125 East High Avenue	New Philadelphia	Ohio	44663
Bolivar, Village of	Village Hall 109 Canal Street NW	Bolivar	Ohio	44612
Dennison, Village of	County Administrative Offices 125 East High Avenue	New Philadelphia	Ohio	44663
Dover, City of	City Hall 110 East Third Street	Dover	Ohio	44622
Gnadenhutten, Village of	Village Hall 131 South Walnut Street	Gnadenhutten	Ohio	44629
Midvale, Village of	Village Hall 3111 Barnhill Road	Midvale	Ohio	44653
Mineral City, Village of	Village Hall 8728 North High Street	Mineral City	Ohio	44656
New Philadelphia, City of	City Hall 150 East High Avenue	New Philadelphia	Ohio	44663
Newcomerstown, Village of	Village Hall 124 West Church Street	Newcomerstown	Ohio	43832

Table 11. Map Repositories

Community	Address	City	State	Zip Code
Parral, Village of[1]	County Administrative Offices 125 East High Avenue	New Philadelphia	Ohio	44663
Port Washington, Village of	Village Hall 107 East Main Street	Port Washington	Ohio	43837
Roswell, Village of	County Administrative Offices 125 East High Avenue	New Philadelphia	Ohio	44663
Stone Creek, Village of[1]	County Administrative Offices 125 East High Avenue	New Philadelphia	Ohio	44663
Strasburg, Village of	Village Hall 358 5th Street	Strasburg	Ohio	44680
Sugarcreek, Village of	Village Hall 410 South Broadway	Sugarcreek	Ohio	44681
Tuscarawas County, Unincorporated Areas	County Administrative Offices 125 East High Avenue	New Philadelphia	Ohio	44663
Tuscarawas, Village of	Village Hall 522 East Cherry Street	Tuscarawas	Ohio	44682
Uhrichsville, City of	City Hall 305 East Second Street	Uhrichsville	Ohio	44683
Zoar, City of	County Administrative Offices 125 East High Avenue	New Philadelphia	Ohio	44663

[1] No Special Flood Hazard Areas Identified



* DATA NOT AVAILABLE

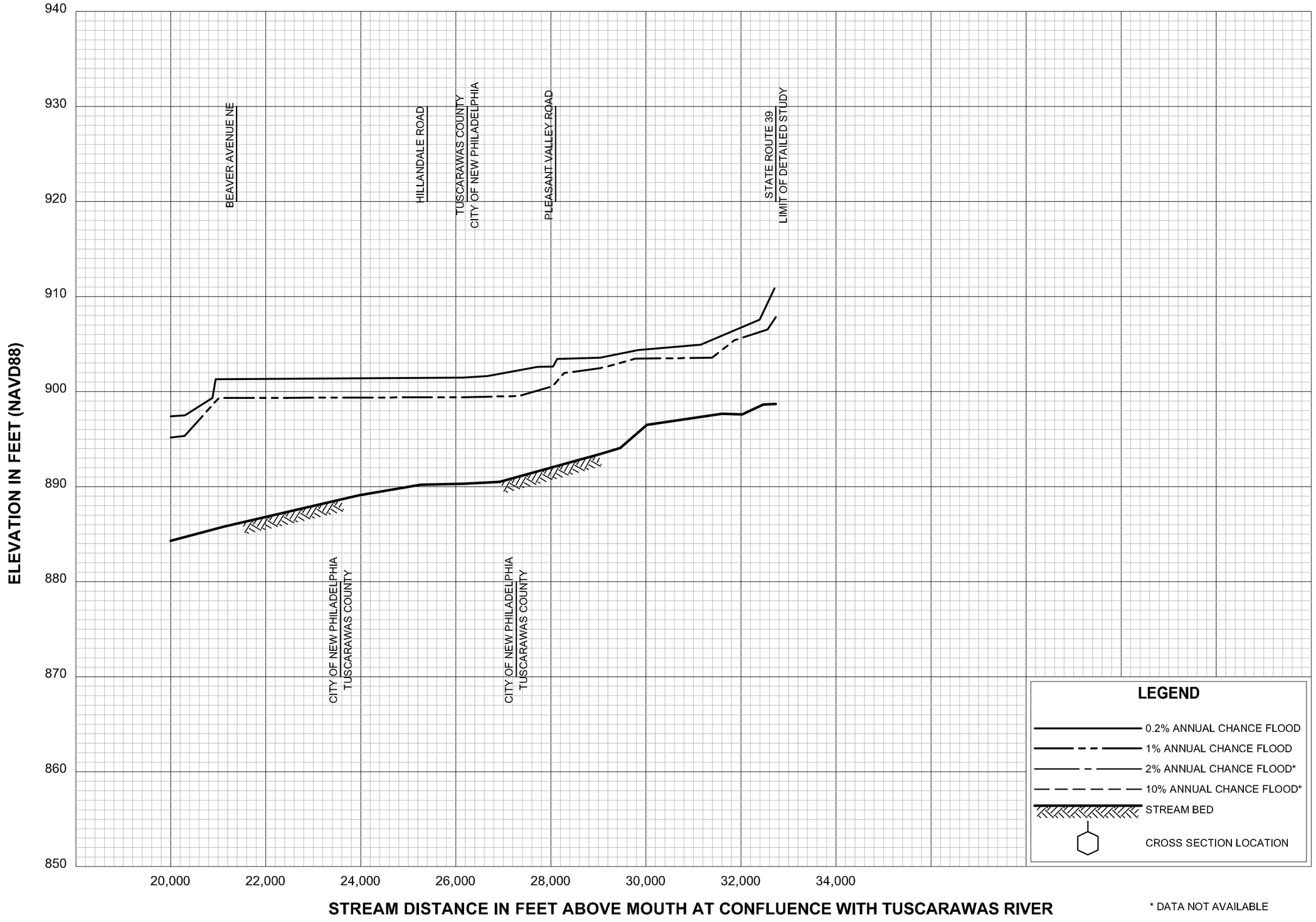
FLOOD PROFILES

BEAVERDAM CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

TUSCARAWAS COUNTY, OH

AND INCORPORATED AREAS



* DATA NOT AVAILABLE

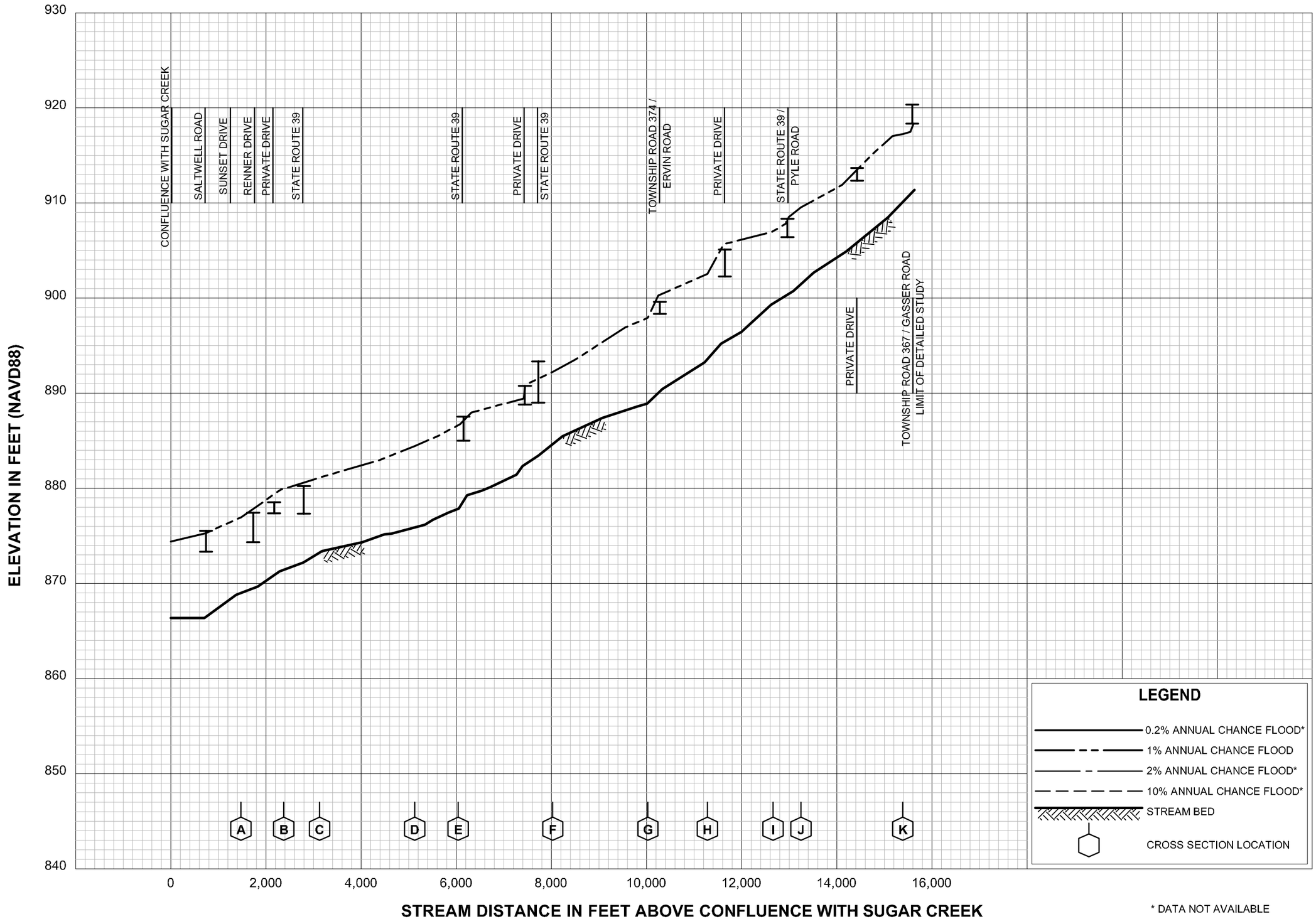
FLOOD PROFILES

BEAVERDAM CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

TUSCARAWAS COUNTY, OH

AND INCORPORATED AREAS



* DATA NOT AVAILABLE

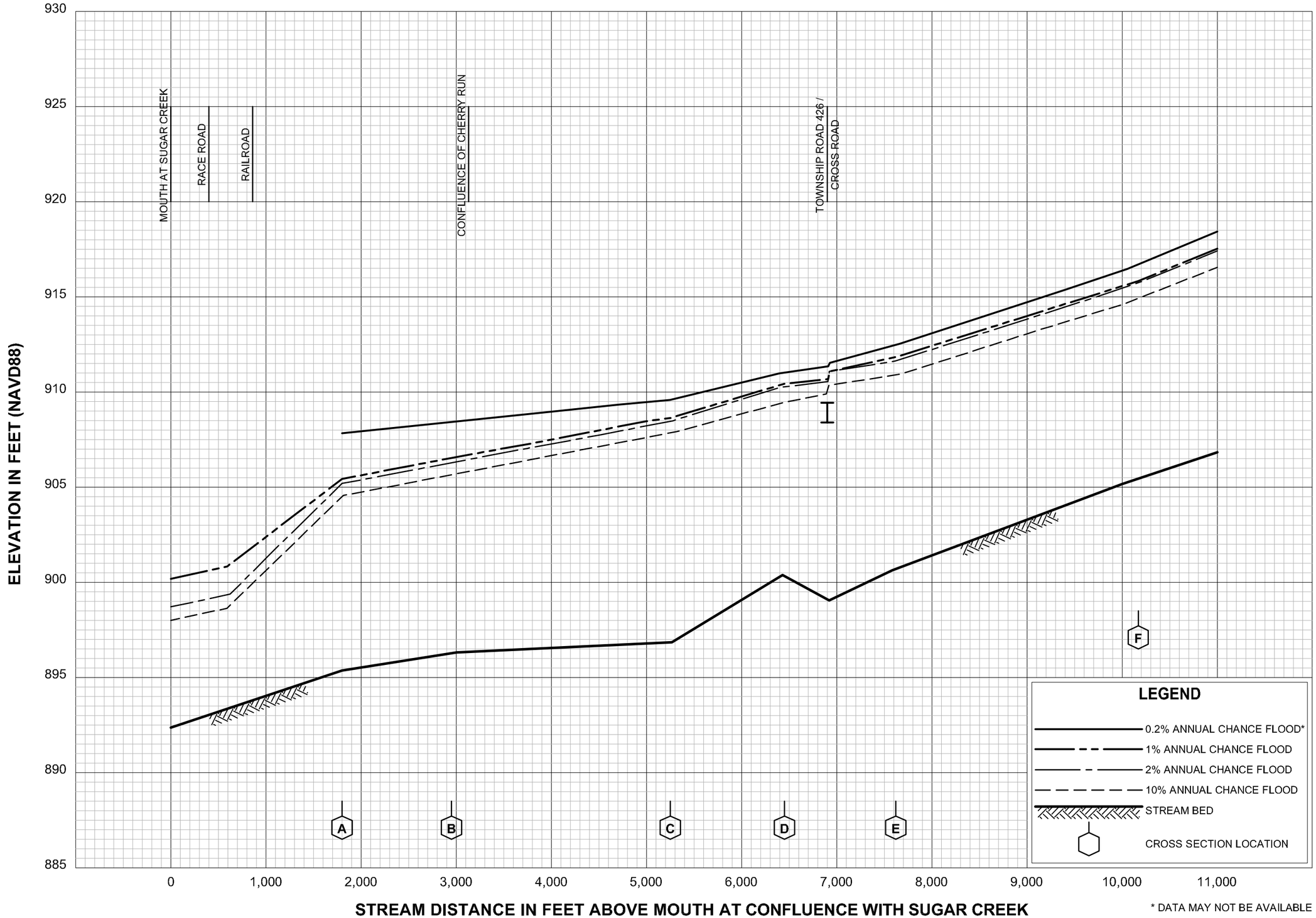
FLOOD PROFILES

BRANDYWINE CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

TUSCARAWAS COUNTY, OH

AND INCORPORATED AREAS



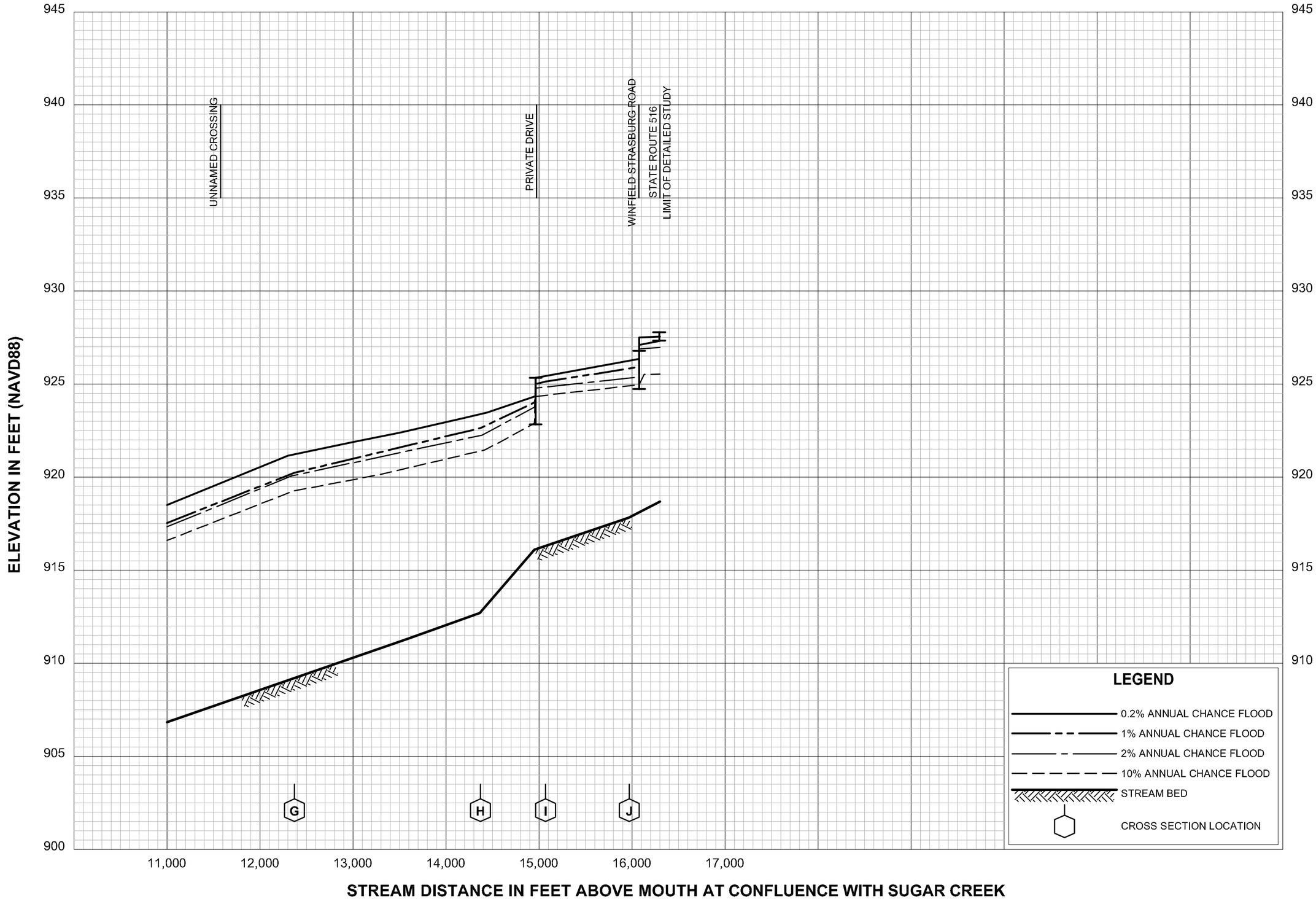
FLOOD PROFILES

BROAD RUN

FEDERAL EMERGENCY MANAGEMENT AGENCY

TUSCARAWAS COUNTY, OH

AND INCORPORATED AREAS



FLOOD PROFILES

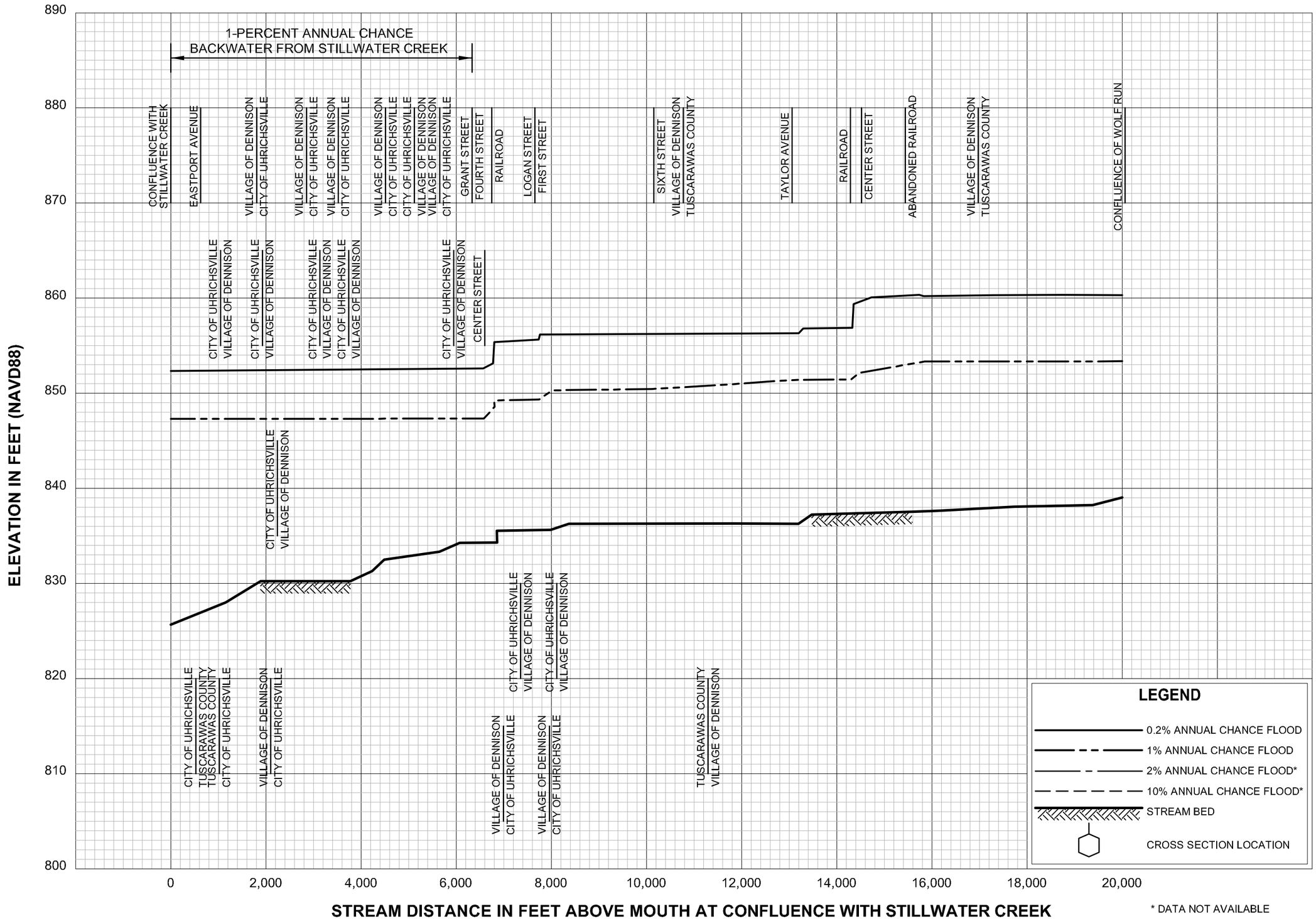
BROAD RUN

FEDERAL EMERGENCY MANAGEMENT AGENCY

TUSCARAWAS COUNTY, OH

AND INCORPORATED AREAS

05P



FLOOD PROFILES

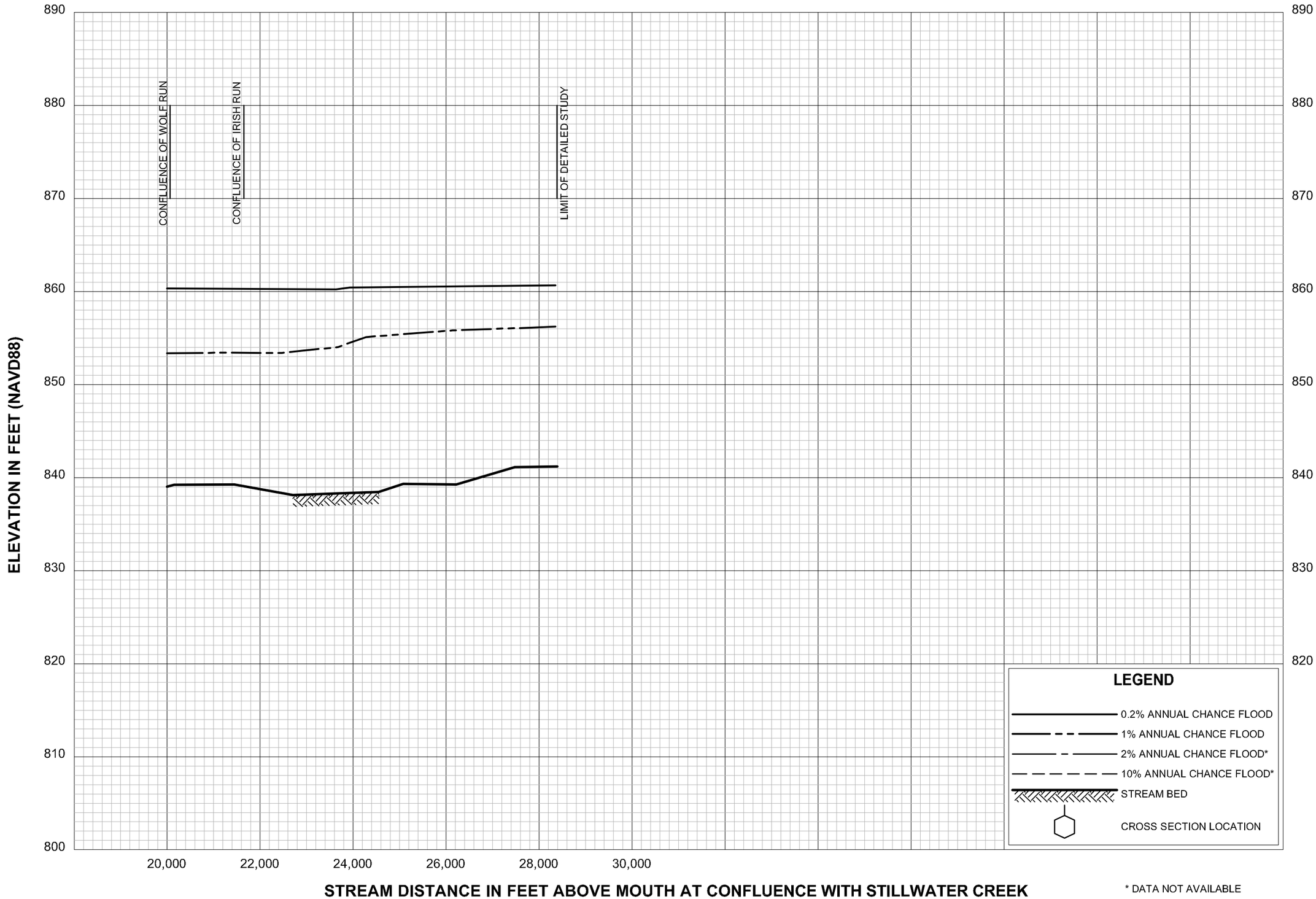
LITTLE STILLWATER CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

TUSCARAWAS COUNTY, OH

AND INCORPORATED AREAS

06P



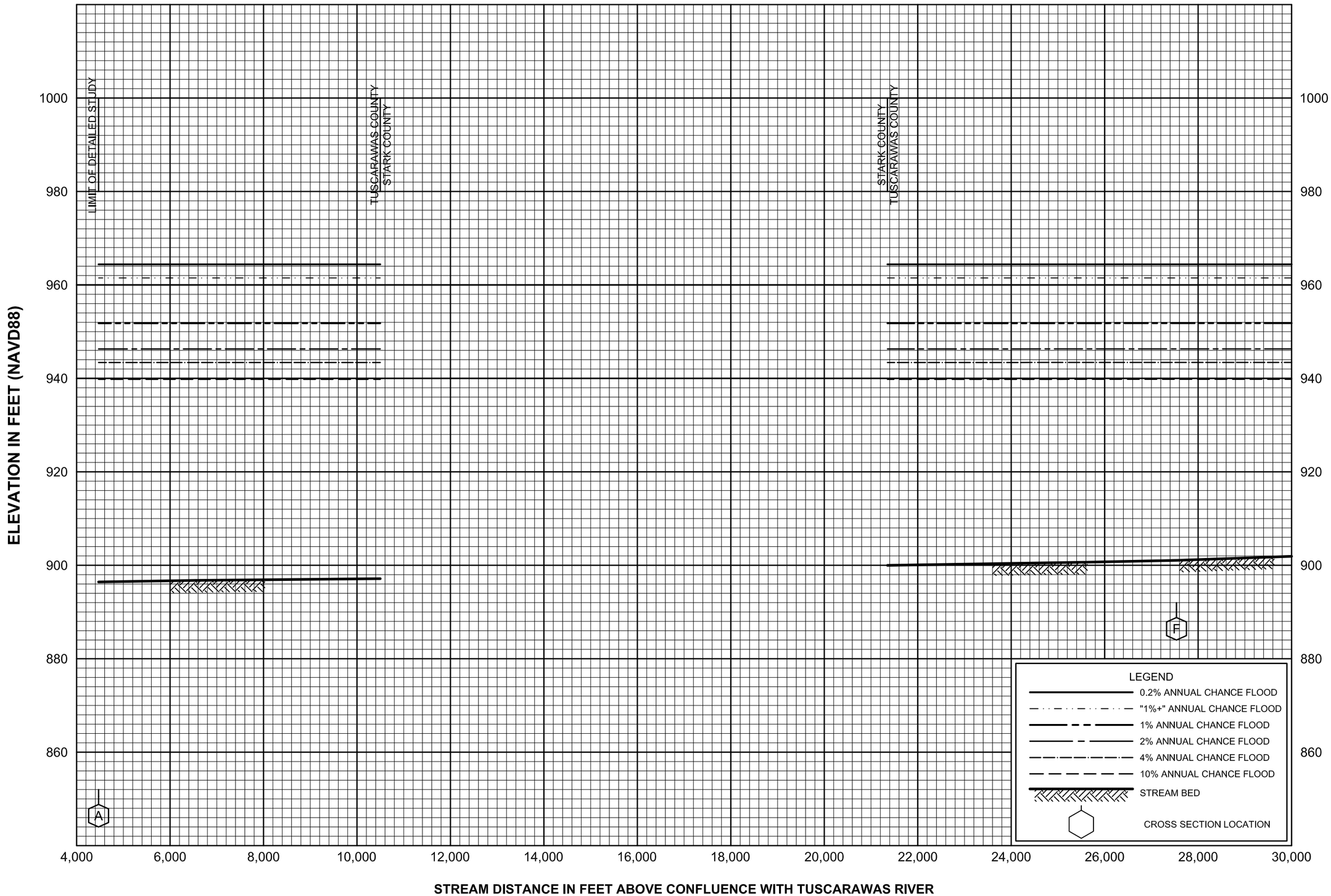
FLOOD PROFILES

LITTLE STILLWATER CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

TUSCARAWAS COUNTY, OH

AND INCORPORATED AREAS



FLOOD PROFILES

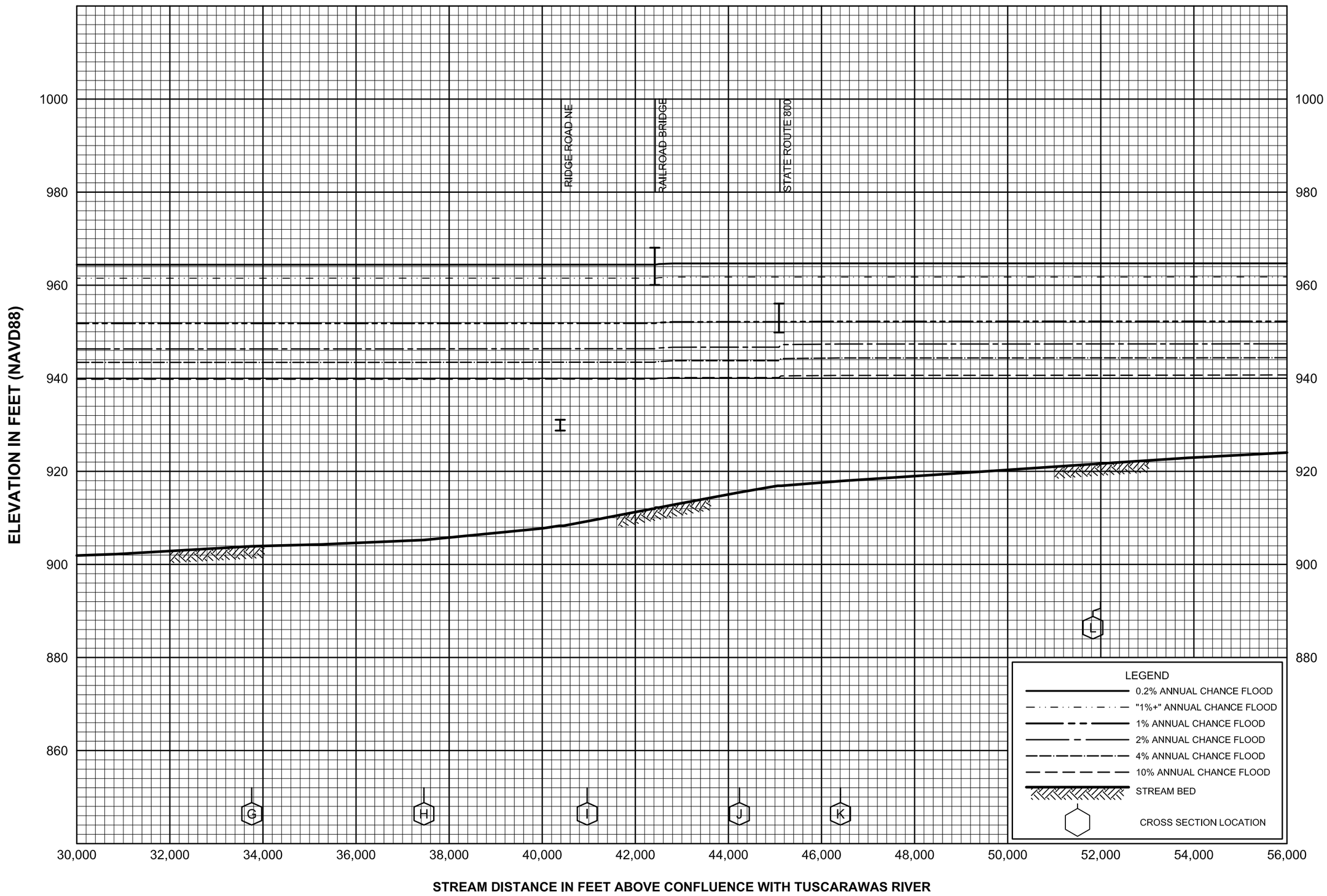
SANDY CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

TUSCARAWAS COUNTY, OH

AND INCORPORATED AREAS

08P



FLOOD PROFILES

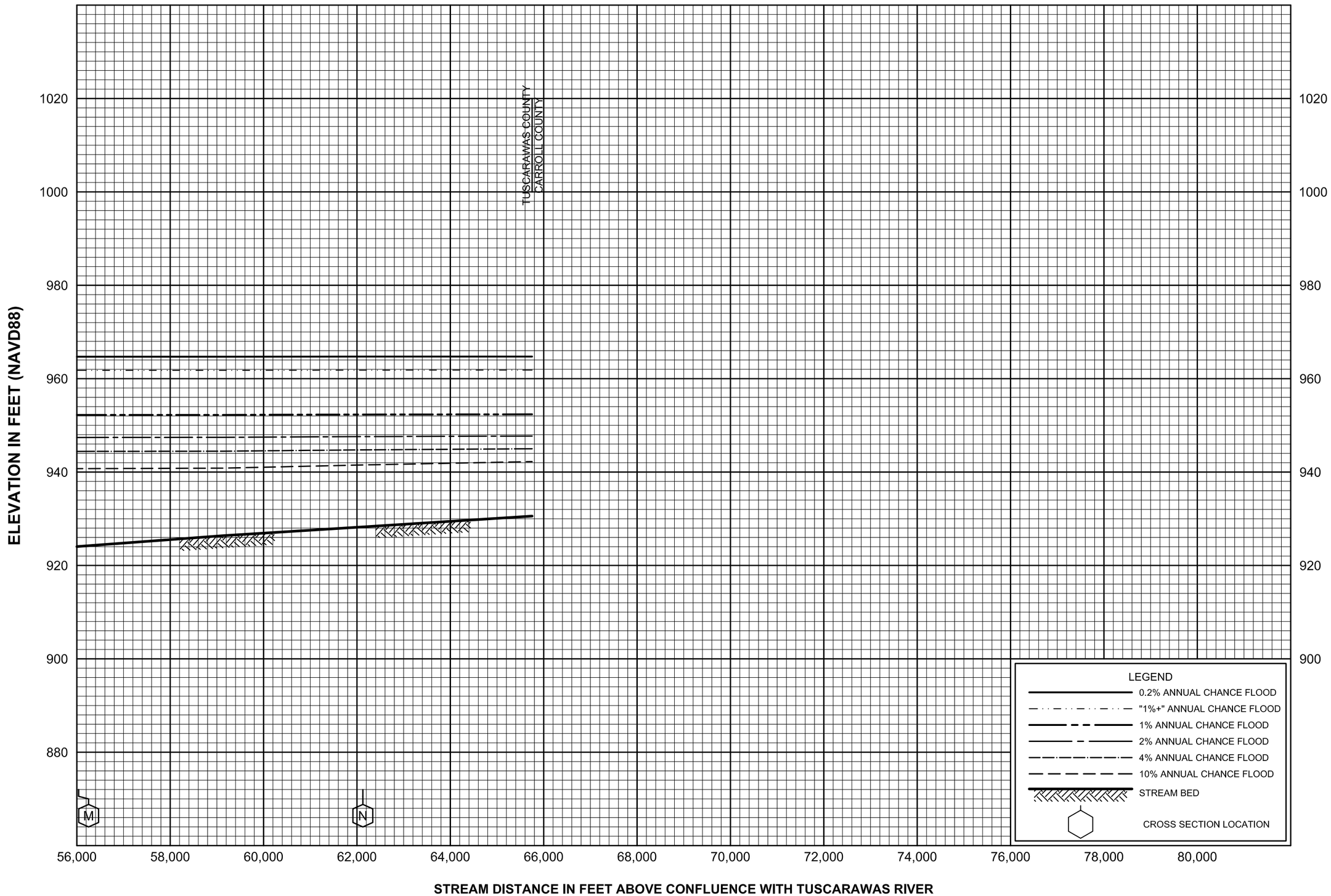
SANDY CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

TUSCARAWAS COUNTY, OH

AND INCORPORATED AREAS

09P



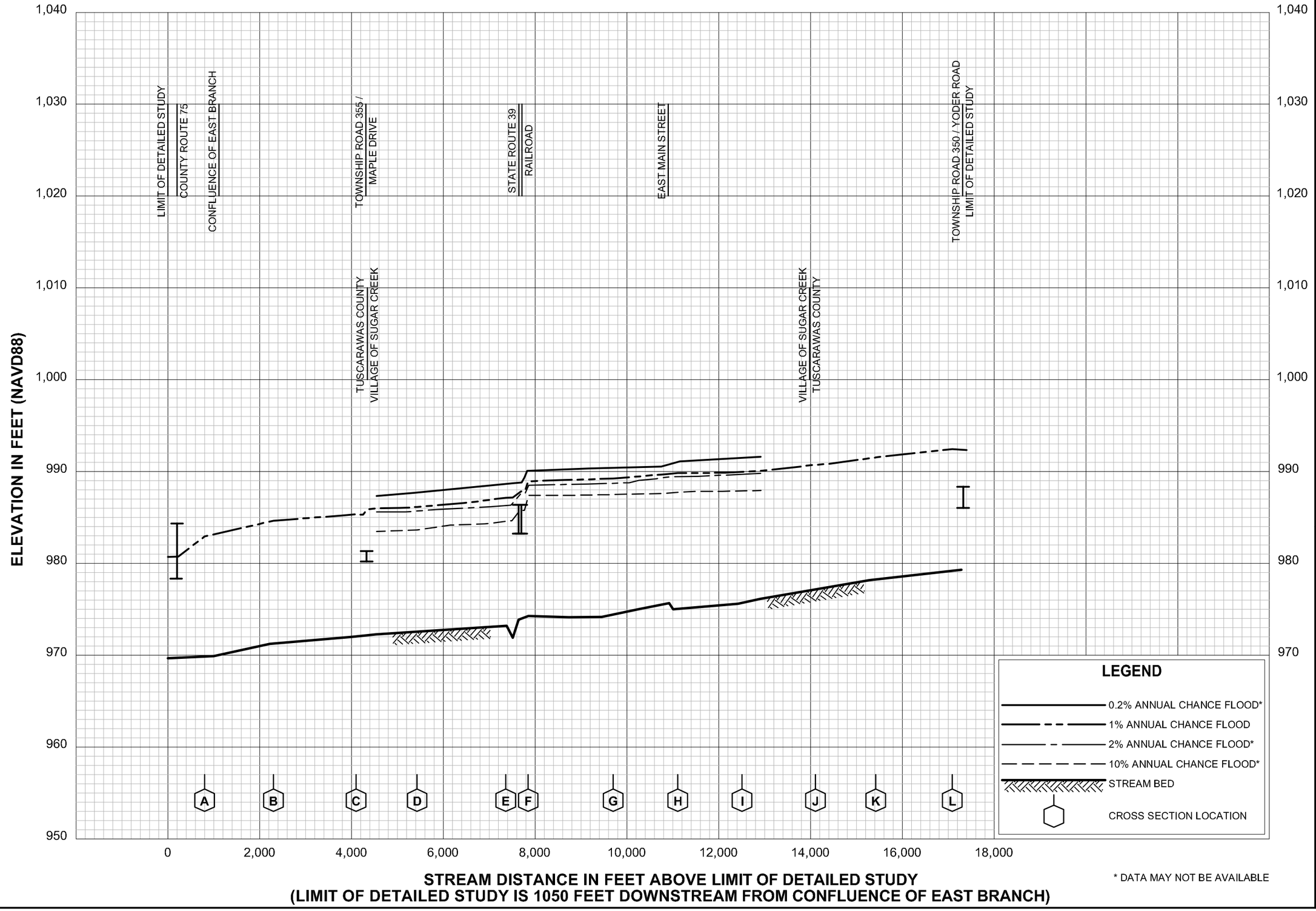
FLOOD PROFILES

SANDY CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

TUSCARAWAS COUNTY, OH

AND INCORPORATED AREAS



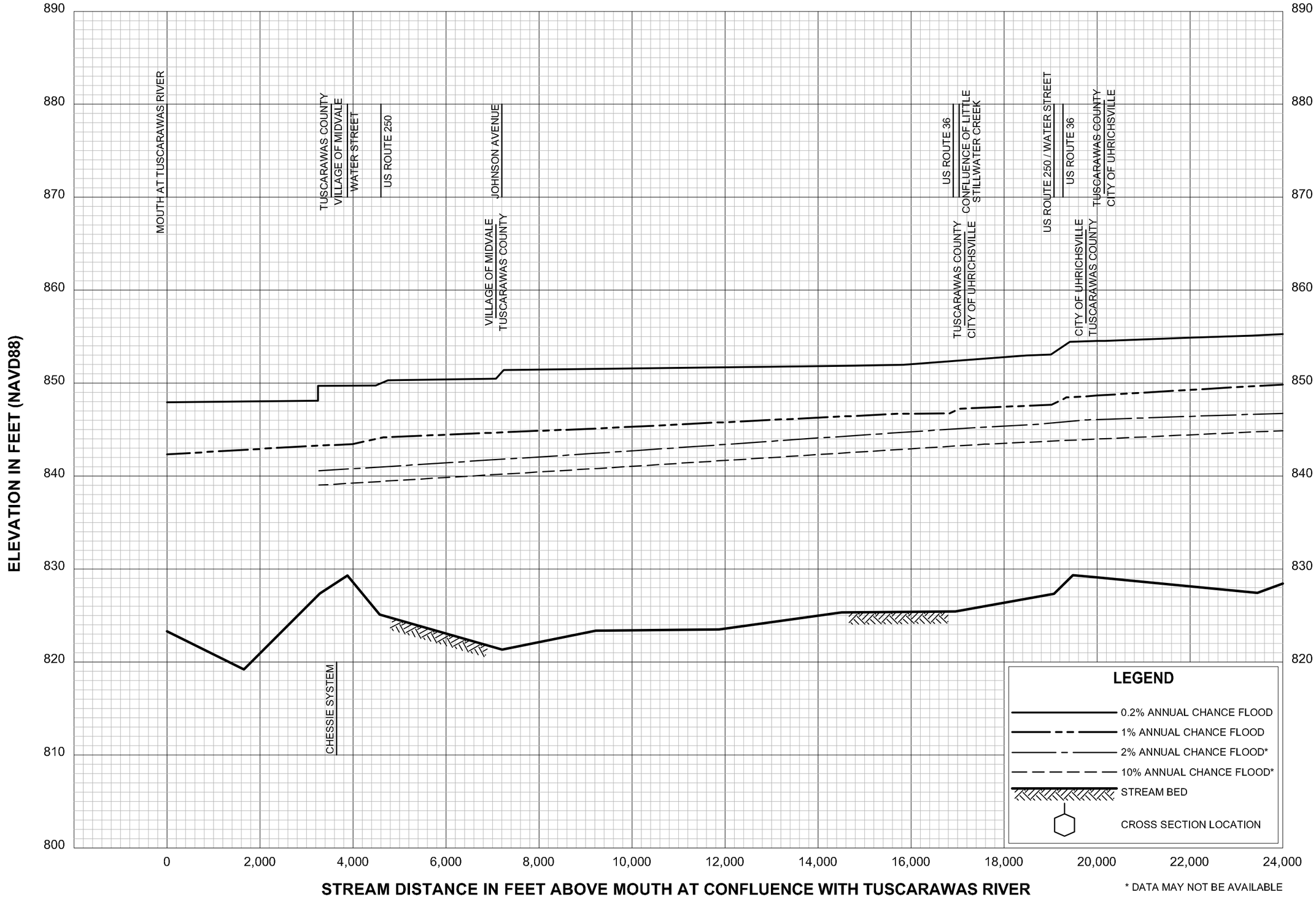
FLOOD PROFILES

SOUTH FORK SUGAR CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

TUSCARAWAS COUNTY, OH

AND INCORPORATED AREAS



* DATA MAY NOT BE AVAILABLE

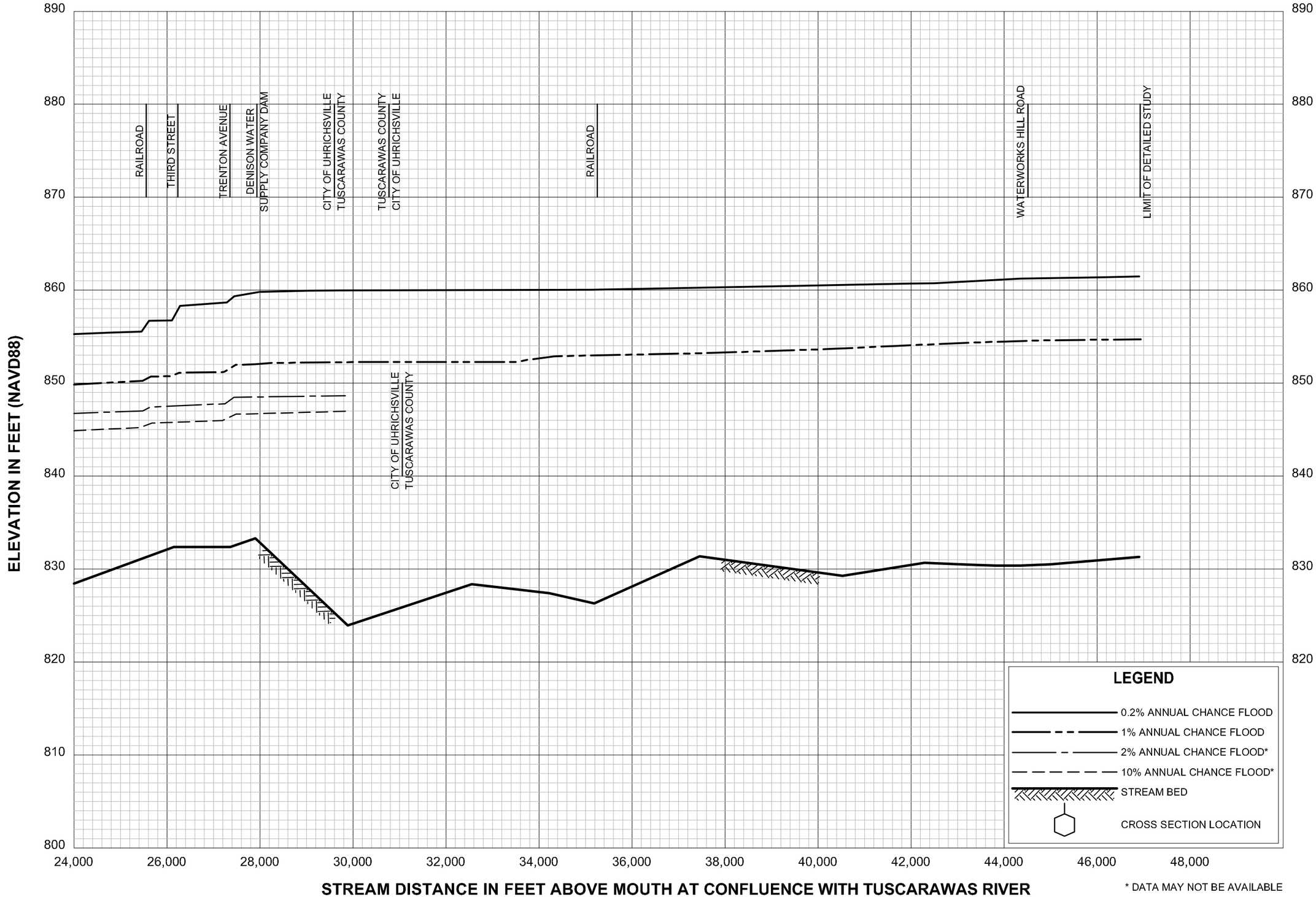
FLOOD PROFILES

STILLWATER CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

TUSCARAWAS COUNTY, OH

AND INCORPORATED AREAS



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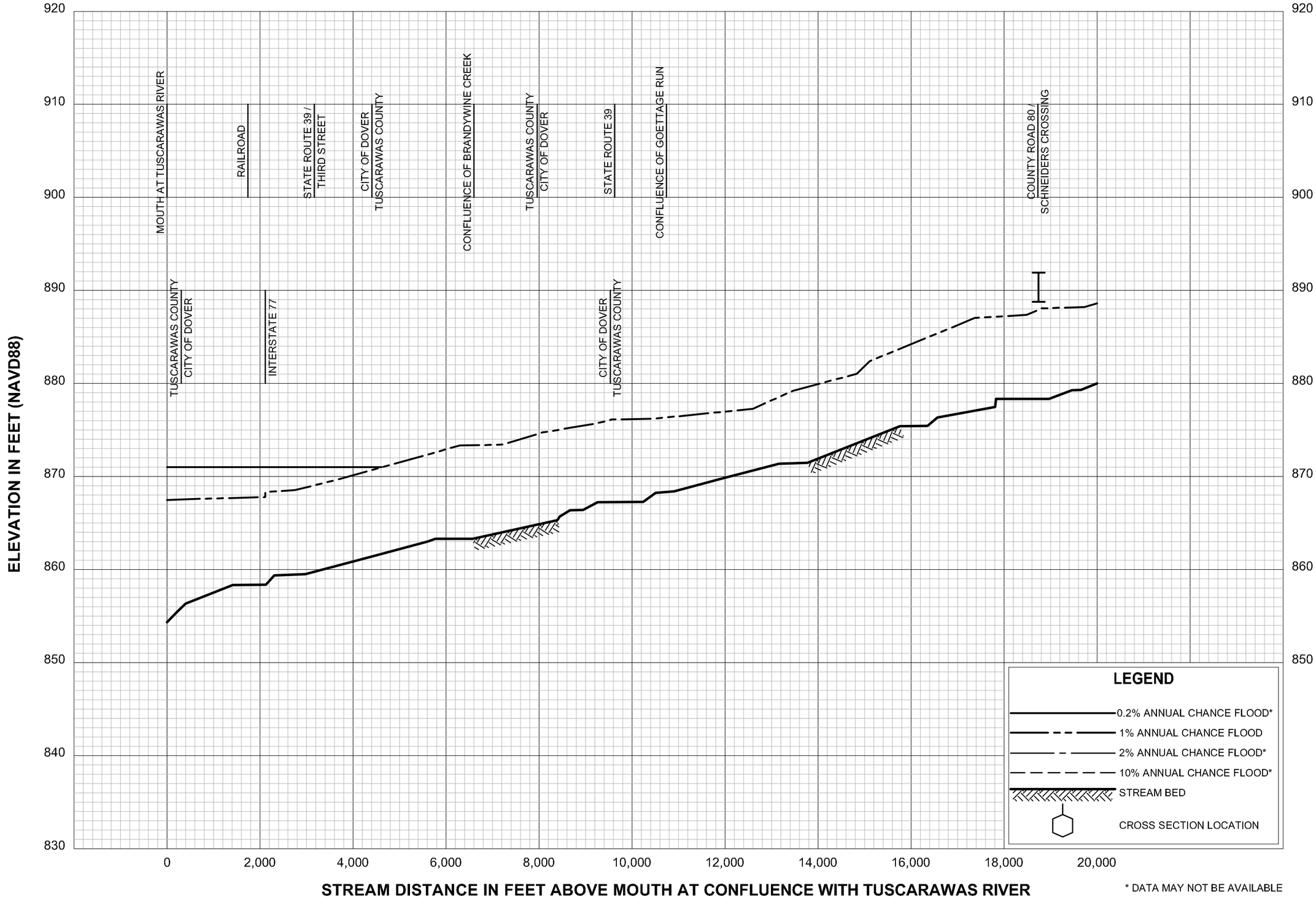
FLOOD PROFILES

STILLWATER CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

TUSCARAWAS COUNTY, OH

AND INCORPORATED AREAS



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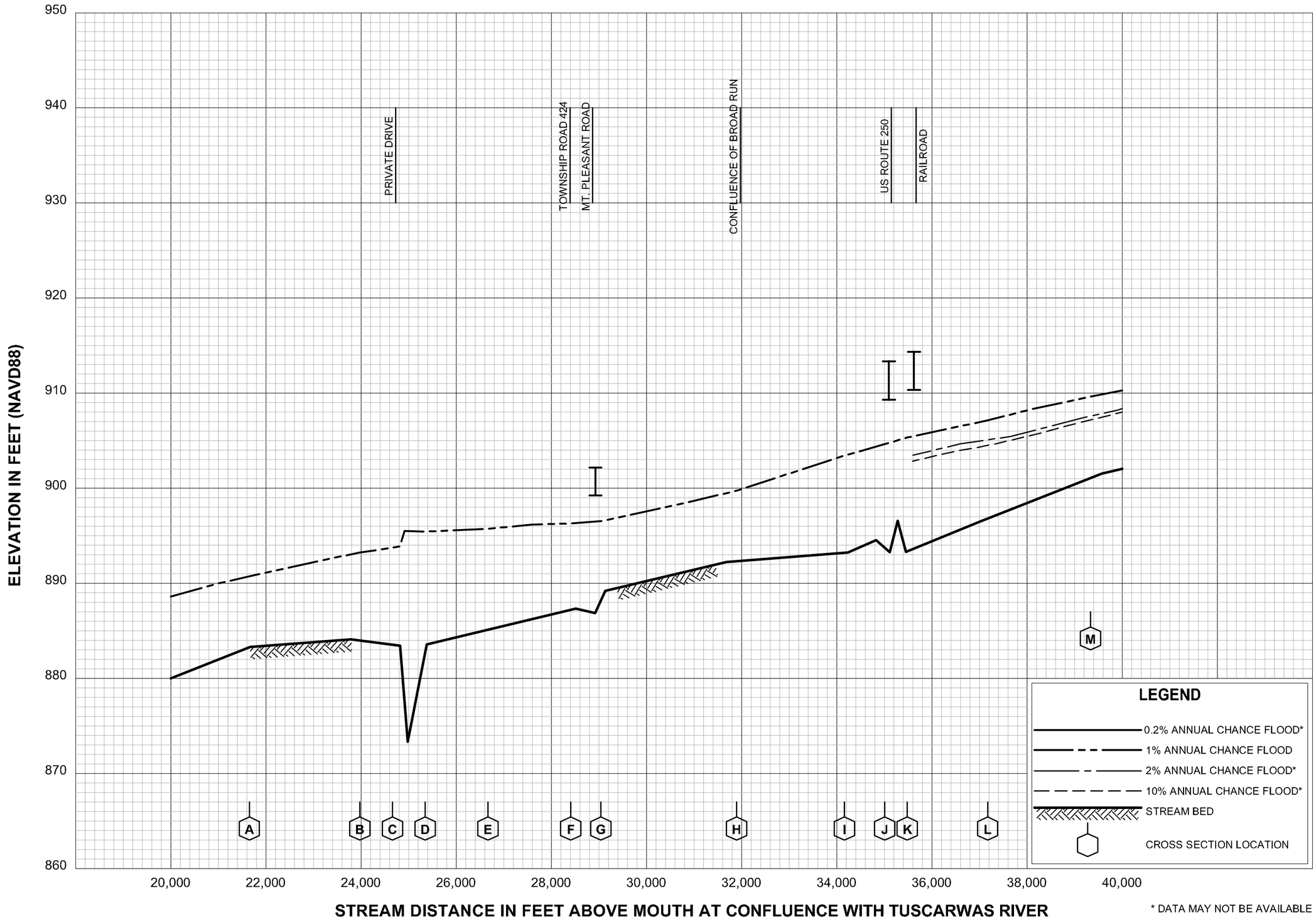
FLOOD PROFILES

SUGAR CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

TUSCARAWAS COUNTY, OH

AND INCORPORATED AREAS



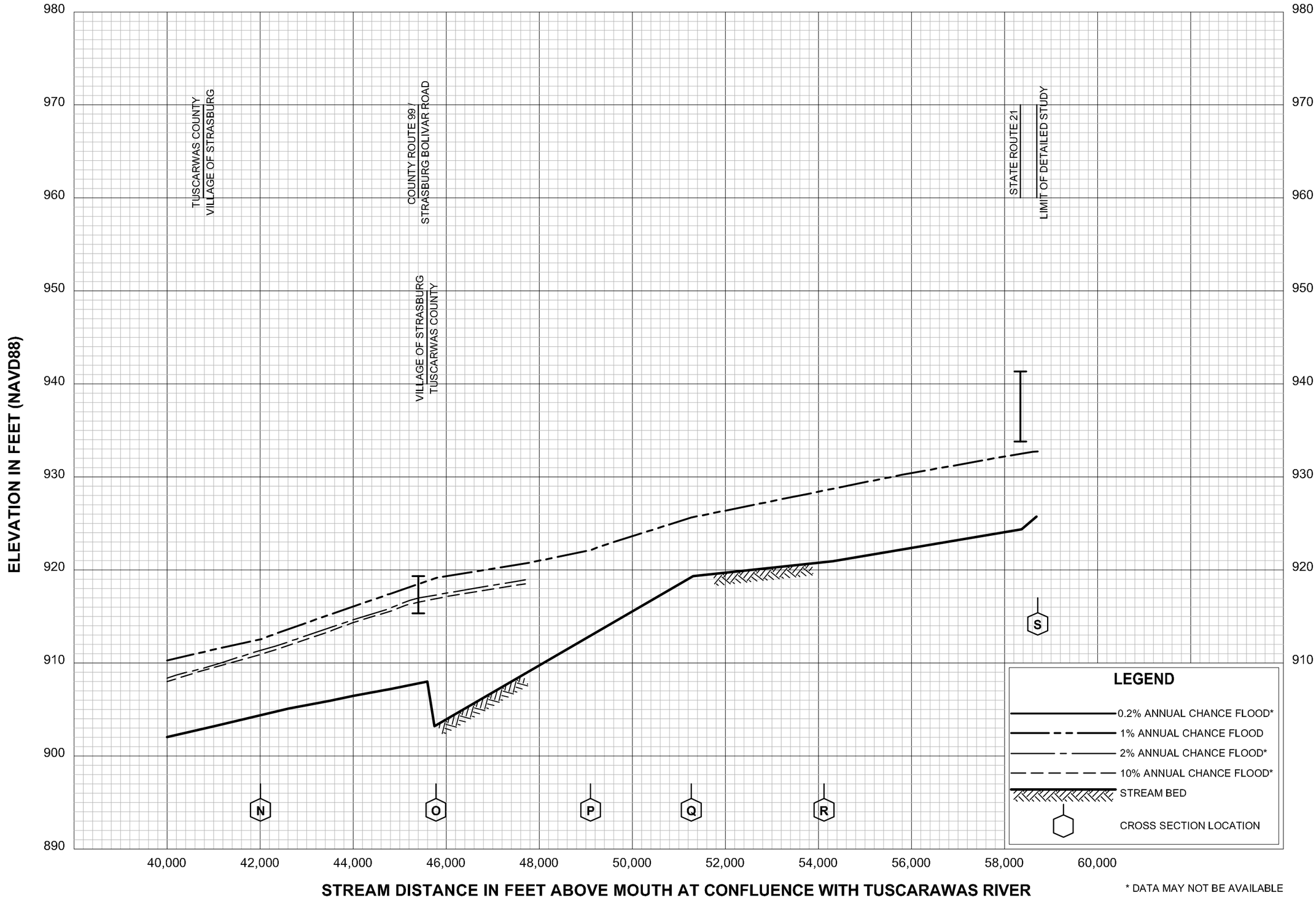
FLOOD PROFILES

SUGAR CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

TUSCARAWAS COUNTY, OH

AND INCORPORATED AREAS



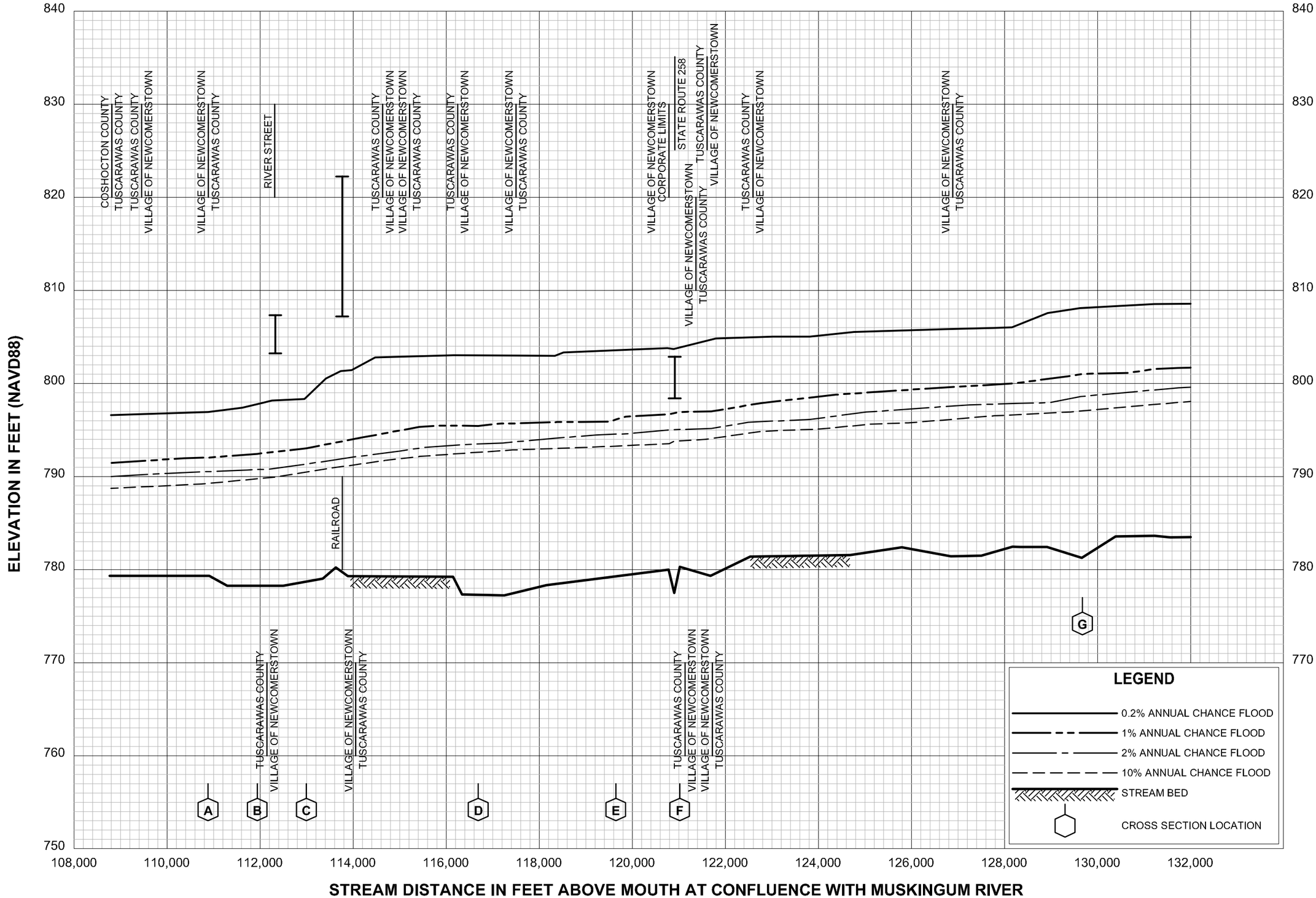
FLOOD PROFILES

SUGAR CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

TUSCARAWAS COUNTY, OH

AND INCORPORATED AREAS



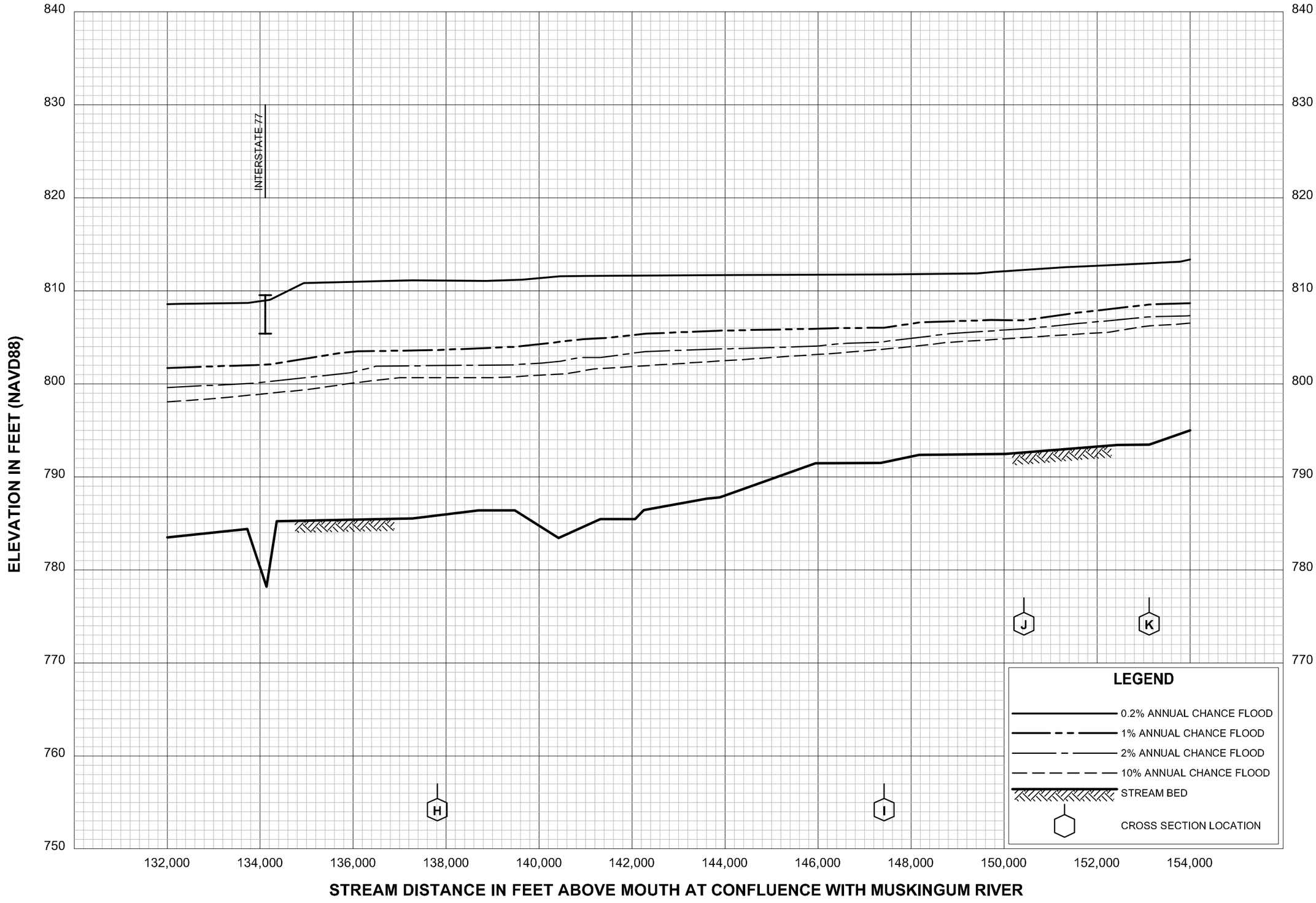
FLOOD PROFILES

TUSCARAWAS RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

TUSCARAWAS COUNTY, OH

AND INCORPORATED AREAS



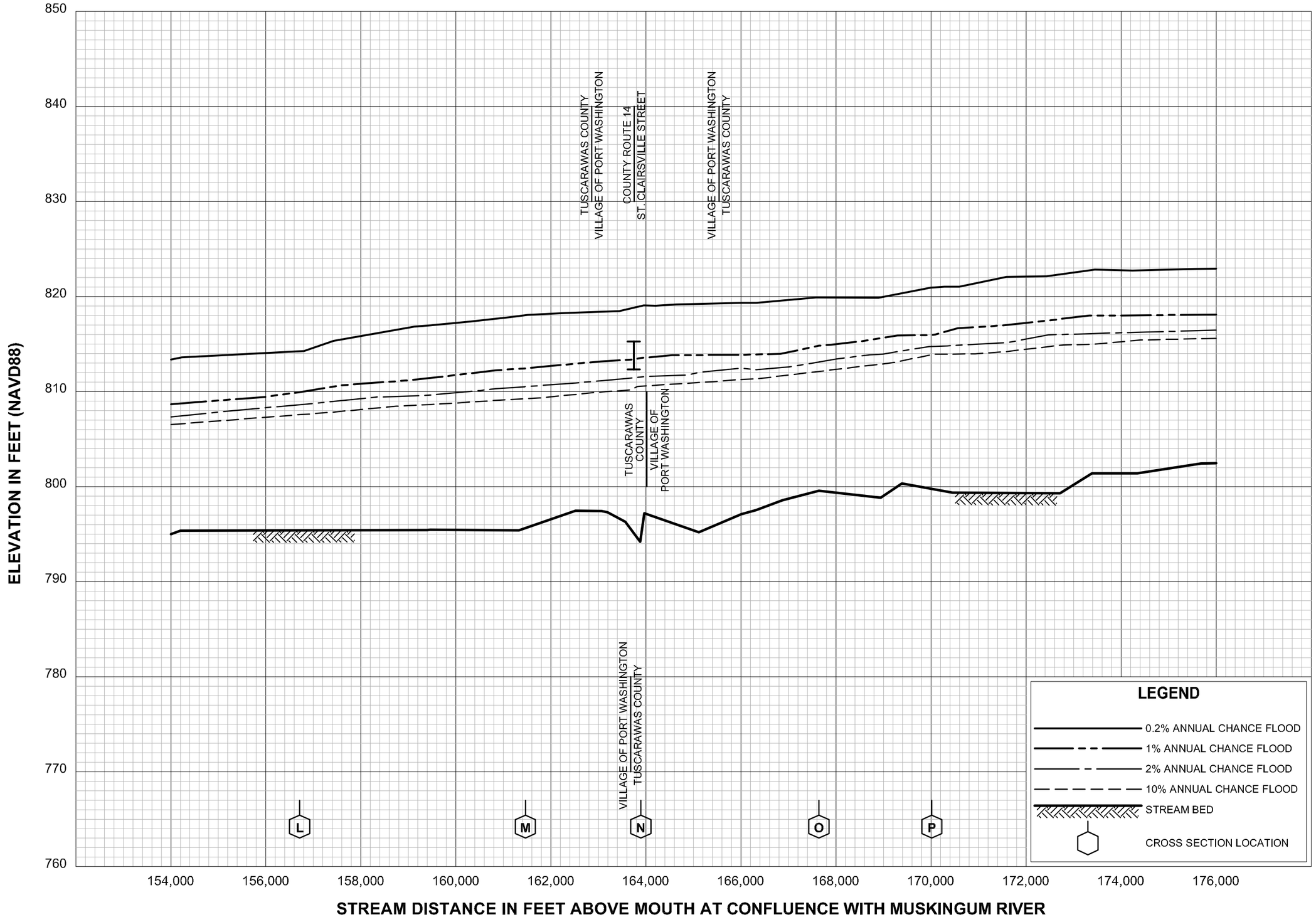
FLOOD PROFILES

TUSCARAWAS RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

TUSCARAWAS COUNTY, OH

AND INCORPORATED AREAS



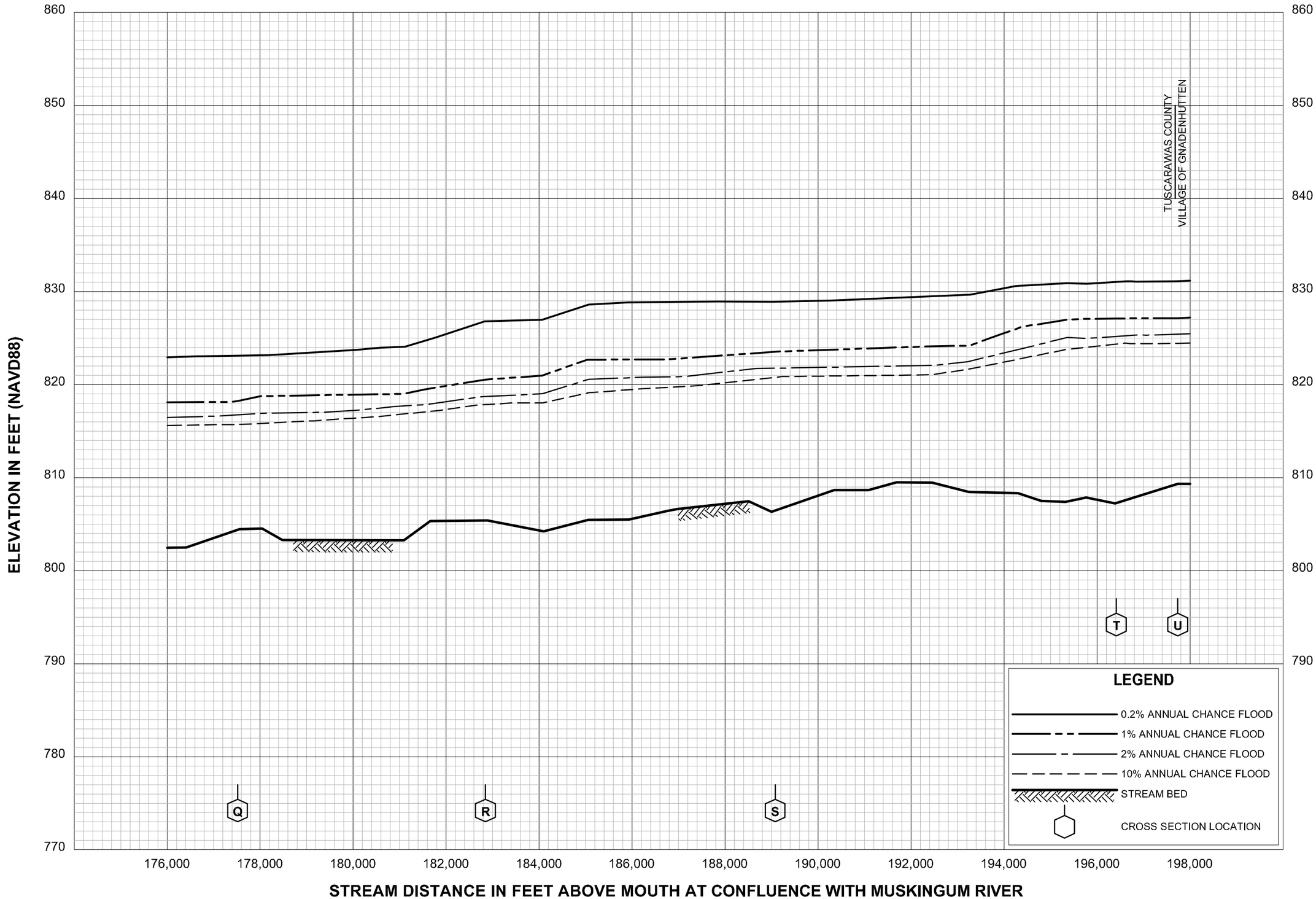
FLOOD PROFILES

TUSCARAWAS RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

TUSCARAWAS COUNTY, OH

AND INCORPORATED AREAS



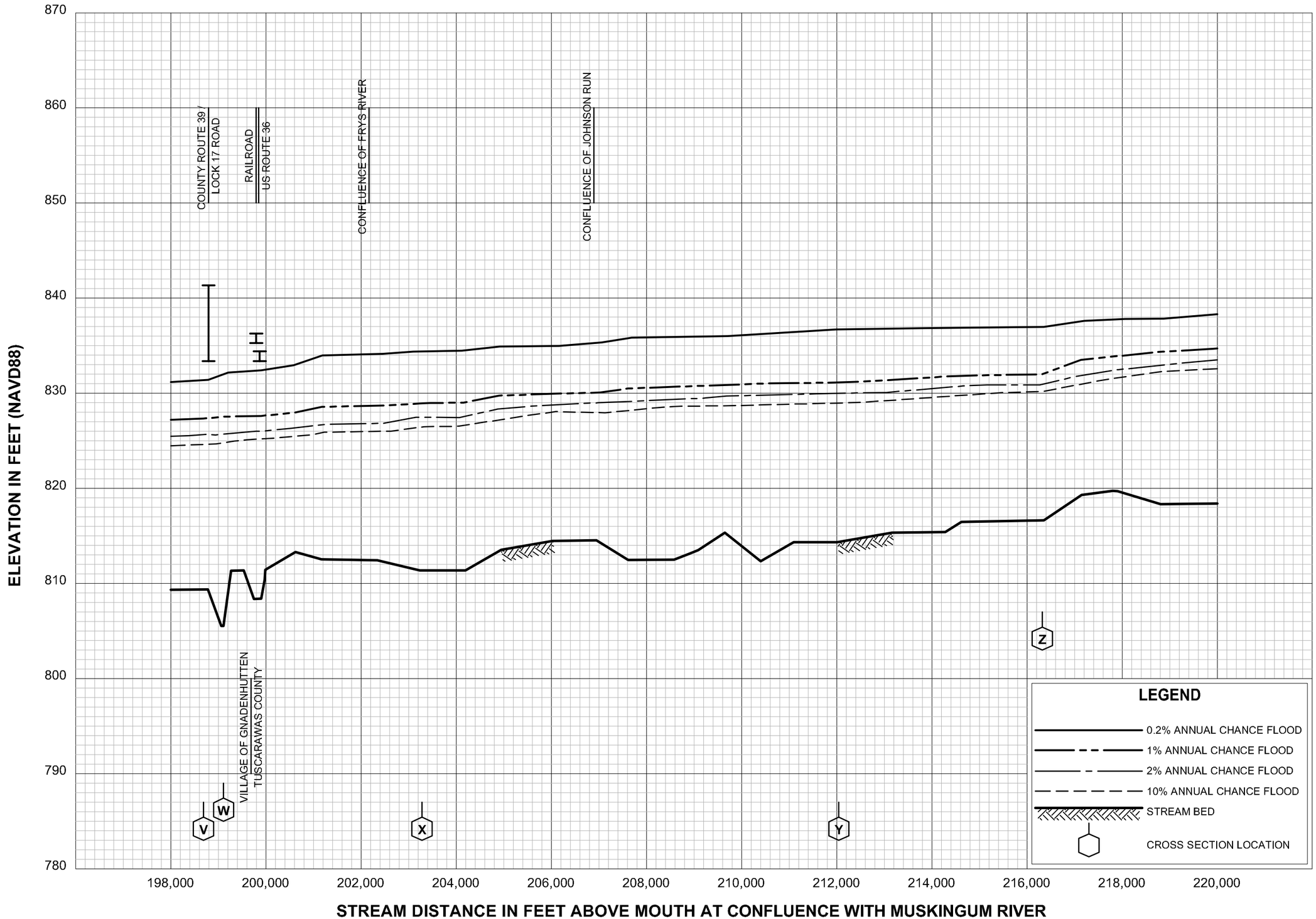
FLOOD PROFILES

TUSCARAWAS RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

TUSCARAWAS COUNTY, OH

AND INCORPORATED AREAS



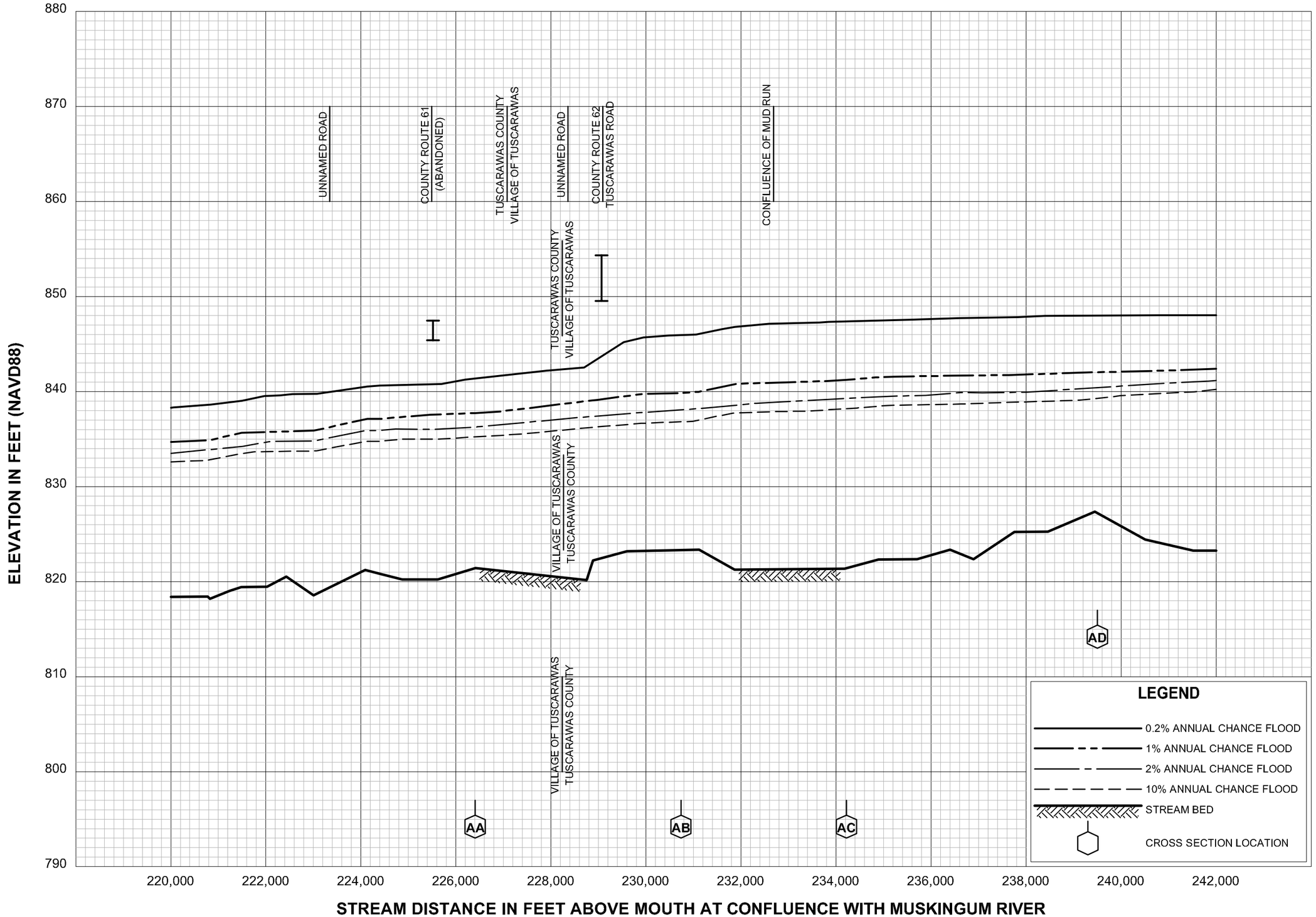
FLOOD PROFILES

TUSCARAWAS RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

TUSCARAWAS COUNTY, OH

AND INCORPORATED AREAS



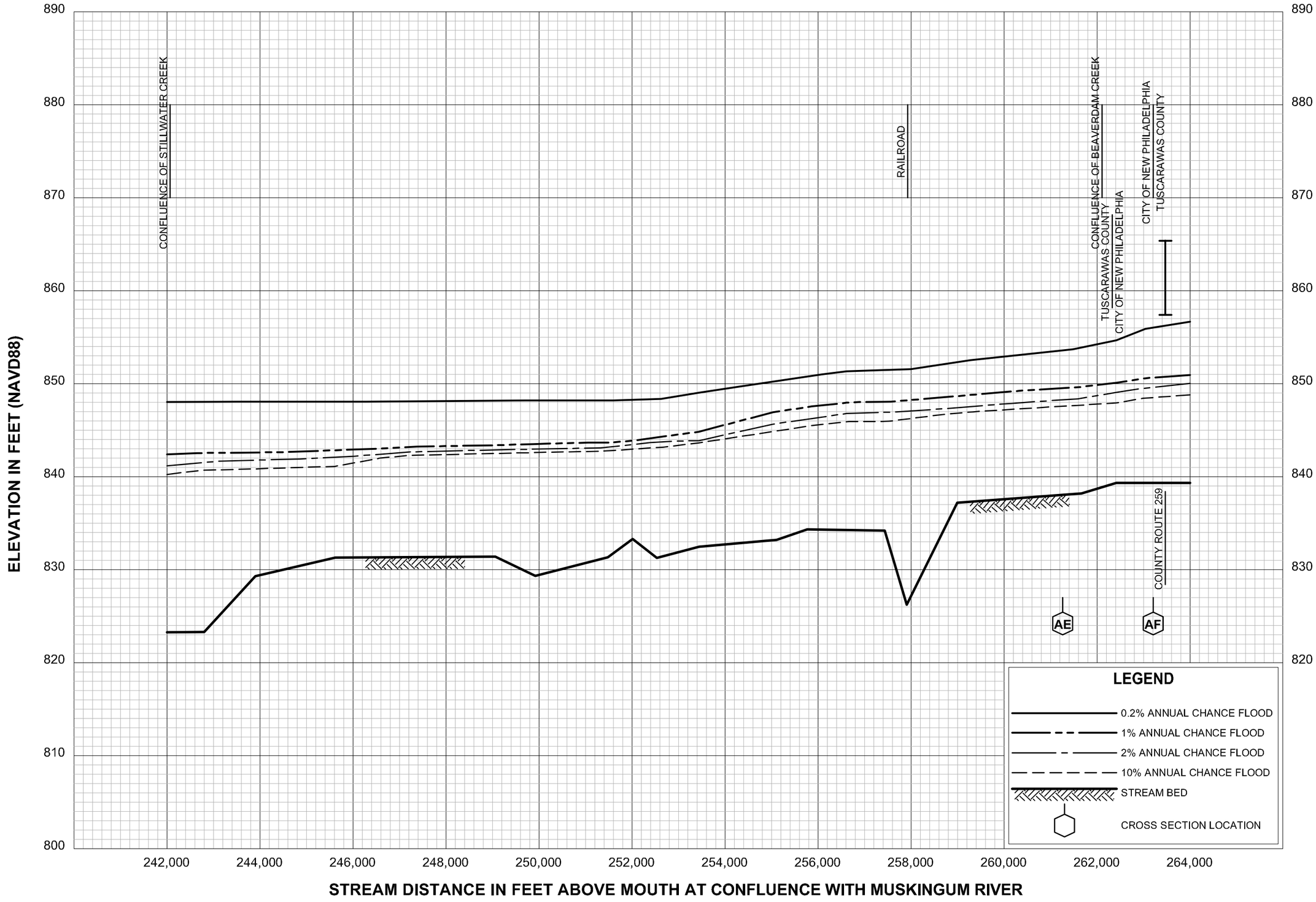
FLOOD PROFILES

TUSCARAWAS RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

TUSCARAWAS COUNTY, OH

AND INCORPORATED AREAS



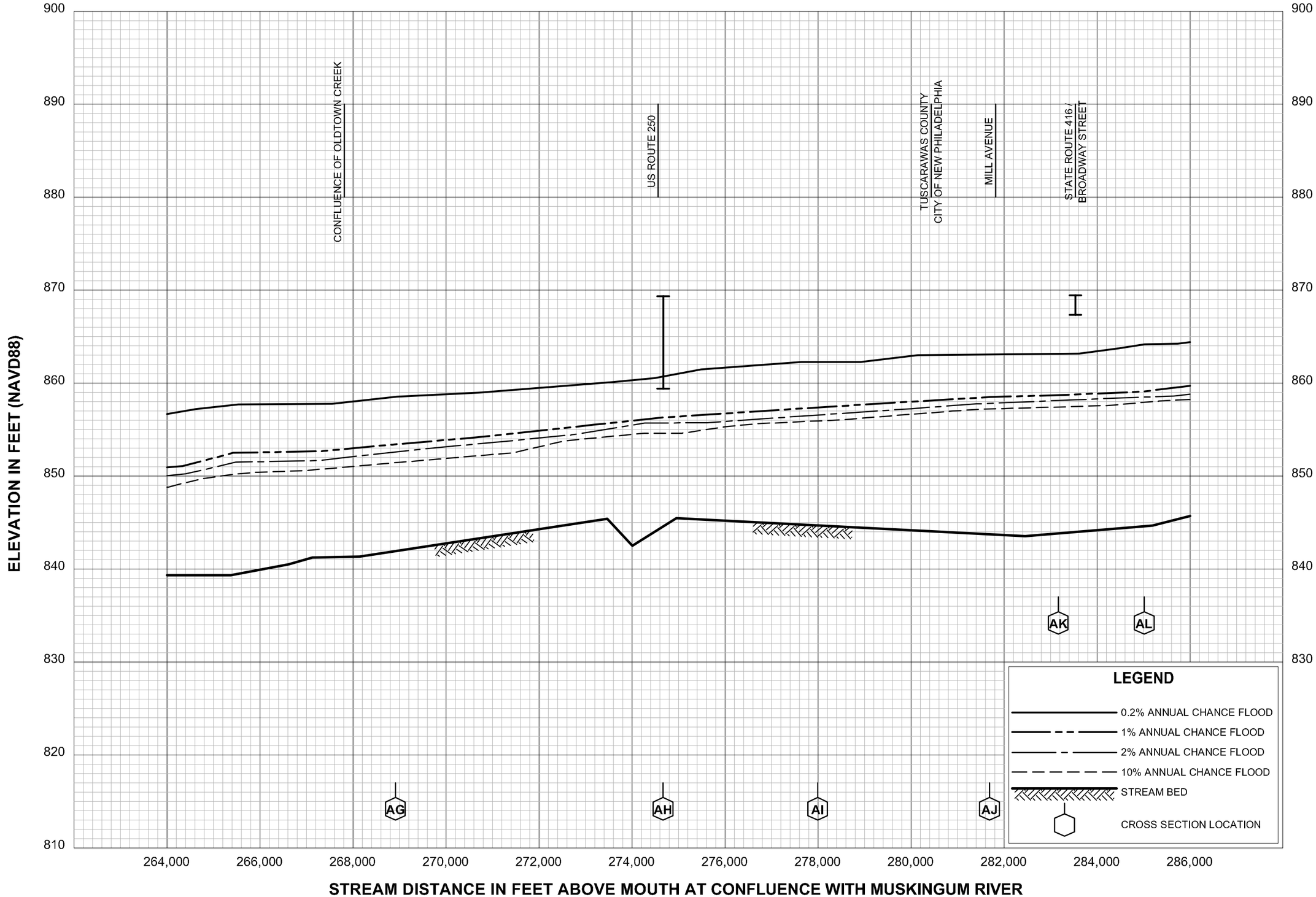
FLOOD PROFILES

TUSCARAWAS RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

TUSCARAWAS COUNTY, OH

AND INCORPORATED AREAS



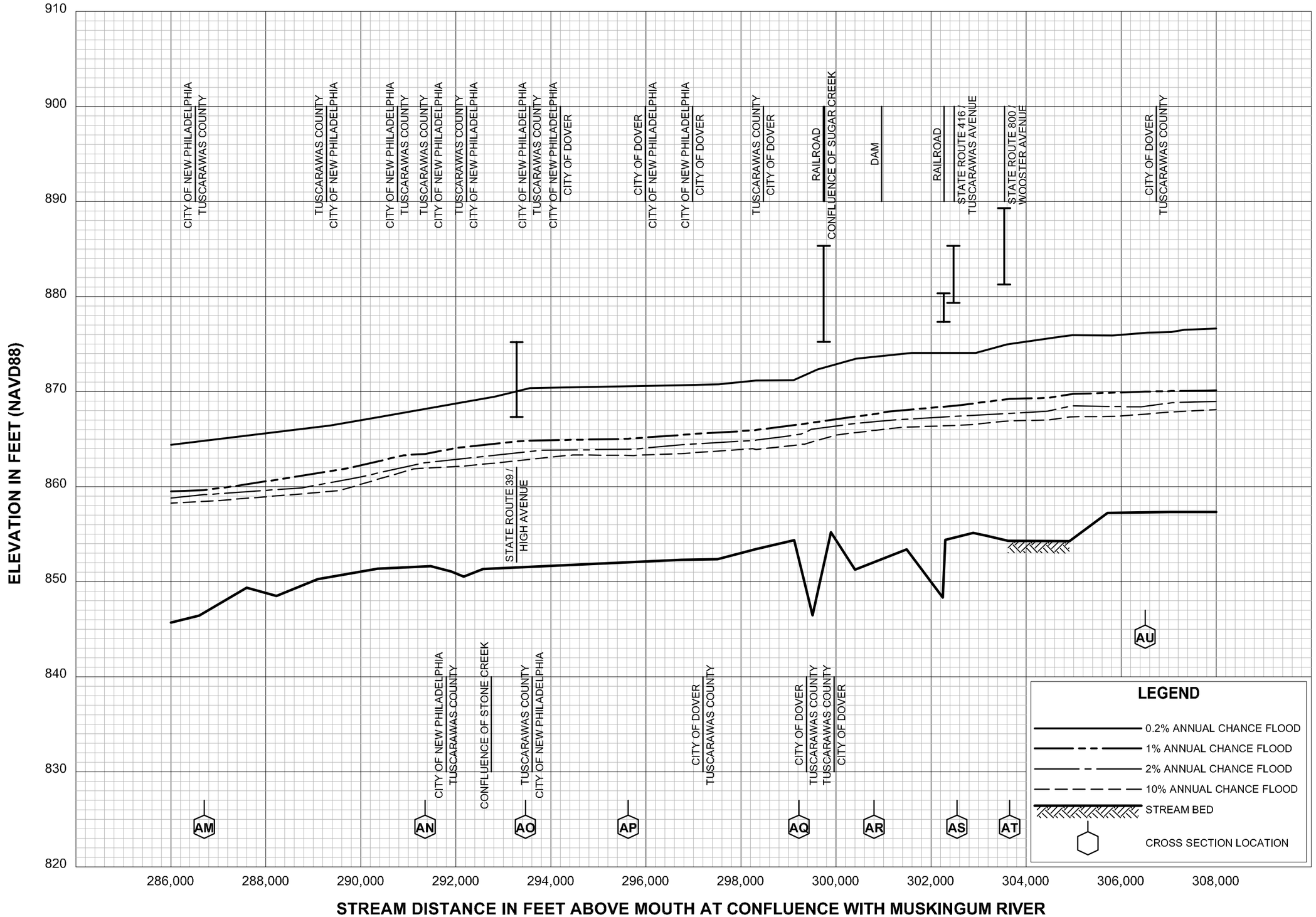
FLOOD PROFILES

TUSCARAWAS RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

TUSCARAWAS COUNTY, OH

AND INCORPORATED AREAS



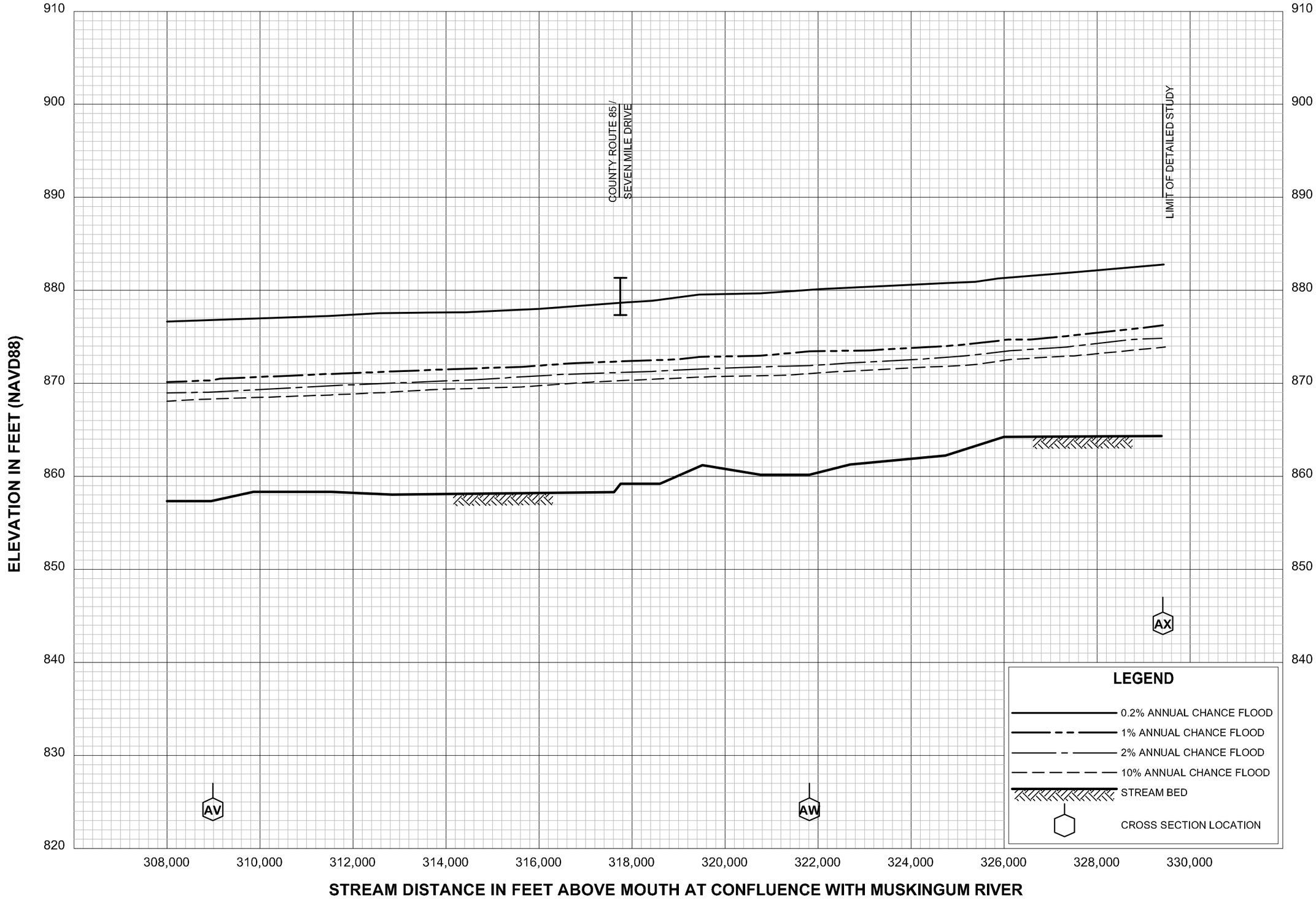
FLOOD PROFILES

TUSCARAWAS RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

TUSCARAWAS COUNTY, OH

AND INCORPORATED AREAS



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